The Development of Written Language from Middle to Senior School:
a Case Study

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Abstract

The development of written language during the school years is of interest to both educators and linguists. While the existing research is extensive, little attention has been paid to empirical examination from a linguistic perspective of such development in individual students over an extended period of the school years. This research undertook a case study to trace such a trajectory, mapping the written language development of one student in an Australian school from Year 6 to Year 12 (age 12-18) in her classroom writing for the learning areas of history and science. The analysis drew on the theoretical model of Systemic Functional Linguistics (SFL) across the strata of context, discourse semantics and lexicogrammar. The focus was on ideational and textual meanings, or the development of language related to content knowledge within the two learning areas and then how that content knowledge was organized into written texts. Detailed analysis of 32 representative texts is presented.

The findings identify the specific changes across the time period, as the written language developed from a transition into educational meanings in Year 6 to highly specialized and abstract language at the end of schooling. In this extensive development, the most significant advance, changing the quality of the writing, was in the development of abstraction and technicality, largely dependent on the use of grammatical metaphor, in which the 'uncommonsense' educational meanings of the secondary school curriculum were realized. This change demonstrated the student's culturally based semiotic development. In tandem with associated growth in rhetorical text organization, realized in the text types of each discipline, the expanding use of these new resources evidenced her learning of curriculum knowledge as inseparably linked to her learning of language. She was learning to mean as a historian and a scientist.

The development in the lexicogrammatical resources of transitivity, clause complexing and Theme involved continual expansion rather than major changes in the types of resources. Comparison of the two learning areas identified differences and commonalities. The trajectory was found to be built on a strong foundation in Year 6, and was characteristically incremental in nature, even when demands were multiple, but with some gaps in consistency. A range of linguistic learning strategies were implicated in the incremental changes.

In responding to the demands of the specific school context, the student's written language trajectory advanced in parallel with the continually changing demands of the assigned writing tasks, particularly in genre, Field, and the quantity of writing required, with likely additional influence from other written language experience within the broader curriculum.

The primary contribution of this study is in its presentation of the authentic trajectory of one individual's written language development in secondary school in context, providing exemplification of a successful pathway and of the process of learning disciplinary curriculum knowledge through language. The importance and nature of language growth in secondary school are implicated. Further research may compare other individual trajectories and expand understanding of the linguistic processes involved.

Declaration

I certify that this work contains no material which has been accepted for the award of any other degree or diploma in my name, in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text. In addition, I certify that no part of this work will, in the future, be used in a submission in my name, for any other degree or diploma in any university or other tertiary institution without the prior approval of the University of Adelaide and where applicable, any partner institution responsible for the joint award of this degree.

I give permission for the digital version of my thesis to be made available on the web, via the University's digital research repository, the Library Search and also through web search engines, unless permission has been granted by the University to restrict access for a period of time.

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June 2022

NOTE:

1. The copyright to all the Ellie texts belongs to the author of those texts, who has given permission for their use in the research.

2. The author has no potential conflict of interest with regard to Steiner education nor any Steiner school or organisation.

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I thank my supervisors, Dr. John Walsh and Dr. William Winser, for their tireless professional support and guidance, and John also for the original concept for the study and the sourcing of the data.

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I also thank 'Ellie' for making available the data for the research and allowing me the privilege and pleasure of engaging with her writing journey through school.

I acknowledge Samuel Ratcliffe for his technical assistance in the creation of the figures with circles, and Elite Editing for some advice and assistance with formatting the thesis.

This work has been motivated by an interest to support student writers, following my experience with those whom I have encountered in my own teaching.

Evita Ratcliffe

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List of Abbreviations and Symbols

MA   material Process

MN   mental Process

BH   behavioural Process

VR   verbal Process

RA   relational Process, attributive

RI   relational Process, identifying

EX   existential Process

//   boundary between clauses

[[   ]]   embedded clause

[   ]   embedded phrase qualifying nominal element

<< >>   enclosed clause

Italic font is used to indicate all language examples, including the content of Ellie's texts.
In the reproduction of Ellie's texts, the following apply:

( )   Parentheses with text in italics are as included as originally written.

( )   Parentheses with text not in italics indicate editorial annotations, which may

                be additions to represent elisions or apparently inadvertent omissions.

                Addition of elided terms is minimised.

(?)   illegible or unclear words in the original text

Minor instances of unconventional spelling have usually been corrected; the original syntactic structure and punctuation have been retained.

List of Capitalisation

The conventions of SFL require the use of upper case for selected technical terms. Terms used in this thesis are listed below, indicating conventional usage of upper and lower case. Additional use of upper case adopted in the thesis for the sake of clarity is indicated with the symbol *.

Systemic Functional Linguistics; systemic, functional
context of culture, context of situation
genre
narrative, historical account, etc. (- type of text)
Orientation, Background, etc. (- generic stage)
metafunction
ideational, interpersonal, textual, experiential, logical
register
Field*
Tenor*
Mode*
discourse semantics
Ideation*; activity sequence, kinds of entities
abstraction, abstract, concrete, technicality, grammatical metaphor, metaphorization
Conjunction*; addition, comparison, time, temporality, consequence, cause (etc.)
Identification*
Periodicity*; macroTheme, macroNew, hyperTheme, hyperNew
Negotiation*
Appraisal
cohesion
lexicogrammar
clause, clause complex, embedded clause, enclosed clause
transitivity
process; material Process, relational Process, etc.
Participant, Actor, Goal, etc. (- Participant roles)
Circumstance
extent, cause, location, etc. (- types of Circumstance)
Theme
marked Theme, unmarked Theme, topical Theme, etc. (- typse of Theme)
Information, Given, New
Adjunct
MOOD
history, science, subject English

CHAPTER 1   Introduction

1.1   Rationale for the study

Writing is an essential skill throughout life for personal and professional participation in society. From social media messaging to the complex written documents of institutional and bureaucratic contexts, the capacity to write remains relevant in the electronic age. Consequently, understanding how writing develops is of interest to educators, linguists and other researchers.

In schooling, writing is valued as both a goal and a means of education. From early literacy experiences which include foundational skills, students meet expanding contexts of written language across the curriculum as the learning areas increasingly depend on varied, unfamiliar patterns of language use, and writing demands escalate. Effective display of learning for assessment is often required in writing, so that written language competence is a key element for success in school and entry to pathways following schooling.

Concerns to better support student writing capacity in school remain ongoing, in contexts of curriculum and technology changes, and as diversity and disadvantage among student cohorts are highlighted. Additional focused concerns in Australia currently relate to reported declines in student writing achievement in the National Assessment Program – Literacy and Numeracy (NAPLAN) (New South Wales Education Standards Authority 2018; Thomas 2020; Weekes & Jones 2021) as well as the associated debates around the structure of the NAPLAN itself (Carter, Manuel & Dutton 2018; Gardner 2018; Hickey 2019). Linked to this is the decline in Australian student achievement in the Program for International Assessment (PISA) (Thomson 2021). PISA does not include a writing assessment per se but is associated with school achievement in general (Thomson 2021).

Wider concerns about literacy achievement have been raised in industry (Australian Industry Group 2018) and in the introduction of literacy assessments for students entering teacher education (Australian Council for Educational Research 2021).

Research in writing development therefore seeks to address practical as well as theoretical concerns. A significant current gap in this research is the absence of empirical evidence of the developmental pathway of individual students over extended time frames, despite the recognised need for such studies (Bazerman et al. 2017; Weekes & Jones 2021).

The present study drew on the availability of an unusually comprehensive set of one student's classroom written texts, to contribute to addressing this need. This data set contained the extensive portfolio of one student's writing during her schooling, from the beginning of school to the completion of the senior secondary year, including written texts from all subject areas across all levels. The data set was therefore marked not only by its comprehensiveness, but also by its continuity. The rarity of such data, understood to be difficult to obtain, is likely a significant factor in the existing lack of information about individual written language development. This data set was therefore particularly useful and provided an ideal opportunity for detailed analysis of an authentic individual trajectory of writing development.

1.2   A linguistic approach to written language development

Investigation of writing development has been approached in various ways. This study adopted a linguistic lens so that the focus was on the language of the written texts, and the changes in that language use as the student moved through her education.

The linguistic perspective adopted was functional rather than purely structural, using the framework of Systemic Functional Linguistics (SFL), an approach in which language is

considered not only in terms of form but primarily as a resource for making meanings (Halliday & Matthiessen 2004; Martin & Rose 2007; Martin & Rose 2008). The focus is on language choices in context, or what the user is able to do with the language. SFL has been widely accepted as useful for text analysis, and has been demonstrated to be an effective analytical approach for exploring student writing, with a productive contribution to the domain of written language development (e.g. Christie & Derewianka 2008; Schleppegrell & Christie 2018).

SFL provides a detailed model of the language system. The strength of the framework is in its comprehensiveness in addressing and linking several levels of meaning in language, from lexicogrammatical meaning at the level of the clause, through semantic meanings across the whole text, to the social context and purpose of the text realised in genre. The tools thus available in the framework allow the tracing of detailed development in texts written over time, through identification of changes across the full range of language resources. Additionally, the framework ties these changes to the social context in which they occur. The impact of context is widely recognised as being important in the learning of writing (e.g. Bazerman et al. 2017).

For application in the educational context, SFL not only offers a framework for linguistic analysis of texts in context, but also proposes a language-based theory of learning (Halliday 1993b). The language of school writing is understood to be the language of learning; educational learning is inherently bound to language. The question of a relationship between language development and learning is potentially of great interest for educators.

SFL was therefore selected in this study as the most useful framework for analysis of the texts in the data set to identify written language development and provide some insights with regard to contextual factors of that development and learning.

1.3   Research questions

The purpose of the study was to explore the trajectory of written language development of an individual student through extended years of schooling, by examining the language of sequential texts created by this student in school, and to consider that development in relation to context. The term 'trajectory' is used here to refer to the sequence of movement of change in the individual's language choices, not a predetermined path; the term 'pathway' will be used at times as a synonym. The following research question was addressed:

- What was the trajectory of written language development in an individual student, in a broad range of key meanings as seen across linguistically contrasting learning areas, through middle and secondary school, and how might this have related to learning within the specific school context?

This purpose required limitation according to the time and presentation constraints of the project. To this end, the focus was restricted to two learning areas. Also, in the analytical framework, priority was given to meanings related to subject content knowledge, and how that knowledge was organised into written texts; these meanings are understood in SFL as ideational and textual meanings respectively. This prioritisation precluded further expansion of the analysis to other important meanings, including the interpersonal. In this way, the overall research question was translated into two specific objectives, as follows.

The first objective was to identify and describe the student's written language trajectory. This objective was addressed in the following questions:

- Through linguistic analysis using a Systemic Functional approach, with a focus on ideational and textual meanings, what qualitative incremental steps of language change can be identified in the written texts of this student from Year 6 to Year 12 (ages 12 to 18), in the learning areas of history and science?

- To what extent is the pathway similar or different across the two learning areas?

The second objective was to explore, based on the above, whether there may be evidence within this trajectory of a connection between the language development, learning and context. This objective was considered in these questions:

- To what extent is it feasible to link the incremental changes in writing development to the process of learning, with reference to the language-based theory of learning proposed by Systemic Functional Linguistics?
- In what ways can a relationship be understood between the student's written language development and the curriculum demands within the school context, in general and in relation to the specific school?

1.4   Design and scope of the research

To address these questions, the research was designed as a qualitative naturalistic case study based on the written texts created by the individual student, here given the pseudonym Ellie, in her schooling. While a case study is limited in context and generalisability, this method allowed the intensive, phenomenological study of one person's experience using authentic data. Such detailed tracking of individual language use from one point in time to the next was possible given the availability of such comprehensive data, and was necessary for tracing a developmental trajectory in order to fulfil the objectives of the research.

The data set was fortuitously obtained and generously made available for the research with the agreement of Ellie, who is now an adult. The texts in the set were written in the normal course of her day-to-day education in a regular day school, which was a school affiliated with Steiner Education Australia (2021), a fully accredited private organisation within the

Australian education system. The texts were created some years prior to the study, in the early 2000s, and therefore no coercion or influence from the research goals impinged in any way on their production.

The set of texts included extensive writing for the subjects of the curriculum. The main focus of the research was the history and science writing at four distinct age levels, Years 6, 8, 10 and 12, so that 56 history texts and 266 science texts were examined, in the context of the wider data set. 32 representative texts that displayed the distinctive elements of change at each point were selected for comprehensive analysis, with others analysed in part. Consistent with the research purpose, the focus of the study was on the word-based texts; elements in other semiotic modes were not included.

The analytical framework addressed selected elements from within the entire available SFL toolkit. The analysis was qualitative, examining changes in use of language resources at different points to identify sequential development. This analysis was of language change per se, with the first and primary goal being to identify the changes over time in language use. It is important to note that the primary concern of the study was to document 'What can she do with language at this level that she could not do previously?' before considering contextual matters such as the curriculum and learning, so that the analysis was not in the first instance an assessment of whether the language development met pre-determined criteria such as curriculum requirements. Such matters were only addressed after the linguistic analysis of the texts and identification of the trajectory were completed.

1.5   Significance of the study

This study expands on existing research in writing development and educational linguistics by providing a description of an individual developmental trajectory, an authentic example of how written language developed in an individual student. A detailed literature search

was unable to uncover any other detailed linguistic studies of this type that examined individual writing development over an extended period of schooling, with consideration of a broad range of language elements from a functional perspective.

Evidence of this individual pathway complements existing studies of group and specific individual development and of the language requirements of schooling. While group studies have shown particular facets of writing development, they leave invisible the trajectory of individuals within those groups. An individual study can potentially reveal relationships between specific elements of the development, as well as weaknesses and strengths, and can also specifically link that development to the context.

In relation to theoretical concerns, this case provides an opportunity to further explore the SFL understandings of the ontogenesis of language, particularly during secondary school, and its relationship to learning.

1.6   Overview of chapters

The thesis is presented as follows. Chapter 2 provides a literature review and an overview of the theoretical and educational contexts for the study. Chapter 3 describes the methodology used in the research. Findings from the analysis of the texts are presented in Chapter 4, and then the trajectory of the written language development is described and discussed in Chapter 5. Chapter 6 provides a conclusion, including a discussion of implications of the research.

CHAPTER 2   Literature review and contexts for the study

2.1   Introduction to research in writing development

The extent of research on writing development is evidenced by the volume of literature

(e.g. ed. Bazerman 2008; eds Bazerman et al. 2018; eds Beard et al. 2009; eds MacArthur,

Graham & Fitzgerald 2015). That literature originates in a wide range of fields, including

education, rhetoric, anthropology, sociology, psychology and neuroscience, as well as

linguistics (eds Bazerman et al. 2010; eds Bazerman et al. 2018; eds MacArthur, Graham

& Fitzgerald 2015). Many aspects of writing, in school and across the lifespan, in both first

and additional languages, have been explored using a variety of approaches, and more or

less explicit attention to development is included. A brief introduction to the main areas of

this research in relation to first language writing within the context of schooling is

presented below.

2.1.1   Cognitive and socio-cultural studies

Cognitive and socio-cultural studies have been prominent in the field of writing research,

following some early linguistic studies. Cognitive studies since the 1980s have focused on

the mental processes involved in writing. Flower and Hayes (1981) introduced the process

model and Bereiter and Scardamalia (1987) contrasted the processes of 'knowledge

telling', in which writing draws on given content and schemas, and 'knowledge

transforming', which is the reworking of knowledge through the writer's own thought.

Aspects of writing considered in cognitive research have included the processes of

composing, planning, revising, problem-solving, self-regulation, motivation, dispositions,

goal setting and memory, as well as knowledge of topic, language and text features, and

development of writing (e.g. Abbott, Berninger & Fayol 2010; Berninger 2009; Berninger,

Nagy & Beers 2011; Graham, Gillespie & McKeown 2013; Hayes 2011, 2012; Kellogg 2008; MacArthur & Graham 2015; McCutchen, Teske & Bankston 2008; Olinghouse, Graham & Gillespie 2015). Some of this research has drawn on Piagetian concepts of developmental stages (e.g. see Camp 2012; Harmey & Wilkinson 2019). Some has been more explicitly psycholinguistic (e.g. McCutchen 1986). From the 1990s, much cognitive research has included some consideration of context, following the influence of socio-cultural approaches that drew attention to the relevance of multiple factors in writing development and the need to look beyond the individual's cognitive processes (e.g. Deane 2018; Graham 2018; Zimmerman & Risemberg 1997).

Socio-cultural perspectives have explored the influence on writing of social and contextual elements, including factors such as a developing understanding of audience, collaborative writing, community norms, identity and voice (e.g. Bazerman 2015; Beach, Newell & VanDerHeide 2015; Gardner 2013; Newell et al. 2011). In this vein, some scholars have drawn on Vygotsky's notion that social interaction is a prerequisite for development (e.g. Rowe 2018).

More recently, there has been some interest in a level of integration of different approaches, including cognitive, socio-cultural and linguistic (e.g. eds Bazerman et al. 2017; Bazerman et al. 2018; Ferretti & Graham 2019). The importance of considering language itself as part of a comprehensive picture of writing is thus recognised. Bazerman et al. (2018), a group of multi-disciplinary co-authors integrating different theoretical perspectives, including functional linguistics, have proposed eight general principles to support further exploration of writing development across different perspectives. They assert that writing trajectories vary, and highlight the significance of context, curriculum, and of the educator's knowledge of the ways that written language creates meaning in texts. They also acknowledge the incompleteness of the existing research in understanding writing development and individual trajectories (Bazerman 2018). Others also have noted

that the research across the whole field remains fragmented in its diversity (eds Beard et al. 2009; Harmey & Wilkinson 2019; Weekes & Jones 2021).

2.1.2 Language-oriented research

Studies in writing development from a distinctly linguistic perspective typically focus on usage and changes over time in the elements of language in the written texts. In this research, the dominant interest has been in structural syntactic elements, with attention also given to lexical items, cohesion and features of specific types or purposes of writing.

Early studies of texts written by children in school measured use of syntactic structures based on traditional and structural grammars, which included t-units, length of clauses, length of sentences, and subordination characteristics (e.g. Crowhurst & Piche 1979; Harpin 1976: Loban 1976). The t-unit, defined by Hunt (1965), comprises an independent clause and its accompanying dependent clauses, and has been widely used to measure development. Perera (1984) described the sequential introduction of different sentence features in children's writing. Syntactic features have continued to be of interest; for example, studies have explored the use of subordinate clauses in writing at ages 7-9 (Allison, Beard & Willcocks 2002); syntactic complexity in middle school and primary school, defined in terms of words per clause and clauses per t-unit (Beers & Nagy 2009, 2011); and use of adverbial clauses from ages 6 to 16 (Durrant, Brenchley & Clarkson 2020). Myhill (2008) explored development in terms of detailed sentence features such as length, sentence openings, subordination and coordination, and syntactic variety in secondary school.

In a systematic review of 36 studies of syntactic complexity, Jagaiah, Olinghouse & Kearns (2020) note that the variety of measures used does not allow for definitive conclusions about development. There is some agreement across the literature that development is associated with length and complexity of t-units, clauses, sentences and

phrases, and increasing use of non-finite clauses, but these elements have been found to depend on the genre or type of the writing, and while the use of subordination increases in frequency and variety through primary school, it diminishes later in the development of alternative strategies such as the compacting of information within phrases and clauses (Crossley 2020; see also sources listed above).

Studies of lexical features have found lexical variation, or lexical sophistication, defined by rating words in terms of length, frequency of occurrence, register appropriacy, polysemy, abstraction or concreteness, or nominalisation, to be a feature of development (Crossley 2020; Durrant & Brenchley 2019; Olinghouse & Leaird 2009; Olinghouse & Wilson 2013; Sun & Nippold 2012). Cohesion, understood as connections between items in the text such as pronouns and lexical repetition, has been another area of interest, with development seen in terms of movement from local to global cohesion and more varied strategies (Crossley 2020; also e.g. Struthers, Lapadat & MacMillan 2013).

Attention to specific types of texts has arisen from the early recognition that language features vary with the purpose of writing. Britton et al. (1975) examined student texts in terms of functional categories and writer-audience relationship, while Harpin (1976) noted changes in types of texts in the developmental trajectory through schooling. More recent research has addressed, for example, narrative writing (e.g. Beard & Burrell 2010; Burrell & Beard 2018a), persuasive writing (e.g. Beard, Burrell & Horner 2016; Burrell & Beard 2018b; Nippold, Ward-Lonergan & Fanning 2005) and argumentative writing (e.g. Taylor et al. 2019). Studies related to specific types of writing, as also some others, have at times included consideration of multiple language elements (e.g. Hall-Mills & Apel 2015; Sun & Nippold 2012; Wagner et al. 2011).

In a different approach, Myhill (2009), in a study of secondary school writing, proposed linking linguistic and cognitive elements. While changes in syntactic structure were

measured, development was then interpreted as linguistic 'design', incorporating three 'complementary trajectories': movements from spoken to written language; from 'declaration', or simple statements, to 'elaboration' that included more detail; and 'from knowledge translation to transformation', the latter a concept drawn from cognitive studies (Myhill 2009).

A wide diversity is evident across the linguistic research, covering different language features, text types, analytical frameworks and age groups, providing extensive detail but again with minimal integration. The concept of development has also been intertwined with notions of writing quality and assessment, resulting in a lack of focus on evidence of actual development. Attention to development in secondary school has been limited until more recently (Myhill 2008). Cross-sectional studies have dominated, with data collected from groups of students, while longitudinal studies have been relatively few, and mainly focused on the early years and post-school students (Bazerman 2018; Tierney & Sheehy 2004). A gap therefore remains in knowledge of individual trajectories of development over the school years.

Further, it is now recognised in the field that purely quantitative structural analyses of language features, including by the use of software, are not adequate for describing development, but must be supported by the investigation of functional use to judge their effectiveness in creating meaning (e.g. Durrant, Brenchley & Clarkson 2020).

SFL offers such a functional approach to the linguistic analysis of writing development, distinctive in its attention to meaning, as highlighted by Schleppegrell and Christie (2018). The SFL research is described in Section 2.3; to provide background for that discussion, the SFL framework is first outlined in Section 2.2.

2.2 SFL theoretical framework

SFL is a tradition within linguistics that describes language as a resource for making meanings within socio-cultural contexts. This theoretical framework was selected for the present study because of its functional approach that moves beyond structure to consider language choices in context: what the user does with the language in terms of meaning. The use of this perspective also links the study to the body of SFL educational linguistics literature.

SFL has developed from the work of Michael Halliday (e.g. Halliday 1975a, 1975b; Halliday & Hasan 1985; Halliday & Matthiessen 2004), with Halliday's work influenced by Firth, Jakobson and other mid-20th century linguists (Halliday 1974b; Martin 2016). The availability of the model to educational contexts has been further advanced by Martin, Rothery, Christie and others in what has been termed the Sydney School, to a large extent through research in the educational context in Australia (e.g. Martin 2013, 2014, 2016; Martin & Rose 2007, 2008; Veel 2006). SFL methods have been developed specifically for detailed linguistic analysis of texts (Halliday & Matthiesssen 2004). The productivity of the approach is evident in extensive research in educational linguistics in Australia (see Section 2.3) and in other locations including South Africa, China, Hong Kong, the United Kingdom, Spain, Portugal and Sweden (e.g. eds de Oliveira & Iddings 2014; Frändberg, Lincoln & Wallin 2013; Thomson & Hart 2006; Walsh 2006), as well as in a range of other institutional contexts such as health, science, history, media and sport (e.g. eds Caldwell et al. 2017; eds Eggins, Slade &Geddes 2016; Halliday & Martin 1993; Martin 2003). This variety attests to Halliday's proposal that SFL be understood as an 'appliable' linguistics (Halliday 2010).

The SFL theoretical framework has been described in an extensive literature (e.g. as above; also Butt et al. 2012; Derewianka 2011; Eggins 2004; Humphrey, Droga & Feez 2012;

Martin, Matthiessen & Painter 2010). The core elements of the theory as relevant to educational linguistics are presented below: the systemic functional model that ties language to context, including specific systems, and the understanding of language development and learning within SFL.

2.2.1   The systemic functional model of language

SFL presents language as a functional social semiotic system, the most fundamental system of signs making socially based meanings (Halliday & Hasan 1985). It is argued that while human beings live in the material world, they simultaneously live in a semiotic world. In the context of human social environments, meanings are co-constructed and shared through systems of sign-meaning correspondences, or semiotic systems. Language is arguably the most pervasive and complex of these systems (Halliday & Hasan 1985).

In this semiotic function, language is a resource through which reality is construed and social relationships within a culture are enacted (Halliday 1978). Through social experiences with language, as meanings are co-constructed in a process of intersubjectivity, reality is created and shared between interactants. By the division and categorisation in language of the phenomena of life experiences, everyday experiences are transformed into meaning. Hence reality is understood as a social construct. Meanings are not pre-existing; while there are patterns and order in the material world, the way they are defined and organised is not naturally given but is culturally and socially determined through language. In this way, the language system is the realisation of the culture. This is not a static semiosis. Rather, there is a two-way relationship between language and social context: while the language realises the culture, evolving over time in context, the culture is also continually shaped by the language (Halliday 1980).

This social semiotic model of language includes the key concepts that are introduced below: instantiation, stratification, metafunctions and systems.

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2.2.1.1 Instantiation

The language system as a whole is the reservoir of meaning-making potential in the culture (Halliday & Matthiessen 2004). From this entire potential, selected meanings can be drawn in the creation of texts (Halliday & Matthiessen 2004). The text is understood in SFL as the basic unit of meaning. A text is a meaningful use of language in context, which is coherent in relation to its context and cohesive in relation to the semantic meanings within itself. Context is understood in two ways: the broader context of culture and the immediate context of situation, a distinction drawn from the anthropological insights of Malinowski through Firth (Halliday 1991). A text occurs, and is understood, within the context of a situation within the culture. As the situation 'instantiates', or is an instance of, the culture, the text 'instantiates' the language system, being realised through specific choices from the entire language system (Halliday & Matthiessen 2004). This instantiation, understood as a cline, is represented in Figure 2-1, adapted from Halliday and Matthiessen (2004, p.28).

context of culture   context of situation

| |

potential   ⟵⟶   *instance*

| |

system of language   text

cline of instantiation
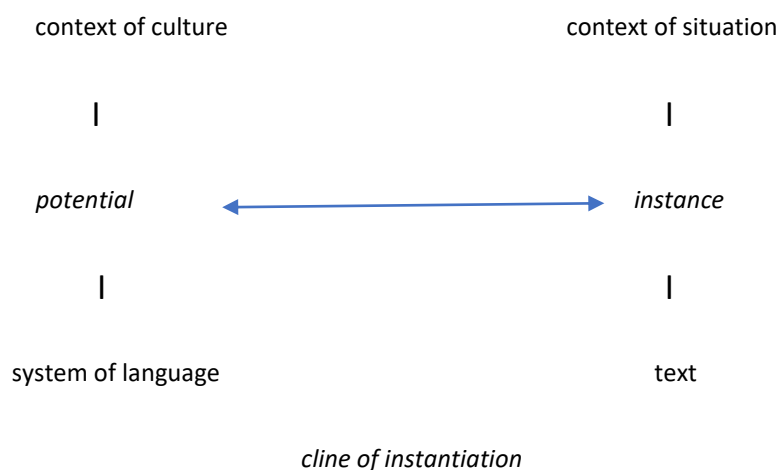
Figure 2-1. Instantiation (based on Halliday & Matthiessen 2004, p. 28)

2.2.1.2 The SFL stratified model of language in context

A stratified model of language in context is proposed, comprising context, content and expression (Halliday & Matthiessen 2004; Martin 2016). Social context is understood as a stratum of meaning at the most abstract level (Martin 2016). The functionality of language

arises in context as the social context is realised, or encoded, in language. The content stratum relates to language itself, the way the language works to construe meanings. The content is further stratified into semantics and lexicogrammar (Halliday & Matthiessen 2004; Martin 2016). This division of the content level into two is significant, because the relation between the semantics and the lexicogrammar creates the capacity of language for making complex meanings (Halliday & Matthiessen 2004). Finally, the content is in turn realised at the expression level, which is the physical expression of language in phonological or graphological forms (Halliday & Matthiessen 2004).

The stratification is based on a principle that each stratum realises the more abstract level above it, via the process of meta-redundancy (Lemke 1993), defined as a set of redundancies in which the strata redound with each other. This dependency, or supervenience, in the stratified model is represented visually as co-tangential circles, illustrated in Figure 2-2.
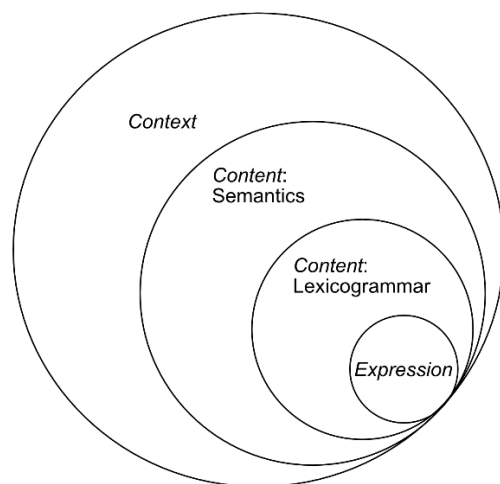
Figure 2-2. The stratified model of language in context (based on Halliday & Matthiessen 2004, p. 25)

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2.2.1.3 Stratification of context

In the SFL model as it is commonly applied in relation to education, the understanding of context as culture and situation is reworked as the two strata of genre and register (Martin & Rose 2008). Culture is modelled as a system of genres, with genres understood as 'recurrent configurations of meaning', defined more simply as 'goal-oriented, staged social processes' (Martin & Rose 2008, p.6). They are 'linguistic ways of getting things done in a culture' (Veel 2006, p.72).

Different genres accomplish different social purposes. For example, story genres serve to entertain and to transmit values within a culture, contributing to the stability and direction of social relationships; history genres realise social management on a broader scale, recording and interpreting the past with a focus on sequences of events, time, causality and value; science genres serve to interpret the material world (Martin & Rose 2008). Appropriate to their social purpose, each genre is realised as a specific text type with a distinctive staging, a typical unfolding sequence through which the social purpose is accomplished, which contributes to making the genre predictable and recognisable (Martin & Rose 2008). For example, among story genres, recounts relate sequences of events, while narratives tell stories that include a complication and resolution (Martin & Rose 2008).

Genres become institutionalised. In education, they are recontextualised for the process of apprenticing students into institutionalised social practices, and are important for understanding how language is used in social contexts (eds Christie & Martin 1997). This has been the impetus for the educational application of genre in SFL, originating from a project aimed to teach genres explicitly to disadvantaged groups in a progressive system that veiled how to write successfully (Martin & Rose 2008).

The second stratum of context, register, in which genres are realised, comprises three dimensions of the situational context that are collectively referred to as the register variables (Martin & Rose 2008). These three situational dimensions are Field, Tenor and Mode, following Halliday (Halliday 1974a, 1975a).

The Field is the social activity involved in the context, relating to the different domains of social life (Halliday 1974a, Martin & Rose 2008). In the school context, this can refer to the subject matter of the text. The Tenor comprises the roles and relationships between the participants in the interaction, in terms of status and social distance (Martin & Rose 2008). The Mode is the role played by language in the text, and thus the nature of the text: whether the language constitutes the social interaction or is attendant to it (Martin & Rose 2008). Mode is seen on a cline based on the spatial and experiential distance between the interactants, thus from spoken, conversational language to written text (Eggins 2004). Along this cline, texts vary in their more spoken-like or written-like language features. Spoken-like language is characterised by interaction and spontaneity, context dependence, chronological unfolding, everyday lexis, non-standard and interrupted grammar, and grammatical intricacy in chaining of clauses. At the written end of the cline, texts evidence independence from context, crafted and rhetorical organisation of information flow, editing, non-everyday or academic lexical choices, conventional grammar, and a grammatical simplicity and high lexical density that are associated with the use of grammatical metaphor (Eggins 2004).

2.2.1.4   Stratification of content

The stratification of content as semantics and lexicogrammar has been noted above in Section 2.2.1.2. The reworked modelling of the semantics stratum as discourse semantics (Martin 2016; Martin & Rose 2007) was adopted in the study reported in this thesis. Discourse semantics, as the more abstract stratum of content, is concerned with meanings at the level of the whole text (Martin & Rose 2007). These resources are deployed within

clauses but operate across clauses to interpret cohesive ties across a text that make the text unified. In this way, Halliday and Hasan's (1976) original SFL work on cohesion has been reworked into this stratum (Martin 2016). The understanding of discourse semantics offers a distinct level of analysis within language at the level of the whole text, as distinct from the clause level, a noted gap in other frameworks (Martin & Rose 2007), thus addressing language resources of interest to educational linguistics.

The lexicogrammar, as the less abstract stratum within the content, is concerned with meaning at the level of the clause (Halliday & Matthiessen 2004). This level includes the lexis and the grammar, being all the words and the possible structuring of the words in the clause, which are located at the same stratum on the basis that the lexis is understood as the 'most delicate grammar' (Hasan 1996c).

Figure 2-3 provides a visual representation of the stratified context and content in this model.
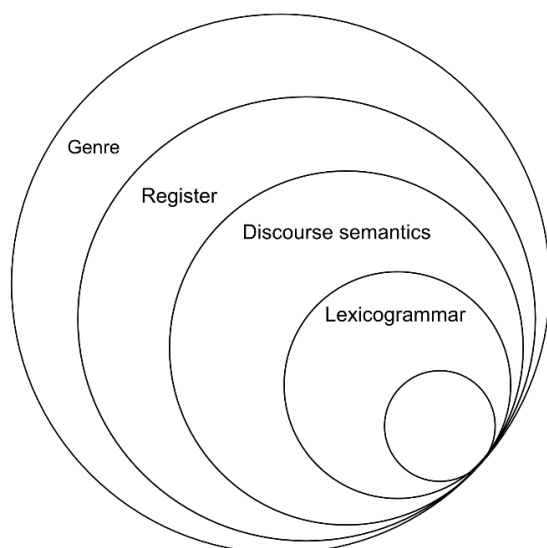
Figure 2-3. Stratified context and content (based on Martin & Rose 2008, pp.17, 29)

2.2.1.5 The metafunctions

As another characteristic of the architecture of language that contributes to the capacity of language for making complex meanings in context, the metafunctions represent the 'functional components of the semantic system' (Halliday 1975a, p.183). These are the three general functions of language, through which the register variables of Field, Tenor and Mode are tied to language use. They are the ideational, interpersonal and textual metafunctions, which are described by Halliday and Matthiessen (2004) as follows.

The ideational metafunction, related to the social activity in the Field, is the construal of experience; it is composed of experiential and logical components. The interpersonal metafunction, which is the enacting of social relationships, is related to the roles and relationships in the Tenor. These two, the ideational and interpersonal metafunctions realise the cultural environment. Halliday explains these respectively as 'reflection on the environment' and 'action on the environment' (Halliday & Matthiessen 2004, p.29-30). The third metafunction, the textual, relates to the organisation of meaning into texts. It contrasts with the other two, in that it fulfils an internal function of language itself, enabling the shaping of ideational and interpersonal meanings into coherent texts. In any language use, all three metafunctions are at play simultaneously, since the context includes all three register variables. The metafunctions are represented in Figure 2-4.
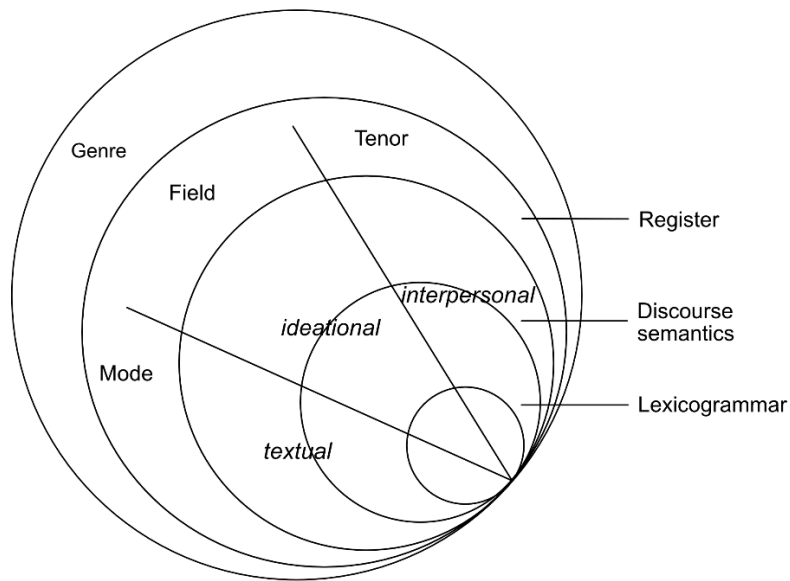
Figure 2-4. The metafunctions (based on Martin & Rose p.17)

In this way, the register variables are important in shaping language use. While Field, Tenor and Mode exist in the extra-linguistic context, they are tied to the internal language strata at the semantic level in the generalised types of meaning understood as the three metafunctions. Language and context are thus inextricably linked; the context is directly tied to motivated language choices at the content level according to the meanings at risk in the socio-cultural situation. As a result, texts arising from similar social contexts tend to share similar probabilities of language choices, with certain constellations of meanings more likely. This creates recognisable language patterns, or patterns of patterns, in different social contexts, such as law, medicine, sport, history or science. As social situations are institutionalised, such patterns are in some measure regularised and predictable. Accordingly, as language realises the social context, the context is also identifiable in the text.

In its orientation to meaning, SFL models language as a system that is itself comprised of systems, which are mapped across the metafunctions at the two levels of discourse semantics and the lexicogrammar. While both the paradigmatic and syntagmatic relations within language at the content level are recognised, the paradigmatic are prioritised in the systemic perspective (Halliday & Matthiessen 2004; Martin 2016).

Syntagmatic relations relate to structure, or constituency, in the lexicogrammar, understood as a combination of parts. Language comprises components that can be combined into larger units, which again can be composed into larger units, in part-whole, or syntagmatic, configurations. These components, or constituents, are, in 'rank' order, morpheme, word, group or phrase, clause, and clause complex (Halliday & Matthiessen 2004). This rank scale is represented in Figure 2-5.

clause complex
clause
group or phrase
word
morpheme
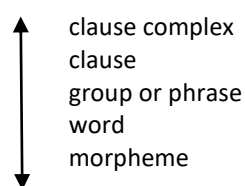
Figure 2-5. The rank scale (based on Butt et al. 2012, p.46)

Paradigmatic relations, on the other hand, lie in the organisation of language as sets of oppositional choices, so that the whole system of language is modelled as comprising within itself networks of systems, and systems within systems. In these sets of options, the interest is in 'what could go instead of what' paradigmatically, rather than 'what goes with what' structurally (Halliday & Matthiessen 2004, p.22), whereby language use is understood as choice. Simple examples are the system of polarity, which allows the options of positivity or negativity, with more delicate choices possible for negativity; or the system of pronouns, which allows selection of person and number and in some instances gender. A simple network diagram representing the latter is presented in Figure 2-6.
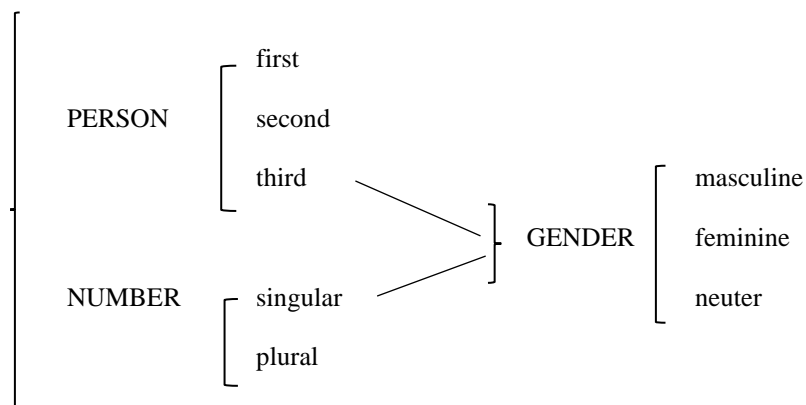
Figure 2-6. Sample network diagram: pronouns (based on Martin 2016, p.40)

Each system is comprised of specific sets of language resources that realise meanings within the metafunctions and strata. In a text, the speaker or writer makes meaningful language choices from the oppositions within the systems, motivated by socio-cultural context, that is Field, Tenor and Mode. The paradigmatic, systemic approach is therefore focused on meaning, alongside structure, in context.

The major systems at the discourse semantic level, realising the ideational, interpersonal and textual metafunctions respectively, are Ideation and Conjunction, Appraisal and Negotiation, and Periodicity and Identification (Martin & Rose 2007). Parallel to these, the primary systems in the lexicogrammar are transitivity, MOOD and Theme and Rheme (Halliday & Matthiessen 2004). These systems are shown in Figure 2-7.
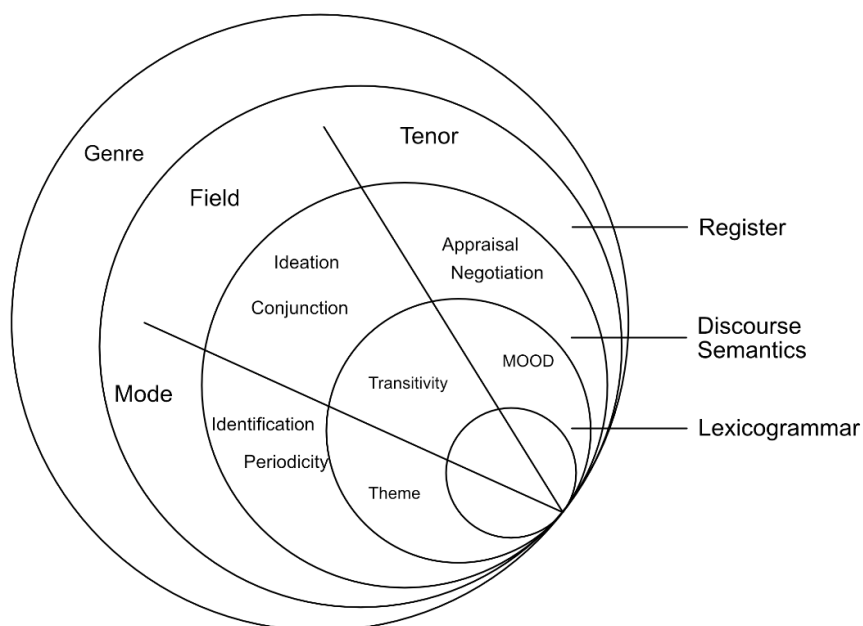
Figure 2-7. Key systems within language (based on Halliday & Matthiessen 2004; Martin & Rose 2007)

Through this detailed and explicit mapping of language in its relationship to context, the model provides an ideal framework for the analysis of texts aimed at understanding functional, contextual meaning-making. This is a comprehensive framework across all strata of language, with a focus on meaning that is not available in purely structural approaches. The pairing of Martin and Rose's (2007) contextual and discourse semantics framework with Halliday's lexicogrammatical framework (Halliday & Matthiessen 2004) is inclusive of attention to elements at the whole text level that relate directly to the effectiveness of written texts.

The systems of ideational and textual resources were in focus in this study, having been selected for investigation on the basis of their importance in understanding written language in schooling. They are described below. The examples of clauses included in this description are from Ellie's writing unless otherwise indicated.

2.2.2 Systems of ideational meanings

Ideational meanings are significant in relation to the educational content of schooling and the building of knowledge. Ideation, Conjunction and transitivity are discussed below, and also the related system of clause complexing.

2.2.2.1 Ideation

Ideation is concerned with the elements within the text that construct the Field, or the construal of experience in the text, which are the human and non-human entities and their qualities, the places and the processes (Martin & Rose 2007). The interest is in what these meanings are and how they are consolidated across the whole text in terms of the lexical relations between them. Two aspects of ideation of specific interest here are taxonomic relations and activity sequences.

Firstly, taxonomic relations between elements in a text as they expand the Field may include repetition, synonymy, contrast, part-whole relations, scale or cycle (Martin and Rose 2007). To expand the consideration of taxonomic relations, Martin and Rose (2007) provide a further framework to examine the 'kinds of entities' in texts by differentiating between concrete, abstract, metaphoric and technical entities, as described below.

Concrete entities are those perceptible to the senses, such as *water* or *ship*, while abstract entities as those that are not, such as *fun, love* or *conditions.* A special category of abstract entities is the metaphoric, or those realised in grammatical metaphor, where meanings such as processes, qualities and circumstances are non-congruently construed as entities. For example, the processes *move* or *destroy,* or the quality *able,* may be reconstrued as the entities *movement, destruction* and *ability.* In grammatical metaphor, the semantics is disconnected from the grammar to reconstrue meanings in new ways and construct a different kind of reality with a focus on 'pseudo-Things' (Unsworth 2005, p.256). In consequence, metaphorisation makes possible the compacting of meaning, including

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expansion of meaning-making potential in modification of entities (e.g. *complete destruction*), as well as construal of processes as agentive with omission of human agents (e.g. *The destruction of…*), and new textual options for reorganisation of information flow, such as in the construal of Participants and Themes (Halliday 1998b; Halliday & Martin 1993). Metaphorisation thus increases abstraction, and facilitates taxonomising of knowledge and abstract reasoning, making it is a key resource in the language of institutionalised fields such as history and science. The final category of entities, technicality, refers to meanings which are specific to and defined within the knowledge structure of a discipline and learnt through building disciplinary knowledge in language, terms such as *Punic War, sulphuric acid, photosynthesis* or *meiosis*. Technical terms may be concrete, abstract or metaphoric.

The four major divisions can be further subdivided. The categorisation of entities according to these criteria is relevant to the significant distinction between concrete everyday Fields, such as, for example, personal experience in one's own community, and the abstract Fields of social institutions such as the disciplines and bureaucracy (Martin & Rose 2007).

Secondly, as another aspect of Ideation, the activity sequences in a text are concerned with relations between the activities that construe the Field (Martin & Rose 2007). In the unfolding of a text as a series of events, or processes involving entities, a semantic relationship exists between the processes, because patterns of human activity within different fields tend to be recognisable and somewhat predictable (Martin & Rose 2007). As fields vary, so do the activities. For example, in a text or text phase concerning a military context, it may be expected that the activities would construe military activities, perhaps with some concluding outcome, as underlined in the following excerpt:

In the 2ⁿᵈ war, however, Hannibal almost <u>conquered</u> Italy by a daring campaign from the

north.

It was only the final stroke of the Roman general, Scipio,

who <u>attacked</u> Carthage itself,

that <u>forced</u> Hannibal out of Italy and into final defeat (201 BC).

After peace <u>was made</u>…   (from Text 1.1)

Similarly, in a descriptive text, or descriptive phase within a text, the processes may

identify qualities or components of an entity, rather than actions, as in the following

example:

Some constellations <u>are</u> above the celestial equator,

some (<u>are</u>) below.

Sagittarius and Scorpio <u>are</u> very high in the winter sky

while Taurus and Gemini <u>are</u> very low in the summer sky.

What we see in the sky <u>is hidden</u> behind the sun in the opposite season. (from Text 1.7)

2.2.2.2   Conjunction

The system of Conjunction, closely related to Ideation, is focused on the logical relations

between the activities in the text, and the patterns of these relations across the whole text

(Martin & Rose 2007). While activity sequences deal with semantic relations, Conjunction

relates to logical meanings. Martin and Rose (2007) outline four major types of

conjunctive relations: addition, comparison, time and consequence; the latter includes

cause, means, condition and purpose. Conjunction may be external, relating to the Field, or

internal, organising the flow of discourse within the text (Martin & Rose 2007). External

Conjunction is detailed below; internal Conjunction is addressed later in Section 2.2.3.1 in

relation to textual meanings.

Conjunction is a meaning-based system, with varied grammatical realisation. Resources for external Conjunction include conjunctions or prepositions that explicitly connect clauses in either equal or dependent relationship, as well as conjunctive adjuncts, which realise links across clauses.

These resources are illustrated in Table 2-1 which is simplified from Martin and Rose (2007, page 153); the table is adapted to show the grammatical differences across four columns, a format designed simply to make the resources clear for facilitating analysis; it is not intended to emphasise structure over meaning.

Table 2-1. Conjunction (external) resources (adapted from Martin & Rose 2007, p.153)

	Combining clauses - equal (conjunctions)	Combining clauses - dependent (conjunctions)	Combining clauses - dependent (e.g. prepositions)	Linking clauses - cohesive (conjunctive adjuncts)
addition	*and* *both…and* *or, either…or* *nor, neither…nor*	*if not…. then*	*as well as* *besides*	*furthermore* *besides* *alternatively* *on the other hand*
comparison	*but*	*as* *as if* *whereas* *while*	*like* *instead of* *in place of* *rather than* *other than* *except that*	*instead* *rather*
time		*when* *after* *since, now that* *before* *once, as soon as* *until* *as, while*	*prior to* *subsequent to*	*subsequently* *previously* *at once* *meanwhile* *simultaneously*
consequence				
cause	*so* *but*	*because* *though, although* *even though*		*therefore* *consequently* *as a result* *however*
means	*but*		*by* *even by*	*thus* *by this means*
condition		*if (…then)* *provided that* *as long as* *even if* *unless*		*even then*
purpose	*so that*	*lest*	*to, in order to* *so as to* *without* *for fear of, in case*	*even so*

Additional to the above is the small set of continuatives, listed in Table 2-2 as adapted from Martin and Rose (2007, p.143).

Table 2-2. Conjunction (external) resources: continuatives (adapted from Martin & Rose 2007, p.143)

addition	*too, also, as well*
comparison	*so (INV), only, just, even*
time	*already, finally, at last, still, again*

A further resource for realizing external conjunction is logical metaphor, the use of grammatical metaphor in the non-congruent realization of Conjunction (Martin & Rose 2007). For example, in the clause below, causal Conjunction is realized as a process:

> *The movement of the plates <u>causes</u> 'continental drift'.*

This metaphorisation contrasts with more congruent construal in two clauses, as, for example, with *so*:

> *The plates move, <u>so</u> 'continental drift' happens.*

Options for logical metaphor include Conjunction realised as process, circumstance, entity, or quality, so that the logical relation is realised 'in the clause' rather than between clauses. A summary of selected options is shown in Table 2-3, adapted from Martin and Rose (2007, pp.148-152).

Table 2-3. Conjunction (external) resources: logical metaphor (adapted from Martin & Rose 2007, pp. 148-152)

Conjunction as process	*lead to, result from*
Conjunction as circumstance	*without…*
Conjunction as entity	*first time, sequel, reason, result, consequence, conclusion, means, condition*
Conjunction as quality	*resulting, enabling (action etc), actual (size etc), conclusively, subsequently, previously, conditionally (shown etc)*

Resources such as those listed above realise Conjunction explicitly, but the relations between processes in a text may also be implicit, where the relation is culturally expected

within the type of text and so understood (Martin & Rose 2007). For example, additive Conjunction is implicit in 'story'-type texts, in which activities are typically construed in sequence, and in descriptive texts, which unfold with a sequence of elaborations. Use of explicit Conjunction resources in such cases may signal an unexpected relation or a change of direction in the text, although this is not always so.

A different pattern of implicit causality is deployed in some science writing, where succeeding activities are understood to be related by cause and effect; this is known as an 'implication sequence', and can be seen in the following example adapted from Martin and Rose (2008, p. 151):

> *In the wet season huge volumes of water flow from the escarpments.*
>
> *When (<u>as a result</u>) this water hits the floodplains*
>
> *(<u>as a result</u>) it slows down*
>
> *and (<u>as a result</u>) spreads out*
>
> *(<u>as a result</u>) forming the wetlands.*

In this rich array of resources, Conjunction offers numerous grammatical choices for realising relations between processes that may be complex and multiple across a text.

2.2.2.3   Transitivity

Transitivity is the ideational system concerned with the realisation of experiential meanings at the level of the clause (Halliday & Matthiessen 2004). SFL treats each clause as one 'quantum of change' in the flow of activities that unfolds in a text (Halliday & Matthiessen 2004, p.169). This change is realised in a Process, so that the Process is the central meaning in the clause, with associated Participants and Circumstances (Halliday & Matthiessen 2004). Participants are the human or non-human entities that are engaged with

or agentive of the Process; Circumstances, such as time and place relate less centrally to the Process. For example:

The captain	<u>*would yell out*</u>	*news*	*over the roaring wind.*
Participant	<u>Process</u>	Participant	Circumstance

In this way, a clause gives 'information about what is going on, who/what is taking part, and any circumstances surrounding the activity' (Derewianka 2011, p.13).

Within the system of transitivity, Processes are categorised as six types: material, mental, behavioural, verbal, relational and identifying, with some subcategorisations of each, and Participant roles vary according to the type of Process (Halliday & Matthiessen 2004). Table 2-4 provides a summary of the Process types.

Table 2-4. Types of Processes (based on Halliday & Matthiessen 2004)

Process type	Experience construed
material	activity in the material world
mental	internal experience in consciousness, sensing (incl. cognitive, perceptive, desiderative, emotive)
behavioural	physiological behaviour of conscious participant (between material and mental Processes)
verbal	spoken and semiotic activity
relational attributive	a relationship between two Participants, as Carrier and Attribute
relational identifying	a relationship between two Participants, as Toke and Value
identifying	existence of entities

Examples of these different types of Processes and their most commonly associated Participant roles are shown in Table 2-5, with the examples drawn from a Year 6 text by Ellie, entitled *The Story of Caius.*

Table 2-5. Transitivity: Process types and Participants (based on Halliday & Matthiessen 2004) with examples

Process type	Processes with Participants – with examples		
	Participant +	**Process**	+ **Participant**
material	Actor *Many men*	**material Process** *were hammering*	Goal *boards…*
	Actor *He*	**material Process** *could cross*	Range *the seas…*
behavioural	Behaver *He*	**behavioral Process** *sighed…*	-
mental	Senser *He*	**mental Process** *remembered*	Phenomenon *about seven…*
verbal	Sayer *The captain*	**verbal Process** *would yell out*	Verbiage *news…*
relational attributive	Carrier *The ships*	**relational attributive Process** *looked*	Attribute *so beautiful and proud…*
relational identifying	Token *I*	**relational identifying Process** *will be*	Value *a soldier…*
existential	- *There*	**existential Process** *were*	Existent *so many…*

Grammatical realisation of Participants is most commonly in noun groups, either a simple pronoun, noun or noun with determiner, or a more expanded noun group that may include a modifying embedded clause. Alternatively, a Participant may be realised in a clause that is deployed within and as a constituent of the clause. Such use of expanded resources allows increased density and complexity of information. Illustrative examples of Participants are provided in Table 2-6.

Table 2-6. Participants: examples of grammatical realisation

noun group	*He sighed happily.* *The men just hung their heads in shame*
noun group with premodification	*Harsh Roman voices were yelling orders…*
noun group with postmodifying phrase	*The deck [of the ship [in front of him]] was being made.*
noun group with postmodifying 'embedded' clause	*…that all in Rome [[who opposed him]] should be put to death.* *She is the bravest person [[I can remember]]* *We got to choose some rocks [[to take home]].*

Circumstances, as the third type of element within the clause from the perspective of transitivity, realise a range of meanings, as listed in Table 2-7.

Table 2-7. Circumstance types (based on Halliday & Matthiessen 2004) with examples

Extent	distance	*I will sail <u>all over the sea</u>.*
	duration	*We have been bowing down to them <u>for so long</u>.*
	frequency	*<u>Each day</u> it rises later.*
Location	place	*There were so many <u>along his own shore</u>.*
	time	*<u>On the twelfth day</u> he died.*
Manner	means	*We rubbed the glass tube <u>with a piece of silk</u>.*
	quality	*He sighed <u>happily</u>.*
	comparison	*<u>Like me and my father</u>, my brother and I hadn't been so close.*
	degree	*My big brother was my father's favourite <u>by far</u>.*
Cause	reason	*They were murdered <u>for their efforts</u>.*
	purpose	*It is time we fought <u>for freedom</u>.*
	behalf	*He worked <u>for a grocer</u>.*
Contingency	condition	*<u>With an active vision</u>, the light world becomes more luminous.*
	default	*Never before have all the slaves run off <u>without permission</u>.*
	concession	*These surfaces remain dark <u>in spite of the surrounding brightness.</u>*
Accompaniment	comitative	*He could cross the seas <u>with the soldiers</u>.*
	additive	*<u>Instead of the maid</u>, I made the cake.*
Role	guise	*He worked <u>as a shop assistant.</u>*
	product	*They split us <u>into groups of about five</u>.*
Matter		*I could feel the mysteriousness <u>about it</u>.*
Angle	source	*This true aim, <u>according to Marx</u>, should be to change the world.*
	viewpoint	*<u>In Sufi tradition</u>, it is said that…*

Circumstances are most commonly realised in adverbs and prepositional phrases. Types of Circumstances and the grammatical choices can be expected to vary according to text type and Field. For example, Circumstances of time are often important in texts relating to history.

2.2.2.4   Clause complexing

While the system of transitivity deals with the experiential component of ideational meanings at the level of the clause, the associated logical meanings are realised across a number of smaller systems. Of particular interest in this study was clause complexing. This logical linking of two or more adjacent clauses may be seen as being 'above the clause' but is understood within the lexicogrammar rather than within discourse semantics, given that the connection is grammatical (Halliday & Matthiessen 2004). The focus here is localised, on meanings within the complexes deployed, rather than on meanings across the whole text.

In the combining of clauses into clause complexes, two systems are simultaneously at play: logico-semantic relations and taxis (Halliday & Matthiessen 2004). Logico-semantic relations may be either of projection or expansion. Projection is only deployed where the projected clause realises an idea in a mental Process or a locution in a verbal Process. Expansion is the addition of further meaning, including elaboration (qualification or exemplification), extension (addition, variation, or alternation of information) or enhancement (addition of circumstantial information, such as time, place or reason).

Taxis refers to the degree of dependency involved, in whether the relationship is one of equality, known as parataxis, or of dependency, referred to as hypotaxis. This distinction is similar, but not always equivalent, to the concepts of coordination and subordination.

These options for clause complexing are illustrated in Table 2-8, using examples from Ellie's writing, with some of the examples adapted for simplicity or to show different grammatical realisations of the alternative choices.

Table 2-8. Logical relations in clause complex (based on Halliday & Matthiessen 2004) with examples

Equal relation (parataxis)	Dependent relation (hypotaxis) (dependent clause underlined)
Expansion	
He sighed happily // and went home. (addition)	*He looked up desperately at Tony, // <u>who was standing straight and still</u>.* (elaboration)
He took my letter with a smile // but only put it in his pocket. (variation)	*<u>When I was nine</u>, //we went to the beach.* (time)
They deserved names // so he named them. (result)	*She bent over //<u>to dust off her grazed knees.</u>* (purpose)
	There were many ships, // <u>beached along his own shore.</u> (elaboration)
	He went along the rows, <u>naming them</u>. (elaboration)
Projection (projected clause underlined)	
<u>'They all deserve names'</u>, // Caius thought. (idea)	*Caius thought // <u>that they all deserved names.</u>* (idea)
	He wished // <u>he could cross the seas with the soldiers.</u> (idea)
<u>'Stay away from the soldiers'</u>, // Caius's mother warned sternly. (locution)	*Caius's mother warned him // <u>to stay away from the soldiers.</u>* (locution)

Grammatically, clause complexing can involve finite and non-finite clauses. Clauses in equal relationships are always finite. Dependent clauses may be finite or non-finite, and conjunctions may be deployed. A complex can be formed with varied numbers of clauses in different configurations. It is to be noted that an enclosed clause is not part of a clause complex, but may be enclosed within a clause or complex, such as in the following example, where the enclosed clause is indicated within angle brackets:

Arthur, <<who respected his brother in every way, >> drew up also.

2.2.3 Systems of textual meanings

In addition to ideational meanings, textual meanings are also critical in regard to the development of writing in the school subject areas. The two textual systems of Periodicity and Theme and Rheme are therefore described below.

2.2.3.1 Periodicity and internal Conjunction

Periodicity is concerned with the management of information flow in a text, in terms of the packaging of information in waves of meanings (Martin & Rose 2007). Some texts unfold with a simple serial expansion, in which small waves of information simply follow in a sequence. Periodic organisation, on the other hand, involves a hierarchical structure of waves of information across the text, or part of the text, with the waves signposted in some way (Martin & Rose 2007). The largest of these waves can be the whole text, signposted by a predictive macroTheme deployed at the opening, which looks forward and previews the whole text. In tandem with the macroTheme may be a closing macroNew which looks back to the text and distils or consolidates the meanings that have been presented, often bringing some additional insight. In this way the text unfolds as a unified wave of information, signposted at the beginning and end (Martin & Rose 2007).

Similarly, smaller waves of information may occur within the larger, overarching wave of the whole text, in the phases of the text (Martin & Rose 2007). Here the signposting

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elements are the hyperTheme and hyperNew. A hyperTheme is commonly understood as the 'topic sentence' of a paragraph. This then creates a hierarchical organisation.

