

Reading and Writing Informational Texts While Exploring Soil:
A Curriculum Unit

By

Katie Harding

A project submitted to the Graduate Program in Faculty of Education
in conformity with the requirements for the
Degree of Master of Education

Queen's University
Kingston, Ontario, Canada

October, 2012

Copyright © Katie Harding, 2012

Abstract

Many students struggle with comprehending informational texts (Duke, 2004; Hall, Sabey, & McClellan, 2005; Stafford et al., 2005; Marinak & Gambrell, 2008; Read et al., 2008; Duke, 2010). Informational texts are particularly difficult to comprehend because they contain complex ideas and information that not only is usually unfamiliar to the reader (Williams et al., 2009), but is organized into different text structures such as description, sequence, compare and contrast, problem and solution, and cause and effect. Adding to the difficulty, the information in many informational books is often organized using a combination of these text structures (Stafford et al., 2005).

This project addresses the difficulties associated with reading and writing informational texts. Also, it includes a curriculum unit demonstrating how such texts can be integrated into a grade 3 science unit on soil. It is written for elementary teachers who want to learn how to better prepare their students for the many nonfiction texts they will encounter throughout their educational career and entire life. It is especially intended for teachers who tend to focus on teaching with narrative texts because that is what they are comfortable with. The research and lessons that comprise this project are meant to support teachers so that they might have a better understanding of how to teach their students to read and write informational texts and the importance of doing so.

Acknowledgements

I am passionate about teaching and always have been. My teaching career started as a young child when I would beg my siblings to play school with me. Growing up, I always knew that someday I was going to be a teacher. Upon graduating with my Bachelor of Education degree, I was quick to receive long term teaching positions which evolved into a permanent contract in New Brunswick. As an educator, I believe that learning is a life-long endeavor and I have always known that in order to be a successful teacher I must be committed to life-long learning. A couple of years ago, my passion for teaching was still immense, but I felt like I was ready for something more. That is when I decided to go back to school.

Never having lived outside of New Brunswick, I began to look at schools outside of my home province. I had a sister and extended family living close to Kingston which led me to consider Queen's University. After much research and hearing only positive comments about the school, I made my decision to apply. The day I received my acceptance letter I was consumed with excitement and could not wait for my new educational adventure to begin.

As my education at Queen's comes to a close, every day I am pleased when I think about how much I have learned by completing this degree. My confidence as a person and an educator has grown. It has been an amazing experience that would never have been possible without many important people.

I would like to thank all of my professors, but I would like to extend a most sincere thank-you to Elizabeth Lee. I had the pleasure of working closely with her during my time at Queen's and I will never be able to express my gratitude for everything she has taught me over the past couple of years. She challenged, supported and guided me throughout my entire Master's experience. It was not easy when I moved home and completed this project from a

distance, but Elizabeth was patient with me and truly understood how difficult it was to complete such a project while also teaching full time.

None of my successes would have been possible without my family and friends who have always encouraged me. They have genuinely shown an interest in this project and supported me throughout the entire process. Words cannot express what it feels like to know that you have a guaranteed support system ready to help with whatever the future holds.

Completing my Masters of Education at Queen's University is a highlight of my educational career.

Table of Contents

ABSTRACT	ii
ACKNOWLEDGEMENTS	iii
TABLE OF CONTENTS	v
CHAPTER 1	1
INTRODUCTION	1
Project Overview	2
Purpose	3
Rationale	3
The Scarcity of Informational Texts in Elementary School	3
The Problem With Regard to Reading	4
The Problem With Regard to Writing	5
The Connection to Science Education	6
Science Literacy for All Students	7
Definitions	7
CHAPTER 2	9
LITERATURE REVIEW	9
Science Cannot Be Separated From Reading and Writing	9
Reading in Science	9
Writing in Science	10
The Difficulties Associated with Reading Informational Texts	11
Background Knowledge	11
Content	11
Vocabulary	11
Lack of Exposure	12
Lack of Instructional Time	13
Implications for Practice – Reading	13
Read Aloud Informational Texts	14
Explicitly Teach Comprehension Strategies	14
Use Think-Alouds	15
Teach Text Features	15
Teach Text Structures	16
Small Group Text Structure Instruction	16
Whole Class Text Structure Instruction	17

Teach Signal Words	18
Use Visual Representations	19
Use Nonfiction Texts to Motivate Students to Read	19
Use Real-World Texts for Real-World Reasons	20
Implications for Practice – Writing	20
Using Concept Maps to Scaffold the Writing Process	21
Teach Students How to Write Different Structured Texts	22
CHAPTER 3	24
CURRICULUM DESIGN	24
Backward Design	24
Gradual Release of Responsibility	26
CHAPTER 4	28
CURRICULUM UNIT RATIONALE	28
CHAPTER 5	31
CONCLUSION	31
REFERENCES	32
APPENDIX	37
CURRICULUM UNIT	37

Chapter 1: Introduction

Think about the texts you have read or written in the past week. Were they fiction or nonfiction? It is likely that most adults being asked this question would answer nonfiction. In the past week, I have read empirical research papers, nonfiction books about teaching, maps, recipes, and the newspaper. As for writing, in the past week, I have filled out loan documents, written a report about the action research project I was involved in last year, and currently I am in the process of designing this curriculum unit. Though I thoroughly enjoy reading fictional books for pleasure, I rarely have the time to do so. According to Duke (2004) my experiences over the past week with regard to reading and writing tend to be the norm:

We are surrounded by text whose primary purpose is to convey information about the natural or social world. Success in schooling, the workplace, and society depends on our ability to comprehend this material. Yet many children and adults struggle to comprehend informational text. We should not wait to address this problem until students reach late elementary, middle, and high school, when learning from text is a corner-stone of the curriculum. (p. 40)

My inspiration for completing this project stems from the issue mentioned in the above quote: “Many children and adults struggle to comprehend informational text (Duke, 2004, p. 40).” This statement caused me to reflect on my personal experiences as a student.

When I think about my own schooling, I wish I had been taught how to read expository text structures because it is definitely an area I am lacking in. It was not until this year at graduate school that I realized I am one of those adults who struggles to comprehend informational text. Reading and interpreting empirical research articles has been a challenge for me. I feel I have had to teach myself how to go about reading such articles. For the majority of the year I was overwhelmed when professors assigned these readings and expected me to participate in conversations about the articles with my peers. With practice I feel as though I am

improving, but my lack of ease in this area led me to think about similar occasions that proved to be a challenge, such as reading a map, following assembly directions, and filling out mortgage application forms. I notice myself continuously re-reading and relying on the help of others when doing such activities much more so than when I read a narrative text. Therefore, I can relate to the difficulties associated with reading and writing informational text. For this reason, it is important to me to learn more about how I can help my students better comprehend the informational texts that they will frequently encounter throughout their educational career. In order to do so it is necessary for my students to be exposed to and have access to informational texts. I was in disbelief when I read the evidence regarding the scarcity of informational texts being used in the classroom.

Project Overview

This project consists of five chapters: Introduction, Literature Review, Curriculum Design, Curriculum Unit Rationale and Conclusion. The curriculum unit is attached as an appendix after the Reference section. Throughout the remainder of the Introduction, the purpose and rationale for completing this project will be explained. Also, the problems with regard to reading and writing expository texts will briefly be discussed, as well as the connection made between these topics and science education. This chapter ends with a list of definitions that are pertinent to the issues discussed in this paper.

Chapter 2 describes the main ideas from the literature I reviewed before creating the curriculum unit. First, the literature supporting a reading and writing connection with science will be reviewed. Second, the difficulties associated with reading expository text are described. This chapter ends with the implications for teaching students how to read and write informational texts based on the literature.

Before I could begin to design a curriculum unit, I had to research the literature associated with curriculum design. The third chapter explains how I used the Backward Design approach to design the curriculum unit itself. Also, it explains how I used the Gradual Release of Responsibility instructional model to create each individual lesson.

Chapter 4 contains the rationale for each lesson that is included in the curriculum unit.

Chapter 5 is the conclusion. It is followed by the Reference section with the curriculum unit attached as an appendix.

