SCIENCE CONTENT READING:
THE ROLE OF READING IN THE SEVENTH AND EIGHTH GRADE SCIENCE CLASSROOM

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ABSTRACT

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Interactions with reading in school happen every day. At the junior high level, a lot of these interactions are on a “reading to learn” basis. Reading extends from the Language Arts classroom and into all content areas. One of the most difficult content classes to read instructional materials is science. Due to the extensive vocabulary and presentation of reading materials, seventh and eighth grade students struggle to read content materials to further their knowledge.

This study looked at the role that reading plays in the seventh and eighth grade classroom. Reading encompasses fluency, vocabulary, and comprehension. The purpose of this study was to discover what teachers are doing to integrate vocabulary knowledge, comprehension skills, and overall reading strategies into their every day content instruction. For this study, I observed, took field notes, and interviewed five seventh and eighth grade science teachers to collect data.

After data was collected and analyzed, I concluded that all teachers observed and interviewed used reading comprehension, vocabulary, and fluency instruction in their every day lessons. Two of the five teachers intentionally included reading instruction in their daily activities because of their background in reading education. Three of the five teachers used some forms of reading instruction, but not intentionally. Overall, all five teachers believed that reading instruction is important because if students cannot read materials presented during science class, they will not learn the materials presented to them.
This thesis is dedicated to my wonderful family, my supportive advisor, Dr. Cindy Hendricks, 
and the amazing 2008-2009 Martha Gesling Weber Reading Center Graduate Assistants.
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CHAPTER I. INTRODUCTION

It is the last period of the school day and Mary sighs because it is time for science class. It isn’t that Mary doesn’t enjoy learning about science; she just doesn’t like to read the science material because it is too difficult for her. Mary thought about her attempt to read the assigned chapter last night and gave up in frustration because she could not understand many of the words in the passage. She enjoyed looking at the pictures, but could not make sense of them because she could not understand the complex vocabulary that supplemented each picture. As she entered into the class with the rest of her eighth grade peers, she began to dread the thought of her science teacher asking her questions about the reading in front of the entire class. Mary was relieved when the teacher called on Peter to summarize the chapter, but wished there was a way for her to read science material so she understood it. This way, Mary could confidently walk into science class every day without fear and be ready to answer any questions the teacher may ask.

Statement of the Problem

Mary’s problem seems to be that she does not understand or comprehend the science reading material that is assigned to her. This problem is not because Mary doesn’t like science or that she is not interested in the topics being discussed. The problem is that Mary lacks knowledge, vocabulary background, and reading strategies to help her with reading science material because she has not been taught. A majority of content teachers lack the knowledge and do not have the proper training to help students read difficult material (Armbruster, 1993).

Science textbooks, labs, directions, and supplemental materials tend to have extensive vocabulary and students cannot learn from these materials without knowing
how. If teachers have knowledge about ways to help students read science material, they may not be sharing it with the students in their classes. Another problem teachers face is that they have limited time to cover all the content they are required to in a given day so spending time teaching reading strategies may not be an ideal way to spend class time. Lastly, teachers may not be aware that their students are struggling with their class content simply because they cannot read it, not because they do not enjoy it or are not interested.

Research Question

There are required textbooks and other reading materials that accompany all content reading classes, making reading unavoidable. Reading in science involves a lot of new vocabulary and comprehension essential for success in this particular content area. If teachers do not instruct students on how to practice reading strategies that work for them, their reading will not benefit their learning. This study focused on how seventh and eighth grade teachers were implementing reading and all aspects of reading in their science classrooms. Specifically, this study sought to discover what junior high science teachers were doing to implement reading skills, such as vocabulary acquisition and comprehension of material, into science instruction.

Rationale

Teachers must discover ways to integrate effective reading strategies into their content to get successful results in return from their students. These reading strategies can help students reach their full potential. Tovani (2004) states that instead of thinking of this as “content-area reading,” she thinks of it as “teaching students how to remember and reuse the information we ask them to read” (p. 7). The best way to accomplish this is to find strategies and practices that work for students to learn information they read and make it
meaningful to their lives. This study provides teachers with suggestions and implications for what they can do to develop content reading in their classrooms. Reading skills teachers use to instruct would allow students to successfully demonstrate knowledge in the area they are learning.

Terms

The following terms will be used throughout this paper; the meanings are listed to bring better understanding to readers:

**Vocabulary activities:** Activities used in a classroom that introduce new vocabulary words supplementing the content taught in the class. There are a variety of ways that these activities could be presented in the classroom. A vocabulary activity is any time the teacher introduces vocabulary words through instruction or through student investigation. For example, it would be considered a vocabulary activity if a teacher provides a list of new vocabulary words on the chalkboard and instructs the students to define them.

**Fluency activities:** Activities used in a classroom that aid in a student’s fluency of reading materials. Such activities could consist of, but are not limited to oral reading, repetitive reading, and choral reading.

**Comprehension activities:** Activities used in a classroom that help students comprehend what they are reading. These activities consist of a variety of types such as different level questioning, games, and summarizing what was read.

Limitations and Delimitations

The primary delimitation for this study was that teachers were observed in only one school district. Different school districts value aspects of teaching in different ways and the school used may value content reading more or less than another school. By observing
seventh and eighth grade teachers in only one school, the study focused on one administration, one curriculum, and one faculty. This limitation provided a narrow view of the role that reading plays in the science classroom. Also, only five science teachers were observed, so that will limit the observational data to a very small sample of seventh and eighth grade science teachers.

Another delimitation was that each teacher was observed for four days. In these four days, only a snapshot of their academic year can be obtained. The time of the academic year limited observations because the teachers may have been teaching a unit that requires more or less reading when compared to other units they teach at other times of the year. The unit that the teachers are currently teaching could also vary as far as to how much reading takes place in that particular unit. Observing teachers for only four days limits views of what role reading plays in the science classroom throughout the school year. There is a multitude of diversity amongst teachers, their backgrounds, and their teaching styles. Observing only five teachers provides an exposure to diversity amongst those teachers.

Another limitation of this study was that the teachers had a general idea of the purpose of the investigation. By the teachers knowing the purpose, they may insert reading strategies and activities that they do not normally use when teaching science. This limitation will not provide a genuine idea of what that particular teacher uses for reading instruction in their content classroom.
CHAPTER II. REVIEW OF LITERATURE

Many students experience frustration while attempting to read materials presented to them in content area classes, particularly science. It is unfortunate for students who show a genuine interest in science but cannot read the supplemental materials used by teachers to illustrate science concepts. Teachers must be aware of this problem in their classroom so they can successfully transfer information from reading materials to a student’s understanding. The purpose of this observational study was to examine the role reading plays in seventh and eighth grade science classrooms. When exploring research that supplements different aspects of this study, it is important to consider issues concerning content reading, teacher’s attitudes toward content reading, science literature readability, problems with science reading materials for seventh and eighth graders, and the role of reading in scientific thinking.

Content Reading

History

Content reading instruction came about in recognition of the fact that young readers require various strategies when they study particular subject areas and read many kinds of materials for different purposes (Moore, Readence, & Rickelman, 1983). Moore, Readence, and Rickelman state, “To date, the primary mission of this instruction is to develop students’ reading-to-learn strategies. This focus seems to help students locate, comprehend, remember, and retrieve information that is contained in various styles of writing across the curriculum” (p. 420). The importance of content reading became evident in the middle 1800s when Horace Mann began advocating reading for meaning. Moore, Readence, and Rickelman quote Mann by saying, “to suffer children to read without
understanding is one of the most flagrant cases of incompetent teaching” (p. 421). Through the years, humanists, developmentalists, scientific determinists, and reading educators all agree that content reading is beneficial to all students (Moore, Readence, & Rickelman).

**Motivation in Content Reading**

Content reading is a crucial and unavoidable practice that is used by all teachers for instruction. Motivating students to read content material is a constant struggle for all teachers. If students find reading texts in the content areas too difficult, boring, or unappealing and the teaching practices associated with these texts do not engage students, then students are likely to avoid reading about important topics in the content areas (Strommen & Mates, 2004). Hirsch (2008) states, “Students who don’t read content texts run the risk of never acquiring critical background knowledge, which is the foundation for academic success” (p. A21). Content text requires more effort from the student to read, process, and comprehend. With that in mind, students need more practice reading materials in the content area. Students need to spend sufficient time with content area texts to develop their reading skills for this type of material (Brozo & Flynt, 2008).

Theoretically, Rosenblatt (2005) argues that the teacher plays a crucial role in fulfilling the function of growth between young readers and books. “Above all, students need to be helped to have personally meaningful transactions with literature. Then they will develop the habit of turning to literature for the pleasures and insights it offers” (Rosenblatt, p. 63). Rosenblatt’s main goal was to help educators stay focused on helping students develop lifelong personal relationships with books and reading. In content reading, it is important for teachers to find books that supplement content material that each individual student can use to understand. Rosenblatt stressed, “Our main
responsibility is to help the student to find the right book for growth” (p. 67).

Teachers not only need to possess skills for developing students’ academic vocabularies, they need to be able to instill excitement in students about reading and learning from text in social studies, math, science, and the language arts (Brozo & Flynt, 2008). Guthrie (2008) argues, “Student motivation increases when teachers are their allies in the reading and learning process (p. 43).” From a different perspective, Brozo and Flynt explain that a student who is not interested in textbook reading or content materials may be engaging in other forms of literacy such as reading graphic novels, e-mailing, instant messaging, and magazines. Students will always obtain information with more success if the information presented is meaningful to the student’s past personal experiences. Meaning doesn’t evolve from highlighting textbooks or using sticky notes; meaning evolves when students have a purpose for reading (Tovani, 2004).

One problem content teachers face is meeting the content literacy needs of language-diverse students. To provide responsive content literacy instruction for diverse learners, Brozo and Flynt (2008) recommend teachers develop extensive toolkits of practices and strategies. These toolkits should contain strategies and practices related to motivation and engagement (allowing students to choose reading material that motivates them), academic and instructional language (students’ understanding of what they are reading), and reflection and experimentation (students’ ability to look back, or reflect, on their reading and decide what can be done to better their reading in the future). These content literacy toolkits could be especially helpful to struggling readers and children with disabilities (Brozo & Simpson, 2007). It appears to provide structure and organization for students who are not motivated to tackle reading in the content area.
Comprehending Content Material

Comprehension is a large part of content literacy because it proves what students learn and truly understand. Neufeld (2005) believes comprehension instruction needs to become an integral part of content area instruction for many reasons. One reason is that learning from textbooks and other material is an important part of learning in all subject areas. Second, hands-on learning mixed with text-based learning has proved to be a more effective strategy in content area classes than eliminating text-based learning altogether. Third, students can be taught reading comprehension strategies and that such instruction improves their understandings of the texts they read (Neufeld).

A key concept of comprehending content area texts is teaching students how to think about what they are getting ready to read. Identifying a purpose for reading content area texts will improve overall comprehension and understanding (Pressley, 2000). Neufeld (2005) concluded that success in subject area classes requires students to comprehend their content texts; however, if students are on their own regarding comprehension, they may struggle to read and learn from these texts. It is the classroom teacher’s responsibility to teach comprehension in a way that can be applied in all content areas. Sampson, Rasinski, and Sampson (2003) state, “To achieve success in school, students must acquire the skills necessary to comprehend expository texts” (p. 468).

Content Area Textbooks

A majority of teachers assume that textbooks are necessary for teaching and learning content or they are required to use a textbook by their state or school district (Wade & Moje, 2000). Alverman and Phelps (2002) outline three assumptions underlying the use of textbooks in the classroom. The first assumption is that textbooks will help
structure curricular goals and help teachers stay on target to cover all content in a given
time. A second assumption is that students will use their textbooks to learn course content.
This assumption can be disputed based on which textbook is being used and which subjects
the textbooks cover. The third assumption is that textbooks will present topics in a way
that students will understand and without bias. Anyon (1979) noted that more than two
decades ago, textbook authors couldn’t help but include their own personal views and
ideological perspectives in their writing. Alvermann and Phelps (2002) continue by stating
that “Given appropriate planning strategies, even the most biased of texts can lead to
excellent classroom discussions in which students learn to look at both sides of an issue for
sources of possible misunderstanding” (p. 6). In today’s diverse classroom, taking
advantage of this opportunity could potentially make students appreciate individual
differences of the textbook authors as well as their teachers and peers.

Often times, good readers become poor readers when asked to read their social
studies or science textbooks. Sampson, Rasinski, and Sampson (2003) believe that this is
because the material in textbooks is written very differently than the stories that students
have read in children’s books or young adult literature. Some researchers believe that this
content literacy deficiency begins in the fourth grade where students experience the
“fourth-grade slump” (Chall, Jacobs, & Baldwin, 1990). During this time, students are
confronted with the responsibility of learning content and other academic information
through reading textbooks and other supplemental materials.

**Content Vocabulary**

Vocabulary is a very important part of content reading in all subject areas. Freebody
and Anderson (1983) believe, “Children who know the meaning of the words they hear and
read comprehend more than those who do not” (p. 21). Research by Spencer and Guillaume (2006) shows that children in lower socioeconomic groups and other students with poor vocabulary not only will have a difficult time understanding the oral and written language they are exposed to, but will be less likely to learn new words. They indicate that there are four main facets of vocabulary acquisition: (a) word knowledge is incremental; (b) words have multiple meanings; (c) word knowledge is multidimensional, and (d) word knowledge is interrelated (Spencer & Guillaume). Overall, Spencer and Guillaume found that when teachers create an environment in which students are motivated to learn new vocabulary in the content classroom, they build skills that will aid in each individual student’s success in comprehending content area reading material.

Teacher’s Attitudes Toward Content Reading

Finding time for teachers to model and instruct reading strategies can be a challenge. Tovani (2004) explains that only the teacher can decide whether they should use content instruction time to design strategies for reading and comprehension that mean something to students. The teacher’s role in content is very important; however, “When students become too dependent on teachers as their primary source of information, they are rarely in a position to think and learn with text” (Vacca & Vacca, 2002, p. 2). Teachers must find a balance of teaching content while incorporating reading instruction. If a teacher pushes his or her students to memorize reading material, strategy instruction and other reading tips will not be very successful (Tovani). Vacca and Vacca stress, “All teachers play a critical role in helping students think and learn with texts” (p. 3). Being capable readers themselves, a lot of teachers cannot put themselves in the places of illiterate students who need guidance in content reading. This lack of understanding causes teachers to make
integration of reading strategies and critical literacy into content area classes less of a priority (Alger, 2007).

Gillespie and Rasinski (1989) state that it is absolutely necessary for teachers to have a positive “affective predisposition toward reading instruction” (p. 45). After analyzing results of a survey, Gillespie and Rasinski (1989) stated that all teachers placed a high value on teaching reading and felt qualified to do so and had equally positive attitudes toward content area reading instruction. Gillespie and Rasinski (1989) reviewed a number of other studies analyzing teacher attitude and concluded that “In almost all of the studies reviewed, content area teachers reported having positive attitudes toward teaching reading in the content areas, either initially or after completing a content area reading course” (p. 58).

Their review of these studies supported four major findings:

1. Content area teachers are not as knowledgeable as they need to be about reading in general and about reading skills and strategies that apply to their content.