Such advanced information flow management is a feature of rhetorical, abstract discourse (Martin & Rose 2007). Periodic structure is illustrated in a simple example seen in a text from Ellie's Year 8 English writing relating to a literary work; this is an early attempt and so is limited, but the key resources are evident. The text begins with the macroTheme:

> *Throughout A Tale of Two Cities, there are different themes of resurrection.*

Following this opening, the discussion unfolds in three stages, each explaining one theme of resurrection in the novel. The first stage is marked with a hyperTheme commencement and a hyperNew closing as follows:

> *The very first resurrection example happens early on in the book…*

> *This resurrection is only one of the many that followed. It is the first significant resurrection in the book.*

The two succeeding stages are similarly organised. The whole text then closes with an attempted macroNew, completing the unified, hierarchical organisation of the text:

> *To conclude, we see that the thread of resurrection runs through the book.*

Supporting the system of Periodicity is the logical system of internal Conjunction, which relates to the internal organisation of a text as noted in Section 2.2.2.2. Internal Conjunction is typically demanded by rhetorically organized texts, such as in the use of *to conclude* in the example above, which signals the macroNew.

Table 2-9 presents selected resources in Martin and Rose's (2007) framework for this type of Conjunction; some of these resources can also serve for external Conjunction.

Table 2-9. Conjunction (internal) resources (adapted from Martin & Rose 2007, p.141)

addition	*further, moreover, in addition, as well, besides, additionally*
	alternatively
	now, well, all right, okay
	anyway, anyhow, incidentally, by the way
comparison	*similarly, again*
	that is, for example, for instance
	in general, in particular, in short
	in fact, indeed, at least
	rather, by contrast, on the other hand
	conversely
time	*first, secondly, third, next, previously; finally, lastly*
	at the same time
	still
consequence	*therefore, thus, hence, accordingly; in conclusion, consequently,* (spoken*: so*)
	after all; anyway, anyhow, in any case, at any rate
	admittedly, of course, needless to say, (spoken*: but*)
	but, however, nevertheless, nonetheless, still

2.2.3.2   Theme and Rheme

The textual system of Theme and Rheme is concerned with the organisation of information flow within the clause, construing the clause as a message (Halliday & Matthiessen 2004). The Theme is the 'point of departure of the message' (Halliday & Matthiessen 2004, p.64), comprising all the elements up to and including the first ideational element in the clause. This ideational element is the topical Theme, and two further Theme elements may appear simultaneously, preceding the topical Theme: a textual element, for example a conjunction, as a textual Theme, or an interpersonal element, for example a vocative, as an interpersonal Theme (Halliday & Matthiessen 2004). Following the Theme, the remainder of the clause comprises the Rheme.   .

Options for topical Themes include the most common, thus unmarked, default choice of the Subject, which is the element that would be identified by a question tag, or alternatively a marked choice of a different ideational element (Halliday & Matthiessen 2004). Among more diverse options, a clause can act as Theme to another clause in a clause complex, and Theme predication and postposition of Subjects through the use of 'It' involve organisation of the clause to delay the introduction of new information (Halliday &

Matthiessen 2004). Selected options for types of Theme choice are illustrated in Table 2-10.

Table 2-10. Theme: examples

topical Theme (unmarked)	*Crassus* was the richest man in Rome.
textual Theme + topical Theme (unmarked)	*…but Caesar* did not bow to their will.
topical Theme (marked)	*After some ten years* Crassus was slain…
clause as Theme in clause complex	*When Caesar crossed the River Rubicon*, his fate was decided.
predicated Theme	*It was only the final stroke…* that forced Hannibal out of Italy…
postposed Subject	*It was then* that I realised she was not coming with us.

Theme choices, and the progression of Themes through a text, contribute significantly to the flow of the information in the text (Butt et al. 2012; Halliday & Matthiessen 2004). The deployment of marked Themes foregrounds selected meanings, often at key points in the text. For thematic progression, options include the simple repetition of the same subject Themes in a linear pattern, or the picking up of meanings from the Rhemes into the Themes in a zigzag fashion (Halliday & Matthiessen 2004). Related to the system of Theme and Rheme is the system of Information, comprising Given and New, so that within each clause the Theme typically equates with Given information that is already provided in the text, and the Rheme is understood as New information, though variation is possible (Halliday & Matthiessen 2004).

In dealing with textual information flow, the system of Theme is related to the larger picture of information management at the discourse level seen in Periodicity (Martin & Rose 2007). Theme and Rheme realise the smallest 'wave' of information in the text, and therefore the choices relating to these resources impact the overall flow of meaning.

2.2.4 Language development, cognition and learning

SFL links language and language development to cognition and learning. This aspect of the theoretical framework is particularly important in educational linguistics, given that the

purpose of school is teaching and learning and a prime motivation in research and pedagogy is to understand and support successful learning.

The development of language from infancy is understood as learning how to mean (Halliday 1975b, 1978, 1998a), on the basis that language is understood as a resource for making meanings in social context. A child is understood as a social semiotic being, who learns how to mean in social contexts where meanings are co-constructed and exchanged (Halliday 1978). At first this occurs in the immediate social context of the caregivers in the home, where language function and form are modelled in everyday situations such as conversations at mealtimes and during outings. Later this shared meaning-making is extended to a wider social circle and then to schooling (Halliday 1975c). As social demands expand, the child develops language resources to meet these demands, with every new phase of development arising in response to functional semiotic needs in social interaction.

The development of language is thus explained as the expanding realization of meaning potential, witnessed in the development of language resources. This includes both the addition of new language resources, and new ways of deploying existing resources. Painter (1985, p.44, 80) defines and describes language development as follows:

> … a process of developing resources for expressing meanings, and learning to deploy those resources in an appropriate way… (p. 44)

> …language develops as new options for meaning, as new grammatical realisations of existing options, as new configurations of options and as a new contextual deployment of existing options. (p. 80)

Painter's reference to language resources here is understood in functional terms in accordance with the SFL model. Through such development of new resources, the individual expands their language 'repertoire' from the 'culture's reservoir of potential

meanings', which is the entire meaning potential of the whole language system, the sum and potential of all the 'repertoires' within the community (Bernstein 2000, p.158; Martin & Rose 2013, p.26).

This understanding of language as a 'social phenomenon learned in interaction' (Painter 1985, p.7) differs from perspectives with an individual orientation (Halliday 1980; Painter 1999). The ontogenesis of language is not viewed as innate, arising internally from the child through an endowed universal grammar, as in formalist Chomskyan perspectives, nor as the result of universal, biological stages of development as in a Piagetian approach (McDevitt et al. 2019; Painter 1999). Language is not seen as a pre-existing commodity to be possessed or acquired, nor or as a conduit for expressing developing cognition, so that the SFL view differs also from behaviourist and psycholinguistic approaches. Rather, it aligns more closely with Vygotsky's (1986) notion of the social nature of the ontogenesis of speech.

Through the focus on meaning, development of language is linked to cognition, as SFL adopts a linguistic explanation of cognition:

> Instead of explaining language by reference to cognitive processes, we explain cognition by reference to linguistic processes. (Halliday & Matthiessen 1999, p. x).

The concern is not with psychological processes, but with meaning-making via semiotic systems, in particular the system of language, so that language is placed at the centre of consideration about cognition. Language development equates to expansion of meaning and therefore of cognition. It is through language, as meanings are constructed and internalised, that cognition develops; language precedes thought; language is a 'resource for thinking' (Painter 1996). The critical notion is the linguistic construct of meaning, so that language is not separated from thinking and understanding. In this way, the SFL

approach to cognition is different from, though complementary to, psychological approaches.

Accordingly, SFL proposes a language-based theory of learning, a theory of learning in which language is central (e.g. Halliday 1980, 1993b, 1999; Painter 1996, 1999). Learning is understood in terms of meaning-making. Macken-Horarik (1996, p.233) defines learning as 'an ability to access and utilise a new meaning potential'. Meanings are construed in language, so that the expansion of language equates with the expansion of meanings, or learning:

> When children learn language, they are not simply engaging in one kind of learning among many; rather they are learning the foundation of learning itself. The distinctive characteristic of human learning is that it is a process of meaning making – a semiotic process; and the prototypical form of human semiotic is language. Hence the ontogenesis of language is at the same time the ontogenesis of learning (Halliday 1993b, p. 327).

Painter (1996, p.80) refers to a 'symbiotic' relationship' between learning language and learning through language, and describes learning as a 'linguistic process' (Painter 1999, p.76). 'Learning language, learning through language and learning about language' are understood as effectively being elements of a single process (Halliday 1980).

Since what is learnt is meaning, 'knowledge' is also understood as meaning (Halliday & Matthiessen 1999). In the educational context, two general kinds of knowledge are understood: 'commonsense' and 'uncommonsense' or educational knowledge (Halliday 1994, 1999). 'Commonsense' knowledge comprises the meanings that are a part of everyday life and are learned in daily social interaction; they are constructed predominantly in language, typically in the child's community of experience (Halliday 1999). Educational, or 'uncommonsense', knowledge consists of the organised sets of meanings that belong to specialised, technical and institutionalised aspects of the culture,

such as science, law and history, and as such is taught in institutionalised settings including schooling. This type of knowledge depends for its construction on language (Halliday 1988). In other words, most of the time, 'knowledge is not something that is encoded in language – knowledge is made of language' (Halliday 1988, p. 347).

From this vantage point, as school is a social intervention designed to promote learning in the child, it is necessarily also an intervention in children's language development, as the school takes the child beyond the common sense of daily life in their community setting to focus on new ways of meaning in relation to 'uncommonsense' learning, through language (Halliday 1980).

The SFL view of learning outlined here has been derived from and given support by empirical studies of the ontogenesis of language in early childhood (Halliday 1975b; Painter 1985, 1999; Tor, cited in Halliday 1993b). These studies tracked language development over extended periods of time and recorded in detail the changes in meaning potential that contributed to learning and how those changes occurred. For example, Halliday (1993b, p.340), in his case study of Nigel, illustrated the child's development of hypothetical meanings through the use of warnings and threats (*'if'*) and of abstract meanings in the interpersonal context through utterances such as '*that's not fair'*; Painter (1999, p.85) demonstrated how a young child developed meanings of naming and categorising through discussing how things are 'called'.

As is evident from the approach outlined here, a language-based theory of cognition and learning has direct implications for education, relating to the language contexts and demands of educational learning, the relevance of social experience of language to the developmental directions of individuals students' meaning-making, and the processes and visibility of learning.

This thesis aims to demonstrate these theoretical notions of meaning and learning in relation to Ellie's classroom writing. Through the use of the meaning-based SFL analysis, Ellie's language development and its relationship to school learning were examined. The study was set in the context of the SFL educational research described in the following section.

2.3   SFL research in writing development in the school years

SFL research related to the development of written language in the school years has been extensive in many parts of the world, but particularly in Australia where the research and pedagogic interest first developed. As more broadly in SFL, theory has been combined with practice and expanded through action research (Christie 2008). In this 'appliable' approach, the research has adopted a dialectic and interventionist approach, being significantly motivated by concerns for transparency and equity (Christie 2012; Schleppegrell 2004; Veel 2006).

Three different strands can be seen in this research. Two of these, Halliday's general model of language development, and a view of development as seen in the language demands of schooling, form a background to the third, which comprises the empirical studies of student experience of development. All three are described below.

2.3.1   A general linguistic view of language development

In a broad view of language development, Halliday has proposed a 'three-step model of human semiotic development' (Halliday 1993b, p.349), describing the key steps in the ontogenesis of language that follow the child's entry to the mother tongue. The three steps are three key semantic movements in the child's language development: from generalisation to abstraction and on to metaphorisation (Halliday 1993b, 1994). These are

understood as significant qualitative changes in meaning-making, not simply the addition of more resources.

The first step, generalisation, is the capacity to make meanings realising general categories, and is key to entering the adult language (Halliday 1993b). The second is the capacity for abstraction, beginning around four to five years of age, which is essential for literacy and therefore for school entry (Halliday 1993b). In beginning literacy, the child must deal with the abstraction of language itself, including the use of language to talk about language and the abstract symbols of written text (Halliday 1993b).

The third semiotic step, metaphorisation, is necessary for the learning of the disciplines in secondary school, being an essential, pervasive feature of the institutionalised knowledge-building in these fields (Derewianka 1995; Halliday 1993a, 1993b). In grammatical metaphor, introduced earlier in Section 2.2.2.1 in relation to entities, but not limited to entities, the reconstrual of experience in new categories and relationships is far removed from 'commonsense' experience and thus the most difficult move in the pathway (Halliday 1999). The development of meaning in the pathway is distinctly linguistic but is linked to the 'maturational principles' of the culturally normative organisation of schooling (Halliday 1994, p.377). In describing language development in terms of a 'semiotic pathway', with key steps described as occurring at approximate age points, Halliday avoids debates about specific 'stages' of development.

In the three steps of this 'semiotic pathway', the ontogenesis of language in the child parallels the phylogenesis of language in society, with grammatical metaphor understood as a historically recent evolution of language resources, initially arising to support the construction of scientific knowledge (Halliday 1999; Martin 1998).

Hasan (1996b) points out that successful progression through this full semiotic pathway requires specific forms of mediation. Both concrete and abstract meanings, in the human

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'higher consciousness' or 'higher mental functioning' that derives from the meaning potential of the stratified grammar, are developed in social context through language use, or Vygotsky's 'semiotic mediation'; however, they require different kinds of mediation:

> … the more highly valued 'abstract categorical thinking' cannot be attributed to 'semiotic mediation' *per se*; rather its emergence must be attributed to *particular forms of* 'semiotic mediation'… (Hasan 1996b, p. 162).

Social contexts and experiences are understood to differentially provide such mediation, creating unequal access to the semiotic pathway (Hasan 1996b).

While Halliday highlights the key semantic steps of language development as critical elements, he also makes it clear that these are not the only changes that occur (Halliday1994).

2.3.2 A curriculum-based view of writing development

The second strand of research in language development during school has been focused on identifying and making visible the specific language demands of schooling. Language development is understood to occur in response to expanding demands in social context; in schooling, these are the changing demands of the school subjects (Christie & Derewianka 2008). The sequence of demands in these requirements therefore delineates the developmental trajectory needed for successful educational outcomes.

In this extensive literature, Halliday's three key semiotic moves are highlighted, but other language elements are included. The perspective is distinctly education-oriented, locating grammatical or discourse resources within writing tasks in the different learning areas where they are to be functionally deployed.

A key starting point in this endeavour has been genre, or text type. SFL theorisation of genre arose in the educational context, in the 1980s interventionist work of Martin, Rothery and others investigating student writing in Australian primary school classrooms,

where students' written language was initially found to be limited and repetitive (eds Cope & Kalantzis 1993; Martin 2009; Rothery 1996; Veel 2006). Genre, understood as the social purpose of the text, was used as a way to define and describe what students needed to write to facilitate support for their writing progress (eds Cope & Kalantzis 1993; Rothery 1996; Veel 2006).

Central to this approach therefore has been the identification and description of different types of texts that are generally valued and expected to be written in schooling, including their specific characteristic language resources at all levels. According to Veel (2006, p. 77), the initial focus related to primary school and was on the 'foundation genres', 'recount, narrative, report, explanation and exposition'. The text types of secondary school, in contrast, were found to foreground disciplinary differences, as the distinctive discourse of each institutional discipline was recontextualized in the educational setting for the purpose of apprenticing students into those field (eds Christie & Martin 1997). Many scholars have since detailed descriptions of types of text typically written in the classroom, such as narratives and response genres in English, historical accounts and factorial explanations in subject history, and descriptive, classifying and compositional reports and sequential explanations in science (e.g. Christie 2002; Christie & Derewianka 2008; Christie & Dreyfus 2007; Derewianka & Jones 2012; Martin & Rose 2008; Rothery 1996; Wignell 1998). Closely related to this work has been the exploration of the characteristic language resources of knowledge-building in each discipline.

From the perspective of genre, development is understood in the progression of learners from the more 'commonsense' text types to those that are more abstract and specialised; in general, this involves moving from personal and story genres towards explanation and argumentation, and from chronologically organised to rhetorically organized texts. The new demands of each type give students the opportunity to incrementally build control of language resources in graduated steps, building on what has gone before. In this way, such

a progression forms a cline of difficulty through the school years, a 'learner pathway' in a gradual apprenticeship into the meanings and language practices of the discipline, or a 'stairway of recontextualisation' from mundane meanings to the more academic (Martin & Rose 2008, p.131). Coffin (1997) identified such a topology of history genres, and Veel (1997) of science texts. Christie and Derewianka (2008) outline specific progressions for school English as well as history and science, indicating the higher demands of interpretive genres in all three areas. Further discussion of this research as relevant to school history and science is presented in Section 2.4.

Alongside the focus on genre, some scholars have highlighted the distinctive features of educational language in more general terms, particularly in contrast to the language of everyday life. Education requires information related to the complex, technical, specialised and abstract knowledge of the disciplines to be presented, in an authoritative manner with the institutionalised tenor of more cautious personal expression in consideration of audience, and with standard conventions of crafted, organised monologic texts in the written mode (Fang, Schleppegrell & Cox 2006; Schleppegrell 2001, 2004). In this approach, the functionality of such language for the purposes of education is stressed, and the valued features identified, such as specific, technical and elaborated noun phrases and nominalisation, non-pronominal subjects, clause linking and hierarchical text organisation.

The descriptions of school language demands in this literature present a guide to what success in writing looks like at each point in the curriculum. Like Halliday's semiotic pathway, this is an ideal pathway, and may not be the experience of individual students.

A point of interest mentioned by Schleppegrell and Christie (2018) that moves beyond the task focus of this curriculum perspective is the goal of developing flexibility in language to enhance social options after the completion of schooling. This point does not appear to be well developed in the SFL literature, with the focus being on clarifying schooling demands

in very specific terms as related to success in the learning areas. The notion of flexibility as an indicator of writing proficiency has been mooted elsewhere in the literature, in relation to a writer's ability to create high quality texts of different kinds in context (Allen, Likens & McNamara 2018; Ferretti & Graham 2019).

2.3.3   Empirical evidence of writing development

The third strand of the developmental literature comprises the studies that have presented empirical evidence of authentic student writing development during the school years. In a case study, Derewianka (1995) reported a longitudinal study of an individual student's development of grammatical metaphor in written work from age 5 to 14, tracing changes in the emergence of different kinds of metaphor and their use. This study supported the theoretical description of the third phase of the semiotic pathway.

A seminal study has been that of Christie and Derewianka (2008), reprised to some extent also in later work by Christie (2010, 2012). Christie and Derewianka (2008) reported a comprehensive study mapping the development of written language in authentic classroom texts across the school years, from age 6 to 18, in the curriculum areas of subject English, history and science. The study was based on a broad database numbering hundreds of texts. A sequence of illustrative student texts of various types was presented to demonstrate the ontogenesis of language through a progression of genres in each learning area, and key language resources indicative of development identified, including expanded nominal expressions, increased abstraction, grammatical metaphor and technical lexis, expanded variety of clauses, increased lexical density (being the number of lexical as opposed to grammatical items per clause) and improved cohesion and management of information flow in clauses and texts (Christie & Derewianka 2008).

Encompassing these details, an overall trajectory was proposed of four sequential phases through the school years, along with the key challenges of language in each (Christie &

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Derewianka 2008). The four phases were identified as follows. The first phase is the beginning of schooling in early childhood, ages 6 to 8, where 'commonsense' knowledge is still prominent, and the learning of literacy is the challenge; the abstraction of using written language is encountered here. 'Commonsense' knowledge is realised in a congruent grammar. In the second phase from approximately age 9 to early adolescence, there is some expansion of new resources as the curriculum begins to move away from everyday into educational meanings, with requisite shifts in language, including grammatical metaphor, particularly in the entry into early secondary disciplinary learning. This time is recognised as a challenge, when many students struggle to maintain the required development. The third phase, in mid-adolescence is marked by a significant increase in 'uncommonsense' knowledge, with extensive abstraction. In the final phase, schooling requires the full range of genres in theoretical knowledge and interpretation across disciplines, including metaphorisation, generalisation, abstraction and technicality, as 'uncommonsense' knowledge is realised non-congruently. Through the four phases, interpersonal meanings expand and become more focused. The general shift in this movement is described as being from more 'spoken' to more 'written' language (Christie & Derewianka 2008).

Christie (2010, 2012) presents this pathway with a greater focus on the four-stage chronology rather than the disciplinary differences. The proposed development shows similarity to the findings of other linguistic approaches, but with a more expanded analysis, as the focus here is on meaning (Schleppegrell & Christie 2018). The direction of Halliday's semiotic pathway is evident within this progression.

While the findings of Christie and Derewianka (2008) were based on authentic student writing, the focus, in their aim to expand the understanding of writing development, remained to a large extent oriented to the progressive demands made in the school context and their achievement. Texts written by diverse students were reviewed, with the intention

to 'benchmark' successful written language at each step (Christie & Derewianka 2008, p.6). Given this goal, the reviewed texts were selected on the basis of teacher evaluation in relation to successful qualities in the writing. Consequently, the exemplars presented in the published work were predominantly illustrative of the ideal pathway, somewhat as an extension of the curriculum-based research noted in the preceding section.

Since 2008, smaller empirical studies of writing development in schooling have expanded or added more detail to the trajectory described above. Some have their focus on describing student writing in ways that support or expand that trajectory. For example, Lewis (2014) examined the development of experiential elements in the clause and found that they varied according to genre. Macken-Horarik and Morgan (2011) identified resources deployed to realise voice and stance in a curriculum area of senior literature study, showing how the study topic may have encouraged that development. Macken-Horarik and Sandiford (2016) explored highly rated student texts to develop a scale of accomplishment for evaluating narratives. Thomas (2014) and Thomas, Thomas and Moltow (2015) examined students' persuasive writing to offer further description of valued language in this genre. Thomas and To (2016) examined highly assessed persuasive texts written in primary and secondary school to illustrate the successful use of nominalisation, or grammatical metaphor. Fang (2014), explicitly aiming to expand on the findings of Christie and Derewianka (2008), examined report writing in pre-adolescent students, and suggested that the evident inconsistencies in development may have resulted from inadequate understanding of the genre.

In slightly different approaches, other researchers have evaluated student texts with a view to exploring pedagogical needs or interventions. For example, Brisk and De Rosa (2014) investigated development of logico-semantic relations, which were found to be genre based, and more advanced where a wider range of text-types was taught. Sandiford and Macken-Horarik (2020) drew on writing development after intervention to explore growth-

oriented pedagogy for narrative writing. Seah, Clarke and Hart (2011, 2014, 2015) examined the language in Year 7 science writing to identify points of difficulty for the purpose of pedagogy. Hodgson-Drysdale (2014) reported improvement in student's development of science language following explicit teaching. While the general direction of this research has often referred back to curriculum-based expectations, some information has been offered about different points of written language development in specific cohorts, though these findings have been limited by the scale and number of the studies.

In the rich range of the SFL research introduced above, therefore, written language development during schooling has been primarily focused on a curriculum perspective in the delineation of a pathway of required linguistic resources. Additionally, the general pattern has been the use of data from groups of students, so that the specific trajectories of individual students are not seen. Consequently, empirical evidence of individual experience has been limited, and a gap therefore remains with regard to continuous, sequential individual development over extended years of schooling. The need for such studies has been noted (Painter 2017; Weekes & Jones 2021).

Individual studies can offer information about not only the content, but also the continuity of the development, as seen in the work of Derewianka (1995). Individual case studies undertaken in early childhood language development (Halliday 1975b; Painter 1985, 1999; Oldenburg-Torr, cited in Halliday 1993b) illuminated not only the changes that occurred, but also strategies through which the changes occurred, as strategies for learning language, and for learning through language as new meanings were developed. These included the following: semiotic strategies based on interpersonal interaction; generalisation; definition; related paradigmatic choices; comparison, contrast and classifying; refining meanings for greater delicacy; filtering new options to accept manageable changes; deconstruction and reconstruction; and 'magic gateways' as points of entry to new meanings (Halliday 1975c,

1993b; Oldenburg 1990; Painter 1999). Individual studies therefore offer potential for new insights.

2.3.4 The present study

This study addressed the lack of information about individual experience by examining the developmental trajectory of one student. The first concern was to identify the changes that occurred, before evaluation with respect to a curriculum pathway. The intention was not to find exemplars of successful writing, but rather to explore the student's unique progression of language change, and then relate that to learning in the educational context.

In this study, the applied framework differed slightly from the existing research in the application of the adapted SFL model, particularly the discourse semantic stratum. This was not a substantial difference in the content of the analysis, but a variation in structure. The inclusion of this stratum provided an organised way to integrate the relevant elements of language into a more unified framework.

2.4 The language of disciplinary knowledge

An understanding of the disciplinary discourses of history and of science, the two learning areas addressed in the study, is relevant for linking Ellie's development of written language to her educational learning.

Each discipline is understood to have its own forms of discourse, which have evolved as functional for building disciplinary knowledge, and these characteristic patterns of language choices are then recontextualised in education for the purpose of apprenticing students into the field (Martin & Rose 2008). The learner within the discipline must manage these language patterns to master the knowledge and display their learning. While

the SFL research has addressed the wider discourse in each of these disciplines, the focus in the summary below is on the educational perspective.

2.4.1 The language of history

History is concerned with reconstructing, interpreting and evaluating past events. A sequence of text types that apprentice the learner into the discourse of history, beginning with the chronological recording genres of recounts and accounts, and progressing to explanation and argumentation, has been described by a number of scholars, including Coffin (1997, 2006a), Christie and Derewianka (2008), Matthiessen (2015) and Martin and Rose (2008).

These genres, their purpose and their generic staging in terms of the unfolding sequential elements of the text, are listed in Table 2-11, based on a synthesis of comparable descriptions from a number of SFL scholars.

Table 2-11. Genres of school history (based on Christie & Derewianka 2008; Coffin 1997, 2006a; Martin & Rose 2008)

GENRE	SOCIAL PURPOSE AND GENERIC STRUCTUE
CHRONOLOGICAL RECORDING	
Autobiographical/ personal recount	Record of events of personal experience Orientation ^ Record ^ (Reorientation)
Empathetic autobiography	Record of events in the life of a person in a historical context, written as imagined personal experience Orientation ^ Record ^ (Reorientation)
Biographical recount	Record of significant events in the life of a person of considered to have historical significance Person Identification ^ Episodes ^ Evaluation
Historical recount	Record of events considered to have historical significance Background ^ Account sequence ^ (Deduction)
Historical account	Record of events considered to have historical significance, including some causal linking Background ^ Account sequence ^ (Deduction)
DOCUMENTING	
Site study	Description of location considered to have historical significance Site identification ^ Site description
Period study	Description of period of time considered to have historical significance Period identification ^ Description
Site interpretation	Description of location considered to have historical significance, with assessment of that significance Site identification ^ Assessment of evidence ^ Conclusion
EXPLAINING	
Factorial explanation	Explanation of causal factors of some situation considered to have historical significance Outcome ^ Factors ^ (Reinforcement of factors)
Consequential explanation	Explanation of outcomes of some situation considered to have historical significance Input ^ Consequences ^ (Reinforcement of consequences)
ARGUING	
Exposition	Argument for an adopted position (Background) ^ Thesis ^ Arguments ^ Reinforcement of thesis
Discussion	Presentation and debate of alternative views, arriving at a conclusion Background) ^ Issue ^ Perspectives ^ Position

KEY: ^ represents 'followed by'; parentheses indicate optional stages

The recording genres focus on concrete events with a chronological unfolding; learning to construct history in this way is an essential foundation for the types of texts expected later in schooling. Among the recording genres, autobiographical recounts and empathetic autobiographies are concerned primarily with individual first-person participants, the former with serial time and the latter with episodic time. Empathetic autobiographies are

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texts in which the writer imaginatively recreates historical contexts. Their value is questioned by Coffin (2006a), who suggests that these tasks do not demand the type of language students must develop for their later history writing and therefore do not adequately support student progress. Biographical recounts focus on third person participants, and along with historical recounts and accounts also involve not only individual, but also more generalised, participants. Whilst all these texts focus on recording events chronologically, historical accounts also begin to introduce causation.

The term 'documenting' is adopted from Matthiessen (2015) to refer to three genres which present non-chronological descriptions: site and period studies and site interpretations. Following Matthiessen (2015), and as also noted by Christie and Derewianka (2008), these texts can be considered as somewhat similar to reports in science. Site studies present descriptions of historical sites whilst period studies document events and habitual human activities of a period of history. Site interpretations move beyond pure description to assess the historical significance of a site, so they are to some extent explanatory.

Explanations, both factorial and consequential, focus on causality related to the events of history (Coffin 2006a). The argument genres, exposition and discussion, assert the importance of interpretation and interpretive stance within the discipline (Coffin 2006a). These present reasoning for a position, or a conclusion drawn from more than one position, respectively.

The sequence of these genres as listed above creates a learner pathway, as noted above in Section 2.3.2, from everyday, 'commonsense' knowledge to increasingly abstract meanings of history. Chronological texts that recount personal experience are closest to the student's own experience. Moving gradually further away from that experience are the genres of documenting, explaining and then contesting interpretations of those events, in texts that are organised rhetorically rather than chronologically, with increased emphasis

on abstract reasoning. Accordingly, each new genre in the sequence demands new language resources in a cumulative progression of linguistic change (Coffin 2006a; Martin & Rose 2008; Matthiessen 2015). Table 2-12 displays the specific changes in kinds of meaning through the sequence.

Table 2-12. Genres of school history: learning progression (based on Christie & Derewianka 2008; Coffin 1997, 2006a; Martin & Rose 2008)

GENRE	NEW MEANINGS		
	Participants	**Causation**	**Text organisation**
Personal recount	1st (+ 3rd) person; specific participants	(not in focus)	chronological: external time -serial
Empathetic Autobiography			↓ chronological: external time - episodic
Biographical recount	↓ 3rd person specific and other generic participants		
Historical recount	↓ mainly generic, also specific important individuals		
Historical account	↓ mainly generic/nominalized	↓ External cause	
Site study Period study Site interpretation			↓ internal organisation
Factorial explanation Consequential explanation			
Exposition Discussion		↓ internal cause	

Wignell (1998) clarifies the development of abstract meanings in history as moving from specific instances in time and space to generic groups of people in general activities, to events reconstrued as abstract entities, and finally to interpretive abstract reasoning. Grammatical metaphor, most often non-technical, is a central resource realising abstraction in historical discourse, for generalisation, as well as for construal of entities for elaboration, interpretation and reasoning (Coffin 1997; Martin 1993b).

In the building of historical knowledge, temporality and causality are key meanings. In relation to the importance of time, Coffin (2006a) identifies historically valued ways of representing time according to cultural constructs such as linearity, the cyclical nature of time, and chronology, including sequencing, segmenting time into periods, setting, duration and phasing of time. Grammatically, time is realised explicitly in a range of resources including processes, temporal Circumstances and temporal conjunctions, and through metaphorisation; it is often foregrounded via the textual resources of Theme and Periodicity (Coffin 2006a, 2006b).

In the construal of causality, Coffin (2004, 2006a) distinguishes between simple linear cause and effect and complex webs of interconnected causes that influence events. Conjunctions and processes may be adequate to realise simple causality, but the construal of more complex relations and causal reasoning depends on making links across texts, requiring use of an expanded range of conjunctive expressions, for example internal Conjunction and abstract nouns of cause, such as *reason, factor* and *outcome*. The latter may, for the purposes of analysis and reasoning, be modified (e.g. *one major effect*), set into relationships with other events (e.g. *the first reason*), and also deployed in more flexible ways in a text, such as in Theme position (Coffin 2006a).

Coffin (1997, 2006a) also explains in detail the use of interpersonal language resources of evaluation in explanation and argument in history to indicate different interpretations of past events, again drawing on the use of abstraction and grammatical metaphor.

In sum, these language resources are essential in the making of meanings in history, including in the school context.

2.4.2   The language of science

Science is concerned with observing and interpreting the natural world, in identifying, naming, describing, organising and categorising natural phenomena as well as explaining

them. Key SFL research on the language of science was undertaken initially by Halliday and then by others with a particular focus on science in schooling (e.g. Halliday1998b; Halliday and Martin 1993, Unsworth 2005; Veel 1997). In relation to education, Veel (1997) provided a clear classification of four general kinds of texts written in school science: those that are concerned with 'doing science', 'organising scientific information' in reports, 'explaining events scientifically' and 'challenging science'. Christie and Derewianka (2008) and Martin and Rose (2008) have further elaborated these categories. The genres of science relevant to this study are listed below in Table 2-13 according to their descriptions in that literature.

Table 2-13. Genres of school science (based on Christie & Derewianka 2008, Martin & Rose 2008)

GENRE	SOCIAL PURPOSE AND GENERIC STRUCTUE
EXPERIMENTING / INVESTIGATING	
Procedural recount	Record of a science experiment, including its aim, materials used, activities and conclusion
	Aim ^ Record of events ^ Conclusion
Demonstration	Description of a science experiment, including the purpose and reinforcing the scientific concepts in focus
	Introduction ^ Demonstration record ^ Discussion
REPORTING	
Descriptive report	Description of natural phenomena
Classifying report	General statement ^ Description ^ (References)
Compositional report	
EXPLAINING	
Sequential explanation	Explanation of natural phenomena – how and why they occur
Causal explanation	Phenomenon identification ^ Explanation
Factorial explanation	
ARGUING	
Exposition	Argument for an adopted position
	(Background) ^ Thesis ^ Arguments ^ Reinforcement of thesis
Discussion	Argument/debate related to scientific phenomena
	Issue ^ Arguments ^ Recommendations
KEY: ^ represents 'followed by'; parentheses indicate optional stages	

The experimental or investigative genres, concerned with 'doing' science, record temporally organised science-oriented activities and their outcomes. Reports organise

scientific information in entity-based descriptions of natural phenomena, and may be descriptive, compositional or classifying (taxonomic). Explanations are temporal sequences of activities that are related by cause and effect; they may be realised in 'implication sequences', described in Section 2.2.2.2 above. The arguing genres, concerned with 'challenging science', include exposition and discussion, both of which present and support positions in rhetorically organised texts. Expositions in science are similar in generic structure to those in history, though the nature of the arguments is different; the unfolding of discussions is distinctive (Christie & Derewianka 2008).

In terms of a learner pathway, Christie and Derewianka (2008) note a tendency in schools for procedural recounts and reports to appear earlier than the other types. Reports can become more advanced over the years (Christie & Derewianka 2008). Veel (1997) explains a progression through explanations from sequential to causal, to factorial, to theoretical explanations. Across the years, students move from concrete to more abstract meanings, reaching advanced purposes of scientific discussion and argumentation in the later years (Christie & Derewianka 2008).

With regard to specific language resources, Martin (1993a) explains that the distinctive feature of scientific language is technicality, the specialized lexis that enables scientific entities to be classified and built into taxonomies in order to construct scientific knowledge. In this way, science knowledge is vertically, or hierarchically, structured in that it is organized in explicit meanings that are systematically built upon prior knowledge (Bernstein 2000). Through technicality, knowledge is condensed, in the sense that technical terms are understood on the basis of the constructed field knowledge underlying them (Halliday 1998b). Definition of technical terms is heavily dependent on clauses of the identifying type, making this another characteristic feature of science discourse (Wignell 1998).

Grammatical metaphor has also been highlighted as a definitive and prevalent feature of meaning-making in science (Halliday 1998b; Unsworth 2005). Via the reconstrual of events or qualities as entities, grammatical metaphor enables an 'objectification' of the world in science that creates new ways of thinking about natural phenomena, incongruent with everyday experience (Halliday 1998b). Metaphorisation impacts science meanings in a number of ways.

Firstly, in terms of ideational meanings, grammatical metaphor provides the basis for technicalisation of actions, events and qualities, transforming clauses into entities and thus allowing the taxonomising that is functional for building scientific knowledge. For example, Unsworth (2005, p.251) gives the example of the technicalisation of 'weathering':

> *The production of rock waste by mechanical processes and chemical changes <u>is called</u>*
> ***weathering***.

Also in relation to ideational meanings, metaphorisation allows meanings to be expanded and compacted efficiently in the noun group, through elaboration (e.g. *glass crack growth rate)* (Halliday 1993a); and expansion (e.g. '*production of rock waste by mechanical processes and chemical changes'* in the example above*).* By this means, multiple steps in a sequence can be compressed into a single nominal expression or a single clause, creating a high density of information that is heavily oriented to nouns (Halliday 1998b; Martin 1993a). Such entities are frequently related to one another as Participants in relational Processes (Halliday 1998b).

Secondly, grammatical metaphor offers expanded ways of reasoning about science through textual organisation (Halliday 1998b). For instance, Wignell (1998, p. 301) illustrates the use of a summarising nominal expression concluding a paragraph explaining processes of air quality:

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This type of temperature change which results from internal processes alone is called adiabatic change.

The summarising term is then available for the continuation of the explanation. Metaphoric entities can also be foregrounded through thematisation, as the starting point of the clause, sentence or paragraph to introduce new information, and can be placed in relationship with one another in various ways in clauses. These are useful textual strategies for organizing the presentation of explanations and interpretations in science. The multiple benefits of grammatical metaphor form the basis of its importance in construing disciplinary knowledge and hence also in Halliday's semiotic pathway noted above in Section 2.3.1.

In addition to technicality and grammatical metaphor, other features of science discourse have been identified. Wignell (1998) highlights the significance of the construal of causality in explanatory texts. Christie and Cléirigh (2008) note the use of 'showing' verbs (e.g. *The experiment shows…, demonstrates)* for reflection on natural phenomena. While the importance of other semiotic modes of meaning is recognised as a significant component of science discourse (Martin & Rose 2008), these are not addressed in this study.

This summary of language patterns in history and science discourse serves to provide the disciplinary context for the discussion in Chapter 5 that addresses the relationship between Ellie's trajectory of written language development and her learning of the educational knowledge within the school curriculum.

2.5   Educational context of the study: Steiner Education

The final context relevant to this study is the school in which Ellie created her written texts. This was a school associated with Steiner Education Australia (SEA), a body affiliated with the international Steiner Waldorf movement. Key relevant features of the

Steiner educational approach are described below; this information is drawn from documentation that is currently, or was previously, publicly available through the organisation's website (SEA 2021).

Schools associated with the Steiner organisation operate in Australia as accredited independent schools (SEA 2021). The Steiner curriculum has been recognised as an approved alternative framework alongside the Australian Curriculum (ACARA 2021a; SEA 2021). The student cohort at Ellie's school has in recent years ranked somewhat higher than average in the measure of Socio-Educational Advantage, but not to the extent seen in the schools with the highest fees (ACARA 2021b); these are recent figures but there is no reason to expect that they have changed significantly since the years of Ellie's education. Parental choice of independent schools outside the public system is usually deliberate, though not necessarily uniformly motivated.

The Steiner curriculum includes the conventional range of learning areas, but these are delivered within a distinctive philosophical approach (SEA 2011a). Key elements of this philosophy are its child development focus and integrated, holistic approach. Cognitive development is considered to be integrated with other areas of growth: social, emotional, aesthetic, spiritual and moral, as well as practical (SEA 2011a, 2011b). It is held that a child's intellectual progress depends on age-appropriate nurturing of all these areas throughout childhood, and the purpose of education is to foster individual development in all aspects.

The curriculum design and pedagogy are therefore developmentally targeted at all levels according to an understood pathway of three major developmental stages: 0 to7, 7 to14 and 14 to 21 years, overlapping the early years, primary and secondary school (SEA 2011a, 2011b). In the early years, imitation and experiential learning are emphasised, and in the primary grades, attention to feeling, aesthetics and narrative aims to engage the child

emotionally and imaginatively in academic learning and build the emotional and social development necessary for cognitive development (SEA. 2011a, 2011b). Secondary schooling then emphasises more rigorous academic learning, including abstract conceptual thinking and logical analysis where the student finds their own authentic 'voice' (SEA 2011a, 2011b).

The holistic philosophy is also reflected in the organisation of class activities. The daily class schedule is focused around the Main Lesson, which is a topic-based learning unit that may integrate elements from diverse learning areas (SEA 2011a). Such integration may, for example, involve the writing of science-related narratives alongside science learning. Each Main Lesson is studied over approximately three weeks, with other classroom work linked to and expanding on this content (SEA 2011a). Another feature of the approach is a phenomenological focus (SEA 2011a). Real experience, including daily life activities, creativity and contact with the natural environment, is a basis for learning.

Specific application of the philosophy in the learning area of history is the linking of the child development focus to the notion of human development over the course of history, with the pedagogy organised as follows:

> …a sequence of narrative history which moves from the home and family and local surroundings of the child to mythological and then episodic or biographical history before the conceptual, the study of cause and effect… (SEA 2014b).

This sequence shows some similarity to the notion of moving from 'commonsense' to 'uncommonsense' knowledge, and to the progression in history text types noted in the SFL research in Section 2.4.1 above.

The science curriculum is dominated by the phenomenological pedagogy, with the focus on experiential learning and first-hand observation, and some consideration of the historical development of scientific knowledge (SEA 2014c).

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Another element of interest in the Steiner perspective is its view of language as the 'basis for the development of thought' (SEA 2014a, p.3), so that the value of literacy is emphasised. Some explicit teaching of grammatical understanding is included in the curriculum, and teacher modelling plays a central role in early writing development, in the daily presentation of teacher-prepared texts that are introduced orally in the first instance and later form a basis for writing (SEA 2014a). The effect of such modelling in early writing was a factor in the selection of texts for this study, to avoid focus on texts that were not Ellie's original writing.

While this educational approach generally applies to Steiner-affiliated schools, it may be expected that local implementations could vary. Evidence for a relationship between the Ellie's writing development and her specific school context is explored in Chapter 5.

In the next chapter, the focus is on the design, process and framework for the analysis which flow from the model of language outlined.

CHAPTER 3   Methodology and Analytical Framework

3.1   The case study approach

This study was a qualitative, naturalistic case study, the examination of one specific individual's school writing experience. The limitations of a case study are acknowledged, particularly that the data are limited and are dependent on the localised characteristics and circumstances of the individual involved, and as a consequence the results are not generalisable (Duff 2008, Yin 2018). At the same time, there are distinct benefits from such a study linked to three aspects of the purpose of the research: individuality, experience and detail.

Firstly, the choice of a case study was appropriate to the aim of exploring individual data as distinct from group data. This fulfilled the aim of the research to address the lack of individual studies compared to the dominance of group studies in the field. While group studies may reveal trends and allow benchmarking of the valued achievement of successful individuals in the group, they provide only a generalized description that leaves invisible the differences in the unique trajectory of individual students. Individuals may progress along different paths to reach the same or different destinations, with distinctive successes and failures along the way. Understanding this unfolding development requires the unique, authentic, comprehensive and continuous data from the individual. Such data offer evidence of changes over time in the way that that individual instantiates the language system to make meaning across multiple, distinctive texts, responding to specific contexts. The individual case may then be compared with group data, educational benchmarks, and what is considered to be typical or 'normal', as well as the trajectories of other individuals, which may provide new insights relevant for educators and linguists, and new areas for further research which have not been noted in group studies.

Secondly, as the case study tracked authentic experience in context, it revealed the student writer's development per se, rather than idealized views of development. As an exploration of an individual's lived experience, a phenomenological study of human behaviour in a particular set of circumstances (Pollio et al., cited in Barnacle 2001), the case study used naturalistic, unelicited data from authentic, unforced contexts, not from experimental conditions. It showed what took place within specific given contexts. The findings of one person's real experience thus may also contribute to what is already known about written language development.

Finally, in limiting the focus to a single individual, it was possible to provide a description rich in detail, exploring multiple elements of the continuous writing trajectory. Halliday (1980) noted the value of cases studies in understanding the full scope of development of meaning-making. The method has been demonstrated to be productive in previous case studies in SFL for tracing individual development (e.g. Derewianka 1995; Halliday 1975; Painter 1999), as well as in applied linguistics more broadly (Duff 2008).

3.2   Data selection

The full set of available data for the study consisted of texts written by Ellie throughout her schooling. From this extensive collection of writing, it was necessary to limit the study to a selected portion of the data that would allow the research purpose to be achieved while fitting within the practical constraints of the study. Several steps were taken in this process.

Firstly, Year 6 was chosen as the starting point for the study, to avoid writing that may have been significantly influenced by the pedagogy of teacher modelling routinely used in the lower grades in Steiner schools. Year 12 was the natural end point for exploring the pathway to the end of schooling. This placed the focus of the study on middle to secondary school.

As a next step, an extensive familiarisation with the entire data set within those year levels was undertaken to gain a general understanding of the scope of the written texts. The full data set available for Years 6 to 12 consisted of 82 booklets and folders of Ellie's collated classroom writing, as shown in Table 3-1.

Table 3-1. Number of booklets and folders of Ellie's writing in the data set

	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12
English	5	5	3	2	2	5	4
History	1	2	2	1	1	1	1
Science	4	4	4	4	5	5	5
Other	2	0	2	3	1	4	3
TOTAL	12	11	11	10	9	16	13

Each booklet or folder contained Ellie's collected writing from one unit of learning in one curriculum area, either English, history, science, geography, art history, or mathematically oriented work that included some writing. Almost all were Main Lesson Books, each representing work from distinct units of approximately three weeks, as explained above in Section 2.5. The texts in each related to the learning area, though occasionally some slightly unusual framing of content was evident in accordance with the school's integrated approach, noted earlier in Section 2.5. Three items from Year 6, marked 'English', were notebooks of writing that included some drafts of the Main Lesson work for English, history, science and other subjects. The full set provided a comprehensive collection of Ellie's school writing, even though it was understood that some other writing outside the Main Lesson was likely not included here.

The texts within the booklets were handwritten in most years but often typed in Year 12. The number of texts in each set varied, as did the length of the individual texts, depending on the curriculum area and genre, but generally increased over the year levels. Most of the

Year 6 texts were brief, with some comprising only a few clauses; many of the Year 12 texts extended to multiple pages of typed script.

The booklets of writing almost invariably included some teacher responses to the texts, either as teacher comments added directly onto the text pages, or in the form of an assessment and feedback page inserted inside the back cover of the booklet, or both. In some cases, the assessment pages also included assessment grades and/or information about requirements of the unit and writing tasks. The teacher feedback noted in relation to Ellie's written work indicated that she was a successful student, with the standard of her achievement most often regarded highly in terms of the requirements of the school curriculum expectations; where there were weaknesses, these were noted in the comments.

Secondly, the writing in two learning areas, history and science, was selected to be the focus, on the basis that these are distinct fields of knowledge with recognized differences in language use, as noted in Chapter 2, Section 2.4. The data set offered a suitable quantity and scope of writing in these learning areas. The history writing was primarily found in the history units, which each typically focused on a single historical period, but some was found within booklets for the related learning areas of art history, Australian studies and geography. The writing about science was found within the science units, which were differentiated as either geology, astronomy, biology, physics or chemistry.

It was further planned that the analysis would consider writing at 2-year intervals, namely Years 6, 8, 10 and 12 (ages 12, 14, 16 and 18) to examine changes in language use, taking a cross-sectional view of the writing over those four age levels. A close review of the data revealed a small number of distinctive texts within Years 9 and 11 that needed to be included in a representative selection of the writing. These were seven history texts from Year 9 and one from Year 11, given that the history writing in Year 10 was slightly limited, as well as one distinctive science text from Year 9.

Only texts of continuous writing and direct relevance to the learning area were considered. Excluded therefore were texts that comprised discontinuous sentences or notes; creative pieces such as narratives and poems that reflected the integrated approach but did not directly relate to the learning topic; texts from diverse learning areas that contained some historical content but not as the primary focus; writing that was distinctly personal or related to philosophical matters; and texts that appeared to be compromised in originality through dependence on source material. The originality of texts was evaluated on the basis of their content, the linguistic consistency of the data, the teacher feedback on the writing, and some use of text matching through Turnitin.

From this filtering process, the final number of texts relevant to the study totaled 56 history texts and 266 for science, as shown on Table 3-2.

Table 3-2. Number of texts included in the study

	Year 6	Year 8	Year (9-)10	Year (11-)12	Total
History	11	21	16	8	56
Science	37	93	61	75	266

All texts were closely compared for similarities and differences in language features. A set of 32 representative texts was selected for the final comprehensive analysis and presentation in the thesis, comprising four from history and four from science at each of the four levels, Years 6, 8, (9)-10 and (11)-12, thus eight sets of four, or eight texts from each age level. These texts were selected as representing the significant characteristics of Ellie's writing as noted from the close comparison of all the texts, including detailed analysis of at least as many further samples in each category. All Year 6 texts were analysed in detail to ensure a well-defined starting point for the first age level of the study.

Copies of the 32 texts are provided in Appendices B and C. The framework for the linguistic analysis is mapped in the following section below.

3.3   Analytical framework

The analysis was conducted using elements of the theoretical framework introduced in Chapter 2, which allowed the tracking in the texts of language resources from the different systems within language. By this means, the changes from Ellie's earlier to later writing were identified, as evidence of the development in her written language.

The selected elements of the analytical framework are first identified below, and then explained. While an ideal analysis would have included all the systems within language as outlined in the SFL model, only a limited selection was practical for this project. The analysis therefore included context, and ideational and textual meanings at the discourse semantic and lexicogrammatical levels. The ideational systems of Ideation, Conjunction, transitivity and clause complexing, and the textual systems of Periodicity and Theme and Rheme were included. Table 3-3 lists these areas of analysis, in the order in which they are addressed in Chapters 4 and 5.

Table 3-3. Analytical framework for the study

Genre	1	Genre, or text type (context)
Field and ideational meanings	2	Field (context: register)
	3	Ideation: entities (discourse semantics)
	4	Ideation: activity sequence, plus Conjunction (discourse semantics)
	5	Transitivity (lexicogrammar)
	6	Clause complexing (lexicogrammar)
Mode and textual meanings:	7	Mode (context: register)
	8	Periodicity (discourse semantics)
	9	Theme and Rheme (lexicogrammar)

The relationship between the selected systems can be seen in the diagrammatic representation of the complete model in Figure 3-1, in which the included areas of analysis are underlined.
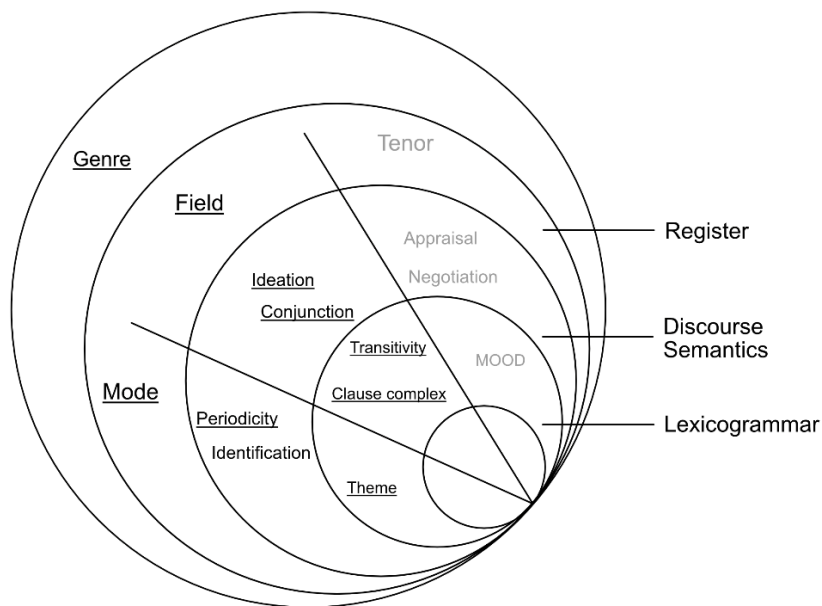
Figure 3-1. Analytical framework for the case study

The omission of the remaining textual system of Identification, as well as interpersonal and multimodal elements, does not suggest that they are not important. The inclusion of systems at both strata of language content reflected the intention for multi-level analysis, considering meanings across the whole text as well as meanings within the clause. While some other studies include elements at both levels, a structured combination in this manner across both ideational and textual meanings is not evident. For example, both levels are included by Humphrey (2013), but they are organised by ranked constituents rather than by the strata within the language model as here.

In the analysis, each system was considered separately, though the interconnectedness between them was evident. Language is modelled in SFL as a fully integrated system, in which all the metafunctions and systems are realized simultaneously within any text. Systems within strata redound with systems within other strata so that from the context down to language each level is realised at the next level below. The interrelationship across

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all these areas of meaning is less apparent when the focus is on only a few elements, but becomes more evident when many are being considered, particularly across different strata. Consequently, in applying the framework for this study, it was necessary to delineate clear criteria for each step of the analysis to ensure accuracy and consistency and avoid any distracting or repetitive overlap. Despite the element of restriction in this process, the separate system analyses combined productively to allow for a rich understanding of the texts.

The rationale for the selection of each component of the framework, and the criteria for each analysis, are explained below.

3.3.1 Genre

Analysis of genre was considered to be foundational for an understanding of each text, since the social purpose governs the language choices within any text, and so language choices can typically be expected to vary across different genres of writing. Sorting texts by type facilitated the grouping of similar texts for more efficient comparison within and across text types and across age levels to track linguistic change. This also located the study firmly within the educational context, as genre is a prevalent consideration in SFL educational linguistics and in pedagogy in Australian schools more broadly.

The identification of the specific type of text, followed by an analysis of generic structure, was the starting point for analysis. Each text was compared with the history and science genres prevalent in schooling, which have been described in Chapter 2, Section 2.4. Additional to those frameworks, two 'story'-type genres that normally appear in subject English were also included, the recount and the narrative, shown in Table 3-4 as described by Christie and Derewianka (2008).

Table 3-4. Two 'story' genres (based on Christie & Derewianka 2008)

GENRE	SOCIAL PURPOSE AND GENERIC STRUCTURE
Recount	Record of events Orientation ^ Record ^ (Reorientation)
Narrative	'Story' with a problem that arises, evaluation, and solution to the problem (Abstract) ^ Orientation ^ Complication^ Evaluation ^ Resolution ^ (Coda

KEY: ^ represents 'followed by'; parentheses indicate optional stages

A recount is a type of 'story' genre, in which the social purpose of the text is to record events. A recount may be autobiographical or written in the third person. A narrative is an alternative type of 'story' that involves a problem, or complication, followed by a resolution.

Categorisation of specific texts according to type is not always straightforward. While the genres listed above and in Chapter 2, Section 2.4, are common and typical, it is recognised that the purposes of texts exist on a cline, in that there are not simply a limited number of distinct types but rather a range of purposes in which these are culturally common points (Martin & Rose 2008). Consequently, some texts may fall between the defined types, sharing characteristics expected in different genres. In other instances, different social purposes may be mixed within a text, with different portions of the text appearing as different genres (Martin & Rose 2008). In this study, while it was expected that the conventional range of text types would be found in the data, it was also anticipated that the distinctive pedagogy of Ellie's school may have resulted in some more unusual types of writing. In dealing with such texts in the analysis, it was necessary to acknowledge the differences and accept the texts as they were written, considering each with reference to its purpose and characteristics in comparison to the closest genre type or types, recognising that some texts were not fully aligned with the listed descriptions.

Further support for the analysis of unusual texts was drawn from the broader, unifying framework of socio-semiotic purposes outlined by Matthiessen (2015), with its useful

linking to genres. This framework, adapted here to be more inclusive of the range of genres relevant to this study, is shown in Table 3-5.

Table 3-5. Genres in relation to socio-semiotic processes (adapted from Matthiessen 2015)

SOCIO-SEMIOTIC PROCESS (type)	SOCIO-SEMIOTIC PROCESS (sub-type)		GENRE (as more delicate subtype of socio-semiotic process)	
			history + 'story' genres	science
primarily semiotic	sharing	(sharing experiences, values)		
	recreating	(narrating, dramatizing)	Narratives	
	reporting	chronicling	Recounts Biography Historical account	Procedural recounts
		surveying		
		inventorying		
	expounding	explaining	Explanations	Explanations
		categorising ('documenting')	Site/Period study Site Interpretation	Reports
	exploring	arguing	Exposition Discussion	Exposition Discussion
	enabling	instructing		
		regulating		
	recommending	promoting		
		advising		
primarily social	doing	directing, coordinating		

3.3.2   Field and ideational meanings

Field and ideational meanings were considered essential to include in the analysis on the basis of their significance in construing subject content in school (Halliday 1999). Field, as noted in Chapter 2, Section 2.2.1, in the context of the classroom is understood as the topic of the text, which is the subject matter of the curriculum. Fields can be expected to change over time along the cline from 'commonsense' social domains to the 'uncommonsense' knowledge that is seen in the technical and specialized educational content of schooling. Language choices in texts are influenced by Field, and an understanding of the Field prepares the reader for the ideational and textual meanings that will be found in the text. Field also links the text to the other writing on the same topic or in the same learning unit.

Based on the importance of Field, analysis of ideational meanings was of value for examining how Ellie constructed the Field, drawing on discourse semantic and lexicogrammatical resources, including her development of abstraction, metaphorisation and technicality, movement into more complex connections beyond simple additive chronology, and use of grammatical resources to construe new and more complex meanings.

The frameworks applied were those of Martin and Rose (2007) for the discourse semantic systems, and Halliday and Mattheissen (2004) for the lexicogrammatical level, outlined in Chapter 2, Section 2.2.2. Whilst the application of the published frameworks for these systems was mostly straightforward, slight modifications were made in the analysis of Ideation. The first modification was to simplify the lexical relations component of the Ideation analysis to an identification of lexical chains of entities in the text. Listing the entities in this way was adequate for the scope of most of the texts; where further taxonomical detail was of value, this was included.

The second adaptation was in a small change in the framework for kinds of entities, which differentiates between concrete, abstract, metaphoric and technical entities (Martin & Rose 2008). A summary of the framework as adapted, with examples, is provided in Table 3-6.

Table 3-6. Kinds of entities (adapted from Martin & Rose 2007, p. 114) with examples

concrete	everyday	*air, water, ship, forest*
	specialized	*mine, gas lamps, microscope*
abstract	institutional	*historian, scientist, governor*
	semiotic	*letter, essay, evidence*
	generic	*time, position, generation*
abstract, metaphoric	process	*movement, invention, ventilation*
	quality	*power, safety, wealth*
technical		*photosynthesis, alliance, Punic Wars*

The main elements of this categorisation were retained so that:

- concrete entities were subdivided into those which are everyday, mundane items and those which are specialised in relating to the technology of concrete but uncommon occupations not normally associated with everyday life;

- abstract entities were subcategorised as those which realise institutionalised social organisation, those which are semiotic entities involved in the exchange of communication, and generic terms for the labelling of dimensions;

- abstract metaphoric entities were treated as a separate category with differentiation of types of meaning.

The modification was in listing technicality as a distinct category rather than as a further sub-category of abstraction. This modification was useful when dealing with Ellie's texts, in which the range of technical terms from simple to highly specialised created some complexity in the categorisation. This was perhaps inevitable given that the category distinctions are not necessarily fully defined in language and in use, including overlap between abstraction, metaphorization and technicality. While Martin and Rose (2007) classify technical terms in their framework as abstract, on the basis that they can be understood only through explanation of the topic, the terms 'abstraction' and 'technicality' are not consistently clarified across the literature (Derewianka 1995; Hao 2015). Therefore it was found helpful to simply list technical entities, whether abstract or not, as a separate category. This separation also allowed the differences in technicality between the two learning areas of history and science to be visible. Technicality was understood in the history writing as those resources construing people, places, times, events and concepts which have their meanings within specific fields of historical knowledge. In science, technical entities were taken to be those construed in scientific terminology, as meanings that are constructed and defined in the vertical, hierarchical knowledge of each area of scientific enquiry, where meanings are built up through layers of definitions. Alongside clear instances of abstraction, some technical terms, such as the earth's *crust* may be

considered to be concrete, or at least potentially accessible to the senses; both types were simply included as technical, with finer distinctions considered separately. Entities were classified as grammatical metaphor if they could be construed in more congruent ways; this simple criterion was used despite unclear boundaries in the literature (Derewianka 1995).

3.3.3   Mode and textual meanings

Textual meanings were also included in the analysis, on the basis that the capacity to create effectively structured texts and organize the logical flow of information in the written mode is necessary for a student to successfully display curriculum learning and achieve schooling success. This analysis allowed investigation of Ellie's developing capacity to move from the construction of simple texts to abstract, rhetorical text organisation.

In relation to Mode, all the texts in this study were written, so that the role of language was to constitute rather than support the social interaction. The extent to which the language in any text is written-like depends on multiple features, as noted in Section 2.2.1.3. The analysis of Mode considered these features so as to highlight key relevant points, and also addressed lexical density over the whole text. Lexical density was measured as the average number of lexical items per clause.

The analysis of Periodicity across the whole text was based on the framework provided by Martin and Rose (2007) and that of Theme and Rheme by Halliday and Matthiessen (2004) as described above in Chapter 2, Section 2.2.3.

3.4   Analysis and presentation of the findings

For the purpose of the analysis, and for presentation of findings in this thesis, each text and its elements were reproduced in a number of different formats to make visible specific

features. For the analysis of genre, each text was reproduced to display its generic structure. This display for all the selected texts is presented in Appendix B. As in all formats, the text content is presented in italic font, and the analytical annotations in regular type.

For analysis of elements across clauses, particularly activity sequences and Conjunction, each text was printed with the clauses shown in separate lines. For more detailed analysis within clauses at the lexicogrammatical level, the texts were reproduced in tabular format using Microsoft Word, with the clauses displayed horizontally and the clause constituents in vertical columns. Annotations were added for further detail where necessary. A simplified version of these tables for each selected text is presented in Appendix C. This format facilitated efficient analysis, since the tabular presentation sorted the lexicogrammatical elements in such a way that they could be conveniently identified and compared. These charts could also be readily copied or expanded, either in whole or in part, or for the display of selected columns or portions, such as the transitivity resources or Themes and Rhemes.

The framework of resources outlined in this chapter in unison provided a comprehensive set of analytical tools for the purpose of the research. Chapter 4 presents illustrative findings from the analysis.