Purpose

My purpose for completing this project was to learn more about what contributes to making reading informational texts difficult: particularly in science. In addition, I hoped to improve my instructional practices with regard to teaching my students to read and write informational texts. I chose to design a science curriculum unit because it is a content-area subject that requires students to read and write expository texts and because it is a subject that I feel less competent teaching. Therefore, I felt I could benefit from researching this topic with regard to science in hopes that I may become a more effective and confident science and language teacher.

Rationale

The Scarcity of Informational Texts in Elementary Schools

In 2000, Duke published a study that was based on her observations of 20 first-grade classrooms in the Boston area. The purpose of her research was to determine how often students are exposed to informational texts at school. She visited each classroom on four different occasions for the entire school day. During each visit, she took note of the displayed print

around the classroom and how much of it was informational text. She examined the books available in the classroom library. In addition, she paid attention to the types of written language activities that students were involved in. Another purpose of the study was to compare high-socio economic status classrooms with low-socio economic status classrooms.

Overall, Duke found that informational texts and activities were scarce in the observed classrooms, but even more so in the low-SES classrooms. There were few informational texts on classroom walls and in classroom libraries. High-SES classroom libraries had a mean of 12.7% for informational books, whereas the low-SES libraries had a mean of 6.9% for informational books. An average of only 3.6 minutes per day was spent with informational texts during written language activities in high-SES classrooms compared to an average of 1.9 minutes in low-SES classrooms.

These results astounded me, but I was able to relate to them once I thought about my own teaching practices. As I mentioned previously, I feel more comfortable reading narrative texts, therefore, I tend to rely on such genres when I teach. I am one of those teachers who overemphasizes narrative texts for instructional purposes – a situation that is unfair to my students. Elementary students need to be exposed to informational texts and taught how to read and write such texts in order for them to be more well-rounded readers and writers. I have chosen this topic for this project because it affects me personally. I want to improve my reading and writing instruction in order to prepare my young students for the educational journey that extends well beyond elementary school.

The Problem With Regard to Reading

Many students struggle with comprehending informational texts (Duke, 2004; Hall, Sabey, & McClellan, 2005; Stafford et al., 2005; Marinak & Gambrell, 2008; Read et al., 2008;

Duke, 2010). Informational texts are particularly difficult to comprehend because they contain complex ideas and information that not only is usually unfamiliar to the reader (Williams et al., 2009), but is organized into different text structures such as description, sequence, compare and contrast, problem and solution, and cause and effect. Adding to the difficulty, the information in many informational books is often organized using a combination of these text structures (Stafford et al., 2005).

The difficulties that students have with comprehending informational texts is a problem that educators need to take seriously. There is no single quick fix, but there are several factors that used in conjunction with one another will begin to address this problem for our students. Duke & Pearson (2008) identify important features of good reading instruction that students need:

(a) a great deal of time spent actually reading, (b) experience reading real texts for real reasons, (c) experience reading the range of text genres that we wish students to comprehend, (d) an environment rich in vocabulary and concept development through reading, experience, and, above all, discussion of words and their meanings, (e) substantial facility in the accurate and automatic decoding of words, (f) lots of time spent writing texts for others to comprehend, (g) an environment rich in high-quality talk about text. (p. 108)

The Problem With Regard to Writing

Writing is a cognitively demanding task that teachers expect of their students (Harris et al., 2008). It involves much more than thinking of ideas and putting them on paper. As I tell my students, a writer needs to create a bold beginning that captures the readers' attention, a mighty middle with well developed ideas and an excellent ending that ties all of the ideas together and concludes the writing piece effectively. In addition, the writer must organize her writing into well-written paragraphs with a variety of sentence types while making creative word choices and paying attention to the mechanical aspects of writing. Also, she must choose the correct text

form that coincides with her purpose for writing. Due to these numerous cognitive demands, it is not surprising that some children struggle with writing.

Teaching writing is a passion of mine; however, it can be challenging at times. As an elementary teacher, my writing instruction is characterized by three fundamental underpinnings. Firstly, I am expected to teach my students about different genres of writing and their corresponding text structures. Secondly, students need to be taught how to apply the six traits of effective writing to their compositions regardless of the genre. The six traits include: content, organization, word choice, voice, sentence structure, and conventions. Thirdly, it is my responsibility to teach my students that writing is a process that involves planning, drafting, editing and revising, and publishing.

Developing good writing skills from an early age is important. Young children need to learn to write so that they will be more likely to succeed in school. They need to have a strong foundation on which they can continue to build their writing skills because they will need these skills beyond school in their areas of work and in life in general (Tracy et al., 2009).

The Connection to Science Education

After deciding that I wanted to design a curriculum unit with an emphasis on explicit instruction of reading and writing expository texts, I decided it made sense to integrate such instruction into a science unit. The reason being that “much of the teaching which takes place in science lessons is dependent on the use of language—talking, reading and writing (Rowell, 1997, p. 19).” Also, as I mentioned previously, it is a personal goal of mine to develop professionally as a science teacher.

Science Literacy for All Students

In recent years, in Canada, the United States, and other countries the research and professional development related to science education has focused on science literacy for all students (Norton-Meier et al., 2010). The research supports using in-depth science instruction to replace traditional reading/language arts instruction as long as the science instruction embeds reading comprehension and writing instruction (Romance & Vitale, 2011). Thus, it is possible and recommended that reading and writing be taught during content-area instruction.

Definitions

It is important for the reader to be familiar with the definitions of a few key words that are pertinent to the issues addressed in this paper.

Informational texts (used interchangeably with “expository texts”):

Informational texts differ from narrative texts in their tone, style, structure, features and authority....Informational texts, first and foremost, possess a level of authenticity and accuracy related to various topics. The author is an authority on the subject and seeks to convey information, often by speaking directly to the reader (Fisher & Frey, 2007, p. 9).

Different Types of Informational Text Structures (Akhondi et al., 2011):

- Cause/Effect
- Compare/Contrast
- Description
- Problem/Solution
- Sequence

Text Features:

“These are the structural items used by the author to organize the content. They serve as markers for the reader to better understand the text” (Fisher & Frey, 2007, p. 11). Examples of text features include: table of contents, subtitles, bold print, photographs, and glossaries.

Scientific Literacy:

An individual’s scientific knowledge, and use of that knowledge, to identify questions, acquire new knowledge, explain scientific phenomena and draw evidence based conclusions about science-related issues; their understanding of the characteristic features of science as a form of human knowledge and enquiry; their awareness of how science and technology shape our material, intellectual and cultural environments; and their willingness to engage in science-related issues, and with the ideas of science, as a reflective citizen (OECD, 2010, p. 137).

Content Area Reading:

Refers to teaching students reading strategies that will help them to better understand the texts they are expected to read in content area subjects such as math, science, and social studies (Ulusoy & Dedeoglu, 2011).

Chapter 2: Literature Review

Science Cannot Be Separated From Reading and Writing

It has been argued that reading and writing are inherent to science (Norris & Phillips, 2009; Rowell, 1997). Norris and Phillips (2009) contend that reading and writing are not just a part of science, but that you could not have science without reading and writing. They maintain that reading and writing are just as much a part of science as observation, measurement, and experiment. Based on this argument, Norris and Phillips (2009) advocate for scientific literacy.

Construing scientific literacy as we suggest would entail rather dramatic changes to school science and reading education. Instead of the current heavy focus on teaching reading in the context of narrative text, reading of the expository and argumentative genres more typical of science would become more frequent. Also, whereas the prevalent view presumes that learning to read ends sometime in early elementary school—to be replaced by reading to learn—teaching and learning to read scientific texts could conceivably continue into high school and beyond. There is an alternative—the lifelong learning view of reading – that makes better sense of people’s reading practices. (p. 282)

Reading in Science

Traditionally, science teachers were not concerned with teaching reading during science (Norris & Phillips, 2009), but they should be. There is research to support using science contexts to teach reading because it can lead to increased achievement in reading comprehension and science (Romance & Vitale, 2006).

Reading is not something simple that students master by the time they are in Grade 4 or 5. Also, because a student can decode most words does not mean that they ultimately can read any text at all. Furthermore, being able to read science texts is not as simple as decoding the words and understanding the point that is being made. It is about inferring information from what has been read (Norris & Phillips, 2009) and constructing meaning from the text (Yore, 2000). More specifically,

Science reading is an interactive-constructive process wherein the reader makes meaning by negotiating understanding among the science text and the reader's concurrent experiences and memories of the topic, science, science text conventions, and science reading procedures within a sociocultural context. (Yore, 2000, p.107)

For this reason, students need explicit reading instruction embedded into their science instruction (Yore, 2000).