2. Teachers appear to have different attitudes toward content reading instruction based on their instructional level, how knowledgeable they are of reading, and which particular content they teach.

3. Teachers have an overall good attitude and are willing to enroll in content reading courses to expand their knowledge and implement techniques they learn in these courses in their own content class.

4. These courses generally affect the teachers’ attitude in a positive way in that the teachers are more willing to implement learned strategies and skills in their own content classrooms. (Gillespie & Rasinski, pp. 58-59)
Tovani (2004) identified one teacher who proclaimed, “My job isn’t about raising state test reading scores or getting kids to the advanced reading level on someone else’s scale. My job is about teaching kids how to read and think about text in meaningful ways that help them better understand the people around them” (p. 16). If teachers increase their knowledge of reading instruction in the content area, they are more likely to have a positive attitude toward content reading instruction (Gillespie & Rasinski, 1989).

Educators are learning that attitudes and motivation are crucial determinants of learning and therefore deserve direct attention. For substantive learning to occur, students must have positive attitudes about themselves as learners and readers, about their ability to succeed in school, and about the instructional goals that their teachers and their schools set. To foster such positive attitudes, teachers must exhibit those attitudes themselves (Graves, Juel, & Graves, 2001). Pressley (1998) offers a number of suggestions that current theory and research support in the development of teachers’ attitude toward reading:

1. Assured student success.
2. Be a teacher who scaffolds students.
3. Encourage students to attribute their successes to expending appropriate efforts and their failures to lack of effort.
4. Failures occur. Encourage students to interpret failures as a natural part of learning.
5. Do not encourage student competition. Encourage students’ cooperation and interaction in literacy tasks.
6. Make certain that students have access to a wide range of interesting books.
7. As often as possible, permit students’ choice with respect to what they read.
8. Favor depth over breadth as much as possible. (p. 68)

Graves, Juel, and Graves (2001) believe, that effective teachers must possess a “you can do it” attitude towards reading in the content areas. They believe if teachers possess this attitude, it will motivate students to have a positive attitude about content reading.

The Role of Reading in Scientific Thinking

The role of reading in science is a very controversial one. Armbruster (1992) explains that on one hand, reading seems to be viewed positively in the science community. On the other hand, reading tends to be viewed negatively in science because the trend in science education since the 1960s has been “doing” science through hands-on activities and labs. Elliott and Nagel (1987) suggest, “The main argument against reading in science is that science materials, particularly textbooks, emphasize the products of science (facts and generalizations) rather than the nature and processes of science” (p. 10). Research tends to always support the idea that science should be “done” rather than “read about.” By “doing” science, students develop processing skills and tend to hold more positive attitudes towards science (Barman, 1992, p. 61). Barman explains, “Ironically, despite their belief in the relative ineffectiveness of reading and their qualms about textbooks, most elementary teachers use textbooks for many reasons” (p. 346). It seems that a majority of teachers, mainly in the elementary grades, believe they are underprepared to teach science, so they are uncomfortable teaching it. If teachers aren’t comfortable teaching science because they do not understand the content, they cannot effectively help students read the material to read it themselves (Pratt, 1981).

In Brassell’s (2006) study of Veronica, a third grade science teacher, he explores how this teacher inspired students to read in the science classroom by creating a special
science library. Her students did not read books in the “science” section of her library because science reading material is not appealing to third graders. Veronica began reading aloud these science books in class daily. By exposing students to these science books, students began visiting the science section more frequently. The role of the teacher in content reading is crucial to exposing students to science literacy.

Teachers must first begin by finding out what students already know about the reading and writing processes. Casteel and Isom (1994) argue, “Educators who become more focused on the basic literacy aspects of science as they teach scientific content will diminish many factors that cause students to dislike science” (p. 538). Many students who have difficulty in reading and comprehending science content material also have difficulty integrating listening, speaking, reading, thinking, and writing skills together for success (Casteel & Isom). Guthrie (1991) shares that while the processes in science and literacy are not the same, they do overlap in important ways. Comparing the two, science processes relate to understanding and reporting about the physical world, which require literacy processes related to communication.

Casteel and Isom (1994) found that linking science and literacy processes by drawing on literature should make the study of scientific concepts more familiar, less frustrating, and more motivating to students. This can be accomplished by integrating a wide variety of literature including trade books, texts, and reference sources into content teaching. This approach causes science to be taught successfully though thematic units and individual lessons that use literature, process writing, and interdisciplinary activities with cooperation of other content teachers. By using this approach, instruction is focused on what is meaningful and interesting to the student. Casteel and Isom argue, “Merging
literacy and science processes through literacy-based instruction allows students to broaden their application of the processes in both areas” (p. 541). The results of Casteel’s and Isom’s research include benefits for students from “reciprocal teaching.” The main benefit is that students are more knowledgeable in science and more proficient in reading and communicating.

Problems with Science Reading Materials

Science reading materials can be very valuable to students’ learning the content. However, there are many problems students and educators face that cause science materials to be ineffective. Lack of instruction, de-emphasis of reading in the content classroom, and readability in science material are the main problems faced when reading to learn in the classroom.

Lack of Instruction and De-emphasis of Reading

One of the main problems with reading materials in the science classroom is that a majority of teachers are ill prepared to teach the reading skills necessary to be successful in reading science material to further their knowledge in the content. Armbruster (1993) states, “Although teachers support teaching students how to read science, they offer little such instruction. The reason seems to be that teachers are poorly prepared to do so” (p. 346). Research shows that the inquiry-based approach to teaching science is clearly important, but it seems that reading is devalued in science education for two main reasons. The first, if reading is ignored in the science classroom, some of the most important goals of “scientific literacy” will not be attained. For example, high school graduates cannot be expected to read and analyze scientific articles if they are not taught to do so. Second, reading is considered to some as antithetical, or contrasting to, the development of
scientific thinking. At a cognitive level, reading and science are similar processes. There is a reciprocal relationship between science and reading and teaching them together can be mutually beneficial (Armbruster, 1993). Wellman’s (1978) research shows that the study of science helps develop language and reading skills and “strengthens the logical processes necessary for effective content reading” (p. 3).

Teachers being poorly prepared to teach students how to read the science material they are presented results in a lack of effective instruction in reading from science materials. There are many resources and useful advice available for content teachers (Barman, 1992). Science education literature (Barman) explains how to use an “activity-oriented teaching approach called the learning cycle with textbooks” (p. 59). The learning cycle teaches science in three consecutive phases known as exploration, term introduction, and concept application. Exploration allows students to investigate new reading materials to begin to formulate questions and points of clarification for science discussion. Exploration could also take place in the form of an interactive activity. Term Introduction allows the teacher to introduce terms in whichever way he or she seems fit and also to explain new concepts. Reading instruction is utilized the most during this phase as they read about the topic they are learning. Concept application provokes students to see trends in their reading and apply that new knowledge to other reading materials from which they are gaining information (Musheno & Lawson, 1999). The main problem is that teachers are not aware of this strategy or do not fully understand its purpose (Armbruster, 1993).

Research shows that instruction of explicit reading strategies in the content areas prompts students to engage their prior knowledge and to monitor their comprehension (Radcliffe, Caverly, Hand, & Franke, 2008). Despite the research and evidence of the
effectiveness of these strategies, a number of studies have reported that few teachers use these strategies in their instruction and need added support to change their instructional routine (Pressley, 2002).

Teachers are responsible for instructing students on how to use reading strategies to comprehend science literature, and it seems this responsibility is not being fulfilled. Zywica and Gomez (2008) state that by the time students get to high school, they usually lack strategies to read literature in their subject areas. English and reading classes generally support reading strategies, but often less attention is given to the demands of reading expository and non-literature-based materials. Zywica and Gomez add:

Asking students to read and understand science content without providing and encouraging the use of strategic reading approaches can and frequently does result in poor understanding of content material, limited class discussion (because students don’t understand the material), and lack of interest in science. (p. 157)

The presence or lack of literacy skills and reading will make a huge difference in a student’s ability to understand not only science and other content areas, but also political and social issues they will face as part of life. Conley (2008) stresses that it is essential to master cognitive strategies for reading, writing, and thinking in difficult situations involving texts that will be required for success in college and in the workplace.

The National Middle School Association (International Reading Association, 2002) recently reported the discouraging news that “American readers get off to a fast start during the elementary grades but begin to falter during early adolescence” (p. 1). Researchers continually argue that middle school and junior high students deserve to have continued and systematic reading instruction (Radcliffe, Caverly, Hand, & Franke, 2008).
Another major concern among middle school and junior high teachers is the low scores for most students paired up with lack of a notable increase in students’ overall achievement scores on the National Assessment of Educational Progress Report, a long-term trend in reading assessment (National Center for Education Statistics, 2001). Teachers have the main responsibility of adjusting this issue. Science teachers help students adopt a purposeful stance and a questioning attitude for textbook reading. This mindset and attitude can be implemented during class time as strategies for content area reading (Radcliffe, et al.).

*Science Literature Readability*

Readability refers to the relative accessibility or difficulty of a text. Sentence length and word difficulty are among the elements used in formulas that assign grade-level readability scores for text materials (Vacca, Vacca, Gove, Burkey, Lenhard, & McKeon, 2003). There has been much criticism of science textbooks and other literature in recent years because of the difficulty of the text. An alternative or supplement to textbooks is science trade books that include not only nonfiction but also include biographies, autobiographies, diaries, reports of major science events, and science fiction. The readability of these trade books exceeds the readability of classroom textbooks (Armbruster, 1993). Fleming and Billman (2005) found that science texts may confuse students, contain unfamiliar vocabulary, and present challenging text structures.

Klare (2000) believes that if materials are not readable to the intended reader, then the material is not readable. Readability is based on the judgment of the reader alone. Klare puts the responsibility on the writer. He states that, “Ideally, a writer should have a rather detailed picture of his audience. He should have information about reading, educational and intellectual levels, background, or previous experience with the writer’s topic,
interests, level of motivation, and voluntary or involuntary attention to the material” (p. 108). Klare adds that the main concerns of the writer should be the targeted audience’s reading speed and efficiency, the reader’s judgment of the material presented, and readership (wide amount of people able to read material). It is also important for readers to comprehend, learn, and retain what is written (Klare).

Comprehending textbooks can be very difficult for all students, especially seventh and eighth graders. Comprehension is not just finding, answering, or recognizing. Comprehension is building understanding and is an active and demanding process, especially when children are reading to learn and difficult concepts (Walpole, 1999). Studies of science texts have focused on the big picture of how well these texts train (or fail to train) future scientists, the role texts have in controlling the science curriculum, and the way that texts describe scientific thinking (Stinner, 1995). However, Walpole argues that teachers need reviews of texts that evaluate “static characteristics of texts and active use of texts in teachers’ instruction and children’s understanding” (p. 359). Walpole studied the general format, organization, sentences and paragraphs, and illustration differences between a textbook published in 1992 and one in 1995. Walpole’s findings showed that textbook readability is improving by changes in format and organization to help students, but remaining the same in length and in integrating meaningful text and visual information.

According to the NAEP (National Center for Education Statistics, 2001), 80% of eighth-grade science teachers reported using the textbook regularly. However, weaknesses in textbook content and ineffective approaches to teaching with print may prevent textbook reading from being useful. The American Association for the Advancement of Science (2002) reported that science textbooks do a poor job of following standards-based
principles for concept learning making it more difficult for educators to utilize.

Vacca et al. (2003) agree that textbooks are an integral part of a student’s schooling by stating, “In most classrooms, textbooks blend into the physical environment, much like desks, bulletin boards, chalkboards, and computers” (p. 421). Yet teachers often remark that children find textbooks difficult. Vacca et al. also point out that most teachers seem to be acutely aware of the mismatch between the reading abilities students bring to text material and the difficulty of the text. For teachers to determine the difficulty of the readability of a textbook, they should consider how difficult the text is to understand, how usable the text is, and how interesting the text would be to their students (Vacca, et al.).

It seems that the difficulty that students have with text material are caused by factors in both the reader and the text. Teachers should consider the publisher-provided descriptions of the design, format, and organizational structure of the textbook, along with grade-level readability designations. One important limitation of examining textbook readability is that none of the readability formulas take into account the experience and knowledge that young, middle school, linguistically and culturally diverse, or struggling readers bring to content material (Vacca et al., 2003). Hittleman (1973) maintained, “Readability is actually a moment in time in which a reader’s human makeup interacts with the topic, the purposes for reading, and the semantic and syntactic structures in the material” (p. 784).

Middle school students are forced to read textbooks much like high school textbooks and even college textbooks. The problem with this is that these middle school students are still developing as readers. To make it more difficult, students of all ages are challenged to read and learn new information in a rapidly changing electronic environment. Teachers
hold the responsibility to help those struggling readers in the content areas (Vacca et al., 2003).

Summary

The importance of content reading instruction came about in the early 1800s and has grown to be one of the most important aspects of content reading instruction to date (Moore, Readence, & Rickelman, 1983). One of the major points found in research explain that content literacy instruction is important and essential in all subject areas (Brozo & Flynt, 2008). Teachers must incorporate strategy instruction for their students to succeed in reading content materials. However, motivation also plays a role in a student’s retention of content material. Roseblatt’s (2005) theory of motivation states that teacher’s play a huge role in student motivation. She believes that educators must emphasize the value of creating personal and lifelong relationships between students and books.

Comprehending textbook material can be very difficult, but is an integral part in teaching content to students. Comprehension instruction needs to be a part of an educator’s every day curriculum for the students’ benefit (Neufeld, 2005). Although there is controversy surrounding the effectiveness of textbooks, Alvermann and Phelps (2002) believe that “Even the most biased of texts can lead to excellent classroom discussions if the teacher uses plans effectively” (p. 6).

Another major aspect is that the teacher’s attitude towards content reading affects the student's attitude toward content reading (Tovani, 2004). Gillespie and Rasinski (1989) state that it is absolutely necessary for teachers to have a positive attitude toward reading instruction, no matter what subject the educator teachers. Graves, Juel, and Graves (2001) believe that effective content teachers must possess a “you can do it” attitude to achieve
success in student content reading.

Armbruster (1992) explains that reading plays a large role in the science content classroom and reciprocal teaching must be incorporated so students can “do science” as well as read science. Lastly, there are some problems with content reading at the middle school level. One problem is that reading is de-emphasized in middle schools and teachers lack knowledge to teach content reading (Zywica & Gomez, 2008). A second problem is that the readability of textbooks is too difficult for students to comprehend so teachers are either avoiding textbooks or misusing them (Vacca et al., 2003).
CHAPTER III. METHODS AND PROCEDURES

Reading is unavoidable and necessary in every content area and content teachers are responsible for implementing strategies and practices that will help their students to succeed in content reading. Content reading consists of vocabulary, comprehension, fluency, and recollection of what was read. Science, in particular, utilizes different forms of reading such as labs, textbooks, and supplemental materials that require teachers to teach their students how to read science material to obtain information. Given research that argues for the need of content teachers to teach reading, this study was designed to determine what role reading plays in the seventh and eighth grade science classroom.

This chapter explains the methods and procedures used to gather data relevant to the purpose of this investigation, which is to examine the role reading plays in seventh and eighth grade science classrooms. The chapter will also explain what data will be collected and how it will be analyzed to draw conclusions from the study.