CHAPTER 4   Analysis of texts

4.0   Set of selected texts

The 32 selected representative texts are identified in Table 4-1, and specified for the genre they exemplify, with the texts indicated in bold font being those that are investigated in detail in this chapter.

Table 4-1. List of Ellie's texts selected for detailed analysis

Year	Subject	No.	Title	Genre
Year 6	History	1.1	*Rome and Carthage*	Historical account
		1.2	***Bravery***	**Empathetic autobiography**
		1.3	*The Triumvirate*	Historical account
		1.4	*Behind their Smiles*	Empathetic /Narrative
	Science	**1.5**	***Geology Excursion***	**(Procedural) recount**
		1.6	*Sedimentary Rocks*	Explanation, sequential
		1.7	*The Zodiac*	Report, descriptive
		1.8	*Experiments with Electrical*	Procedural recount
Year 8	History	2.1	*James Ruse*	Biographical recount
		2.2	*Revolutionary Events*	Historical account
		2.3	***Why did the Industrial Revolution begin in England?***	**Factorial explanation**
		2.4	*Was life better before the Industrial Revolution?*	Exposition
	Science	**2.5**	***Kundt's Tube***	**Procedural recount**
		2.6	*How Organisms Work*	Report, classifying
		2.7	*Water Wheel Flour Mill*	Explanation, sequential
		2.8	*Fat Fire*	Procedural recount
Year 9/10	History	**3.1**	*The Treasure of Pompeii*	Site interpretation
		3.2	***How the British claimed Australia***	**Exposition**
		3.3	*First Dynasty*	Period study
		3.4	*Ming and Qing Dynasties*	Historical account
	Science	3.5	*The Hand in Comparison to the Foot*	Report, descriptive
		3.6	*Testing Wood to Destruction*	Procedural recount
		3.7	*Crystal Garden*	Procedural recount
		3.8	***The Lungs***	**Report /Explanation**
Year 11/12	History	4.1	*Mabo*	Biographical recount
		4.2	from *Ancient Greek Architecture (excerpt)*	Period study
		4.3	**from *World War I (excerpt)***	**Historical account/Factorial explanation**
		4.4	from *World War II (excerpt)*	Historical account
	Science	4.5	*The Traps of Neo-Darwinism*	Discussion
		4.6	from *Life on Earth (excerpt)*	Explanation, causal
		4.7	from *Different forms of rocks (excerpt)*	Report
		4.8	**from *Could human beings create the conditions for life… on the moon? (excerpt)***	**Exposition**

Each of the eight sets is addressed in turn, with the detailed discussion of the one text followed by summaries and highlights of the remaining three.

The content of this chapter is illustrative of the complete findings. The analysis provided an extensive amount of detail, and space does not allow for a full description of all. Ellie's trajectory of development, as described and discussed in Chapter 5, was determined on the basis of the full set of 32 texts, as well as reference to other texts in the data. Examples included from texts written by Ellie outside the set of 32 are annotated with the title of the source text.

The listing of the texts within each set in Table 4-1 is in chronological order of writing, or as close to that order as it was possible to ascertain; the same order is used in the Appendices. It was considered important to recognise this sequence, although in the discussion in this chapter, the texts are introduced in the order that best suits the discussion, which may not be the chronological order of writing, and thus not the numbered order within each set.

For consistency and readability in this chapter, each of the eight sections is commenced on a new page. The discussion of information in a table is always provided after that table has been presented, and additional page breaks have been inserted where necessary to avoid irregularities in the presentation of the tables. Some minor inconsistencies in Ellie's spelling have been corrected, being not significant to the analysis, though not all unconventional syntax and punctuation. Any names occurring within the texts have been changed to preserve anonymity.

4.1　Year 6 History texts

Text 1.2, *Bravery*, was one of the early texts written by Ellie in Year 6 history.

4.1.1　Text 1.2: Genre

Text 1.2 is displayed in part in Table 4-2, with the generic structure of the text indicated.

Table 4-2. Text 1.2: Generic structure

Bravery - Empathetic autobiography	Generic structure
I was just like every other slave boy. My story therefore is rarely told. I was just another of those million slaves.	Orientation
The Romans conquered our home and everything (it) owned. On the night we, the slave to be's, were going to be taken away on a ship to Rome, my mother left me this journal ….	Record
My father, big brother and I were loaded onto the ship. The grief of it had not yet sunken in, it all seemed so unreal. The moon was up and we were sailing away. I stood leaning over the railing staring down at the dark water. I had always hoped to be a warrior and now all was lost…	
Many, many hours later we entered Rome in the long parade, chained one behind another following the carts filled with our own belongings. A few hours after we were standing in the market square...	
Slavery was horrible, torturous, order after order, never a break. It turned out that my brother had been bought by a man not so far away and we often saw him in the marketplace. My father rarely talked to me now, he was too tired and depressed to say anything even to his own son. He looked so sick and weak, to think he was a warrior. Slowly we drew apart. Sometimes I thought he had forgotten he was my father. I missed my mother's love. So at the age of nine I lost both my parents and my siblings, I was deprived of any love or care whatsoever. I tried to hide all this but inside me, was crying out for help. I had lost everything I had once possessed. Every day was the same, no laughter, no fun just work, lifeless work.	
At the age of 14 I was made a gladiator and at 15 I won freedom. *But after 6 years of captivity I had no family to go to, no-one to rejoice with, nothing. I had been bought four times so my father no longer recognized me. He had lost his heart, his hope, as I so nearly did.*	
I now live in Greece with my wife and 5 children. Many, many years have passed since my first night of slavery but I remember it as if it were yesterday.	Reorientation

This text is written as an empathetic autobiography, with the purpose of recording, in chronological order, the key events of the individual's life experience relevant to the historical context being considered. The generic structure is conventional, comprising Orientation ^ Record ^ Reorientation. Almost one half of the whole text is displayed in

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Table 4-2, including the beginning and the ending, but some phases, and portions of phases, within the Record have been omitted. The discussion below relates to the whole text.

While analysed as an empathetic autobiography, the text is also organised somewhat like a biographical recount, in that the Orientation resembles a Person Introduction, and the remainder of the text covers key events in the individual's life, so that the time is episodic rather than purely serial.

4.1.2 Text 1.2: Field

The Field for Text 1.2 relates to the history of the Roman Empire, in particular the practice of slavery. The task that has been addressed is the writing of the life experiences of an individual slave in that context. As expected for this genre, the text includes some creativity in the psychological elements and the descriptions of the natural setting. This is a 'commonsense' approach to the educational topic of the Roman Empire.

4.1.3 Text 1.2: Ideation (Entities)

In the Ideation analysis, the entities in the text were first examined, as shown in Tables 4-3 and 4-4.

Table 4-3. Text 1.2: Ideation – Entities

boy	*story, boy (slave), hand, eyes, warrior, sight, age; wife, children, Greece*
family	*parents, siblings, sister (baby)*
	mother (gentle), figure, lady, person (bravest), clothes (white), appearance, arms, hug, love (mother's), journal, book, gods
	father, son, heart, hope
	brother (big), favourite (father's), warrior
home	*women, children, men, back, heads, shame, rags, chaos, carts, belongings*
night	*sea breeze (gentle), moon, water (dark), shore (distant), cliff (big black), sky (evening),*
Romans	*Rome, soldiers (Roman), ship, railing, voices (harsh Roman), chaos, orders, whip, parade, market square, chain, ground, shouting, bargaining, slave driver, man (huge), bag (small),*
slavery	*sadness, grief, fear, pang, break, things, love, care, laugher, fun*
	work (lifeless), things, break; freedom, captivity
time (last)	*hours, day*

Table 4-4. Text 1.2: Ideation – Kinds of entities

concrete	everyday	*boy, women, lady, children, man, person, figure; gods* *back, heads, arms, eyes, hand, heart, hug, sight, voice, order* *book, journal, rags, clothes, carts, belongings, bag; ship; railing; whip* *sea, water, shore, cliff, ground, moon, sky*
	specialised	-
abstract	institutional	*family, parents, siblings, father, mother, brother, sister, son, wife* *soldiers, warrior*
	semiotic	*story*
	generic	*hours, day*
abstract, metaphoric	process	*work, break; laughter, love, care, hope, pang* *slavery, appearance; age* *shouting, bargaining*
	quality	*(fun), shame, sadness, grief, fear, chaos, freedom, captivity*
technical		*Rome, Romans, market square, slave, slave driver, gladiator, Greece*

Consistent with the type of text, the people involved are primarily individuals, being the protagonist and his family, and many of the entities construed are concrete and everyday. The text nevertheless includes some entities that are technical or abstract. The technical entities relate specifically to the historical Roman Empire and its practices, such as slave marketing and gladiators; their inclusion indicates that Ellie has some knowledge of the topic related to the learning area and can construct her story to reflect this. The instances of grammatical metaphor, while commonly used lexis, are of significance because of the choices that Ellie has made in construing these meanings as entities rather than by more congruent means. For example, nominalisation has been deployed in the following:

> *At the <u>age</u> of 14 I was made a gladiator and at 15 I won <u>freedom</u>. But after 6 years of <u>captivity,</u> I had no family to go to…*

> *…her <u>appearance </u>was peaceful…*

> *<u>Slavery</u> was horrible…*

More congruent, everyday construal might be as follows:

> *<u>When I was</u> 14, I was made a gladiator and at 15 I <u>was made</u> free. But after 6 years of <u>being a slave</u> I had no family to go to…*

> *… she <u>appeared</u> peaceful…*

It was horrible to be a slave…

These choices demonstrate some familiarity with ways that metaphorization is deployed in a text, with the benefit of allowing non-entities such as qualities or processes to become participants in the activities. This is relevant to Ellie's development of Ideation and her shift towards more written-like language.

4.1.4   Text 1.2: Ideation (Activity sequence) plus Conjunction

The activity sequence was examined as the second aspect of Ideation. Table 4-5 displays the activity sequence and the explicit Conjunction resources in the final portion of the text.

Table 4-5. Text 1.2 Ideation (Activity sequence) and explicit Conjunction: selection

Slavery was *horrible, torturous, order after order, never a break.*
It <u>turned out</u> that my brother had been bought by a man not so far away
and *we often <u>saw</u> him in the marketplace.*
My father rarely <u>talked</u> to me now,
he <u>was</u> too tired and depressed to say anything even to his own son.
He <u>looked</u> so sick and weak,
to <u>think</u> he was a warrior.
Slowly we <u>drew</u> apart.
Sometimes I <u>thought</u>
he <u>had forgotten</u>
he <u>was</u> my father.
I <u>missed</u> my mother's love.
So *at the age of nine I <u>lost</u> both my parents and my siblings,*
I <u>was deprived</u> of any love or care whatsoever.
I <u>tried to hide</u> all this
but *inside me, <u>was crying</u> out for help.*
I <u>had lost</u> everything I had once possessed.
Every day <u>was</u> the same, no laughter, no fun just work, lifeless work.
At the age of 14 I <u>was made</u> a gladiator
and *at 15 I <u>won</u> freedom.*
But *after 6 years of captivity I <u>had</u> no family to go to, no-one to rejoice with, nothing.*
I <u>had been bought</u> four times
so *my father no longer <u>recognized</u> me.*
He <u>had lost</u> his heart, his hope,
as I so nearly <u>did</u>.*
I now <u>live</u> in Greece with my wife and 5 children.
Many, many years <u>have passed</u> since my first night of slavery
but *I <u>remember</u> it*
as if *it <u>were</u> yesterday.*
KEY: <u>Activities</u> underlined; Conjunction resources in bold font

The focus of the activity sequence is to reconstruct the events of the boy's experience of slavery (e.g. *conquered, entered, live*), including his observations (e.g. *saw, was*), and his responses to these (e.g. *thought, missed, crying*), to realise the Field.

Logical relations between these activities are construed in the Conjunction resources. As would be expected within a chronological text, the logical connection between the activities is external, and primarily one of addition, with events added in temporal sequence as the text unfolds through each stage. Additive Conjunction is therefore generally implicit, supported by some explicit use of *and*. Ellie has also marshalled a range of Conjunction resources of time (*as, until*), as well as condition (*if only*) and comparison (*as, instead of, while, as if*), including counterexpectancy to foreground changes in the boy's experience (*but, yet*). The uses of *therefore* and *so* serve for internal Conjunction, and so are discussed later in connection with Periodicity.

4.1.5 Text 1.2: Transitivity

The ideational meanings are realised through choices in transitivity at the level of the lexicogrammar. These resources are illustrated in selected, non-contiguous clauses in Table 4-6, which shows examples of all the Process types deployed and some of the different grammatical realisations of Participants.

Table 4-6. Text 1.2: Transitivity – Processes and Participants: examples

Participant	Process	Process type	Participant
I	*was*	RA	*just like every other slave boy.*
my story	*is told.*	VR	
I	*was*	RI	*just another of those million slaves.*
The Romans	*conquered*	MA	*our home and everything [[(it) owned]]*
Women	*wept*	BH	
There	*was*	EX	*much shouting and bargaining.*
My father	*talked*	VR	*to me*
he	*was*	RA	*too tired and depressed [[to say anything even to his own son]].*
we	*drew*	MA	
I	*thought*	MN	
he	*had forgotten*	MN	*he was my father.*
I	*missed*	MN	*my mother's love.*
I	*lost*	MA	*both my parents and my siblings,*
I	*was deprived of*	MA	*any love or care whatsoever.*
I	*tried to hide*	MA	*all this*
	was crying out for	MA	*help.*
I	*was made*	MA	*a gladiator*
I	*won*	MA	*freedom.*
I	*had*	RA	*no family [[to go to]], no-one [[to rejoice with]], nothing…*
I	*remember*	MN	*it*
it	*were*	RI	*yesterday.*

KEY**:** MA - material; BH - behavioural; MN - mental; VR - verbal; EX **–** existential**;** RA- relational attributive;
RI - relational identifying

The full range of Process types is evident. Material and behavioural Processes realise the actions, mental Processes realise the boy's observations and thoughts, and relational Processes the descriptions within those; verbal and existential Processes are also evident.

Participants are realised in various grammatical forms. While pronouns are frequently deployed, reflecting the focus of the text on personal experience, a range of expanded noun groups is evident. This is seen in the following examples from various parts of the text:

a man [not so far away]

the grief [of it]

the carts [[filled with our own belongings]]

no family [[to go to]],

too tired and depressed [[to say anything even to his own son]]

the bravest person [[I can remember]]

Embedded clauses in a nominal role are at times deployed to construe Participants, most often but not only as Phenomenon in mental Processes; for example:

I saw [[the big black cliff standing out against the evening sky]]... (Phenomenon)

...he had forgotten [[he was my father]]. (Phenomenon)

Always do [[what is right]]. (Goal in material Process)

Apposition is evident, albeit somewhat awkwardly realised, as follows:

On the night [[we, the slave to be's, were going to be taken away on a ship to Rome]] ...

Participants are occasionally elided through the use of passive, as in:

My father, big brother and I were loaded onto the ship.

I was deprived of any love or care whatsoever.

...my brother had been bought by a man not so far away

At the age of 14 I was made a gladiator...

Such elision maintains the focus on the experience of the boy and his family members, and the anonymity of the Roman captors.

Circumstances are varied, primarily realising time and place, which are both of significance in historical texts, but also quality, reason, accompaniment and matter. Examples of each include:

Many, many hours later we entered Rome in the long parade... (time)

...we often saw him in the marketplace. (place)

I clung to the book, with eyes wide with terror. (quality)

...the men just hang their heads in shame. (reason)

...she was not coming with us. (comitative accompaniment)

...standing there as if he cared not for life. (matter)

Ellie additionally deployed other Circumstances in the draft of this text, a version which shows only small differences in comparison with the final copy. These include degree, comparison and purpose, as follows:

*My big brother was my (*father's*) favourite <u>by far</u>.* (degree)

<u>Like me and my father</u>, my brother and I hadn't been so close. (comparison*)*

Long ago I would have stopped praying to the gods <u>for help.</u> (purpose)

4.1.6   Text 1.2: Clause Complexing

Examples of clause complexing in this text are shown in Table 4-7.

Table 4-7. Text 1.2: Clause complexing: illustrative examples

Equal relation (parataxis)	Dependent relation (hypotaxis) (dependent clause underlined)
Expansion	
At the age of 14 I was made a gladiator // and at 15 I won freedom. Many, many years have passed since my first night of slavery // but I remember it …	<u>As we were taken away</u> // I glanced back at my brother… I had been bought four times // <u>so my father no longer recognized me.</u> …I remember it // <u>as if it were yesterday</u>. <u>Giving me the book,</u> // she held me in a hug for the last time. Many, many hours later we entered Rome in the long parade //chained one behind another // <u>following the carts filled with our own belongings.</u>
Projection	
… to me he said // 'Fetch my books, Talius.'	Sometimes I thought // <u>he had forgotten</u> // <u>he was my father.</u>

In such complexes, Ellie is able to compact information and show logical relations. Both paratactic (equal) and hypotactic (dependent) relations are in evidence, in both expansion and projection. Dependent clauses, which may be thematised, include both finite and non-finite, and cover a broad range of meanings across the Year 6 history texts, as seen in the following selected examples:

<u>As we were taken away</u> // I glanced back at my brother… (time)

*... he came to Medina, // <u>where he settled</u>... (*place – from *Muhammed*)

The Emperor Nero lights his garden at night <u>// by burning us</u>… (means – from *Diary under the Floorboard*)

...I remember it // <u>as if it were yesterday</u>. (comparison)

Long ago, I would have stopped praying to the gods for help, // but <<<u>to fulfil my mother's wish,</u>>> I did. (purpose – from first draft of Text 1.2)

I had been bought four times // <u>so my father no longer recognized me</u>. (result)

<u>If only my gentle mother had been there</u>, // she would have held my hand. (condition)

*My father recognized me no longer...// <u>though we still saw each other</u>. ((concession – from first draft of Text 1.2)

... he always said he was proud of him...// <u>while to me he said</u>, //'Fetch my books, Talius.' (addition)

*Many, many hours later we entered Rome in the long parade //<u>chained one behind another</u> // <u>following the carts filled with our own belongings</u>. (*elaboration*)*

Rome set out on the 3rd War, // <u>which led to the absolute destruction of Carthage</u>. (elaboration – from Text 1.1*)*

Overall, Ellie has demonstrated a broad range of ideational resources at the clause level, in her control of both transitivity and clause complexing resources.

4.1.7   Text 1.2: Mode

The Mode of Text 1.2 is somewhat spoken-like in the use of everyday lexis, with a relatively low lexical density of approximately 2.3.

4.1.8 Text 1.2: Periodicity

The textual organisation is chronological, as consistent with the genre, so that a macroTheme is not expected. Nevertheless, the opening clauses of the Orientation provide an overall view of the text somewhat predictively in the mention of the *story* to be told:

> *I was just like every other slave boy. <u>My story</u> therefore is rarely told. I was just another of those million slaves.*

HyperThemes have been deployed to signpost the beginning of each phase of the text:

> *The Romans conquered our home and everything it owned…*
>
> *My mother came running up…*
>
> *My father, big brother and I were loaded onto the ship…*
>
> *Many, many hours later we entered Rome in the long parade…,*
>
> *Slavery was horrible, torturous, order after order, never a break…*
>
> *At the age of 14 I was made a gladiator …*
>
> *I now live in Greece with my wife and 5 children…*

Also noteworthy is the use of the conjunctions *therefore* and *So,* which serve a textual function of internal cause, interpreting and summarising the recorded events and the boy's experiences.

4.1.9 Text 1.2: Theme and Rheme

Textual resources at the clause level are illustrated in Table 4-8, which shows the final portion of the text.

Table 4-8. Text 1.2: Theme and Rheme: selected examples

Textual Theme	Marked Topical Theme	Unmarked Topical Theme	Rheme
		Slavery	*was horrible, torturous…*
		It	*turned out that my brother had been bought by a man…*
and		*we*	*saw him often in the marketplace.*
		My father	*talked rarely to me now*
		he	*was too tired and depressed …*
	Slowly	*we*	*drew apart.*
	Sometimes	*I*	*thought*
		he	*had forgotten he was my father.*
		I	*missed my mother's love.*
So	*at the age of nine*	*I*	*lost both my parents and my siblings,*
		I	*was deprived of any love or care whatsoever.*
		I	*tried to hide all this*
but	*inside me*		*was crying out for help.*
		I	*had lost everything I had once possessed.*
		Every day	*was the same*
			no laughter, no fun, just work, lifeless work.
	At the age of 14	*I*	*was made a gladiator*
and	*at 15*	*I*	*won freedom.*
But	*after 6 years of captivity*	*I*	*had no family to go to, no-one to rejoice with, nothing.*
		I	*had been bought four times*
so		*my father*	*no longer recognized me*
		He	*had lost his heart, his hope,*
as		*I*	*so nearly did.*
		I	*live now in Greece with my wife and 5 children.*
		Many, many years	*have passed since my first night of slavery*
but		*I*	*remember it*
as if		*it*	*were yesterday.*

The unmarked Themes in the whole text most often realise the boy and his family members, reflecting the personal focus of the text. This results in some sequences of repetitively pronominal Themes in linear development, though not elsewhere to the same extent as seen in the excerpt in Table 4-8. Other varied choices are evident to manage information flow. Marked Themes, including the use of a clause as Theme in a clause complex, most often construe the temporal relations of the activities, and signal new Episodes, as illustrated below:

Many, many hours later we entered Rome in the long parade…

As we were taken away I glanced back at my brother

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Predicated Theme, and the positioning of information at the end of the clause with the use

of *It* in anticipation, are strategies that have been deployed to highlight information:

> *It was then that <u>I realised she was not coming with us</u>.* (predicated Theme)

> *It turned out that <u>my brother had been bought by a man not so far away</u>…*
> (postpositioning)

Unexpected foregrounding of a Participant or Circumstance is another thematic variation

in this and other texts at this age:

> *<u>What I saw next</u> I will never never forget.*

> *<u>So much </u>was he loved by his people that he walked without guards surrounding him. (from*
> *Text 1.4).*

Ellie thus demonstrates capacity to vary her Themes despite some simple repetition. The

Rhemes construe the activities and descriptions to build the record.

4.1.10 Texts 1.1 -1.4: Summary

Text 1.2 achieves its purpose of constructing the imagined individual experience of a slave

within the historical context of the Roman Empire. While Ellie has drawn on her own

everyday experience, she has also demonstrated to a limited extent some relevant

knowledge of history, thus linking the mundane and everyday to the educational learning.

Her elementary use of abstraction, and control of a wide range of lexicogrammatical

resources, both ideational and textual, is demonstrated in this text, with some discourse

semantic textual resources also evident and some effective variation of Theme choices.

Text 1.2 is the most extended of the Year 6 history empathetic autobiographies, which are

significantly varied, including a recount, two narratives of which one is Text 1.4, *Behind*

their Smiles, a journal entry, and a political speech as an instance of hortatory exposition.

The latter is a genre defined by Humphrey (2010) as having a persuasive purpose,

motivating the hearer to social action, and in Matthiessen's (2015) framework is classified

as a 'recommending' text. As empathetic texts, these all relate to personal experiences of ordinary people in historical contexts.

In tandem with the empathetic texts, Ellie also wrote historical accounts, including Texts 1.1, *Rome and Carthage*, and 1.3, *The Triumvirate*, which construe more educational Fields of history. The focus in these relates to specific events and individuals considered historically important, and some causes of these events. While generic differences between these and the empathetic texts would be expected to result in some language differences, such as the more prominent technicality in the accounts, analysis reveals specific features that suggest some degree of classroom scaffolding of the accounts, rather than these purely representing Ellie's original work.

Among these features is the unusual, but effective, application of generic structure in Texts 1.1 and 1.3. In particular, the Ideation analysis shows that the accounts demonstrate a greater consistency and prevalence of abstraction and grammatical metaphor in comparison with the balance of more concrete meanings in the empathetic texts. While this is predictably a difference related to text type, the choices at times seem somewhat advanced:

> *Much of his wealth came from the misfortunes of those who…* (from Text 1.3)
>
> *In his conquest in Spain and Gaul…* (from Text 1.3)
>
> *After a failed attempt to overthrow the government… (*from *Marius and Sulla)*
>
> *Their refusal to worship Nero and other gods….* (from *Rome and Christianity)*

The difference is not in the use of abstraction and metaphor but in the consistency of their use in the accounts. Abstraction and metaphorisation are evident in Ellie's other writing from the same period, as seen above in the simple examples in Text 1.2, and in some specific choices occurring across text types and learning areas. For example, the following appear in Text 1.1, a historical account:

> *Rome… had <u>little interest</u> in the land beyond… The final <u>stroke</u> of the Roman*

general…which led to the absolute <u>destruction</u> of Carthage. (from Text 1.1)

These can be compared with similar choices from story texts written for science and subject English within a few weeks of the above examples:

Her mother commented and without <u>any interest </u>went on with the cooking… (from *Walking Back Up,* Year 6 science)

…With this <u>stroke</u> will come the mighty <u>destruction</u> of the castle….. (from *A Tale of Balyn,* Year 6 English)

It is the greater pervasiveness of such choices in the accounts that suggests scaffolding. The lexical density of those texts is correspondingly distinctly higher. In addition, only in one account, Text 1.1, is there an example of logical metaphor in which cause is construed as a process (*led to*). Further evidence for scaffolding of the accounts lies in the absence of drafts for all except the final of these, while draft versions of all the empathetic texts and of the final account are found in the notebooks. The relevance of this writing support is discussed further in Chapter 5.

4.2　Year 6 Science texts

Text 1.5, *Geology Excursion*, is an early example of Ellie's activity-based science texts written in Year 6.

4.2.1　Text 1.5: Genre

The complete text is reproduced in Table 4-9 with the generic structure displayed.

Table 4-9. Text 1.5: Generic structure

Geology Excursion – Recount / Procedural recount	Generic structure
Class 6 visited (a science centre). *Fossil making* *We went into a small room and sat down at the table. Jason split us into 3 groups of about 5. The groups all had one bowl and one spoon. While the other groups filled their bowls up with plaster powder, we chose our fossil mould. Once we had our powder we added water to make a not so thick plaster mix. We spooned in the stuff, then wrote our name on a small piece of blue paper and left it to set.* *Geo Quest* *We were given a sheet with some things we had to do written on it. We had to find a crystal of rock to match each colour. For red I got spinal, it is a small crystal. For orange I chose Minium it's a sort of grey slate with orange on the top, it looks like it's been sprayed with orange spray paint. I chose sulphur for yellow, it's a really nice one, all yellow. Malachite is dark green. For blue I chose Halite or Kröhnkite (?) (I can't remember). Blue crystals are my favourite (by far). Fluorite is purple, a little bit like amethyst.* *Fossicking* *We were taken to a rock bed and we got to choose some rocks to take home. I chose a rock that looked like a cigarette lighter cause it was in the shape of one and it was dark grey with a white square on the top. There were heaps of other rocks too.* *Microscope* *I didn't look at much under the microscope but I did see a thin bit of mica and a thin bit of basalt. mica looks like a cracked wall and basalt has actually got fluorescent green in it.*	Record of Events
Quarries *Geologists love quarries because they can see where the rocks have been cut in half.* *Fossil hunting* *It is a waste of time to look for fossils in our town, because the rocks are too old, and animals didn't live then.* *Tasting Rocks* *You should only taste rocks that are light in weight and light in colour.* *Lead is poisonous.*	Conclusion

The purpose of this text is to recount science activities that were undertaken and note some science learning gained. In some ways the text resembles a personal recount, with 'commonsense', everyday language choices. At the same time, the recorded events are school science activities, and there is a Conclusion stage with generalised information that appears to be derived from the activity session, albeit without explicit linking to it. These features suggest that this text is a transitionary attempt towards a procedural recount, with Ellie building on her familiarity with recounts and moving towards the more conventional science text type. The headings further suggest this type of development, since their general organisation, despite their wording, reflects the characteristic generic structure of a procedural recount.

4.2.2 Text 1.5: Field

The Field for the text concerns a class exploration of fossils and rock specimens in an institutional context external to the school. While the formation of fossils and the classification of minerals form educational knowledge, the Field is approached in a 'commonsense' way, via familiar entities and simple shape and colour comparisons in the sorting and description of the minerals.

4.2.3 Text 1.5: Ideation (Entities)

The entities in the text are shown on Tables 4-10 and 4-11.

Table 4-10. Text 1.5: Ideation – Entities

(we)	*Jason, groups, name; home, town; quest*
room	*table, bowl, spoon, fossil mould, paper (blue)*
plaster powder	*water, mix, stuff*
sheet	*things (written on it)*
rocks	*rock (crystal), crystal (small, blue)*
	colour, red, orange, yellow, blue, green (dark, fluorescent)
	spinal, minium, sulphur, malachite, halite, kröhnkite (?), fluorite, amethyst, mica, basalt (–type)
	grey slate, orange paint, cigarette lighter, wall (cracked) (–resemblance)
	top, shape, square, bit (thin) (–shape)
	fossicking, quarries; fossils, animals, time, waste; weight, colour, lead
	rock bed; microscope
	geologists

Table 4-11. Text 1.5: Ideation – Kinds of entities

concrete	everyday	*room, table, bowl, spoon, paper, sheet*
		water, mix, stuff, rock
		grey slate, orange paint, cigarette lighter, wall (cracked), home, town
	specialized	*plaster powder, fossil mould, grey slate, rock bed, microscope, fossicking*
abstract	institutional	*geologists*
	semiotic	*name*
	generic	*group, things, colour, red, orange, yellow, blue, green*
		top, shape, square, bit, time
abstract, metaphoric	process	*quest, waste*
	quality	*weight*
technical		*crystal fossil, spinal, minium, sulphur, malachite, halite, kröhnkite* (?),
		fluorite, amethyst, mica, basalt, lead

The range of entities reflects the focus in the text on the investigation of the rock specimens, as they are identified and described in terms of colour, type, resemblance and shape. Alongside the obvious concern with concrete experience, the Ideation also moves into technical meanings of science, which are introduced through that experience and familiar knowledge. Several of the terms involved are highly technical, and unlikely to be encountered in everyday experience, but the technical language has not been avoided and its learning seems to have been part of the purpose of completing and recording the activity. There is some basic use of metaphorisation. This text is the original draft copy; in the edited version, Ellie has, perhaps with guidance, replaced the lexical choices *stuff, got, things* and *nice* with *mixture, chose, projects* and *pretty.*

4.2.4   Text 1.5: Ideation (Activity Sequence) plus Conjunction

The activity sequence and explicit Conjunction in selected portions of the text are shown in Table 4-12.

Table 4-12. Text 1.5: Ideation (Activity sequence) and explicit Conjunction: selection

We _went_ into a small room **and** _sat down_ at the table… **While** the other groups _filled_ their bowls up with plaster powder, we _chose_ our fossil mould… **Once** we _had_ our powder we _added_ water **to** _make_ a not so thick plaster mix. We _spooned_ in the stuff, **then** _wrote_ our name on a small piece of blue paper **and** _left_ it **to** _set._
We _were given_ a sheet with some things we had to down written on it. We _had to_ find a crystal of rock **to** _match_ each colour. For red I _got_ spinal, it _is_ a small crystal. For orange I _chose_ Minium it_'s_ a sort of grey slate with orange on the top, it _looks like_ it's been sprayed with orange spray paint. I _chose_ sulphur for yellow, it_'s_ a really nice one, all yellow. Malachite _is_ dark green. For blue I _chose_ Halite or Kröhnkite (?)…
Geologists _love_ quarries **because** they _can see_ where the rocks have been cut in half.
It _is_ a waste of time to look for fossils in our town. **because** the rocks _are_ too old, **and** animals _didn't live_ then.
You _should_ only _taste_ rocks that are light in weight and light in colour. Lead _is_ poisonous.
KEY: _Activities_ underlined; Conjunction resources in bold font

The activities unfold firstly as concrete physical actions construing the initial science task, and then move into a mixing of actions with descriptions in the characterisation of the different minerals and the concluding generalised information.

The text draws on both implicit and explicit Conjunction. The implicit logical relation, between the sequential actions as well as among the descriptions, is addition, as each new piece of information is simply added to what has gone before. This is the expected relation for the Record stage of this genre and for the descriptive information in the Conclusion. The chronological temporality of the activities is made explicit at times in the recounting

of the first task (*While, Once, then, and (then)*), but left implicit in the second. Purpose and cause are also explicitly realised at times (*to, because*); cause, or perhaps exemplification, is implied in the final clause (*lead is poisonous*).

There is some apparent discontinuity in the Conclusion of the text, where the logical relations are not made clear. Firstly, the concluding comments are not explicitly connected to the tasks, so that the reader is left to make assumptions as to whether this information was drawn from the tasks, or provided to the students in another activity, such as a talk given preparatory to the activities or in later classroom instruction. Also, the three elements in the Conclusion are not explicitly linked to each other in any way, being related only in their connection to the general topic of rocks. Ellie seems to have simply listed some points of learning that were highlighted or remembered. These gaps in the logical relations may be due to immaturity or to classroom requirements.

4.2.5 Text 1.5: Transitivity

Table 4-13 presents illustrative examples of Processes and Participants in this text.

Table 4-13. Text 1.5: Transitivity – Processes and Participants: examples

Participant	Process	Process type	Participant
Jason	split	MA	us
The groups all	had	RA	one bowl and one spoon.
We	were given	MA	a sheet [with some things [[we had to do]] [[written on it]]].
We	had to find	MA	a crystal rock [[to match each colour]].
it	is	RI	a small crystal .
I	chose	MA	Minimum
it	's	RI	a sort of grey slate…
it	looks like	RI	[[it's been sprayed with orange paint]].
I	chose	MA	sulphur
it	's	RI	a really nice one,
we	got to choose	MA	some rocks [to take home]
I	chose	MA	a rock [[that looked like a cigarette lighter // cause it was in the shape of one // and it was grey with a white square on top]].
There	were	EX	heaps of other rocks.
Geologists	love	MN	quarries
they	can see	MN	[[where the rocks have been cut]].
It …[[ ]]	is	RI	a waste [of time]
[[	to look for	MA	fossils]]
the rocks	are	RA	too old

KEY**:** MA - material; MN - mental; EX **–** existential**;** RA- relational attributive; RI - relational identifying

The Processes are as expected by the activity sequence: material Processes realise the activities and relational Processes the descriptions. The occasional mental Processes construe perceptions and thoughts.

Participants are often grammatically simple but are at times realised in expanded nominal groups or embedded clauses. Such expansion is particularly prominent where detailed elaboration of the rocks is involved. The grammatical range of noun group expansion is comparable to that seen in Text 1.2, a text of much greater length.

The Circumstances in this text are varied, realising place, time, comparison, degree and purpose, as seen in these examples:

We went into a small room. (place)

… animals didn't live then. (time)

Fluorite is purple, a bit like amethyst. (comparison)

Blue crystals are my favourite (<u>by fa</u>r).   (degree)

<u>For orange</u> I chose Minimum…   (<u>purpose</u> – 'so that I would have a match for orange')

The range of Circumstance types across the Year 6 science writing covers a majority of the possible types. Though a similarly broad range was seen in the history writing, there is some difference in the types selected.

4.2.6   Text 1.5: Clause complexing

Clause complexing is of limited frequency in Text 1.5 but includes both equal and dependent clauses in expansion relations. Some examples, with dependent clauses underlined, are as follows:

We went into a small room // and sat down at the table.

I didn't look at much under the microscope // but I did see a thin bit of mica…

<u>Once we had our powder</u> //we added water // <u>to make a not so thick plaster mix</u>.

Geologists love quarries // <u>because they can see [[where the rocks have been cut in half]]</u>.

While other science texts from the same age level include further variations in clause complexing, the overall range and frequency is slightly less in the science texts than in the history writing.

In this text, therefore, Ellie again deploys a wide range of transitivity resources and some range of clause complexing resources.

4.2.7   Text 1.5: Mode

Text 1.5 shows some distinct spoken-like qualities in the personalised content (e.g. *we, I, my favourite*), in some lexical choices (e.g. *not so thick, really nice, thin bit*), and in the missing contextual information noted above. The lexical density of approximately 3.3 derives significantly from the expanded elaborations.

4.2.8 Text 1.5: Periodicity

The overall textual organisation of information has been managed in part by the use of headings, which divide the text into its phases and thus guide the reader through its unfolding. Chronology also contributes to textual flow, within each of the four activity phases and likely in the ordering of those phases. At the beginning of the text, the first clause serves as a macroTheme, although is not predictive of the text content in detail. Periodicity resources of hyperThemes are not evident, reflecting the recount approach.

The discontinuity in the information flow was noted earlier. In addition, the text seems somewhat incomplete as the first science task is explained only in terms of actions, and the reader may be left wondering about the purpose or outcome of the task. Overall, this text suggests an ability to manage chronological organisation, but demonstrates limited control over non-chronological text flow. The latter may have motivated the use of headings.

4.2.9 Text 1.5: Theme and Rheme

Themes in the text are illustrated on the selection in Table 4-14.

Table 4-14. Text 1.5: Theme and Rheme: selected examples

Marked Topical Theme	Unmarked Topical Theme	Rheme
	We	*were given a sheet with some things we had to down written on it.*
	We	*had to find a crystal of rock*
		to match each colour.
For red		*I go spinal,*
	it	*is a small crystal.*
For orange		*I chose Minium*
	it	*'s a sort of grey slate with orange on the top,*
	it	*it looks like it's been sprayed with orange spray paint.*
	I	*chose sulphur for yellow,*
	it's	*a really nice one, all yellow.*
	Malachite	*is dark green.*
For blue		*I chose Halite or Kröhnkite* (?)
	(I	*can't remember).*
	Blue crystals	*are my favourite (by far).*
	Fluorite	*is purple, a little bit like amethyst…*

Thematic choice is of limited variety in this text. Themes in the activity phases are significantly repetitive, in pronominal realisation of the student or class as the primary agents of the actions, though there is some thematization of the rocks where they are being described. The topical Themes are almost exclusively unmarked. A point of interest is the use of three marked Themes, which are distinctive in that as Ellie records her choice and description of the crystals, she draws on external factors of the context, namely the colour requirements, to create some internal text organisation in that phase of the text. This is more striking because of the generally sparse use of marked Themes across the Year 6 science texts. Her use of this strategy, drawn simply from the Field, may represent a small step towards further development of non-chronological text organisation.

4.2.10 Texts 1.5 - 1.8 Summary

In summary, while Text 1.5 shows some limitations, it demonstrates some developing generic features, technicality, a variety of lexicogrammatical resources and perhaps incidentally some movement towards internal text organisation.

Further texts from this year level that record science activities are of two kinds, those that reflect a personal recount style, as in Text 1.5, and those that more closely resemble conventional procedural recounts. This is partly related to Fields, as activities that draw on experiences of a more everyday nature, such as experiments with sound, are realised to a greater extent in mundane language choices. Towards the end of the year, Ellie demonstrates greater capacity to independently write a more conventional text of this type in Text 1.8, *Experiments with Electrical*, in which each activity and its result are recorded in an organised manner, with a Conclusion. Nevertheless, some personal language is still retained, and the Conclusion appears scaffolded. An excerpt is presented below:

  E1   What we did:

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We cut up tiny bits of paper and laid them on the desk. We then rubbed amber against fur. We held the amber above the bits of paper and observed what occurred.

E2 & 3   What we did:

We set up the retort stand hanging a piece of polystyrene from the end of it. We rubbed the class tube with a piece of silk then held it beside the polystyrene and watched what happened…

Result

E1: After rubbing the fur against the amber and holding it above the bits of paper we watched the paper bits slowly rise. Some turned cartwheels on its surface some stuck there and others jumped off and floated back down.

E2: Once the glass tube had been rubbed by the piece of silk… (from Text 1.8)

Other types of texts in the Year 6 science writing include reports and explanations. Text1.7, *The Zodiac*, a report on star constellations, again draws on commonsense meanings in its General Statement:

The path of the Sun, Moon and planets across the sky transverse a starry course. Although we do not see stars during the day, they are there as an invisible background to the sun's journey. We see this same course with the Sun as the path of moon and planets at night. This special path of stars is called the Zodiac. (from Text 1.7)

Following this introductory information, the constellations within this area are described with the deployment of technical terminology (*celestial equator, Sagittarius, Scorpio, Taurus, Gemini*).

An example of an explanation is seen in Text 1.6, *Sedimentary Rocks*, which combines an 'implication sequence' with descriptive information related to geology. This text evidences a structure and some language choices that appear comparatively advanced, such as some lexical choices (e.g. *the fine particles of weathered rocks, the accumulation of the remains,*

abound) and use of passives (e.g. *are compressed, are embedded*). Further choices in similar texts that also seem more mature include the construal of cause in logical metaphor, as seen in the following examples:

> *The movement of the plates <u>causes</u> 'continental drifts'.* (from *Tectonic Plates*)

> *Earthquakes <u>result from</u> this moving of plate against plate.* (from *Tectonic Plates*)

As in Ellie's history writing, there is a diversity in the nature of the science writing, with the inclusion of unusual and mature language choices in some texts suggesting a degree of classroom scaffolding for those tasks.

4.3 Year 8 History texts

In her Year 8 history writing, Ellie continued to write chronological texts, but also introduced new, rhetorically organised text types of explanation and argument. Text 2.3 exemplifies this development.

4.3.1 Text 2.3: Genre

Table 4-15 displays a partial copy of Text 2.3 that provides an overview of the generic structure, with the textual resources of Periodicity also highlighted.

Table 4-15. Text 2.3: Generic structure, and Periodicity resources (underlined)

Why did the Industrial Revolution begin in England? - **Factorial explanation**	**Generic structure**
The Industrial Revolution began in England for these reasons. The conditions for workers, especially the coal miners, were harsh, unhealthy and dangerous. This called for new mechanical inventions. It was a small, contained country unhindered by the conflicts that burdened other countries. It had the world's most powerful navy and they plundered Spain's wealth. They were the first country to overthrow their monarch, replacing it with a religious parliament. These factors created a necessity which became the mother of invention.	Outcome (including preview of Factors)
The conditions in the coal mines were so bad and the death rates so high scientists were forced to invent safer ways of mining. The mines were entered in a sort of cage that ran straight down the shafts, guided by tracks down the wall. … Rescue parties were sent down but very few could be saved or recovered. In an incident like this in a Belgian mine 3 out of 36 survived a methane explosion. These frequent and fatal accidents demanded scientists to create new inventions to help coal miners.	Factor 1
England was a small, contained country which meant that there was no rivalry. While other countries were in conflict with each other England maintained a strong sense of nationality…	Factor 2
In those times whoever ruled the sea ruled most of the world's trade. This was England, Elizabeth the 1ˢᵗ and her most powerful navy. They took power from Spain, plundering the Spanish wealth… So they kept countries from having their own economy taking it for themselves. This gave enough wealth to support scientists and their inventions.	Factor 3
England was the first country to overthrow their monarch… They had a king but parliament had the power. This meant that money could go towards improvements rather than one person's desires and comforts.…Enclosure meant that the land was taken from the peasants, the dividers taken down and whole paddocks of certain crops were grown rather than small strips of all different kinds. This meant that many people lost their jobs and were forced to live out in the forests, beg, or turn to robbery. Some set out to find work closer to the city.	Factor 4
So England was the first to have an industrial revolution because it had the desperate need and the wealth to fulfil that need.	Reinforcement (Review) of Factors

The text is analysed as a factorial explanation, for which Ellie has deployed the conventional generic structure, identifying one outcome and its four contributing factors in the first stage, and then explaining each factor in turn in the ensuing stages, before providing a final review of the explanation. Approximately half of the text has been reproduced in Table 4.15, with portions within the Factors omitted.

4.3.2   Text 2.3: Field

The Field for this text relates to a learning unit about the Industrial Revolution, and specifically the consideration of causes that located the beginning of this sequence of events in England. This is an 'uncommonsense' educational Field involving abstract reasoning about complex causality, moving beyond the simple chronologies and causal chains of Ellie's earlier empathetic texts and historical accounts.

4.3.3   Text 2.3: Ideation (Entities)

The entities in the text are shown on Tables 4-16 and 4-17.

Table 4-16. Text 2.3: Ideation – Entities

Industrial	*inventions (new, mechanical), improvements, scientists,*
Revolution	*reasons, factors, need (desperate), necessity, mother of invention, wealth*
England:	*conditions (harsh, unhealthy, dangerous, bad); workers, coal miners, pickers, miners,*
coal mines	*positions (awkward, crouching, lying); people, men, boys, girls, families*
	cave, cells, (bottom), coal, shafts, cage, compartments, tracks, fall, wall, tunnels (dark,
	hot), carts, gas lamps; feet; water, air, oxygen, methane gas (highly flammable),
	ventilation, coal (thick), muck, stuff, heat (intense), rock (falling)
	task, work, shovelling, loading, rest, hours, minutes, equivalent, wages, price
	safety, death rates, explosion, incident, accident (frequent, fatal), rescue parties, mine
	(Belgian), ways (safer)
England:	*country (small, contained), sense of nationality (strong), rivalry*
sense	*countries (other, European) Holland, Germany, conflict, sense of nationality*
England:	*the English, sense of belonging, situation (strong), Elizabeth the 1st, times*
trade	*navy (world's most powerful) power; fleet (small, fast), cannons, sea;*
	Spain, ships (Spanish, trading), cannons, wealth (Spanish)
	empire, countries, America, India
	money, amount; trade, cotton, raw material, clothes, rugs, economy, wealth
England:	*King, monarch, King Henry the 8th, wife, monarchy (constitutional)*
monarchy	*Catholic Church, Catholics, Church of England, lands, church, parliament (religious)*
	nobles, families, generations, manor lord, land
	power, money, desires, comforts, cruelty
	peasants, people, strips, village, centre, produce, enclosure, dividers, paddocks, crops
	enclosure, jobs, forests, robbery, city

Table 4-17. Text 2.3: Ideation - Kinds of entities

concrete	everyday	*person/people, men, boys, girls; land, village, paddocks, crops, forests, city water, air, muck, stuff; sea, ships, cotton, clothes, rugs, money*
	specialised	*mine, cave, cells, coals, shafts, cage, compartments, tracks, wall, tunnels, carts, gas lamps; oxygen, methane gas; cannons; material*
abstract	institutional	*country, kingdom, monarch, King, nobles, navy, church; wife, families workers, miners, pickers, rescue parties, scientist; wages, jobs*
	semiotic	-
	generic	*amount, mother (=source), ways, feet, minutes, times, hours, minutes, generations, fleet, conditions, situation*
abstract, metaphoric	process	*need, invention, improvement, death, mining, fall, position, shovelling, loading, rest, work, task, price, ventilation, explosion, incident; conflict, rivalry, sense, belonging, desires; trade, produce, robbery,*
	quality	*necessity, rates, equivalent, accident, safety, nationality, wealth, economy, power, cruelty, comforts, centre*
	Conjunction	*reasons, factors*
technical		*England, the English, Elizabeth the 1st, King Henry the 8th, England, Holland, Germany, European countries, Spain, The Spanish, America, India; Catholic Church, Catholics, Church of England*
		parliament, constitutional monarchy; manor lord, peasants empire; The Industrial Revolution, enclosure, strips, dividers

In the construal of entities, Ellie has expanded the Ideation to show her detailed knowledge of different aspects of the topic, particularly in relation to the coal-mining industry and the salient political events. The generalisation of people, aside from the two individual monarchs, in social and economic groups, reflects the preoccupation of the text with the broad scope of the Field in terms of social events and conditions.

The concrete entities in the text reflect the detailed attention given to the description of the physical circumstances that Ellie presents as the basis for some of the abstract reasoning. At the same time, significant abstraction is evident, in institutional, technical and abstract entities that are central to different aspects of the topic and are removed from everyday knowledge, including technical packaging of time in *Industrial Revolution*. The significant use of grammatical metaphor demonstrates greater movement away from commonly-used lexis compared to Year 6 and towards new ways of making meanings and a greater prevalence of abstraction. The choices of grammatical metaphor (e.g. *improvements, death rates*) and gerunds, which are verb forms with '-ing' used nominally *(shovelling, loading)*, allow non-entities to become Participants and thus agents, including processes as

Participants in other processes; similar choices were noted in relation to Text 1.2 in section 4.1.3, although such usage is still limited in Year 8. The significance of the abstract terms *reasons* and *factors*, construing causality, is discussed in the following section. The abstract meaning *sense of nationality* can be compared with *sense of unity* in Text 2.2 and *sense of belonging* in Text 2.4, other texts in this set.

4.3.4   Text 2.3: Ideation (Activity Sequence) plus Conjunction

The Ideation in the activity sequence, in combination with the Conjunction resources deployed, is of particular interest in relation to the novelty of this genre in Ellie's writing. Analysis of the activity sequence and Conjunction, as the semantic relations and logical relations between the activities, are discussed together below, also relating these to the entities where relevant. The use of these resources is distinctive in each stage of the text. The first stage is displayed in Table 4-18.

Table 4-18. Text 2.3: Ideation (Activity sequence) and explicit Conjunction - Outcome stage

The Industrial Revolution <u>began</u> in England for these reasons.
The conditions for workers, especially the coal miners, <u>were</u> harsh, unhealthy and dangerous.
This <u>called for</u> new mechanical inventions.
It <u>was</u> a small contained country
<u>unhindered</u> by the conflicts that burdened other countries.
It <u>had</u> the world's most powerful navy
***and** they <u>plundered</u> Spain's wealth.*
They w<u>ere </u>the first country to overthrow their monarch,
<u>replacing</u> it with a religious parliament.
These factors <u>created </u>a necessity
which <u>became</u> the mother of invention.

KEY: <u>Activities </u>underlined; Conjunction resources in bold font

The first clause introduces the event that is the outcome. This is followed by a sequence of descriptions and events which construe the elements that have been metaphorically summarised in the first clause as causative, in *these reasons*. The additive relation between the elements listed in sequence here is, perhaps disappointingly, implicit. They are finally linked in the summarising expression *These factors*, which is in turn linked back to the outcome (*became the mother of invention*), as a reconstrual of the outcome, though with

omission of explicit reference to *England*. In this final clause, the causality is

metaphorically realised in *factors*, and implicit in *created, which, became* and *mother:*

> *These factors created a necessity which* (as a result) *became the mother of invention.*

Significant abstraction can be seen in this stage of the text in the activities (e.g. *began, called for, unhindered*) in combination with the abstract entities involved (e.g. *conditions, conflicts, necessity, inventions*), including the abstract construal of cause (*reasons, factors*). This abstraction and causality in the text underpin the abstract reasoning that is central to its purpose.

For Factor 1, the activity sequence and Conjunction from the greater part of this stage are shown in Table 4-19.

Table 4-19. Text 2.3: Ideation (Activity sequence) and explicit Conjunction - Factor 1 excerpt

The conditions in the coal mines <u>were </u>so bad
***and** the death rates (<u>were</u>) so high scientists were forced to invent safer ways of mining.*
The mines <u>were entered</u> in a sort of cage that ran straight down the shafts, guided by tracks down the wall.
The cages <u>had</u> six compartments
each <u>fitting</u> around 3 people in each.
This <u>was</u> a hair-raising, very fast free fall.
The tunnels <u>were</u> low, only a few feet high.
The pickers <u>were </u>usually men,
<u>working</u> in awkward, crouching or lying positions.
The shovelling and loading of the carts <u>was done</u> by young boys and girls of about 10…
The gas lamps used to light the cave <u>used up</u> the oxygen
***and** the air <u>was</u> full of thick coal.*
There <u>was</u> no ventilation
***and** the walls <u>leaked</u> water.*
Slowly the cells <u>would fill</u> with oozy muck and highly flammable methane gas.
The miners <u>knew</u> this was dangerous and the stuff should be cleared out
***but** they <u>could not afford</u> a day's rest from collecting the coal.*
For 13 hours solid work and 15 minutes rest the men <u>were paid</u> the equivalent of 50c,
barely enough for them and their starving families to survive on.
***So, though** they <u>knew </u>the price*
they <u>could not give up</u> a day's wages to ensure their own safety.
This methane gas <u>collected</u>, especially in the bottom cells
***and** eventually the lamps <u>would light</u> it,*
<u>causing</u> an explosion.
The miners <u>were burnt</u>,
<u>crushed</u> beneath falling rock
***or** <u>trapped</u>.*
Rescue parties <u>were sent</u> down
***but** very few <u>could be saved or recovered</u>.*
In an incident like this in a Belgian mine 3 out of 36 <u>survived</u> a methane explosion.
These frequent and fatal accidents <u>demanded</u> scientists <u>to create</u> new inventions
<u>to</u> help coal miners.

KEY: <u>Activities </u>underlined; Conjunction resources in bold font

The activities in much of this Factor are significantly concrete and descriptive, construing the physical world of the mines (e.g. <u>had</u> six compartments; <u>were</u> low) and the generalised, habitual concrete activities related to the industry (e.g. *were entered, sweating, leaked, burnt*). Two instances of gerunds (*the shovelling, loading)* move slightly away from the concrete in construing actions as abstract entities, and further abstractions also appear (e.g. *ventilation, explosion*). The relations between the descriptions and activities are at first implicitly additive as information simply unfolds in sequence, but later become more explanatory. Causality is explicit in relation to the miners' risk awareness *(So)*, metaphorical where realised 'in the clause' (*causing*), and implicit in the science-like

explanation of the gas explosions, as an 'implication sequence' where each activity is the result of the preceding activity:

> (as a result) *Slowly the cells would fill with oozy muck and highly flammable methane gas…*
>
> (as a result) *This methane gas collected, especially in the bottom cells*
>
> (as a result) *and eventually the lamps would light it,*
>
> (as a result) *causing an explosion.*
>
> (as a result) *The miners were burnt…*
>
> (as a result) *Rescue parties were sent down*

The abstract reasoning in this stage as a Factor in the text is based on the construal of this mining context in abstract terms, in the entities *conditions and death rates*, and later *These frequent and fatal accidents,* as well as in some of the activities (e.g. *afford, ensure*), alongside further abstract entities. The linking of the factor to the outcome (*new inventions*), at the end of this stage follows a similar pattern to that seen in the first stage, with the deployment of a summarising noun group (*These frequent and fatal accidents*).

For comparison, the activity sequence and Conjunction in the second Factor are shown in Table 4-20.

Table 4-20. Text 2.3: Ideation (Activity sequence) and explicit Conjunction - Factor 2

England <u>was</u> a small, contained country
which <u>meant</u> that there was no rivalry
While *other countries <u>were</u> in conflict with each other*
England <u>maintained</u> a strong sense of nationality.
Holland, Germany and other European countries <u>were</u> bordered by others.
People <u>were</u> constantly <u>coming</u>
and *<u>going</u>*
so, *unlike England, there <u>was</u> not much sense of nationality.*

KEY: <u>Activities</u> underlined; Conjunction resources in bold font

This Factor is more abstract throughout, and more consistently explanatory, giving greater prominence to causality. While concrete descriptions and activities are included in relation to the geographical context (e.g. *small contained, were bordered, coming, going*), the focus is on their impact (*meant, maintained*) on national sentiment, construed in abstract terms (*rivalry, conflict, sense of nationality*). Cause is introduced almost immediately in the Process *meant*. It is also construed explicitly (*So*), as well as implicitly in a contrast (*While*) and between clauses, as seen here:

> *Holland, Germany and other European countries were bordered by others.*

> (<u>as a result</u>) *People were constantly coming and going…*

Factor 2 is not linked to the outcome at this point, but only after combination with the further explanation in Factor 3, which is shown in Table 4-21.

Table 4-21. Text 2.3: Ideation (Activity sequence) and explicit Conjunction - Factor 3

In those times whoever ruled the sea <u>ruled</u> most of the world's trade.   *This <u>was</u> England, Elizabeth the 1st and her most powerful navy.*   *They <u>took</u> power from Spain,*   *<u>plundering</u> the Spanish wealth.*   *The Spanish ships <u>were</u> huge*   ***and** <u>weren't</u> easy to manoeuvre*   *which <u>meant</u> the small fast fleet of the English could easily defeat Spain's trading ship before the cannons could be turned on them.*   *With England's sense of belonging and strong situation it soon <u>spread</u> its empire over many countries including America and India.*   *They <u>got</u> the people in India <u>to grow</u> cotton,*   *<u>bought</u> the raw material off them*   *<u>made</u> it into clothes and rugs*   ***and** <u>sold</u> it back.*   ***So** they <u>kept</u> countries <u>from having</u> their own economy*   *<u>taking</u> it for themselves.*   *This <u>gave</u> enough wealth to support scientists and their inventions.*
KEY: <u>Activities</u> underlined; Conjunction resources in bold font

The explanation in Factor 3 provides reasoning about the complex causes of English wealth through control of trade. The design of the English ships created greater efficiency, leading to their control of the seas over Spain; this is then linked to the impact of the national sentiment and empire-building. Causality is implied in *(by) plundering* and

explicit in *meant*, causative actions (*got to grow, kept from having*) and use of *So*. The final clause again uses a summarising expression (*This*) to make the link to the outcome, as previously:

> *This gave enough wealth to support scientists and their inventions.*

Throughout the course of the text, therefore, Ellie deploys a range of resources to construe causality and complex abstract reasoning.

The final Factor differs further in its realisaton of activity sequence and Conjunction, in its dependence on chronology. The relevance of England's political context is built up through a sequence of activities that construes an account of events, similar to the unfolding of an Account Sequence in a historical account. For example:

> *When the Catholic Church <u>would not let</u> King Henry the 8th <u>divorce</u> his wife*
>
> *he <u>made</u> the Church of England.*
>
> *All those who did not convert <u>were persecuted</u>*
>
> *and <u>killed</u>.*
>
> *Some generations later the Catholics <u>rose up</u>*
>
> *<u>overthrew</u>*
>
> ***and** <u>beheaded</u> the King*
>
> ***and** <u>ruled </u>as a parliament….*

The causal link to the Industrial Revolution is realised in the two instances of *This meant,* in the middle and at the end of this account, of which the latter is only partially successful:

> *<u>This meant</u> that money could go towards improvements rather than one person's desires and comforts.*

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> *This meant* that many people lost their jobs and were forced to live out in the forests, beg, or turn to robbery. Some set out to find work closer to the city.

The attempted link in the latter instance is incomplete, in not making clear the relevance to the Revolution of work-seeking closer to cities. The reader is left to conclude that this provided a newly available workforce to facilitate the industrial developments. While the chronology here is effective, the explanatory reasoning is only partially so.

The final stage of the text completes the explanation of this complex causality by combining all the Factors, as *needs* and *wealth,* representing the first factor and the others respectively, and then making the explicit causal link to the beginning of the Industrial Revolution in England:

> *So England was the first to have an industrial revolution*
>
> *because it had the desperate need and the wealth to fulfil that need.*

Overall, in the abstract reasoning about complex causality in this text, Ellie demonstrates new developments in the abstract construal of entities, activity sequences and Conjunction resources, while often still drawing on familiar writing of descriptions and accounts to support these new meanings.

4.3.5   Text 2.3: Transitivity

Selected transitivity resources realising Process and Participant in non-contiguous clauses are illustrated in Table 4-22.

Table 4-22. Text 2.3: Transitivity - Processes and Participants: examples

Participant	Process	Process type	Participant
The conditions for workers, especially the coal miners,	*were*	RA	*harsh, unhealthy and dangerous.*
	unhindered	MA	*by the conflicts [[that burdened other countries]].*
They	*were*	RI	*the first country [[to overthrow their monarch]]*
the death rates	*(were)*	RA	*so high [[that scientists were forced to invent safer ways of mining]].*
(who)	*were given*	MA	*the task [[(of)pushing the heavy coals along the dark, hot tunnels]].*
	sweating	BH	
The gas lamps [[used to light the cave]]	*used up*	MA	*the oxygen*
the air	*was*	RA	*full [of thick coal].*
The miners	*knew*	MN	
they	*could not afford*	RA	*a day's rest [[from collecting the coal]].*
which	*meant*	RI	*[[that there was no rivalry]].*
[[whoever ruled the sea]]	*ruled*	MA	*most of the world's trade.*
This	*was*	RI	*England, Elizabeth the 1st and her most powerful navy.*
	weren't	RA	*easy [[to manoeuvre]]*
which	*meant*	RI	*[[the small fast fleet [of the English] could easily defeat Spain's trading ships // before the cannons could be turned on them]].*
England	*was*	RI	*the first country [[to overthrow their monarch]].*
All those [[who did not convert]]	*were persecuted*	MA	
they	*persecuted*	MA	*those [[who remained loyal to the Church of England]].*
They	*made*	MA	*[[what was later modified to a constitutional monarchy]].*
(there)	*was*	EX	*a church*
The king	*demanded*	VR	*an amount / from the manor lord*
This	*meant*	RI	*[[that money could go towards improvements rather than one person's desires and comforts]].*
Enclosure	*meant*	RI	*[[that the land was taken from the peasants, // the dividers taken down // and whole paddocks of certain crops were grown rather than small strips of all different kinds]].*
England	*was*	RI	*the first [[to have an industrial revolution]]*

KEY**:** MA - material; BH - behavioural; MN - mental; VR - verbal; EX – existential**;** RA- relational attributive; RI - relational identifying

Familiar uses of transitivity resources in Text 2.3 are the material Processes realising actions, and relational Processes realizing description. These are, however, at times abstract (e.g. *called for, afford, maintained*). Of interest also are the causative Processes, including several instances of the Process *meant* in relational identifying clauses. The

consistent construal of Participants in expanded noun groups and embedded clauses, as illustrated in Table 4-22, demonstrates increased complexity in comparison with Year 6.