Writing in Science

Just as students need to be able to read in order to learn science, they also need to be able to write-to-learn in science (Appleton, 2007). Writing-to-learn means writing expository text: a task which is cognitively more demanding than writing narrative text because students are required to transform their knowledge as opposed to telling their knowledge (Bereiter & Scardamalia, 1987).

Writing, especially expository writing, offers an opportunity for students to work actively and independently with their own knowledge. They can clarify meanings, find inconsistencies, discover implications, and establish connections between previously isolated fragments of knowledge. In order to do this, however, they need to function according to a knowledge-transforming rather than a knowledge-telling model. From what we know so far, it appears that for students to develop a knowledge-transforming model of composing is itself a major intellectual achievement. (Bereiter & Scardamalia, 1987, p. 362)

Patterson (2001) explains the difficulties associated with writing in science based on Vygotsky's research. Thought and speech are two separate entities. Students may have accurate thoughts about science concepts in their mind, but explaining their thoughts is not just as simple as saying what they are thinking. In addition to thought and speech being two different units, when students are expected to share their thoughts through writing they also have to rely on their knowledge of writing conventions such as spelling, punctuation, and grammar. Patterson (2001) reiterates Bereiter & Scardamalia's (1987) argument that writing-to-learn is a very cognitively-demanding task. She researched how teachers can help their students to express their ideas more

clearly in their science writing by using concept maps, because she recognized how crucial it is to science teaching and learning that students are able to express their understandings.

The Difficulties Associated With Reading Expository Texts

As mentioned in the previous chapter, many students struggle with comprehending informational texts (Duke, 2004; Hall et al., 2005; Stafford et al., 2005; Marinak & Gambrell, 2008; Read et al., 2008; Duke, 2010). Lack of background knowledge, unfamiliar content and difficult vocabulary could all contribute to the reasons for such struggles to occur. Also, it is possible that students struggle to comprehend expository texts due to a lack of exposure to and instructional time given to such texts.

Background Knowledge

For students to comprehend expository texts, they need to have background knowledge to rely upon in order for new learning to take place (Ermis, 2008). Their background knowledge needs to be activated in order for them to make connections between the old information and the new information they learn as they read.

Content

The content in expository texts is factual and meant to teach the reader new information, whereas the content in a narrative is simply a story that is meant to entertain the reader (Jitendra et al., 2011). Thus, it is understandable that the sometimes unfamiliar and factual content that consumes an expository text will pose a challenge for young readers.

Vocabulary

“Expository materials, even those written for young children, often contain a high density of specialized vocabulary, making them difficult for readers to grasp” (Ermis, 2008, p. 89).

Reading in the content areas is not like reading a narrative in which you might not know all of the vocabulary, but can easily infer its meaning. Vocabulary in the content areas, such as science, often includes low-frequency words that students have little experience with and consequently struggle with (Hedrick et al., 2005).

Romance & Vitale (2011) argue that students are not being given enough opportunities to engage in content based science reading and as a result students are continuously being exposed to everyday language and are not often enough exposed to the discourse of science.

Students require explicit vocabulary instruction in the content areas. This explicit instruction should be characterized by integration, repetition, and meaningful use (Hedrick et al., 2005). Integration is based on schema theory and basically means that teachers should explain how new words are related to words that students already have a schema for. Students also need repeated practice using new vocabulary words effectively and in a meaningful way.

It has also been stated that vocabulary and reading comprehension are linked. The strategies that students are taught to figure out unfamiliar words are needed for comprehension to occur. Therefore, vocabulary instruction is a very important component of reading comprehension instruction (Duke & Pearson, 2002).

Lack of Exposure

Duke (2000) suggests that informational texts are difficult for students to read because of a lack of exposure to them, especially in the primary grades. Based on the results of her study, Duke (2000) concluded that most early childhood educators overemphasize narrative texts in the classroom.

Researchers also attribute the lack of exposure to the belief that informational texts are more difficult because there is not a predictable sequence of events like there is in narrative texts.

Instead, informational texts are organized into different types of text structures and usually include unfamiliar content (Williams et al., 2009).

Another possible explanation for the lack of exposure to informational texts could be that teachers do not know very much about expository instruction (Hall et al., 2005). Many educators assume that reading is reading. In other words, educators assume that if they teach students how to read using narrative texts it will transfer to them being able to read informational texts (Hall-Kenyon & Black, 2010). However, this is not the case. When reading informational texts, “children must learn where and how to find meaning, along with how to make it useful” (Hall-Kenyon & Black, 2010, p. 339).

Lack of Instructional Time

If teachers are not exposing their students to informational texts then obviously they are not using such texts during instructional time. If this is the case, it is no wonder that students struggle with reading informational texts.

When informational texts are being used during instructional time it is most likely during content based instruction such as science and social studies. In these classes, the focus is on the content being addressed as opposed to focusing on teaching students how to read and comprehend informational texts (Hall-Kenyon & Black, 2010). This is problematic because students need direct instruction, integrated with all subject areas, about informational text structures in order to be able to comprehend them (Pressley, 2002).

Implications For Practice–Reading

Duke & Pearson (2008) recommend that teachers take a balanced approach to teaching comprehension. Teachers need to strike a balance, time-wise, between explicitly teaching students comprehension strategies and providing students with opportunities to actually read,

write and discuss informational texts. In addition to a balanced approach, Duke & Pearson (2008) advocate for using an instructional model referred to as the gradual release of responsibility. Basically, teachers who use this model begin with direct instruction and modeling. They involve students in their modeling and guide students until eventually they can do the assigned task independently.

More instructional time should be spent using informational texts. You will often read literature that suggests that children learn to read in the primary grades and they read to learn in the upper elementary grades and beyond. However, more currently, researchers are making the claim that children are learning to read and reading to learn across all grade levels (Hall et al., 2005; Marinak & Gambrell, 2008; Williams et al., 2009). There is evidence to suggest that primary grade students can learn from reading informational texts; consequently, we should give them opportunities to do so (Hall et al., 2005; Williams et al., 2009).

In the paragraphs that follow, effective teaching practices for developing students' reading and comprehension skills of expository texts will be described.

Read Aloud Informational Texts

Teachers can embed vocabulary and comprehension instruction into activities such as reading aloud informational texts (Duke, 2010). Vocabulary instruction is an important component when teaching students how to comprehend informational texts.

A great deal of research suggests that vocabulary and comprehension are inextricably linked. Thus, strategies related to ascertaining the meaning of unknown words, as well as general vocabulary building, are also essential to a strong program in comprehension instruction. (Duke & Pearson, 2008, p. 114)

Explicitly Teach Comprehension Strategies

Teachers can improve their students' comprehension by explicitly teaching comprehension strategies. Students' comprehension can be enhanced if they make predictions as

they read and verify the accuracy of their predictions based on what they actually read. Also, making predictions requires students to apply other strategies such as activating their prior knowledge, previewing and overviewing (Duke & Pearson, 2008).

Another way of improving students' comprehension is to teach them how to summarize what they read. Summarizing is a difficult task to do well, but with much modeling and guided practice, students can become better at it over time (Duke & Pearson, 2008).

Also, it is beneficial for students to learn how to generate their own questions about the text they are reading. This comprehension strategy is referred to as questioning (Duke & Pearson, 2008).

Use Think-Alouds

As a means to teach reading comprehension strategies explicitly, a teacher could engage in a think-aloud. Thinking aloud means vocalizing what you are thinking as you read. Students benefit from watching their teacher model thinking aloud as they read because they learn when and when not to apply particular comprehension strategies (Duke & Pearson, 2002; Duke & Pearson, 2008). Also, students' comprehension has been shown to improve when they engage in thinking aloud as they read (Duke & Pearson, 2002).

Teach Text Features

Informational texts often include several text features that are unique compared to narrative texts. The glossary, index, table of contents, subtitles and diagrams are all examples of text features. Students need to be taught about the purposes of these features and how to use them to aid their comprehension when reading informational texts (Marinak & Gambrell, 2008).

Kelley & Clausen-Grace (2010) recommend training students to take a "text feature walk" before reading an informational text.