Methods

Research Design

This study used a methodology that included the data collection strategies of observations and interviews. Both semi-structured observations and semi-structured interviews were used to guide the investigation and also allowed some flexibility within the data collection process.

Observations occurred in seventh and eighth grade science classrooms. The teachers observed were in their natural school environment and taught as they normally would on a daily basis. During these observations, field notes recorded how the observed
teachers incorporated aspects of reading into their content teaching. Glesne (2006) states that:

Through participant observation—through being a part of a social setting—you learn firsthand how the actions of research participants correspond to their words; see patterns of behavior; experience the unexpected, as well as the expected; and develop a quality of trust, relationship, and obligation with others in the setting. (p. 49).

The researcher did not take part in the classroom activities, but collected all documents handed out during class.

The observations focused on content reading and all other aspects that reading encompasses. These observations were semi-structured observations to allow for observing all aspects and activities that happened simultaneously in the classroom. Semi-structured observations are “free-flowing,” allowing a shift of focus from one event to another as new, and perhaps more interesting events arise (Mertler, 2009, p. 107).

After the observations were completed, the science teachers who participated in this study were interviewed in a one-on-one setting. An interview guide was used, containing either specific or general questions that were asked during each interview (see Appendix A). The interviews were conducted in semi-structured and relatively open-ended formats. This allowed the teachers to expand on interview questions that were asked and add any other thoughts or insights they believed were important. In semi-structured interviews, several “base” questions were asked with the option of following up a given response with alternative, optional questions (Mertler, 2009). The purpose of these interviews was to expand on the data collected during observations. The interview gave the
teacher a chance to provide more information regarding the role of reading in his/her science classroom.

Participants

The participants for this study were seventh and eighth grade teachers at a junior high school in northwestern Ohio. This school was chosen because it encompassed both seventh and eighth grade. Also, to achieve the goals established by the state of Ohio, content literacy is continually being stressed. Five science teachers were observed: three seventh grade science teachers and two eighth grade teachers; all of the teachers have varied years of experience. In choosing this school, the demographics of the students were not considered. The school was selected as a convenience sample of seventh and eighth grade science teachers. All teachers signed a consent form giving permission to observe and interview (see Appendices B and C).

Data Sources

The materials used to complete the research study included a notebook and writing utensils for writing field notes during observations and a list of interview questions for the follow-up interviews. Informal interview questions were created prior to the observations and were revised based on analysis of completed observations (see Appendix A). After all observations were completed, field notes were reviewed to identify portions of the observations that need to be clarified. Interviews were tailored to each individual science teacher depending on the observation results. Interviews were also used as a follow up of the observations. Data collection involved observation and interview transcriptions as well as artifacts that were collected throughout the class period.
Procedures

The procedures for this study were conducted in two parts. The two parts were observations in seventh and eighth grade science classrooms, and teacher interviews that followed the observations.

In part one of this observational study, each of five seventh or eighth grade science teachers were observed for four days for one class period a day. The eighth grade science teachers were observed in the mornings and the seventh grade teachers in the afternoon based on their daily schedule. During these observations, field notes recorded all instances of reading that occurred throughout the duration of the class. These instances included anything the teacher did to directly or indirectly teach or assess vocabulary, comprehension, or fluency. Any activity or task designed to reinforce vocabulary, comprehension or fluency was identified as an instance of reading. Observational notes of how the teachers approached these aspects of reading while teaching science content were completed. Notes that were taken during observations were transcribed into detailed narrative field notes following each observation.

In part two of this observational study, each teacher who was observed was interviewed one-on-one. These interviews were to clarify and expand upon what was observed. The interviews gave the teacher a chance to expand upon his or her view of the role reading plays in his or her own classroom. Data collected during observations were used to prompt more specific responses and expansions to interview questions. Interview questions were developed prior to the observations, but were altered based on the analysis of observations.

The time line for this observational research study was approximately two weeks.
Considering that each science class was conducted four times during the school day and seventh and eighth grade science classes occurred at different times of the day, three or four teachers were observed each day.

Data Collection

The data were collected in the form of narrative field notes from observations of all participating science teachers and from the follow-up interviews. Field notes that were written during observations included any activity, task, or assignment that encompasses any aspect of reading during instruction. These activities included anything that had to do with reading a book, directions, labs, etc. or learning vocabulary, comprehension, or fluency. The researcher captured as much as possible during observations, including the environment of the classroom itself that affected data. These notes were expanded upon, organized, and interpreted following the observations and transcribed into narrative descriptions of the observations.

Interviews were tape recorded to maintain a free flowing conversation with the teachers and few interview notes were taken. Interview notes included key phrases and ideas presented in the interview by the teacher. The teacher interview responses were recorded and expanded in a more organized fashion following the interview. Key ideas learned through the teacher interviews were written down immediately following the interviews. Any artifacts that included aspects of reading distributed by science teachers during observations were collected. These artifacts included worksheets, informational documents, or textbook copies.
Data Analysis

The data collected from the observations and interviews were analyzed for interpretation and discussion. After observations were completed, the narrative field notes were analyzed for occurrences of reading in the science classroom. Field notes from classroom observations were coded to identify reading strategies, vocabulary activities, comprehension activities, and/or fluency activities. After interviews were completed, transcripts were written and used to clarify, expand upon, and validate observations. Both narrative field notes and interview transcripts were analyzed and integrated together.

Summary

This observational research study was designed to examine what role reading plays in selected seventh and eighth grade science classrooms. Observations were used to identify any reading strategies, vocabulary activities, comprehension tasks, and fluency practices that were used by science teachers. Interviews of the science teachers following the observations were conducted to allow the teachers to clarify or expand upon anything observed during the observational part of the study. The focus of this investigation was to identify what practices science teachers are currently using to instruct students on reading in the science content.
CHAPTER IV. DATA ANALYSIS AND DISCUSSION OF RESULTS

The purpose of this study was to determine the role that reading plays in the seventh and eighth grade science classroom. The first part of the study involved the completion of science teacher observations in their science classrooms. These observations consisted of recording field notes of the observed teacher’s use of reading comprehension, vocabulary, and fluency throughout the class period (see Appendix D). The second part of the study was a semi-structured interview that was used as a follow up and an opportunity to gather more information about the teachers’ attitudes and knowledge of reading in the content. This chapter will present the results of the investigation by presenting data obtained from the classroom observations, and then present data obtained from the interviews. A discussion of the results will follow.

Data Analysis Observations

During the observations in the seventh and eighth grade science classroom, teachers used many different aspects of comprehension, vocabulary, and fluency throughout their instruction. Through follow up interviews, some teachers said they were not aware that they were incorporating effective vocabulary, comprehension, and fluency throughout their science instruction. All three aspects of reading were practiced in every class period that was observed. Some teachers seemed more cognizant of their students’ content reading capabilities than others.

Teacher One, Eighth Grade

Teacher One used comprehension, vocabulary, and fluency activities every day during observations. Each aspect of reading was used in various quantities throughout observations. Table 1 shows how many times and explains specific ways Teacher One used
different aspects of reading in his classroom.

Table 1

Teacher One Use of Reading

<table>
<thead>
<tr>
<th>Teacher One</th>
<th>Day One</th>
<th>Day Two</th>
<th>Day Three</th>
<th>Day Four</th>
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</thead>
<tbody>
<tr>
<td>Comprehension</td>
<td>XX</td>
<td>XXX</td>
<td>XXX</td>
<td>XXXXX</td>
</tr>
<tr>
<td>Vocabulary</td>
<td>XXXXXX</td>
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<td>XX</td>
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<tr>
<td>Fluency</td>
<td></td>
<td>X</td>
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</tbody>
</table>

Comprehension

On day one, Teacher One provided the students guided notes on Plate Tectonics (see Appendix G). Teacher One had students fill in guided notes before he went over the notes. The students were expected to read and complete the guided notes and comprehend what they were reading and writing. On Day two, the teacher conducted a lab on lithospheric plates. The teacher split the class into groups. The students were responsible for reading all directions to themselves and completing their lab on their own. During the lab, the teacher walked around the room asking students questions to be sure the students were comprehending the reading material. Overall, the teacher asked a lot of questions from time to time to be sure the students were on task and following directions they were reading.

On day three, the teacher had the students conduct an activity that differentiated divergent, convergent, and transform boundaries. The students had to categorize aspects of these three boundaries by organizing laminated flashcards with information on them. The
students were expected to comprehend the material presented on the flashcards to group them accordingly. Following the activity, the teacher gave students multiple-choice questions that were meant to prepare students for a test. The teacher proceeded to review and asked questions to students to ensure they comprehend what they are reading, writing, and reviewing.

Finally, on day four, the students took a quiz and were expected to read and respond to the questions on their own. The teacher expected the students to read and comprehend the directions and questions on the quiz.

*Vocabulary*

On day one, Teacher One orally reviewed the vocabulary on the layers of the earth. Teacher One said each layer and asked the students what each layer was. The teacher also orally reviewed the vocabulary words *convection, conduction,* and *radiation* with the class. During guided notes, students wrote the definition of each vocabulary word presented. In the guided notes, the vocabulary words were introduced in isolation and the students wrote the definition. During the lesson, Teacher One used vocabulary words in context and in sentences as he explained and expanded on concepts.

On day two, the teacher had the class perform a lab examining plate movement in Hawaii. The students read the lab and completed it on their own, so they were required to understand vocabulary words used in lab. The teacher was available to be sure all students understood the vocabulary in the lab.

On day three, the teacher opened the lesson by instructing the students to compare and contrast the lithosphere and the aesthenosphere. Both words were vocabulary words that were taught through guided notes and reviewed in previous classes. The teacher then
instructed the students to complete an activity showing the difference between divergent, convergent, and transform boundaries. These three vocabulary words were taught in previous classes.

Finally, on day four, students took a quiz matching vocabulary words with their descriptions. These quizzes were given regularly to prepare students for standardized tests. The quizzes forced students to memorize vocabulary words so they could match them up with the correct explanation. After the quiz, the students did an observation lab on the consistencies of the lithosphere and the aesthenosphere with no reading materials. As the teacher explained the observation lab, he used vocabulary words in context of his lesson that had been taught in previous classes.

**Fluency**

On day one, Teacher One read aloud the guided notes to students and added short stories to make the content material easier to comprehend. On day two, Teacher One read directions aloud to students to be sure they comprehended material read aloud to them. Throughout the class, Teacher One paused to read a part of the textbook or lab directions to students. On day three, Teacher One read aloud questions from a test preparation activity the students had to complete for homework. On day four, there was no evidence of reading fluency apparent throughout the class. Overall, fluency was the least practiced of the aspects of reading in Teacher One’s science classroom.

**Teacher Two, Eighth Grade**

Teacher Two used comprehension, vocabulary, and fluency activities almost every day during observations. Each aspect of reading was used in various quantities throughout observations. Table 2 illustrates the number of times and explains specific ways Teacher
Two used different aspects of reading in his classroom.

Table 2

Teacher Two Use of Reading

<table>
<thead>
<tr>
<th>Teacher Two</th>
<th>Day One</th>
<th>Day Two</th>
<th>Day Three</th>
<th>Day Four</th>
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<tbody>
<tr>
<td>Comprehension</td>
<td>X</td>
<td>XXXXX</td>
<td>XXXX</td>
<td>XXX</td>
</tr>
<tr>
<td>Vocabulary</td>
<td>XXXXX</td>
<td></td>
<td></td>
<td>X</td>
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<tr>
<td>Fluency</td>
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<td>X</td>
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</tbody>
</table>

Comprehension

On day one, Teacher Two had the students take out their textbooks and follow along as he went through class notes. Throughout his lecture, Teacher Two referred to the textbook for students to use graphics and other information to make connections between content and the students’ lives. For example, when talking about plate boundaries, Teacher Two referred the class to a picture in the textbook of a volcano. Teacher Two helped students comprehend stories about real occurrences, such as the San Andreas Fault in California to explain how transform plate boundaries work.

On day two, the teacher gives a quiz and reads aloud directions and all quiz questions for the class. Some students read ahead of the teacher and were finished with the quiz before the rest of the class. During this time, the Intervention Specialist was re-reading quiz questions to certain students in the classroom. After the students were finished with the quiz, Teacher Two instructed students to silently read the lab sheet on their desks. Teacher Two quickly reviewed what students read to ensure they comprehended what to
do, and the students completed the lab for the rest of the class period.

On day three, the students were instructed to read a different lab and complete the lab with a partner. The students were reading through provided materials and completing charts when needed. Throughout the class, the teacher circulated the room to be sure the students comprehended the material.

Finally, on day four, the teacher gave worksheets for students to work on for the entire class period. The students were instructed to use their textbooks to help them find answers to the worksheets.

**Vocabulary**

On day one, Teacher Two was providing students with guided notes to review concepts of Plate Tectonics. There were new vocabulary words presented in the guided notes. Teacher Two introduced these vocabulary words by reading the word and its definition. Teacher Two then used the vocabulary words in a sentence for students to hear how the word would be used in context. Teacher Two also utilized the textbook to show graphics and other supplemental material that supported the vocabulary words that were presented in the guided notes.

On day two, the students were responsible for reading and conducting a lab presented to them. There was no vocabulary instruction; however, the students were expected to read and understand the vocabulary words presented in the lab.

On day three, Teacher Two instructed students to perform a lab representing the way magma moves and how it is formed. Teacher Two read lab directions aloud to students and paused to be sure students understood the vocabulary words embedded in the lab. The
students have been exposed to all of the vocabulary words presented in this lab. The students conducted lab for the remainder of the class period.

Finally, on day four, the teacher distributed worksheets for students to complete. There was no formal vocabulary instruction. The teacher circulated the room mid-way through the class to be sure students were on track. The students asked no questions regarding vocabulary on the worksheets.

Fluency

On day one, the teacher read aloud the short phrases presented on guided notes throughout the class period. This exemplified what good, fluent reading sounds like to the class. The students did not read aloud. On day two, Teacher Two read aloud information and directions on the lab that the students were to complete. Throughout the class, the teacher walked around and re-read aloud sections of the lab to struggling students. On day three, the teacher read aloud some background information to students regarding the lab they were going to conduct on that particular day. Teacher Two then read aloud directions students were to complete. Finally, on day four, there was no fluency exemplified by teacher. The students read through and completed their materials individually with no oral reading.

Teacher Three, Seventh Grade

Teacher Three used comprehension, vocabulary, and fluency activities almost every day during observations. Each aspect of reading was used in various quantities throughout observations (see Table 3). Table 3 summarizes the number of times and specific ways Teacher Three used different aspects of reading in his classroom.
Table 3

Teacher Three Use of Reading

<table>
<thead>
<tr>
<th>Teacher Three</th>
<th>Day One</th>
<th>Day Two</th>
<th>Day Three</th>
<th>Day Four</th>
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</thead>
<tbody>
<tr>
<td>Comprehension</td>
<td>XXXXX</td>
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<tr>
<td>Vocabulary</td>
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<tr>
<td>Fluency</td>
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<td>XXX</td>
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</tbody>
</table>

Comprehension

On day one, Teacher Three instructed the students to read over their lab (see Appendix F) to get an idea of what they were doing in class. Teacher Three then read the directions aloud to the students, but instructed the students to read the remainder of the lab to successfully complete the activity. In some groups, one student would read aloud the directions to the rest of his or her lab group. There were both silent and listening comprehension occurring in this class.