Ellie continues to demonstrate a varied range of Circumstances, with time and place dominant but with reason, quality, comparison and role (*as a parliament*) also evident.

4.3.6   Text 2.3: Clause complexing

Clause complexing is deployed frequently in this and other Year 8 history texts, compacting information, with some new variations, including the expanded use of relative clauses with prepositions. Dependent clauses are underlined in the following examples:

> *The Spanish ships were huge // and weren't easy to manoeuvre // which meant [[the small fast fleet of the English could easily defeat Spain's trading ships // before the cannons could be turned on them]].*
>
> *As had been done to them // they now persecuted those [[who remained loyal to the Church of England]].*
>
> *In the centre of the village was a church // to which 10% of everyone's produce was paid.*
>
> *To get him started // they provided him with a hut, some wheat, a spade, a hoe, two pigs and six chickens.* (from Text 2.1)

Enclosed clauses are deployed at times across this range of texts, more frequently than in the minimal use of these in Year 6, as seen in the example below:

> *So <<although they knew the price,>> they could not give up a day's wage // to ensure their own safety.*

4.3.7   Text 2.3: Mode

The use of metaphorisation and a related higher lexical density of approximately 3.9, along with the crafted, rhetorical textual organisation, move Text 2.3 more in the direction of written language than was evident in the Year 6 writing.

4.3.8   Text 2.3: Periodicity

The deployment of textual resources to manage the rhetorical structure of the text, in which all of the content revolves around one identified outcome as a central nucleus, is a key development in this text. Ellie shows that she is beginning to manage these resources, albeit with limited control. The resources of hierarchical Periodicity deployed in the text are underlined in Table 4-15, where they can be seen in relation to the whole text. The first stage provides a clear macroTheme where the outcome is presented and the four factors are previewed, predicting the generic stages to come. In the Factor stages which follow, some use of hyperThemes and hyperNews is evident, although without complete consistency. An attempted final macroNew summarises all the Factors to complete the coherence of the text. This statement succinctly repackages the key information in the whole explanation, even though no new information is included that would make this element a conventional and complete macroNew.

In connection with the Periodicity, Ellie has begun to deploy limited resources of internal Conjunction in the use of *So* in the final statement, which brings together the causative reasoning of the whole text. Wider use of internal Conjunction resources may have been expected to support information flow in a text of this type, such as perhaps signaling internal text time with some ordering resources (e.g. *first, firstly*). Such usage could have guided the reader more effectively, particularly if deployed alongside more consistent use of hyperThemes. Ellie demonstrates only partial development of these resources here.

4.3.9   Text 2.3: Theme and Rheme

Some examples illustrating Theme and Rheme in Text 2.3 are presented in Table 4-23, most in non-contiguous clauses.

Table 4-23. Text 2.3: Theme and Rheme: selected examples

Textual Theme	Marked Topical Theme	Unmarked Topical Theme	Rheme
	For 13 hours solid work and 15 minutes rest	*the men*	*were paid the equivalent of 50c,*
	In an incident like this in a Belgian mine	*3 out of 36*	*survived a methane explosion.*
	In those times	*whoever ruled the sea*	*ruled most of the world's trade.*
		This	*was England, Elizabeth the 1ˢᵗ and her most powerful navy.*
		They	*took power from Spain,*
			plundering the Spanish wealth.
		The Spanish ships	*were huge*
and			*weren't easy to manoeuvre*
whi…		*…ich*	*meant the small fast fleet of the English could easily defeat Spain's trading ships before the cannons could be turned on them.*
	With England's sense of belonging and strong situation	*it*	*soon spread its empire over many countries including America and India.*
	Generations later	*their families*	*still owned them*
and		*the peasants*	*worked the land.*
	In the centre of the village		*was a church*
to whi…	*…ich*	*10% of everyone's produce*	*was paid to which*
		Each peasant	*had 3 strips of land to work on*
wh…		*…ich*	*they rotated.*
		The king	*demanded an amount from the manor lord*
and	*according to that*	*the peasants*	*had to pay produce to the lord.*
After		*paying*	*that and the 10% to the church*
		they	*had little or none for themselves.*
		Enclosure	*meant that the land was taken from the peasants, the dividers taken down and whole paddocks of certain crops were grown rather than small strips of all different kinds.*
		This	*meant that many people lost their jobs and were forced to live out in the forests, beg, or turn to robbery.*

The Themes are varied, though occasionally repetitive unmarked Themes occur where several points of new information are related to the same agents, such as in Factor 4 (*the Catholics, they, these people, They, They*). Both linear and zigzag thematic progression are evident. Rhemes are at times lengthy and add significant detail to the information, particularly, but not only, where cause is construed in *meant*. One instance of weak thematic choice stands out in the abrupt introduction of the New information *Enclosure*

near the end of Factor 4, where the Given information, *peasants* and *land*, is in the Rheme. A reversal of this choice, possibly with a marked temporal Theme indicating the chronology, would have been more effective.

4.3.10 Texts 2.1-2.4-: Summary

In Text 2.3, Ellie shows significant development, not only in the capacity for more sustained writing, but particularly in multiple new resources of abstraction, causality and textual organisation appropriate to the purpose of the text. Abstract Ideation is expanded; reasoning is abstract and moves beyond the simpler meanings of Year 6; summarizing terms are deployed to distil information; causality is construed in expanded resources, including explicit, implicit and metaphorical; and the text is organised rhetorically, with some beginning deployment of internal Conjunction. Knowledge of the history topic and its technical meanings is demonstrated. At the same time, some of these resources are in the early stages of development, so that Ellie has only partially met the demands of the genre. It is of interest that her teacher's feedback written on the text was highly positive; the teacher appears to recognise the level of achievement and not penalise the weaknesses.

 In other rhetorically organised texts written at this age, Ellie at times shows similar success in explanation, but her expositions are less developed, as illustrated in Text 2.4, *Was Life Better before the Industrial Revolution*, a simple argument based on comparison. She also continued to write chronological texts at this age, as illustrated in Text 2.1, the biographical recount *James Ruse*, and Text 2.2, *Revolutionary Events*, a historical account. The latter is slightly more abstract than the Year 6 texts of the same type in its attention to the more complex motivations of the protagonists.

4.4 Year 8 Science texts

Text 2.5 exemplifies the procedural recount genre, the dominant text type in Ellie's Year 8 science writing.

4.4.1 Text 2.5: Genre

The generic structure of Text 2.5, *Kundt's Tube*, is displayed in Table 4-24.

Table 4-24. Text 2.5: Generic structure

Kundt's tube – Procedural recount	Generic structure
We used a 600m long x 2.5 mm D glass tube. The tube had a rubber piston placed in one end. The glass tube was standing on two blocks of wood. Inside was a layer of fine earth dust.	Record of Events
What we did: *(A) Angela put her mouth to the end of the glass tube and screamed into it. The cork dust stood up and when the sound stopped settled into waves made up of bigger and smaller walls.* *(B) We put the Audio Generator, which was attached to the speaker, to the end of the glass tube. On the lower frequency there were two waves, on higher frequency there were three waves*	
Observations: (A) *When the glass tube was screamed into on a low frequency the cork dust rose up in thin vibrating walls. When the sound stopped the active walls collapsed into two waves of corrugation. On a higher frequency it was much the same only the walls were closer together and we were left with three waves inside the tube.*	
Observations: (B) *The result after using the Audio Generator was much the same as with the voice. When the Audio Generator was turned on the cork dust danced almost to the top of the tube then settled down into corrugations. The walls varied in height creating waves, more on higher frequency and less on lower frequency.*	
Conclusion: *The vibrations of the voice move down the tube creating walls. The collecting of powder formed rarefaction and compression. Compression is the thin walls and rarefaction is the space between.*	Conclusion

In this procedural recount, the Record of Events is divided into phases, with headings used for most of these. This practice is common among Ellie's similar texts in Year 8 and later, with the heading 'What we used' often added for the first phase. She does not include an Aim stage in her procedural recounts at any age. In this text, the 'What we did' phase is

slightly inconsistent in that it includes some observations, but the Observations phases describe the outcome of the activities in more detail. A brief Conclusion is included, which crystallises the relevant generalised science learning, including clarification of the technical language.

4.4.2 Text 2.5: Field

The Field for this text concerns the study of physics, in particular, sound, in the operation of a Kundt's tube, a device designed for this purpose. Sound entering a Kundt's tube causes air movements which disturb the powder contained in the tube, causing the powder to form shapes that replicate the sound waves. This is an 'uncommonsense' educational Field.

4.4.3 Text 2.5: Ideation (Entities)

The entities in the text are shown in Tables 4-25 and 4-26.

Table 4-25. Text 2.5: Ideation – Entities

glass tube	*Kundt's tube, rubber piston, end, blocks of wood, cork dust, powder, top*
Audio Generator	*speaker*
we	*Angela, mouth*
sound	*frequency (higher, lower), voice, vibrations*
wave	*walls (vibrating, thin), corrugations, collecting, height, space, compression, rarefaction; result*

Table 4-26. Text 2.5: Ideation - Kinds of Entities

concrete	everyday	*blocks of wood, powder, mouth, sound, voice, walls, space*
	specialised	*glass tube, rubber piston, cork dust, Audio Generator, speaker*
abstract	institutional	-
	semiotic	-
	generic	*end, top*
abstract, metaphoric	process	*vibrations, (collecting)*
	quality	*corrugations, height*
	Conjunction	*result*
technical		*Kundt's tube; frequency, wave, rarefaction, compression*

Concrete, technical and metaphoric entities are included in this text. Concrete entities comprise the equipment used in the experiment, including both everyday and specialised

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items. The Kundt's tube itself, as an instrument of science. is understood as a technical entity. More abstract technical entities relate to sound and its effects (*frequency, wave, rarefaction, compression).* The non-technical metaphorisations deployed in the reconstrual of *sound* as *vibrations,* of *bigger* and *smaller* as *height,* of the affected dust as *corrugations* change processes and qualities into entities. The gerund *collecting* achieves the same effect. The phenomena of interest are explained as much as possible in commonsense terms first, with the more abstract meanings introduced gradually, and the most technical lexis in the Conclusion. Definitions of these latter terms, *rarefaction* and *compression,* are provided, construing taxonomised meanings within the knowledge structure of science, enabled by the metaphorisation. These are more abstract than many of the technical terms seen in Year 6, though their definition is still closely linked to the visible dust formations (*walls*, *the space between)* rather than being precisely scientific. In this way the abstraction in the text is tied to the observed concrete events as the activity physically represents the invisible natural phenomena.

4.4.4   Text 2.5: Ideation (Activity Sequence) plus Conjunction

The activity sequence and explicit Conjunction in the text are highlighted in Table 4-27.

Table 4-27. Text 2.5: Ideation (Activity sequence) and explicit Conjunction

We used a 600m long x 2.5 mm D glass tube. *The tube had a rubber piston placed in one end.* *The glass tube was standing on two blocks of wood.* *Inside was a layer of fine earth dust.*
(A) Angela put her mouth to the end of the glass tube ***and** screamed into it.* *The cork dust stood up* ***and** <<>> settled into waves made up of bigger and smaller walls.* ***when** the sound stopped* *(B) We put the Audio Generator <<>>to the end of the glass tube.* *<<which was attached to the speaker,>>* *On the lower frequency there were two waves,* *on higher frequency there were three waves*
Observations: (A) ***When** the glass tube was screamed into on a low frequency* *the cork dust rose up in thin vibrating walls.* ***When** the sound stopped* *the active walls collapsed into two waves of corrugation.* *On a higher frequency it was much the same* ***only** the walls were closer together* ***and** we were left with three waves inside the tube.* *Observations: (B)* *The result after using the Audio Generator was much the same as with the voice.* ***When** the Audio Generator was turned on* *the cork dust danced almost to the top of the tube* ***then** settled down into corrugations.* *The walls varied in height* *creating waves,* *more on higher frequency and less on lower frequency.*
The vibrations of the voice move down (the) tube *creating walls.* *The collecting of powder formed rarefaction and compression.* *Compression is the thin walls* ***and** rarefaction is the space between.*
KEY: Activities underlined; Conjunction resources in bold font

Following the initial description of the equipment, the activity sequence construes the actions undertaken and the resulting natural phenomena. Some activities are construed as entities, as noted earlier.

The Conclusion here is brief and succinct; the effects of the experiment are described, but they are not explained in detail. The abstract science terms defined in the Conclusion are simply equated to the physical entities (*is the thin walls; is the space between*). In contrast, other Year 8 science texts often provide interpretive explanations, realised either by a

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'showing verb' (e.g. *shows, demonstrates*), or in other related resources, such as in the following examples:

> *This experiment <u>demonstrates</u> which part of the eye perceives colour.* (from *Side Vision*)

> *The cone <u>represents</u> the auricle because they both direct sound to the ear and therefore make it easier to hear.* (from *Ear Cone*)

> *The flask is a rough <u>model</u> of our eye.* (from *The Round Flask*)

Conjunctive relations of addition, time and cause are evident as expected for the text type. In the chronology of activities, Conjunction is implicitly additive and at times explicitly temporal; the Conclusion also depends partially on implicit additive conjunction. Causality is important here to construe the effect of the actions, which is the purpose of the experiment, and a range of resources for realising causality are deployed. These include implicit cause as in the following implication sequence:

> *Angela put her mouth to the end of the glass tube*
>
> *and screamed into it.*
>
> <u>(as a result)</u> *The cork dust stood up…*

Cause is also realised temporally:

> <u>*When* </u>*the glass tube was screamed into…;* <u>*When*</u> *the generator was turned on…*

Logical metaphor is also deployed:

> *The <u>result </u>after using the Audio Generator was much the same as with the voice.*

In the course of her other procedural recounts at this level, Ellie adds additional resources of cause and consequence, such as in the following examples:

> <u>*Due to*</u> *many windings of coil around a U-shaped coil, the magnetic field is strong.* (from *U-Coil)*

__By__ changing the polarity, we change the sides of the poles on the magnet. (from *Coils as a Magnet*)

4.4.5 Text 2.5: Transitivity

Illustrative examples of Processes and Participants in the text are shown in Table 4-28.

Table 4-28. Text 2.5: Transitivity – Processes and Participants: examples

Participant	Process	Process type	Participant
We	used	MA	a 600m long x 2.5 mm D glass tube.
The tube	had	RA	a rubber piston [[placed in one end]].
The glass tube	was standing	RI	on two blocks [of wood].
(there)	was	EX	a layer of fine cork dust.
Angela	put	MA	her mouth
	screamed	MA	
The cork dust	stood up	MA	
	was	RA	attached [to the speaker]
there	were	EX	two waves,
there	were	EX	three waves.
the glass tube	was screamed into	MA	
the cork dust	rose up	MA	
the sound	stopped	MA	
	settled into	RI	waves [[made up of bigger and smaller walls]].
the active walls	collapsed into	RI	two waves of corrugation.
it	was	RA	much the same
the walls	were	RA	closer together
we	were left with	MA	three waves
The result [[after using the Audio Generator]]	was	RI	much the same [as with the voice].
the Audio Generator	was turned on	MA	
the cork dust	danced	MA	
	settled down into	RI	corrugations
The walls	varied	RA	in height
	creating	MA	waves,
The vibrations [of the voice]	move	MA	
	creating	MA	walls.
The collecting [of powder]	formed	MA	rarefaction and compression.
Compression	is	RI	the thin walls
rarefaction	is	RI	the space [between].

KEY**:** MA - material; MN - mental; EX **–** existential**;** RA- relational attributive; RI - relational identifying

In the transitivity choices, the Process types are as expected: material to realise the actions and relational and existential to realise descriptions, including the new shapes of the dust. The deployment of relational identifying Processes to create the definitions is a feature distinctly related to the science meanings.

Two choices of passive voice allow the human Actor to be elided (*was screamed into, was turned on*). Passive voice was evident in Year 6, but primarily in the texts that appeared scaffolded. In the realisation of Participants, the noun groups show some limited expansion with modifying prepositional phrases or non-finite clauses, but the expansion is less prevalent than in Ellie's history writing of the same year.

Circumstances are deployed frequently and are varied, construing the locations within the equipment, the conditions created in the activity, as well as the resulting dust quality and products. For example:

> *...the cork dust danced <u>almost to the top of the tube</u>* (place)
>
> *<u>On the lower frequency</u> there were two waves...* (condition)
>
> *the cork dust rose up <u>in thin vibrating walls</u>.* (quality)
>
> *the active walls collapsed <u>into two waves of corrugation</u>.* (product)

4.4.6 Text 2.5: Clause complex

The use of clause complexing is for the most part limited to simple addition (*and*) and dependent clauses of time (*when, then*), but with one instance of comparison (*only*, meaning 'except that'), and with the occasional non-finite clause (*creating…*). Ellie's tendency towards more limited use of clause complexing in science in Year 8 contrasts with her history writing at the same age. This is a general trend, though some instances of complexing with a greater number of clauses and in different combinations of relations do appear in different science texts, as in the following examples, shown with dependent clauses underlined:

> *The Miller pours wheat into the Hanging Shoe // <u>which swings back and forth</u> // <u>spreading the grain evenly onto the grindstones</u> //<u>where it is crushed</u> //then poured into a chute made of cloth. (from Text 2.7)*

This is [[because the butter still contains whey //<u>which has lots of water</u>]]. (from Text 2.8)

4.4.7   Text 2.5: Mode

This text contrasts with Text 1.5 in several features. Text 2.5 is distinctly written-like, with standard, simple clause grammar and the use of disciplinary lexis, including grammatical metaphor. The lexical density of approximately 4 arises partly from the use of grammatical metaphor, both technical and non-technical, and the consistent inclusion of Circumstances.

4.4.8   Text 2.5: Periodicity

The flow of information across the text is well organised, with headings and further alphabetical divisions; these strategies were begun in simpler form in late Year 6. Within each phase, the information is ordered, chronologically in the activity phases and then logically in the final three phases. The opening of each of the latter two may be considered a hyperTheme.

4.4.9   Text 2.5: Theme and Rheme

The Themes in the text are illustrated in selected clauses in Table 4-29.

Table 4-29. Text 2.5: Theme and Rheme: selected examples

Textual Theme	Marked Topical Theme	Unmarked Topical Theme	Rheme
	On the lower frequency	*there*	*were two waves,*
	on higher frequency	*there*	*were three waves.*
When		*the glass tube*	*was screamed into on a low frequency*
		the cork dust	*rose up in thin vibrating walls.*
When		*the sound*	*stopped*
		the active walls	*collapsed into two waves of corrugation.*
	On a higher frequency	*it*	*was much the same*
only		*the walls*	*were closer together*
and		*we*	*were left with three waves inside the tube.*
		The result after using the Audio Generator	*was much the same as with the voice.*
When		*the Audio Generator*	*was turned on*
		the cork dust	*danced almost to the top of the tube*
then			*settled down into corrugations.*
		The walls	*varied in height*
			creating waves, more on higher frequency and less on lower frequency.
		The vibrations of the voice	*move*
			creating walls.
		The collecting of powder	*formed rarefaction and compression.*
		Compression	*is the thin walls*
and		*rarefaction*	*is the space between.*

There is significant variation in the unmarked Themes. The minimal repetition of pronouns can be partially attributed to the small number of human actions in the experiment, so that several Themes realise the other entities involved in the activity (e.g. *the cork dust, the walls*), with the more elaborated Rhemes then expanding the behaviours of those entities in the phenomena observed. The thematisation of the abstract *result* and of the technical terms defined in the final two clauses foreground the science learning. Grammatical metaphor (*vibrations*) and a gerund (*collecting*), allowing actions to become agents as noted earlier, have been used to textual advantage.

Three marked Themes are deployed, differentiating the two different conditions of the experiment and their outcomes, and thus organising the information according to the external activity, as seen also in Text 1.5. The parallel between the three instances of

marked Theme here, and absence of other instances, is consistent with the generally focused and limited use of this resource in Ellie's Year 8 science writing.

4.4.10 Texts 2.5-2.8: Summary

Text 2.5 achieves its purpose of recording the activities undertaken and providing a scientific description of the phenomena observed. This text illustrates several developments from Year 6 to Year 8, including more complete generic structure, expanded technicality and grammatical metaphor. increased text length for the genre and effective textual organisation. At the same time, there is limited expansion of some transitivity resources and clause complexing.

The brevity of the Conclusion in Text 2.5 is typical of some, but not all, of the examples of this text type at this age. Conclusions are usually either descriptive or explanatory. A more extended and explanatory Conclusion in a procedural recount is seen in Text 2.8, *Fat Fire*, which incorporates an extended implication sequence, part of which is reproduced below:

> *When we first heated the butter,*
>
> (<u>as a result</u>) *it bubbled up.*
>
> *This is because the butter still contains whey*
>
> *which has lots of water.*
>
> (<u>as a result</u>) *This moisture bubbles up*
>
> *and at 120° C it evaporates.*
>
> (<u>as a result</u>) *We are left with fat that smokes, goes black and smells bad.*
>
> *If it gets hot enough (over 200° C)*
>
> (<u>as a result</u>) *the heat will ignite the oil.* (from *Text 2.5*)

While this latter example evidences limited technicality due to the Field, Year 8 science texts typically each include a few new technical terms, building an accumulation over the whole year (e.g. *copper sulphate, polysaccharides, buoyancy, density, pressure, photosynthesis, retina, radial muscles*).

Representing other text types, Text 2.6, *How Organisms Work*, or as corrected by the teacher, *How Organisms Feed,* is an example of a discrete report, in this case a classifying report. This text is also organised with headings, although some of the reports do evidence some internal organisation. For example, a short report on the topic of wheat is organised into phases that respectively outline its origins and biological identity, its value as a food source, and its diseases and cultivation risks.

Text 2.7, *Water Wheel Flour Mill*, is one of several discrete sequential explanations written by Ellie in Year 8. These texts evidence repeated and varied use of resources of causality, including those noted above in Section 4.4.4. In the case of Text 2.7, causality is realised implicitly in the use of temporal relations, non-finite processes and relative clauses, as seen in the excerpt below:

> *<u>As</u> the pole turns the spurs goes round.*
>
> *<u>hitting</u> a bar called the slapper stick.*
>
> *<u>When</u> the spur hits the stick.*
>
> *it slaps the cloth chute,*
>
> *<u>which</u> acts as a sieve,*
>
> *<u>letting</u> the fine flour fall through,*
>
> *<u>separating</u> it from the bigger husks*
>
> *<u>which</u> will be ground again*
>
> *<u>after</u> it is caught in a bag.*

In such texts, Ellie builds her capacity to write extended sequences of causal relations.

The texts described above illustrate the diversity in Ellie's Year 8 science writing.

4.5 Year 9-10 History texts

A number of texts from Year 9 history were considered along with the Year 10 writing, as in each of these years the writing was somewhat limited in quantity and generic range. Text 3.2 is from Year 9 and is discussed here because it demonstrates important developments in language resources.

4.5.1 Text 3.2: Genre

Text 3.2 is displayed in full in Table 4-30, showing generic structure, with Periodicity resources also highlighted.

Table 4-30. Text 3.2: Generic structure, and Periodicity resources (underlined)

How the British claimed Australia – Exposition	Generic structure
To claim the resources and management of a country, the British had three ways. The Europeans had agreed that by fulfilling these three layers, they would divide up the world. The first was a legal claim. This was on the basis of first discovery of the land or conquest. The second is that your people had to physically occupy and live on that land to claim it, or your people had to defeat the original inhabitants and protect it against their supplanted rivals. The third was a claim of moral proprietorship. This meant that the Europeans had to live there long enough that they called it home, that they could write poetry. To claim this moral proprietorship they had to feel that this place was where they belonged. Also, outsiders and the original inhabitants had to accept them as legitimate owners of the land.	Background
In the claiming of Australia none of these were properly fulfilled.	Thesis
The Europeans were not the first to discover Australia as the Indigenous Australians were there for at least 60,000 years before, and it is believed that they migrated from somewhere else. They did not conquer the Aboriginals here or dispossess them of their land. To overcome this the Europeans did not recognize the Aboriginal Australians as human inhabitants. They were legally considered part of the country and not humans with rights.	Argument 1
The second of these layers, like the 1st, was not obeyed. The Europeans did not defeat or chase out the Indigenous people, nor did they physically occupy Australia as the Aboriginal people did.	Argument 2
Concerning the third layer, the Europeans had not been there long enough to develop a link to the land. In fact most European Australians did not feel like the country was their home until after World War 2. And the Indigenous people certainly did not freely and willingly acknowledge this new society as the owner of their country.	Argument 3
So the Europeans found the loopholes and go around their own laws by not legally recognizing the Indigenous Australians as human beings.	Reinforcement of Thesis

This text is understood as an Exposition in that its purpose is to present arguments in support of a thesis. The conventional generic structure is deployed, comprising Background, Thesis, three Arguments and a Reinforcement of Thesis. The Background is lengthy, setting out the three elements of the topic that are picked up in each of the three Arguments, so that the Thesis stage is brief.

4.5.2 Text 3.2: Field

The Field for this text is concerned with the historical British claim to the continent of Australia, and the question of the legality of that claim. This Field is significantly abstract, further removed from everyday experience than was the case in Text 2.3.

4.5.3 Text 3.2: Ideation (Entities)

The entities and the kinds of entities are listed in Tables 4-31 and 4-32.

Table 4-31. Text 3.2: Ideation – Entities

the British	*people, The Europeans, outsiders, European Australians, society (new) home, poetry*
Indigenous Australians	*inhabitants (human), Aboriginals, Aboriginal Australians, Indigenous people, Aboriginal people, human beings*
Australia	*resources, country, land*
discovery	*conquest, rivals (supplanted)*
the claiming	*management, claim (legal) , proprietorship (moral), rights, owner, owners (legitimate), inhabitants (original), loopholes, laws, ways, layer, basis*
	world, place, years, World War 2

Table 4-32. Text 3.2: Ideation – Kinds of entities

concrete	everyday	*people, humans, human beings, land, home, world*
	specialised	-
abstract	institutional	*country, society, owner, loopholes, laws, rights, outsiders*
	semiotic	*poetry*
	generic	*place, years, ways, layer, resources*
abstract, metaphoric	process	*management, claiming, claim, basis, proprietorship, discovery, conquest, inhabitants, rivals*
	quality	-
technical		*British, The Europeans, Australians, Aboriginals, Australia; World War 2.*

The three groups of people involved in the historical events are generalised, being the colonial powers and the collective migrants (*the British, Europeans, European*

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Australians), at times realised in the same terms, as well as the original inhabitants (*indigenous Australians, Aboriginals, Aboriginal Australians, indigenous people*). The significant level of abstraction in the text is evident in the analysis of entities. The institutional entities reflect the concern with legal matters, and the metaphoric choices construe activities related to the discovery and legal ownership of foreign land. Metaphorisation allows these activities to be integrated into the text as entities to enable the abstract reasoning about them. The three criteria are weakly construed by the choices of *ways* and *layer*.

4.5.4 Text 3.2: Ideation (Activity Sequence) plus Conjunction

The activity sequence is shown in Table 4-33.

Table 4-33. Text 3.2: Ideation (Activity sequence) and explicit Conjunction

To claim the resources and management of a country,
 the British _had_ three ways.
 The Europeans _had agreed_
 that by _fulfilling_ these three layers,
 they _would divide up_ the world.
 The first _was_ a legal claim.
 this _was_ on the basis of first discovery of the land or conquest.
 The second _is_ that your people had to physically occupy and live on that land to claim it, or your people
   had to defeat the original inhabitants and protect it against their supplanted rivals.
 The third _was_ a claim of moral proprietorship.
 This _meant_ that the Europeans had to live there long enough that they called it home, that they could
   write poetry.
 To _claim_ this moral proprietorship
 they _had to feel_ that this place was where they belonged.
 Also, outsiders and the original inhabitants _had to accept_
 them as (to be) legitimate owners of the land.

In the claiming of Australia none of these _were_ properly _fulfilled_.
The Europeans _were not_ the first to discover Australia   **as** the indigenous Australians _were_ there for at least 60,000 years before,   **and** _it is believed_   that they _migrated_ from somewhere else.   They _did not conquer_ the Aboriginals here   **or** _dispossess_ them of their land.   _To overcome_ this   the Europeans _did not recognize_   the Aboriginal Australians (to be) as human inhabitants.   They _were_ legally _considered_   (to be) part of the country and not humans with rights.
The second of these layers, like the 1st, _was not obeyed_.   The Europeans _did not defeat_   **or** _chase out_ the Indigenous people,   **nor** _did_ they physically _occupy_ Australia   **as** the Aboriginal people _did_.
Concerning the third layer, the Europeans _had not been_ there long enough to develop a link to the land.   In fact most European Australians _did not feel_ like the country was their home until after World War 2.   **And** the Indigenous people certainly _did not_ freely and willingly _acknowledge_   this new society as (to be) the owner of their country.
So the Europeans _found_ the loopholes   **and** _go around_ their own laws   **by** _not_ legally _recognizing_ the Indigenous Australians as (to be) human beings.
KEY: _Activities_ underlined; Conjunction resources in bold font

The Background sets out Britain's three criteria for land occupation, and then the thesis is based on negation of those criteria. The Arguments supporting the thesis mirror and dispute these points in turn, first defining the criterion (_was, is, meant_) and then discussing

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its non-fulfilment (e.g. *were not, did not…*). The activities related to the occupation of land include non-specific actions of a military nature (e.g. *occupy, defeat, protect, conquer, dispossess)* that are hypothetical, and abstract actions and interpretations *(e.g. divide up, claim, fulfil, overcome, obeyed, go around)*. The abstraction here is not linked to the concrete world to the extent seen in relation to the coal mines in Text 2.3. Attitudes and beliefs underlying the actions are also a central focus in the text (e.g. *agreed, feel, accept, believe, recognise, consider, acknowledge*).

In the negation that constructs the overall argumentation, the second Argument simply refutes the points listed for the criterion. In contrast, the first and third are elaborated in more detail, through the addition of further information about the arrival of the indigenous population and the British strategy for bypassing this fact, as well as the European Australians' link to the land. These elaborations expand and clarify the argumentation.

Explicit Conjunction contributes to building the arguments; this includes addition, to extend the negation of the criteria (*and, Also, or, nor*); comparison to contrast between the two groups (*a*s), and purpose in relation to the colonial goals (e.g. *to claim*). A relation of means is deployed to summarise the context and the combined arguments (*by*). All these resources have been used previously; they are deployed here in ways that serve the purpose of this text. The text also depends significantly on internal Conjunction, which is discussed below in Section 4.5.8 in relation to the textual meanings.

4.5.5   Text 3.2: Transitivity

Selected Processes and Participants in this text are shown in Table 4-34.

Table 4-34. Text 3.2: Transitivity – Processes and Participants: examples

Participant	Process	Process type	Participant
	To claim	RA	the resources and management [of a country]
the British	had	RA	three ways.
The Europeans	had agreed	VR	
they	would divide up	MA	the world.
	fulfilling	MA	these three layers
The first	was	RI	a legal claim.
This	was	RA	on the basis of first discovery [of the land] or conquest.
The second	is	RI	[[that your people had to physically occupy // and live on that land to claim it,// or your people had to defeat the original inhabitants //and protect it against their supplanted rivals]]
The third	was	RI	a claim [of moral proprietorship].
This	meant	RI	[[that the Europeans had to live there long enough [[that they called it home]], [[that they could write poetry]].
	To claim	RA	this moral proprietorship
they	had to feel	MN	[[that this place was [[where they belonged]]]].
outsiders and the original inhabitants	had to accept	MN	
none of these	were fulfilled.	MA	
The Europeans	were not	RI	the first [[to discover Australia]]
the Indigenous Australians	were	RA	there
it… [[that they migrated from somewhere else]].	is believed	MN	
They	did not conquer	MA	the Aboriginals
	dispossess	MA	them
	To overcome	MA	this
the Europeans	did not recognize	MN	
They	were considered	MN	
	(to be)	RI	part of the country and not humans with rights.
The second of these layers,	was not obeyed.	MA	

KEY: MA - material; MN - mental; VR – verbal; RA- relational attributive; RI - relational identifying

At the lexicogrammatical level, the activities are realised in the Processes. Material Processes construe the actions, whether concrete or abstract. Relational Processes are often identifying, being deployed to define the criteria and the roles of the two communities. The Process *meant* here is relational identifying, rather than causative as was the case in Text 2.3. A range of mental Processes are deployed to realise the attitudes and beliefs of the participants. A key element of the argumentation is the distinction being made between the

ideas adopted by the British, which are realised in mental Processes, and the facts of indigenous human occupation, realised in relational Processes. The mental Process in *it is believed* indicates Ellie's acknowledgement of external sources, although she does not name the holders of such beliefs.

Participants are realised in grammatical resources already deployed in previous texts, with extended embedded clauses evident in the definitions.

Circumstances in the text are again varied and may be abstract. They include place, time, duration, comparison, manner, behalf, viewpoint and matter; the latter are seen in the following:

> *They were <u>legally</u> considered part of the country…* (viewpoint)

> <u>*Concerning the third layer,*</u> *the Europeans had not been there long enough…* (matter)

4.5.6   Text 3.2: Clause complex

Patterns of clause complexing continue to show further variety in lengthier combinations in this text and others from this age, as seen in the examples below, in which the dependent or projected clauses are underlined:

> *The Europeans were not the first [[to discover Australia]] // <u>as the indigenous Australians were there for at least 60,000 years before,</u> //and it is believed [[<u>that they migrated from somewhere else</u>]].*

> <u>*Although this is a devastating tragedy,*</u> *// it has provided historians and scientists with an amazing insight into [[what life was like for them then]] // <u>because the ash and magma has perfectly preserved their world</u>.* (from Text 3.1)

> *It [[…]] is speculated [[that, <<<u>could they go further,</u> >> there would be much, much more]].* (from Text 3.1)

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It was not until two days of complete darkness <<broken only by lightning and flames of

electric storms >> // that his body could be found. (from Text 3.1)

The crew was made up of 1000s of (men) // amongst whom were mapmakers, shipwrights,

masons, metalsmiths and other such tradesmen. (from Text 3.4)

The complexing is very occasionally slightly awkward where Ellie tries to combine

meanings in complex ways, as in the following instances:

The Europeans had agreed //that by fulfilling these three layers, // they would divide up the

world.

One would hope // that, << coming from upright, moralistic and hard-working parents //

and living in an honest society,>> the amount of selfish, power or lazy people would be

very few. (from *Utopia*)

4.5.7   Text 3.2: Mode

The text displays distinct characteristics of written language in its choices of non-everyday

abstract lexis, grammatical metaphor, standard grammar and careful organisation, with a

lexical density of approximately 4.

4.5.8   Text 3.2: Periodicity

Increased control of textual resources is evident in this text compared to Year 8, with Ellie

demonstrating expansion of some developments begun at that age, particularly

hyperThemes and internal Conjunction. In this text, Periodicity resources are evident in the

management of macroTheme, hyperThemes and macroNew, as shown in Table 4-30, so

that the reader is guided through the text predictively at each key point. The use of

hyperThemes is more consistent here than in Text 2.3, although hyperNew elements do not

appear, perhaps in part due to the brevity of the Arguments. The effective deployment of

internal Conjunction in this text makes the rhetorical organisation clear. Internal

Conjunction is realised in logical metaphor, in the use of sequencing terms (*first, second,*

third) as either a numerative modifier or an entity. These terms do not refer to external temporality, but to internal text time in the sequencing of the three criteria within the text, so that the flow of information is managed in an orderly manner to construct the argumentation as three supporting elements of the thesis.

4.5.9   Text 3.2: Theme and Rheme

Theme analysis is illustrated in Table 4-35, in the Background and Thesis of the text.

Table 4-35. Text 3.2: Theme and Rheme: selected examples

Textual Theme	Marked Topical Theme	Unmarked Topical Theme	Rheme
		the British	had three ways.
		The Europeans	had agreed
that		they	would divide up the world.
by			fulfilling these three layers
		The first	was a legal claim.
		This	was on the basis of first discovery of the land or conquest.
		The second	is that your people had to physically occupy and live on that land to claim it, or your people had to defeat the original inhabitants and protect it against their supplanted rivals.
		The third	was a claim of moral proprietorship.
		This	meant that the Europeans had to live there long enough that they called it home, that they could write poetry.
		they	had to feel that this place was where they belonged.
Also,		outsiders and the original inhabitants	had to accept
		them	as being legitimate owners of the land.
	In the claiming of Australia	none of these	were properly fulfilled.

Theme choice is effective in both structuring the text and building the argument. The unmarked Themes move back and forth between realisations of the criteria and of the people involved. The former build organisation into the text, with the Rhemes elaborating the criteria or stating their rebuttal. In the latter, the agents are thematised so that their activities in the Rhemes build the sequence of evidence that explains the arguments. Linear and zigzag patterns of thematic progression are deployed. For example, the progression is linear in relation to the criteria, but zigzags to elaborate them:

> *The third was <u>a claim of moral proprietorship</u>. <u>This</u> meant…*

There are two marked Themes. The first draws attention to the Thesis, not only highlighting that statement but also signalling the end of the Background and the commencement of the Arguments; this is helpful to guide the reader through the text. The second marked Theme, not shown on Table 4-35, introduces the third Argument:

> *<u>Concerning the third layer</u>, the Europeans had not been there long enough…*

This choice serves to build variety of expression, to avoid repetition in the manner in which the three criteria are introduced, following the use of unmarked Themes in the Background and different choices in the preceding Arguments. Ellie is able to vary the Themes in a number of ways when she chooses to do so.

4.5.10 Texts 3.1 – 3.4: Summary

Text 3.2 demonstrates Ellie's further development of rhetorical text organisation, as she continues to expand some of the resources that began to be evident in Year 8. Abstraction is also evident; this is a significant feature of her history writing at this age and is now well integrated into her texts. Examples from other texts include the following:

> *…The <u>obliteration</u> of Pompeii was witnessed from out at sea… In later years he wrote his <u>recollection</u> of the <u>eruption</u>...* (from Text 3.1)

> *…<u>Commerce</u> flourished…They demanded free <u>access</u> to the concession cities...* (from Text 3.4)

> *…He unified the <u>will</u> of the people under his <u>leadership</u> and gained their support… The <u>decline</u> of the Tang led to the Song <u>Dynasty</u>…,* (from *Tang, Song, Mongols*)

While Text 3.2 is an exposition, Text 3.4, *Ming and Qing Dynasties*, is a historical account, another familiar text type at this age. Continued expansion of technicality is significant in the accounts at this level (e.g. *Song Dynasty, British East India Company,*

Opium Wars), including in the new ways of packaging time. Moreover, Ellie continues to refine her ability to manage chronological information flow via marked Themes and hyperThemes, including where the text is of greater length. The key growth in the accounts is in more effective use of resources that have been introduced earlier, rather than new kinds of resources.

Two new types of text appear in this set, exemplified in Text 3.1, *The Treasure of Pompei*, a site interpretation and Text 3.3, *First Dynasty*, a period study. While the generic structure of these texts is generally conventional, Text 3.1 shows some overlap between purposes in different stages, in the inclusion of description alongside chronological information. A distinctive feature of both of these particular texts is the additional Extension stage that presents historiographical content, clarifying contemporary sources of the information. This is in one instance presented as a recount of events:

> *…The obliteration of Pompeii was witnessed from out at sea by a young nephew of a famous encycloped*(ist*). In later years he wrote his recollection of the eruption…* (from Text 3.1)

In the other, in Text 3.3, like some earlier use of the term *evidence,* the realisation is more abstract, in terms of s*ources*, rather than processes (*witnessed, wrote*) as follows:

> *The first reason we can know all this is the literary sources…. The other main source of knowledge we have today comes from the non-literary sources…* (from Text 3.3)

The inclusion of historiographical information in this way is new for Ellie at this age and is more expanded than the brief reference to external sources in Text 3.2 (*It is believed*). Some brief reference to sources appeared earlier in her science writing, in Year 6, though they were possibly scaffolded (*Geologists believe; In Sufi tradition)*.

The developments described here are characteristic of Ellie's history writing at this age, despite being not fully evident at all times. Some clauses are still grammatically simple,

lexical choices unsophisticated, or unmarked Themes repetitive where entities in the text

are few, so that the evidence points to Ellie's development as ongoing.

4.6   Year 10 Science texts

While procedural recounts continue to dominate Ellie's science writing in Year 10, Text 3.8, *The Lungs,* described below, is a text that incorporates the generic purposes of reporting and explaining.

4.6.1   Text 3.8: Genre

Text 3.8 is displayed in full in Table 4-36, with an interpretation of its generic structure.

Table 4-36. Text 3.8: Generic structure

The Lungs – Report/Explanation	Generic structure
The lungs mostly work automatically but sometimes emotion triggers reaction. Crying is a contraction of the lungs whereas laughing is an exhaling. *When we inhale our thoracic cavity expands and a diaphragm goes down. Air rushes in to fill the vacuum that's created. Jason brought in a model to demonstrate this.*	Explanation
Lungs are asymmetr(ical*), the right lung having 3 lobes and the left having 2 lobes. They have nearly the same shape as a cauliflower, looking like inverted trees. They are basically conical sponges that exchange carbon dioxide to oxygen.*	Description
How it works *Air goes into the nasal passage where fine hairs stop big objects from being inhaled (insects). This is where the air gets filtered, odours are simplified and the air is made warm and is humidified. The air continues down through the larynx, trachea where the cartilage rings give the airway structural support. If you're going to try 'swallowing' fire it's important to do it while you exhale so that the heat can't damage the airway. The air then branches into the left and right bronchi and here your mucus traps dust, pollen, etc. In our main vessels we have cilia (small hairs) that wave mucus back up, keeping fungi and virus out of our lungs. The bronchi break up into bronchioles, then into alveoli. Alveoli is the site of air exchange. They are lubricated by surfactant, a substance with an oily quality that keeps the alveoli moist. Veins and arteries wrap the alveoli. Blood comes in low in O2 and goes into the alveoli. That's how we exchange CO2 for O2. CO2 comes out of the blood flow into the air space then is breathed out. In the same way, the O2 enters the blood flow. It turns bright scarlet and travels to the left heart. Each person breathes in 250 ml of O2 per min and breathes out 250 ml of CO2 per min. there is still some oxygen in our breath which is why we can give mouth to mouth resuscitation.*	Explanation (sequential) / Description
There are some conditions that can affect our pathways of breathing: *Smoking produces a layer of tar that coats the alveoli making oxygen exchange hard.* *Asthma is when the lining of the lung reacts to something i.e. pollen, chemicals, cat fur, and makes it swell. This swelling obstructs the pathway and breathing becomes tight and restrained.* *Pneumonia is an infection of the lung lining so that also stops oxygen penetrating into the blood.*	Description/ Explanation (Report: General statement + Description (including causal explanation))

Text 3.8 is unconventional in its generic structure. The global purpose of the text is to provide scientific information concerning a natural entity and its processes, covering different aspects so that the information is at times descriptive, and at times explanatory. On this basis, the text could be understood globally as a report, in which the first stage, with two phases, is primarily explanatory, the second descriptive, and the remaining stages combine both. The final stage is itself structured as a brief report with an opening General Statement and a description in three parts, again with some explanation included.

4.6.2   Text 3.8: Field

The Field is concerned with a study of the systems of the human body, in particular the lungs and respiratory system, and their relationship to the circulatory system. This Field is educational, exploring a scientific understanding of 'commonsense' phenomena.

4.6.3   Text 3.8: Ideation (Entities)

The entities in the text are shown in Tables 4-37 and 4-38.

Table 4-37. Text 3.8: Ideation – Entities

lungs (right, left)	*cavity (thoracic), diaphragm, bronchi (left, right), mucus, vessels (main), cilia, bronchioles, alveoli, veins, arteries, blood, flow (blood), space (air), flood (blood), heart (left), breath, breathing, resuscitation (mouth-to-mouth), lining (lung)*
	contraction, exhaling
airway	*passage (nasal), hairs (fine, small), larynx, trachea, rings (cartilage), support (structural)*
emotion	*reaction, crying, laughing*
air	*vacuum, carbon dioxide, oxygen, odours, exchange*
model	*cauliflower, trees (inverted), sponges (conical), shape (same)*
objects (big)	*insects, dust, pollen, fungi, virus, chemicals, fur (cat)*
fire	*heat*
	ways; pathway, site; minute; person
conditions	*smoking, tar, asthma, swelling, pneumonia, infection*

Table 4-38. Text 3.8: Ideation – Kinds of entities

concrete	everyday	*cauliflower, trees, sponges* *objects, insects, dust, pollen, chemicals, fur* *person, blood, hairs, breath, air, fire, flood, pathway*
	specialized	-
abstract	institutional	-
	semiotic	*model*
	generic	*ways, shape, conditions, space, shape, minute, site*
abstract, metaphoric	process	*contraction, exchange, flow, support* *(breathing, exhaling. smoking, crying, laughing, swelling, emotion, reaction)*
	quality	*heat, odours*
technical		*lungs, cavity thoracic cavity, diaphragm, bronchi, mucus, vessels, cilia,* *bronchioles, alveoli, veins, arteries, blood, heart, lung lining* *airway, nasal passage, larynx, trachea,* *cartilage rings; infection; mouth-to-mouth resuscitation* *air, carbon dioxide, oxygen, vacuum, solid, tar, asthma, pneumonia, fungi,* *virus*

This text illustrates the substantial level of technicality that Ellie controls at this age level, a capability that is evident not only in the number of technical lexical choices, but also in the effective integration of this lexis into the text. The technical entities are often not defined within the text; the definitions are provided on another page in a visual representation. A smaller number of commonsense entities are also evident, some for comparison but many reflecting the everyday nature of the natural phenomena with which the text is concerned.

Abstract entities further contribute to distancing the text from everyday meaning. Processes, or occasionally qualities, are reconstrued in grammatical metaphor or gerunds, as seen in the following examples:

> *Crying is a contraction of the lungs…*

> *.. the cartilage rings give the airway structural support.*

> *Alveoli (is) the site of air exchange.*

> *… breathing becomes tight and restrained.*

> *…so that the heat can't damage the airway.*

More congruent expression may have been as follows:

When we <u>cry</u>, our lungs <u>contract</u>…

.. the cartilage rings <u>support</u> the structure of the airway.

Alveoli (is) the site where air i<u>s exchanged</u>.

When we <u>breathe</u> it feels tight and restrained.

… so that the airway can't be damaged by <u>being heated</u>.

The metaphoric choices contribute to the overall 'nouniness', or dominance of entities in the text, which is continuing to develop in Ellie's writing. These grammatical choices have ideational and textual benefits as noted earlier, and have allowed her to compact information more succinctly, often by reducing word requirements, and also by allowing modification of the entities (e.g. <u>*structural*</u> *support,* <u>*air*</u> *exchange*).

4.6.4   Text 3.8: Ideation (Activity Sequence) plus Conjunction

The activity sequence and explicit external Conjunction are illustrated in Table 4-39, which displays the third and fourth stages of the text.

Table 4-39. Text 3.8: Ideation (Activity sequence) and explicit Conjunction: selection

Air goes into the nasal passage
where fine hairs stop big objects from being inhaled (insects).
This is where the air gets filtered, odours are simplified and the air is made warm and is humidified.
The air continues down through the larynx, trachea
where the cartilage rings give the airway structural support.
***If** you're going to try 'swallowing' fire*
it's important to do it while you exhale
***so that** the heat can't damage the airway.*
The air then branches into the left and right bronchi
***and** here your mucus traps dust, pollen, etc.*
In our main vessels we have cilia (small hairs)
that wave mucus back up,
keeping fungi and virus out of our lungs.
The bronchus break up into bronchioles,
***then** into alveoli.*
Alveoli is the site of air exchange.
They are lubricated by surfactant,
a substance with an oily quality that keeps the alveoli moist.
Veins and arteries wrap the alveoli.
Blood comes in low in O2
***and** goes into the alveoli.*
That's how we exchange CO2 for O2.
CO2 comes out of the blood flow into the air space
***then** is breathed out.*
In the same way, the O2 enters the blood flow.
It turns bright scarlet
***and** travels to the left heart.*
Each person breathes in 250 ml of O2 per min
***and** breathes out 250 ml of CO2 per min.*
There is still some oxygen in our breath
which is why we can give mouth to mouth resuscitation.

There are some conditions that can affect our pathways of breathing:
Smoking produces a layer of tar
***that** coats the alveoli*
making oxygen exchange hard.
Asthma is when the lining of the lung reacts to something ie pollen, chemicals, cat fur, and makes it swell.
This swelling obstructs the pathway
***and** breathing becomes tight and restrained.*
Pneumonia is an infection of the lung lining
***so** that **also** stops oxygen penetrating into the blood.*

KEY: Activities underlined; Conjunction resources in bold font

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The activities in the first stage of the text explain and contrast the processes of breathing, crying and laughing, and in the second stage provide a description of the shape of the lungs. In the third stage, included in Table 4-39, the activity sequence is complex in combining description and explanation. It traces the movement of air through the human respiratory system, as in the following example:

> *Air <u>goes</u> into the nasal passage … The air <u>continues</u> down through the larynx, trachea*
>
> *…The air then <u>branches</u> into the left and right bronchi…*

As the pathway of the air is followed through the body, descriptions of key parts of the anatomy are given in terms of their function, and these descriptions simultaneously continue the explanation of the processes involved:

> *… the nasal passage, where fine hairs <u>stop</u> big objects <u>from being inhaled</u> (insects). This <u>is</u> where the air gets filtered, odours are simplified and the air is made warm and is humidified.*

> *… the left and right bronchi and here your mucus <u>traps</u> dust, pollen, etc. In our main vessels we <u>have</u> cilia (small hairs) that <u>wave</u> mucus back up, <u>keeping</u> fungi and virus out of our lungs.*

The tracing of the pathway through the text is more successful in the first half, apart from the seemingly misplaced reference to *swallowing fire*. In the second half, there is some loss of clarity which is discussed below in relation to textual resources, in Section 4.6.9. Additive Conjunction is implicit in the chronology of the air movement and in the descriptive information, with some explicit addition (*and*), implicit addition (*which*, meaning 'and this') and temporal relations (*then*).

The final stage of the text again interweaves description and explanation as the three types of conditions are defined in terms of processes, so some implicit causality is realised:

> *Smoking produces a layer of tar that coats the alveoli*
>
> <u>(as a result)</u> *making oxygen exchange hard.*

> *Asthma is when the lining of the lung reacts to something i.e. pollen, chemicals, cat fur, and* <u>(as a result)</u> *makes it swell.*

> <u>(as a result)</u> *This swelling obstructs the pathway*

and <u>(as a result)</u> *breathing becomes tight and restrained.*

4.6.5   Text 3.8: Transitivity

The Processes and Participants in selected clauses of the text are displayed in Table 4-40.

Table 4-40. Text 3.8: Transitivity – Selected Processes and Participants: examples

Participant	Process	Process type	Participant
Crying	*is*	RI	*a contraction [of the lungs]*
laughing	*is*	RI	*an exhaling.*
Air	*rushes*	MA	
	fill	MA	*the vacuum [[that's created]].*
They	*have*	RA	*the same shape [as a cauliflower],*
	looking like	RA	*inverted trees.*
This	*is*	RI	*[[where the air gets filtered…]]*
it… [[to do it while you exhale]]	*'s*	RA	*important*
the heat	*can't damage*	MA	*the airway.*
The air	*branches*	MA	
your mucus	*traps*	MA	*dust, pollen, etc.*
we	*have*	RA	*syllia (small hairs) [[that wave mucus back up]],*
Alveoli	*is*	RI	*the site of air exchange.*
They	*are lubricated*	MA	*by surfactant, a substance [with an oily quality [[that keeps the alveoli moist]]].*
Veins and arteries	*wrap*	MA	*the alveoli.*
Blood	*comes*	MA	
	goes	MA	
That	*'s*	RI	*[[how we exchange CO2 for O2]].*
CO2	*comes out of*	MA	
	is breathed out.	MA	
the O2	*enters*	MA	*the blood flow.*
It	*turns*	RA	*bright scarlet*
	travels	MA	
Each person	*breathes in*	MA	*250 ml of O2*
	breathes out	MA	*250 ml of CO2*
there	*is*	EX	*some oxygen*
	is	RI	*[[why we can give mouth to mouth resuscitation]].*
There	*are*	EX	*some conditions [[that can affect our pathway of breathing]]:*
Smoking	*produces*	MA	*a layer of tar*
	coats	MA	*the alveoli*
Asthma	*is*	RI	*[[when the lining of the lung reacts to something ie pollen, chemicals, cat fur, // and makes it swell]].*
This swelling	*obstructs*	MA	*the pathway*
breathing	*becomes*	RA	*tight and restrained.*
Pneumonia	*is*	RI	*an infection [of the lung lining]*
that	*stops… penetrating*	MA	*oxygen*

KEY**:** MA - material; EX **–** existential**;** RA- relational attributive; RI - relational identifying

Material, relational and existential Processes realise the explanations and descriptions The agents of processes are elided several times through the use of passives, such as in the following sequence of clauses:

> *This is where the air <u>gets filtered</u>, odours <u>are simplified</u> and the air <u>is made warm</u> and <u>is humidified.</u>*

Participants tend to be realised simply, consistent with the general tendency to grammatical simplicity evident in Ellie's science writing, although there are instances of expansion.

The Circumstances in this text are also of familiar types. Circumstances of place are the most frequent, as consistent with the focus on the anatomy. Other types include degree, frequency and quality, as in the following examples:

> *They have <u>nearly</u> the same shape as a cauliflower…* (degree)

> *Each person breathes in 250 ml of O2 <u>per min</u>…* (frequency)

> *Blood comes in <u>low in O2</u>…* (quality)

4.6.6   Text 3.8: Clause complex

The resources of clause complexing are similar to those Ellie has deployed previously. The step-by-step nature of the description and sequential explanation accounts for the frequent use of equal clause complexes with *and*, as well as relative clauses.

4.6.7   Text 3.8: Mode

The text is written-like, although with some everyday lexis and weakness in textual management. The lexical density of 3.4 contrasts with the higher measure for some of Ellie's other science writing at this age, including Text 2.1, in which the language is more succinct and grammatical metaphor more prevalent.

4.6.8 Text 3.8: Periodicity

While the text is clearly organised into four distinct stages, textual resources deployed here are inconsistent, so that limited guidance is given to the reader. The first and second stages of the text are not signalled with explicit textual resources, though the third stage is signposted with a heading and is chronologically organised. The fourth stage evidences a clear hyperTheme and internal organisation. Whilst Ellie has elsewhere demonstrated a capacity to deploy Periodicity resources effectively, minimal use is evident in this text.

4.6.9 Text 3.8: Theme and Rheme

The textual resources at the level of the clause are illustrated in Table 4-41, in the third stage of the text.

Table 4-41. Text 3.8: Theme and Rheme: selected examples

Textual Theme	Marked Topical Theme	Unmarked Topical Theme	Rheme
		Air	*goes into the nasal passage*
where		*fine hairs*	*stop big objects from being inhaled (insects).*
		This	*is where the air gets filtered,*
		The air	*continues down through the larynx, trachea*
where		*the cartilage rings*	*give the airway structural support.*
If		*you*	*'re going to try 'swallowing' fire*
		it	*'s important to do it while you exhale*
so that		*the heat*	*can't damage the airway.*
		The air	*branches then into the left and right bronchi*
and here		*your mucus*	*traps dust, pollen, etc.*
	In our main vessels	*we*	*have cillia (small hairs) that wave mucus back up,*
		The bronchus	*break up into bronchioles,*
then		*(bronchus)*	*into alveoli.*
		Alveoli	*is the site of air exchange.*
		They	*are lubricated by surfactant, a substance with an oily quality that keeps the alveoli moist.*
		Veins and arteries	*wrap the alveoli.*
		Blood	*comes in low in O2*
and		*(blood)*	*goes into the alveoli.*
		That	*'s how we exchange CO2 for O2.*
		CO2	*comes out of the blood flow into the air space*
then		*(CO2)*	*is breathed out.*
	In the same way,	*the O2*	*enters the blood flow.*
		It	*turns bright scarlet*
and		*(it)*	*travels to the left heart.*
		Each person	*breathes in 250 ml of O2 per min*
and		*(each person)*	*breathes out 250 ml of CO2 per min.*
		there	*is some oxygen still in our breath*
wh…		*…ich*	*is why we can give mouth to mouth resuscitation.*

Patterns of Theme seen in Ellie's earlier science writing continue to be evident, particularly variation in Theme choice and a low frequency of marked Themes. The thematic variety draws on the involvement of numerous entities within the main activity sequence, so that repetition is more easily avoided than in, for example, some procedural recounts. Metaphorised entities (e.g. *emotion*) and gerunds (e.g. *crying, breathing*) are found among the Themes.

Some Theme choices contribute to the textual weakness noted earlier. Throughout most of the text, as is usual in Ellies' writing, each Theme is drawn from either a preceding Theme,

in a linear development, or a preceding Rheme in a zigzag pattern. However, here, new information is introduced abruptly in *Veins and arteries,* whereas greater clarity could have been achieved by thematization of *alveoli*, exchanging the Theme with the Rheme, to create improved textual flow in this clause and the one following. Further clarification would have also been gained by improved organisation of information flow in the succeeding clauses to link New information more effectively to the Given, such as changing the order of introduction of *CO2* and *O2*, or adding further elaboration, such as in the following alternative wording:

> … *the O2 <u>from the new air in the alveoli</u> enters the blood flood*

Another weak Theme choice is the use of *It*, being unclear as to whether it picks up the preceding Theme of (*O2*) or Rheme (*the blood flow*). Ellie writes many effective science explanations, but such small inconsistencies do occur in some of her more complex texts.

4.6.10 Texts 3.5-3.8: Summary

Text 3.8, as described above, illustrates an attempt to write a text that involves complexity in its purpose and Field, combining description and explanation. The text demonstrates Ellie's development of technicality and capacity for integration of such language into texts, further application of grammatical metaphor, and sequential and causal explanation, but also some textual weakness. Her choice to not use textual resources here may be due to the number of diverse aspects that she has tried to include, or simply a lack of attention to these elements on this occasion.

Text 3.8 was selected for detailed discussion here, despite its weaknesses, to illustrate a type of text different from the procedural recounts already discussed, Texts 1.5 and 2.5. Procedural recounts in Year 10 are exemplified in Texts 3.6 and 3.7, which demonstrate Ellie's further development in that text type.

Text 3.6, *Testing Wood to Destruction,* illustrates the technicality, metaphorisation and organisation seen in many similar texts, used with significant consistency. Four headings are used to organise the text: *What we used; What we did; Observations; Discussion and understanding*. The latter begins with a generalisation as follows:

> *The strength of different materials can only be decided by testing them to destruction. The compression, tension and shear loading is gradually increased to the point where the material fails. The way in which a particular material fails is also of interest, in that designs can be made which avoid these specific failure modes for the given material.* (from Text 3.6)

The remaining portion following this excerpt presents three numbered points that elaborate the failure modes of different materials in a well-organised manner.

While the language of Text 3.6 appears quite advanced, the text is the final in a series where the technicality and other resource have been gradually built up over succeeding lessons, so that the accumulated resources would be readily available to be used for the recording of the final activity. This is a clearly different context from the writing of Text 3.8. Additionally, Text 3.6 has a more specific focus than the diversity of elements in Text 3.8, likely making it easier to write.

In the technical meanings in Text 3.6, taxonomizing is clearly evident in *compression loading, tension loading and shear loading*, and technicality also in *testing to destruction* and *failure modes*; the benefit of grammatical metaphor is also again seen in elaboration. Consistent use of passives as seen in the excerpt above is common in Ellie's science writing at this age.

Text 3.7, *Crystal Garden*, is a sample of a procedural recount in which the Conclusion provides a detailed explanation. The use of exemplification demonstrates Ellie's capacity to combine different elements to create effective explanations.

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Finally, Text 3.5, *The Hand in Comparison to the Foot*, is a descriptive report that displays highly effective management of internal text organisation, including greater control of internal Conjunction and Periodicity resources that were beginning to be deployed in Year 8.

In total, this set of texts demonstrates Ellie's expanded and increasingly effective use of language resources that were introduced earlier. At the same time, there is some inconsistency, which at times, but not always, appears to arise from new challenges.

4.7   Year 11-12 History texts

Text 4.3 is an excerpt from a text entitled *World War 1*.

4.7.1   Text 4.3: Genre

The text is presented in Table 4-42, showing the generic staging.