In a text feature walk, students work in a small group, reading each feature in the order that it appears and discussing what they think they will be learning. As each feature is read, students must think about and discuss how the information relates to the main idea of the text. (Kelley & Clausen-Grace, 2010, p. 192)

Teach Text Structures

Researchers advocate that text structure instruction leads to increased comprehension of informational texts (Duke & Pearson, 2002; Hall et al., 2005; Marinak & Gambrell, 2008; Williams et al., 2009). Also, understanding the structure typically leads to an increased recall of the important ideas (Duke & Pearson, 2008). “Because the structure of expository prose varies greatly from that of narrative prose, students need explicit training in strategies that teach them to identify different types of text structure and apply appropriate structure-specific strategies” (Bakken & Whedon, 2002, p. 230). Such instruction has been demonstrated to be successful as a whole class approach and in small groups.

Small Group Text Structure Instruction

Hall, Sabey, & McClellan (2005) evaluated the effectiveness of teaching reading comprehension during small group guided reading sessions. They focused on teaching the compare/contrast text structure.

The participants involved in this study were from an elementary school in the United States. Five second-grade classrooms participated which accounted for a total of 20 guided reading groups. The teachers were randomly assigned to one of three experimental conditions: text structure, content, or no-instruction.

The teachers assigned to the no-instruction group carried out their guided reading lessons as they usually would with whatever texts they wished. The teachers involved in the text structure and content instruction groups followed similar lessons designed by the researchers using informational books and structured compare/contrast paragraphs written by the authors.

The major difference between the two groups was that the text structure instruction focused on teaching about text structure as a means of comprehension, whereas the content instruction focused on the content (animal classification). Each lesson began with the teacher introducing the text to the students. Then the students read the text. During the last part of the lesson they discussed and revisited the text. The results of this study indicated that text structure instruction is an effective comprehension strategy for assisting second-grade students with comprehending informational texts.

Whole Class Text Structure Instruction

According to a study published in 2009, it is possible to embed reading comprehension training in content-area instruction without taking away from the content to be learned (Williams et al.). The purpose of this particular study was to evaluate the effectiveness of teaching reading comprehension during second-grade science classes. The reading comprehension strategy that they focused on was teaching about text structure, specifically the compare/contrast structure.

Fifteen female teachers from four elementary schools in a large metropolitan area were randomly assigned to one of three experimental conditions: the text structure program, a content program, or a no-instruction control program. Previous to the study, there was not a substantial amount of time devoted to science instruction in each school and there was not a core curriculum for teachers to follow. The teachers taught their assigned program to all 341 of their second-grade students, but only 215 returned the signed permission documents to participate in the study.

The teachers assigned to the no-instruction control program continued to teach science as they usually would have. Both the text structure and content programs consisted of 12 lessons that were taught in 22 sessions of 45 minutes each. The two programs were similar except that

students in the text structure program were taught about the compare/contrast structure. The text structure instruction included the teaching of the signal words that are often used in compare/contrast texts, the teacher asking compare/contrast questions, and students using graphic organizers.

The results of this study indicated that reading comprehension can be improved with direct text structure instruction at the primary level. Even more importantly, the results imply that comprehension improvements can be made in conjunction with an increase in science content-knowledge. In other words, students will not miss out on learning science related content because their teacher is using their science time to teach reading comprehension skills. Therefore, based on this study, the evidence suggests that integrating reading comprehension into content-area subjects is beneficial for students.

Teach Signal Words

According to Marinak & Gambrell (2008) these are the 5 informational text structures that are most common in kindergarten through grade 8 books and text books: enumeration, time order, compare and contrast, cause and effect, question and answer. A set of signal words is associated with each of these structures. For example, the cause and effect text structure uses signal words such as, because of, as a result of, and consequently (Marinak & Gambrell, 2008). Marinak and Gambrell provide a useful table of the signal words associated with different text structures in their 2008 article. Students need to be taught about the structures as well as the signal words that are associated with each to aid their comprehension when reading and in order for them to be able to write an expository text following one of these structures (Marinak & Gambrell, 2008).

Use Visual Representations

Much of the research regarding how to teach students to read and write expository texts suggests using visual representations (Patterson, 2001; Duke & Pearson, 2002; Ermis, 2008; Marinak & Gambrell, 2008). Whether they are referred to as graphic organizers, concept maps, semantic webs, or flow chart they are all visual representations that help students to comprehend what they are reading. As Duke and Pearson (2002) point out, they are “re-presentations”—meaning that they re-present the same information, but in a visual way.

Ermis’ (2008) study focused on elementary students using graphic organizers to aid in their comprehension of informational texts. Therefore, the implications of her research pertain to reading. She concluded that when reading informational text, students gain more knowledge and vocabulary when the information they are reading about is organized into a graphic organizer because it “highlight(s) main ideas and represent(s) relationships among key concepts” (p. 90). Also, she suggested that concept maps and cyclical maps may be the most appropriate graphic organizers to use with elementary students.

Use Nonfiction Texts to Motivate Students to Read

Teachers should use informational texts more often to enhance their students’ motivation to read (Mohr, 2006).

The more students read independently, the better their reading becomes. When students read books of their own choosing, they are likely to be more motivated, independent readers. The ultimate goal is to encourage motivated, skilled readers who choose to read widely and who develop lifelong reading habits. (Mohr, 2006, p. 82)

Mohr (2006) investigated the reading preferences of 190 first graders by having them choose a book to keep from a collection of nine books, five fiction and four nonfiction. The majority of the first graders, 159 to be exact, chose a nonfiction book. Thus, Mohr concluded that many young children have a preference for reading nonfiction over fiction. Therefore, if

teachers use nonfiction texts for instructional purposes and provide opportunities for their students to read nonfiction then students might be more likely to be motivated to read which consequently would lead to improved reading skills.

Use Real-World Texts for Real-World Reasons

Students will be more motivated to read and write informational texts if they are given opportunities to do so for real-world reasons (Duke & Pearson, 2002). Duke (2010) argues that students' purposes for reading and writing informational texts need to be authentic. In other words, teachers need to use real-world texts for real-world reasons.

“Real-world” reading of informational text in schools must involve students reading because they actually want or need to know information. Outside of school, people write informational text because they want or need to communicate information to someone who does not have that information and wants or needs it; “real-world” writing in schools should replicate this situation. (Duke, 2010, p. 69)

Implications For Practice–Writing

Based on the recommendation of Yore (2000), writing-to-learn tasks in science should be developed by the following guiding principles:

- Keep science content central in the writing process;
- Help students structure and synthesize their knowledge;
- Provide a real audience for student writers that will value, question, and provide supportive criticism;
- Spend time prewriting, collecting information from various sources (concrete experiences, print materials, experts, electronic data banks, visuals, etc.), sharpening focus, and strategic planning;
- Provide ongoing teacher support, guidance, and explicit instruction;

- Encourage revisions and redrafts based on supportive criticism to address conceptual questions and clarify understandings; and,
- Clarify the differences between revising and editing (format, spelling, mechanics, grammar). (pp. 112-113)

In order for students' science writing to improve, teachers need to provide more structure for the writing tasks they assign (Patterson, 2001; Warwick et al., 2003; Appleton, 2007).

Patterson (2001) recommends using structured and unstructured concept maps to scaffold the writing process. Genre school proponents advocate that students need to be taught how to write different text structures since each structure has a specific purpose and audience (Rowell, 1997; Wray & Lewis, 1997).

Using Concept Maps to Scaffold the Writing Process

Concept maps can be used as an after reading activity or prewriting activity to enhance students' understanding of the topic being studied, as well as help them to synthesize new and old information as a means of transforming their knowledge about the topic (Yore, 2000). Using concept maps requires much demonstration in the beginning combined with lots of scaffolding, but Yore argues that it will be time well spent because of the value of these maps as learning tools for students.

In Patterson's 2001 study, concept maps were used prior to writing as an aid for students to record their ideas. The concept maps served as a planning tool before drafting. First, students were taught how to use an unstructured concept map in which they represented their ideas using key words and phrases which they arranged around the theme word. After they completed the

unstructured concept map, they were instructed to use the concept map to put their ideas into sentences.

Secondly, students were taught how to use a structured concept map to plan their writing. In addition to having the theme word in the center, a structured concept map also outlined specific concept areas that students should be thinking about. They wrote their ideas next to the correlating concept area.