On day two, the students continued with their lab from the previous day. Teacher Three continually walked around and questioned the students to be sure they understood what they were reading.

On day three, Teacher Three presented the students with guided notes and read through the notes to the students. Throughout the notes, Teacher Three asked questions to ensure students were following along and comprehending what they were writing and
reading. On day four, Teacher Three instructed students to retrieve their textbooks and read aloud the first part of their new chapter. The teacher then selected students to read out loud different sections from the new chapter in the textbook. At the end of the class, and to finish at home for homework, the teacher assigned the comprehension questions at the end of the chapter.

Vocabulary

On day one, Teacher Three reviewed vocabulary from the previous day by saying a sentence that used the vocabulary word in context, but left the word out of the sentence so the students would complete the sentence. Teacher Three also used science vocabulary words in the context of her conversation with students about content.

On day two, Teacher Three explained the meaning of the word *analysis* by using other forms of the word. She asked the students, “What does analyze mean?” The teacher then used the word *analysis* in a sentence to provide further instruction on the meaning of the word.

On day three, the teacher started the class with the question, “What is another meaning to the word for organisms?” The students responded, “Living things.” Throughout the lesson, the teacher used synonyms to help the students understand the meaning of vocabulary words. Another example of this was on day four when Teacher Three asked the students, “What is a synonym for the word *essential*?” The students responded with *necessary* and *you need it*. Teacher Three also used connections with students for them to remember the meaning of vocabulary words presented. For example, when Teacher Three introduced *stimulus* and *response*, she used the example of when it rains, earthworms respond to the vibrations of the rain and come to the surface.
Fluency

On days one and two, Teacher Three read aloud directions for lab to students, but most of the reading was to be done by the students to themselves or as a group. The teacher gave the suggestion of one student reading aloud the directions to the rest of the group if needed. The most fluency instruction provided by Teacher Three was on day four when she read the textbook aloud to the students. Teacher Three had all students get their textbooks and follow along as she read parts of the textbook aloud. Throughout the reading, Teacher Three called on other students, voluntarily and involuntarily, to read short sections of the chapter aloud to the rest of the class.

Teacher Four, Seventh Grade

Teacher Four used comprehension, vocabulary, and fluency activities almost every day during observations. Each aspect of reading was used in various quantities throughout observations (see Table 4). The following shows how many times and explains specific ways Teacher Four used different aspects of reading in his classroom.

Table 4
Teacher Four Use of Reading

<table>
<thead>
<tr>
<th>Teacher Four</th>
<th>Day One</th>
<th>Day Two</th>
<th>Day Three</th>
<th>Day Four</th>
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<tbody>
<tr>
<td>Comprehension</td>
<td>XXXXX</td>
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<td>XXX</td>
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<tr>
<td>Vocabulary</td>
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<td>XXXXX</td>
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<tr>
<td>Fluency</td>
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</table>

Comprehension
On day one, Teacher Four conducted the same lab as Teacher Three (see Appendix F). The students were responsible to read and comprehend the lab in groups to follow the step-by-step instructions to complete the lab. The students were expected to silently comprehend the directions presented to be successful.

On day two, the class continued the lab they began on day one. When they were finished with the lab, the students answered comprehension questions at the end of the lab. The students answered these questions on an individual basis.

On day three Teacher Four presented guided notes on cells. The teacher went through the guided notes little bits at a time. Throughout Teacher Four’s lecture, she asked the students questions that informally assessed whether or not the students comprehended what they were discussing in class. The students were assigned to read eight pages in their textbook and write a paragraph comparing plant and animal cells.

On day four, Teacher Four continued the guided notes. Toward the end of class, Teacher Four had some students share the paragraphs they wrote comparing plant and animal cells.

Vocabulary

On day one, the teacher reviewed the vocabulary words mass, volume, and density by simply asking the students what each of them meant and how they were measured. Throughout the class, Teacher Four used science vocabulary in her conversations with students. On day two, the students continued to work on their lab. Teacher Four circulated through the room to be sure students understood vocabulary and were using science vocabulary effectively. Days three and four, Teacher Four used guided notes to present a new concept. There was a lot of new vocabulary embedded in these guided notes. When
new vocabulary was introduced, Teacher Four made connections that students could relate to for them to remember the meaning of the word. For example, the teacher told the students to compare *ribosomes* and *proteins* to the bones in the body.

**Fluency**

On days one and two, Teacher Four read aloud the directions to the lab the students were assigned. The students were responsible to read the lab on their own to complete it. In some groups, one group member read aloud the directions to the rest of the group. By the students reading aloud, they were practicing fluency. On days three and four, the teacher read aloud the guided notes that were presented to the class. The students were responsible for reading their textbook for homework, but it is unknown if the students read silently to themselves or read aloud fluently.

*Teacher Five, Seventh Grade*

Teacher Five used comprehension, vocabulary, and fluency activities almost every day during observations. Each aspect of reading was used in various quantities throughout observations. Table 5 illustrates how many times and the specific ways Teacher Five used different aspects of reading in his classroom.

**Table 5**

Teacher Five Use of Reading

<table>
<thead>
<tr>
<th>Teacher Five</th>
<th>Day One</th>
<th>Day Two</th>
<th>Day Three</th>
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<td>Comprehension</td>
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<td>XXX</td>
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<tr>
<td>Vocabulary</td>
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</tbody>
</table>
**Fluency**

| X |

**Comprehension**

On day one, the students used the day as a final workday to do research for a project. The students were all on computers and silently reading the research they were retrieving. Some students were writing notes and others were printing information. Students were expected to read and comprehend the information.

On day two, the students presented their projects on living organisms. During presentations, the students read information from a PowerPoint or poster they created. The rest of the class followed along, but were expected to comprehend what was being read aloud to them.

On day three, Teacher Five had the students walk around the room and read all projects that were completed for the unit. The students had to read information from posters and PowerPoint presentations and take notes on what they found. For information acquisition, students silently comprehended what they were reading on other students’ projects. On day four, the students took a quiz that they read on their own. After the quiz, the students used their textbooks to complete a worksheet. Before students began, Teacher Five instructed students to look at the Table of Contents and go through the chapter and look at headings before they read the chapter. This was evidence of a pre-reading strategy.

**Vocabulary**

On day one, there was no vocabulary instruction; however, students were expected to understand the vocabulary that was embedded in their research project. On day two, as students presented their information, they used vocabulary words in context. There was no
clarification or defining the vocabulary words by either the teacher or student. On day three, as the students circulated the room and recorded observations of other students’ projects, they had to understand the vocabulary they recorded to comprehend the content presented on the presentations. On day four, the words *parasitism, mutualism,* and *commensalism* were written on the board in isolation. After the students took their quiz, they used their textbooks to fill out a worksheet that had to do with the three vocabulary words written on the board. The teacher did not review the vocabulary words before the students began to work.

*Fluency*

During student presentations on day two, students read aloud their presentations from a poster or PowerPoint while the rest of the class listened. The students read their information fluently without much trouble. During one presentation, the student could not pronounce the word *salmon* and the teacher had to repeat the pronunciation of the word *salmon* twice after. The student comprehended what a salmon was, but did not pronounce it correctly. On day four, Teacher Five read aloud directions to the quiz to be sure the students comprehended what they were supposed to do.

Data Analysis Teacher Interviews

Each of the five teachers took part in a follow up interview after all observations were completed. Included in this interview were various questions that touched on their personal attitudes towards reading, content reading strategies, and what they do personally in their science classroom when it comes to reading science materials (see Appendix E). All five teachers said that they read for pleasure in their spare time, but for different reasons. Four of the five teachers said they read to relax and for fun, but Teacher
One only read to catch up on current events via newspapers or online articles.

When asked about how they use the textbook in their classroom, all five teachers responded in a variety of ways. It was evident that the school provided the science department with textbooks that cater to the seventh and eighth grade curriculum and that are appealing to students. The teachers all agreed that they used the textbook as a supplement to the concepts they were currently teaching. All teachers said they used the textbook to show the students pictures and graphics of what they were learning. The biggest concern of the teachers was that even though the textbook was appealing to the eye, the content was still written at a higher level. Teacher Two mentioned that he and the intervention specialist re-wrote some parts of the test to accommodate students who are struggling readers. Other barriers mentioned in science reading material were vocabulary acquisition and the fact that the textbook was not accommodating for a wide range of reading levels. Four of the five science teachers said they used trade books to help students with concepts. These trade books included chapter books (*Hoot*) to give a fictional example of a science concept and others were informational trade books that supplemented textbook material.

All five teachers indicated during the interviews that they incorporated some kind of content reading strategy into their daily science class. For example, Teacher Two reported spending an entire class at the beginning of the year on content reading strategies that the students could apply to all science readings (see Appendix H). Teacher Two required students keep their guided notes in their science folder to refer back throughout the year. The other teachers interviewed said they used pre, during, and post reading strategies such as reading the headings and skimming through text instead of reading the material
carefully. Teacher Three used paired readings to practice fluency and to help students comprehend reading. Three of the five teachers said that it was crucial to provide a purpose for reading materials, as it motivated students to actually read it and held them accountable. All five teachers mentioned that they taught vocabulary in a variety of ways ranging from teaching words in isolation and giving the definition to using new vocabulary in phrases or asking students to use context clues to figure out the meaning of words. Teacher Two said that he asked students to break vocabulary words into smaller words to figure out the meaning of words.

All five teachers who were interviewed had some form of training in content reading. One of the five teachers has completed his Master of Education degree in reading education and another one of the five is currently pursuing her advanced degree in reading. Based on these two teachers’ response to interview teachers, they appeared more knowledgeable and more aware of the need for content reading strategies in their every day science classrooms. The other three teachers have either taken undergraduate courses in content reading or have attended professional development conferences to receive training in content reading. The teachers who have graduate level content reading courses were more aware and more cognoscente of the need for content reading, but the teachers who do not have the strong background were willing to learn and think content reading is important.

All five teachers who were interviewed were aware of which students in their science classes were struggling readers. Many of their struggling readers were in their inclusion classes. It was helpful to them that the intervention specialist re-reads materials to struggling readers to help them digest the material. Teacher Four said she read
questions and other materials aloud to certain students she knew were struggling. All five teachers read aloud to their students on a daily basis, whether directions for an activity, guided notes, or the textbook. Based on the interview responses, the students do not read aloud very often during class. Teacher Three said the only time her students read aloud was when they did popcorn reading, whole class reading, or paired reading.

Discussion of Results

This study was conducted to determine the role of reading in seventh and eight grade science classes. Through observations and interviews, the aspects of comprehension, vocabulary, and fluency were examined. Based on both observations and interviews, reading played a major role in the seventh and eight grade classroom. All three aspects of reading were evident in all five classrooms observed.

Comprehension

Based on observations, students had to comprehend science material by either reading material to themselves or listening to materials being read aloud to them. The students were presented with textbooks and other supplemental material that they were responsible for reading and comprehending themselves to be able to successfully complete daily activities.

Vocabulary

Based on observations, the role of vocabulary in all five of the science classrooms was significant. All five teachers observed constantly used science vocabulary in their instructions and other conversations with students about content that was currently being instructed. Vocabulary was taught either in isolation with the definition that followed or in context of a textbook or short phrases presented in either verbal explanations by teachers
or by guided notes. Vocabulary was a crucial part of students understanding what was asked of them on a daily basis because if they did not understand the vocabulary embedded in instruction and other reading materials, they would not understand the content, nor could they complete activities successfully.

**Fluency**

The role of fluency in the seventh and eighth grade science classroom was significantly smaller than comprehension and vocabulary. Overall, based on observations, the only evidence of fluency was when the teachers read aloud the textbooks, directions, and other supplemental materials. There was only one instance observed that students practiced fluency by reading the textbook aloud.

**Overall Reading**

Based on interviews, teachers were aware that content reading is important and that comprehension, vocabulary, and fluency instruction must exist for students to learn content they are expected to read. All five teachers said they use strategies such as pre, during, and post reading, book walks, and vocabulary acquisition activities to help students understand content. Based on interviews, all five teachers indicated that the role of reading in their science classroom was crucial for students to succeed and reach their potential as science students. The roles of comprehension and vocabulary were the most important, based on interviews, because they go hand in hand. If students did not understand vocabulary, they would not completely comprehend reading material with vocabulary embedded. Fluency is important, based on interviews, and used in ways such as textbook
read alouds and paired assigned readings, but falls below vocabulary and comprehension in importance.

Summary

Data collected through observations and interviews of five seventh and eighth grade science teachers indicated that teachers are aware of the importance of content reading and that they all implement a strategy to supplement that awareness. The teachers used strategies such as pre, during, and post reading strategies, partner readings, giving a purpose for reading, reading aloud, and various ways to teach new science vocabulary. Class observations and teacher interviews exposed the true importance of incorporating content reading strategies in a subject area that is filled with difficult vocabulary and difficult concepts to grasp. Teacher interviews also indicated that the teachers have an overall positive attitude towards content reading and are willing to try new things to help their students comprehend new material. Overall, all five teachers used a great variety of strategies to match their personal teaching styles and to reach the unique groups of students they teach on a daily basis.
CHAPTER V. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The purpose of this study was to determine the role that reading plays in the seventh and eighth grade science classroom. The first part of the study involved the completion of science teacher observations in their science classrooms. The second part of the study was a semi-structured interview that was used as a follow up and an opportunity to gather more information about the teachers’ attitudes and knowledge of reading in the content. This chapter includes a brief summary of the study, conclusions drawn from the study, and recommendations for further research.

Summary of Study

The purpose of this research study was to discover the role that reading plays in the seventh and eighth grade science classroom. More specifically, the study sought to discover how teachers incorporated reading comprehension, vocabulary acquisition, and fluency into their daily lessons. A review of literature examined the history and theories of content reading and what aspects affect the motivation of students in content reading. The literature review also examined comprehending content material and textbooks, teacher’s attitudes towards content reading, the role of reading in scientific thinking, and problems with science reading materials.

A research design consisting of observations and interviews was used to investigate the role of reading in the seventh and eighth grade science content classroom. Two eighth grade and three seventh grade teachers were observed for four class periods each and field notes were taken during observations. Field notes recorded any time the teacher used reading comprehension, vocabulary, or fluency throughout his or her instruction. After all observations were complete, all five teachers were interviewed to follow up with the data
collected during observations. Narratives of observations and transcripts of interviews were developed and analyzed. Conclusions from this analysis follow.

Conclusions

Conclusions for this research study are grounded by issues and topics presented in the literature review. The remaining categories developed as a direct result of the data analysis of the observations and interviews conducted during the study. These categories include: the importance of teacher preparation, the need for content reading instruction, teacher attitude towards content reading, strategies currently used in content reading, and the roles of comprehension, vocabulary, and fluency in science instruction.

Teacher Preparation

Based on observations, there seems to be three categories of science teachers who took part in this study. The first category consisted of the teachers who have a strong background in reading instruction and purposefully use reading strategies on a daily basis. They use these strategies because they know, based on their own education, that the strategies are effective and will help students not only read, but better comprehend the science material and concepts. Teachers Two and Three fall into this category.