Table 4-42. Text 4.3: Generic structure

from *World War I* – Historical account	Generic structure
In the time leading up to WW1, many people believed that the war would never come. 　*There were a few main reasons for this.* 　*One was simply that most of the rulers of Europe were related and people didn't see cousins going to war as a likely possibility. It was not the royal family however, that truly ruled the countries.* 　*Another reason was that the war had been avoided by the diplomats for so long, it was seen as something of the past, uncivilised ad barbaric.* 　*The third thing that prevented people from truly believing the war would take place was the socialist movements. The socialists were the representatives of the workers and questioned why fellow 'brother' workers should go to war with each other, not matter which country they came from. In 1913 socialist leaders from many different countries met under a Frenchman named Jaures for a conference in Paris. They declared that if war were announced they would carry out a general workers strike. When Jaures strove to put this into practice on the brink of the war, he was assassinated and the social democrats became patriots rather than internationalists.*	Background (including factorial explanation)
When international relations really fell apart, largely due to Wilhelm II, the Germans created the Schlieffen Plan, seeing war as inevitable. In the event of war Germany would be faced with a two-front war: Russia and France. The Schlieffen Plan relied on Russia, being such a large and newly industrialised country, taking a longer time to prepare armies. The Germans planned to defeat France by taking Belgium and then Paris, finishing the operations in time to face Russia. It was only this way that Germany could defeat both Russia and France as they were not strong enough to take on both at once. The majority of the soldiers were sent towards Belgium with only a small number left to defend Germany. At the last moment Von Moitke, head of the German army, panicked and brought some of the troops home to defend should France attack, leaving his attacking force weaker. *Britain, seeing Germany's plans. told them that if they tried to take Belgium the Britons would come against the Germans.* *So many alliances had been formed across Europe to prevent war, but in the end it was these alliances that drew everyone into the tragedy.* *Europe's summer of 1914 was beautiful and the horrors of war seemed distant. However, news came that Russia was mobilizing. With war seeming inevitable a mass hysteria swept over most of the continent and soon everyone was gathering and preparing their troops.*	Account Sequence

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For a learning unit about modern history in Year 12, Ellie wrote a series of five historical accounts, which together extend to 28 pages of typed text. *World War I* is the second text in that sequence and is slightly over four pages in length. The excerpt in Text 4.3 comprises its opening portion, almost one third of the whole. Many of the elements noted in relation to Text 4.3 are also evident in Text 4.4, which is from a later account in the sequence. The primary purpose of the complete series, and of each of the texts within it, can be understood as reconstructing a chronology of events, with specific points of interest elaborated in detail, presenting learning within the curriculum unit.

The generic structure within this extract includes a brief Background as the first stage, within which is incorporated a factorial explanation linked to the first clause. This is followed by an Account Sequence. The continuation of the text, not reproduced here, comprises further phases of the Account Sequence that chronicle events of the war. Alternative interpretations of the generic structure are possible: the entire portion that concerns the pre-war period, forming the complete excerpt above, may be understood as the Background, or all parts of the text may be interpreted as an ongoing Account Sequence that continues from the preceding text.

The integration of a factorial explanation within the text demonstrates Ellie's flexibility to use generic staging to suit the purpose of her writing. Other instances of mixed text occur elsewhere at this age, such as in the descriptions of political viewpoints later in this historical account sequence. The integration of different purposes within a text is a further development beyond the simpler addition of an Extension as seen in Year 10.

4.7.2   Text 4.3: Field

In terms of Field, the text is concerned with the historical investigation of World War I and the associated political and military events and attitudes across several of the nations involved, which is a distinctly 'uncommonsense', educational Field.

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4.7.3　Text 4.3: Ideation (Entities)

The entities in the text are displayed in Tables 4-43 and 4-44.

Table 4-43. Text 4.3: Ideation – Entities

people	Germans, Russia, France, Britons, everyone
	rulers, family (royal), cousins, diplomats, Wilhelm II, Von Moitke, head
socialist movements	socialists, representatives, workers (fellow 'brother'), leaders, Frenchman, Jaures, conference, social democrats, patriots, internationalists, strike (general workers')
war	international relations
	WW1, war (two-front), armies, operation, soldiers, troops forces, plans, alliances, tragedy, horrors, hysteria (mass), Schlieffen Plan, German army
countries	Europe, Paris, country (large and newly industrialised), Belgium, continent
time	past, brink, moment; summer
	possibility, way, both, majority, number, news
	reasons

Table 4-44. Text 4.3: Ideation – Kinds of entities

concrete	everyday	people, family, cousins, everyone
	specialized	continent
abstract	institutional	countries, rulers, diplomats, head, representatives, workers, leaders, armies, soldiers, troops, forces
	semiotic	news
	generic	time, past, brink, moment, summer, way, number,
abstract, metaphoric	process	movements, conference, strike, (international)relations, operation, plan, war
	quality	possibility, majority, alliance, tragedy, horrors, hysteria
	other	reason
technical		Europe, Britain, France, Germany, Russia, Belgium, Britons, Germans, Frenchman
		Jaures, Wilhelm II, Von Moitke, WWI, Schlieffen Plan
		socialist, social democrats, patriots, internationalists

The entities include technical, discipline-specific terms, as is common in Ellie's writing at this age. There are also numerous abstractions that non-congruently realise actions and qualities as entities, allowing them to become participants in the activity sequence and explanation. These features have continued to expand in Ellie' writing, so that significant levels of abstraction and metaphorization, including the qualification of metaphoric entities, are evident in this text and the other texts in the series. Some further examples from the account sequence include:

His treaty conditions were to devastate Germany… Germany had to finance the repair for the destruction done to infrastructure…They were to bear the guilt for all the destruction and devastation of the war…. (from World War II)

As a result of the war, there was great dislocation in the life in Europe… Mussolini and his fascism became an inspiration and propaganda point for Adolf Hitler… He appealed to the emotion of the people and did it amazingly so that those falling under his power were blinded to the true atrocity of his proclamations. (from World War II)

Hitler… made a further attempt to take Britain by sea…Hitler then turned his gaze toward Russia…The internal unrest of Russia made this all the more easy…the Germans put their racial policies into effect…The outcomes of many of the battles fought in Russia were determined by the climate. (from Text 4.4)

Alongside these lexical choices, occasional instances of everyday lexis appear at different points in some of the accounts, such as *amazingly* seen in the example above, and including the following:

The third thing that prevented people from truly believing the war would take place was the socialist movements

At this time, Germany adopted democracy and many people thought it weak, blaming the democratic system for inflation amongst other things. (from World War II)

Engels got together with Marx as they shared similar ideas. (from Hitler, Stalin and Russia)

4.7.4   Text 4.3: Ideation (Activity Sequence) plus Conjunction

The activity sequence and explicit external Conjunction in the early part of the text are displayed in Table 4-45.

Table 4-45. Text 4.3: Ideation (Activity sequence) and explicit Conjunction: selection

In the time leading up to WW1, many people <u>believed</u>   *that the war <u>would</u> never <u>come</u>.*

There <u>were</u> a few main reasons for this.

One <u>was</u> simply [[that most of the rulers of Europe were related and people didn't see cousins going to war as a likely possibility]].   *It <u>was</u> not the royal family however, [[that truly ruled the countries]].*

Another reason <u>was</u> [[that the war had been avoided by the diplomats for so long, it was seen as something of the past, uncivilised ad barbaric]].
The third thing [[that prevented people from truly believing the war would take place]] <u>was</u> the socialist movements.   *The socialists <u>were</u> the representatives of the workers*   **and** <u>questioned</u>   *why fellow 'brother' workers <u>should go</u> to war with each other, no matter which country they came from.*   *In 1913 socialist leaders from many different countries <u>met</u> under a Frenchman named Jaures for a conference in Paris.*   *They <u>declared</u>*   *that **if** war <u>were announced</u>*   *they <u>would carry out</u> a general workers' strike.*   *When Jaures <u>strove to put</u> this into practice on the brink of the war,*   *he <u>was assassinated</u>*   *and the social democrats <u>became</u> patriots rather than internationalists.*

*<u>**When**</u> international relations really <u>fell apart</u>, largely due to Wilhelm II,*
the Germans <u>created</u> the Schlieffen Plan,
<u>seeing</u> war as inevitable.
In the event of war Germany <u>would be faced with</u> a two-front war: Russia and France.
The Schlieffen Plan <u>relied on</u> [[Russia, <<>> taking a longer time to prepare armies]].
<<<u>being</u> such a large and newly industrialised country,>>
The Germans <u>planned</u>
***to** <u>defeat</u> France*
***by** <u>taking</u> Belgium and then Paris,*
<u>finishing</u> the operations in time [[to face Russia]].
It <u>was</u> only this way [[that Germany could defeat both Russia and France]]
***as** they <u>were</u> not strong enough [[to take on both at once]].*
The majority of the soldiers <u>were sent</u> towards Belgium
with only a small number <u>left</u>
***to** <u>defend</u> Germany.*
At the last moment Von Moitke, head of the German army, <u>panicked</u>
***and** <u>brought</u> some of the troops home*
***to** <u>defend</u>*
<u>should</u> France <u>attack</u> ..

KEY: <u>Activities</u> underlined; Conjunction resources in bold font

The Background stage of the text is an explanation of the beliefs of the people in this historical setting, and the events and circumstances that were the *reasons* for those beliefs and their error. The focus in this stage is on abstract reasoning consistent with the purposes of explanation and interpretation.

The subsequent Account Sequence realises a series of events, real or anticipated (e.g. *created, would be faced, planned, defeat*), with explanation of the contemporary rationale behind the events (e.g. *would be forced, relied, panicked*) and some interpretation:

> *…it was these alliances that drew everyone into the tragedy.*

In these events, the potential of war is construed in different resources, including Conjunction resources, as a hypothetical reality:

> *They declared that <u>if</u> war were announced they would carry out a general workers strike…*
>
> *…told them that <u>if</u> they tried to take Belgium…*
>
> *… <u>should</u> France attack…*
>
> <u>*In the event of*</u> *war Germany <u>would be faced with</u> a two-front war…*
>
> *…The Germans <u>planned</u> to defeat France…*
>
> *…With war <u>seeming inevitable…</u>*

Contrasted with the unexpectedness and the beautiful summer, this anticipation builds a sense of impending conflict in preparation for the account that follows.

Conjunction resources are deployed to realise a range of relations relevant to the Field. Resources of condition (*if, in the event of*), purpose (*to*) and means (*by*) contribute to the construal of the military planning. Time relations (e.g. *when, in the end, prior to*) support the chronology of the events. Causality is central to the explanation, and is construed in a range of explicit, implicit, and metaphorical resources, as in the following examples:

> *It was only this way that Germany could defeat both Russia and France <u>as</u> they were not strong enough…*
>
> *…the Germans created the Schlieffen Plan, <u>seeing war as inevitable</u>.* ('because they saw')

The Schlieffen Plan relied on Russia, <u>being such a large and newly developed country,</u>

taking a longer time to prepare armies. ('because it was')

It was these alliances that <u>drew </u>everyone into the tragedy. ('that caused everyone to be in')

Further resources realising causality appear through the other texts of the historical account sequence, such as the following:

<u>As a result</u> of the war, there was great dislocation in the life in Europe. (from *World War II*)

Germany then sent war planes to bomb Britain and <u>so ensued</u> the Battle of Britain. (from Text 4.4)

The <u>outcomes</u> of many of the battles fought in Russia were <u>determined</u> by the climate. (from Text 4.4)

<u>Consequently</u>, many people of the Soviet Union wanted to see the end of Stalin… (from *World War II*)

4.7.5   Text 4.3: Transitivity

The Processes and Participants in the opening clauses of the text are displayed in Table 4-46.

Table 4-46. Text 4.3: Transitivity - Processes and Participants: examples

Participant	Process	Process type	Participant
many people	*believed*	MN	
war	*would never come.*	MA	
There	*were*	EX	*a few main reasons for this.*
One	*was*	RI	*[[that most of the rulers of Europe were related // and people didn't see cousins going to war as a likely possibility]].*
It… […]	*was not*	RI	*the royal family*
	ruled	MA	*the countries.*
Another reason	*was*	RI	*[[that the war had been avoided by the diplomats for so long, [[it was seen as something of the past, uncivilised ad barbaric]]]].*
The third thing [[that prevented people from truly believing the war would take place]]	*was*	RI	*the socialist movements.*
The socialists	*were*	RI	*the representatives of the workers*
	questioned	VR	
fellow 'brother' workers	*should go to war with*	MA	*each other*
socialist leaders from many different countries	*met*	MA	
They	*declared*	VR	
they	*would carry out*	MA	*a general workers' strike.*
war	*were announced >>*	VR	
Jaures	*strove to put into practice*	MA	*this*
he	*was assassinated*	MA	
the social democrats	*became*	RI	*patriots*
international relations	*fell apart,*	MA	
the Germans	*created*	MA	*the Schlieffen Plan,*
	seeing	MN	*[[war as (being) inevitable]].*
Germany	*would be faced with*	MA	*a two-front war: Russia and France.*
The Schlieffen Plan	*relied on*	RA	*[[Russia, <<>> taking a longer time to prepare armies]].*
	<<being	RI	*such a large and newly industrialised country,>>*

KEY**:** MA - material; MN - mental; VR - verbal; EX **–** existential**;** RA- relational attributive; RI - relational identifying

Familiar transitivity resources are evident. Mental Processes construe the beliefs and viewpoints. Material Processes include concrete and abstract (e.g. *fell apart, created, had been formed, drew, swept*) activities. Relational Processes are deployed for the identification and elaboration of the *reasons* and some entities. The Circumstances are varied, with time and place dominant, as consistent with the account genre. A Circumstance of source, not seen in earlier texts, appears later in this series:

This true aim, <u>according to Marx</u>, should be to change the world. (from *Marxism and Russian Rule*)

4.7.6 Text 4.3: Clause complex

Further lexicogrammatical development evident in the Year 11-12 history texts is in the clause complexing, where a complex may include several clauses in a variety of combinations. The construal of Participants in embedded clauses contributes to this varied realization of relations and compacting of information, as does the incorporation of enclosed clauses. Examples from this text and Ellie's other history writing from this age are as follows:

> *Another reason <u>was</u> [[that the war had been avoided by the diplomats for so long [[it was seen as something of the past, uncivilised ad barbaric]]]].*

> *The Germans planned // to defeat France // by taking Belgium // and then Paris, // finishing the operations in time [[to face Russia]].*

> *Britain, <<seeing Germany's plans >> told them // that <<if they tried to take Belgium>> the Britons would come against the Germans.*

> *However, the Germans put their racial policies into effect //, first slaughtering the Jews, // and then the Slavs //and it wasn't long [[before those [[who had welcomed Hitler]] realized [[he was far worse [than Stalin]]]]].* (from Text 4.4)

> *The Russians had a Scorched Earth Policy // which meant [[that whenever they were forced to retreat, //they completely destroyed the landscape, //burning crops and homes //so that <<when the Germans arrived,>> they would be met with nothing but a barren desert, nothing [[to survive on]]]].*   (from Text 4.4)

> *One [of the things [[that got Mabo through the hard times]]] was his absolute belief and certainty [[that, <<when he returned to Mer <<as he so often said // he would,>> >> his piece of land would be waiting for him, under the care of his family]]]].* (from Text 4.1)

4.7.7 Text 4.3: Mode

Text 4.3 is written-like in its use of grammatical metaphor, clause complexing and crafted organisation, although the occasional choice of everyday lexis slightly undermines this. The lexical density is approximately 3.8.

4.7.8 Text 4.3: Periodicity

As noted earlier, the global organisation of Text 4.3 is serial, as is ongoing through the entire sequence of accounts that comprise most of this learning unit, with variation in the extent of clear signposting to guide the reader in the flow of information. The factorial explanation at the beginning of Text 4.3 is explicitly signposted with macroTheme and hyperThemes, with internal Conjunction also evident (*one, another, the third thing*). Elsewhere in the text, hyperThemes are frequently deployed to guide the reader, such as in the first phase of the Account Sequence above:

> *When international relations really fell apart, largely due to Wilhelm II, the Germans created the Schlieffen Plan, seeing war as inevitable.*

4.7.9 Text 4.3: Theme and Rheme

The Themes and Rhemes in the early part of the text are displayed in Table 4-47.

Table 4-47. Text 4.3: Theme and Rheme: selected examples

Textual Theme	Marked Topical Theme	Unmarked Topical Theme	Rheme
	In the time leading up to WW1,	*many people*	*believed*
that		*war*	*would never come.*
		There	*were a few main reasons for this.*
		One	*was simply that most of the rulers of Europe were related and people didn't see cousins going to war as a likely possibility.*
		It	*was not the royal family*
[[th…		*…at*	*truly ruled the countries.*
		Another reason	*was that the war had been avoided by the diplomats for so long, it was seen as something of the past, uncivilised ad barbaric.*
		The third thing that prevented people from truly believing the war would take place	*was the socialist movements.*
		The socialists	*were the representatives of the workers*
and			*questioned*
why		*fellow 'brother' workers*	*should go to war with each other no matter which country they came from*
	In 1913	*socialist leaders from many different countries*	*met under a Frenchman named Jaures for a conference in Paris.*
		They	*declared*
that		*they*	*would carry out a general workers' strike.*
if		*war*	*were announced*
When		*Jaures*	*strove to put into practice this on the brink of the war,*
		he	*was assassinated*
and		*the social democrats*	*became patriots rather than internationalists.*
When		*international relations*	*really fell apart, largely due to Wilhelm II,*
		the Germans	*created the Schlieffen Plan,*
	In the event of war	*Germany*	*would be faced with a two-front war: Russia and France.*
		The Schlieffen Plan	*relied on Russia taking a longer time to prepare armies.*
		The Germans	*planned*

Effective choice of Themes and marked Themes is generally evident, supporting the effective development. Each factor in the factorial explanation is thematized when introduced (*One*, *Another reason, The third thing*), and in the Account Sequence temporal marked Themes, including the use of a clause as Theme in a clause complex, are evident as expected. Grammatical and lexical choices for Themes tend to be varied, with only minor

instances of repetitiveness in topical Themes where the text concerns several activities of a single agent.

4.7.10 Texts 4.1-4.4: Summary

Text 4.3 demonstrates Ellie's capacity to manage high levels of abstraction and effective external Conjunction in sustained writing that mixes segments with different purposes into chronological accounts. Other key features in Ellie's historical accounts at this age level are frequent technicality, the prevalence of causality, varied use of clause complexing and flexible management of information flow. Text 4.4, an excerpt from *World War II*, particularly illustrates her use of grammatical metaphor.

Two other text types are exemplified in the selection. Text 4.1, *Mabo. Life of an Island Man*, is a biographical recount providing a reconstruction of Mabo's struggle for indigenous land rights. Though intended to form part of a film response, the biography was the only portion completed. Of particular interest in this text are the significant level of abstraction, again with frequent use of grammatical metaphor (e.g. *discrimination, determination, decision, recognition, acknowledgement*), and the expanded examples of clause complexing, illustrated in Section 4.7.6 above.

Text 4.2, a period study from *Ancient Greece Architecture*, which forms approximately the first half of a longer text, also evidences a high level of abstraction, such as in the following:

> *The civilisation of the Greeks was influenced by the many different peoples who migrated to Greece in around 500 BCE… The way the people of Greece governed themselves was an evolving progression…. This time is seen by many as the birth of Free Thinking amongst the Greeks.* (from Text 4.2)

This period study provides contextual background for the introduction of Greek architecture in the second half of the text, although the minimal linking between the two

sections works to keeping them somewhat separated. Elsewhere Ellie integrates such historical introductions to other specific topics more successfully.

The range of text types in the data for Year 12 history is limited, with the accounts dominant, perhaps due to Ellie's curriculum choices at this level, so that no expository writing appears in this portion of the data. Argument at this age is found in other learning areas, including science.

4.8 Year 12 Science texts

Alongside familiar text types in Ellie's Year 12 science writing, expository writing is a new genre, exemplified in Text 4.8.

4.8.1 Text 4.8: Genre

Text 4.8 is reproduced in part in Table 4-48 with its generic structure indicated.

Table 4-48. Text 4.8: Generic structure

Could human beings create the conditions for life, as we know it, on the moon? - Exposition	Generic structure
Hypothesis: *With today's technology and the current knowledge, it is not possible for humans to create conditions for life on the moon.*	Thesis
● *It is a common belief of scientists that without water, life cannot be sustained. The moon is thought to have (water) on it, but nothing like Earth's oceans.* (citation added)	Argument 1
● *The moon, being smaller, has gone further in the process of cooling than the Earth. The moon has passed beyond the point of cooling at which life first came into existence on Earth. Life did not form on the moon at that point, and therefore it is practically impossible for life to be able to survive there now, even if human beings put it there.*	Argument 2
● *It is thought that the first life form on Earth, bacteria, was spontaneously created by a chance chemical reaction. The conditions of Earth happened to be right for the organism's survival. To work out how to create a chemical reaction that would produce a life form that could survive in the conditions of the moon would be very nearly impossible.*	Argument 3
● *If a comet crashed into the moon leaving behind great chunks of ice, and those chunks of ice melted, it might then be possible for life to begin and from there create oxygen and whatever it needed to survive, but it would have to be the forces of the universe at work, men could not trigger that.* ● *…*	Argument 4 (Arguments 5-7 not reproduced here)
● *It took even longer for the Earth to evolve enough to support the complex life forms that it does today. It is questionable whether the moon will survive long enough to let that evolution take place.* (citation added)	Argument 8
Conclusion: *By looking at the points above, it can be seen that human beings alone cannot begin the process of life on the moon. It would take far more than the power of humans and human resources to set that in motion. The conditions have to be perfectly right for life to survive. Even if humans took the first bacteria believed to have lived on Earth, and put it on the moon, the moon would have to have water and an atmosphere to sustain it. If humans were to put those simple life forms on another planet, and begin the process of evolution, it would have to be a planet that already had the same conditions that Earth had had at the moment of the chemical reaction that created the first organisms. Humans do not have the power to control planet movement, nor to redirect ice bearing comets. We have a certain amount of control within our own little worlds but over the great universe, we really have none.*	Reinforcement of Thesis (with further argumentation)

In her writing for science in Year 12, Ellie demonstrates advanced use of resources that have been noted in the earlier years, including generalisation, technicality, grammatical metaphor and text organization in descriptions and explanations. In this text, she applies these capacities to engage in reasoning about science.

The purpose of this text is to present an argument in answer to a question. The generic structure is that of an exposition, where the Thesis is first presented, followed by Arguments for that thesis, and a Reinforcement of Thesis at the end. The presentation is slightly unconventional in the use of dot points, and in the inclusion of further argumentation in the Reinforcement. The excerpt in Table 4-48 omits Arguments 5 to 7, as well as the Extension added at the end of the text, in which Ellie reflects on how she defined the concepts in the question and developed her arguments; this Extension is not discussed here.

4.8.2   Text 4.8: Field

The Field for the text is identified in the question being asked, so that the concern is with the possibility of the existence of life in the environment of the moon. This Field is 'uncommonsense' in its scientific specificity. The text was written for a unit of geology learning that included study of the origins of life on earth, and Elle has drawn on this and other science knowledge to argue against the possibility proposed in the question. Some external sources have been consulted for technical details and are acknowledged.

4.8.3   Text 4.8: Ideation (Entities)

The entities in the text are shown in Tables 4-49 and 4-50.

Table 4-49. Text 4.8: Ideation – Entities

humans	*human beings, men, belief, scientists*
	technology, knowledge, power, resources, control, worlds
	water, chunks, ice, oxygen. heat, temperature, climate, Celsius, polarities
life	*conditions, existence, life form, bacteria, survival, organisms*
moon	*Earth, oceans, comet, forces, universe, atmosphere, sun's rays (sun's), planet, universe*
process	*cooling, point, reaction (chemical), work, way, creation, evolution, motion, movement*
night	*day, years*
hypothesis	*points*

Table 4-50. Text 4.8: Ideation – Kinds of entities

concrete	everyday	*humans, human beings, men* *moon, Earth, oceans, comet, sun's rays, planet, water, ice, worlds*
	specialized	-
abstract	institutional	*scientists*
	semiotic	*points*
	generic	*technology, conditions, resources, chunks, process, point, way, night, day, years, polarities*
abstract, metaphoric	process	*life, belief, hypothesis, knowledge, control, existence, survival, cooling, forces, work, creation, motion, movement*
	quality	*temperature, power, heat*
technical		*life form, bacteria, universe, atmosphere, oxygen, evolution, reaction, organism, climate, Celsius*

The text construes numerous technical and abstract entities. Many of these are generalised, which, along with the number of generic terms, reflects the broad, theoretical scope of the Field. The extent and usage of grammatical metaphor seen here is common in Ellie's science writing by this age.

4.8.4   Text 4.8: Ideation (Activity Sequence) plus Conjunction

The activity sequence and explicit Conjunction resources in the first five arguments of the text are displayed in Table 4-51.

Table 4-51. Text 4.8: Ideation (Activity sequence) and explicit Conjunction: selection

It <u>is</u> a common belief of scientists that without water, life cannot be sustained. The moon <u>is thought to have</u> (water) on it, **but** nothing like Earth's oceans.
The moon, <<>> <u>has gone</u> further in the process of cooling than the Earth. <<<u>being</u> smaller,>> The moon <u>has passed</u> beyond the point of cooling at which life first came into existence on Earth. Life <u>did not form</u> on the moon at that point, **and therefore** it <u>is</u> practically impossible for life to be able to survive there now, **even if** human beings <u>put</u> it there.
It <u>is thought</u> that the first life form on Earth, bacteria, was spontaneously created by a chance chemical reaction. The conditions of Earth <u>happened to be</u> right for the organism's survival. To work out how to create a chemical reaction that would produce a life form that could survive in the conditions of the moon <u>would be</u> very nearly impossible.
If a comet <u>crashed</u> into the moon <u>leaving</u> behind great chunks of ice, **and** those chunks of ice <u>melted</u>, it <u>might</u> then <u>be</u> possible for life to begin and from there create oxygen and whatever it needed to survive, **but** it <u>would have to be</u> the forces of the universe at work, men <u>could not trigger</u> that.
It <u>took</u> even longer for the Earth to evolve enough to support the complex life forms that it does today. It <u>is</u> questionable whether the moon will survive long enough to let that evolution take place.
KEY: <u>Activities</u> underlined; Conjunction resources in bold font

The activities in the sequence include varied actions and descriptions of natural phenomena (e.g. *has gone, has passed, crashed; happened to be, has*). Explicit claims related to possibility support the thesis in most of the arguments *(<u>is</u> practically impossible, <u>would be</u> very nearly impossible, <u>could not trigger</u>, <u>are</u> too extreme, <u>is not</u> possible, <u>is</u> questionable)*.

The complexity of reasoning can be seen in the multiple ways that the activity sequences construct the arguments. Some indicate the unmet conditions on the moon (e.g. Argument 1), some make a historical comparison with the earth (e.g. Arguments 1, 2), and others involve a proposal and refutation of a hypothesis, (*If a comet…, For humans to be able to…)*. Some of the descriptions of past earth conditions are construed as theoretical (*e.g., It is <u>thought</u>*), as are the hypotheses (e.g. *<u>might</u> then <u>be</u> possible*). The Reinforcement stage

presents a review and completion of the Arguments with some synthesis of points and some generalisation (e.g. *conditions, power, control*).

The use of explicit Conjunction in this text indicates two different types of relations. One of these comprises relations within the descriptions and comparisons, relating to the external world, as in the examples that follow:

> *The moon is thought to have (water) on it, <u>but </u>nothing like Earth's oceans.*

> *The moon has no atmosphere to shield it against some of the sun's rays, or to keep in some of the heat at night. <u>Therefore</u> the moon's temperature during the night <u>is</u> 233 Celsius, <u>and</u> (<u>is</u>) 123 Celsius during the day.*

Other instances of Conjunction construe the logical relations of the reasoning, forming the internal development within each argument, as in the following:

> *Life did not form on the moon at that point, <u>and therefore</u> it is practically impossible for life to be able to survive there now, <u>even if</u> human beings put it there.*

> *<u>If </u>a comet crashed into the moon leaving behind great chunks of ice, <u>and</u> those chunks of ice melted, it might then be possible for life to begin and from there create oxygen and whatever it needed to survive, <u>but</u> it would have to be the forces of the universe at work. Men could not trigger that.*

Internal Conjunction to organise the text as a whole has not been deployed, with a dependence on the use of dot points and a heading for the final generic stage.

4.8.5 Text 4.8: Transitivity

The transitivity analysis of selected clauses in the text is presented in Table 4-52.

Table 4-52. Text 4.8: Transitivity - Processes and Participants: examples

Participant	Process	Process type	Participant
it… [[for humans to create conditions for life on the moon]].	is not	RA	possible
It…[[that without water, life cannot be sustained]].	is	RI	a common belief [of scientists]
The moon	is thought to have	RA	(water)
The moon	has passed	MA	
Life	did not form	MA	
It…[[that the first life form [on Earth], bacteria, was spontaneously created by a chance chemical reaction]].	is thought	MN	
The conditions [of Earth]	happened to be	RA	right
[[To work out how to create a chemical reaction [[that would produce a life form [[that could survive in the conditions [of the moon]]]]]]]	would be	RA	very nearly impossible.
a comet	crashed into	MA	the moon
	leaving	MA	great chunks of ice,
The moon	has	RA	no atmosphere [[to shield it against some of the sun's rays, //or to keep in some of the heat at night]].
humans	to be able to make	MA	the conditions [on the moon] / right [[for supporting life]],
they	would have to figure out	MN	a way [[of making the moon create its own protective atmosphere]]
that	is not	RA	possible.
It… [[for the Earth to evolve enough to support the complex life forms that it does today]].	took	RA	even longer
It… [[whether the moon will survive long enough [[to let that evolution take place]]]].	is	RA	questionable
it	would have to be	RI	a planet [[that already had the same conditions [[that Earth had had at the moment [of the chemical reaction [[that created the first organisms]]]]]]].
Humans	do not have	RA	the power [[to control planet movement, //nor to redirect ice bearing comets]].

KEY: MA - material; MN – mental; RA- relational attributive; RI - relational identifying

Both the types of Processes and the realisation of the Participants are significant in the building of the argument. Firstly, the large number of relational Processes realise the descriptions and assessments in the arguments, and Mental Processes realise the scientific theories. Secondly, Participant construal is often complex, with several facts and ideas

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related to the arguments realised in lengthy embedded clauses as either nominal elements or modifiers. This not only serves to compact information, but also allows such facts and actions, now construed as single entities, to become the focus of discussion. They can then be expanded (e.g. *X took even longer*), and also, importantly, integrated into the reasoning in the argument about ideas that are proposed (e.g. *X is not possible*). The repeated postposing of such embedded clauses, by the use of *It..*, is discussed below in Section 4.8.9 in relation to Theme. Ellie has drawn on these grammatical resources to suit the purpose of the text.

Circumstances in the text are of familiar types and varied, as expected in this complex argumentation.

4.8.6   Text 4.8: Clause complex

Clause complexing is evident, with paratactic and hypotactic relations realising the meanings of external Conjunction noted earlier, though the range of combinations is not as extensive as seen in the history writing. Here, clause complexity is found in the expansion within clauses, in expanded nominal groups and embedded clauses, rather than complexing of ranking clauses.

4.8.7   Text 4.8: Mode

The relatively high lexical density in this text, at approximately 5.3, arises from this combination of expanded nominal groups elaborating information and the embedded clauses, as well as metaphorization. At the same time, the use of dot points rather than a crafted continuity of writing, and the repeated use of *It* both shift the Mode away from written-like quality.

4.8.8   Text 4.8: Periodicity

In the flow of information across the whole text, there is limited evidence of Periodicity resources, with the reader guided primarily by the dot-point format. The initial Thesis

Statement could be considered a type of macroTheme, but it is limited in not providing any signposting for the stages that follow. The Reinforcement stage is marked by a title and also a hyperTheme that includes some internal linking to the remainder of the text:

> *By looking at the points above, it can be seen that human beings alone cannot begin the process of life on the moon.*

This stage serves as a macroNew, closing with a concluding generalization after review of the Arguments:

> *We have a certain amount of control within our own little worlds but over the great universe, we really have none.*

4.8.9   Text 4.8: Theme and Rheme

Selected clauses from the text are displayed in Table 4-53, showing the Themes and Rhemes.

Table 4-53. Text 4.8: Theme and Rheme: selected examples

Textual Theme	Marked Topical Theme	Unmarked Topical Theme	Rheme
	With today's technology and the current knowledge,	it	is not possible for humans to create conditions for life on the moon
		It	is a common belief of scientists that without water, life cannot be sustained
		The moon	is thought to have (water) on it,
but			nothing like Earth's oceans.
		The moon	has gone further in the process of cooling than the Earth.
		The moon	has passed beyond the point of colling at which life first came into existence on Earth.
		Life	did not form on the moon at that point,
and therefore		it	is practically impossible for life to be able to survive there now.
even if		human beings	put it there.
		It	is thought that the first life form on Earth, bacteria, was spontaneously created by a chance chemical reaction
		The conditions of Earth	happened to be right for the organism's survival
		To work out how to create a chemical reaction that would produce a life form that could survive in the conditions of the moon	would be very nearly impossible.
		The polarities of the climate	are too extreme for any life form we know of to adjust to and survive.
For		humans	to be able to make the conditions on the moon right for supporting life,
		they	would have to figure out a way of making the moon create its own protective atmosphere
and	with today's knowledge and technology	that	is not possible
	over the great universe	we	really have none.

The distinctive feature of the Theme selections is the repeated choice of *It* to allow positioning of lengthy information at the end of the clause, as noted earlier. This is a resource that Ellie used in Year 6, but she has deployed it strategically here to manage the information flow in the construction of the argument, averting any awkward or unwieldy clause structures. Only once does a lengthy expanded embedded clause appear as Theme.

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As an alternative to the choice of *It,* the use of grammatical metaphor may in some instances have been possible, as in the comparison shown below:

> *Life did not form on the moon at that point, and therefore <u>it is practically impossible for life to be able to survive there now</u>, even if human beings put it there.*

> *Life did not form on the moon at that point, and therefore <u>the survival of life there now is practically impossible</u>, even if human beings put it there.* (suggested alternative)

However, this would perhaps have required a further step of development additional to those already seen in this new type of text, for which she may not have been ready.

Otherwise, the unmarked Themes are generally varied, though with some repetition of *moon* and *humans*. The use of marked Themes is minimal, but functional. The first marked Theme sets the context for the hypothesis, which is reinforced later; the final instance (*over the great universe*) seems to highlight the weight of the argument.

4.8.10 Texts 4.5-4.8: Summary

Text 4.8 provides evidence of Ellie's redeployment of ideational and textual resources in new ways to realise exposition in relation to science. To suit the nature of the arguments, she has developed the activity sequence in a variety of ways; she has also deployed distinctive Participants and Themes to construe and manage the information.

An arguing text that is handled differently is seen in Text 4.7, *Traps of Neo-Darwinism*, which addresses an ethical rather than a scientific question, related to the topic of cloning. This text adopts the generic structure of a discussion, in presenting alternative Perspectives on the issue, including some from external sources, before providing a Conclusion and Recommendations. This text is the most complex attempt among Ellie's Year 12 argument texts, with some clear weakness in the linking between ideas and parts of the text, but shows the extent of the types of writing she has engaged with at this age. The use of

rhetorical questions is a strategy used in this text to construe elements of the Arguments, as shown in the following extract:

> *We have looked at the role of Darwinism in many discoveries that have happened over the years, in terms of genes. We saw it in the artificial or selective breeding, but today that has been taken another step further with the interbreeding of different plant or animal species. Is breeding within species the same as genetically engineering across species? Those who support genetic engineering argue that this practice is no more harmful than selective breeding.* (from Text 4.7)

Alongside these and other argument texts, Ellie continues to write the familiar science genres in Year 12, with high levels of technicality, and the technicality is well integrated. She demonstrates capacity for effective explanations and competent text organization. Text 4.6, an excerpt from *Life on Earth,* is an example of an explanation; it forms a portion of a text within a series of explanations and reports, and hence makes links to the earlier meanings not visible in the excerpt as it appears in the Appendix. Text 4.7, taken from *Different Forms of Rocks,* is a complex classifying report which presents a detailed taxomomy (e.g. *decompression melting* vs. *heat transfer melting*; *silica rock* vs. *mafic minerals*) with causal explanations of the differentiations that are taxonomised. Procedural recounts also continue to be written.

Another type of text written in Year 12 science, not exemplified here, uses a historical approach to present science information as it was discovered and developed over time in the work of recognised individual scientists, thus blending a historical account with a science explanation or report.

The Year 12 writing is rich in technicality. A particularly high level is evident in some texts, such as the one from which the following illustrative excerpt is taken:

A membrane called the zona pellucida then forms around it and it undergoes its first maturation division. The secondary oocyte takes most of the cytoplasm, leaving the first polar body to simply degenerate. At ovulation the secondary oocyte starts the second maturation division, but is brought to a stop at metaphase…. (from *Gametogenesis*)

Ellie's use of metaphorisation at this age often reflects the technicality as well as the benefits of metaphor in the qualification of entities (e.g. *gradual build-up, internal differentiation, partial melting, less dense liquid state*) and in combination of metaphorized terms in noun groups (e.g. *heat transfer melting, source rocks*).

It is clear that at this level Ellie has developed a significant capacity for highly specialized writing about science.

In both history and science, Ellie's writing in Year 12, her final year of schooling, has changed substantially in comparison to her writing in Year 6. The texts analysed provide evidence of the changes across the different language strata and systems over these years, building to consistent deployment of language sources that realise advanced educational meanings in both subjects.

The purpose of the analysis provided in this chapter has been to illustrate the trajectory of developmental change in in Ellie's written language over the years as evidenced in the texts. This trajectory is summarised and discussed in Chapter 5.

CHAPTER 5   Written language development, learning and school context

5.1   An individual trajectory of written language development

Based on the findings as illustrated in Chapter 4, a summary of the written language development seen in Ellie's texts is provided here in terms of chronological development across the year levels. Development is understood as expansion or redeployment of language resources for making meanings. It is important to note that the four levels represent periods along a continuity, not four separate stages.

5.1.1   Year 6: Transition to educational meanings

Ellie's Year 6 writing included a combination of 'commonsense' and educational texts, so that she seems to have been moving from construing meanings known in her own daily experience to creating more educational kinds of meanings.

For history, Ellie wrote empathetic texts and historical accounts, most of which addressed different perspectives on the Roman Empire. In the empathetic texts, she approached the historical content of the curriculum in 'commonsense' ways, imagining the personal experiences of individuals in the historical context. These were story-type texts, and as such, shared some common features with the stories with which she was already familiar in the Steiner school setting, including myths and legends from the past, in her earlier classroom experience and within subject English at this age, both in her own writing and the language of others. The Year 6 empathetic texts demonstrated some incorporation of history curriculum knowledge.

The historical accounts shared many features with the empathetic texts but at the same time showed development of new resources. Both types of text featured chronological organisation, focus on individuals and concrete events, some explicit historical content, and deployment of abstraction and grammatical metaphor. In the accounts, however, being focused on a more educational approach to the learning area, the individuals and events were those considered historically significant; generalised groups of people were construed in technical terms and time in historical terms as BC; construal of cause was more evident; and the use of abstraction and grammatical metaphor was more prominent. The differences in the language, although to some extent related to the genre, suggested that the earlier of the accounts may have been to some extent scaffolded.

In Year 6 science, a somewhat similar combination of 'commonsense' and educational approaches was evident. The writing comprised texts that were, or were moving towards, procedural recounts, reports and explanations, across multiple Fields. Texts recording concrete experience of science activities at first resembled the personal recount genre, but later in the year science activities were at times recorded in a more conventional way, though generally written as incomplete portions of procedural recounts, with varied language use. A more standard example of this genre appeared towards the end of the year. The reports and explanations similarly varied in their language use. Textual development was inconsistent, with organisation of information flow or use of headings in some texts.

Through the science writing, technical science terms appeared consistently, but were almost always directly based on concrete experience, either in specific concrete activities undertaken, such as identifying mineral specimens by colour, or in linking unknown to known entities, such as constellations to stars. In a few cases, technicality distant from daily experience was illustrated in visual representations, such as diagrams of the movements of the earth's crust. Occasionally, the technical lexis in the text was indicated with quotation marks, as if acknowledging its special status.

In science as in history, there was general variation in the language use between some of the more 'educational' texts and the writing that was more closely related to Ellie's personal experience, in specific choices but particularly in the patterns of choices, raising the question of originality. It seems likely in both learning areas that some support was given in the classroom for developing language related to the curriculum, a practice that would be consistent with the school's approach. It could be expected that Ellie would be learning from this. Later texts demonstrated an expanding repertoire, with independent use of language resources that had appeared scaffolded earlier, or greater consistency in the deployment of more advanced features.

Therefore, in both learning areas, Year 6 appears to have been somewhat of a transition year, in which Ellie wrote familiar, 'commonsense' types of text, in empathetic 'stories' and personalised recounts, while gradually moving into more 'educational' types of texts and meanings related to the learning of history and science content, more distant from her own experience. By the end of the year, she had entered into the new kind of meaning-making in the chronological history genres and three conventional text types of science.

A point of interest across the Year 6 writing was the evidence of a well-developed range of lexicogrammatical resources, for both ideational and textual meanings, similar across history and science but with less frequent use in science of more expanded forms. A comprehensive array of types of Processes and Circumstances, construal of Participants and clause complexing appeared in the texts, along with a variety of thematic options strategically deployed. This capacity was valuable for allowing the significant variety of meanings that were made. Beginning use of grammatical metaphor was also evident.

5.1.2   Year 8: Educational and abstract language

Year 8 brought major change in Ellie's writing in history, and more gradual changes in science, as she continued her journey into increasingly 'uncommonsense' meanings in a broad range of educational Fields.

The history writing progressed into new purposes of writing in factorial explanations and expositions. In these texts, Ellie was no longer simply concerned with sequences of events, but with abstract discourse of complex causality and argumentation about history, moving further away from her direct personal experience into educational discourse. The increase in abstraction was evident in ideational meanings, such as generalisations of historical context (e.g. *conditions, sense of nationality, medical knowledge, unit labour*), and resources for internal reasoning (e.g. *reasons, factors, disadvantages, demanded*), with expanding use of metaphorization. Causality was important in the explanations and was realised in familiar and new resources of Conjunction. At various points, the deployment of summarising expressions (e.g. *These factors, These frequent and fatal accidents, This…)* allowed Ellie to bring together concrete details as abstractions in order to build the explanation or argument. Also contributing to the abstraction were technical resources (e.g. *enclosure, constitutional monarchy, Third Estate*), including the conventional framing of certain historical periods of time as *revolution* and *century*.

In addition, these were rhetorically organised texts, so that Ellie demonstrated development of textual meanings in Periodicity, with some deployment of macroThemes, hyperThemes, hyperNews and macroNews. Such text organisation was partially scaffolded through classroom instruction in a basic 'essay structure' in subject English at that time, which addressed some of these elements.

In responding to the simultaneous demands for multiple new resources in these new types of text, Ellie demonstrated a degree of management of some, but not control of all.

Concrete descriptions or event sequences formed a basis for moving into the abstraction needed for explanation and reasoning. There were some textual inconsistencies and the use of internal Conjunction was limited. Her factorial explanations were generally more complex and more successful than her expositions. Meanwhile she continued to write familiar text types in historical accounts, but also with increased abstraction in considering motivations in addition to concrete events. Biographical recounts, another type of chronological genre that is slightly more demanding than autobiographies, were also written.

In Year 8 science, in contrast, no new genres were introduced, but the three types that were already written in Year 6 were developed further. Key movements were an increase in technicality, which was often abstract, development of explanation, and more consistent text organisation.

Whereas in Year 6 most of the technicality construed concrete entities, Year 8 saw extensive technicalisation not only of entities (e.g. *radial muscle, calcium carbonate, hydraulic jack*) but also of abstract meanings (e.g. *frequency, convection, thermal stratification, Archimedes' principle*), building up taxonomies of scientific knowledge. These technical meanings were introduced gradually across the large number of texts in this set, predominantly in the context of activities, since the 74 procedural recounts comprised the dominant genre. In other text types, links were often made to known entities.There was thus still some linking to the student's own experience, but the technicality extended further than in Year 6 into more advanced educational meanings.

In developing explanation, Ellie wrote several sequential explanations of mechanical, industrial or biological processes, in addition to the causal explanations within the procedural recounts. Resources for interpretation of science activities were also expanded

beyond *show* and *demonstrate*, which appear to have been already scaffolded in Year 6, to include *a model of* and *represents*.

In terms of text organisation, the procedural recounts were well organised with headings that reflected the generic structure. The Conclusions in these texts tended to be either descriptive or explanatory, somewhat like brief reports or explanations. In the discrete reports and explanations, the flow of information generally unfolded in logical phases, occasionally with the use of headings or numbering. Grammatical metaphor and Theme choices supported information flow.

Overall, therefore, in Year 8, Ellie's writing moved further into more specialised educational meanings, now well removed from her everyday experience, and she demonstrated significant growth in her capacity to display this knowledge in more organised and rhetorical ways. While this was significant progress, some of the new resources were still only partially developed.

5.1.3 Years 9-10: Consolidation of 'educational' language

The writing in Years 9-10 was not primarily marked by significant new kinds of resources, but by further development of those already attempted, with more effective control evident.

In history, the chronological historical accounts were at times of greater length than those previously written, with recursive account sequences supported by clear temporal organisation. Ideational resources were expanded, with abstract and metaphoric meanings and expanded technicality more effectively integrated. Construal of time in the conventions of historical discourse also continued to develop.

Alongside the accounts, new text types were period studies and site interpretations, built on elements of these types of purposes within texts in the art history units, and requiring simple internal organisation.

In the few rhetorically organised texts, expositions were demonstrated to be more effectively controlled from Year 9, with more consistent use of Periodicity resources and internal Conjunction.

In some of the history writing at this age, Ellie worked flexibly with generic structure. While this may be understood as a lack of application of genre conventions, it also seems to indicate that Ellie worked constructively with staging of her texts to achieve different purposes. Examples were the inclusion of account and descriptive elements within stages of a site interpretation, and the Extensions added to provide supplementary information. An explanatory text in Year 9, which discussed the development of an Australian sense of identity, was staged in a rhetorical organisation similar to a factorial explanation, but focused on explaining three sequential social periods rather than factors.

The inclusion of historiographical details in a few texts demonstrated movement into more advanced disciplinary meanings and control of the new language resources required. Presentation of such information ranged from construal as historical events (*The obliteration of Pompeii was witnessed… by)*, to abstraction and metaphorisation *(sufficient evidence, The first reason we know all this…, The other main source of knowledge we have…)*.

In science, too, the same genres were written as in the previous years, but there was significant development within these. Procedural recounts continued to be dominant, but were more expanded, with detailed descriptions of the activities undertaken, and with generally longer and more complex Conclusions, now at times titled *Discussion and Understanding*, that comprised either explanations of the experiments or report-type descriptions of the elements involved, or a combination of both. An Extension stage was added to some of these to relate the science content to practical contexts. The other types of texts were sequential and causal explanations and reports, some highly effective and

others tending to mix purposes with less clarity. Textual organisation was variable, but a high level of periodic organisation was demonstrated in a comparative report written in Year 9.

Technicality was generously deployed in these texts and was effectively integrated, as Fields continued to expand and move into more advanced science knowledge. This writing suggests a student who was comfortable using scientific terminology. The technical knowledge was often linked to concrete experience, such as in linking a specific chemical substance to its presence in human skin, or mechanical principles to bridge building, but this appeared purposed to highlight the reality of the topic, rather than serving as a pathway to introduce the educational meanings as in the earlier years.

In summary, in both history and science, Ellie's writing at this age indicated that she was primarily consolidating the language resources she had already begun to use in the previous years, to reach a level where she was competent to use them and to redeploy them in new ways where it suited her purpose. At times she still chose not to deploy all the capacity that she had at her disposal.

5.1.4   Year (11-)12: Highly specialised and flexible writing

Year 12 saw Ellie's science writing 'catch up' in genre development, and with continuing gradual consolidation in most areas, she demonstrated the capacity to construe highly specialised meanings of the curriculum in both learning areas, with flexibility also manifest in her writing.

The Year 12 history writing comprised a series of consecutive extended historical accounts, somewhat resembling successive chapters, in the main learning unit. While this was a familiar text type, distinct growth was evident in more sustained writing, with the texts being significantly lengthier than previous writing; in expanded deployment of abstraction and grammatical metaphor; and in the seamless incorporation of portions that

served other generic purposes, such as factorial explanation, biographical or descriptive information, within the account. These texts unfolded serially, guided at times with hyperThemes; the serial structure allowed extended and elaborated discussion, and incorporation of the extra diverse content. Other text types were not evident in this unit, but were written in Year 11, including biographical recounts and period studies within either history or the related units of art history and Australian Studies.

In contrast, the Year 12 science writing evidenced significant change in text types, as argument texts, the exposition and discussion, appeared for the first time in this learning area. The purpose of these texts was to realise reasoning about science, either scientific or ethical, depending on Field. The arguments were often complex, including discussion of viewpoints from other sources, or consideration of multiple factors. In these, Ellie worked variously with rhetorical generic structure, though its application and the use of internal Conjunction to organise the flow of information remained somewhat limited, so that while she was generally able to make her arguments clear, the effectiveness and continuity of the presentation was at times incomplete. Specific grammatical devices were deployed strategically to build the arguments, including rhetorical questions, distinct types of clause complex and Theme choices.

In science, further development was also evident in the familiar text types. Reports and explanations, which became more prevalent with increased specialisation in some of the learning units, were often lengthy and well organised in logical ordering of information. They included classification, description and explanation, such as in the detailed description of the magma that forms certain kinds of rocks and the different processes involved. In the presentation of scientific theories or knowledge, historical information was often included to show the origins and processes of their development by scientists. Procedural recounts were also further expanded, and now at times included discussion of

unsuccessful results and possible explanations for these. In all these text types, Fields and technicality continued to expand.

In summary, in Year 12, in both history and science, Ellie demonstrated a substantial capacity to construe highly specialised educational meanings and present them in generally appropriate text types. The history writing and science writing were distinctly different, reflecting the differences of each of the Fields and genres. Also evident was not only competent handling of established genres, but the ability to write more complex texts by drawing on the elements in her repertoire to suit her purpose, mixing and adapting generic structure for the task at hand. Her repertoire was large enough to allow flexibility. It is important to note that while Ellie gave evidence of this development, it remained the case that she did not always deploy the full resources that she had in her repertoire.

The key developments over the whole course of Ellie's trajectory, from her movement into the educational meanings of middle school until she reached the level of specialised writing accomplished in Year 12, are summarised in Tables 5-1 to 5-6 in Appendix A, and further described below.

5.2   Patterns in the development

The developmental change in Ellie's written language between Year 6 and Year 12 as described above was extensive. Several features of the trajectory are noteworthy.

5.2.1   Key developments in language

The most significant development was the movement in ideational meanings from 'commonsense', everyday concrete meanings into 'uncommonsense', abstract meanings, generalisation and technicality, which were heavily dependent on grammatical metaphor. The increasing use of these resources created a substantial qualitative change in the nature

of Ellie's writing over the period and was indicative of her attainment of the final stage of Halliday's semiotic pathway discussed in Chapter 2, Section 2.3.1. The change was in broad terms similar across the two learning areas, but with distinctive differences in application.

In the history writing, the increase in abstraction was marked across the period, and characterised by the use of grammatical metaphor that was primarily non-technical. By Year 12 Ellie demonstrated a capacity for construal of experience in which abstract, metaphoric entities were prominent and pervasive. The change from Year 6 to Year 12 is typified in the following examples:

> *At the <u>age</u> of 14 I was made a gladiator and at 15 I won <u>freedom</u>. But after 6 years of <u>captivity,</u> I had no family to go to, no-one to rejoice with, nothing.* (Year 6, Text 1.2)

> *The <u>internal unrest of Russia</u> made this all the more easy…the Germans put their <u>racial policies</u> into <u>effect</u>…The <u>outcomes of many of the battles fought in Russia</u> were <u>determined by the climate</u>* (Year 12, Text 4.3)

She developed the capacity to fully exploit the potential of metaphor. She distilled and compacted information, firstly in the metaphorization itself, such as the compression through nominalisation of experience that would congruently be construed in clauses (e.g. *unrest*), and secondly, in elaboration (e.g. <u>*internal*</u> *unrest* <u>*of Russia,*</u> <u>*racial*</u> *policies*). Non-entities became agents of change as Participants in the clause, so that they could be reasoned about (e.g. *The internal unrest of Russia made…*). Not only processes but also logical relations were metaphorised (e.g. *outcomes, determined*). In these resources, in tandem with the inclusion of additional, non-metaphoric abstraction and other generalised meanings (e.g. *Russia, dynasty*), Ellie demonstrated the capacity for advanced abstract discourse. Her use of technicality also grew significantly, according to the numerous Fields addressed.

Her parallel development in science was dominated by technicality, much of which was realised metaphorically, classifying and organising the world in scientific taxonomies. The change in the science writing is typified in the following comparison between the personal, chronological and concrete writing of Year 6 and the technical writing of Year 12:

> *For orange I chose Minium it's a sort of grey slate with orange on the top, it looks like it's been sprayed with orange spray paint... It is a waste of time to look for fossils in our town, because the rocks are too old, and animals didn't live then.* (Year 6, Text 1.5)

> *<u>Fractional crystallization</u> too can be a <u>contributing factor</u> Not all the <u>minerals</u> within the <u>magma crystallise</u> at the same time. The <u>mafic minerals</u>, with less than 50% <u>silica</u>, <u>solidify</u> at a <u>higher temperature</u> than those with more silica...* (Year 12, Text 4.7)

The latter example demonstrates Ellie's deployment of technical metaphorization (*fractional crystallization*), in which the entity and its elaboration both contribute to the taxonomised meaning. Other grammatical metaphor that was non-technical (e.g. *factor, polarities, this practice*) was also deployed increasingly.

In the use of these resources in both history and science, Ellie's language developed to be substantially removed from everyday meanings. The role of grammatical metaphor was crucial in this development, in providing the resource for reconstrual of non-entities as entities and their qualities. This entity-dominated realisation is the key feature that makes dynamic meanings static, or 'synoptic' (Halliday 1993b, p.348), enabling the necessary reasoning, argumentation and taxonomising of history and science at the secondary level and beyond. Logical metaphor that reconstrues relations between processes as entities was also salient here. Non-metaphoric abstraction and technicality are important resources but do not have the semiotic power of metaphor.

In students' journey along the 'semiotic pathway', it is reported in the literature that that the capacity for grammatical metaphor may be attained before the age of 12 (Derewianka

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1995; Halliday 1993b), which was Ellie's age in Year 6. The extended time period of the data in this study provided evidence of how control of this resources was a process spanning the whole of middle to secondary school. A distinct pathway of increasing use was observed. In Year 6, the occasional use did not substantially affect the quality of the texts, having 'only local significance' (Halliday 1998b, p. 192) within clauses where used. In the science at that age, the technicality often realised concrete entities, taxonomised but without metaphor. In Year 8, where the meanings in history and the technicality in science became more abstract, metaphorization became more frequently deployed, but it was not until Year 10 that it was well integrated into the texts. By Year 12, the pervasiveness of the metaphorisation was evidenced as a 'regular, sustained feature of discourse of a particular kind' (Halliday 1998b, p. 192), demonstrating Ellie's control of this transformed way of construing experience. As would be expected, the extent of her deployment of these resources was varied in individual texts, according to genre and Field.

A gradual expansion was also seen in generalisation and abstraction more broadly. Though a capacity for these kinds of meanings begins earlier in the semiotic pathway, Ellie demonstrated expanded use over the years to advanced levels.

5.2.2   Broader developments in language

While the elements noted above were the most significant, important changes were also evident in other resources, with development evident in every system examined.

In relation to genre, significant growth occurred as the new text types were added. Genre is a contextual element in the language system, but Ellie needed and learnt to develop her capacity to respond to new purposes for writing, and managed the typical school progression of text types, even at times with creativity, beyond the reproduction of fixed templates.

Textual resources at the discourse semantic level were another distinctive area of growth, in terms of rhetorical and internal flow of information, Periodicity resources and internal Conjunction. This type of text organisation is another kind of abstraction in moving away from chronological and 'commonsense' patterns of information flow seen in recounts and in very simple reports that unfold in additive organisation. These changes appeared in tandem with, and were functional for, the advanced text types, extended writing and abstract ideational meanings into which Ellie moved.

In lexicogrammatical systems, her development of transitivity, clause complexing and Theme was evident and significant, but less distinctive than in the areas noted above. Ellie had built a broad range of these resources by the end of Year 6, so that her progress through secondary school consisted more of expansion of existing kinds of resources rather than major qualitative changes. Transitivity resources were an area of difference between history and most science genres throughout the years, with the latter characterised by a lower frequency, though not a significantly smaller range, of more complex forms: expansion of noun groups, embedded clauses, and Circumstances. Clause complexing was also more limited in most science text types. This lexicogrammatical growth was generally consistent with the recognised successful pathway as found in the literature (e.g. Christie 2010; Christie & Derewianka 2008; Schleppegrell & Christie 2018; Crossley 2020),

More generally, alongside the addition of new resources, continued expansion of resources that were already familiar was also evident, gradually increasing her capacity to construe meanings in more extended and varied texts. Another indicator of the extent of the development was the flexibility Ellie built in her language use, noted above in relation to generic structure but also evident in 'transportable' resources (Butt 2004; Christie 2012a) drawn on across the texts and learning areas to suit her purposes; examples included Periodicity and lexicogrammatical resources. The overall development involved the complementary development of resources in different systems, with 'all levels of language

successfully working together to create coherent texts that suit their social purpose' (Gebhard & Martin 2011, p.300).

The notable level of capacity that Ellie had attained by the end of Year 6 was mentioned earlier in Section 5.1.1, regarding her significant lexicogrammatical range, ready for expansion over the secondary years. Also already evident were the capacity to write several different text types, and some control of elementary resources of abstraction, grammatical metaphor, technicality and causality, thus a beginning of educational meanings. Further, there was evidence that she was building on the modelling of the scaffolded work in that year. This level of control appears to have formed a strong foundation in preparation for the years ahead, so that her secondary school development focused on the introduction of abstract work in Year 8 and the acceleration of educational meanings. Continuing, consistent progress was maintained, with no evidence of a developmental plateau in her written language growth in the transition to secondary school. The importance of adequate language development by late childhood has been highlighted in the literature (Christie 2012). At the same time, notwithstanding Ellie's capacity in Year 6, her expansion of resources in the following years indicated that the amount of change involved in the succeeding years, to accomplish the level she achieved in Year 12 writing, was substantial.

5.2.3 Gaps in the development

Despite the strong development, there remained some smaller weaknesses in Ellie's ongoing individual trajectory, as noted in Chapter 4 and in the description of the trajectory in Chapter 5, Section 5.1. These were specific gaps consisting in the absence of resources that may have been expected to be included in certain texts, resulting in a discontinuity of meaning or apparently misplaced choice. Firstly, a temporary gap was evident in Ellie's delayed control of some of the new resources useful for the abstract genres introduced in

Year 8 history. This was remediated over time; it is discussed in more detail in the Section 5.3.2.

Secondly, a more persistent gap was in her choice to not deploy with greater consistency resources that she had in her repertoire, particularly in the omission of some textual elements where they may have been helpful. This may have been due to a lack of confidence or attention, but other contributing factors may have been an ideational focus or time constraints. Ellie's primary concern, and that of her teachers, may have been to record the ideational content of the learning in a reasonably organised way, without detailed attention to careful crafting of every text, particularly where the generic purpose was somewhat mixed. Time may also not have been available for such care, given the large volume of writing created. Accordingly, it may be that greater emphasis on textual elements in the classroom could have addressed this gap, though perhaps with additional impacts such as a reduction in the quantity of writing.

A final small but persistent gap was in the occasional use of everyday or weak lexical choices rather than more advanced resources. Given Ellie's significant use of 'uncommonsense' language, including grammatical metaphor, such choices stand out in contrast. This issue may again have been partly due to the focus on the particular history and science content being taught, so that development of non-technical lexis attracted less attention in those classes. A comparison with the writing for other subject areas may be of interest in this regard, to explore whether a similar gap was evident elsewhere, or in which curriculum component this might have been addressed. The use of commonplace language may be considered in relation to interpersonal language resources (- see e.g. Christie & Derewianka 2008), which are not addressed in this study.

Despite these gaps, Ellie evidenced significant growth, building an expansive repertoire of language resources, across multiple systems within language, for creating educational meanings.

5.3 Learning language, learning through language

Ellie's development of written language can be considered in relation to her learning. SFL proposes an essential relationship between language and learning, and evidence for this can be seen in Ellie's case in two aspects of the data: the educational content and her learning strategies.

5.3.1 Learning curriculum knowledge

In the resources that Ellie developed in her written language, it is clear that the direction of growth followed the classroom demands, in the movement into increasingly educational meanings. Language development is not simply a matter of learning new grammatical forms, but of expanding meaning potential in a functional way in context. Ontogenesis of language does not occur in isolation from context; Halliday (1975c, p. 301) states the following:

> The social context is… not so much an external condition on the learning of meanings as a generator of the meanings learnt.

Specific language changes during schooling, including the key semiotic move into grammatical metaphor in the expansion of abstraction and technicality, are related to curriculum design. This is the basis for curriculum modelling of language development, and also demonstrates learning on the part of the student, since it is in the new language learnt that the student engages with the new meanings of the curriculum. Ellie's language change followed this path.

Further, these 'educational' meanings that realise disciplinary knowledge are increasingly meanings that are discursively constructed, and dependent on language. As Halliday (1999, p. 369) states:

> *Commonsense* knowledge is **largely** construed in language, as children transform their experience into meaning… *Educational* knowledge is **almost entirely** construed in language; even when it is presented in other forms, like scientific diagrams or mathematical formulas, these are given verbal equivalents during the learning process.

Ellie deployed abstractions such as *reason, disadvantage, sense of nationality, treaty conditions* and *international relations,* technical meanings such as *Industrial Revolution, 3rd estate, constitutional monarchy, igneous rocks, sodium silicates, meiosis, rarefaction, fractional crystallization* and *internal differentiation,* and reasoning in Conjunction resources such as logical metaphor. Such choices demonstrate educational knowledge that depends on construal in language. In this way, language was the substance of what Ellie was learning (Halliday 1991). She was learning the ideational content of the curriculum through language, and the language was central to her learning. Her language growth was directly and specifically linked to her learning in each discipline area.