Patterson (2001) concluded that the use of structured concept maps to support students' scientific writing was more likely to lead to 'knowledge transforming' as it was described by Bereiter and Scardamalia (1987); whereas, the unstructured maps did not always lead to students being able to explain, in their writing, the facts and descriptions that they included on their concept map, but the exercise did improve their science concept understanding.

Teach Students How to Write Different Structured Texts

Students need to be taught to establish a purpose for their writing and then choose an appropriate form based on their purpose (Hand et al., 1999). Therefore, the implications of this in practice is that students need to know how to write different structured texts so that depending on the purpose of their writing they will be able to select the appropriate text form. Wray and Lewis (1997) suggest using writing frames to scaffold students' nonfiction writing and they have developed writing frames for several different nonfiction genres of writing. Also, Warwick et al. (2003) recommend using writing frames to develop students' written expression of the inquiry activities they do.

Writing frames help students to learn the text form framework and the key words associated with that text form. As Wray and Lewis (1997) explain it, students can concentrate on what they want to say without having to remember the framework of the particular text form they

are writing. After using the writing frame a few times or more, depending on the learner, they should be better able to write that text form because they will be familiar with it.

Based on the reviewed literature, the curriculum unit that is the premise of this project is a way to integrate science, reading, and writing. It addresses some of the difficulties associated with reading and writing expository texts. It is meant to be a useful tool for any teacher who wants to include more expository texts in their daily teaching at the elementary level.

Chapter 3: Curriculum Design

Though I have been planning lessons and teaching for quite a few years now, I could not design a curriculum unit without reviewing the research on curriculum design. Beginning with the end in mind has always been a philosophy of mine when it came to creating long range plans and daily lesson plans. Within my lesson plans, I follow the gradual release of responsibility instructional model. Throughout the remainder of this chapter, I will explain, in more detail, how I used these planning and instructional models as I developed this curriculum unit.

Backward Design

I believe that my students need to know the learning targets at the beginning of each lesson that I teach so that they are not left guessing what it is that they are supposed to understand by the end of the lesson. Someone once gave me the analogy of learning targets being like the flags on a golf course. Without the flag, a golfer would not know where they need the ball to eventually land. Having the flag allows the golfer to know what they are aiming for: it is their target. Learning targets are similar and therefore, I always try to be explicit about explaining the learning target at the beginning of each lesson that I teach my students.

Just as I begin each lesson with the end in mind, I also do so when creating long-range plans and curriculum units such as this one. This is a best practice of mine that I have always had, but it was not until I began doing the research for this section of my project that I realized there was a name for such planning: “backward design” (Wiggins & McTighe, 1998). Like Wiggins and McTighe (1998) suggest, the backward design is really the most logical way to plan and makes the most sense, but they refer to it as backward in comparison to how many teachers have traditionally planned.

This curriculum unit was created using the backward design approach as described by Wiggins and McTighe in their book, *Understanding by Design* (1998). This design approach consists of three stages: identifying the desired results, creating assessments that will provide the evidence needed to determine whether or not students have met the desired results, and planning learning experiences and the instruction that will lead to students achieving the desired results.

This project began with me researching Scientific Literacy and how students learn to read and write expository texts. Before I could begin planning a curriculum unit, I needed to do research on why the unit I was about to design was important. I realized that I was asking myself not only what do my students need to know, but even more importantly why do they need to know it. That is what sparked the entire Literature Review section of this project. After doing much research with regard to my rationale, I began designing the actual unit by looking at the curriculum outcomes for grade 3 science and language arts. I determined the “big ideas” of what I wanted my students to understand by the end of this unit. The science content that students learn by completing this unit is coincidental. The primary purpose of this project is that students will learn more about reading and writing expository texts. Therefore, I began by creating the learning targets for each lesson based on what the research suggested for teaching students how to read and write informational texts.

Next, I created the assessments that I would use to measure students’ understanding at the end of each lesson. As I was doing so, I kept the following information in mind:

During the second stage of backward design, we consider the evidence needed to determine whether students have achieved the desired learning. To address the full range of identified learning goals, school teams need to analyze multiple sources of data, examining a “photo album” of assessment evidence instead of looking only at the snapshot provided by a single test. To assess student understanding of important ideas, we need to ask students to apply their learning to a new situation and explain their responses rather than just make selections from a list of given alternatives. (McTighe & Thomas, 2003, p. 52)

The two main ideas that resonated with me from reading this section of the McTighe and Thomas (2003) article were that I needed to use a variety of assessments and in addition, I needed to provide students with the opportunity to apply what they learned to new situations.

“Teaching is a means to an end. Having a clear goal helps us as educators to focus our planning and guide purposeful action toward the intended results” (Wiggins & McTighe, 1998, p. 7). This rang true as I planned the daily lesson plans that I will use to teach my students the “big ideas” that I decided were important at the beginning of all this planning. It was easy to create the daily lessons because I had a clear goal of what I wanted my students to achieve.

Gradual Release of Responsibility

Though I use the gradual release of responsibility model as a best practice, I have never before taken the time to read the theory behind it, until completing this project. In 1983, Pearson and Gallagher published a paper entitled *The Instruction of Reading Comprehension* in which they review the research and suggest that students should be taught reading comprehension strategies. Also, they suggest that teachers follow a model of explicit instruction which is most currently referred to as the gradual release of responsibility model. Pearson and Gallagher (1983) proclaim that in order for students to complete any academic task it requires the responsibility of the teacher and student, but to different degrees. They use a diagonal line to depict the gradual release of responsibility. The top-left of the diagonal represents total teacher responsibility. It is the responsibility of the teacher to provide instruction and model the strategy. The bottom-right of the diagonal represents total student responsibility to practice and apply what they have learned. Guided practice takes place in between these two extremes of

responsibility. The end goal of this instructional model is that every student will eventually assume full responsibility and be able to independently apply the strategy learned.

The lessons within this curriculum unit were designed using the gradual release of responsibility instructional model. Each lesson begins with the teacher having the most responsibility for teaching the intended learning goal. As each lesson progresses, the activities are scaffolded so that students become less dependent on the teacher. At this point the responsibility is shared between the teacher and student, but the scaffolding causes the responsibility to gradually be released solely to the student until eventually they are expected to independently show their understanding of the intended learning goal in some form of assessment.

In summary, the attached curriculum unit was created based on the reviewed literature regarding curriculum design. The entire unit was produced using “backward design” (Wiggins & McTighe, 1998) and each of the lessons follow a gradual release of responsibility model (Pearson & Gallagher, 1983).

Chapter 4: Curriculum Unit Rationale

This curriculum unit is comprised of four different types of lessons: an introductory lesson, inquiry lessons, reading lessons, and writing lessons. In the following paragraphs I will explain why I included the introductory and inquiry lessons, but they are not the emphasis of this particular project. The reading and writing lessons are the primary focus.

In order for students to be able to comprehend expository texts it is important for them to have prior knowledge and be able to activate it (Ermis, 2008). Therefore, I would suggest beginning this expository text unit by doing some sort of activity that will activate students' prior knowledge.

Yore (2000) states that: "we need to do first and read and write later. Science instruction needs to present science as inquiry, enhance students' concrete experience with science, and provide a more authentic view of science as an evaluative, connected, and dynamic enterprise" (p. 105). Therefore, the lessons in this unit are organized in such a way that students will engage in an inquiry activity about a science concept before reading and writing about that concept. Again, the emphases of this project are the reading and writing lessons, therefore, the inquiry lessons are not elaborated upon.

The first 3 reading lessons were created to teach students about nonfiction text features. In lesson one students will learn the purpose of an index and how to find specific information in a book by looking at the index. In lesson 2 students will learn that it is important to read the caption that is included with a photograph in nonfiction texts as it provides additional information to help them understand the topic about which they are reading. In lesson 3 students will learn that in well-written texts, an effective subtitle will indicate the most important information in the following paragraphs.

Reading lesson 4 and inquiry lesson 5 are intertwined. The inquiry activities include reading procedural texts in order to complete the activity. I have included this in the curriculum unit as a reading lesson because in doing the activity it is an opportunity to teach students about the organizational structure of a procedural text. As mentioned in the literature review, students need direct instruction on informational text structures in order to be able to comprehend them (Bakken & Whedon, 2002; Pressley, 2002; Hall et al., 2005; Duke & Pearson, 2008; Williams et al., 2009).