The second category, where Teachers Four and Five fall, included the teachers who utilize reading strategies and effective reading practices in his or her science classroom, but were not necessarily aware that they were doing so. These teachers had very little background in reading instruction. For example, Teacher Four provided students with a vocabulary sheet that had students use new vocabulary words in sentences, in an illustration, and in a definition. When asked in Teacher Four’s interview, Teacher Four did not mention this as a strategy for vocabulary acquisition.
Teacher Five had a background in early childhood education, which incorporated learning to read. However, Teacher Five had very little background in content reading. Based on observations, Teacher Five naturally used reading and vocabulary strategies throughout her class in some way. The last category encompassed Teacher One. In this category, Teacher One used vocabulary words and basic questioning strategies to help students in content classroom reading. This teacher had the least content reading education background. Based on observations, this teacher had different pieces of knowledge about content reading, but did not put all the pieces together to create successful content reading strategies.

**Content Reading**

Research shows that text reading in content areas requires more effort from the student to read, process, and comprehend materials (Brozo & Flynt, 2008). With that in mind, content teachers must use reading instruction to help students navigate through the difficult text presented to them. Based on observations in the seventh and eighth grade science classrooms, all of the teachers included some form of content reading strategy that helped students with vocabulary, reading comprehension, or fluency. Some examples of strategies were guided reading, giving students a purpose for reading, presenting vocabulary in a variety of ways, and used questioning to be sure students comprehended what they were reading.

Based on research and field observations, it is necessary for teachers to include reading instruction as part of their science curriculum. Materials, especially textbooks, can be very difficult for students to comprehend. Reading instruction includes giving students a purpose for reading. Pressley (2002) believed that teaching students how to think about
what they are getting ready to read is a key concept of comprehending text. Giving students a purpose for reading in the textbook will improve overall comprehension and understanding.

During observations, Teachers Two and Four both presented a purpose for reading the science textbook. Teacher Four presented her purpose for reading by previewing what she expected the students to obtain from the reading before they read it. Teacher Two used the textbook as a supplement to his instruction by referring students to their textbook to examine graphics and other pictures that went along with the content he was teaching. Teacher Four assigned textbook reading for homework and spent approximately 10 minutes giving the students a preview of what they would be reading. This strategy gave students some background information and sparked curiosity to motivate them to read. Teacher Four also expected the students to come in to class the next day with answers to her guided notes going over the chapter. This was a way to keep students accountable, which gave another purpose for reading. Teacher Five had students look at the Table of Contents and skim through the headings of the chapter they were suppose to read so they got an idea of what they were going to be reading about.

Teacher Attitude

The teacher is the only one who can decide whether or not he/she should use content instruction time to implement strategies for content reading and comprehension (Tovani, 2004). Based on observations, all five science teachers observed used some kind of content reading strategy in their instruction. Vocabulary plays a large role in daily science activities and it is crucial that the students not only understand the vocabulary, but they can apply it to other science concepts. For example, Teachers One and Two were both
teaching units on plate tectonics. Both teachers did labs that supplemented the material that were engaging and cooperative. However, if students did not understand the difference between the lithosphere, aesthenosphere, and different plate boundaries, they were unable to successfully complete the labs because they couldn’t completely comprehend. During observations, students appeared to understand the different plate boundaries and other vocabulary based on the success of the completion of their labs and the correct answers to the teachers’ questions that were asked.

Based on interviews conducted with the five science teachers observed, all five replied that they read for pleasure. Four of the five teachers read daily for enjoyment and one of the five only read the newspaper or online articles. The teachers generally had a good attitude towards reading in their personal lives. Five of the five teachers expressed that they were aware of the need for reading instruction in their science classroom and found it necessary for there to be some sort of intervention for the struggling readers in the class. Teacher Two devoted an entire lesson on content reading strategies at the beginning of the year (see Appendix H). He presented students with pre, during, and post reading strategies. Teacher Two admitted in the interview, however, that he does not revisit these strategies very often throughout the remainder of the year.

Gillespie and Rasiniski (1989) believe that it is absolutely necessary for teachers to have a positive attitude towards reading instruction in the content classrooms. If teachers have this positive attitude, the students will be more successful in learning content through reading. The teacher interviews showed that all five teachers have had some content reading training or instruction, ranging from a few classes to a masters degree in reading. Based on observations and interviews, seventh and eighth grade science teachers value
content reading and are aware that it is an issue. With the teachers’ previous training, they also have knowledge of how to use reading instruction in their science classroom. All teachers interviewed had a positive attitude towards content reading instruction and were open to learning more ways to make content reading a bigger part of their science curriculum.

*Roles of Comprehension, Vocabulary, and Fluency*

Reading comprehension, vocabulary acquisition, and fluency are the three aspects of reading that were observed in the five seventh and eighth grade science classrooms. Based on observations, all five of the science teachers exemplified all three of these aspects throughout their daily class activities in different means. Based on the individual teacher’s background in reading, each teacher used more or less effective reading strategies in their particular classrooms. Reading comprehension was present in two forms, listening and silent comprehension. Most of the time, the teachers read directions aloud to students and the students responded with an understanding of what they were supposed to accomplish. At times, the students were expected to read independently. For example, Teacher Three instructed students to read all the steps in their lab so they knew exactly what to do. When the students were responsible for reading the material on their own, there was more confusion on what was to be completed. This was because they students simply didn’t read the text or they didn’t comprehend what they read. Sampson, Rasinski, and Sampson (2003) state “To achieve success in school, students must acquire the skills necessary to comprehend expository texts” (p. 468).

Science vocabulary acquisition and review took up a lot of the class time. In all science activities, if students could not understand the vocabulary, they could not
successfully complete and understand the activities and labs for which they were responsible. Vocabulary knowledge goes hand in hand with comprehending content material. Freebody and Anderson (1983) believe that students that know and fully understand vocabulary that they read and hear comprehend reading material more than those students that do not. This was evident during the observations that took place because teachers reviewed vocabulary repetitively to be sure students understood. Also, all students were able to successfully complete the labs, which is an indication that they understood the main vocabulary that was presented on the lab. Based on teacher interviews, all five teachers taught vocabulary and reviewed on a daily basis. Two of the five teachers mentioned that they presented the new vocabulary word in isolation and gave the definition. The teachers used a lot of their science instruction time to teach and review vocabulary, which shows that it is an important role in the science content.

The aspect of fluency was by far the least instructed aspect of reading that was evident in the five science classrooms observed. All five teachers observed read science material aloud for students. The read aloud opportunities consisted of reading directions, reading textbook selections, or clarifying a reading for students that had questions. Teacher Three had students read aloud, after she modeled reading, out of the textbook. Teacher Three selected students randomly to read aloud. It was a way to change the reading and make it interesting for students listening. Overall, it seemed that if students heard science reading, they comprehended information much better than if they had to read silently on their own. Based on these observations, it can be concluded that teachers need to incorporate more reading aloud of science material to their students.

Barman (1992) believes that teachers being poorly prepared to teach students how
to read the science material they are presented results in a lack of effective instruction in reading from science materials. Based on observations, Teachers Four and Five prove this to be false. Teachers Four and Five have very little to no educational background in content reading, but yet utilize comprehension, vocabulary, and fluency strategies in their classroom daily. During an observation on day one, Teacher Four proclaimed in an informal conversation that she is a “science teacher, not a reading teacher.” However, Teacher Four used strategies such as pre-reading the textbook, response to reading through application, teaching vocabulary in context, and reading aloud to students as well as having students read aloud to her and each other. Teacher Four was using reading strategies without realizing it.

Recommendations

The completion of this research study warrants several recommendations for teachers. These recommendations are given in terms of what teachers can do to help develop students’ reading comprehension, vocabulary acquisition, and fluency in science content reading. Also, recommendations to show how teachers can be proactive in terms of their own knowledge and attitudes to promote content reading on a daily basis on their science classrooms.

**Comprehension**

To ensure that students comprehend material they read silently or listen to orally, teachers must constantly assess students using a variety of strategies to be sure the students comprehend what they read. Strategies could be simple questioning, summarizing, or quick writes. By using these strategies, teachers will be more aware of who can comprehend reading material and who needs extra help. If teachers know who
their strong readers are, they can pair strong readers with struggling readers to get through materials together. Science teachers should also continue to read aloud to students on a regular basis. Principals should provide teacher in-services that expose teachers to narrative books that could be read aloud or shared with classes to supplement what is being taught out of the textbook.

Any time teachers assign reading for students to do independently, they should always provide students with a purpose for reading. Giving students a purpose will motivate them more instead of just assigning pages to read. Teachers can provide a purpose for reading by previewing what they are responsible for learning in the chapter or by summarizing the chapter. Teachers can also do a text walk with the students and have them open their books and read headings and key vocabulary words before they begin reading. Paired readings, whole class readings, and other various ways to get through content material helps keep variety in the content reading and students interested. It is also recommended that teacher incorporate more trade books with science information to reinforce concepts taught during guided notes, labs, and textbook readings.

**Vocabulary**

Vocabulary is a large part of comprehending science concepts and there is a lot of important vocabulary that students must understand to be successful in science. It is recommended that vocabulary be taught and revisited on a daily basis. It is also recommended that teachers continue to use science vocabulary in their conversational speaking during science class. This allows students to hear difficult vocabulary being used in context, which attached meaning to words. Another effective way for vocabulary acquisition is for the teacher to make connections with the students’ lives and vocabulary.
By a teacher relating a nucleus of a cell to a brain, which controls us, students will make that connection and remember the function of the nucleus. Teachers could also create word walls for different units. These word walls could have pictures that accompany the words to help students apply the word to a real concept.

It is recommended that all teachers in the science department meet to discuss and brainstorm ideas to incorporate vocabulary and comprehension into their science classrooms. By working together, they can collectively identify skills and strategies that have worked and that have not worked. By coming together to brainstorm ideas, the teachers that have stronger backgrounds in reading instruction can help the students with little to no reading instruction background make reading in their science classes a more prominent part of instruction.

**Fluency**

In the science classroom, fluency was practiced the least of the three components of reading that were studied. Even though fluency is not as crucial and relevant to science concepts, it is still important. It is recommended that teachers read aloud to students often. Students comprehend science materials more efficiently by using their listening vocabulary rather than their silent reading comprehension. By listening to the teacher read aloud, the students will understand how to read the material themselves. They will hear what good reading sounds like. Also, if teachers continue to read aloud to their students, they can pause after reading sections and apply content read to the students. By modeling this, students will be more likely to dissect the reading and apply newly acquired knowledge to science concepts. Students should also practice their fluency by reading aloud. This can be accomplished by paired or partner reading or the teacher can recommend students read
aloud at home while going through their science text.

*Teachers Being Proactive*

It is very important for teachers to continually build their knowledge of content reading in their science classrooms. Teachers taking content reading classes at the graduate level or taking part in professional development sessions can accomplish this idea. Teachers who have strong backgrounds in reading could present a teacher in-service on effective and research-based reading strategies that can easily be implemented into daily content instruction. There are also many books available that teachers can read to locate new strategies for reading comprehension and vocabulary. It is recommended that teachers chose a book and have an informal book club to discuss ideas and other ways to incorporate content reading strategies into their every day instruction. Teachers can also be proactive by modeling positive attitudes towards reading themselves. Teachers can talk about books they are currently reading or want to read. They can also model good reading strategies for students to see.

Teachers need to become more aware of all the aspects that reading holds. Some teachers did not realize that vocabulary instruction is a part of reading instruction. Based on a lack of reading background, teachers did not fully understand all the reading jargon and terms used in effective content reading. However, they used strategies that supported evidence based effective reading instruction. These teachers need to be more aware of what they are already doing in their classroom to integrate content reading. By becoming more aware, they can use reading instruction on purpose to help students read materials, acquire new vocabulary, and read a variety of science texts fluently.
Summary

This chapter presented a summary of this research study as well as conclusions formed from the study and recommendations for science teachers. It was concluded that all science teachers who took part in this study were at least aware of the need for some kind of content reading instruction in their daily activities. The teachers had an overall positive attitude towards reading and believe reading plays a crucial part in the seventh and eighth grade science classroom. The teachers who had the strongest background in reading instruction used more purposeful and effective reading strategies than the teachers lacking background education in reading instruction. Some teachers utilized reading strategies in their instruction without knowing that what they were doing was effective content reading instruction. There are many recommendations for teachers to incorporate more strategies for reading comprehension, vocabulary acquisition, and fluency in their science classes as well as being proactive in educating themselves on new ideas to improve content reading of science materials.
REFERENCES


APPENDIX A

INTERVIEW FORM FOR SCIENCE TEACHERS
Appendix A
Interview with Science teachers

Preface: Any follow-up questions based on observations. (Example: Why did you do what you did in class? Do you do that regularly?)

1. How often do you read for pleasure?
   - Why do you think it’s important?

2. Describe how you have your students utilize reading (oral reading, silent reading, peer discussion, homework assignments, etc.) and what kind of materials do they use?

3. Do you ever incorporate trade books into your science classroom? How are they used?

4. Do you expect your students to read at home?

5. How do you think textbook reading helps the students understand the content?

6. Have you provided any direct reading instruction in your science classroom?
   - If so, in what form?
7. What barriers have you faced when assisting or teaching reading in your science classroom?

8. How do you typically teach new vocabulary?

9. Typically, how does reading comprehension instruction occur in your classroom?

10. Describe any strategies you use to help your students read?
    - If so, what do you do?

11. Describe the training you have received on content reading strategies?
    - If so, what training do you have?

12. Are you aware of the students in your class that need extra reading help?
    - How do you help these students on an individual basis?

13. Do you assign textbook reading to the students in your class?
    - Do you assign it for homework?
    - Do they read aloud?
    - Do you read aloud?
APPENDIX B

CONSENT TO OBSERVE TEACHERS
CONSENT FORM TO OBSERVE

Dear Teacher,

I am a graduate student at Bowling Green State University pursuing my Master’s Degree in Reading and am conducting a study for my thesis. You are invited to be a participant in a research study on the role of reading in the science classroom. The purpose of this study is to gather information through observations and interviews of what role reading and reading strategies plays in 7th and 8th grade science classrooms. This information will be used to provide science and other content teachers with strategies and knowledge of how to incorporate reading into the classroom.

This study will involve me observing you for 5-7 of your science classes. During the observations, I will be taking field notes on how reading is incorporated into your science class. The purpose of the observations is for me to learn what types of reading and reading strategies take place in the 7th and 8th grade science classrooms. This study will benefit you as a science educator by allowing you to learn more about reading in the science classroom and apply the knowledge you gain to your classroom content reading practices for effective instruction.

The anticipated risks to you are no greater than those normally encountered in daily life. The information that I glean during the observations will remain confidential and your name will not be revealed in any published results of the study. My observations of you will be transcribed and analyzed, but at no time will your name be included in the study. Participants will be referred to as a pseudonym (e.g. Teacher 1, ...). All material and documentation will be locked in a cabinet in 555 Education Building for confidentiality purposes. Participation in this observational study is voluntary, and you are able to refrain
from any part without penalty or explanation and you are free to withdraw completely at any time. If you have any questions or comments about this study, you can contact me (Jessica Cooper) at 419-303-8210 or at jescoop@bgsu.edu. You may also contact my advisory, Dr. Cindy Hendricks at 419-372-7320 or at cindyg@bgsu.edu. You may also contact the Chair of Bowling Green State University’s Human Subjects Review Board at 419-372-7716 or at hsrh@bgsu.edu if you have any questions about your rights as a research participant. Thank you for your time and participation.