This was also the case in her management of genre. She created text types that reflected the purposes of the historian, moving from recording and documenting events, to explaining and reasoning about them in explanations of complex causality and expanded arguments. Similarly, in science she produced texts with the purposes of recording, describing and explaining natural phenomena, transforming her experience, often first-hand and concrete, into scientific meanings through language in characteristic science discourse. Each genre demanded from her the appropriate language resources at the discourse and lexicogrammatical levels.

In these ways, Ellie progressively developed the key language resources needed in secondary school to move increasingly into the specialised, written-like language of these two learning areas. As she learnt this language, she was learning how to mean as a historian and as a scientist. The findings of this study therefore provide evidence that Ellie's learning development was inseparable from her language development, supporting a language-based theory of learning.

Hasan (1996a, p.187) points out the inseparability of the development of language and knowledge, as follows:

> In fact, it would be difficult to draw a distinction between the pupils' knowledge of an academic discipline and their discursive ability to listen/read, speak/write the discourses of that discipline. Academic disciplines are after all largely a constellation of certain types of discourse, and, in the end, what counts as knowing a discipline is the ability to participate successfully in the discourses of that discipline.

Accordingly, Ellie's educational success in those learning units was based on this written language development. The teacher feedback on her writing indicated that she was a successful student, making meanings in line with the requirements to the satisfaction of the school. The assessment of her learning lay in the assessment of her writing, as is common practice in education; teacher comments such as '*well written'* and '*well explained'* appear to have carried the same message as those that stated '*well learnt'*.

Halliday's 'semiotic pathway' is the sequence of key language change, the development of semiotic capacity for making meaning in social interaction. The curriculum application in schooling is the cultural context in which those key capacities are developed and enacted, within the broader ontogenesis of language. Ellie, as a successful student, predictably followed this culturally expected trajectory. In doing so, she was learning language and

learning through language, with learning understood in semiotic, linguistic terms. At the same time, her exact track was unique in its details.

5.3.2   Learning strategies

The second aspect of interest regarding Ellie's learning concerns her linguistic processes of learning. The changes in her written language, in terms of the specific resources that were added or redeployed, and the sequence of these changes, as discussed above, formed the content of her development. At the same time, the continuity of the data also offered the possibility to consider how the development occurred, in terms of the way those changes were made.

A clear feature of the process of change was that while the overall growth was extensive, it progressed incrementally, in small steps, rather than in large leaps or distinct stages. Change occurred alongside a great deal of repetitive rehearsal of familiar resources. New genres built on the foundation of earlier types; related ideational meanings appeared where Fields were slightly altered; technical science meanings were added, initially a few in each text, gradually becoming more pervasive and integrated; internal Conjunction grew from sporadic instances in Year 8 as rhetorical text types were gradually expanded; generic structure variation increased and was later adapted creatively. Where new demands were multiple, clear steps could be seen in the changes. As new resources were continually added, the redeployment of resources in new ways multiplied the meaning potential. This step-by-step development was not strictly linear, as a lock-step process, but accumulated over time as new resources were more or less gradually integrated, to build a competent and successful writing capacity. Ellie's pathway can thus be seen as a continuing momentum, a gradual building of her repertoire through many small steps of progress over a large number of instances of language use, in multiple written texts, rather than as 'stages' of development. This is consistent with Halliday's description of development as

being pushed along in 'innumerable small momenta' (Halliday 1980, p.319), through consistent, extensive new experiences of meaning-making.

In this incrementality of change observed in the data, relationships were often seen between specific newly introduced resources, resources previously deployed, and the semantic context. These potentially offer some indication of how specific changes were made, understood as specific linguistic strategies of learning. Such processes have been recognised in the literature as relevant to the question of learning through language. Halliday (1993b), in proposing a language-based theory of learning, suggested a list of points for consideration in formulating such a theory. While all these listed elements are intertwined in the process of learning to make meaning in language, a degree of distinction can be drawn between those that are more focused on the nature of the resources, systems and capacities that are developed, as the content, or outcome or goal of the learning (e.g. metafunctions, grammatical metaphor) compared with those that refer to strategies of learning, or ways in which those resources are introduced (e.g. filtering, 'magic gateways', complementarity). Halliday (1975c, p.295-297) elsewhere described 'semiotic strategies' in relation to the early learning of language as follows:

> … from a child's point of view, learning how to mean is like learning any other form of activity. It is something he has to master, and it has to be broken down into manageable tasks… The functional system with which the child is operating at any moment acts as a filter on the semantic input, so that he processes just those elements which are consonant, or resonant, with his semiotic potential at the time. (p.295)
>
> …he develops semiotic strategies such that he can use his meaning potential as he is building it and build it as he is using it. (p.297)

Such learning strategies have also been described in other early childhood studies, as noted in Chapter 2, Section 2.3.3.

In Ellie's case, processes similar to those identified in that literature were potentially implicated in some specific movements from familiar to new meanings. A comprehensive analysis of such elements would require a focused investigation of more of the data, and the list below is not intended to be definitive, but provides preliminary observations, based on examples noted in Chapter 4. Strategies that were suggested included generalisation, definition, contrast and classifying, paradigmatic variation and deconstruction. Generalisation from existing meanings in texts to create new meanings was seen in the summarizing of concrete elements in Text 2.3 (*factors*, *These frequent and fatal accidents; need, wealth*), and in conclusions about the qualities and behaviours of types of substances that were drawn from specific observed phenomena in the procedural recounts. Definition was used frequently to introduce new meanings, deploying resources such as relational identifying Processes including the Process *mean*t, as was also the strategy of contrast and classifying, seen in taxonomizing (e.g. *compression, rarefaction; sedimentary rocks, igneous rocks*). Paradigmatic variation was evident in the repetition of similar phrases in Year 8 history (*sense of nationality, sense of unity, sense of belonging*), and deconstruction and reconstruction in clause complexing expansion and reworked generic structure.

Also suggested was a strategy of filtering, or adding increments that were within range, a similar notion to Vygotsky's 'zone of proximal development' (Halliday 1993b). Evidence for Ellie's use of this strategy lay in the incrementality in general, but particularly in her temporary gap in rhetorical resources in Year 8 history. Though the new abstract text types at that point may have appeared as large 'leaps' in language and learning, the detailed analysis indicated that the changes were closely built on existing control, with gradual integration over time of the many new resources required. This delay could be explained in terms of filtering as a 'selective process' Halliday (1975c, p.296) of integrating manageable change. A related implication of this is that the extent of change that she did

achieve in Year 8 points to her strong foundation in Year 6, placing many of the challenges in Year 8 within reach.

Use of these processes in Ellie's development would suggest that early strategies for learning through language may continue to be activated throughout schooling. Such semantic strategies represent incremental change in meaning, and thus incremental learning. They are linguistic strategies, as ways that a learner moves from language realizing one meaning to language realizing a related meaning. The essential relationship between language and learning is thus again demonstrated.

Such processes may be seen partially as individual strategies, on which Ellie drew in her efforts to make meanings, and partially as context-based. It is important that they occurred as she engaged with the social context of schooling. This school context is further discussed in the following section.

5.4   School context and written language development

In the SFL theoretical perspective, it is understood that language development, rather than arising innately through maturation, is semiotically mediated in social context. The immediate context of Ellie's writing was the particular local school. It is therefore useful to consider that specific school context in relation to her developmental trajectory. As the study data consisted only of the extant texts, the details of the daily classroom pedagogy remain unknown, beyond limited evidence of the school's educational philosophy noted in Chapter 2, Section 2.4. Nonetheless, the data provided evidence of some contextual elements that appear salient.

In general terms, the intentional goals of history and science curriculum learning gave direction to the content of Ellie's written language development. This role of the school context as 'generator' of meanings has been noted earlier in Section 5.3.1.

More specifically, in the daily process of curriculum learning, the school engaged Ellie in practices of semiotic mediation. Such mediation is understood primarily in terms of social participation in language use. Information in the data about such interaction in Ellie's classroom experience suggests two factors that merit consideration as likely or potential influences on her development: the immediate writing requirements, and the broader experience of language across the curriculum.

5.4.1 The assigned writing tasks for history and science

The requirements of the writing tasks for history and science placed demands on Ellie to engage in language use. It can be reasonably assumed that Ellie's written texts were created in response to classroom obligations, as set assignments within the process of teaching and learning, rather than on her own initiative, given the formal organisation of the texts in the booklets, and the accompanying teacher comments and assessment feedback. A clear relationship was evident between these tasks and Ellie's writing development, relating to three aspects of the requirements: the range of text types and Fields and the volume of the writing.

Firstly, the assigned text types were diverse and sequenced to present incremental language demands. The value of this approach is recognised in the genre progressions noted in Chapter 2, Section 2.4; the developmental influence of writing different text types, with their demands for varied resources, is also recognized elsewhere in the literature (e.g. Brisk & DeRosa 2014; Christie & Derewianka 2008; Lewis 2014). Although in Ellie's case there was no evidence of explicit genre pedagogy for history and science, and only basic 'essay structure' instruction, the assigned tasks engaged her in addressing the many, and increasingly educational, generic purposes, with appropriate language resources for each. A close relationship was evident, for example, between the development of generic structure, Ideation, internal Conjunction and Periodicity resources in the rhetorically organised texts, and in the use of resources distinct to specific genres.

A point of interest was the school's use of empathetic texts in history, which, though somewhat controversial in the literature as displacing the writing of more educational texts, (Coffin 2006a; Christie & Derewianka 2008), seems to have been valuable in Ellie's case. In these texts, she was able to shunt between the more concrete and the more abstract, building capacity in chronology, temporality and some abstract and technical meanings in preparation for writing historical accounts. The writing of these texts, alongside rather than instead of other text types, thus appears to have supported development of the more educational writing rather than preventing it. 'Story' texts appear to have been used as transitional texts in both history and science in Year 6.

Secondly, alongside text types, an extensive range of Fields was required to be addressed in the writing, consistently demanding new resources. Additionally, the expansion of many of those Fields in multiple texts of slightly different focus, with ongoing movement into further educational meanings, presented some continuity, but also further demands and opportunities for growth. While some elements of Ideation in the assigned Fields, including the technical language, would likely have been explicitly introduced in the classroom, Ellie's integration of those elements into her writing required her to also manipulate other resources accordingly, such as Conjunction and clause complexing and textual resources.

In relation to specific Fields and ideational meanings, the apparent strategy in Year 6 science of linking new abstract meanings to familiar concrete meanings, noted above in Section 5.1.1, seems likely to have originated in the school context. The external Field also motivated the early observed instance of Ellie's building of internal text organization from external, concrete elements in Year 6 (*for red… for orange…for blue*); though less intentional, this example illustrates the influence of the demands of Field.

Finally, changes in Ellie's language were also linked to the volume of the writing required. The need to produce extensive numbers of texts created impetus for continued and incremental development, not only in adding text types and Fields as noted above, but also in allowing repetitive practice so that small variations arose in similar texts, control of specific resources advanced and writing became more sustained. Ellie's language growth through this extensive body of writing supports the notion that writing is developed by writing (Christie & Schleppegrell 2018). A similar understanding is expressed by Hasan in the following comments:

> … the valued higher mental functions develop only if that potential [of language] is *actualised* in verbal interaction. (1996b, p. 164*).*

> You can only learn how to mean by attempting to mean. (1996d, p.26)

The school's practices in the determination of the specific writing tasks thus appear to have been significant for Ellie's written language development in those tasks.

5.4.2   The context of the broader curriculum

It is also relevant to consider further elements of Ellie's language experience in the broader curriculum which may potentially have contributed some influence on her written language development in history and science.

Firstly, writing in other curriculum areas also placed demands on Ellie's language use, and likely expanded cross-fertilisation of her language choices. Across Ellie's history and science writing, parallels were evident such as in shared, 'transportable;' resources of the lexicogrammar and Periodicity, and increasing abstraction and metaphorisation. As resources were developed in one or other text, she could draw on them, redeploy them and build on them as needed in a different learning areas as a single language user engaging in and building on diverse language use. It seems likely that the writing for other areas would be part of the same process. Specific examples of shared resources from Ellie's substantial

amount of writing for subject English were evident. For example, narratives written for Year 6 English related to legends of a historical nature, with some language choices shared with history texts, and basic elements of rhetorical text organisation learnt in Year 8 English was applied in the history writing, as noted in teacher comments. Further cross-disciplinary sharing of resources was possible in the unusual curriculum framing that required the flexible writing of varied text types across subject boundaries. Every writing task contributed language demands.

Secondly, outside of her own writing, Ellie was provided with extensive experience of written language across learning areas, which likely familiarized her with distinctive characteristics of written language in varied genres and within the different language systems. This experience included the following, for which evidence is available in the data: listening to and copying of mythical stories in primary school; consistent reading to a high level, including advanced classical literary and science texts in secondary school; dictation; and the use of published texts as sources for her own writing in diverse subjects, involving adaptation of information and imitation or rephrasing of written language,

Finally, the school's integration into the curriculum of explicit attention to knowledge about language and language variation may potentially have further familiarised Ellie with written language patterns, and given her some conscious awareness of ways in which language works, so that she could apply a degree of thoughtfulness in her language choices. Her Year 6 English work included explicit practice of grammatical elements, vocabulary, and language variation, including verb tenses in a narrative, comparative language choices in letter writing for different purposes, and the varied language of character roles in narratives. Teacher feedback on her writing at times made explicit reference to such features; for example, a teacher comment on one of her Year 6 English texts observed that she had captured 'the high language of the prophet'. Information about language was also applied in the learning of languages other than English. It is not possible

to draw definitive conclusions about the impact of this explicit attention to language, but as Ellie consistently demonstrated a wide variety of choices appropriate to different kinds of texts, it is feasible that some level of awareness was developed through these curriculum elements.

5.5 Summary: Written language development and learning in context

In summary, Ellie's trajectory of written language in ideational and textual meanings developed from commonsense, everyday meanings to specialised educational writing marked by abstraction, generalisation and technicality. The key resource of grammatical metaphor was crucial to this development.

In her language changes over the period, Ellie's direction of growth followed the cultural semiotic pathway, attaining the final stage in metaphorisation. In relation to the purposes of education, this growth occurred within and was directly linked to her achievement of the educational goals in the curriculum pathway, and demonstrated her learning of subject content through language, for successful completion of those areas of schooling. The data suggested evidence of her use of learning strategies. Ellie's development can be related to the context of the specific writing demands and the broader experience of written language afforded by the school.

While the evidence points to helpful contextual elements within the school, information about the semiotic mediation experienced by Ellie outside of her school context was not available. It is therefore not known whether her home and community experience offered the particular kind of semiosis considered important for achieving the valued language growth, or the comparative influence on her success of external factors in comparison with the school. Examination of the developmental trajectories of less successful students in the same classroom context would be of interest in this regard.

Ellie's trajectory demonstrates the importance of the school years for language development. The value of this development extends beyond those years. Ellie was learning through language, and completing required curriculum, while at the same time more broadly she was engaging in the semiotic process of deploying new meaning potential (Macken-Horarik 1996). The extent and flexibility of her developed language capacity suggested that she would have been well prepared to continue to draw on and expand these resources past schooling, to meet unknown new demands in the future, where further new genres, new resources and new redeployments of resources would likely be required. The relevance of language development for life after school is highlighted by Schleppegrell and Christie (2018, p.143):

> Knowledge and language develop together… and the years of schooling are opportunities for children to engage with a broad range of cultural knowledge, whether or not they will continue to engage with all of those areas as they move into adulthood. The schooling years are a period for exploring and developing flexibility in writing, so that as students move on into adulthood, they can participate in social life in the ways they choose.

Ellie's flexibility arose from building adequate resources so that she would have multiple options for choice in multiple new contexts, beyond reproduction of known templates and familiar patterns of use. In this way, her learning of language was valuable beyond successful navigation of specific educational gateways, evolving into a semiotic resource for future use.

CHAPTER 6   Conclusion

6.1   Research questions: review of findings

The purpose of this study was to identify the trajectory of written language development in an individual student, named Ellie for the purposes of the research, from Year 6 to Year 12 in her history and science writing, with a focus on ideational and textual meanings, and to consider that development in relation to learning and context. The findings are summarised below in relation to the specific research questions.

Firstly, the qualitative, incremental steps of written language development in Ellie's trajectory were identified, and have been presented in detail in Chapter 5.1 and Appendix A. This development involved movement from a transitionary level in Year 6, into more distinctly abstract and technical educational meanings in Year 8, which were then consolidated over Years 9 and 10 to build towards highly specialised and flexible language use by Year 12. The most important growth was in ideational meanings of abstraction, technicality, and generalisation that drew significantly on grammatical metaphor, the essential semiotic resource that reconstrues experience with a focus on entities, making possible new ways of organizing information, reasoning, and technical taxonomies. These key developments were crucial resources for construing the disciplinary knowledge of history and science. Major development was also evident in textual resources for rhetorical text organisation. Alongside these discourse semantic changes, lexicogrammatical changes were significant but less distinctive. The full range of growth appeared within a significant progression of text types. Overall, Ellie's trajectory of language development was extensive, and across all strata and systems that were examined, following a strong foundation in Year 6. Her pathway was successful in terms of both semiotic development

and school requirements, as described in the relevant SFL research, though with some small gaps.

Secondly, the comparison between the history and science writing indicated differentiation consistent with the recognized characteristic disciplinary discourse, particularly in the prevalence of non-technical abstraction in history compared with technicality in science. A secondary difference was the lower frequency of expanded lexicogrammatical resources, in other words a 'simpler' grammar, in most science genres. Commonalities across the two learning areas were in the general direction of developmental change towards educational meanings and in 'transportable' resources in the lexicogrammar.

Thirdly, in relation to the question of learning, the trajectory provided evidence that in the development of language, particularly of 'uncommonsense' educational meanings, Ellie was learning through language, learning how to mean in history and science. Her learning of curriculum content knowledge was inextricably tied to her language development, with learning understood in semiotic terms as control of the discourse of each subject area. At the same time, she was also building her language repertoire as a meaning potential for future use beyond schooling. Indications of distinct learning strategies were suggested.

Finally, in consideration of the specific school context in which the writing was undertaken, a relationship was evident between Ellie's development and the writing demands imposed in the classroom, in the nature and quantity of the prescribed writing tasks. Based on the SFL understanding that language develops in response to educational demands, the inference is drawn that these requirements were influential in Ellie's written language development. Consistent experience of written language provided in the learning programmme, as evidenced in the wider data, may have offered additional support.

6.2   Contributions of the study

This case study contributes to the research in written language development in addressing the recognized gap in empirical information about individual development. The study particularly contributes to the SFL body of knowledge in exemplifying the ontogenesis of language in the individual in the adolescent years, expanding on the case study of Derewianka (1995) and the generalized curriculum-based research described in Chapter 2, Section 2.3.

The findings support the key theoretical understanding of a 'semiotic pathway', noted in Chapter 2, Section 2.3.1, and the centrality of abstraction, technicality and grammatical metaphor in the secondary school years. Rich evidence for this development is provided in the analysis, as reported in Chapter 4 and in the Appendices. Further, the progressive maturation of the use of these resources, to the completion of schooling, is exemplified in context. The final key step of the semiotic pathway is not limited to initial capacity for metaphorization, but requires expansion to confident and pervasive use, and this case study illustrates the extensive language development this entails in secondary school. The findings resonate with those of Christie and Derewianka (2008), though provide more detail over the age period, and the incrementality of Ellie's language change illustrates Christie and Derewianka's (2008) 'phases' developing as a continuum, amidst the changing demands of successive stages of the school curriculum.

The theoretical proposal of a language-based theory of learning is also supported in the increasingly 'uncommonsense' educational knowledge realised in the changing meanings in Ellie's trajectory, and the discursively constructed nature of that knowledge. The study further highlights expanded consideration of strategies for learning language and learning through language, building on the evidence of such linguistic processes in early childhood. In addressing the language change in one individual writer, the case study has integrated

the different theoretical strands of language development research in SFL: the 'semiotic pathway', the language demands of schooling, learning through language, learning strategies, and elements of social contextual mediation.

In the analysis undertaken, the theoretical and analytical frameworks have demonstrated the fruitful application of the SFL functional, meaning-based approach to language. The approach across strata and systems makes clear how written language development involves a range of different kinds of meaning-making resources working together.

Finally, for further research and application, the individual description is made available for comparison with the pathways experienced by other students. While each student's trajectory is understood to be unique, the advances and difficulties seen in this case may be usefully considered in relation to other individual cases from similar or different social contexts, as well as to understandings of normative development.

The aim of these contributions is to support and enhance understanding of written language development, not only for theoretical advance but also for expanding support for students in their writing, their learning and their development of language more broadly.

6.3   Implications of the study

While this was a case study, so that the findings are limited to the individual context, the following implications for pedagogy can be highlighted.

Firstly, as already noted, the study points to the extensive scope of language development required during middle to secondary school, and the importance of building the advanced linguistic resources for learning in the disciplines. The broader post-schooling value of developing such an expansive, flexible language repertoire at this age is also suggested.

Complementary to the above, the study indicates the significance of adequate language development in primary school to provide the necessary foundation for the years ahead, particularly in the lexicogrammatical systems of transitivity, clause complexing and Theme, as well as initial, elementary capacity in abstraction, technicality and grammatical metaphor. In this way, the development in secondary school can be focused on the new requirements in those years.

Additionally, Ellie's case signals the importance of the school context in providing appropriate demands and opportunities for development, including the value of requiring a wide range of text types written in developmentally considered sequence, multiple Fields, and adequate amounts of practice. A caution is suggested where the simultaneous introduction of many new language demands occurs, particularly at key transition points in the curriculum such as in the move into greater abstraction and rhetorical texts. At such times, students' use of filtering may delay full accomplishment, and repetitive opportunity may be needed for consolidation towards skilful independent control.

Finally, extended student experience of written language in the broader curriculum appeared in Ellie's case to be valuable. As part of this experience, explicit attention to knowledge about language may have contributed to her strong development in writing. Though this may be a contested area of pedagogy, support for educators in the first instance, in relation to their own knowledge about language, is likely be of significant value to them as they guide student writers.

It is recommended that support for educators in relation to all the above points be readily available.

6.4   Limitations of the study

While this study was fruitful, a number of limitations can be noted. Firstly, as a case study, the analysis related to an individual student in the context of one specific school in Australia, so that the pedagogical context was distinctive and the case study was geographically, socially and culturally limited, as well as gender-specific.

Secondly, the scope of the research was broad, and yielded an extensive amount of detail so that the analysis took a survey-type of approach that was not able to be extended in depth and nuance at each point. The reporting of the findings in the thesis was also limited by the space constraints, so that only an illustrative selection of the analysis could be presented. The purpose of the research was nevertheless achieved, and care has been taken to present as much evidence as possible for the conclusions drawn.

Though expansive, the scope of the study remained limited to a portion of the entire data and to selected systems within language. A more comprehensive study of Ellie's writing could have included the omitted systems in the model, as well as a greater number of texts, from both the remaining year levels of history and science as well as other learning areas, particularly the extensive writing in subject English. Information about further contextual elements outside of school may additionally have been pertinent.

6.5   Suggested areas for further research

The study suggests the following areas as of potential value for future research.

Studies of the written language development of other individual students in different contexts and in learning areas beyond history and science could be expected to offer new insights, including potentially useful comparisons with the findings in Ellie's case. This could include comparative studies of more and less successful students in shared contexts.

Further research in relation to the linguistic strategies involved in language development during schooling would seem valuable, to expand understanding not only of language development but also for building the language-based theory of learning.

With regard to the theoretical framework, the tools applied in this study were fruitful. One area for further exploration may be more wide-ranging examination of meaning-making within stages of generic structure, such as the nature of explanations and arguments, and different options of Conjunction in these, which could be useful for expanding understanding of more complex texts.

Appendices

Appendix A. Ellie's Development of Written Language

Tables A-1 to A-6 on the following pages summarise key elements in Ellie's trajectory.

Table A-1. Key developments in Ellie's written language: genre progression

YEAR 6	YEAR 8	YEAR (9-)10	YEAR (11-)12
Genres - History			
Empathetic texts: - recount, narrative, autobiography, journal entry, hortatory exposition - mostly chronological **Historical accounts:** - chronology with some causality - some internal text organisation adapting generic structure - earlier texts possibly scaffolded, later fully independent	New rhetorical text types: - **factorial explanations** - developing - **expositions** – limited/limited success Chronological: - **historical accounts**: further developed in detail/length/abstraction - **biographical recounts** A few empathetic texts	New text types: - **period studies** - **site interpretation** Previous text types further developed: Other texts that mix different generic purposes Added Extension stage in some texts	**Historical accounts**, extended, in continuous sequence **Biography, period study,** in Year 11 history and related learning units in Years 11 and 12 Flexible inclusion of other generic purposes where relevant e.g. factorial explanation within historical account
Genres – Science			
Procedural recount developing form personal recount to more conventional **Reports and explanations** — with some internal logical organisation Reports - descriptive or classifying Explanation**s** – few, some implication sequence Many texts are brief or show only part of generic structure Some use of headings for generic stages Some texts possibly scaffolded (all genres)	**Same text types** as previously, but generic structure more complete Procedural recounts brief but well organised, with headings related to generic structure Reports - descriptive or classifying Explanations - mostly sequential e.g. *How it works*	**Same text types** as previously, but with consolidation in longer and more detailed texts Procedural recount Conclusion as either report or explanation or both, with occasional Extension Reports, explanations (sequential, causal) Some texts have mixed purpose	**Exposition** and **discussion** introduced Other text types as previously, with further consolidation in some Some inclusion of historical context re development of the science Procedural recounts may include discussion of unsuccessful elements of experiments and possible explanations

Table A 2. Key developments in Ellie's written language: Field

YEAR 6	YEAR 8	YEAR (9-)10	YEAR (11-)12
Fields - History			
Commonsense approach to history learning in empathetic texts e.g. life experience of individuals in context, encounter with a famous person Uncommonsense knowledge of history in accounts e.g. specific wars, specific rulers Several different perspectives on one general period of history	Fields become more abstract e.g. complex interconnected causes of social change, motivations of individuals and groups in political event, comparing social contexts Abstractions still linked to concrete meanings e.g. physical conditions of mines as a cause of Industrial Revolution, actions of Ford that resulted in popularity of cars Abstract reasoning, based on concrete events or descriptions	Fields relate to educational knowledge, detailed and often specialised and abstract - concrete e.g. concrete context of period/site, rise and fall of dynasties and other powers, events of political contests - abstract e.g. validity of territorial claims, development of national identity, political goals Abstract reasoning Historiographical content at times	Fields relate to educational knowledge, detailed, extended and often specialised and abstract
Fields – Science			
Commonsense approach to science learning e.g .colour and shape of different mineral specimens, creating static electricity effects with mundane objects Educational knowledge linked to everyday experience e.g. star constellations Fields from wide range of science: geology, physics, astronomy (in all years)	Fields more removed from, but linked to, concrete experience – learning through activities e.g. visual demonstration of sound waves, modelling human eye function, chemistry of foods	Educational Fields, moving further into more specialised science knowledge, detailed Links made from specialised knowledge to everyday experience	Highly specialised Fields with detailed content related to embryology, chemistry, optics, astronomy, geology Reasoning about science – scientific and ethical

Table A-3. Key developments in Ellie's written language: Ideation

YEAR 6	YEAR 8	YEAR (9-)10	YEAR (11-)12
Ideation - History			
People: focus on individuals, either first person or known historical figures; some generalised groups of people e.g. *Romans* Activities mostly concrete Abstraction and grammatical metaphor evident though limited e.g. *slavery, appearance, captivity* Time foregrounded; place important Conventions of history: time *BC;* naming people by place e.g. *Rome* Technicality in names, places, events e,g, *Punic Wars, Roman Empire* Expansion of meanings e.g. military activities*: dominated, decimated, campaign*	People: greater sps e.g. *nobles, Third Estate* Abstraction increased, including metaphor e.g. *conditions, sense of nationality, rivalry, trade, reasons, factors; called for, demanded, afford, maintain* Technicality increased and more abstract; incl. time e.g. *enclosure, constitutional monarchy, Tennis Court Oath, Industrial Revolution; Ice Age* Activities include generalised habitual activities of social groups	Abstraction significantly increased, dominant in some texts e.g. *legal claim, moral proprietorship, recollection, non-literary sources, commerce, colonialism, decline* Technicality continues to expand e.g. *Golden Age of China, Ming Dynasty, Boers, Gallipoli*	Significant levels of technicality and abstraction integrated within accounts Some everyday lexical choices continue at times
Ideation - Science			
Technicality developing, based on: - first-hand experience e.g. rock samples, light, sound - everyday knowledge e.g. stars, landforms - multimodal elements Technicality often refers to physical items e.g. *halite, solar system, earth's crust*	Technicality increased and less concrete, may be metaphoric e.g. *rarefaction, photosynthesis, buoyancy, polysaccharides, thermal stratification* Interpretation of phenomena e.g. *demonstrates, represents, is a model of*	Technicality increased and effectively integrated	Very high level of technicality, well integrated Some everyday lexical choices continue at times

Table A-4. Key developments in Ellie's written language: Conjunction

YEAR 6	YEAR 8	YEAR (9-)10	YEAR (11-)12
Conjunction (external)- History			
Broad range of explicit Conjunction - incl. addition, comparison, time, cause, means, purpose Implicit Conjunction - additive in chronology - dominant - includes condition (not explicit) Causation in a range of resources - explicit - *so, therefore, thus, as, because* - some 'cause in the clause' as process e.g. *led to, forced to work* and as Circumstance e.g. *for their efforts*	Broad range of explicit Conjunction as previously Implicit Conjunction includes cause Causality is complex, realized in expanded range of resources – explicit as previously, also *so that* - 'cause in the clause' e.g. *reason, factor, meant, kept from having; for these reasons*	Broad range of Conjunction resources as previously	Broad range of Conjunction resources as previously Causality prominent and frequently metaphorised
Conjunction (external)- Science			
Broad range of explicit Conjunction Additive implicit Conjunction in chronological texts and reports Causation in a range of resources - incl. explicit conjunction - *because* - 'cause in the clause' e.g. *effect, causing, result from, influence* - implied in time/place relations e.g. *when…, where…)* - implication sequence: some use	Broad range of explicit external Conjunction as previously Causality resources expanded - *due to;* varied grammar in implication sequence e.g. *This turns a spindle wheel <u>that</u> turns a pole … …the spur goes round, <u>hitting</u> a bar...* Implication sequence: more extended	Broad range of external Conjunction as previously, with some minor additions of lexical choices (*as well as, except that*) More complex logical relations in explanations	Broad range of external Conjunction as previously, with some minor additions of lexical choices (*consequently, in return for*)

Table A-5. Key developments in Ellie's written language: transitivity and clause complexing

YEAR 6	YEAR 8	YEAR (9-)10	YEAR (11-)12
Transitivity and clause complex - History			
Processes – full range Participants – wide range incl. expanded noun groups modified with prepositional phrase or finite and non-finite clause; embedded clause used nominally; apposition Elision of agency by use of passive Circumstances – all types except condition, additive accompaniment, guise, product, source, viewpoint Clause complex – equal and dependent, expansion and projection Enclosed clause	Broad range of resources as previously	Broad range of resources as previously Clause complexing continues to expand in number of clauses and ways of combining	Broad range of resources as previously Incl. Circumstance of source – *according to Marx* Clause complexing continues to expand in number of clauses and ways of combining
Transitivity and clause complex- Science			
Simpler clause grammar than in history – same types of resources are used but less frequent use of more complex options Circumstances varied, incl. condition, guise, product, viewpoint	Broad range of resources as previously	Broad range of resources as previously	Broad range of resources as previously Strategic choices of language resources to suit purpose e.g. postpositioning with *'It…'* in argument

Table A-6. Key developments in Ellie's written language: Mode and textual resources

YEAR 6	YEAR 8	YEAR (9-)10	YEAR (11-)12
Mode and textual resources - History			
Chronological text organisation Limited internal organisation HyperThemes -some use Unmarked Themes may vary, though repetitive pronominal Themes if focus on same entity Marked Theme, clause as Theme in clause complex, postposition, other foregrounding strategies Thematic development linear and zigzag Low lexical density	Rhetorical text organisation, with macroTheme, hyperThemes, hyperNew – partial success Some use of headings Theme resources as previous Internal conjunction – limited - consequence, in reasoning in an extended rhetorical text (*Therefore we see that, So, In conclusion*) - text time and comparison, in reasoning more briefly at the end of a chronology (*Firstly, secondly, thirdly, for example*) and in predicting (*Under each heading*) Summarising nominal group – *this, these*	Rhetorical text organisation more consistent where used Chronological texts more extended Internal conjunction expanded and more consistent	Chronological texts more extended Organisation of genre within genre, including internal Conjunction Textual resources not always deployed Lexical density may be high
Mode and textual resources - Science			
Some chronological texts Non-chronological genres more prevalent but texts most often brief, very limited internal organisation HyperThemes limited; hyperNew rare Marked Themes less common but assist text organisation Theme variation as in history Headings used in some texts Low lexical density	Texts more organised and complete Headings used at times – generic in procedural recounts, topical in reports Numbering used in some reports HyperThemes deployed at times Theme – as previously	Some texts well organised, at times with use of periodicity resources, internal Conjunction Some textual inconsistencies where text purpose is mixed in longer texts	Effective organization of complex extended texts, with some use of periodicity resources Text organisation may vary with length, resources not always deployed Lexical density may be high

Appendix B. Set of Selected Texts

The 32 selected texts are presented here with their generic structure displayed.

KEY

Italic font is used to indicate the original texts by Ellie.

( )　　　　Parentheses with text in italics are as included in the texts as originally written.

( )　　　　Parentheses with text not in italics indicate editorial annotations, which may be additions to represent elisions or apparently inadvertent omissions. Addition of elided terms is minimised.

(?)　　　　illegible or unclear words in the original text

Minor instances of unconventional spelling have often been corrected; the original syntactic structure and punctuation have been retained.

Text 1.1 *Rome and Carthage* – Historical account (Year 6)

By 300 BC Rome had dominated all of Italy but had little interest in the land beyond.	Background
In 264 BC a conflict arose with Carthage which forced Rome to build a fleet of ships.	Account Sequence
Over the course of 3 wars – the Punic Wars – Rome decimated the Carthaginians.	
In the 2ⁿᵈ war, however, Hannibal almost conquered Italy by a daring campaign from the north. It was only the final stroke of the Roman general, Scipio, who attacked Carthage itself, that forced Hannibal out of Italy and into final defeat (201 BC).	Account Sequence
After peace was made Hannibal brought prosperity back to Carthage.	
When he re-armed to defend against a neighbouring kingdom (friend to Rome) Rome set out on the 3ʳᵈ War which led to the absolute destruction of Carthage (146 BC).	

Text 1.2 *Bravery* – Empathetic autobiography (Year 6)

I was just like every other slave boy. My story therefore is rarely told. I was just another of those million slaves.	Orientation
The Romans conquered our home and everything it owned. On the night we, the slave to be's, were going to be taken away on a ship to Rome, my mother left me this journal. We all stood shivering in our rags. It was quite dark and the sea breeze certainly was cold. Harsh Roman voices were yelling orders, occasionally a whip was lashed across a back. Women wept, children screamed, the men just hang their heads in shame. Everything was chaos. I was only nine then.	Record
My mother came running up, she held my baby sister in her arms, she wasn't crying. My Mother is brave. 'Talius, take this, remember all I have taught you. Be good. Be brave, don't cry. Talius, promise to me you will never forget the gods, pray to them, have trust. Always do what is right. Be brave, Talius, be brave.' Giving me the book she held me in a hug for the last time. It was then that I realized she was not coming with us. I do not know how she escaped the Roman soldiers. I clung to the book, with eyes wide with terror.	
My father, big brother and I were loaded onto the ship. The grief of it had not yet sunken in, it all seemed so unreal. The moon was up and we were sailing away. I stood leaning over the railing staring down at the dark water. I had always hoped to be a warrior and now all was lost. *Looking back to the distant shore I saw the big black cliff standing out against the evening sky. What I saw next I will never never forget. I saw the figure of a lady standing on the cliff. My mother is brave; she is the bravest person I can remember She stood unmoving, her white clothes fluttered in the gentle breeze. Sadness hung in the air yet her appearance was somehow peaceful. So noble standing there, almost like a god. I watched her until she was out of sight, she never moved once.*	
Many, many hours later we entered Rome in the long parade, chained one behind another following the carts filled with our own belongings. A few hours after we were standing in the market square. I was next to my brother and father, waiting to be sold. I had always presumed I would be sold with my family but I was so proved half wrong. There was much shouting and bargaining. 'This one's only a boy! Useless! Free, I should say.' One of the slave drivers marched up, he kicked the heavy trail of chain, almost pulling me to the ground. 'He goes with his father this one, came together.' He said pointing to me and my father. I saw a huge man pull out his small bag to pay and my heart filled with fear. If only my gentle mother had been there, she would have held my hand. Out of my brother and I, I was always considered the weaker. So, my brother was my (father's) favourite, he always said he was proud of him, what a promising young warrior he was, while to me he said, 'Fetch my books, Talius.' As we were taken away I glanced back at my brother (as did my father) standing there as if he cared not for life. I felt a pang of grief, instead of ever being jealous of my brother I had admired him and wanted to be like him but we had not been so close. Now I thought how it would be without him. I was sorry for my father, too.	
Slavery was horrible, torturous, order after order, never a break. It turned out that my brother had been bought by a man not so far away and we often saw him in the marketplace. My father rarely talked to me now, he was too tired and depressed to say anything even to his own son. He looked so sick and weak, to think he was a warrior. Slowly we drew apart. Sometimes I thought he had forgotten he was my father. I missed my mother's love. So at the age of nine I lost both my parents and my siblings, I was deprived of any love or care whatsoever. I tried to hide all this but inside me, was crying out for help. I had lost everything I had once possessed. Every day was the same, no laughter, no fun just work, lifeless work.	

At the age of 14 I was made a gladiator and at 15 I won freedom. But after 6 years of captivity I had no family to go to, no-one to rejoice with, nothing. I had been bought four times so my father no longer recognized me. He had lost his heart, his hope, as I so nearly did.	
I now live in Greece with my wife and 5 children. Many, many years have passed since my first night of slavery but I remember it as if it were yesterday.	Reorientation

Text 1.3 *The Triumvirate* – Historical account (Year 6)

In the time following Sulla, three Romans took over the reins of power in Rome. Crassus, Pompey and Caesar formed the Triumvirate.	Background
Crassus was the richest man in Rome. Much of his wealth came from the misfortunes of those who had suffered at the hands of Sulla and other disasters and tragedies.	
Pompey was the favourite of the nobles and senate and had won high honour by success against the pirates, the final battle with Mithridates and the conquest of Jerusalem.	
Julius Caesar, a descendent of Aeneas, was loved by the common people. The games he hosted were always the best. In his conquest in Spain and Gaul his foes became his friends respecting him and wanting to live as Romans. Caesar said, 'My greatest and only pleasure in victory is to save the lives of those who have fought against me.'	
After some ten years Crassus was slain and Pompey and Caesar came into a contest for power in Rome. Pompey influenced the senate to limit Caesar's power. But Caesar did not bow to their will and decided to settle the matter by returning to Rome with his army which was to declare war upon Rome itself. When Caesar crossed the river Rubicon his fate was decided; 'The die is cast!" he said as he moved to make one of the most decisive strokes of history. (49 BC)	Account Sequence

Text 1.4 *Behind their smiles* – Empathetic autobiography (Year 6)

I was visiting Rome from Greece. I had met Caesar and now I know why he was so loved. I knew what they meant when the people said his words were 'his only enjoyment of victory was saving his foe'. So much was he loved by his people that he walked without guards surrounding him.	Orientation
The night before I had supped with the senators that were plotting against him, only because of jealousy. As soon as I reached home I wrote him this letter. 'Oh, mighty Caesar, I am only a noble from Greece, but please take my warning: Do not go to the senate house today. I supped with certain Senators last night and heard them plotting to kill you! Jealousy is behind their friendly smiles! Be warned!'	Complication
I waited with the note in my hand, then he came. They smiled and cheered him and he waved and smiled back. I think he loved his people as much as they loved him. As he passed I ran out then bent on my knees holding the letter out. *'Caesar, Caesar. Listen! Take heed! Read my letter Caesar. Be warned!' He took my letter with a smile but only put it in his pocket and walked on. Tears sprang in my eyes as I called after him.*	Resolution

Caesar was murdered by the senators including his best most trusted friend, Brutus, his last words were 'And you Brutus?'	Reorientation

Text 1.5 *Geology excursion* – **(Procedural) recount (Year 6)**

Class 6 visited (a science museum).	Record of Events
Fossil making *We went into a small room and sat down at the table. Jason split us into 3 groups of about 5. The groups all had one bowl and one spoon. While the other groups filled their bowls up with plaster powder, we chose our fossil mould. Once we had our powder we added water to make a not so thick plaster mix. We spooned in the stuff, then wrote our name on a small piece of blue paper and left it to set.*	
Geo Quest *We were given a sheet with some things we had to do written on it. We had to find a crystal of rock to match each colour. For red I got spinal, it is a small crystal. For orange I chose Minium it's a sort of grey slate with orange on the top, it looks like it's been sprayed with orange spray paint. I chose sulphur for yellow, it's a really nice one, all yellow. Malachite is dark green. For blue I chose Halite on Kröhnkite (?). (I can't remember). Blue crystals are my favourite (by far). Fluorite is purple, a little bit like amethyst.*	
Fossicking *We were taken to a rock bed and we got to choose some rocks to take home. I chose a rock that looked like a cigarette lighter cause it was in the shape of one and it was dark grey with a white square on the top. There were heaps of other rocks too.*	
Microscope *I didn't look at much under the microscope but I did see a thin bit of mica and a thin bit of basalt. mica looks like a cracked wall and basalt has actually got fluorescent green in it.*	
Quarries *Geologists love quarries because they can see where the rocks have been cut in half.*	Conclusion
Fossil hunting *Fossils It is a waste of time to look for fossils in Mt Barker, because the rocks are too old, and animals didn't live then.*	
Tasting Rocks *You should only taste rocks that are light in weight and light in colour.* *Lead is poisonous.*	

Text 1.6 *Sedimentary Rocks* – (Causal) Explanation (Year 6)

The fine particles of weathered rocks are washed down by water and are deposited on the beds of lakes, rivers or seas. Layer after layer build up until those below are compressed into rocks. Such rocks are sandstone, siltstone and conglomerate. Flint stone is formed with extremely small particles. As layers deposit sometimes the remains of a plant or animal are embedded. These become fossil records of life from the primeval past. The most abundant rock is limestone. It is the accumulation of the remains of tiny sea creatures (drill fish and corals) that abound in warm seas. Such prolific life ends up as deep layers of limestone. Much of the (state) *are limestone landscape.*	Explanation Sequence

Text 1.7 *The Zodiac* – Descriptive Report (Year 6)

The path of the sun, moon and planets across the sky transverse a starry course. Although we do not see stars during the day, they are there as an invisible background to the sun's journey. We see this same course with the Sun as the path of moon and planets at night. This special path of stars is called the Zodiac.	General Statement
It is made of four groups (constellations) which have been named since ancient times. Each group occupies about 1/12 of the band or circle that weaves above and below the celestial equator. Some constellations are above the celestial equator, some below. Sagittarius and Scorpio are very high in the winter sky while Taurus and Gemini are very low in the summer sky. What we see in the sky is hidden behind the sun in the opposite season. (Note: '*four groups*' incorrect)	Description

Text 1.8 *Experiments with electrical* – Procedural Recount (Year 6)

<u>E1 What we did:</u> *We cut up tiny bits of paper and laid them on the desk. We then rubbed amber against fur. We held the amber above the bits of paper and observed what occurred.* <u>E2 & 3 What we did:</u> *We set up the retort stand hanging a piece of polystyrene from the end of it. We rubbed the class tube with a piece of silk then held it beside the polystyrene and watched what happened.* <u>What we did</u>: *We did the same to the pipe as we did to the class tube and we ended up with much the same result.* <u>E4 What we did:</u> *We placed a piece of contact on the desk and then pressed a sheet of plastic onto that. We held down the corners of the contact and watched.*	Record of Events
<u>Result</u> *E1: After rubbing the fur against the amber and holding it above the bits of paper we watched the paper bits slowly rise. Some turned cartwheels on its surface some stuck there and others jumped off and floated back down.* *E2: Once the glass tube had been rubbed by the piece of silk, we held it next to the piece of polystyrene. By moving the tube back and forth a little we saw how the hanging piece of polystyrene was drawn toward the glass tube.*	

E3: The third experiment had much the same effect as the 2. Having rubbed the pipe with fur and held it a short distance from the polystyrene we watched the plastic pipe draw it near. *E4: After pressing the sheet of plastic down onto the sheet of contact, we lifted the corners of the plastic sheet and watched the bits of shredded tissue rise, and stand on end.*	
<u>Conclusion to E1-4</u> (comprises dot pointed notes that appear to not be Ellie's original work)	Conclusion

Text 2.1 *James Ruse* – **Biographical recount (Year 8)**

James Ruse was the first wheat farmer in Australia.	Person Identification
He came in the 1ˢᵗ fleet of convicts in 1788. They arrived in Sydney Cove and were given grain to try and grow. *The only ones who knew anything about farming were J. Ruse and another man. Ruse was put in charge of some other convicts to attempt growing the wheat. It was hard work and their only tools were very basic. Nor was the land much good. They knew they wouldn't get much that year and they didn't. They harvested only enough to save for another crop.*	Episodes
Ruse suggested they go further and find more fertile land. They went to Rose Hill where the soil was richer and started over. From that crop they harvested 5.44 tons. Governor Phillip (was) *happy because he knew that wheat would grow in Australia.*	
About a year after he arrived here his sentence was up. Phillip gave him 12 hectares of land and said that if James could survive off this land for 2 years it would be his. *To get him started they provided him with a hut, some wheat, a spade, a hoe, two pigs and six chickens. Ruse was robbed and attacked by wild dogs during that time.*	
After a while another ship came into Sydney Harbour bearing 1000 convicts. 273 of these were dead and 500 sick, so bad was the treatment and conditions. *From among these (alive ones) James wanted to choose a wife. He picked out a nice looking girl by the name of Elizabeth and asked if she wanted to be his bride. She consented and he took her back to his land.*	
Bushfires, caterpillars, and not much rain meant that the crop was poor and not enough to live on yet Ruse wouldn't accept food from the Government or give up so easily. They took pity on him and gave both the 12 hectares and food to him. He moved with his wife to Hawkesbury where the land was much better. He became known as the first successful wheat farmer in Australia. Other people joined him there and soon they had enough wheat to feed the whole colony.	
He had two girls, he sailed and farmed and died at the age of 77 in 1837.	

Text 2.2 *Revolutionary Events* – **Historical account (Year 8)**

After receiving 60,000 letters of grievance, King Louis decided something had to be done.	Background

When he called an assembly he didn't realise that the thousands of people come to Paris would mix. He couldn't keep the separate estates from talking. The conditions for everyone were harsh so when they came together they were all angry which gave them a sense of unity. Advisers told the King of the 3rd estate's demand for equal power. That, because they were the majority of the population their votes should be counted double.	Account Sequence
Louis wasn't happy about that so when, on the day of the assembly, the King barred the doors against the 3rd estate representatives whom had had invited, Paris didn't remain still, 15000 followed the barred out men through the rain and helped them break down the door to the sheltered tennis court. It was not only 3rd estate people that joined but also priests.	
These people decided that they were the real representatives of France and wanted to be called the National Assembly. They swore that they wouldn't leave the court until the King agreed to see them. They signed their names on the unhinged door. They did not want to remove the King but cut out the 1st and 2nd estate.	
That day, the 20th of June 1789, is called the Tennis Court Oath.	

TEXT 2.3 *Why did the Industrial Revolution begin in England* **– Factorial explanation (Year 8)**

The Industrial Revolution began in England for these reasons. The conditions for workers, especially the coal miners, were harsh, unhealthy and dangerous. This called for new mechanical inventions. It was a small contained country unhindered by the conflicts that burdened other countries. It had the world's most powerful navy and they plundered Spain's wealth. They were the first country to overthrow their monarch, replacing it with a religious parliament. These factors created a necessity which became the mother of invention.	Outcome Preview Factors
The conditions in the coal mines were so bad and the death rates so high scientists were forced to invent safer ways of mining. The mines were entered in a sort of cage that ran straight down the shafts, guided by tracks down the wall. The cages had six compartments each fitting around 3 people in each. This was a hair-raising, very fast free fall. The tunnels were low, only a few feet high. The pickers were usually men, working in awkward, crouching or lying positions. The shovelling and loading of the carts was done by young boys and girls of about 10 (who) were given the task (of) pushing the heavy coals along the dark, hot tunnels. There were five miners (t…?) all working, sweating in the intense heat and thick coal. The gas lamps used to light the cave used up the oxygen and the air was full of thick coal. There was no ventilation and the walls leaked water. Slowly the cells would fill with oozy muck and highly flammable methane gas. The miners knew this was dangerous and the stuff should be cleared out but they could not afford a day's rest from collecting the coal. For 13 hours solid work and 15 minutes rest the men were paid the equivalent of 50c, barely enough for them and their starving families to survive on. So, though they knew the price they could not give up a day's wages to ensure their own safety. This methane gas collected, especially in the bottom cells and eventually the lamps would light it, causing an explosion. The miners were burnt, crushed beneath falling rock or trapped. Rescue parties were sent down but very few could be saved or recovered. In an incident like this in a Belgian mine 3 out of 36 survived a methane explosion. These frequent and fatal accidents demanded scientists to create new inventions to help coal miners.	Factor 1
England was a small contained country which meant that there was no rivalry. While other countries were in conflict with each other England maintained a strong sense of nationality. *Holland, Germany and other European countries were bordered by others. People were*	Factor 2

constantly coming and going so, unlike England, there was not much sense of nationality.	
In those times whoever ruled the sea ruled most of the world's trade. This was England, Elizabeth the 1st and her most powerful navy. They took power from Spain, plundering the Spanish wealth. The Spanish ships were huge and weren't easy to manoeuvre which meant the small fast fleet of the English could easily defeat Spain's trading ships before the cannons could be turned on them. With England's sense of belonging and strong situation it soon spread its empire over many countries including America and India. They got the people in India to grow cotton, bought the raw material off them made it into clothes and rugs and sold it back. So they kept countries from having their own economy taking it for themselves. This gave enough wealth to support scientists and their inventions.	Factor 3
England was the first country to overthrow their monarch. When the Catholic Church would not let King Henry the 8th divorce his wife he made the Church of England. All those who did not convert were persecuted and killed. Some generations later the Catholics rose up overthrew and beheaded the King and ruled as a parliament. As had been done to them they now persecuted those who remained loyal to the Church of England. But these people ruled with such cruelty that the (…?) preferred how it had been with a king and called one back. They made what was later modified to a constitutional monarchy. They had a king but parliament had the power. This meant that money could go towards improvements rather than one person's desires and comforts. When King Henry persecuted the Catholics he gave the church's lands to nobles. Generations later their families still owned them and the peasants worked the land. In the centre of the village was a church to which 10% of everyone's produce was paid. Each peasant had 3 strips of land to work on which they rotated. The king demanded an amount from the manor lord and according to that the peasants had to pay produce to the lord. After paying that and the 10% to the church they had little or none for themselves. Enclosure meant that the land was taken from the peasants, the dividers taken down and whole paddocks of certain crops were grown rather than small strips of all different kinds. This meant that many people lost their jobs and were forced to live out in the forests, beg, or turn to robbery. Some set out to find work closer to the city.	Factor 4
So England was the first to have an industrial revolution because it had the desperate need and the wealth to fulfil that need.	Reinforcement (Review) of Factors

Text 2.4 *Was life better before the Industrial Revolution?* **– Exposition (Year 8)**

There were both advantages and disadvantages to life before and after the Industrial Revolution. I don't think one way was better than the other. *Under each heading (environment, health, clothes) I will write different aspects of it, some good or bad things. A good example of how we're better off now is clothes and of how we're worse off is the number of fatal car accidents.*	Thesis
Environment *In England most people lived a rural life so it was a quiet life though hard work. Families lived in one place for generations sharing with combined and extended family, so there would have been a definite sense of belonging. Some disadvantages would be that if you were a son you would be expected to take on your father's trade. Children worked from an early age with a life span of usually 40 – 50 years and no education. People had to be self-sufficient, making their tools out of wood or bone usually unable to afford the metal smiths. People were known by their trade and Christian names. Often their nicknames such as Toogood, Softhand, became their surnames. Church*	Argument 1

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centre of village and the priest and gentry were the only ones who were educated. There was a very limited amount of medical knowledge and disease and other ailments were said to be the work of the devil.	
Health *I think the lack of medical knowledge was one of the disadvantages to life before the revolution. Children had to work very hard. Jobs that suited their physique but not their health. Being the only ones that fitted they had to clean out chimneys, breathing in the poison. In the coal mines they had to drag the coal carts along the tunnels. The machines they did have were huge accidents occurred all the time and children were often killed by them. The employers had no government help. If a worker was ill and missed a day they just lost their jobs. It was unit labour, not personal. Car crashes and cancer were not a problem then.*	Argument 2
Clothes *Clothes are definitely one of the improvements since the revolution. Only the very rich could afford clothes that were not coarse and chafing. But people did not put so much money into what they wore.*	Argument 3
Before the revolution life was simpler though harder and in many ways more cruel. Therefore we see that while many things have changed for the better the environment was better looked after and life was far quieter and the pace of everything was slower.	Reinforcement of Thesis

Text 2.5 *Kundt's Tube* **– Procedural recount (Year 8)**

We used a 600m long x 2.5 mm D glass tube. The tube had a rubber piston placed in one end. The glass tube was standing on two blocks of wood. Inside was a layer of fine earth dust.	Record of Events
What we did: *(A) Angela put her mouth to the end of the glass tube and screamed into it. The cork dust stood up and when the sound stopped settled into waves made up of bigger and smaller walls.* *(B) We put the Audio Generator, which was attached to the speaker, to the end of the glass tube. On the lower frequency there were two waves, on higher frequency there were three waves*	
Observations: (A) *When the glass tube was screamed into on a low frequency the cork dust rose up in thin vibrating walls. When the sound stopped the active walls collapsed into two waves of corrugation. On a higher frequency it was much the same only the walls were closer together and we were left with three waves inside the tube.* *Observations: (B)* *The result after using the Audio Generator was much the same as with the voice. When the Audio Generator was turned on the cork dust danced almost to the top of the tube then settled down into corrugations. The walls varied in height creating waves, more on higher frequency and less on lower frequency.*	
Conclusion: *The vibrations of the voice move down* (the) *tube creating walls.* *The collecting of powder formed rarefaction and compression.* *Compression is the thin walls and rarefaction is the space between.*	Conclusion

Text 2.6 *How organisms work* (feed) – Classifying report (Year 8)

Plants *Most plant rely on the environment: soil, air, sunlight. It takes water, salts, nutrients and minerals from the earth. Plants don't have a choice about where they live or what their environment is like.*	Description Type 1
Animals *Filter Feeders* *These are the kinds of animals most like plants. They will take in sea water and then discard it, keeping the nutrience of it. Some examples of these are: corals, sea anemones, worms and whales. The largest whale reach up to 30m long and can weigh (?). They have specially designed teeth, baleen. They swim about herding tiny krills into a bunch then take a gulp. They close their mouth and spurt the water out through their comb-like teeth, trapping the krill inside.*	Description Type 2a
Herbivores *Herbivores eat herbs or plants only. Some examples of these are: cow, rabbit, horse, sheep, guinea pig and deer. The cow has four stomachs and takes a long time to digest. All these animals need to eat a lot and often. They cannot eat meat as was proven when people tried to feed it to cows. This caused Mad Cow Disease, deterioration of the brain. This spread to humans also.*	Description Type 2b
Carnivores *Examples: eagles, lions, vulture, frogs. They have to hunt, catch and kill it. They eat as much as they can then fast until they have digested it and are hungry again. Depending on the size of their meal they could fast for the next few days. They are built for speed and have keen eyesight.*	Description Type 2c
Omnivores *E.g. Chickens, magpies, ducks, humans. They generally hunt worms, grubs and insects but also eat veggies, wheat, grains that are available. Humans choose what meats they like and will grow favourite foods. We eat cooked food, changing it to our liking, we herd cows and sheep and build boats for fishing.*	Description Type 2d

Text 2.7 *Water Wheel Flour Mill. How it Works* – Sequential explanation (Year 8)

Water mills are built alongside a river.	Phenomenon Identification
The water flows into a diversion pond then is channelled to run down the wheel from above. It fills the buckets on one side of the wheel turning it around, when the buckets are taken under the water they empty out their water rising up the other side to be refilled. *The great wheel constantly turning is a very powerful force.*	Explanation Sequence
(At) *the centre of the wheel is* (a) *fixed bar that joins to a cog wheel inside the mill. This turns a spindle wheel that then turns a pole joining the upper moving millstone on the floor above. Over the millstones is a Hanging Shoe. The Miller pours wheat into the Hanging Shoe which swings back and forth spreading the grain evenly onto the grindstones where it is crushed then poured into a chute made of cloth.* *On the pole that joins the spindle wheel to the mill stones is a sort of spur. As the pole turns the spurs goes round hitting a bar called the slapper stick. When the spur hits the stick it slaps the cloth chute which acts as a sieve, letting the fine flour fall through, separating it from the bigger husks which will be ground again after it is caught in a bag.*	

Text 2.8 *Fat Fire* – Procedural recount (Year 8)

What we used: *We used the butter from ex. 12 and a Bunsen burner and a bowl on a stand to put the butter in. A thermometer.*	Record of events
What we did: *We put the butter in the bowl/metal dish over the flames of the burner. We used a thermometer to test the butter's temperature.*	
Observations: *We observed how the butter bubbled up as it was heated. After a while the bubbles seemed to evaporate and sunk down again. We kept heating and it turned black, the smell wasn't very nice. Over 200° C it caught fire. When we tried to put it out with water it flared up, spitting and smoking. We tried blocking out air with tiles but the round shape of the dish rendered this too, useless. Eventually we put a fire blanket over it but even this barely worked. Fat fires are very hard to extinguish!*	
Conclusion to Ex. 13 Fat Fire *When we first heated the butter, it bubbled up. This is because the butter still contains whey which has lots of water. This moisture bubbles up and at 120° C it evaporates. We are left with fat that smokes, goes black and smells bad.* *Floating on the surface of the liquid was clumps of fat because the 76 different fats that butter contains melts at different times. If it gets hot enough (over 200° C) the heat will ignite the oil.* *Oil is a very good fuel as it contains twice as much energy as sugar and starch. Once it is burning it keeps heating itself that makes it very hard to put out. As we saw when we put the butter in the water that water is heavier. Therefore when water was sprayed onto the fire it sunk to the bottom of the oil. It would almost immediately have turned to around 100° C. It would expand and turn to steam rising in bubbles with a skin of fat around it. It is extremely hot and exposed to a lot of air which feeds it. These are like balls of fire.* *When we put the fire blanket over the fire, we were excluding the air which cooled the flames.*	Conclusion

Text 3.1 *The Treasure of Pompeii* – Site interpretation (Year 9)

The best examples of Roman art were uncovered with the discovery of Pompeii and Herculaneum by archaeologists.	Site identification
Whilst digging a house was found and that led to the whole city being unearthed. It was huge, over a few square km. Pompeii lay beneath farmlands but Herculaneum was under the suburbs of Naples. They exposed a large area but the modern buildings and establishments above it prevent them from exploring further. It is speculated that, could they go further, there would be much, much more. It is judged to be the wealthiest and biggest city of the two though they have only uncovered a fragment of it.	