The first two writing lessons were designed to teach students how to reflect on their inquiry activities and explain how their knowledge was transformed because of these activities. These lessons are based on the research about the use of writing frames as a means to scaffold the writing process (Wray & Lewis, 1997). By using these frames, students can devote their attention to their writing without having to remember how to structure the text.

The third writing lesson was created so that students would learn how to create a concept map for the purposes of pre-writing. According to some research, concept maps scaffold the writing process and help students to recognize how their knowledge has transformed (Yore, 2000; Patterson, 2001) which is the ultimate goal when writing expository text but one of the major challenges faced by students in such tasks (Bereiter & Scardamalia, 1987).

The fourth writing lesson is intended to teach students how to write an exposition. In this lesson, students will use their concept map from the previous lesson to draft an informational text that will be meant to convince their reader that soil is much more than dirt. I feel this is an authentic purpose for writing for students of this age because they usually begin the unit thinking that soil is just dirt and they likely often hear adults complaining about dirt or asking them to stay

out of the dirt. This activity will give them the chance to argue the science content they learned while also having the opportunity to write informational text.

Chapter 5: Conclusion

In 2001, Calkins wrote: “the texts that I read most, the texts you read most, and the texts our children will read most are nonfiction texts” (p. 437). Therefore, the implications of this research on my practice are inevitable. “Incorporating informational text in the curriculum in the early years of school has the potential to increase student motivation, build important comprehension skills, and lay the groundwork for students to grow into confident, purposeful readers” (Duke, 2004, p. 43).

It is my goal to be more conscious of the material I post around the classroom, the books I include in my classroom library and the books I use during instructional activities. I will try to provide my students with more opportunities to interact with informational text—whether it is during guided reading, modeled writing, math or just simply an anchor chart on the wall. Also, I will explicitly teach my students how to read informational texts. Making students aware of the differences between informational text structures and narrative structures will also be a focus. I will be sure to provide my students with authentic purposes for reading informational text. I will attempt to create situations in which my students choose to read an informational text because they want to learn more about something, not because I want them to do so. In addition, I will try to give students more opportunities than I did in the past to write informational texts.

References

- Akhondi, M., Malayeri, F. A., & Samad, A. A. (2011). How to teach expository text structure to facilitate reading comprehension. *The Reading Teacher, 64*(5), 368(5)-373.
- Appleton, K. (2007). 'Elementary science teaching', in SK Abell & NG Lederman (eds), *Handbook of research on science education*, Lawrence Erlbaum, Mahway, pp. 493-535.
- Bakken, J. P., & Whedon, C. K. (2002). Teaching text structure to improve reading comprehension. *Intervention in School and Clinic, 37*(4), 229-233.
- Bereiter, C., & Scardamalia, M. (1987). *The psychology of written composition*. Hillsdale, N.J: L. Erlbaum Associates.
- Calkins, L. (2001). *The art of teaching reading*. New York: Longman.
- Duke, N. K. (2000). 3.6 minutes per day: The scarcity of informational texts in first grade. *Reading Research Quarterly, 35*(2), 202-24.
- Duke, N. K. (2004). The case for informational text. *Educational Leadership, 61*(6), 40-44.
- Duke, N. K. (2010). The real-world reading and writing U.S. children need. *Phi Delta Kappan, 91*(5), 68-71.
- Duke, N. K. & Pearson, P. D. (2002). Effective practices for developing reading comprehension. In A. E. Farstrup & S. J. Samuels (Eds.), *What research has to say about reading instruction* (3rd ed., pp. 205-242). Newark, DE: International Reading Association.
- Duke, N. K., & Pearson, P. D. (2008). Effective practices for developing reading comprehension. *Journal of Education, 189*(1-2), 107.
- Ermis, S. (2008). Using graphic organizers to facilitate elementary students' comprehension of informational text. *College Reading Association Yearbook, 1* (29), 87-102.
- Fisher, D., & Frey, N. (2007). *Reading for information in elementary school: Content literacy*

- strategies to build comprehension*. Upper Saddle River, NJ: Pearson Merrill Prentice Hall.
- Hall, K. M., Sabey, B. L., & McClellan, M. (2005). Expository text comprehension: Helping primary-grade teachers use expository texts to full advantage. *Reading Psychology and International Quarterly*, 26(3), 211-234. doi: 10.1080/02702710590962550
- Hall-Kenyon, K. M., & Black, S. (2010). Learning from expository texts: Classroom-based strategies for promoting comprehension and content knowledge in the elementary grades. *Topics in Language Disorders*, 30(4), 339-349. doi:10.1097/TLD.0b013e3181ff21ea
- Hand, B., Prain, V., Lawrence, C., & Yore, L. D. (1999). A writing in science framework designed to enhance science literacy. *International Journal of Science Education*, 21(10), 1021-1035.
- Harris, K., Graham, S., Mason, L., & Friedlander, B. (2008). *Powerful writing strategies for all students*. Baltimore: Paul H. Brookes Pub.
- Hedrick, W., Harmon, J., & Wood, K. (2005). Research on vocabulary instruction in the content areas: Implications for struggling readers. *Reading & Writing Quarterly*, 21(3), 261-280. doi:10.1080/10573560590949377
- Jitendra, A. K., Burgess, C., & Gajria, M. (2011). Cognitive strategy instruction for improving expository text comprehension of students with learning disabilities: The quality of evidence. *Exceptional Children*, 77(2), 135-159.
- Kelley, M. J., & Clausen-Grace, N. (2010). Guiding students through expository text with text feature walks. *Reading Teacher*, 64(3), 191-195.
- Marinak, B. & Gambrell, L. B. (2008). Elementary informational text instruction: A research review. *The International Journal of Learning*, 15(9), 75-83.
- McTighe, J. & Thomas, R. S. (2003). Backward design for forward action. *Educational*

Leadership, 60(5), 52-55.

Mohr, K. A. J. (2006). Children's choices for recreational reading: A three-part investigation of selection preferences, rationales, and processes. *Journal of Literacy Research*, 38(1), 81-104.

Norris, S. P. & Phillips, L. M. (2009). Scientific literacy. In D. R. Olson & N. Torrance (Eds.), *Handbook of research on literacy* (pp. 271-285). Cambridge: Cambridge University Press.

Norton-Meir, L.A., Tippett, C.D., Hand, B., & Yore, L.D. (2010). Professional development in teaching disciplinary writing in the context of international science reform efforts. In *Research in professional development for writing* (pp. 115-153). New York, NY: Guilford Press.

OECD (2010), *PISA 2009 Results: What Students Know and Can Do: Student Performance in Reading, Mathematics and Science (Volume I)*, PISA, OECD Publishing. doi: 10.1787/9789264091450-en

Patterson, E. W. (2001). Structuring the composition process in scientific writing. *International Journal of Science Education*, 23(1), 1-16. doi: 10.1080/09500690117425

Pearson, P. D., & Gallagher, M. C. (1983). The instruction of reading comprehension. *Contemporary Educational Psychology*, 8(3), 317-344. doi: 10.1016/0361-476X(83)90019-X

Pressley, M. (2002). *Reading instruction that works: The case for balanced teaching*. New York: Guilford Press.