By signing this consent form you are indicating you have read this document and give your consent to participate in this observational study.

Teacher’s Signature: __________________________________________________________________________

Date: ____________________
APPENDIX C

CONSENT TO INTERVIEW TEACHERS
CONSENT FORM TO INTERVIEW

Dear Teacher,

I am a graduate student at Bowling Green State University pursuing my Master’s Degree in Reading and am conducting a study for my thesis. You are invited to be a participant in a research study on the role of reading in the science classroom. The purpose of this study is to gather information through observations and interviews of what role reading and reading strategies plays in 7th and 8th grade science classrooms. This information will be used to provide science and other content teachers with strategies and knowledge of how to incorporate reading into the classroom.

This study will involve you participating in a one-half-hour interview, scheduled at a convenient time for you. The dialogue during the interview will be tape-recorded. The purpose of the interview is for me to learn about your knowledge and views on incorporating reading strategies and skills into the science classroom. This study will benefit you as a science educator by allowing you to learn more about reading in the science classroom and apply the knowledge you gain to your classroom content reading practices for effective instruction.

The anticipated risks to you are no greater than those normally encountered in daily life. The information that you provide during the interview will remain confidential and your name will not be revealed in any published results of the study. The tape-recorded interview will remain in a locked cabinet throughout the study and will be destroyed upon completion of the study. Your responses to the interview questions will be transcribed and analyzed, but at no time will your name be included in the study. All material and documentation will be locked in a cabinet in 555 Education Building for confidentiality.
purposes. Participation in this interview is voluntary, and you are able to refrain from any part without penalty or explanation. If you have any questions or comments about this study, you can contact me (Jessica Cooper) at 419-303-8210 or at jescoop@bgsu.edu. You may also contact my advisory, Dr. Cindy Hendricks at 419-372-7320 or at cindyg@bgsu.edu. You may also contact the Chair of Bowling Green State University’s Human Subjects Review Board at 419-372-7716 or at hsrb@bgsu.edu if you have any questions about your rights as a research participant. Thank you for your time and participation.

By signing this consent form you are indicating you have read this document and give your consent to participate in the interview.

Teacher’s Signature: ________________________________________________________________

Date: __________________________
APPENDIX D

TEACHER OBSERVATION FIELD NOTES
# Field Notes

<table>
<thead>
<tr>
<th>Time</th>
<th>Reading</th>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>2/5/2009</td>
<td></td>
<td><strong>Teacher 1</strong> 8th Grade</td>
</tr>
<tr>
<td>9:45am</td>
<td>Writing</td>
<td>Class Begins, Unit: Earth Movers Observations of Environment: Posters, student work hanging up with writing and drawing.</td>
</tr>
<tr>
<td></td>
<td>Vocabulary</td>
<td>Students write in their agenda. Also, had a quick write for 5 minutes about Earth Movers Orally reviewed vocabulary (layers of the earth)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Orally reviewed convection, conduction. Teacher used examples in real life (vocabulary in context). Teacher presents a “memorizing” technique for vocabulary.</td>
</tr>
<tr>
<td>9:52am</td>
<td>Comprehension/</td>
<td>Guided Notes on Plate Tectonics Teacher instructs students to fill out notes on their own and copy from overhead</td>
</tr>
<tr>
<td></td>
<td>Writing</td>
<td>Students copied notes with new vocabulary onto their guided notes.</td>
</tr>
<tr>
<td></td>
<td>Vocabulary</td>
<td>Vocabulary is presented as a word and definition (in isolation). Teacher had students copy notes before explaining content. Notes are presented in short phrases.</td>
</tr>
<tr>
<td></td>
<td>Vocabulary</td>
<td>Teacher uses new vocabulary words (lithosphere) in context when explaining.</td>
</tr>
<tr>
<td>10:00am</td>
<td></td>
<td>Teacher explanation of content tells a “story.” When explaining continental drift. Teacher uses new vocabulary in the context of his “story.” Teacher had students “use their imagination” to explain the mid-Atlantic Ridge. Defined vocabulary word by stating word and giving definition (isolation).</td>
</tr>
<tr>
<td>10:07am</td>
<td>Vocabulary</td>
<td>[*Overall, teacher 1 uses a lot of “connections” that add meaning of vocabulary.] Teacher uses graphics to support new vocabulary words. Teacher uses flow chart (graphic organizer) of plate tectonics to organize new vocabulary words and concepts. [This is a good way to put all the new words together for comprehension and meaning- students see how all words work together]</td>
</tr>
<tr>
<td>10:15am</td>
<td>Vocabulary</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Vocabulary/</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Comprehension</td>
<td></td>
</tr>
<tr>
<td>10:30am</td>
<td></td>
<td><strong>Teacher 2</strong> 8th Grade</td>
</tr>
<tr>
<td></td>
<td>Vocabulary</td>
<td>Class Begins: Plate Tectonics, uses SmartBoard Classroom Environment: A lot of student work (drawings, writings, and projects). Vocabulary words hung up around the</td>
</tr>
<tr>
<td>Time</td>
<td>Activity</td>
<td>Notes</td>
</tr>
<tr>
<td>------------</td>
<td>-----------------------------------------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>10:35am</td>
<td>Vocabulary/Textbook Reading</td>
<td>Teacher had students get their textbooks out to follow along with notes as they went along. Teacher instructed students to fill out guided notes as best as they could using their textbook. Teacher introduces new vocabulary with a definition. [<em>Students keep textbooks in front of them but not everyone is using them</em>] Teacher explaining content like a “story.” Teacher says the new word (sea-floor spreading) and gives the definition, not in context.</td>
</tr>
<tr>
<td>10:41am</td>
<td>Vocabulary</td>
<td>Teacher used a map of the world to supplement vocabulary. [<em>This seems to be making connections for students</em>] Teacher uses a lot of graphics to support new vocabulary. Teacher also refers to graphics that are in the students’ textbooks for them to refer to during class. Teacher continues to present new vocabulary followed by definition (in isolation). [<em>There isn’t any fluency practice out of the textbook</em>]</td>
</tr>
<tr>
<td>10:50am</td>
<td>Vocabulary</td>
<td>Teacher uses real life examples (real volcanoes in the world) to teach convergent plate boundaries. Teacher uses textbook: “Look at page 33 – find the Mid-Atlantic Ridge.” Teacher uses diagram to support reading and new content. Teacher continues to use graphics to support vocabulary. Teacher uses a graphic organizer that includes all new vocabulary that “ties it all together.”</td>
</tr>
<tr>
<td>11:00am</td>
<td>Comprehension</td>
<td>Class Begins: Bubble Gum Lab (mass, volume, density) Classroom environment: Graphics on white board with vocabulary words listed on board: controlled variables, independent variable, mass, density, volume, and control.</td>
</tr>
<tr>
<td>11:05am</td>
<td>Vocabulary/Comprehension</td>
<td>Teacher instructs the students to “completely read through the lab before you begin.”</td>
</tr>
<tr>
<td>11:15am</td>
<td>Vocabulary</td>
<td>Teacher reads aloud instructions for lab. Teacher uses vocabulary words in context while explaining the lab. “The independent variable is the__________ and the dependent variable is the__________”</td>
</tr>
</tbody>
</table>
| 11:25am    | Vocabulary                                    | Teacher asks students to read aloud the lab directions in a group or one student reads aloud to the rest of the group.
<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Description</th>
</tr>
</thead>
</table>
| 11:30am | Fluency                         | [*Students MUST read labs to know what to do, step by step. If they cannot read it, they will have no idea what to do because the teachers did not show them or tell them, they were on their own to read it and perform the lab.]  
  Teacher instructs students to read and record label information from packaging of gum to help their experiment. |
| 11:40am | Comprehension                  | Teacher walks around and help students with recording information and asking questions to be sure students understand the reading.          |
|       | Comprehension                  | A lot of questioning happens during lab by the teacher to help students comprehend what they are being asked to do.                         |
|       | Comprehension                  | [*Not a lot of direct vocabulary review/instruction- I assume the students have already been exposed to these vocabulary words and understand their meaning.  
  Teacher continually circulates throughout the lab, asking questions and having conversations with students to make sure they are understanding/  
  Teacher constantly uses vocabulary in context for student understanding.  
  Teacher continues to circulate, question, and explain the use of vocabulary.  
  Teacher stops to review the concept of density, which is a vocabulary word. |
| 12:00pm | Class Begins: Lab, Inclusion class | [*Reading material fairly easy to read, vocabulary used in context.]  
Students silently read over directions to lab.             |
|       | Vocabulary                      | Teacher asks, “What happens to mass and density as gum is being chewed?” [*Teacher assumes students know what mass and density are] |
| 12:12pm | Comprehension/ Vocabulary       | Teacher instructs students to read the labels on the gum and }
<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>12:20pm</td>
<td>Vocabulary</td>
<td>Students must read these labels. Teacher reads aloud directions on lab. Students are then responsible to read through the lab on their own to figure out what to do step by step.</td>
</tr>
<tr>
<td>12:31pm</td>
<td>Silent Comprehension</td>
<td>Teacher quizzes the students on vocabulary having them fill in the blank. Example: “Controlled variables are ________.” Teacher continues to quiz students on vocabulary to spark background knowledge.</td>
</tr>
<tr>
<td></td>
<td>Fluency</td>
<td>Teacher encourages one student in a lab group to read aloud and the rest listen.</td>
</tr>
<tr>
<td>12:37pm</td>
<td>Vocabulary</td>
<td>Teacher still walking around to question and help students apply what they are reading.</td>
</tr>
<tr>
<td></td>
<td>Comprehension</td>
<td>Teacher stops students and reads aloud a section of the lab to be sure that students understand that part of the lab.</td>
</tr>
<tr>
<td></td>
<td>*Overall, it seems teacher uses a lot of comprehension strategies such as questioning and unfinished sentences.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>*By writing down data and lab answers, do students understand/comprehend the material they are collecting more efficiently?</td>
<td></td>
</tr>
<tr>
<td>Teacher 5 7th Grade 1:15pm</td>
<td>Silent Comprehension</td>
<td>Class Begins: Research Day, students are researching living organisms and preparing a presentation on their research.</td>
</tr>
<tr>
<td>1:20pm</td>
<td></td>
<td>Teacher instructs students to continue their research from the day before. This includes reading out of their textbooks and other books they found from the library. Research also includes reading information from the internet.</td>
</tr>
<tr>
<td>Time</td>
<td>Activity</td>
<td>Notes</td>
</tr>
<tr>
<td>--------------</td>
<td>-----------------------------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>1:24pm</td>
<td>Silent Comprehension</td>
<td>The majority of students research on the internet.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[*Teacher does not provide any direct reading instruction for the students to read their research.]</td>
</tr>
<tr>
<td>1:30pm</td>
<td>Comprehension</td>
<td>Teacher circulates the class throughout the entire period to be sure students comprehend what they are reading. Teacher asks questions that allow students to expand upon what they are learning.</td>
</tr>
<tr>
<td>2/6/2009</td>
<td>Class Begins: Lab on Lithospheric Plates</td>
<td>Teach reads aloud directions for lab. Directions include many vocabulary words that were discussed the day before. Teacher uses vocabulary in context – teacher seems to be confident that students understand the vocabulary he is reading aloud.</td>
</tr>
<tr>
<td>9:45am</td>
<td>Fluency/Listening Comprehension</td>
<td>unabridged</td>
</tr>
<tr>
<td></td>
<td>Silent Comprehension</td>
<td>[*It seems the reading is fairly comprehensible, assuming the students truly understand the vocabulary.]</td>
</tr>
<tr>
<td>10:05am</td>
<td>Silent Comprehension</td>
<td>Teacher then tells students that they are responsible for reading the rest of the directions on their lab to complete it.</td>
</tr>
<tr>
<td></td>
<td>Fluency/Listening Comprehension</td>
<td>Teacher goes over each step and reads aloud the rest of the lab to make sure students understand what they are doing.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Throughout the class, there is a lot of general, oral questioning by the teacher while the students worked.</td>
</tr>
<tr>
<td>10:30am</td>
<td>Listening Comprehension</td>
<td>Class Begins: Inclusion Class, Notes on Plate Tectonics.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The teacher instructs: “The paper on your desk – I want you to read it.” Students are then instructed to read white directions sheet to themselves when they finish their quiz.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Teacher reads aloud word bank and reads aloud quiz the</td>
</tr>
</tbody>
</table>
10:42am

Listening Comprehension

Silent Comprehension

Fluency/Listening Comprehension

Comprehension

students are taking. Teacher goes through the list of quiz and reads and re-reads the quiz questions to students. [*Later I found out that the teacher does this because this is the inclusion class and the majority of students need words read aloud to them.]

[*While this is happening, the intervention specialist reads the quiz aloud (again) to be sure the students in the group she is working with understand.]

[*I have mixed feelings about this because it seems it could be distracting to some students. Teacher 2 is reading aloud while the intervention specialist is reading aloud.] After quiz is read aloud once, the students seem to be on their own to finish the quiz. [*Did they comprehend what they read?] At this time, students were instructed to read the directions sheet that was on their desks silently.

Teacher reads lab directions out loud (after students supposedly read the directions silently).

Teacher pauses in the middle of readings to explain and review vocabulary and concepts in the directions. [*This is unlike teacher 1]

Teacher continues to read information aloud, preparing them for lab.

Teacher explains, then walks around classroom to see if students understood directions and know what they are suppose to do.

Students are to finish the lab on their own, but with a lot of teacher assistance. Teacher walked around to make sure students could comprehend their instructions and read and pronounce words and clarify anything needed.

During this time, the intervention specialist was constantly reading and questioning students to make sure the students comprehend the questions being asked and the purpose of this activity.