Pompeii and Herculaneum (were) *both overshadowed by the mountain Vesuvius, standing 1500m high.* *On the day of August 24th, 79AD it erupted. By what would normally have been sunset on the same day, the city was already covered by over a metre of ash. A mass of lava and boulders was spouted 1000s of feet up into the air, and crashed down followed by poisonous fumes and magma. The thick pumice covered the ground of Pompeii up to a height of six to eight feet. That night the whole region was convulsed by explosive shocks and violent earthquakes. Dust, ash and cinders rose into the sky and came down again in a seething mass which covered the ground with an additional 7 feet of debris. On the 26th dim light reappeared to reveal the desolation.* *Many people died in their sleep, poisoned* (by) *fumes or choked on the ash.*	
Although this is a devastating tragedy, it has provided historians and scientists with an amazing insight into what life was like for them then because the ash and magma has perfectly preserved their world. People and animals were found, lying in their homes or on streets fleeing, with their possessions, from the terror that surrounded them.	Assessment of evidence/ Description
Tables were set, laid with mugs and bread, awaiting diners who never came. There was only empty shells left of the people so scientists pumped them up with plaster then took away the outside. Artwork was kept almost perfectly intact for well over 1000 years. Pompeii is thought to have been a sort of holiday place for rich people with second houses there. These wealthy houses (are) *full of mosaics and tilings surround ponds in walled in court yards. It is thought that Pompeii's population would have been around 25,000, while Herculaneum had only 5000.*	
The obliteration of Pompeii was witnessed from out at sea by a young nephew of a famous encycloped(ist). *In later years he wrote his recollection of the eruption. Bad conditions and falling debris prevented him from landing so he was forced to sail on to a town south of Vesuvius. Sadly, on the following morning his uncle was overcome by fumes on the beach. It was not until two days of complete darkness, broken only by lightning and flames of electric storms, that his body could be found.*	Extension

Text 3.2 *How the British claimed Australia* – Exposition (Year 9)

To claim the resources and management of a country, the British had three ways. The Europeans had agreed that by fulfilling these three layers, they would divide up the world. *The first was a legal claim. This was on the basis of first discovery of the land or conquest.* *The second is that your people had to physically occupy and live on that land to claim it, or your people had to defeat the original inhabitants and protect it against their supplanted rivals.* *The third was a claim of moral proprietorship. This meant that the Europeans had to live there long enough that they called it home, that they could write poetry. To claim this moral proprietorship they had to feel that this place was where they belonged. Also, outsiders and the original inhabitants had to accept them as legitimate owners of the land.*	Background
In the claiming of Australia none of these were properly fulfilled.	Thesis
The Europeans were not the first to discover Australia as the Indigenous Australians were there for at least 60,000 years before, and it is believed that they migrated from	Argument 1

somewhere else. They did not conquer the Aboriginals here or dispossess them of their land. To overcome this the Europeans did not recognize the Aboriginal Australians as human inhabitants. They were legally considered part of the country and not humans with rights.	
The second of these layers, like the 1st, was not obeyed. The Europeans did not defeat or chase out the Indigenous people, nor did they physically occupy Australia as the Aboriginal people did.	Argument 2
Concerning the third layer, the Europeans had not been there long enough to develop a link to the land. In fact most European Australians did not feel like the country was their home until after World War 2. And the Indigenous people certainly did not freely and willingly acknowledge this new society as the owner of their country.	Argument 3
So the Europeans found the loopholes and go around their own laws by not legally recognizing the Indigenous Australians as human beings.	Reinforcement of thesis

Text 3.3 *First dynasty* - Period study (Year 10)

1700 BC – 1100 BC China formed its first dynasty.	Period identification
There were 30 emperors who built cities and buildings. They mixed copper and tin and made bronze which they called the beautiful metal. Around 1800 BC they made silk. They made chariots for the nobles to go to war in. Their weaponry included extremely powerful bows, spears, pikes. They used rhino hides for shields.	Description 1 (Construction/ Crafts)
Their first currency was cowrie shells. Later they used copper copies instead.	Description 2 (Currency)
They developed writing and became a highly literate culture where everything was recorded.	Description 3 (Literacy)
They set up government departments and each was associated with an element: e.g. wood, fire, water.	Description 4 (Government)
The first reason we can know all this is the literary sources. Bronze wares with symbolic inscriptions are still being unearthed and read today. Graves often held characters written on bamboo slips. Towards 1100 they made books of songs and books of history.	Extension
The other main source of knowledge we have today comes from the non-literary sources. Such as: pottery and graves. Nobles were buried with family: wives, concubines, chariots, jewelry, dogs, wine, servants and horses. *Buildings' remains were uncovered and we see the sophistication of tombs increased. They loved hunting, wild boar, tigers, elephants, etc.*	

Text 3.4 *Ming and Qing Dynasties* – Historical account (Year 10)

The Ming Dynasty lasted from 1368 to 1644.	Background
The Mongols used foreigners to oppress the public so the Ming became xenophobic – isolationists and refused foreigners. They reinstated the exam system. They built the	Account Sequence

Forbidden City in Beijing in an area called GuGong.	(with some descriptive elements)
Commerce flourished, trading mainly silk and porcelain. Navigation and ship building lead to an interest in the outside world. In 1405 to about 1436 they started to explore. The emperor was looking for the previous emperor whom he suspected of plotting against him. He'd supposedly fled west. *Zheng He sent 68 treasure ships and smaller ships out (to) explore. The treasure ships were 450 feet long. The crew was made up of 1000s of (men) amongst whom were mapmakers, shipwrights, masons, metalsmiths and other such tradesmen. Before they left the captains had to learn all the known languages.* *They sailed all over the world, around India, Africa, America, East Coast of Australia, Greenland and the top of Antarctica. There is plenty of good evidence in the truth of their travelling; scriptures, DNA of people who stayed in other countries, etc.*	
In 1644 the Ming Dynasty became corrupt and fell apart as the people revolted.	
Two generals wanted to restore the throne. One of them appealed to a man named Dorgon, from Manchuria, to help. Dorgon saw it as a chance to take over the China. So the Qing Dynasty was established. It was thought of as a foreign take-over.	(Background)
They made all the Chinese men wear a platted queue and shave their hair back in line with their ears. This was so people knew they were Chinese not Manchurian.	Account Sequence
It was a very unstable time, the Europeans were trying to get in. *The Portuguese came to Macao and occasionally had access to other ports. Other countries followed the Portuguese, the Spanish, Dutch, British, Americans, Germans, French and Italians among others.* *In 1800 everyone was jostling to get the best out of China. They wanted porcelain, furniture, tea, silk.* *The Chinese would only trade for silver and gold and the traders were only allowed in a few ports. Mostly the British wanted tea. The British East India Company started growing opium in India then selling it to the Chinese for silver with which they bought tea.* *Neither the Chinese nor the British traders cared about what was happening to the people. It was killing millions. The Qing Court started to get concerned so Lin (Zexu) was appointed by the Chinese to stop opium trade.* *He went to the port, got ship loads of opium, dug pits and burnt it with salt. He then put restrictions on the British.* *From 1839-1842 the Opium Wars waged. British had a big firearms advantage and China was broke.* *In 1847 the Chinese signed a treaty at gunpoint. It said that until 1997 the British would have access to Hong King Islands and Kowloon. They also demanded free access for the British and other Europeans to the 'concession cities' along the East Coasts.*	
In 1860s there was the Taiping rebellion, led by Hong, a visionary influenced by aspects of Christianity. It took 15 years to put the rebellion down.	
The Boxer rebellion in 1899 was the Society of the Heavenly Fist. These people thought they were unable to be harmed by bullets. It didn't succeed.	
In 1912 China was totally broke and Pin Yi (the young emperor) was forced to abdicate.	
From 1912 to 1999 China was a republic. *From 1999 to present – people's republic.*	

Text 3.5 *The Hand in Comparison to the Foot* – **Descriptive report (Year 9)**

The human hand and foot have many similarities but also many differences and, of course, purposes.	General Statement
The similarities between the foot and the hand/toes and fingers include the following: Both are attached to a limb by two bones, una & radius/fibula & tibia (shin bone). The ankle and the wrist are both free moving joints, allowing more flexibility. The foot and the hand have five phalanges each with nails at the end. Neither the foot nor hand have muscles in them, the phalanges are moved by muscles in the limbs. The foot's metatarsal and the hand's metacarpal mirror each other, as do the carpus and the tarsus.	Description (Similarities)
Despite these likenesses the hand and the foot obviously have their differences. Where the thumb is opposable the big toe is not. There are 7 tarsus and 8 carpus. We can use our hands either palm down or palm up which makes them supination and pronation whereas the foot is only pronation. The hand is in line with the arm but the foot comes off the leg at a 90* angle. Fingers are much longer than toes, making the(m) flexible and skilful. We can tie knots and play difficult instruments with our fingers whereas we would find it near impossible to do that with our toes. Although toes aren't designed to hold and wield tools they are very important in helping us keep our balance. Our hands have more nerves in them than our feet and are used much more for discovering things by touch than our feet are. *The ankle and foot area are built much stronger than our wrist and hands so that they can carry the weight of our bodies for long periods of time.* *The heel of our foot is an actual bone that sticks out whereas the heel of our hand is actually just the carpal bones that stick out at certain angles.*	Description (Differences)
So we can see through these examples that though the hand and foot are structured quite similarly, their purposes or uses are sometimes different.	(Reinforcement of General Statement)

Text 3.6 *Testing Wood to Destruction* – **Procedural recount (Year 10)**

What we Used: *two pieces of wood shown below, piece of railway track*	Record of Events
What we Did: *We put the track piece on each piece of wood. We then dropped it onto them.*	
Observations: *When we dropped the weight onto the across grain wood, it snapped easily in sections. When we dropped the weight on the along grain with quite a bit of force it splintered.*	
Discussion and Understanding: *The strength of different materials can only be decided by testing them to destruction. The compression, tension and shear loading is gradually increased to the point where the material fails. The way in which a particular material fails is also of interest, in that designs can be made which avoid these specific failure modes for the given material.* *1. Sone, bricks, mortar and chalk are very weak with tension or shear loading. They snap like a brittle biscuit.* *2. Steel, cable and wire fails in tension loading by 'necking'. Once a local decrease in diameter forms, this concentrates the stress and run-away occurs, with further decreases in diameter and finally total breakage.* *3. Wood fails along the grain with splintered fracture or across the grain by snapping.*	Conclusion

Text 3.7 *Crystal Garden* – Procedural recount (Year 10)

We made up a 1:1 mixture of water and water glass (sodium silicate).	Record of Events
We filled test tubes with these water, waterglass mix then added different salts. *To our test tube we added a few crystals of the following salts:* *Copper chloride, aluminium chloride, copper sulphate, cobalt chloride, ferric nitrate.*	
The crystals sank to the bottom of the test tube. After a short time the crystals grew stalk-like stems with a small bubble at the top. They grew in short bursts, shooting up quickly, then stopping then shooting up again.	
Conclusion: *The glass we have in our windows is silicon dioxide, an acid that forms a solid form. It is the only acid that forms a solid. Silica is found in your skin, hair and in quite a few minerals e.g. agate. We find that silicates tend to form surface coverings. In things like agate their surface coverings are silicate.* *In our solution in Ex 7 we had sodium silicate. When the sodium silicates get in contact with the other salts it forms an invisible skin around the salt we added. Like it can with our skin, moisture can move through the silicate membrane like skin.* *This membrane allows the water in and out but keeps the salt in.* *On one side we have lots of water, on the salt side we have very little water. There is more water pressure on the outside of the stalagmite so more water goes in through the membrane than comes out. The reason the stalagmite grew up in bursts was because when the water came in and filled the stem, some of the skin ruptured at the top and a new stalk grew.*	Conclusion

Text 3.8 *The Lungs* – Report /Explanation (Year 10)

The lungs mostly work automatically but sometimes emotion triggers reaction. Crying is a contraction of the lungs whereas laughing is an exhaling.	Explanation
When we inhale our thoracic cavity expands and a diaphragm goes down. Air rushes in to fill the vacuum that's created. *David brought in a model to demonstrate this.*	
Lungs are asymmetry, the right lung having 3 lobes and the left having 2 lobes. They have nearly the same shape as a cauliflower, looking like inverted trees. They are basically conical sponges that exchange carbon dioxide to oxygen.	Description
How it works *Air goes into the nasal passage where fine hairs stop big objects from being inhaled (insects). This is where the air gets filtered, odours are simplified and the air is made warm and is humidified.* *The air continues down through the larynx, trachea where the cartilage rings give the airway structural support. If you're going to try 'swallowing' fire it's important to do it while you exhale so that the heat can't damage the airway. The air then branches into the left and right bronchi and here your mucus traps dust, pollen, etc. In our main vessels we have cilia (small hairs) that wave mucus back up, keeping fungi and virus out of our lungs.* *The bronchus break up into bronchioles, then into alveoli.* *Alveoli is the site of air exchange. They are lubricated by surfactant, a substance with an oily quality that keeps the alveoli moist.* *Veins and arteries wrap the alveoli. Blood comes in low in O2 and goes into the alveoli.*	Explanation/ Description

That's how we exchange CO2 for O2. CO2 comes out of the blood flow into the air space then is breathed out. In the same way, the O2 enters the blood flow. It turns bright scarlet and travels to the left heart. *Each person breathes in 250 ml of O2 per min and breathes out 250 ml of CO2 per min. there is still some oxygen in our breath which is why we can give mouth to mouth resuscitation.*	
There are some conditions that can affect our pathways of breathing: *Smoking produces a layer of tar that coats the alveoli making oxygen exchange hard.* *Asthma is when the lining of the lung reacts to something ie pollen, chemicals, cat fur and makes it swell. This swelling obstructs the pathway and breathing becomes tight and restrained.* *Pneumonia is an infection of the lung lining so that, also, stops oxygen penetrating into the blood.*	(Report) Description/ Explanation

Text 4.1 *Mabo. Life of an Island Man* – **Biographical recount (within a film review) (Year 11)**

Mabo is a film about a Torres Strait Islander, Eddie Mabo, who fought for the rights of his people.	Person (Text) Identification
In 1939, the Queensland government took ownership of the Murray Islands, a group of Islands in the Torres Strait. Despite the introduction of basic schooling and a few other western ideas, the Murray Island people kept their tradition of passing down land through family.	Episodes (one Episode includes a personal response)
Eddie Koiki Mao's mother died soon after his birth and he was adopted by is Uncle and Aunt who had no children of their own. Mabo grew up on the island of Mer and his teachers soon found him to be bright and determined and it wasn't long before he began to question white man's power over him and his people.	
At a young age Eddie Koikii became romantically involved with a girl whom he was not allowed to be with. As punishment he was exiled from the Islands.	
Mabo found work on small boats and when his year of exile was up, he returned to the mainland determined to discover what it was that gave the white man so much power over his race.	
In Townsville Mabo met and fell in love with Benita, a 16-year-old girl. It wasn't long before the two were married. Mabo found work on the railroads (almost the only employment a black man could get at that time) and they began their family. *The discrimination he and his young family were subject to did not bring Mabo down, rather encouraged his fire and determination. He started up a black school where the children could learn the ways and traditions of the people he so loved, as well as the white folks' ways.* *Though this little school was loved by the children who went there, it was frowned upon by the white community and government officials became suspicious.*	
One of the things that got Mabo through the hard times was his absolute belief and certainty that, when he returned to Mer, as he so often said he would, his piece of land would be waiting for him, under the care of his family. He would not accept that because the Crown had claimed it they could do what they wished with it.	
It was partly this piece of land on Mer that inspired Mabo to finally take steps in his fight for Aboriginal land rights. Mabo did what no other indigenous Australian had done before, he made the decision to learn and go through the governments' courts to get	

recognition.	
He spent 7 long years in legal arguments, going to court, giving speeches and visiting Mer. After all that time the court came to the decision that Mabo had no legal claim to land on Mer, as he had not been officially adopted. Though this was a dispiriting outcome, Mabo had achieved the acknowledgement by the government that the Islanders did have a longstanding system of land ownership.	
It wasn't long after this that Mabo was diagnosed with cancer, causing his sudden death.	
Had Mabo lived just a little longer he would have seen the full achievements of all his struggles. After the appeal the Court decided to acknowledge the people of Mer's ownership of land. This is a huge step in our history, the law of native title. This law states that any Aboriginal or Torres Strait Islander has rights to land to which they have maintained a continuous connection through both culture and tradition.	
Everyone suddenly recognized Mabo's struggles and heralded him as a sort of hero. His family had a beautiful headstone made for him and he was buried in Townsville. Three months later (at the end of the mourning period) there was a huge gathering to celebrate Eddie Mabo's life. The songs and dancing went on all night.	
His story could have come to a satisfactory, happy ending but it was not to be. In the morning Mabo's gravestone was grossly defaced. It was hacked at and shocking words and symbols were sprayed onto it. It made me sick to the stomach. Mabo had done his work, it was over. There is no thinkable excuse for such an atrocity. It is disgusting. I cannot comprehend it. What could drive some to such a heartless act? Wasn't their pain enough already?	
The family had Mabo's body brought back to the Island where he was given a traditional burial. He was laid to rest at last on his native land, welcomed home at last by the people he'd fought so hard to free.	

Text 4.2   from *Ancient Greek Architecture* – Period study *(Year 12)*

The civilisation of the Greeks	Period Identification
was influenced by the many different peoples who migrated to Greece in around 500 BCE, bringing with them their culture. Amongst these people were the Minoans, the Cretans, and the Dorians.	Period Description
Greece is a land that has many islands, mountains and valleys. The mild climates lead to an outdoor lifestyle, with matters of trade, leisure time, entertainment and discussion being held outside.	
After around 500 BCE we begin to see city states developing both on the mainland and on the islands. These city states were separated by the geography of the land, and there was often rivalry between them.	
The way the people of Greece governed themselves was an evolving progression. To begin with they were governed by an Oligarchy, a group of ruling people. After the Oligarchy came the time of Tyrannical rule, where the land was under the complete power of one ruler. The next governing system to be taken up was democracy in around 500 BCE in Athens. At this time Athens was the predominant state, ruling over the rest of Greece and even beyond, to many of the islands.	

This time is seen by many as the birth of Free Thinking amongst the Greeks. It was the time of the great Philosophers such as Socrates and Pythagoras. With this new intellectual thinking power, there began to be a slight separation of the people from their belief system. Though there was still a strong faith in Gods and Goddesses, the focus was changing toward the human being. Even their Gods took on more human forms and qualities such as lust, rage, vengefulness and jealousy. They were no longer so distant and flawless. They still worshipped the Gods but on a different level.	

Text 4.3   from *World War I* – Historical account *(*Year 12)

In the time leading up to WW1, many people believed that the war would never come. There were a few main reasons for this.	Background (includes Factorial Explanation)
One was simply that most of the rulers of Europe were related and people didn't see cousins going to war as a likely possibility. It was not the royal family however, that truly ruled the countries.	
Another reason was that the war had been avoided by the diplomats for so long, it was seen as something of the past, uncivilised and barbaric.	
The third thing that prevented people from truly believing the war would take place was the socialist movements. The socialists were the representatives of the workers and questioned why fellow 'brother' workers should go to war with each other, not matter which country they came from. In 1913 socialist leaders from many different countries met under a Frenchman named Jaures for a conference in Paris. They declared that if war were announced they would carry out a general workers strike. When Jaures strove to put this into practice on the brink of the war, he was assassinated and the social democrats became patriots rather than internationalists.	
When international relations really fell apart, largely due to Wilhelm II, the Germans created the Schlieffen Plan, seeing war as inevitable. In the event of war Germany would be faced with a two-front war: Russia and France. The Schlieffen Plan relied on Russia, being such a large and newly industrialised country, taking a longer time to prepare armies. The Germans planned to defeat France by taking Belgium and then Paris, finishing the operations in time to face Russia. It was only this way that Germany could defeat both Russia and France as they were not strong enough to take on both at once. The majority of the soldiers were sent towards Belgium with only a small number left to defend Germany. At the last moment Von Moitke, head of the German army, panicked and brought some of the troops home to defend should France attack, leaving his attacking force weaker.	
Britain, seeing Germany's plans told them that if they tried to take Belgium the Britons would come against the Germans.	
So many alliances had been formed across Europe to prevent war, but in the end it was these alliances that drew everyone into the tragedy.	
Europe's summer of 1914 was beautiful and the horrors of war seemed distant. However, news came that Russia was mobilizing. With war seeming inevitable a mass hysteria swept over most of the continent and soon everyone was gathering and preparing their troops.	

Text 4.4   from *World War II* – Historical account (Year 12)

Hitler was wary of the Britons. He didn't want to fight them, he wanted them to form an alliance with Germany. But Churchill refused, instead declaring war.	Account sequence
Germany then sent war planes to bomb Britain and so ensued the Battle of Britain. After a few months, and many deaths, the British defeated the German air force and Hitler was forced to call off the raids. Hitler would not give in so easily, and made further attempt to take Britain by sea. In this too, the British were eventually victorious.	
Hitler then turned his gaze toward Russia and in 1941 began the Operation Barbarossa. The German soldiers poured through the Soviet Union. Any attempt to resist the attackers was suicide for the Red Army and the Germans gained huge amounts of territory in a short amount of time. The internal unrest of Russia made this all the more easy for the Germans. Six million people had starved to death in the Soviet Union due to the war between the farmers and the government, instigated by Stalin. Consequently, many people of the Soviet Union wanted to see the end of Stalin and were glad for the German invasion. However, the Germans put their racial policies into effect, first slaughtering the Jews, and then the Slavs and it wasn't long before those who had welcomed Hitler realised that he was far worse than Stalin. The Russians began resisting more strongly, forming partisans.	
The outcomes of many of the battles fought in Russia were determined by the climate. Large numbers of German soldiers simply froze to death, machinery wouldn't operate and food supplies were hard pressed to get to their destination. The Russians had a Scorched Earth Policy which meant that whenever they were forced to retreat, they completely destroyed the landscape, burning crops and homes so that when the Germans arrived, they would be met with nothing but a barren desert, nothing to survive on. The general rule of war was that the civilians would not be killed unnecessarily, however the Germans were committing terrible atrocities and the Russians were responding, fighting from house to house.	

Text 4.5   *Traps of Neo-Darwinism* – Discussion (Year 12)

As life evolves, so does consciousness. Natural science has taken us further from the spiritual understanding of the world and more towards a much more mechanical understanding. This turn was largely influenced by Darwin's theories. People searching for answers were quick to take up his ideas and hold them as truths, allowing them to take the place of mythology, becoming almost a belief system for society. We can follow the development of Darwinism into the 20th Century as it, by stages, incorporates genetics, molecular biology and becomes applied as biotechnology and genetic engineering, then finally as an industry.	Issue
Singer and Monod (?) studied Darwin's work and were both well aware of the traps of Neo Darwinism. They saw and chose to acknowledge the potential for the horrific consequences that might come with pursuing one's own curiosity. They saw that humanity's desire for knowledge might be their downfall	Perspectives
Singer strongly opposed the idea that human beings are superior to other species and said we should refer to ourselves simply as homo sapiens. He proposed that we should replace the term human with two others: the purely 'biological side', and the 'person'. He said that to put ourselves on a different level to the animals is speciesism, not unlike racism. *Singer says that if the definition of human is 'self-awareness, self-control, a sense of the future, a sense of the past, the capacity to relate to others, concern for others,*	

communication, and curiosity', then fetuses, newborn babies and handicapped people cannot be included. He asks then, why it is any worse to take the life of any of the above than the life of a chicken, cow or pig. This then brings up the question, when does one become a 'person'? Who has the right to live? Who has the right to kill? *Right throughout last century there has been the hierarchy of species and of races. It was something that was sustained and even encouraged, (National Socialism). It all seems to run parallel to the hierarchy of evolution, and it is interesting to think what Darwin might have had to say about that. Singer looked at the ideas of hierarchy, purity of race, and competition, and asked, 'What does this mean for the way that I behave?' He looked at the way Darwinism had been taken on so much as a fact of life (even if subconsciously) and wanted to know what that meant for the direction of human life. If everyone is taught to believe in and expect competition, how does that affect the way society behaves?*	
We have looked at the role of Darwinism in many discoveries that have happened over the years, in terms of genes. We saw it in the artificial or selective breeding, but today that has been taken another step further with the interbreeding of different plant or animal species. Is breeding within species the same as genetically engineering across species? Those who support genetic engineering argue that this practice is no more harmful than selective breeding.	
I don't see it that way. To me the idea of cloning doesn't sit comfortably. I think that that view of things leaves little or no room for the spiritual world, which I believe should not be discounted. Even Darwin, who can be said to have introduced this material and mechanical view of life, still believed there was more to life than just the scientific facts.	Position
I think that there are times when questions, however intriguing, must be left unanswered. I think perhaps humanity needs to reflect a little on the days of myths, when mysteries were allowed to be held as sacred. Sometimes knowledge is not a blessing, but rather a heavy, heavy burden.	

Text 4.6 from *Life on Earth* – Causal explanation (Year 12)

(Bacteria) are believed to have been the first life forms on earth, possibly coming from a chemical reaction. They were single cell bacteria with no internal differentiation, having only a membrane and DNA.	Explanation Sequence
As the earth cooled these bacteria migrated more towards the surface of the ocean where they were able to receive rays from the sun. Prior to this time the energy of everything on the earth came from its internal heat and movement. These cyanobacteria were now obtaining energy from photosynthesis. The bacteria took in carbon dioxide, water and sunlight and produced oxygen. Evidence for this can be found in the banded iron formations at the bottom of the sea. These formations were caused by the increase of iron due to the oxygen being produced. During the Protozoic Era the iron precipitated out of the sea forming layers in which fossils can now be found.	
The bacteria caused a gradual buildup of oxygen in the atmosphere, allowing for more complete forms of life to evolve about 1.5 billion years ago. The Eukaryotic bacteria had internal differentiation, with organelles. These bacteria were more efficient at photosynthesizing, which significantly increased the amount of oxygen in the atmosphere.	

About 2.5 billion years ago a new continental crust was being formed, and by the early Protozoic Era roughly 90% of the continental crust was formed. At this stage the plates were colliding and bonding together, creating plates so big that at their centre they were geologically stable. This stability of earth would allow life to survive on land.	

Text 4.7   from *Different Forms of Rocks* – Classifying report (Year 12)

The different rocks we can observe are formed under different conditions. The basalts of the Earth come from volcanic explosions while the granites are formed under the crust and are exposed due to erosion. Each of these cools at a different rate.	General Statement (for whole text)
Rocks that cool beneath the crust of the Earth are known as intrusive igneous rocks as they intrude into the rocks of the crust that are already there, known as country rocks.	General Statement (for Part 1: Beneath crust/Magma)
Magma, liquid rock, is formed when the Earth's mantle begins to melt. This melting only occurs under certain conditions.	General Statement (a) (melting)
One such condition is decompression melting. Decompression melting happens when the pressure on the mantle rock decreases considerably. This form of melting is what takes places at mid-ocean ridges, rift valleys and hot spots.	Description Type 1 (melting)
Heat transfer melting is another condition that causes the mantle to melt. This type of melting is caused by hot rock intruding into the cooler country rock. The heat from the magma is transferred to the country rock.	Description Type 2 (melting)
The addition of volatile is a third process that can cause the mantle to melt. If volatiles, such as water, are taken below the surface of the Earth, the temperature of the mantle is lowered, allowing it to become magma.	Description Type 3 (melting)
All magmas are composed slightly differently, and they are classified based on their silica content.	General Statement (b) (composition)
Magma with more than 70% silica is known as silica rock,	Description Type 1 (composition)
with more than 55% silica it is known as intermediate	Description Type 2 (composition)
and with less than 50% it is known as mafic rock, also rich in iron and magnesium.	Description Type 3 (composition)
The difference in (igneous) *rocks can be due to a number of reasons.*	General Statement (c) (differences)
For a start the source rocks of the magma could be composed of different minerals, or different amounts of those minerals.	Description Type 1 (differences)
But not all magma from the same source rock is the same either. The variations will occur depending on how quickly the rock cooled, and under which conditions it was formed, for example amounts of pressure and heat.	Description Type 2 (differences)
Partial melting can cause differences in the rocks too. As the magma begins to cool it could move away from the source rock, gathering additional minerals. If this is the case two rocks from the same source rock might have compositions of	Description Type 3 (differences)

minerals that are not exactly the same.	
Contamination of the magma can also provide an explanation of the differences in magma. Parts of the country rocks can fall down into the melting magma, and change its composition slightly.	Description Type 4 (differences)
Fractional crystallization too can be a contributing factor Not all the minerals within the magma crystallise at the same time. The mafic minerals, with less than 50% silica, solidify at a higher temperature than those with more silica, (silica melts at a lower temperature.)	Description Type 5 (differences)
As the mantle decompresses and melts, the rock expands into the less dense liquid state, becoming more buoyant. Being lighter, the magma rises towards the crust of the Earth, releasing gases.	(Explanation)
Just as there are many forms of magma, there are also many forms of lava (the magma above the surface of the Earth). The lava will act in different ways depending on the viscosity.	General Statement (For Part 2: Lava)
…	(Descriptions…)

Text 4.8 *Could human beings create the conditions for life, as we know it, on the moon?* – **Exposition**

(Year 12)

Hypothesis: *With today's technology and the current knowledge, it is not possible for humans to create conditions for life on the moon.*	Thesis
● *It is a common belief of scientists that without water, life cannot be sustained. The moon is thought to have* (water) *on it, but nothing like Earth's oceans.* (footnote - citation)	Arguments
● *The moon, being smaller, has gone further in the process of cooling than the Earth. The moon has passed beyond the point of cooling at which life first came into existence on Earth. Life did not form on the moon at that point, and therefore it is practically impossible for life to be able to survive there now, even if human beings put it there.*	
● *It is thought that the first life form on Earth, bacteria, was spontaneously created by a chance chemical reaction. The conditions of Earth happened to be right for the organism's survival. To work out how to create a chemical reaction that would produce a life form that could survive in the conditions of the moon would be very nearly impossible.*	
● *If a comet crashed into the moon leaving behind great chunks of ice, and those chunks of ice melted, it might then be possible for life to begin and from there create oxygen and whatever it needed to survive, but it would have to be the forces of the universe at work, men could not trigger that.*	
● *The moon has no atmosphere to shield it against some of the sun's rays, or to keep in some of the heat at night. Therefore the moon's temperature during the night is 233 Celsius, and 123 Celsius during the day. The polarities of the climate are too extreme for any life form we know of o adjust to and survive.* (footnote -citation)	

● *For humans to be able to make the conditions on the moon right for supporting life, they would have to figure out a way of making the moon create its own protective atmosphere and with today's knowledge and technology that is not possible.*	
● *The process of life beginning on Earth took billions of years. It really was the creation of one thing that led to the creation of another that then allowed for the continual survival of the first.*	
● *It took even longer for the Earth to evolve enough to support the complex life forms that it does today. It is questionable whether the moon will survive long enough to let that evolution take place.* (footnote -citation)	
Conclusion: *By looking at the points above, it can be seen that human beings alone cannot begin the process of life on the moon. It would take far more than the power of humans and human resources to set that in motion. The conditions have to be perfectly right for life to survive. Even if humans took the first bacteria believed to have lived on Earth, and put it on the moon, the moon would have to have water and an atmosphere to sustain it. If humans were to put those simple life forms on another planet, and begin the process of evolution, it would have to be a planet that already had the same conditions that Earth had had at the moment of the chemical reaction that created the first organisms. Humans do not have the power to control planet movement, nor to redirect ice bearing comets. We have a certain amount of control within our own little worlds but over the great universe, we really have none.*	Reinforcement of Thesis (with review of arguments)
I began with the question: Can human beings create the conditions for life on another planet? This proved quite complex as there are many planets out there and each has their own set of conditions. Some are believed to have atmospheres, some are gaseous, others solid, and some are believed to contain ice while others do not. This made answering the question quite complex. So instead I chose a planet, relatively close to home, the moon. It was easier than to think about a particular set of conditions, and what would have to be adjusted. *'…as we know it,,,' was also included into the question in regards to life as it is impossible for us to say if we really are the only 'type' of life. Creatures were found thriving near the mid-ocean ridges in boiling water, something that scientists had not believed possible. In a similar way there may be another form of life that is not created of the same elements as us and that does not depend on the same conditions as the known life forms do to survive. It could be that life whose existence we are unaware of could possibly survive in the conditions of the moon, needing no oxygen or water, though that does come across as very far-fetched.* *The examples of observations that supported the hypothesis mostly came from what was spoken about in class. They show just a few of the reasons why humans at this stage cannot create the conditions for life as we know it on Earth.*	Extension

Appendix C. Set of Selected Texts – Clause Analysis

The 32 texts are presented here in a simplified version of clause analysis, as explained in Section 3.4 of the thesis.

KEY

Italic font is used to indicate the original texts by Ellie.

( )   Parentheses with text in italics are as included in the texts as originally written.

( )   Parentheses with text not in italics indicate editorial annotations, which may be additions to represent elisions or apparently inadvertent omissions. Addition of elided terms is minimised.

(?)   illegible or unclear words in the original text.

//   boundary between clauses

/   boundary between constituents within the same cell; or boundary between phrases

[[ ]]   embedded clause

[   ]   embedded phrase qualifying nominal element

<< >>   enclosed clause

Txt Adj   Textual Adjunct (conjunction or conjunctive Adjunct)

IP   interpersonal elements - interpersonal elements in any column appear in greyed font

Minor instances of unconventional spelling have usually been corrected; the original syntactic structure and punctuation have been retained. Word order within clauses has been altered where necessary to fit the columns; the position of punctuation in relation to wording has generally been retained.

Clauses with predicated Theme or embedded postposed Subject are listed as, but not counted as, two clauses. Minor clauses are not differentiated in the numbering.

The format of these charts was designed to support the analysis process. Alternative interpretations

in the analysis of clauses are at times possible.

Text 1.1 *Rome and Carthage* – **Historical account (Year 6)**

	Textual Adj	Circumstance	Participant	Process	Participant	Circumstance / IP
1		By 300 BC	Rome	had dominated	all of Italy	
2	but			had	little interest [in the land beyond].	
3		In 264 BC	a conflict	arose		with Carthage
4	wh…		…ich	forced… to build	Rome / a fleet of ships.	
5		Over the course of 3 wars – the Punic Wars –	Rome	decimated	the Carthaginians.	
6	however,	In the 2nd war,	Hannibal	conquered	Italy	by a daring campaign [from the north]. / almost
7			It	was	the final stroke [of the Roman general, Scipio] << >>	only
8	<<wh…		…o	attacked	Carthage itself>>	
-	th…		…at	forced	Hannibal	out of Italy and into final defeat (201 BC).
9	After		peace	was made		
10			Hannibal	brought back	prosperity	to Carthage.
11	When		he	re-armed		
12	to			defend		against a neighbouring kingdom (friend [to Rome])
13			Rome	set out on	the 3rd War	
14	wh…		…ich	led to	the absolute destruction [of Carthage] (146 BC).	

Text 1.2 *Bravery* – **Empathetic autobiography (Year 6)**

	Textual Adj	Circumstance/ IP	Participant	Process	Participant	Circumstance / IP
1			I	was	like every other slave boy.	just
2	Therefore		my story	is told.		rarely
3			I	was	another of those million slaves.	just
4			The Romans	conquered	our home and everything [[it owned]]	

5			On the night [[we, the slave to be's, were going to be taken away on a ship to Rome,]]	my mother	left	me / this journal.	
6				We all	stood		
7					shivering		in our rags.
8				It	was	quite dark	
9	and			the sea breeze	was	cold.	*certainly*
10				Harsh Roman voices	were yelling	orders,	
11		*Occasionally*		a whip	was lashed		across a back.
12				Women	wept,		
13				children	screamed		
14				the men	hung	their heads	in shame. / *just*
15				Everything	was	chaos.	
16				I	was	nine	*then* / *only*
17				My mother	came running up,		
18				she	held	my baby sister	in her arms,
19				she	wasn't crying.		
20				My Mother	was	brave.	
21		*'Talius*			take	this	
22					remember	[[all I have taught you]].	
23					Be	good.	
24					Be	brave	
25					don't cry.		
26		*Talius*			promise	to me	
27				you	will forget	the gods,	*never*
28					pray	to them,	
29					have	trust.	
30		*Always*			do	[[what is right]].	
31					Be	brave	
32		*Talius*			be	brave.'	
33					Giving	me / the book	

34			she	held	me	in a hug / for the last time.
35			It	was	then	
-	that		I	realized	[[she was not coming with us]].	
36			I	do not know		
37		how	she	escaped	the Roman soldiers.	
38			I	clung to	the book	
39			eyes		wide	with terror.
40			My father, big brother and I	were loaded		onto the ship.
41			The grief [of it]	had not sunk in.		*yet*
42			it all	seemed	so unreal.	
43			The moon	was	up	now
44	and		we	were sailing		away.
45			I	stood		
46				leaning		over the railing
47				staring		down at the dark water
48			I	had hoped to be	a warrior	*always*
49	and	now	all	was	lost.	
50				Looking		back to the distant shore
51			I	saw	[[the big high black cliff standing out against the evening sky]].	
52			[[What I saw next]] / I	will forget		*never, never*
53			I	saw	[[a figure [of a lady] standing on the cliff]].	
54			My mother	is	brave;	
55			she	is	the bravest person [[I can remember]].	
56			She	stood		there
57				unmoving,		
58			her white clothes	fluttered		in the gentle breeze.
59			Sadness	hung		in the air
60	yet		her appearance	was	peaceful.	*somehow*
61					So noble	
62				standing		there / almost like a god.
63			I	watched	her	

64	until		she	was	out of sight.	
65			she	moved		*never* / *once.*
66		*Many, many hours later*	we	entered	Rome	*in the long parade,*
67				chained		*one behind the other*
68				following	the carts [filled with our own belongings]].	
69		*A few hours after*	we	were standing		*in the market square.*
70			I	was	next to my brother and father,	
71				waiting to be sold.		
72			I	had presumed		*always*
73			I	would be sold		with my family
74	but		I	was … proved	half wrong.	*so*
75			There	was	much shouting and bargaining.	
76			'This one	's	a boy!	*only*
77					Useless.	
78					Free	
79			I	should say.'		
80			One of the slave drivers	marched up,		
81			he	kicked	the heavy trail of chain,	
82				pulling	me	to the ground. / *almost*
83			'He… this one,	goes		with his father
84				came		together'
85			he	said		
86				pointing		to me and my father.
87			I	saw	[[a huge man pull out his small bag [[to pay]]]]	
88	and		my heart	filled	with fear.	
89	If only		my gentle mother	had been	there,	
90			she	would have held	my hand.	
91		*Out of my brother and I*	I	was always considered	the weaker.	
92	So		my brother	was	my (father's) *favourite.*	
93			He	said		*always*

94			he	was	proud	of him
95			what a promising warrior / he	was		
96	while		to me / he	said		
97		*Talius.*		Fetch	my books,	
98	As		we	were taken		away
99			I	glanced		back / at my brother
100	(as		…my father	did)		
101				standing		there
102	as if		he	cared not		for life.
103			I	felt	a pang [of grief];	
104	instead of	*ever*		being	jealous	of my brother
105			I	had admired	him	
106	and			wanted to be	like him	
107	but		we	had not been	so close.	
108		Now	I	thought		
109		how	It… [[ ]]	would be		
-	[[			(being)	without him]].	
110	… too.		I	was	sorry	for my father
111			Slavery	was	horrible, torturous, order after order, never a break.	
112			It… [[ ]]	turned out		
-	[[that		my brother	had been bought	by a man [not so far away]]]	
113	and		we	saw	him	in the marketplace. / *often*
114			My father	talked	to me	now / *rarely*
115			he	was	too tired and depressed [[to say anything *even* to his own son]].	
116		Slowly	we	drew		apart.
117		*Sometimes*	I	thought		
118			he	had forgotten	[[he was my father]].	
119			I	missed	my mother's love.	
120	So	at the age of nine	I	lost	both my parents and my siblings,	
121			I	was deprived of	any love or care whatsoever.	
122			I	tried to hide	all this	

123	but	inside me		was crying out for	help.	
124			I	had lost	everything [[I had once possessed]].	
125			Every day	was	the same	
126					no laughter, no fun, just work, lifeless work.	
127		At the age of 14	I	was made	a gladiator	
128	and	at 15	I	won	freedom.	
129	But	after 6 years of captivity	I	had	no family [[to go to]], no-one [[to rejoice with]], nothing.	
130			I	had been bought	four times	
131	so		my father	recognised	me	*no longer.*
132			He	had lost	his heart, his hope,	
133	as		I	did.		*so nearly*
134			I	live		now / in Greece / with my wife and 5 children.
135			Many, many years	have passed		since my first night [of slavery]
136	but		I	remember	it	
137	as if		it	were	yesterday.	

Text 1.3 *The Triumvirate* – Historical account (Year 6)

	Txt Adj	Circumstance	Participant	Process	Participant	Circumstance / IP
1		In the time [[following Sulla]]	three Romans	took over	the reins [of power]	in Rome.
2			Crassus, Pompey and Caesar	formed	the Triumvirate.	
3			Crassus	was	the richest man	in Rome.
4			Much of his wealth	came from	the misfortunes [of those [[who had suffered at the hands of Sulla and other disasters and tragedies]]].	
5			Pompey	was	the favourite [of the nobles and senate]	
6	and			had won	high honour	by success [against the pirates], the

#						
						final battle [with Mithridates] and the conquest [of Jerusalem].
7			*Julius Caesar, a descendent of Aeneas,*	*was loved*	*by the common people.*	
8			*The games [[he hosted]]*	*were*	*the best.*	*always*
9		*In his conquest [in Spain and Gaul]*	*his foes*	*became*	*his friends*	
10				*respecting*	*him*	
11	*and*			*wanting to live*		*as Romans.*
12			*Caesar*	*said,*		
13		*in victory*	*'My greatest and only pleasure*	*is*	*[[to save the lives [of those [[who have fought against me]]]]] .'*	
14		*After some ten years*	*Crassus*	*was slain*		
15	*and*		*Pompey and Caesar*	*came into*	*a contest [for power [in Rome]].*	
16			*Pompey*	*Influenced… to limit*	*the senate / Caesar's power.*	
17	*But*		*Caesar*	*did not bow to*	*their will*	
18	*and*			*decided to settle*	*the matter*	
19	*by*			*returning*		*to Rome / with his army*
20	*wh…*		*…ich*	*was*	*[[to declare war upon Rome itself]].*	
21	*When*		*Caesar*	*crossed*	*the river Rubicon*	
22			*his fate*	*was decided;*		
23			*'The die*	*is cast!'*		
24			*he*	*said,*		
25	*as*		*he*	*moved to make*	*one of the most decisive strokes [of history]. (49 BC)*	

Text 1.4 *Behind their smiles* – **Empathetic autobiography (Year 6)**

	Text Adj	Circumstance / IP	Participant	Process	Participant	Circumstance / IP
1			I	was visiting	Rome	from Greece.
2			I	had met	Caesar	
3	and	now	I	know	[[why he was so loved]].	
4			I	knew	[[what they meant]]	
5	when		the people	said		
6			his words	were	[['his only enjoyment [of victory] was [[saving his foe']]]].	
7		So much… [[that he walked without [[guards surrounding him]]]]	…he	was …loved	by his people	
8		The night before	I	had supped		with the senators [[that were plotting against him, *only* because of jealousy]].
9	As soon as		we	reached	home	
10			I	wrote	him / this letter.	
11		'Oh, mighty Caesar,	I	am	a noble [from Greece],	only
12	but	please		take	my warning:	
13				Do not go		to the senate house / today.
14			I	supped		with certain Senators / last night
15	and			heard	[[them plotting to kill you]]!	
16			Jealousy	is	behind their friendly smiles!	
17				Be warned!		
18			I	waited		with the note [in my hand],
19	then		he	came.		
20			They	smiled		
21	and			cheered	him	
22	and		he	waved		
23	and			smiled		back.
24			I	think		
25			he	loved	his people	
26	as much as		they	loved	him.	

	Textual Adj	Circumstance	Participant	Process	Participant	Circumstance / IP
27	As		he	passed		
28			I	ran		out
29	then			bent		on my knees
30				holding …out.	the letter	
31		'Caesar, Caesar.		Listen!		
32				Take	heed!	
33				Read	my letter,	Caesar.
34				Be warned!'		
35			He	took	my letter	with a smile
36	but	only		put	it	in his pocket
37	and			walked		on.
38			Tears	sprang		in my eyes
39	as		I	called out		after him.
40			Caesar	was murdered	by the senators	
41				including	his best most trusted friend, Brutus,	
42			his last words	were	[['And you Brutus?']]	

Text 1.5 *Geology excursion – (Procedural) recount (Year 6)*

	Textual Adj	Circumstance	Participant	Process	Participant	Circumstance / IP
1			We	went		into a small room
2	and			sat down		at a table.
3			Jason	split	us	into groups [of about 5].
4			The groups all	had	one bowl and one spoon.	
5	While		the other groups	filled up	their bowls	with plaster powder
6			we	chose	our fossil mold.	
7	Once		we	had	our powder	
8			we	added	water	
9	to			make	a not so thick plaster mix.	
10			We	spooned	the stuff	in
11	then			wrote	our name	on a small piece of blue paper

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12	and			left	it	
13	to			set.		
14			We	were given	a sheet [with some things [[we had to do]] [[written on it]]].	
15			We	had to find	a crystal rock [[to match each colour]].	
16		For red	I	got	spinal,	
17			it	is	a small crystal.	
18		For orange	I	chose	Minium	
19			it	's	a sort of grey slate [with orange on the top],	
20			it	looks like	[[it's been sprayed with orange paint]].	
21			I	chose	sulphur	for yellow,
22			it	's	a really nice one,	
23					all yellow.	
24			Malachite	is	dark green.	
25		For blue	I	chose	Halite on Kröhnkite (?).	
26			(I | can't remember.)		
27			Blue crystals	are	my favourite	(by far).
28			Fluorite	is	purple,	a bit like amethyst.
29			We	were taken		to a rock bed
30	and		we	got to choose	some rocks [[to take home]]	
31			I	chose	a rock [[that looked like a cigarette lighter || (cause) it was in the shape of one || and it was grey with a white square on top]].	
32	…too.		There	were	heaps of other rocks	
33			I	didn't look at	much	under the microscope
34	but		I	did see	a thin bit of mica and a thin bit of basalt.	
35			Mica	looks like	a cracked wall	
36	and		basalt	has got	fluorescent green	in it. / actually
37			Geologists	love	quarries	
38	because		they	can see	[[where the rocks have been cut in half]].	
39			It… [[ ]]	is	a waste [of time]	
-	[[			to look for	fossils	in (this location)]].
40	because		the rocks	are	too old,	
41	and		animals	didn't live		then.
42			You	should taste	rocks that are light [in weight] and light [in colour].	only
43			Lead	is	poisonous.	

Text 1.6 *Sedimentary Rocks* – (Causal) Explanation (Year 6)

	Textual Adj	IP	Participant	Process	Participant	Circumstance
1			The fine particles [of weathered rocks]	are washed down	by water	
2	and			are deposited		on the beds of lakes, rivers or seas.
3			Layer after layer	build up		
4	until		those below	are compressed		into rocks.
5			Such rocks	are	sandstone, siltstone and conglomerate.	
6			Flint stone	is formed		with extremely small particles.
7	As		layers	deposit		
8		*sometimes*	the remains [of a plant or animal]	are embedded.		
9			These	become	fossil records [of life [from the primeval past]].	
10			The most abundant rock	is	limestone.	
11			It	is	the accumulation [of the remains [of tiny sea creatures (drill fish and corals) [[that abound in warm seas]]]].	
12			Such prolific life	ends up as	deep layers [of limestone].	
13			Much of (the state)	are	limestone landscape.	

Text 1.7 *The Zodiac* – Descriptive Report (Year 6)

	Textual Adj	Participant	Process	Participant	Circumstance
1		The path [of the sun, moon and planets across the sky]	transverse	a starry course.	
2	Although	we	do not see	stars	during the day,
3		they	are	there	as an invisible background [to the sun's journey].
4		We	see	this same course [with the Sun]	as the path [of the moon and planets at night].

5		This special path [of stars]	is called	the Zodiac.	
6		It	is made of	four groups (constellations)	
7	wh…	…ich	have been named		since ancient times.
8		Each group	occupies	about 1/12 of the band or circle [[that weaves above and below the celestial equator]].	
9		Some constellations	are	above the celestial equator,	
10		some		below.	
11		Sagittarius and Scorpio	are	very high [in the winter sky]	
12	while	Taurus and Gemini	are	very low [in the summer sky].	
13		[[What we see in the sky]]	is hidden		behind the sun/ in the opposite season.

Text 1.8 *Experiments with electrical* – **Procedural Recount (Year 6)**

	Textual Adj	Participant	Process	Participant	Circumstance
1		We	cut up	tiny bits of paper	
2	and		laid	them	on the desk.
3	then	We	rubbed	amber	against fur.
4		We	held	the amber	above the bits of paper
5	and		observed	[[what occurred]].	
6		We	set up	the retort stand	
7			hanging	a piece of polystyrene	from the end of it.
8		We	rubbed	the glass tube	with a piece of silk
9	then		held	it	beside the polystyrene
10	and		watched	[[what happened]].	
11		We	did	the same	to the pipe
12	as	we	did		to the glass tube
13	and	we	ended up with	much the same result.	
14		We	placed	a piece of contact	on the desk
15	and then		pressed	a sheet of plastic	onto that.
16		We	held down	the corners of the contact	

17	and		watched.		
18	After		rubbing	the fur	against the amber
19	and		holding	it	above the bits of paper
20		we	watched	[[the paper bits slowly rise]].	
21		Some	turned	cartwheels	on its surface
22		some	stuck		there
23	and	others	jumped		off
24	and		floated		back down.
25	Once	the glass tube	had been rubbed		by the piece of silk
26		we	held	it	next to the piece of polystyrene.
27	By		moving	the tube	back and forth a little
28		we	saw	[[how the hanging piece of polystyrene was drawn toward the glass tube]].	
29		The third experiment	had	much the same effect [as the 2].	
30			Having rubbed	the pipe	with fur
31	and		held it		a short distance from the polystyrene
32		we	watched	[[the plastic pipe draw it near]].	
33	After		pressing	the sheet of plastic	down onto the sheet of contact
34		we	lifted	the corners of the plastic sheet	
35	and		watched	[[the bits of shredded tissue rise || and stand on end]].	

Text 2.1 *James Ruse* – Biographical recount (Year 8)

	Txt Adj	Circumstance	Participant	Process	Participant	Circumstance
1			James Ruse	was	the first wheat farmer	in Australia
2			He	came		in the 1st fleet of convicts / in 1788.
3			They	arrived		in Sydney cove
4	and			were given	grain [[to try and grow]].	
5			The only ones [[who knew anything about farming]]	were	J. Ruse and another man.	
6			Ruse	was put	in charge of some other convicts	
7	to			attempt growing	the wheat.	

8			It	was	hard work	
9	and		their only tools	were	very basic.	
10	Nor		the land	was	much good.	
11			They	knew	[[they wouldn't get much that year]].	
12	and		they	didn't.		
13			They	harvested	only enough [[to save for another crop]].	
14			Ruse	suggested		
15			they	go		further
16	and			find	more fertile land.	
17			They	went		to Rose Hill
18	wh…	…ere	the soil	was	richer.	
19		From that crop	they	harvested	5.44 tons.	
20			Governor Philip	(was)	happy	
21	because		he	knew	[[that wheat would grow in Australia]].	
22		About a year [[after he arrived here]]	his sentence	was	up.	
23			Philip	gave	him / 12 hectares of land	
24	and			said		
25	that <<>>		it	would be	his.	
26	<<if		James	could survive		off this land / for 2 years>>
27	To			get… started	him	
28			they	provided…with	him / a hut, some wheat, a spade, a hoe, two pigs and six chickens.	
29			Ruse	was robbed		
30	and			attacked	by wild dogs	during that time.
31		After a while	another ship	came		into Sydney Harbour
32				bearing	1000 convicts.	
33			273 of these	were	dead	
34	and		500		sick,	
35			so bad	was	the treatment and conditions.	
36		From among these (alive ones)	James	wanted to choose	a wife.	
37			He	picked out	a nice-looking girl [by the name of	

#	Txt Adj	Circumstance	Participant	Process	Participant	Circumstance
					Elizabeth]	
38	and			asked		
39	if		she	wanted to be	his bride.	
40			She	consented		
41	and		he	took	her	back to his land.
42			Bushfires, caterpillars, and not much rain	meant	[[that the crop was poor and not enough [[to live on yet]]]]	
43			Ruse	wouldn't accept	food / from the Government	
44	or			give up		so easily.
45			They	took	pity	on him
46	and			gave	both the 12 hectares and food / to him.	
47			He	moved		with his wife / to the Hawkesbury
48	wh…	…ere	the land	was	much better.	
49			He	became known as	the first successful wheat farmer	in Australia.
50			Other people	joined	him	there
51	and	soon	they	had	enough wheat [[to feed the whole colony]].	
52			He	had	two girls,	
50			he	sailed		
54	and			farmed		
55	and			died		at the age of 77 / in 1837.

Text 2.2 *Revolutionary Events* – Historical account (Year 8)

	Txt Adj	Circumstance	Participant	Process	Participant	Circumstance
1	After			receiving	60,000 letters [of grievance]	
2			King Louis	decided		
3			something	had to be done.		
4	When		he	called	an assembly	
5			he	didn't realise	[[that the thousands of people [come to Paris] would mix]],	
6			He	couldn't keep… from talking	the separate estates	

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7			*The conditions*	*were*	*harsh / for everyone.*	
8	*so <<>>*		*they … all*	*were*	*angry*	
9	*<<when*		*they*	*came*		*together >>*
10	*wh…*		*…ich*	*gave*	*them / a sense [of unity].*	
11			*Advisors*	*told*	*the king*	*of the 3rd estate's demand [for equal power].*
12	*That, <<>>*		*their votes*	*should be counted*	*double.*	
13	*<<because*		*they*	*were*	*the majority>>*	
14			*Louis*	*wasn't*	*happy*	*about that*
15	*so <<>>*		*Paris*	*didn't remain*	*still*	
16	*<<when,*	*on the day [of the assembly],*	*the King*	*barred*	*the doors*	*against the 3rd estate representatives [[whom he had invited]]>>*
17			*15,000*	*followed*	*the barred-out men*	*through the rain*
18	*and*			*helped… break down*	*them / the door [to the sheltered tennis court]*	
19			*It*	*was*	*not only 3rd estate people but also priests.*	
-	*th…*		*… at*	*joined.*		
20			*These people*	*decided*		
21	*that*		*they*	*were*	*the real representatives [of France]*	
22	*and*			*wanted to be called*	*the National Assembly.*	
23			*They*	*swore*		
24	*that*		*they*	*wouldn't leave*	*the court*	
25	*until*		*the King*	*agreed to see*	*them.*	
26			*They*	*signed*	*their names*	*on the unhinged door.*
27			*They*	*did not want to remove*	*the King*	
28	*but*			*cut out*	*the 1st and 2nd estate.*	
29			*That day, the 20th of June 1789,*	*is called*	*the Tennis Court Oath.*	

TEXT 2.3 *Why did the Industrial Revolution begin in England* – Factorial explanation (Year 8)

	Txt Adj	Circumstance / IP	Participant	Process	Participant	Circumstance / IP
1			The Industrial Revolution	began		in England / for these reasons.
2			The conditions [for workers, especially the coal miners],	were	harsh, unhealthy and dangerous.	
3			This	called for	new mechanical inventions.	
4			It	was	a small contained country	
5				unhindered	by the conflicts [[that burdened other countries]].	
6			It	had	the world's most powerful navy	
7	and		they	plundered	Spain's wealth.	
8			They	were	the first country [[to overthrow their monarch]],	
9				replacing	it / with a religious parliament.	
10			These factors	created	a necessity	
11	wh…		…ich	became	the mother of invention.	
12			The conditions [in the coal mines]	were	so bad	
13	and		the death rates	(were)	so high [[that scientists were forced to invent safer ways [of mining]]].	
14			The mines	were entered		in a sort of cage [[that ran straight down the shafts]],
15				guided	by tracks [down the wall].	
16			The cages	had	six compartments	
17			each	fitting	around 3 people	in each.
18			This	was	a hair-raising, very fast free fall.	
19			The tunnels	were	low, only a few feet high.	
20			The pickers	were	men,	usually
21				working		in awkward, crouching or lying positions.
22			The shovelling and loading [of the carts]	was done	by young boys and girls [of about 10]	
23	(wh…		…o)	were given	the task [[(of) pushing the heavy coals along the	

						dark, hot tunnels]].
24			There	were	five miners	(t...?)
25				working,		
26				sweating		in the intense heat and thick coal.
27			The gas lamps [[used to light the cave]]	used up	the oxygen	
28	and		the air	was	full of thick coal.	
29			There	was	no ventilation	
30	and		the walls	leaked	water.	
31		Slowly	the cells	would fill with	oozy muck and highly flammable methane gas	.
32			The miners	knew	[[this was dangerous // and the stuff should be cleared out]]	
33	but		they	could not afford	a day's rest [[from collecting the coal]].	
34		For 13 hours solid work and 15 minutes rest	the men	were paid	the equivalent of 50c,	
35					barely enough [for them and their starving families to survive on]].	
36	So, <<>>		they	could not give up	a day's wages	
37	<<though		they	knew	the price >>	
38	to			ensure	their own safety.	
39			This methane gas	collected,		especially in the bottom cells
40	and	eventually	the lamps	would light	it,	
41				causing	an explosion.	
42			The miners	were burnt,		
43				crushed		beneath falling rock
44	or			trapped.		
45			Rescue parties	were sent		down
46	but		very few	could be saved		
47	or			recovered.		
48		In an incident like this [in a Belgian mine]	3 [out of 36]	survived	a methane explosion.	

49			*These frequent and fatal accidents*	*demanded*		
50			*scientists*	*to create*	*new inventions*	
51	*to*			*help*	*coal miners.*	
52			*England*	*was*	*a small contained country*	
53	*wh…*		*…ich*	*meant*	*[[that there was no rivalry]].*	
54	*While*		*other countries*	*were*	*in conflict*	*with each other*
55			*England*	*maintained*	*a strong sense [of nationality].*	
56			*Holland, Germany and other European countries*	*were bordered*	*by others.*	
57			*People*	*were coming*		*constantly*
58	*and*			*going*		
59	*so,*	*unlike England,*	*there*	*was*	*not much sense [of nationality].*	
60		*In those times*	*[[whoever ruled the sea]]*	*ruled*	*most of the world's trade.*	
61			*This*	*was*	*England, Elizabeth the 1st and her most powerful navy.*	
62			*They*	*took*	*power*	*from Spain,*
63				*plundering*	*the Spanish wealth.*	
64			*The Spanish ships*	*were*	*huge*	
65	*and*			*weren't*	*easy [[to manoeuvre]]*	
66	*wh…*		*…ich*	*meant*	*[[the small fast fleet [of the English] could easily defeat Spain's trading ships // before the cannons could be turned on them]].*	
67		*With England's sense [of belonging] and strong situation*	*it*	*spread*	*its empire*	*soon / over many countries [[including America and India]].*
68			*They / the people [in India]*	*got … to grow*	*cotton,*	
69				*bought*	*the raw material / off them*	
70				*made*	*it / into clothes and rugs*	
71	*and*			*sold… back.*	*it*	
72	*So*		*they*	*kept.. from having*	*countries / their own economy*	

73				taking	it / for themselves.	
74			This	gave	enough wealth [[to support scientists and their inventions]].	
75			England	was	the first country [[to overthrow their monarch]].	
76	When		the Catholic Church	would not let … divorce	King Henry the 8th / his wife	
77			he	made	the Church of England.	
78			All those [[who did not convert]]	were persecuted		
79	and			killed.		
80		Some generations later	the Catholics	rose up		
81				overthrew		
82	and			beheaded	the King	
83	and			ruled		as a parliament.
84	As			had been done	to them	
85	now		they	persecuted	those [[who remained loyal to the Church of England]].	
86	But		these people	ruled		with such cruelty [[that the (…?) preferred how it had been with a king // and called one back]].
87			They	made	[[what was later modified to a constitutional monarchy]].	
88			They	had	a king	
89	but		parliament	had	the power.	
90			This	meant	[[that money could go towards improvements rather than one person's desires and comforts]].	
91	When		King Henry	persecuted	the Catholics	
92			he	gave	the church's lands / to nobles.	
93		Generations later	their families	owned	them	still
94	and		the peasants	worked	the land.	
95		In the centre of the village		was	a church	

96	*to wh…*		*… ich / 10% of everyone's produce*	*was paid*		
97			*Each peasant*	*had*	*3 strips of land [[to work on]]*	
98	*wh…*		*… ich /they*	*rotated.*		
99			*The king*	*demanded*	*an amount / from the manor lord*	
100	*and*	*according to that*	*the peasants*	*had to pay*	*produce / to the lord.*	
101	*After*			*paying*	*that and the 10% [to the church]*	
102			*they*	*had*	*little or none / for themselves.*	
103			*Enclosure*	*meant*	*[[that the land was taken from the peasants, // the dividers taken down// and whole paddocks of certain crops were grown rather than small strips of all different kinds]].*	
104			*This*	*meant*	*[[that many people lost their jobs //and were forced to live out in the forests, //beg, //or turn to robbery]].*	
105			*Some*	*set out*		
106				*to find*	*work [closer to the city].*	
107	*So*		*England*	*was*	*the first [[to have an industrial revolution]]*	
108	*because*		*it*	*had*	*the desperate need and the wealth [[to fulfil that need]].*	

Text 2.4 *Was life better before the Industrial Revolution?* – Exposition (Year 8)

	Txt Adj	Circumstance / IP	Participant	Process	Participant	Circumstance / IP
1			*There*	*were*	*both advantages and disadvantages*	*to life/ before and after the Industrial Revolution.*
2			*I*	*don't think*		
3			*one way*	*was*	*better than the other.*	
4		*Under each heading (environment, health, clothes)*	*I*	*will write*	*different aspects [of it], some good or bad things.*	
5			*A good example [of [[how we're*	*is*	*clothes*	

			better off now]]]		
6	*and*		*(example) [of [[how we're worse off]]]*	*is*	*the number of fatal car accidents.*	
Environment						
7		*In England*	*most people*	*lived*	*a rural life*	
8	*so*		*it*	*was*	*a quiet life*	
9	*though*		*(it)*	*(was)*	*hard work.*	
10			*Families*	*lived*		*in one place / for generations*
11				*sharing*		*with combined and extended family,*
12	*so*		*there*	*would have been*	*a definite sense [of belonging].*	
13			*Some disadvantages*	*would be*	*[[that << if you were a son>> you would be expected to take on your father's trade]].*	
14			*Children*	*worked*		*from an early age / with a life span [of usually 40-50 years] and no education.*
15			*People*	*had to be*	*self-sufficient,*	
16				*making*	*their tools*	*out of wood or bone,*
17		*usually*			*unable [[to afford the metal smiths]]*	
18			*People*	*were known by*	*their trade and Christian names.*	
19		*Often*	*their nicknames such as Toogood, Softhand*	*became*	*their surnames.*	
20			*Church centre of village and the priest and gentry*	*were*	*the only ones [[who were educated]].*	
21			*There*	*was*	*a very limited amount [of medical knowledge]*	
22	*and*		*disease and other ailments*	*were said to be*	*the work [of the devil].*	
Health						
23			*I*	*think*		
24			*the lack [of medical knowledge]*	*was*	*one of the disadvantages [to life [before the revolution]].*	
25			*Children*	*had to work*		*very hard.*
26			*Jobs [[that suited their physique*			

					but not their health]].		
27				Being	the only ones [[that fitted]]	
28			they	had to clean out	chimneys,	
29				breathing in	the poison.	
30		In the coal mines	they	had to drag	the coal carts	along the tunnels.
31			The machines [[they did have]]	were	huge	
32			accidents	occurred		*all the time*
33	and		children	were killed	by them	*often.*
34			The employers	had	no government help.	
35	If		a worker	was	ill	
36	and			missed	a day	
37		*just*	they	lost	their jobs.	
38			It	was	unit labour, not personal.	
39			Car crashes and cancer	were not	a problem	then.
Clothes						
40			Clothes	are	one of the improvements	since the revolution. */definitely*
41			Only the very rich	could afford	clothes [[that were not coarse and chafing]].	
42	But		people	did not put	so much money	into what they wore.
43		Before the revolution	life	was	simpler though harder	
44	and	in many ways			more cruel.	
45	Therefore		we	see	[[that <<while many things have changed for the better>> the environment was better looked after // and life was far quieter// and the pace of everything was slower.]]	