Read, S., Reutzel, D. R., & Fawson, P. C. (2008). Do you want to know what I learned? using informational trade books as models to teach text structure. *Early Childhood Education Journal*, 36(3), 213-219. doi: 10.1007/s10643-008-0273-0

- Romance, N.R. & Vitale, M.R. (2006). Research in science education: An interdisciplinary perspective. In J.Rhoton & P. Shane (Eds.), *Teaching science in the 21st century* (pp. 329-351). Arlington, Va: NSTA Press.
- Romance, N. R., Vitale, M. R., & Society for Research on Educational Effectiveness. (2011). An Integrated Interdisciplinary Model for Accelerating Student Achievement in Science and Reading Comprehension across Grades 3-8: Implications for Research and Practice. Society for Research on Educational Effectiveness. Retrieved from <http://www.sree.org/conferences/2011/program/downloads/abstracts/125.pdf>
- Rowell, P. M. (1997). Learning in school science: The promises and practices of writing. *Studies in Science Education*, 30(1), 19-56. doi:10.1080/03057269708560102
- Stafford, K. B., Hall, K. M., deCani, J. S., Williams, J. P., DeSisto, L. A., & Lauer, K. D. (2005). Expository text comprehension in the primary grade classroom. *Journal of Educational Psychology*, 97(4), 538-550. doi:10.1037/0022-0663.97.4.538
- Tracy, B., Reid, R., & Graham, S. (2009). Teaching young students strategies for planning and drafting stories: The impact of self-regulated strategy development. *The Journal of Educational Research*, 102(5), 323-331.
- Ulusoy, M., & Dedeoglu, H. (2011). Content area reading and writing: Practices and beliefs. *Australian Journal of Teacher Education*, 36(4), 1-17.
- Warwick, P., Stephenson, P., Webster, J., & Bourne, J. (2003). Developing pupils' written expression of procedural understanding through the use of writing frames in science: Findings from a case study approach. *International Journal of Science Education*, 25(2), 173-92. doi: 10.1080/09500690210163251
- Wiggins, G. & McTighe, J. (1998). *What is backward design?* Retrieved January 26, 2012,

from Association for Supervision and Curriculum Development Web site:

http://pdonline.ascd.org/pd_online/ubd_intro/wiggins98chapter1.html

Williams, J. P., Stafford, K. B., Lauer, K. D., Hall, K. M., & Pollini, S. (2009). Embedding reading comprehension training in content-area instruction. *Journal of Educational Psychology, 101*(1), 1-20. doi:10.1037/a0013152

Wray, D. & Lewis, M. (1997). Teaching factual writing: Purpose and structure. *Australian Journal of Language and Literacy, 20*, 131-139.

Yore, L. D. (2000). Enhancing science literacy for all students with embedded reading instruction and writing-to-learn activities. *Journal of Deaf Studies and Deaf Education, 5*(1), 105-122. doi:10.1093/deafed/5.1.105

Appendix: Curriculum Unit

Unit Outline

Introductory Lesson: Activate prior knowledge

Inquiry Lesson 1: What is soil?

Writing Lesson 1: Model Using a Writing Frame

Reading Lesson 1: Purpose of an index

Inquiry Lesson 2: What is soil made of?

Writing Lesson 2: Using a Writing Frame

Inquiry Lesson 3: Do different types of soil absorb different amounts of water?

Reading Lesson 2: Reading Captions for Additional Information

Inquiry Lesson 4: What effect does moving water have on soil?

Reading Lesson 3: Using subtitles

Inquiry Lesson 5: How do living things affect soil? How are living things affected by soil?

Reading Lesson 4: Comprehending Procedural Text Structures

Inquiry Lesson 6: Why is soil important to humans? What everyday objects are made from soil?

Writing Lesson 3: Creating a Concept Map

Writing Lesson 4: Writing an Exposition

***Please note:** the purpose of this curriculum unit was to develop nonfiction reading and writing lessons that could be integrated into science. For this reason, the inquiry lessons are not elaborated upon in the unit.

Introductory Lesson: Activate prior knowledge

Inquiry Lesson 1: What is soil?

Writing Lesson 1: Model Using a Writing Frame

Learning Goal: Students will learn that they can use a writing frame as a means of reflecting on the inquiry activity they did.

Give students time to complete the inquiry activity. You will complete the activity along with them so that you are able to model filling in the science investigation writing frame (Wray & Lewis, 1998, p. 30-32) after the activity.

Before completing the writing frame in front of your students, explain that within this science unit you will be teaching students how to read and write expository text. Tell them that, according to the research, one way for students to learn how to write different types of expository text is to use writing frames. Hence, your reason for this lesson today.

Model filling in the writing frame for science investigations and reflecting on the activity that you did. Think aloud as you write. When you finish, have a discussion about how your knowledge transformed from the beginning of the activity to the end. Explain to your students that expository writing is not only a means of writing about what you think you know, but also writing about how your knowledge has transformed based on the inquiry activities and what you have read from different sources.

Reading Lesson 1: Purpose of an index

Learning Goal: Students will learn the purpose of an index and how to find specific information in a book by looking at the index.

Remind students of yesterday's lesson. Refer to the class chart about what soil looks like, feels like, smells like, and sounds like.

Explain to students that scientists ask questions, create experiments to investigate the question, as well as read the research that has already been written about the question they are trying to answer. Explain that today they will learn about reading the research by using an index to locate the information they want to read about.

Show students a selection of books. Model choosing a book based on the question you are investigating (What does soil look, feel, smell and sound like?). Choose *Soil* (Sally M. Walker). Put the book under the document camera in order for it to be projected onto the SMARTboard. Mention to students that one of the features of nonfiction texts is that you do not have to read the book from front to back like you do with a fiction book. Explain that you are going to look at the Index at the back of the book to determine the parts of the book that you want to read. Explain that your purpose for reading is to find out general information about soil. Model using the index to figure out what pages you are going to read. Choose the following pages and explain your reasoning aloud:

Colors of Soil - page 28, 29

Textures of Soil - page 29, 36-37

Continue to use the document camera to read over these pages together. The teacher can read aloud and students can follow along with their eyes. Point out the photographs, captions, color chart, pronunciation key—all nonfiction text features. It is important that students understand that they need to pay attention to these text features in order to help them understand what they are reading. In my experience, students will often skip over important nonfiction text features because they have not been taught what the features are and what purposes they serve.

Have a discussion about how the index helps us to find the information we are looking for so that we do not have to spend time reading the entire book. In other words, the index helps us narrow our search for information.

Choose another book for students to practice using an index. Give students a copy of the index. Have them take a few minutes to decide which pages you should look at to learn more about what soil looks, feels, sounds, smells like. Assist the students who seem to be struggling with the activity.

After sufficient time has passed, ask students what they decided and why. Read the pages they suggest to determine if they were about what they expected. Again, add to the class chart about soil based on what they learned from what they read.

Assessment: Show students the index of another book. Have them answer the following questions:

If I wanted to find information about _____, what page or pages would I turn to?

If I was wondering about _____, what page or pages should I turn to?

Possible Conference Question: How does the index help you when you are reading a nonfiction book?

Inquiry Lesson 2: What is soil made of?

Writing Lesson 2: Using a Writing Frame

Learning Goal: Students will practice using a writing frame as a means of reflecting on the inquiry activity they did.

Give students a copy of the writing frame for a science investigation (Wray & Lewis, 1998, p. 30-32). Remind them of the writing frame you modeled for them after the previous inquiry activity. Explain to students that they will be doing a shared writing activity today in groups. Tell students that you would like them to work with their inquiry group to complete the writing frame as they complete the inquiry activity about what soil is made of.

Remind students of the paragraph frames that you completed before doing the inquiry activity:

I am investigating...

I will do this by...

In order to make it a fair test I must...

I think I will discover...

Then students work with their group to complete these sections of the science investigation frames (Wray & Lewis, 1998, p. 30-32).

Students complete the inquiry activity.

Remind students of the paragraphs frames that you completed after the inquiry activity:

My results were...

These results show...

Before I did the investigation I thought the results would show...

So I was...

Then students work with their group to complete these sections of the science investigation frames (Wray & Lewis, 1998, p. 30-32).

As students are working with their groups, you can scaffold the activity even more so by walking around the room and conferencing with groups.

After groups have finished reporting on their inquiry activity, review the purpose of expository writing – writing about what you think you know and about how your knowledge has transformed based on the inquiry activities you have done and what you have read from different sources.

Assessment: Have students explain one way that their thinking changed from the beginning of the inquiry activity to the end.

Inquiry Lesson 3: Do different types of soil absorb different amounts of water?

Reading Lesson 2: Reading Captions for Additional Information

Learning Goal: Students will learn that it is important to read the caption that is included with a photograph in nonfiction texts as it provides additional information to help them understand the information they are reading about.

Remind students that scientists investigate the questions they ask, but they also read the research that has already been written about the question they are trying to answer.

Use the *Soil* (Sally M. Walker) book. Put it under the document camera in order for it to be projected onto the SMARTboard. Model looking at the Index at the back of the book to determine the parts of the book that you want to read. Explain that your purpose for reading is to learn more about water in soil. Choose the following pages and explain your reasoning aloud:

Water in soil – pages 20-21, 32-33

Continue to use the document camera to read over these pages together. The teacher can read aloud and students can follow along with their eyes. Point out the photographs and captions - nonfiction text features. Explain that when you are reading nonfiction texts it is very important to pay attention to the photographs and the caption that accompanies it. Explain that the caption usually gives the reader additional information about the topic they are reading about.