[*Overall, the teacher was definitely aware that students needed some assistance in the reading of this content. This was apparent because the teacher had the students read text to themselves, then read aloud to them (stopping to clarify information) – then re-read to some students individually to be sure they comprehend the information as well as what they’re suppose to do.]
<table>
<thead>
<tr>
<th>Time</th>
<th>Teacher</th>
<th>Class Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>11:15</td>
<td>Teacher 3</td>
<td>Comprehension: Continuation of lab</td>
</tr>
<tr>
<td></td>
<td>7th Grade</td>
<td>Teacher reviews what they did the day before – teacher reads over lab. Teacher explains components of lab (interprets reading and abbreviations/science terms).</td>
</tr>
<tr>
<td></td>
<td>7th Grade</td>
<td>Teacher constantly walks around to different groups to be sure they comprehend material.</td>
</tr>
<tr>
<td>12:05pm</td>
<td>Teacher 4</td>
<td>Comprehension: Uses questioning: “How do you find density?” This tests comprehension and vocabulary. The students cannot properly answer the question if they do not understand the vocabulary.</td>
</tr>
<tr>
<td></td>
<td>7th Grade</td>
<td>Vocabulary: Teach instructs students to record data – their findings and interpretations of data collected.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[*Overall, teacher is very aware of the of reading (vocabulary, comprehension, fluency) and exhibits strategies.]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Vocabulary: Teacher asks great questions and gives examples of vocabulary words such as validity. These examples help students make connections with real life.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Teacher asks, “What does it mean to analyze data? Think about the word analyze: analysis” Teacher goes on to give definition after students guessed the correct answer by the teacher using words in context.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Overall, the students have the main responsibility of reading/comprehending materials. The teacher was readily available to clarify, read aloud, and explain.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Listening Comprehension: Teacher goes over and re-reads some instructions/data to class to reinforce what was done the day before.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The teacher seems to be confident that the students understand what they are to be doing and know and understand vocabulary.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Teacher uses all vocabulary in context and assumed students knew the meaning.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[*This shows me that students were taught the vocabulary words and context of vocabulary previously in another class.]</td>
</tr>
</tbody>
</table>
| Teacher 5  
7th Grade  
1:15pm | Vocabulary | Teacher goes over safety and directions and refreshes students on directions they read yesterday.  
Teacher constantly circulates the classroom asking questions to be sure students understand readings, directions, and concepts.  
Intervention specialist is also a part of this class – reading and re-reading directions and information to certain students to make sure they understand what is going on.  
[*Overall, this teacher seems to be aware of the importance of students knowing the meaning of words, especially in science context.*]  
The students are giving their presentations that they have been researching.  
Project instructions (written): contain vocabulary in context that students must have prior knowledge about.  
It seems the students used a lot of online reading to collect data for their presentation. Students did research online to find information on their living organisms.  
Students use Power Point or posters and read off the Power Points or posters during their presentation.  
[*This method of reading information online, writing it in a presentation, then reading it aloud seems to help students comprehend material. This is apparent to me because the students were prepared to answer all questions that students and teacher asked them.*]  
A lot of vocabulary embedded in student projects. |
| Teacher 5  
7th Grade  
1:15pm | Comprehension |
| Teacher 5  
7th Grade  
1:15pm | Silent Comprehension |
| Teacher 5  
7th Grade  
1:15pm | Fluency |
| Teacher 5  
7th Grade  
1:15pm | Vocabulary |

| 2/12/2009  
Teacher 1  
8th Grade  
9:50am | Vocabulary | Teacher announces: “You need your science textbook today.”  
Teacher uses compare and contrast methods to see differences in lithosphere and aesthenosphere. Teacher presents word, followed by definition. |
| 2/12/2009  
Teacher 1  
8th Grade  
9:50am | Vocabulary |
<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:55am</td>
<td>Silent Comprehension</td>
<td>Teacher had students read their “Top 10 most important aspects of Plate Tectonics” and used questioning to be sure students comprehended what they read.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Activity differentiated between divergent, convergent, and transform boundaries. Students were not allowed to use notes and had to use the background knowledge they already had to categorize aspects of these three new vocabulary words.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The teacher constantly questions the students going over the different boundary vocabulary.</td>
</tr>
<tr>
<td>10:00am</td>
<td>Vocabulary</td>
<td>The last few minutes of class, the teacher instructs the students to work on their test prep and to use their textbook to help them find answers.</td>
</tr>
<tr>
<td>10:12am</td>
<td>Comprehension</td>
<td>The teacher does not help the student with textbook reading, but expects students to pull information out of the book themselves.</td>
</tr>
<tr>
<td></td>
<td>Silent Comprehension</td>
<td>Teacher goes over the study guide the students were to be working on. He reads the questions and directions aloud. The students were instructed to use their textbook.</td>
</tr>
<tr>
<td></td>
<td>Fluency/ Listening Comprehension</td>
<td>Teacher reads aloud background information for lab and students follow along.</td>
</tr>
<tr>
<td>10:30am</td>
<td>Fluency</td>
<td>Students then read the lab to themselves again and followed directions to complete the lab.</td>
</tr>
<tr>
<td>10:40am</td>
<td>Fluency</td>
<td>Throughout the class, the teacher circulates around the classroom to help students navigate through the textbook to find answers.</td>
</tr>
<tr>
<td>11:00am</td>
<td>Comprehension</td>
<td>At the end of class, on the back of the lab, students were instructed to answered reference, analysis, and conclusion questions about the information they obtained during lab.</td>
</tr>
<tr>
<td>11:05am</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teacher 2 8th Grade</td>
<td>Teacher goes over the study guide the students were to be working on. He reads the questions and directions aloud. The students were instructed to use their textbook.</td>
<td></td>
</tr>
<tr>
<td>10:30am</td>
<td>Fluency/ Listening Comprehension</td>
<td>Teacher reads aloud background information for lab and students follow along.</td>
</tr>
<tr>
<td>10:40am</td>
<td>Fluency</td>
<td>Students then read the lab to themselves again and followed directions to complete the lab.</td>
</tr>
<tr>
<td>11:00am</td>
<td>Comprehension</td>
<td>Throughout the class, the teacher circulates around the classroom to help students navigate through the textbook to find answers.</td>
</tr>
<tr>
<td>11:05am</td>
<td></td>
<td>At the end of class, on the back of the lab, students were instructed to answered reference, analysis, and conclusion questions about the information they obtained during lab.</td>
</tr>
<tr>
<td>Teacher 3 7th Grade</td>
<td>Teacher asks “What’s another word used for organisms?” (Living things)</td>
<td></td>
</tr>
<tr>
<td>11:25am</td>
<td>Vocabulary (Synonym)</td>
<td>Teacher then presents guided notes for students to fill in the blanks.</td>
</tr>
<tr>
<td>Time</td>
<td>Period</td>
<td>Activity</td>
</tr>
<tr>
<td>--------</td>
<td>----------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>11:35am</td>
<td>Vocabulary</td>
<td>Teacher explains new concepts and vocabulary in context. Teacher reads sentences with vocabulary word in the sentence and has students figure out the meaning of the words.</td>
</tr>
<tr>
<td></td>
<td>Comprehension</td>
<td>Teacher continually questions students to be sure they comprehend what they are reading and writing from the guided notes.</td>
</tr>
<tr>
<td>11:45am</td>
<td>Vocabulary</td>
<td>New vocabulary is presented in phrases in guided notes, instead of in isolation followed by a definition.</td>
</tr>
<tr>
<td></td>
<td>Comprehension</td>
<td>Teacher introduces the vocabulary concept of stimulus and response. Teacher uses real life situations and scenarios to help students make connections with what these words mean.</td>
</tr>
<tr>
<td></td>
<td>Vocabulary</td>
<td>Teacher uses scenarios using scientific vocabulary in the sentences used.</td>
</tr>
<tr>
<td></td>
<td>Comprehension</td>
<td>Overall, teacher uses many connections from what the students read to real life so students comprehend the reading with more meaning.</td>
</tr>
<tr>
<td>Teacher 4 7th Grade 11:50am</td>
<td>Silent Comprehension/Writing</td>
<td>Homework on the board is for students to read eight pages in the textbook and write a paragraph about what they read.</td>
</tr>
<tr>
<td></td>
<td>Vocabulary</td>
<td>Teacher uses guided notes for the lesson today.</td>
</tr>
<tr>
<td></td>
<td>Comprehension</td>
<td>Throughout guided notes, some vocabulary is introduced in context. In the notes, the vocabulary is used in sentence and students must interpret.</td>
</tr>
<tr>
<td>12:00pm</td>
<td>Vocabulary</td>
<td>As students learn new vocabulary, teacher assumes students read about vocabulary in homework the night before. Teacher refers to textbook reading.</td>
</tr>
<tr>
<td></td>
<td>Comprehension</td>
<td>There is a lot of vocabulary embedded in guided notes.</td>
</tr>
<tr>
<td>12:20pm</td>
<td>Comprehension</td>
<td>Teacher makes real life connections with students for what they read in their textbook. Example: “You can compare the ribosomes and proteins in cells to bones in athletes.”</td>
</tr>
<tr>
<td>12:25pm</td>
<td>Comprehension</td>
<td>Teacher questions class to see if they understand what they are reading and writing.</td>
</tr>
<tr>
<td></td>
<td>Vocabulary</td>
<td>Teacher tells students to “underline the words host, parasite,”</td>
</tr>
</tbody>
</table>
| Teacher 5  
| 7th Grade |  
| 1:15pm | **Vocabulary** | and symbiosis” in their notes. These words were written on the front board: parasitism, mutualism, and commensalism. 
|  | *Vocabulary* | Teacher mentions these vocabulary words in the context that students need to organize information according to these three words. It was assumed by teacher that the students understood the meaning of these words. 
| 1:25pm | **Comprehension** | Teacher instructed students to go around the room to view other students’ projects on different aspects of characteristics of life. Students had to read information from other student projects and record them on a data sheet. 
|  | **Silent Comprehension** | This activity assumes that students comprehend everything they are reading on other student posters instead of students just copying down information. According to teacher, this is a follow up activity to the presentations the previous week. The students had already presented this information to the rest of the class. |
| 2/13/2009 | **Teacher 1**  
| 8th Grade |  
| 10:05am | **Silent Comprehension** | Students take quiz and are expected to read on their own with no vocabulary key.  
| 10:10am | **Comprehension** | After quiz, teacher has students read questions from their homework aloud, one at a time until they go over all the answers to test prep homework. 
| 10:20am | **Vocabulary** | During teacher explanation of activity, teacher uses vocabulary words in context. Students performed oobleck activity. 
|  |  
| \[*Overall, not a lot of reading today. They students had to materials to read, but had to listen to materials presented with a lot of vocabulary embedded in teacher explanation.\] |
| Teacher 2  
| 8th Grade |  
| 11:30 | **Comprehension** | Intervention Specialist pulls students out of class to read them quiz. 
|  | **Silent Comprehension** | Students take quiz and are expected to silently comprehend materials and questions presented on the quiz. 
<p>|  |  | Student Work Day. |</p>
<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>11:50am</td>
<td>Vocabulary</td>
<td>After quiz, students use textbook to do their worksheet – filling in blanks with vocabulary words. Teacher circulates room and asks questions to students making sure they comprehend what they are reading.</td>
</tr>
<tr>
<td>11:20am</td>
<td>Comprehension</td>
<td>Continuation of guided notes from previous day.</td>
</tr>
<tr>
<td>Teacher 3</td>
<td>Vocabulary</td>
<td>Teacher uses sentences and new vocabulary and content in context of her explanation. Teacher talks about concepts and vocabulary before students write.</td>
</tr>
<tr>
<td>7th Grade</td>
<td>11:30am</td>
<td>Teacher uses questioning to be sure students are comprehending what they are reading and writing on their notes page. Teacher explains what the word ‘essential’ means. “What is a synonym for ‘essential’? Essential means necessary, you need it, etc.”</td>
</tr>
<tr>
<td></td>
<td>Comprehension</td>
<td>Teacher takes a break from notes to read the textbook. Teacher tells students they are going to do a whole class reading of a section in their textbook about cells.</td>
</tr>
<tr>
<td></td>
<td>Vocabulary/Synonyms</td>
<td>Teacher reads aloud the first section of the reading. Throughout her read aloud, teacher pauses to make sure students understand concepts and vocabulary presented in reading. Example: “What is another word for function?”</td>
</tr>
<tr>
<td>11:45am</td>
<td>Fluency</td>
<td>Teacher chose other students to read sections out of the book aloud. Teacher makes connections with new vocabulary presented during read alouds. Example: “Think of a cell membrane as a screen in a house that lets good things in like fresh air, but keeps bad things out like bugs and rodents.”</td>
</tr>
<tr>
<td></td>
<td>Vocabulary</td>
<td>Different students read aloud short sections of text.</td>
</tr>
<tr>
<td>12:00pm</td>
<td>Fluency</td>
<td>Teacher continues to make connections with the new vocabulary to concepts students understand.</td>
</tr>
<tr>
<td></td>
<td>Comprehension</td>
<td>Assigned for homework, the teacher instructs students to answer comprehension questions at the end of the chapter.</td>
</tr>
<tr>
<td>Time</td>
<td>Teacher</td>
<td>Subject</td>
</tr>
<tr>
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<td>----------------------------------</td>
</tr>
<tr>
<td>12:10pm</td>
<td>Teacher 4</td>
<td>Comprehension</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fluency</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Vocabulary</td>
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<td></td>
<td></td>
<td>Fluency</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Vocabulary</td>
</tr>
<tr>
<td>12:35pm</td>
<td>Teacher 4</td>
<td>Comprehension</td>
</tr>
<tr>
<td>1:15pm</td>
<td>Teacher 5</td>
<td>Comprehension</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Textbook Comprehension Strategy</td>
</tr>
<tr>
<td>1:35pm</td>
<td></td>
<td>Comprehension</td>
</tr>
<tr>
<td>1:45pm</td>
<td></td>
<td>Comprehension</td>
</tr>
</tbody>
</table>
APPENDIX E

RESULTS OF TEACHER INTERVIEWS
Post-Interviews with Teachers

Teacher 1

Interviewer: How often do you read for pleasure?

Teacher 1: Two hours a week.

Interviewer: Why do you think this is important?

Teacher 1: To catch up on daily news.

Interviewer: How do you require students to read in your classroom?

Teacher 1: I assign textbook reading, but we rarely read the textbook together in class. Students also are responsible to read their homework and directions for labs.

Interviewer: Have you ever incorporated trade books into your science classroom? If so, how were they used?

Teacher 1: Yes, we use books from the school library to supplement the content we are teaching.

Interviewer: Do you expect your students to read at home?

Teacher 1: Yes, but not their science textbooks.

Interviewer: How do you think textbook readings help the students understand the content?

Teacher 1: It doesn’t at all. It helps to reinforce what was taught in class.

Interviewer: How have you taught reading directly to your students in your science class?

Teacher 1: I do pre, during, and post reading strategies to help students fully comprehend.

Interviewer: Do you believe that strategy works for them and why?
Teacher 1: I think it works to an extent. It at least helps the students break down the sections of the reading. It’s better than just turning them lose to read on their own with no structure.

Interviewer: What barriers have you faced when assisting or teaching reading in your science classroom?

Teacher 1: Students cannot read the textbook because it is too difficult of a reading level.

Interviewer: How do you typically teach new vocabulary?

Teacher 1: Through guided notes.

Interviewer: Do students usually remember the meaning of vocabulary through this means?

Teacher 1: Yes, they memorize the words until they take the test. I’m hoping they remember the words for the OAT at the end of the year.

Interviewer: Typically, how does reading comprehension instruction occur in your classroom?

Teacher 1: We read together and try to comprehend together.

Interviewer: So, do you give them answers?

Teacher 1: Not typically, I try to guide them to the right answers and refer to the readings for them to figure out answers on their own.

Interviewer: What other strategies do you use to help your students read?

Teacher 1: I help them look at main headings and discuss vocabulary before reading.

Interviewer: What training do you have in content reading?

Teacher 1: A couple graduate level courses.
Interviewer: How do you help the students in your class that are struggling readers on an individual basis?

Teacher 1: I sit and read one on one or address the issue with the tutor so she can help the student and re-read material to the student.

Interviewer: How do you use textbook reading in your science class?

Teacher 1: I rarely assign textbook reading for homework, but there is crucial information and great graphics in the textbook that help content.

Interviewer: Do you ever read aloud or do your students read aloud during class?

Teacher 1: Yes, I read aloud more than they do.
Post-Interviews with Teachers

Teacher 2

Interviewer: How often do you read for pleasure?

Teacher 2: Almost everyday at varying lengths.

Interviewer: Why do you think this is important?

Teacher 2: Besides being enjoyable, it’s a skill that you always can get better at.