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Text 2.5 *Kundt's Tube* – **Procedural recount (Year 8)**

	Textual Adj	Circumstance	Participant	Process	Participant	Circumstance
1			*We*	*used*	*a 600m long x 2.5 mm D glass tube.*	
2			*The tube*	*had*	*a rubber piston [[placed in one end]].*	
3			*The glass tube*	*was standing*		*on two blocks of wood.*
4		*Inside*	(there)	*was*	*a layer of fine cork dust.*	
What we did:						
5	*(A)*		*Angela*	*put*	*her mouth*	*to the end of the glass tube*
6	*and*			*screamed*		*into it.*
7			*The cork dust*	*stood up*		
8	*and when*		*the sound*	*stopped*		
9				*settled into*	*waves [[made up of bigger and smaller walls]].*	
10	*(B)*		*We*	*put*	*the Audio Generator, << >>*	*to the end of the glass tube*
11	*<< wh…*		*…ich*	*was attached to*	*the speaker>>*	
12		*On the lower frequency*	*there*	*were*	*two waves,*	
13		*on higher frequency*	*there*	*were*	*three waves.*	
Observations: (A)						
14	*When*		*the glass tube*	*was screamed into*		*on a low frequency*
15			*the cork dust*	*rose up*		*in thin vibrating walls.*
16	*When*		*the sound*	*stopped*		
17			*the active walls*	*collapsed into*	*two waves of corrugation.*	
18		*On a higher frequency*	*it*	*was*	*much the same*	
19	*only*		*the walls*	*were*	*closer together*	
20	*and*		*we*	*were left with*	*three waves*	*inside the tube.*
Observations: (B)						
21			*The result [[after using the Audio Generator]]*	*was*	*much the same as with the voice.*	
22	*When*		*the Audio Generator*	*was turned on*		
23			*the cork dust*	*danced*		*almost to the top of the tube*

24	*then*			*settled down into*	*corrugations.*	
25			*The walls*	*varied*	*in height*	
26				*creating*	*waves, more on higher frequency and less on lower frequency.*	
Conclusion:						
27			*The vibrations [of the voice]*	*move*		*down* (the) *tube*
28				*creating*	*walls.*	
29			*The collecting [of powder]*	*formed*	*rarefaction and compression.*	
30			*Compression*	*is*	*the thin walls*	
31	*and*		*rarefaction*	*is*	*the space [between].*	

Text 2.6 *How organisms work* **(feed) – Classifying report (Year 8)**

	Textual Adj	**Participant**	**Process**	**Participant**	**Circumstance** / IP
Plants					
1		*Most plants*	*rely on*	*the environment: soil, air, sunlight.*	
2		*It*	*takes*	*water, salts, nutrients and minerals*	*from the earth.*
3		*Plants*	*don't have*	*a choice [about [[where they live || or what their environment is like]]].*	
Animals: Filter feeders					
4		*These*	*are*	*the kind of animals [most like plants].*	
5		*They*	*will take in*	*sea water*	
6	*and then*		*discard*	*it,*	
7			*keeping*	*the nutrience [of it]*	
8		*Some examples of these*	*are:*	*corals, sea anemones, worms and whales.*	
9		*The largest whale*	*reach*	*up to 30m long*	
10	*and*		*can weigh*	*(?).*	
11		*They*	*have*	*specially designed teeth, baleen.*	
12		*They*	*swim about*		
13			*herding*	*tiny krill*	*into a bunch*
14	*then*		*take*	*a gulp.*	
15		*They*	*close*	*their mouth*	

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16	and		spurt out	the water	through their comb-like teeth,
17			trapping	the krill	inside.
Herbivores					
18		Herbivores	eat	herbs or plants	*only*.
19		Some examples of these	are:	cow, rabbit, horse, sheep, guinea pig and deer.	
20		The cow	has	four stomachs	
21	and		takes	a long time	
22			to digest.		
23		All these animals	need to eat	a lot	
24	and				*often.*
25		They	cannot eat	meat	
26	as		was proven		
27	when	people	tried to feed	it / to cows.	
28		This	caused	Mad Cow Disease, deterioration [of the brain].	
29	...also.	This	spread		to humans
Carnivores					
30		Examples:		eagles, lions, vulture, frogs.	
31		They	have to hunt,		
32			catch		
33	and		kill	it.	
34		They	eat	as much [[as they can]]	
35	then		taste		
36	until	they	have digested	it	
37	and		are	hungry	again.
38			Depending on	the size [of their meal]	
39		they	could fast		for the next few days.
40		They	are built		for speed
41	and		have	keen eyesight.	
Omnivores					
42	e.g.			Chickens, magpies, ducks, humans.	
43		They	hunt	worms, grubs and insects	*generally*
44	but also		eat	veggies, wheat, grains [[that are available]].	
45		Humans	choose	[[what meats they like]]	

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	Textual Adj	Circumstance	Participant	Process	Participant	Circumstance
46	and			will grow	favourite foods.	
47			We	eat	cooked food,	
48				changing	it	to our liking,
49			we	herd	cows and sheep	
50	and			build	boats	for fishing.

Text 2.7 *Water Wheel Flour Mill. How it Works* – **Sequential explanation (Year 8)**

	Textual Adj	Circumstance	Participant	Process	Participant	Circumstance
1			Water wheels	are built		alongside a river.
2			The water	flows		into a diversion pond
3	then		it	is channelled to run		down the wheel / from above.
4			It	fills	the buckets [on one side of the wheel]	
5				turning … around,	it	
6	when		the buckets	are taken		under the water
7			they	empty out	their water	
8				rising		up the other side
9	to			be refilled.		
10			The great wheel [[continually turning]]	is	a very powerful force.	
11		(At) the centre of the wheel		is	(a) fixed bar	
12	th…		…at	joins to	a cog wheel [inside the mill].	
13			This	turns	a spindle wheel	
14	th… then		…at	turns	a pole [[joining the upper moving millstone on the floor above]].	
15		Over the millstone		is	a Hanging Shoe.	
16			The miller	pours	wheat	into the Hanging Shoe
17	wh…		…ich	swings		back and forth
18				spreading	the grain	evenly/ onto the grindstones
19	wh…	…ere	it	is crushed		
20	then			poured		into a chute [[made of cloth]].

	Textual Adj	Circumstance / IP	Participant	Process	Participant	Circumstance / IP
21		On the pole [[that joins the spindle wheel to the mill stones]]		is	a sort of spur.	
22	As		the pole	turns		
23			the spur	goes		round
24				hitting	a bar [[called the slapper stick]].	
25	When		the spur	hits	the stick	
26			it	slaps	the cloth chute	
27	wh…		…ich	acts as	a sieve,	
28				letting… fall	the fine flour	through,
29				separating	it	from the bigger husks
30	wh…		…ich	will be ground		again
31	after		it	is caught		in a bag.

Text 2.8 *Fat Fire* – **Procedural recount (Year 8)**

	Textual Adj	Circumstance / IP	Participant	Process	Participant	Circumstance / IP
What we used:						
1			We	used	the butter [from ex. 12] and a Bunsen burner and a bowl [on a stand] [[to put the butter in]].	
2					A thermometer.	
What we did:						
3			We	put	the butter	in the bowl/metal dish / over the flames [of the burner].
4			We	used	a thermometer	
5	to			test	the butter's temperature.	
Observations:						
6			We	observed	[[how the butter bubbled up [[as it was heated]]]].	
7		After a while	the bubbles	seemed to evaporate		
8	and			sank down		again.
9			We	kept heating		

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10	and		it	turned	black,	
11			the smell	wasn't	very nice.	
12		Over 200° C	it	caught fire.		
13	When		we	tried to put… out	it	with water
14			it	flared up,		
15				spitting		
16	and			smoking.		
17			We	tried blocking out	air	with tiles
18	but		the round shape [of the dish]	rendered	this / useless	too,
19		*Eventually*	we	put	a fire blanket	over it
20	but		this	worked.		*even / barely*
21			Fat fires	are	very hard [[to extinguish]]!	
Conclusion to Ex 13 Fat Fire:						
22	When		we	heated	the butter	first
23			it	bubbled up.		
24			This	is	[[because the butter still contains whey //which has lots of water]].	
25			This moisture	bubbles up		
26	and	at 120° C	it	evaporates.		
27			We	ae left with	fat [[that smokes // goes black //and smells bad]].	
28				Floating		on the surface of the liquid
29				was	clumps of fat	
30	because		the 76 different fats [[that butter contains]]	melts		at different times.
31	If		it	gets	hot enough (over 200° C)	
32			the heat	will ignite	the oil.	
33			Oil	is	a very good fuel	
34	as		it	contains	twice as much energy [as sugar and starch]	
35	Once		it	is burning		
36			it	keeps heating	itself	

	Txt Adj	Circumstance / IP	Participant	Process	Participant	Circumstance / IP
37	th…		…at	makes	it / very hard [[to put out]].	
38	As		we	saw		
39	when		we	put	the butter	in the water
40	that		water	is	heavier	
41	Therefore when		water	was sprayed		onto the fire
42			it	sunk		to the bottom of the oil.
43			it	would have turned to	around 100° C.	almost immediately
44			It	would expand		
45	and			turn to	steam	
46				rising		in bubbles / with a skin of fat around it.
47			It	is	extremely hot	
48	and			exposed to	a lot of air	
49	wh…		…ich	feeds	it,	
50			These	are like	balls of fire.	
51	When		we	put	the fire blanket	over the fire
52			we	were excluding	the air	
53	wh…		…ich	cooled	the flames.	

Text 3.1 *The Treasure of Pompeii* – **Site interpretation (Year 9)**

	Txt Adj	Circumstance / IP	Participant	Process	Participant	Circumstance / IP
1			The best examples [of Roman art]	were uncovered		with the discovery of Pompeii and Herculaneum [by archaeologists].
2	Whilst			digging		
3			a house	was found		
4	and		that	led to	[[the whole city being unearthed]].	
5			It	was	huge, over a few square km.	
6			Pompeii	lay	beneath farmlands	
7	but		Herculaneum	was	under the suburbs [of Naples].	

8			They	exposed	a large area	
9	but		the modern buildings and establishments [above it]	prevent… from exploring	them	further.
10			It… [[ ]]	is speculated		
-	[[that, << >>		there	would be	much, much more]].	
11	<<		…they	could… go		further, >>
12			It	is judged to be	the wealthiest and biggest city [of the two]	
13	though		they	have… uncovered	a fragment [of it].	*only*
14			Pompeii and Herculaneum both	(were) overshadowed	by the mountain Vesuvius,	
15				standing	1500m high.	
16		On the day of August 24th, 79AD	it	erupted		
17		By [[what would normally have been sunset on the same day]],	the city	was covered	by over a metre of ash.	*already*
18			A mass [of lava and boulders]	was spouted		1000s of feet [up into the air]
19	and			crashed		down
21				followed	(by) poisonous fumes and magma.	
22			The thick pumice	covered	the ground [of Pompeii]	up to a height [of six to eight feet].
23		That night	the whole region	was convulsed	by explosive shocks and violent earthquakes.	
24			Dust, ash and cinders	rose		into the sky
25	and			came		down / again / in a seething mass [[which covered the ground with an additional 7 feet of debris]].
26		On the 26th	dim light	reappeared		
27	to			reveal	the desolation.	
28			Many people	died		in their sleep,
29				poisoned	(by) fumes	

30	or			choked		on the ash.
31	Although		this	is	a devastating tragedy,	
32			it	has provided… with	historians and scientists / an amazing insight [into [[what life was like for them then]]]	
33	because		the ash and magma	has preserved	their world.	perfectly
34			People and animals	were found,		
35				lying		in their homes
36	or	on streets		fleeing,		with their possessions / from the terror [[that surrounded them]].
37			Tables	were	set,	
38				laid		with mugs and bread,
39				awaiting	diners [[who never came]].	
40			There	was	empty shells [[left]] [of the people]]]	only
41	so		scientists	pumped up	them	with plaster
42	then			took away	the outside.	
43			Artwork	was kept	almost perfectly intact	for well over 1000 years.
44			Pompeii	is thought to have been	a sort of holiday place [for rich people [with second houses there]].	
45			These wealthy houses	(are)	full [of mosaics]	
46	and		tilings	surround	ponds	in walled-in courtyards.
47			It… [[ ]]	is thought		
-	[[that		Pompeii's population	would have been	around 25,000,	
-	while		Herculaneum	had	5000.	only]]
48			The obliteration [of Pompeii]	was witnessed	by a young nephew [of a famous encycloped(ist)].	from out at sea
49		In later years	he	wrote	his recollection [of the eruption].	
50			Bad conditions and falling debris	prevented… from landing	him	
51	so		he	was forced to sail		on / to a town [south of Vesuvius].
52		Sadly / on the following morning	his uncle	was overcome	by fumes	on the beach.
53			It	was not	until two days of complete darkness,	

				<< broken	by lightning and flames [of electric storms],	*only>>*
-	*that*		*his body*	*could be found.*		

Text 3.2 *How the British claimed Australia* – Exposition (Year 9)

	Txt Adj	Circumstance / IP	Participant	Process	Participant	Circumstance / IP
1	*To*			*claim*	*the resources and management [of a country]*	
2			*the British*	*had*	*three ways.*	
3			*The Europeans*	*had agreed*		
4	*that <<>>*		*they*	*would divide up*	*the world.*	
5	*<<by*			*fulfilling*	*these three layers>>*	
6			*The first*	*was*	*a legal claim.*	
7			*This*	*was*	*on the basis of first discovery [of the land] or conquest.*	
8			*The second*	*is*	*[[that your people had to physically occupy and live on that land // to claim it, // or your people had to defeat the original inhabitants // and protect it against their supplanted rivals]]*	
9			*The third*	*was*	*a claim [of moral proprietorship].*	
10			*This*	*meant*	*[[that the Europeans had to live there long enough [[that they called it home]], [[that they could write poetry]].*	
11	*To*			*claim*	*this moral proprietorship*	
12			*they*	*had to feel*	*[[that this place was [[where they belonged]]]].*	
13	*Also,*		*outsiders and the original inhabitants*	*had to accept*		
14			*them*	*(to be)*	*as legitimate owners [of the land].*	
15		*In the claiming of*	*none of these*	*were fulfilled.*		*properly*

			Australia			
16			The Europeans	were not	the first [[to discover Australia]]	
17	as		the Indigenous Australians	were	there	for at least 60,000 years before,
18	and		it… [[ ]]	is believed		
-	[[that		they	migrated		from somewhere else]].
19			They	did not conquer	the Aboriginals	here
20	or			dispossess	them	of their land.
21				To overcome	this	
22			the Europeans	did not recognize		
23			the Aboriginal Australians	(to be)	as human inhabitants.	
24			They	were considered		legally
25				(to be)	part of the country and not humans [with rights].	
26			The second [of these layers],	was not obeyed.		like the 1st,
27			The Europeans	did not defeat		
28	or			chase	the Indigenous people,	out
29	nor		they	did occupy	Australia	physically
30	as		the Aboriginal people	did.		
31		Concerning the third layer,	the Europeans	had not been	there	long enough [[to develop a link to the land]].
32		In fact	most European Australians	did not feel	[[like the country was their home]]	until after World War 2.
33	And		the Indigenous people	did not… acknowledge		freely and willingly / certainly
34			this new society	(to be)	as the owner [of their country].	
35	So		the Europeans	found	the loopholes	
36	and			go around	their own laws	
37	by			not recognizing		
38			the Indigenous Australians	(to be)	as human beings.	legally

Text 3.3 *First dynasty* – **Period study (Year 10)**

	Txt Adj	Circumstance	Participant	Process	Participant	Circumstance / IP
1		1700 BC – 1100 BC	China	formed	its first dynasty.	
2			There	were	30 emperors	
3	wh…		…o	built	cities and buildings.	
4			They	mixed	copper and tin	
5	and			made	bronze	
6	wh…		… ich / they	called	the beautiful metal.	
7		Around 1800 BC	they	made	silk.	
8			They	made	chariots	
9	for		the nobles	to go		to war / in.
10			Their weaponry	included	extremely powerful bows, spears, pikes.	
11			They	used	rhino hides	for shields.
12			Their first currency	was	cowrie shells.	
13		Later	they	used	copper coins	instead.
14			They	developed	writing	
15	and			became	a highly literate culture	
16	wh…	… ere	everything	was recorded.		
17			They	set up	government departments	
18	and		each	was associated with	an element: e.g. wood, fire, water.	
19			The first reason [[we can know all this]]	is	the literary sources.	
20			Bronze wares [with symbolic inscriptions]	are being unearthed		stlll
21	and			read		today.
22			Graves	held	characters [[written on bamboo slips]].	often
23		Towards 1100	they	made	books [of songs] and books [of history].	
24			The other main source [of knowledge [[we have today]]]	comes from	the non-literary sources. Such as: pottery and graves.	

#	Txt Adj	Circumstance /IP	Participant	Process	Participant	Circumstance /IP
25			Nobles	were buried		with family: wives, concubines, chariots, jewelry, dogs, wine, servants and horses. `
26			Buildings' remains	were uncovered		
27	and		we	see	[[the sophistication of tombs increased]].	
28			They	loved		
29				hunting	wild boar, tigers, elephants, etc.	

Text 3.4 *Ming and Qing Dynasties* – Historical account (Year 10)

	Txt Adj	Circumstance /IP	Participant	Process	Participant	Circumstance /IP
1			The Ming Dynasty	lasted	from 1368 / to 1644.	
2			The Mongols	used	foreigners	
3	to			oppress	the public	
4	so		the Ming	became	xenophobic – isolationists	
5	and			refused	foreigners.	
6			They	reinstated	the exam system.	
7			They	built	the Forbidden City	in Beijing / in an area [[called GuGong]].
8			Commerce	flourished,		
9				trading	silk and porcelain	*mainly*.
10			Navigation and ship building	led to	an interest [in the outside world].	
11		In 1405 to about 1436	they	started to explore.		
12			The emperor	was looking for	the previous emperor	
13	wh…		…om / he	suspected		
14	of			plotting		against him.
15			He	'd fled		west. / *supposedly*
16			Zheng He	sent	68 treasure ships and smaller ships	out
17	(to)			explore.		
18			The treasure ships	were	450 feet long.	
19			The crew	was made up of	1000s of (men)	

20	*amongst wh…*		*…om*	*were*	*mapmakers, shipwrights, masons, metalsmiths and other such tradesmen.*	
21	*Before*		*they*	*left*		
22			*the captains*	*had to learn*	*all the known languages.*	
23			*They*	*sailed*		*all over the world, / around India, Africa, America, East Coast [of Australia], Greenland and the top of Antarctica.*
24			*There*	*is*	*plenty of good evidence*	*in the truth [of their travelling]; scriptures, DNA [of people [[who stayed in other countries]]], etc.*
25		*In 1644*	*the Ming Dynasty*	*became*	*corrupt*	
26	*and*			*fell apart*		
27	*as*		*the people*	*revolted.*		
28			*Two generals*	*wanted to restore*	*the throne*	
29			*One of them*	*appealed to*	*a man [[named Dorgon]], [from Manchuria],*	
30	*to*			*help.*		
31			*Dorgon*	*saw*	*[[it (to be) as a chance [[to take over China]].*	
32	*So*		*the Qing Dynasty*	*was established.*		
33			*It*	*was thought of*	*as a foreign take-over.*	
34			*They*	*made… wear*	*all the Chinese men / a plaited queue*	
35	*and*			*(made…) shave back*	*their hair*	*In line with their ears.*
36			*This*	*was*	*[[so people knew [[they were Chinese not Manchurian]]]].*	
37			*It*	*was*	*a very unstable time,*	
38			*the Europeans*	*were trying to get in.*		
39			*The Portuguese*	*came*		*to Macao*
40	*and*			*had*	*access*	*occasionally / to other ports.*
41			*Other countries… the Spanish, Dutch, British, Americans, Germans, French and Italians among others.*	*followed*	*the Portuguese.*	
42		*In 1800*	*everyone*	*was jostling to get*	*the best*	*out of China.*

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43			They	wanted	porcelain, furniture, tea, silk.	
44			The Chinese	would trade		*for silver and gold / only*
45	*and*		the traders	were allowed		*in a few ports. / only*
46		*Mostly*	the British	wanted	tea.	
47			The British East India Company	started growing	opium	in India
48	*and / then*			selling	it	to the Chinese / for silver
49	*with wh…*	*…ich*	they	bought	tea.	
50			Neither the Chinese nor the British traders	cared about	[[what was happening to the people]].	
51			It	was killing	millions.	
52			The Qing Court	started to get	concerned	
53	*so*		Lin (Zexu)	was appointed	by the Chinese	
54	*to*			stop	opium trade.	
55			He	went		to the port,
56				got	ship loads of opium,	
57				dug	pits	
58	*and*			burnt	it	with salt.
59	*then*		He	put	restrictions	on the British.
60		*From 1839-1842*	the Opium Wars	waged.		
61			British	had	a big firearms advantage	
62	*and*		China	was	broke.	
63		*In 1847*	the Chinese	signed	a treaty	at gunpoint.
64			It	said		
65	*that*	*until 1997*	the British	would have	access [to Hong King Islands and Kowloon].	
66			They	demanded	free access [to the 'concession cities' [along the East coasts]].	for the British and other Europeans
67		*In 1860*	there	was	the Taiping rebellion	
68				led	by Hong, a visionary [[influenced by aspects of Christianity]].	
69			It… [[ ]]	took	15 years	
-	*[[*			to put down	the rebellion]].	

70			The Boxer rebellion [in 1899]	was	the Society of the Heavenly Fist.	
71			These people	thought		
72			they	were unable to be harmed	by bullets.	
73			It	didn't succeed.		
74		In 1912	China	was	totally broke	
75	and		Pin Yi (the young emperor)	was forced to abdicate.		
76		From 1912/ to 1999	China	was	a republic.	
77		From 1999 / to present -			people's republic.	

Text 3.5 *The Hand in Comparison to the Foot* – Descriptive report (Year 9)

	Textual Adj	Circumstance	Participant	Process	Participant	Circumstance / IP
1			The human hand and foot	have	many similarities	
2	but also				many differences and, … purposes.	*of course,*
3			The similarities [between the foot and the hand/toes and fingers]	include	the following:	
4			Both	are attached to	a limb	by two bones, una &radius /fibula & tibia (shin bone).
5			The ankle and the wrist… both	are	free moving joints,	
6				allowing	more flexibility.	
7			The foot and the hand	have	five phalanges each	with nails [at the end].
8			Neither the foot nor hand	have	muscles	in them,
9			the phalanges	are moved	by muscles [in the limbs].	
10			The foot's metatarsal and the hand's metacarpal	mirror	each other	
11	as			do	the carpus and the tarsus.	

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12		*Despite these likenesses*	*the hand and the foot*	*have*	*their differences.*	*obviously*
13	*Where*		*the thumb*	*is*	*opposable*	
14			*the big toe*	*is not.*		
15			*There*	*are*	*7 tarsus and 8 carpus.*	
16			*We*	*can use*	*our hands*	*either palm down or palm up*
17	*wh…*		*…ich*	*makes*	*them / supination and pronation*	
18	*whereas*		*the foot*	*is*	*pronation.*	*only*
19			*The hand*	*is in line with*	*the arm*	
20	*but*		*the foot*	*comes off*	*the leg*	*at a 90* angle.*
21			*Fingers*	*are*	*much longer [than toes],*	
22				*making*	*the(m) / flexible and skilful.*	
23			*We*	*can tie*	*knots*	
24	*and*			*play*	*difficult instruments*	*with our fingers*
25	*whereas*		*we*	*would find*	*it… [[ ]] / near impossible*	
-	*[[*			*to do*	*that*	*with our toes]].*
26	*Although*		*toes*	*aren't designed to hold*		
27	*and*			*wield*	*tools*	
28			*they*	*are*	*very important*	
29	*in*			*helping… keep*	*us / balance.*	
30			*Our hands*	*have*	*more nerves [than our feet]*	*in them*
31	*and*			*are used*		*much more << >> [[than our feet are]].*
32	*<<for*			*discovering*	*things*	*by touch >>*
33			*The ankle and foot area*	*are built*	*much stronger [than our wrist and hands]*	
34	*so that*		*they*	*can carry*	*the weight [of our bodies]*	*for long periods of time.*
35			*The heel [of our foot]*	*is*	*an actual bone [[that sticks out]]*	
36	*whereas*		*the heel [of our hand]*	*is*	*the carpal bones [[that stick out at certain angles]].*	*actually / just*
37	*So*		*we*	*can see*	*[[that << though the hand and foot are structured quite similarly,>> their purposes or uses are sometimes different]].*	*through these examples*

Text 3.6 *Testing Wood to Destruction* **– Procedural recount (Year 10)**

	Textual Adj	Participant	Process	Participant	Circumstance / IP
What we Used:					
1				*two pieces of wood shown below, piece of railway track*	
What we Did:					
2		*We*	*put*	*the track piece*	*on each piece of wood.*
3		*We*	*dropped*	*it*	*then / onto them.*
Observations:					
4	*When*	*we*	*dropped*	*the weight*	*onto the across grain wood,*
5		*it*	*snapped*		*easily / in sections.*
6	*When*	*we*	*dropped*	*the weight*	*on the along grain / with quite a bit of force*
7		*it*	*splintered.*		
Discussion and Understanding:					
8		*The strength [of different materials]*	*can …be decided*		*only*
9	*by*		*testing*	*them*	*to destruction.*
10		*The compression, tension and shear loading*	*is… increased*		*gradually / to the point [[where the material fails]].*
11		*The way [[in which a particular material fails]]*	*is*	*of interest,*	*also*
12	*in that*	*designs << >>*	*can be made*		
-	*<<wh…*	*…ich*	*avoid*	*these specific failure modes*	*for the given material>>.*
13		*1. Sone, bricks, mortar and chalk*	*are*	*very weak*	*with tension or shear loading.*
14		*They*	*snap*		*like a brittle biscuit.*
15		*2. Steel, cable and wire*	*fails*		*in tension loading / by 'necking'.*
16	*Once*	*a local decrease [in diameter]*	*forms,*		
17		*this*	*concentrates*	*the stress*	
18	*and*	*run-away*	*occurs,*		*with further decreases [in diameter] and finally total breakage.*
19		*3. Wood*	*fails*		*along the grain with splintered fracture / or across the grain*
20	*by*		*snapping.*		

Text 3.7 *Crystal Garden* **– Procedural recount (Year 10)**

	Textual Adj	Circumstance	Participant	Process	Participant	Circumstance
1			We	made up	a 1:1 mixture [of water and water glass (sodium silicate)].	
2			We	filled	test tubes	with this water, waterglass mix
3	then			added	different salts.	
4		To our test tube	we	added	a few crystals [of the following salts: Copper chloride, aluminium chloride, copper sulphate, cobalt chloride, ferric nitrate].	
5			The crystals	sank		to the bottom of the test tube.
6		After a short time	the crystals	grew	stalk-like stems [with a small bubble [at the top]].	
7			They	grew		in short bursts,
8				shooting up		quickly,
9	then			stopping		
10	then			shooting up		again.
Conclusion:						
11			The glass [[we have in our windows]]	is	silicon dioxide, an acid [[that forms a solid form]].	
12			It	is	the only acid [[that forms a solid]].	
13			Silica	is found		in your skin, hair and in quite a few minerals e.g. agate.
14			We	find	[[that silicates tend to form surface coverings]].	
15		In things like agate	their surface coverings	are	silicate.	
16		In our solution [in Ex 7]	we	had	sodium silicate.	
17	When		the sodium silicates	get in contact with	the other salts	
18			it	forms	an invisible skin	around the salt [[we added]].
19	Like		it	can		with our skin,
20			moisture	can move		through the silicate membrane /

						like skin.
21			*This membrane*	*allows*	*the water*	*in and out*
22	*but*			*keeps*	*the salt*	*in.*
23		*On one side*	*we*	*have*	*lots of water,*	
24		*on the salt side*	*we*	*have*	*very little water.*	
25			*There*	*is*	*more water pressure*	*on the outside [of the stalagmite]*
26	*so*		*more water… [[than comes out]].*	*goes in*		*through the membrane*
27			*The reason [[the stalagmite grew up in bursts]]*	*was*	*[[because<<when the water came in //and filled the stem,>> some of the skin ruptured at the top //and a new stalk grew]].*	

Text 3.8 *The Lungs* – Report /Explanation (Year 10)

	Textual Adj	Circumstance / IP	Participant	Process	Participant	Circumstance / IP / Textual Adj
1			*The lungs*	*work*		*automatically / mostly*
2	*but*	*sometimes*	*emotion*	*triggers*	*reaction.*	
3			*Crying*	*is*	*a contraction [of the lungs]*	
4	*whereas*		*laughing*	*is*	*an exhaling.*	
5	*When*		*we*	*inhale*		
6			*our thoracic cavity*	*expands*		
7	*and*		*a diaphragm*	*goes*		*down.*
8			*Air*	*rushes*		*in*
9	*to*			*fill*	*the vacuum [[that's created]].*	
10			*Jason*	*brought in*	*a model*	
11	*to*			*demonstrate*	*this.*	
12			*Lungs*	*are*	*asymmetry,*	
13			*the right lung*	*having*	*3 lobes*	
14	*and*		*the left*	*having*	*2 lobes.*	
15			*They*	*have*	*the same shape [as a cauliflower],*	*nearly*
16				*looking like*	*inverted trees.*	
17			*They*	*are*	*conical sponges*	*basically*

18	th…		…at	exchange	carbon dioxide / to oxygen.	
How it works						
19			Air	goes		*into the nasal passage*
20	wh…	…ere	fine hairs	stop… from being inhaled	big objects (insects).	
21			This	is	[[where the air gets filtered, //odours are simplified //and the air is made warm // and humidified]].	
22			The air	continues	down through the larynx, trachea	
23	wh…	…ere	the cartilage rings	give	the airway / structural support.	
24	If		you	're going to try 'swallowing'	fire	
25			it…[[…]]	's	important	
-	[[			to do	it	
-	while		you	exhale]]		
26	so that		the heat	can't damage	the airway.	
27	…then		The air	branches		*into the left and right bronchi*
28	and	here	your mucus	traps	dust, pollen, etc.	
29		*In our main vessels*	we	have	cilia (small hairs) [[that wave mucus back up]],	
30				keeping	fungi and virus	*out of our lungs.*
31			The bronchus	break up into	bronchioles,	
32	then			(break up) into	alveoli.	
33			Alveoli	is	the site [of air exchange].	
34			They	are lubricated	by surfactant, a substance [with an oily quality [[that keeps the alveoli moist]]].	
35			Veins and arteries	wrap	the alveoli.	
36			Blood	comes		*in / low in O2*
37	and			goes		*into the alveoli.*
38			That	's	[[how we exchange CO2 for O2]].	
39			CO2	comes		*out of the blood flow / into the air space*
40	then			is breathed out.		
41		*In the same way,*	the O2	enters	the blood flow.	

42			*It*	*turns*	*bright scarlet*	
43	*and*			*travels*		*to the left heart.*
44			*Each person*	*breathes in*	*250 ml of O2*	*per min*
45	*and*			*breathes out*	*250 ml of CO2*	*per min.*
46			*there*	*is*	*some oxygen*	*still / in our breath*
47	*wh…*		*…ich*	*is*	*[[why we can give mouth to mouth resuscitation]].*	
48			*There*	*are*	*some conditions [[that can affect our pathways of breathing]]:*	
49			*Smoking*	*produces*	*a layer of tar*	
50	*th…*		*…at*	*coats*	*the alveoli*	
51				*making*	*oxygen exchange / hard.*	
52			*Asthma*	*is*	*[[when the lining of the lung reacts to something i.e. pollen, chemicals, cat fur // and makes it swell]].*	
53			*This swelling*	*obstructs*	*the pathway*	
54	*and*		*breathing*	*becomes*	*tight and restrained.*	
55			*Pneumonia*	*is*	*an infection [of the lung lining]*	
56	*so / …also,*		*that,*	*stops… penetrating*	*oxygen*	*into the blood.*

Text 4.1 *Mabo. Life of an Island Man* – Biographical recount (within a film review) (Year 11)

	Txt Adj	Circumstance	Participant	Process	Participant	Circumstance / IP
1			*Mabo*	*is*	*a film [about a Torres Strait Islander, Eddie Mabo],*	
2	*wh…*		*…o*	*fought for*	*the rights of his people.*	
3		*In 1939,*	*the Queensland government*	*took ownership of*	*the Murray Islands, a group of Islands in the Torres Strait.*	
4		*Despite the introduction [of basic*	*the Murray Island people*	*kept*	*their tradition [of [[passing down land through family]]].*	

		schooling and a few other western ideas],			
5			*Eddie Koiki Mabo's mother*	*died*		*soon after his birth*
6	*and*		*he*	*was adopted*	*by his uncle and aunt*	
7	*wh…*		*…o*	*had*	*no children [of their own].*	
8			*Mabo*	*grew up*		*on the island [of Mer]*
9	*and*		*his teachers*	*found*	*[[him to be bright and determined]]*	*soon*
10	*and*		*it… [[ ]]*	*wasn't*	*long*	
-	*[[before*		*he*	*began to question*	*white man's power [over him and his people]]].*	
11		*At a young age*	*Eddie Koiki*	*became involved with*	*girl [[whom he was not allowed to be with]].*	
12		*As punishment*	*he*	*was exiled*		*from the islands.*
13			*Mabo*	*found*	*work*	*on small boats*
14	*and when*		*his year of exile*	*was*	*up*	
15			*he*	*returned*		*to the mainland*
16				*determined to discover*	*[[what it was [[that gave the white man so much power over his race]]]].*	
17		*In Townsville*	*Mabo*	*met*		
18	*and*			*fell in love with*	*Benita, a 16-year-old girl.*	
19			*It*	*wasn't*	*long*	
-	*[[before*		*the two*	*were married]].*		
20			*Mabo*	*found*	*work*	*on the railroads*
21					*(the only employment [[a black man could get at that time]])*	*almost*
22	*and*		*they*	*began*	*their family.*	
23			*The discrimination [[he and his young family were subject to]]*	*did not bring down*	*Mabo,*	
24	*rather*			*encouraged*	*his fire and determination.*	
25			*He*	*started up*	*a black school*	

26	wh…	…ere	the children	could learn	the ways and traditions [of the people [[he so loved]]], as well as the white folks' ways.	
27	Though		this little school	was loved	by the children [[who went there]],	
28			it	was frowned upon	by the white community	
29	and		government officials	became	suspicious.	
30			One of the things [[that got Mabo through the hard times]]	was	his absolute belief and certainty [[that, <<when he returned to Mer // as he so often said // he would>>, his piece of land would be waiting for him, under the care of his family]].	
31			He	would not accept		
32	that <<>>		they	could do	[[what they wished]]	with it
33	<<because		the Crown	had claimed	it>>	
34			It	was	this piece of land [on Mer]	*partly*
-	th…	… at		inspired… to take	Mabo / steps	in his fight [for Aboriginal land rights]. */ finally*
35			He	did	[[what no other indigenous Australian had done before]],	
36			He	made	the decision [[to learn || and go through the governments' courts || to get recognition]].	
37			He	spent	7 long years	in legal arguments,
38				going		to court,
39				giving	speeches	
40	and			visiting	Mer.	
41		After all that time	the court	came		to the decision [[that Mabo had no legal claim to land on Mer, || as he had not been officially adopted]].
42	Though		this	was	a dispiriting outcome,	
43			Mabo	had achieved	the acknowledgement [by the government] [[that the Islanders did have a longstanding system of land ownership]].	
44			It… [[ ]]	wasn't	long	after this
-	[[that		Mabo	was diagnosed with	cancer,	
-				causing	his sudden death]].	

45			Mabo	Had... lived		just a little longer
46			he	would have seen	the full achievements [of all his struggles].	
47		After the appeal	the High Court	decided to acknowledge	[[the people of Mer's ownership [of land]]].	
48			This	is	a huge step in our history, the law [of native title].	
49			This law	states		
50	that		any Aboriginal or Torres Strait Islander	has	rights [to land [[to which they have maintained a continuous connection through both culture and tradition]]].	
51			Everyone	recognized	Mabo's struggles	suddenly
52	and			heralded	him / as a sort of hero.	
53			His family	had … made	a beautiful tombstone / for him	
54	and		he	was buried		in Townsville.
55		Three months later (at the end of the mourning period)	there	was	a huge gathering	
56	to			celebrate	Eddie Mabo's life.	
57			The songs and dancing	went on		all night.
58			His story	could have come		to a satisfactory, happy ending
59	but		it	was not to be.		
60		In the morning	Mabo's gravestone	was defaced		grossly.
61			It	was hacked at		
62	and		shocking words and symbols	were sprayed		on it.
63			It	made	me / sick to the stomach.	
64			Mabo	had done	his work,	
65			it	was	over.	
66			There	is	no thinkable excuse	for such an atrocity.
67			It	is	disgusting.	
68			I	cannot comprehend	it.	
69			What	would drive	some	to such a heartless act?
70			their pain	Wasn't	enough	already?

71			*The family*	*had… brought*	*Mabo's body*	*back to the island*
72	*wh…*	*…ere*	*he*	*was given*	*a traditional burial.*	
73			*He*	*was laid to rest*		*with it / at last / on his native land,*
74				*welcomed*	*home*	*at last / by the people [[he'd fought so hard [[to free]]]].*

Text 4.2   from *Ancient Greek Architecture* – Period study (Year 12)

	Txt Adj	Circumstance	Participant	Process	Participant	Circumstance / IP
1			*The civilisation [of the Greeks]*	*was influenced*	*by the many different peoples [[who migrated to Greece in around 500 BCE, // bringing with them their culture]].*	
2		*Amongst these people*		*were*	*the Minoans, the Cretans, and the Dorians.*	
3			*Greece*	*is*	*a land [[that has many islands, mountains and valleys]].*	
4			*The mild climates*	*lead to*	*an outdoor lifestyle,*	
5	*with*		*matters [of trade], leisure time, entertainment and discussion*	*being held*		*outside.*
6		*After around 500 BCE*	*we*	*begin to see*	*[[city states developing both on the mainland and on the islands]].*	
7			*These city states*	*were separated*	*by the geography [of the land],*	
8	*and*		*there*	*was*	*rivalry*	*between them. / often*
9			*The way [[the people of Greece governed themselves]]*	*was*	*an evolving progression*	
10	*To begin with*		*they*	*were governed*	*by an Oligarchy, a group of ruling people.*	
11		*After the Oligarchy*		*came*	*the time [of Tyrannical rule],*	
12	*wh…*	*…ere*	*the land*	*was*	*under the complete power [of one ruler].*	
13			*The next governing system*	*was*	*democracy*	*in around 500 BCE / in*

	Txt Adj	Circumstance	Participant	Process	Participant	Circumstance / IP
				[[to be taken up]]		*Athens.*
14		*At this time*	*Athens*	*was*	*the predominant state,*	
15				*ruling over*	*the rest of Greece and even beyond, to many of the islands.*	
16			*This time*	*is seen*	*by many / as the birth [of Free Thinking] [amongst the Greeks].*	
17			*It*	*was*	*the time [of the great Philosophers [such as Socrates and Pythagoras]].*	
18		*With this new intellectual thinking power,*	*there*	*began to be*	*a slight separation [of the people from their belief system].*	
19	*Though*		*there*	*was*	*a strong faith [in Gods and Goddesses],*	*still*
20			*the focus*	*was changing*		*toward the human being.*
21			*their Gods*	*took on*	*more human forms and qualities [such as lust, rage, vengefulness and jealousy].*	*Even*
22			*They*	*were*	*so distant and flawless.*	*no longer*
23			*They*	*worshipped*	*the Gods*	*still*
24	*but*					*on a different level.*

Text 4.3   from *World War I* – Historical account (Year 12)

	Txt Adj	Circumstance	Participant	Process	Participant	Circumstance / IP
1		*In the time [[leading up to WW1]],*	*many people*	*believed*		
2	*that*		*war*	*would never come.*		
3			*There*	*were*	*a few main reasons*	*for this.*
4			*One*	*was*	*[[that most of the rulers [of Europe] were related // and people didn't see [[cousins going to war]] as a likely possibility]].*	*simply*
5			*It*	*was not*	*the royal family*	
-	*that*			*ruled*	*the countries.*	*truly*

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6			*Another reason*	*was*	*[[that the war had been avoided by the diplomats for so long, [[it was seen as something [of the past, uncivilised and barbaric]]]].*	
7			*The third thing [[that prevented people from truly believing // the war would take place]]]]*	*was*	*the socialist movements.*	
8			*The socialists*	*were*	*the representatives [of the workers]*	
9	*and*			*questioned*		
10	*why*		*fellow 'brother' workers*	*should go*		*to war / with each other / no matter which country [[they came from]]*
11		*In 1913*	*socialist leaders [from many different countries]*	*met*		*under a Frenchman [[named Jaures]] /for a conference / in Paris.*
12			*They*	*declared*		
13	*that <<>>*		*they*	*would carry out*	*a general workers' strike.*	
14	*<<if*		*war*	*were announced >>*		
15	*When*		*Jaures*	*strove to put …into practice*	*this*	*on the brink of the war,*
16			*he*	*was assassinated*		
17	*and*		*the social democrats*	*became*	*patriots rather than internationalists.*	
18	*When*		*international relations*	*fell apart,*		*largely due to Wilhelm II, / really*
19			*the Germans*	*created*	*the Schlieffen Plan,*	
20				*seeing*	*[[war as (being) inevitable]].*	
21		*In the event of war*	*Germany*	*would be faced with*	*a two-front war: Russia and France.*	
22			*The Schlieffen Plan*	*relied on*	*[[Russia, << being such a large and newly industrialised country,>>>>, taking a longer time to prepare armies]].*	
23			*The Germans*	*planned to defeat*	*France*	
24	*by*			*taking*	*Belgium*	
25	*and then*				*Paris,*	

26				*finishing*	*the operations*	*in time [[to face Russia]].*
27			*It*	*was*		*this way* / only
-	*that*		*Germany*	*could defeat*	*both Russia and France*	
28	*as*		*they*	*were not*	*strong enough [[to take on both at once]].*	
29			*The majority [of the soldiers]*	*were sent*	*towards Belgium*	
30	*with*		*only a small number*	*left*		
31	*to*			*defend*	*Germany.*	
32		*At the last moment*	*Von Moitke, head [of the German army]*	*panicked*		
33	*and*			*brought*	*some of the troops*	*home*
34	*to*			*defend*		
35			*…France*	*should … attack,*		
36				*leaving*	*his attacking forces / weaker.*	
37			*Britain, << >>*	*told*	*them*	
38				*<<seeing*	*Germany's plans>>*	
39	*that << >>*		*the Britons*	*would come against*	*the Germans.*	
40	*<< if*		*they*	*tried to take*	*Belgium>>*	
41			*So many alliances*	*had been formed*		*across Europe*
42				*to prevent*	*war,*	
43	*but*	*in the end*	*it*	*was*	*these alliances*	
-	*that*			*drew*	*everyone*	*into the tragedy*
44			*Europe's summer [of 1914]*	*was*	*beautiful*	
45	*and*		*the horrors [of war]*	*seemed*	*distant.*	
46	*However,*		*news*	*came*		
-	*that*		*Russia*	*was mobilizing.*		
47	*With*		*war*	*seeming*	*inevitable*	
48			*a mass hysteria*	*swept*		*over most of the continent*
49	*and*	*soon*	*everyone*	*was gathering*		
50	*and*			*preparing*	*their troops.*	

Text 4.4   from *World War II* – Historical account (Year 12)

	Txt Adj	Circumstance	Participant	Process	Participant	Circumstance / IP
1	*… then*		*Germany*	*sent*	*planes*	
2	*to*			*bomb*	*Britain*	
3	*and*	*so*		*ensued*	*the Battle of Britain.*	
4		*After a few months, and many deaths,*	*the British*	*defeated*	*the German air force*	
5	*and*		*Hitler*	*was forced to call off*	*the raids.*	
6			*Hitler*	*would not give in*		*so easily*
7	*and*			*made*	*further attempt [[to take Britain]].*	*by sea*
8	*…too*	*In this*	*the British*	*were*	*victorious.*	*eventually*
9	*…then*		*Hitler*	*turned*	*his gaze*	*toward Russia*
10	*and*	*in 1941*		*began*	*the Operation Barbarossa.*	
11			*The German soldiers*	*poured*		*through the Soviet Union.*
12			*Any attempt [[to resist the attackers]]*	*was*	*suicide / for the Red Army*	
13	*and*		*the Germans*	*gained*	*huge amounts of territory*	*in a short amount of time.*
14			*The internal unrest [of Russia]*	*made*	*this / all the more easy / for the Germans.*	
15			*Six million people*	*had starved*		*to death / in the Soviet Union / due to the war [between the farmers and the government],*
16				*instigated*	*by Stalin*	
17	*Consequently*		*many people [of the Soviet Union]*	*wanted to see*	*the end [of Stalin]*	
18	*and*			*were*	*glad*	*for the German invasion.*
19	*However*		*the Germans*	*put… into effect,*	*their racial policies,*	
20		*first*		*slaughtering*	*the Jews*	
21	*and then*				*the Slavs*	
22	*and*		*it… [[ ]]*	*wasn't*	*long*	
-	*[[before*		*those [[who had welcomed Hitler]]*	*realized*	*[[he was far worse [than Stalin]]]]].*	

Textual Adj	Circumstance / IP	Participant	Process	Participant	Circumstance / IP
		The Russians	began resisting		more strongly,
			forming	partisans.	
		The outcomes [of many of the battles [[fought in Russia]]]	were determined	by the climate.	
		Large numbers of German soldiers	froze		to death, / simply
		machinery	wouldn't operate		
and		food supplies	were hard pressed to get		to their destination.
		The Russians	had	a Scorched Earth Policy	
wh…		…ich	meant	[[that <<whenever they were forced to retreat, >> they completely destroyed the landscape, //burning crops and homes]]	
so that <<>>		they	would be met with	nothing but a barren desert, nothing [[to survive on]].	
<< when		the Germans	arrived, >>		
		The general rule [of war]	was	[[that the civilians would not be killed unnecessarily]],	
however,		the Germans	were committing	terrible atrocities	
and		the Russians	were responding		
		fighting			from house to house.

(Row numbers: 23–36)

Text 4.5   *Traps of Neo-Darwinism* – Discussion (Year 12)

	Textual Adj	Circumstance / IP	Participant	Process	Participant	Circumstance / IP
1	As		life	evolves,		
2		so	…consciousness.	does		
3			Natural science	has taken	us	further from the spiritual understanding [of the world] / and more towards a much more mechanical understanding.

4			*This turn*	*was influenced*	*by Darwin's theories.*	*largely*
5			*People [[searching for answers]]*	*were*	*quick [[to take up his ideas // and hold them as truths]],*	
6				*allowing… to take the place of*	*them / mythology,*	
7				*becoming*	*a belief system / for society.*	*almost*
8			*We*	*can follow*	*the development [of Darwinism]*	*into the 20th Century*
9	*as*		*it,*	*incorporates*	*genetics, molecular biology*	*by stages,*
10	*and*			*becomes applied*		*as biotechnology and genetic engineering,*
11	*then finally*					*as an industry.*
12			*Singer and Monod*	*(?) studied*	*Darwin's work*	
13	*and*		*…both*	*were*	*well aware*	*of the traps [of Neo Darwinism].*
14			*They*	*saw*		
15	*and*			*chose to acknowledge*	*the potential [for the horrific consequences [[that might come with [[pursuing one's own curiosity]]]]].*	
16			*They*	*saw*	*[[that humanity's desire for knowledge might be their downfall]].*	
17			*Singer*	*opposed*	*the idea [[that human beings are superior to other species]]*	*strongly*
18	*and*			*said*		
19			*we*	*should refer to*	*ourselves / as homo sapiens.*	*simply*
20			*He*	*proposed*		
21	*that*		*we*	*should replace*	*the term human / with two others; the purely 'biological side', and the 'person'.*	
22			*He*	*said*		
23	*that*		*[[to put ourselves on a different level [to the animals]]]*	*is*	*speciesism,*	*not unlike racism.*
24			*Singer*	*says*		

25	*that if*		*the definition [of human]*	*is*	*'self-awareness, self-control, a sense [of the future], a sense [of the past], the capacity [[to relate to others]], concern [for others], communication, and curiosity',*	
26	*then*		*fetuses, newborn babies and handicapped people*	*cannot be included.*		
27	*… then,*		*He*	*asks*		
28		*why*	*it…[[…]]*	*is*	*any worse… [[than* (to take) *the life of a chicken, cow or pig]].*	
-	*[[*			*to take*	*the life [of any of the above]]]*	
29	*…then*		*This*	*brings up*	*the question,*	
30		*when*	*…one*	*does …become*	*a 'person'?*	
31			*Who*	*has*	*the right [[to live]]?*	
32			*Who*	*has*	*the right [[to kill]]?*	
33		*Right throughout last century*	*there*	*has been*	*the hierarchy [of species /and of races].*	
34			*It*	*was*	*something [[that was sustained // and even encouraged, (National Socialism)]].*	
35			*It all*	*seems to run*	*parallel [to the hierarchy of evolution],*	
36	*and*		*it…[[…]]*	*is*	*interesting*	
-	*[[*			*to think*		
-			*what*	*might …have had to say*	*Darwin*	*about that.]]*
37			*Singer*	*looked at*	*the ideas [of hierarchy, purity [of race], and competition],*	
38	*and*			*asked,*		
39			*'What*	*does this mean*		*for the way [[that I behave]]?'*
40			*He*	*looked at*	*the way [[Darwinism had been taken on so much as a fact [of life] (even if subconsciously)]]*	

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41	and			wanted to know		
42			what	meant	that	for the direction [of human life].
43	If		everyone	is taught to believe in		
44	and			expect	competition,	
45		how	...that	does ...affect	the way [[society behaves]]?	
46			We	have looked at	the role [of Darwinism [in many discoveries [[that have happened over the years]]]],	in terms of genes.
47			We	saw	it	in the artificial or selective breeding,
48	but	today	that	has been taken		another step further / with the interbreeding [of different plant or animal species].
49			...breeding within species	Is	the same [as genetically engineering across species]?	
50			Those [[who support genetic engineering]]	argue		
51	that		this practice	is	no more harmful [than selective breeding].	
52			I	don't see	it	that way.
53		To me	the idea [of cloning]	doesn't sit		comfortably.
54			I	think		
55	that		that view [of things]	leaves	little or no room [for the spiritual world],	
56	wh...		...ich << >>	should not be discounted.		
57	<<		I	believe>>		
58	Even		Darwin, << >>	believed		*still*
59			there	was	more... [than *just* the scientific facts].	to life
60	<< who			can be said to have introduced	this material and mechanical view [of life],>>	
61			I	think		
62	that		there	are	times [[when questions, <<however intriguing>>, must	

					be left unanswered]].	
63			I	think		
64		perhaps	humanity	needs to reflect on	the days [of myths],	a little
65	when		mysteries	were allowed to be held as	sacred.	
66	Sometimes		knowledge	is not	a blessing,	
67	but rather				a heavy, heavy burden.	

Text 4.6   from *Life on Earth* – Causal explanation (Year 12)

	Textual Adj	Circumstance	Participant	Process	Participant	Circumstance / IP
1			Bacteria	are believed to have been	the first life forms	on earth,
2				coming from	a chemical reaction	possibly
3			They	were	single cell bacteria [with no internal differentiation],	
4				having	only a membrane and DNA.	
5	As		the earth	cooled		
6			these bacteria	migrated		more towards the surface of the ocean
7	wh…	…ere	they	were able to receive	rays [from the sun].	
8		Prior to this time	the energy [of everything on the earth]	came from	its internal heat and movement.	
9			These cyanobacteria	were obtaining	energy	now / from photosynthesis.
10			The bacteria	took in	carbon dioxide, water and sunlight	
11	and			produced	oxygen.	
12			Evidence	can be found		for this / in the banded iron formations [at the bottom of the sea].

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13			These formations	were caused	by the increase [of iron]	
14	due to		the oxygen	being produced.		
15		During the Protozoic Era	the iron	precipitated		out of the sea
16				forming	layers	
17	in wh…	…ich	fossils	can be found.		now
18			The bacteria	caused	a gradual build-up [of oxygen]	in the atmosphere,
19				allowing for… to evolve	more complete forms [of life]	about 1.5 billion years ago.
20			The Eukaryotic bacteria	had	internal differentiation,	with organelles.
21			These bacteria	were	more efficient [at photosynthesising],	
22	wh…		…ich	increased	the amount [of oxygen]	significantly / in the atmosphere.
23		About 2.5 billion years ago	a new continental crust	was being formed,		
24	and	by the early Protozoic Era	roughly 90% of the continental crust	was formed.		
25		At this stage	the plates	were colliding		
26	and			bonding		together,
27				creating	plates so big [[that at their centre they were geologically stable]].	
28			This stability [of earth]	would allow… to survive	life	on land.

Text 4.7   from *Different Forms of Rocks* – Classifying report (Year 12)

	Textual Adj	Circumstance	Participant	Process	Participant	Circumstance / IP
1			The different rocks [[we can observe]]	are formed		under different conditions.
2			The basalts [of the Earth]	come from	volcanic explosions	
3	while		the granites	are formed		under the crust
4	and			are exposed		due to erosion.
5			Each of these	cools		at a different rate.

#						
6			Rocks [[that cool beneath the crust of the Earth]]	are known as	intrusive igneous rocks	
7	as		they	intrude		into the rocks of the crust [[that are already there]],
8				known as	country rocks	
9			Magma, liquid rock,	is formed		
10	when		the Earth's mantle	begins to melt.		
11			This melting	occurs		under certain conditions. / only
12			One such condition	is	decompression melting.	
13			Decompression melting	happens		
14	when		the pressure [[on the mantle rock]]	decreases		considerably.
15			This form of melting	is	[[what takes places at mid-ocean ridges, rift valleys and hot spots]].	
16			Heat transfer melting	is	another condition [[that causes the mantle to melt]].	
17			This type of melting	is caused by	[[hot rock intruding into the cooler country rock]].	
18			The heat [from the magma]	is transferred		to the country rock.
19			The addition [of volatile]	is	a third process [[that can cause the mantle to melt]].	
20	If		volatiles, such as water,	are taken		below the surface of the Earth,
21			the temperature [of the mantle]	is lowered,		
22				allowing… to become	it / magma.	
23			All magmas	are composed		slightly differently,
24	and		they	are classified		
25				based on	their silica content.	
26			Magma [with more than 70% silica]	is known as	silica rock,	
27		with more than 55% silica	it	is known as	intermediate	
28	and	with less than 50%	it	is known as	mafic rock,	

29	also				rich [in iron and magnesium].	
30			The difference [in (magma) rocks]	can be due to	a number of reasons.	
31	For a start		the source rocks [of the magma]	could be composed of	different minerals, or different amounts of those minerals.	
32	But		not all magma [from the same source rock]	is	the same	either.
33			The variations	will occur		
34				depending on	[[how quickly the rock cooled, //and under which conditions it was formed, // for example amounts of pressure and heat]].	
35	…too.		Partial melting	can cause	differences	in the rocks
36	As		the magma	begins to cool		
37			it	could move		away from the source rock,
38				gathering	additional minerals.	
39	If		this	is	the case	
40			two rocks [from the same source rock]	might have	compositions of minerals [[that are not exactly the same]].	
41			Contamination [of the magma]	can also provide	an explanation [of the differences [in magma]].	
42			Parts of the country rocks	can fall		down into the melting magma,
43	and			change	its composition	slightly.
44	…too		Fractional crystallization	can be	a contributing factor.	
45			Not all the minerals [within the magma]	crystallise		at the same time.
46			The mafic minerals, with less than 50% silica,	solidify		at a higher temperature [[than those with more silica]].
47			(Silica	melts		at a lower temperature.)
48	As		the mantle	decompresses		
49	and			melts,		
50			the rock	expands		into the less dense liquid state,
51				becoming	more buoyant.	

52				Being	lighter	
53			the magma	rises		towards the crust [of the Earth],
54				releasing	gases.	
55	Just as		there	are	many forms of magma,	
56	… also		there	are	many forms of lava (the magma above the surface of the Earth).	
57			The lava	will act		in different ways
58				depending on	the viscosity.	

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Text 4.8 *Could human beings create the conditions for life, as we know it, on the moon? – Exposition (Year 12)*

	Textual Adj	Circumstance	Participant	Process	Participant	Circumstance / IP
1		With today's technology and the current knowledge,	it …[[…]]	is not	possible	
-	[[for		humans	to create	conditions [for life [on the moon]]]]	
2			It…[[…]]	is	a common belief [of scientists]	
-	[[that	without water,	life	cannot be sustained]].		
3			The moon	is thought to have	(water)	on it,
4	but				nothing [like Earth's oceans].	
5			The moon, <<>>	has gone		further… [than the Earth]. / in the process [of cooling]
6				<< being	smaller>>	
7			The moon	has passed		beyond the point [of colling] [[at which life first came into existence on Earth]].
8			Life	did not form		on the moon / at that point,

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9	and therefore		it…[[…]]	is	impossible	*practically*
-	[[for		life	to be able to survive		there / now
10	even if		human beings	put	it	there.]]
11			It…[[…]]	is thought		
-	[[that		the first life form [on Earth], bacteria,	was created	by a chance chemical reaction.	spontaneously]]
12			The conditions [of Earth]	happened to be	right	for the organism's survival
13			[[To work out [[how to create a chemical reaction [[that would produce a life form [[that could survive in the conditions of the moon]]]]]]]]	would be	very nearly impossible.	
14	If		a comet	crashed into	the moon	
15				leaving behind	great chunks of ice,	
16	and		those chunks of ice	melted,		
17			it…[[…]]	might… be	possible	then
-	[[for		life	to begin		
-	and	from there		create	oxygen and whatever [[it needed to survive]]]]	
18	but		it…[[…]]	would have to be	the forces [of the universe]	
-	(wh…		…ich)	(were)	at work,	
19			men	could not trigger	that.	
20			The moon	has	no atmosphere [[to shield it against some of the sun's rays, //or to keep in some of the heat at night]].	
21	Therefore		the moon's temperature [during the night]	is	-233 Celsius,	
22	and				123 Celsius	during the day.
23			The polarities [of the climate]	are	too extreme [[for any life form [[we know of]]] to adjust to // and survive]].	
24	For		humans	to be able to make	the conditions [on the moon] / right [[for supporting life]],	

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25			they	would have to figure out	a way [[of making the moon create its own protective atmosphere]]	
26	and	with today's knowledge and technology	that	is not	possible.	
27			The process [of [[life beginning on Earth]]]	took	billions of years.	
28			It	was	the creation [of one thing]	*really*
-	th… then		…at	led to	the creation [of another]	
-	th…		…at	allowed for	the continual survival [of the first].	
29			It…[[…]]	took	even longer	
-	[[for		the Earth	to evolve		enough [[to support the complex life forms [[that it does today]]]]]].
30			It…[[…]] …	is	questionable	
-	[[whether		the moon	will survive		long enough [[to let that evolution take place]]]].
31	By			looking at	the points [above],	
32			it…[[…]]	can be seen		
-	[[that		human beings	cannot begin	the process [of life [on the moon]].	alone]]
33			It…[[…]]	would take	far more [than the power [of humans] and human resources]	
-	[[			to set… in motion.	that]]	
34			The conditions	have to be	perfectly right	
35	for		life	to survive.		
36	Even if		humans	took	the first bacteria [[believed to have lived on Earth]],	
37	and			put	it	on the moon,
38			the moon	would have to have	water and an atmosphere	
39	to			sustain	it.	
40	If		humans	were to put	those simple life forms	on another planet,

41	and			begin	the process [of evolution],	
42			it	would have to be	a planet [[that already had the same conditions [[that Earth had had at the moment [of the chemical reaction [[that created the first organisms]]]]]]].	
43			Humans	do not have	the power [[to control planet movement, / nor to redirect ice bearing comets]].	
44			We	have	a certain amount of control	within our own little worlds
45	but	over the great universe,	we	have	none.	*really*

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