Using the document camera, show students other examples of nonfiction texts with photographs and captions. Read the information in the section of text aloud and then have students look at the photograph and read the caption that accompanies that section of text. Ask students: Why is it important that you read the caption? After several examples, hopefully students will understand that the caption provides the reader with additional information, or explains the information in a different way, or reinforces the main idea of that particular section of text. Students need to understand that it is important to read the caption that accompanies a photograph in order to help them have a better understanding of the information they are reading about. It is not a feature that can just be skipped over.

Assessment: Have students answer the following journal question in their Reader's Notebook: Why is it important to read the captions that accompany the photographs when reading a nonfiction text? Collect their notebooks to assess their understanding of the purpose of captions.

Based on their inquiry activities from the previous lessons and what they have read today, have a discussion about what students have learned about soil and water.

Inquiry Lesson 4: What effect does moving water have on soil?

Reading Lesson 3: Using Subtitles

Learning Goal: Students will learn that in well-written texts an effective subtitle will indicate the most important information in the following paragraph.

Explain to students that nonfiction texts often have subtitles throughout them to help the reader make sense of the vast amounts of information they are reading. Go on to explain that a good subtitle should indicate the most important information or main idea of that section of text.

Use pages 10 and 11 of *Soil Erosion and How to Prevent It*. Project the text on the SMARTboard. Read the information. Determine the main idea. Model and think aloud using the following questions: What is the main idea the author wants us to learn from reading this section of text? Once the main idea has been determined, ask yourself: Is the subtitle an appropriate one? Why or why not? You should come to the conclusion that it is an appropriate subtitle if it relays the main idea. If you decide it is not, model suggesting a subtitle that you think would be more effective.

Read a section of another text. Have students turn to their elbow partner and share the main idea they think the author intended for that section of text. Have them discuss whether or not they

believe the subtitle is an appropriate one and why. Be sure to assist the students who seem to be having difficulty.

After sufficient time, go over their ideas as a whole class. If students do not think the subtitle is appropriate, have them brainstorm subtitles that they think would be more appropriate for that section of text. Repeat this partner activity a few times with different sections of text. Use pages 28 and 29 of *Sand and Soil: Earth's building blocks* (Beth Gurney).

Assessment: Use page 4 in *Soil Erosion and How to Prevent It*. Use the section of text that is subtitled *Moving Around*. Show students the text, without showing them the subtitle. Read the text aloud to them. Ask them to give the text an effective subtitle. Have them explain their choice. Ask students: How can subtitles help you when you are reading nonfiction texts? Have them write their responses in their Reader's Notebook. Collect their notebooks to assess their understanding of subtitles.

Inquiry Lesson 5: How do living things affect soil? How are living things affected by soil?

Reading Lesson 4: Comprehending Procedural Text Structures

Learning Goal: Students will learn the purpose for writing procedural texts and the text structure procedural texts typically follow.

Activity 1: Watching Worms at Work (*Dig In*, Tami Morton)

Teach students that informational texts can be written using different text structures. Explain that procedural texts are written to give directions or explain how to do something. Explain that the text structure of a procedural text includes: Goal, Equipment, Procedure, and Evaluation. Show students the “procedure framework” (First Steps, 1994, 70).

Model reading the procedural text, “Dig In.” Be explicit about noticing the text structure as you read. Continue to refer to “procedure framework” (First Steps, 1994, 70). Show that you are able to comprehend what you read by following the directions as they are written in the text.

It is important that students understand that different nonfiction texts have different text structures depending on the type of information the book is providing and the author’s purpose for writing. Make sure that students understand that the purpose of a procedural text is to explain how to do something.

Activity 2: Compost in a Bag (*Composting: Nature’s Recyclers*, p. 22)

Students will follow the directions as they are written in “Composting: Nature’s Recyclers” to learn about how humans can help the soil to be healthier. In doing this activity, they will need to understand the text form of the procedural text in order to read and understand it so that they are able to complete the activity.

Assessment: Ask students: Why would an author write a procedural text? What is the text form of a procedural text? Have students write their responses in their Reader’s Notebook. Collect their notebooks to assess their understanding of the text form of a procedure.

Inquiry Lesson 6: Why is soil important to humans? What everyday objects are made from soil?

Writing Lesson 3: Creating a Concept Map

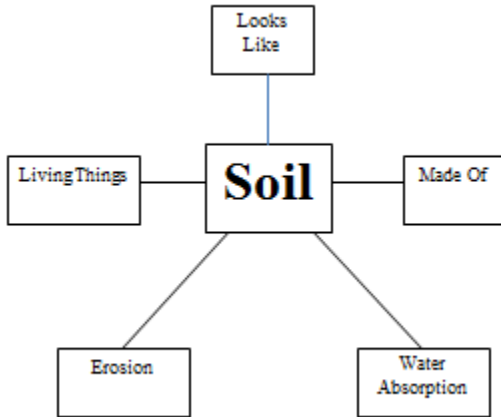
Learning Goal: Students will learn how to create a concept map to use as a prewriting tool.

Choose a concept from a previous unit to model creating a concept map (e.g. plants). Review what was learned in the previous unit and add the information learned to the concept map.

Explain that a concept map is a way to organize the most important information that you have learned about a concept. Be sure to model how you can link related information via a connecting line and a relational word that describes the connection. Being able to recognize connections among concepts and show these relations is what creating a concept map is all about (Yore, 2000).

Explain how the concept map can be used as a prewriting tool. Explain that students will be expected to write an exposition within the next couple of days in which their purpose will be to convince their reader that soil is much more than dirt. Therefore, today they will be creating their own concept map about what they have learned in this unit about soil. By completing the concept map, they are engaging in prewriting which is the first step in the writing process. Make sure that students understand that the more they have written on their concept map the more arguments they will have to convince their reader when they actually write the exposition.

Provide students with a structured concept map to complete about soil. By using a structured concept map you are scaffolding the activity for students.



Assessment: Conference with students about their concept map. Make sure that they have connected related information. Students’ understanding of the concepts will present itself in the number of accurate connections students are able to make among concepts.

Writing Lesson 4: Writing an Exposition

Learning Goal: Students will learn how to write an exposition.

Remind students of when they thought soil was dirt on the ground before beginning this unit.

Remind them of times they have had an adult upset with them because they got dirt all over their clothes or their freshly cleaned house. Explain that there are many people who think just like they did before beginning this unit, but they are going to have a chance to argue that soil is much more than dirt.

Tell students that as a class they will be expected to write an exposition-taking one point of view- to convince their reader that soil is important. Brainstorm what types of audiences they might be writing for: students who have not done this unit, their parents, younger brothers and sisters, etc.

Explain the purpose of this assignment. Tell students that based on their concept maps it is very obvious that they have learned a lot about soil. Now is there chance to put all that they have learned into a written exposition convincing others of the importance of soil.

Show students the text form planning template for an exposition (*First steps*, 1994, p. 138).

Model using your concept map from the previous lesson to make notes on the planning template. Then, model writing your expository text.

After you have modeled, students will write their own exposition based on the concept map that they created. Their purpose is to convince their readers that soil is much more than dirt.

Assessment: Score their piece of writing based on the Exposition Indicators in the *First Steps Writing Resource Book* (1994, p. 141). These indicators will help you determine what students need to learn and improve upon before writing another exposition.

References

- Gurney, B. (2005). *Sand and soil: Earth's building blocks*. St. Catharines, ON: Crabtree Publishing Company.
- Hyde, N. (2010). *Soil erosion and how to prevent it*. St. Catharines, ON: Crabtree Publishing Company.
- Koontz, R. (2007). *Composting: Nature's recyclers*. Minneapolis, MN: Picture Window Books.
- Lewis, M. & Wray, D. (1998). *Writing across the curriculum: Frames to support learning*. Reading, UK: Reading and Language Information Centre, University of Reading.
- Morton, T. (2004). *Dig in*. Parsippany, NJ : DK : Celebration Press.
- Raison, G., Dewsbury, A., Rivalland, J., & Western Australia. Education Dept. *First steps*. Portsmouth, NH.
- Walker, S. M. (2007). *Soil*. Minneapolis, MN: Lerner Publications Company.