Interviewer: How do you require students to read in your classroom?

Teacher 2: The situations differ. Sometimes we have to read the textbook and students have to read background information before completing a lab.

Interviewer: Have you ever incorporated trade books into your science classroom? If so, how were they used?

Teacher 2: From time to time, sometimes I read excerpts out of trade books to reinforce a concept and get out of the textbook.

Interviewer: Do you expect your students to read at home?

Teacher 2: Rarely

Interviewer: How do you think textbook readings help the students understand the content?

Teacher 2: It reinforces what is learned and presented during class.

Interviewer: How have you taught reading directly to your students in your science class?

Teacher 2: Reading strategies. At the beginning of the year, I have a while lesson dedicated to pre, during, and post reading strategies. It gets more out of their reading and focuses on what I want them to actually learn.
Interviewer: What barriers have you faced when assisting or teaching reading in your science classroom?

Teacher 2: The students all have different reading levels and many students have difficulty comprehending content presented in the textbook.

Interviewer: How do you typically teach new vocabulary?

Teacher 2: I usually break down words into smaller parts that will help the student understand the word.

Interviewer: Do students usually remember the meaning of vocabulary through this means?

Teacher 2: They do! Also, they use this strategy of breaking words down and apply it to other vocabulary words they come across.

Interviewer: Typically, how does reading comprehension instruction occur in your classroom?

Teacher 2: The students use all the information provided, not just the main text. This is through guided notes, explanations, and other activities.

Interviewer: What other strategies do you use to help your students read?

Teacher 2: Before, during, and after reading – prior knowledge, having a purpose for reading, using all information provided, re-reading, and analyzing your own comprehension.

Interviewer: What training do you have in content reading?

Teacher 2: I have a few undergraduate content reading courses and also my Masters of Reading Education.
Interviewer: How do you help the students in your class that are struggling readers on an individual basis?

Teacher 2: I use accommodated reading supplements when possible and group and partner reading. The intervention specialist helps with students that have super low reading levels.

Interviewer: How do you use textbook reading in your science class?

Teacher 2: I only use the textbook during class as a supplement for my instruction. I use the pictures in the textbook a lot.

Interviewer: Do you ever read aloud or do your students read aloud during class?

Teacher 2: I usually read directions and readings aloud. The students rarely read aloud during class unless they are in groups.
Post-Interviews with Teachers

Teacher 3

Interviewer: How often do you read for pleasure?

Teacher 3: Weekly, it just takes me a really long time to get through books. I wish I had more time for pleasure reading.

Interviewer: Why do you think this is important?

Teacher 3: I enjoy it and it is a good example for my second grader.

Interviewer: How do you require students to read in your classroom?

Teacher 3: Students have to read directions very carefully for projects and labs. They also have to read out of the textbook. I try not to use the textbook all the time, but there are some great graphics in it and helpful information. We have a great textbook.

Interviewer: Have you ever incorporated trade books into your science classroom? If so, how were they used?

Teacher 3: Myself and one of the other science teachers use *Hoot* to teach characteristics of life. Also, we use the book *March of the Penguins* for their Antarctica project. I read the students a picture book when introducing genetics.

Interviewer: Do you expect your students to read at home?

Teacher 3: Yes, I know they read a lot online.

Interviewer: How do you think textbook readings help the students understand the content?

Teacher 3: Our textbook is very kid-friendly even though the vocabulary may be a bit difficult. It can be used to supplement concepts that are taught directly and used for the pictures.
Teacher 3: I teach pre, post, and during reading strategies. I also read a lot of information aloud to students so they hear what good reading sounds like.

Interviewer: What barriers have you faced when assisting or teaching reading in your science classroom?

Teacher 3: When I instruct students to read on their own, they are not interested because they do not want to tackle vocabulary. Also, all students have different interests.

Interviewer: How do you typically teach new vocabulary?

Teacher 3: I usually teach new vocabulary in guided notes through short phrases. I like to use new vocabulary in sentences and give real-life examples so the students figure out the meaning of the word on their own.

Interviewer: Do students usually remember the meaning of vocabulary through this means?

Teacher 3: Most students do, they can understand and apply to whatever activity we do to actually “do” the science concept.

Interviewer: Typically, how does reading comprehension instruction occur in your classroom?

Teacher 3: I take breaks when we are going through textbook readings and notes to question the students to make sure they are following.

Interviewer: What other strategies do you use to help your students read?

Teacher 3: Guided reading, whole class reading, and paired reading.

Interviewer: What training do you have in content reading?
Teacher 3: I am currently working on my masters in reading and have been part of content reading professional development sessions.

Interviewer: How do you help the students in your class that are struggling readers on an individual basis?

Teacher 3: In the past, I have found supplemental reading materials to accommodate students that need that. I also will walk around while students are working independently to see if they are struggling with the silent reading comprehension.

Interviewer: How do you use textbook reading in your science class?

Teacher 3: I assign it for homework, but always give them a preview of what they are to read and what they are suppose to get out of the reading. We sometimes read in while class settings (popcorn reading) and other times I read it aloud. I use a lot of the pictures presented in the textbook to help visual learners.

Interviewer: Do you ever read aloud or do your students read aloud during class?

Teacher 3: Yes! I read aloud directions a lot and sometimes the text. If we do whole class readings or paired readings, the students read aloud to each other.
Post-Interviews with Teachers

Teacher 4

Interviewer: How often do you read for pleasure?

Teacher 4: Daily

Interviewer: Why do you think this is important?

Teacher 4: I read for enjoyment. It is a stress relief for me and I enjoy the quiet time.

Interviewer: How do you require students to read in your classroom?

Teacher 4: We read the textbook together and I assign it for homework and students have to read a lot when researching for projects.

Interviewer: Have you ever incorporated trade books into your science classroom? If so, how were they used?

Teacher 4: Yes, we read the book *Hoot* by Carl Hiaasen. I am also working on a five book environmental reading project for next year.

Interviewer: Do you expect your students to read at home?

Teacher 4: Yes, I have high expectations for my students.

Interviewer: How do you think textbook readings help the students understand the content?

Teacher 4: Textbook readings help the students by giving examples, complementing what we discuss in the classroom, and give historical relationships that are hard to demonstrate. Textbook pictures, charts, and graphic organizers help kids make connections.

Interviewer: How have you taught reading directly to your students in your science class?

Teacher 4: I do a textbook walk, for each reading, we open the book to the pages, take a look and I always give them a purpose for reading.
Interviewer: Why do you think giving students a purpose for reading is important?
Teacher 4: I have found that if I just assign pages to read, the students do not have any motivation to complete it. If I give them a purpose and preview what they are going to read, they want to discover more about the concepts. A lot of times we will read the first part of the reading together so it cuts their work load.

Interviewer: What barriers have you faced when assisting or teaching reading in your science classroom?
Teacher 4: Sometimes my special needs students can’t read at the 7th grade level.

Interviewer: How do you typically teach new vocabulary?
Teacher 4: I teach vocabulary many different ways, I like visual vocabulary the best. I like to have kids explore and try to match a vocabulary word to a picture that is either an example of that word or that represents the word. Sometimes I do four squares vocabulary, which allows students to define, draw a picture, and create a sentence. Sometimes I just define each word. I never start with vocabulary. I use the vocabulary, demonstrate the vocabulary, and teach the vocabulary through the explanation of the lesson. Usually at the end of the explanation, we will pull the vocabulary out of the context of the lesson or out of a series of lessons.

Interviewer: Do students usually remember the meaning of vocabulary through this means?
Teacher 4: They do! It helps them remember long term because it helps them make connections with pictures and graphics.

Interviewer: Typically, how does reading comprehension instruction occur in your classroom?
Teacher 4: I try not to have the kids read blindly (as first contact with new ideas). I always try to engage and explore before assigning reading. This gives the kids some background and discussion to link their reading to.

Interviewer: What other strategies do you use to help your students read?

Teacher 4: I always give a purpose for reading. I pre-read questions, I picture walk, and I have them list something they learned and something they still question.

Interviewer: What training do you have in content reading?

Teacher 4: I have taken a class and have attended professional development on reading strategies, reading was a building wide goal for 3 years.

Interviewer: How do you help the students in your class that are struggling readers on an individual basis?

Teacher 4: I often read with them or pair them with a peer to read. We also have adapted readers for our textbook.

Interviewer: How do you use textbook reading in your science class?

Teacher 4: Our textbook has great pictures to supplement ideas and concepts. I also assign reading for homework.

Interviewer: Do you ever read aloud or do your students read aloud during class?

Teacher 4: I read aloud textbook selections and always read aloud lab instructions. The students sometimes read aloud to each other in small groups.

Post-Interviews with Teachers

Teacher 5

Interviewer: How often do you read for pleasure?

Teacher 5: Weekly
Interviewer: Why do you think this is important?
Teacher 5: I enjoy it! It is relaxing and I like to be a good role model when it comes to reading for my children.
Interviewer: How do you require students to read in your classroom?
Teacher 5: I only use the textbook occasionally and I use it for homework. I assign reading for homework and they need to read to complete their labs.
Interviewer: Have you ever incorporated trade books into your science classroom? If so, how were they used?
Teacher 5: I do not use any trade books for instruction. However, students sometimes check out books from the library to help them research for projects.
Interviewer: Do you expect your students to read at home?
Teacher 5: No, unless it is assigned for homework.
Interviewer: How do you think textbook readings help the students understand the content?
Teacher 5: It helps develop background knowledge of topics that are taught in class.
Interviewer: How have you taught reading directly to your students in your science class?
Teacher 5: I have discussed how to read non-fiction and help students interpret pictures, diagrams, text features in timelines, charts, and graphs.
Interviewer: Do you use any particular strategy to help your students with these features?
Teacher 5: Not particularly, I just guide them through and explain to them what these features represent.
Interviewer: What barriers have you faced when assisting or teaching reading in your science classroom?
Teacher 5: We have to spend a lot of time reviewing vocabulary so students understand all content.

Interviewer: How do you typically teach new vocabulary?

Teacher 5: 75% of the time, I give the students a completed list of vocabulary words and we discuss them as a class and apply to concepts. The other 25% of the time, I give them new vocabulary on an overhead and they take notes.

Interviewer: Do students usually remember the meaning of vocabulary through this means?

Teacher 5: They tend to memorize a lot of them, but I try to have them apply the words to concepts learned in class so they remember for long-term purposes.

Interviewer: Typically, how does reading comprehension instruction occur in your classroom?

Teacher 5: I test comprehension through homework and see if students understand direction to activities we do in class.

Interviewer: What other strategies do you use to help your students read?

Teacher 5: I teach how to learn from non-fiction text features and interpret charts and graphs.

Interviewer: What training do you have in content reading?

Teacher 5: I have a Language Arts education background and a few masters level content reading courses. It really helps in helping students read about science.

Interviewer: How do you help the students in your class that are struggling readers on an individual basis?
Teacher 5: I read tests aloud to them and check their comprehension on homework assignments. Sometimes I scribe for students that have difficulty reading and writing.

Interviewer: How do you use textbook reading in your science class?

Teacher 5: Just for homework.

Interviewer: Do you ever read aloud or do your students read aloud during class?

Teacher 5: I sometimes read aloud the textbook, but never trade books. At times, the students take turns and read the textbook aloud for the rest of the class.
APPENDIX F

MASS, VOLUME, AND DENSITY LAB
Using Bubble Gum to Investigate Mass, Volume, and Density

Background: Millions of people chew gum every day, yet it serves no nutritional value. Knowing that gum does not get digested even when swallowed, what happens to the gum as you chew? Does any portion of the gum get digested, and if so how?

Purpose: To investigate Bubble Gum and the changes in bubble gum as you chew the gum over a period of time. Students will practice the steps of the scientific method, and explore the topics of mass, volume, and density using a substance that most students crave.

State the Problem:

What happens to the mass, and volume of a piece of Bubble Gum as you are chewing?

Collect information:

Using your background knowledge about mass, matter, and the information on the pack of gum, list seven – ten items that will assist you in your study. (List these on your record sheet)

State the Hypothesis: (On your record sheet)

Using the information that you have collected, and your knowledge of gum, state your hypothesis regarding the problem to be investigated. This will need to be teacher approved.

Test the Hypothesis: Identify the controlled, independent, and dependent variables in your experiment.
To test this hypothesis you will need to complete the following experiment.

1. Using a piece of gum as your **group control**, find the beginning mass, volume, and density. Record it on your record sheet.
   Remember to use the correct unit of measure and the correct piece of equipment.
2. Next give each member a piece of gum. Have them find the mass and record it in the chart.

**Safety: You must save your gum wrapper. Don’t throw away!**

3. Have each member place a piece of gum in their mouth and begin chewing at the start of the stopwatch. Chew vigorously for 3 minutes.
4. Roll gum in a ball with tongue. Place your chewed gum in your original wrapper and find its new mass. Record this information on your record sheet.
5. Continue to repeat steps 2 and 3 for a total of 4 intervals.
6. After the fourth interval find the volume of your gum using displacement. Record this information on your record sheet.
7. **Discard all gum correctly in trash can with liner!**

Make Observations:

While completing the investigation, be sure to note any changes in texture, color, mass, taste, and size and record them on your record sheet.

While testing your hypothesis and making observations, don’t forget to record your data.
Analyze Data:

Create a line graph to show the change in the gum over time for all group members. Be sure to use all properties of a good graph.

<table>
<thead>
<tr>
<th>Graphs Have:</th>
<th>Title</th>
<th>Both Axis Labeled</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Scale</td>
<td>Key</td>
</tr>
<tr>
<td></td>
<td>Neat</td>
<td>On graph paper</td>
</tr>
</tbody>
</table>

Form a Conclusion:

Lastly, write a conclusion answering the original question. Your conclusion should be at least two paragraphs long and contain the following information.

a. Did your results support or deny your hypothesis?
b. What was responsible for the change?
c. Did all group members get the same results? Why or Why not?
d. Where are the substances responsible for the change?
e. What is left in the gum?
f. What could you do to improve the validity of your study?
APPENDIX G

PLATE TECTONIC GUIDED NOTES
PLATE TECTONICS

I. Early clues:

A. ___________________________ - "all land"

1. Alfred Wegener-

2. Puzzle-like fit

B. Evidence from _____________________________

C. Evidence from _____________________________

1. Glossopteris: _____________________________

2. Mesosaurus: _____________________________

D. Evidence from _____________________________

1. _____________________________

2. _____________________________

II. Later Evidence:

A. definition:

1. Harry Hess-

B. Evidence from _____________________________

1. mid-ocean ridge

2. Alvin's crew found _____________________________
C. Evidence from

1. Reversal of Earth's

2. Reversal of magnetic alignment of rock

D. Evidence from

1. Glomar Challenger research
   a. newer rock near
   b. ________ rock farther from mid-ocean ridge
   c. ocean rock is younger than ________ rock

E. Subduction

1. definition:

2. Pacific Ocean:

3. Atlantic Ocean:

III. Theory of

A. definition of Plates:

B. definition of Plate Tectonics:

C. Plate Boundaries

1. ________ boundaries
   a. when 2 plates are moving apart from each other.
   b. Mid-Atlantic Ridge
   c. Rift valleys

[Diagrams of subduction and ocean rock layers]
APPENDIX H

READING STRATEGIES FOR CONTENT INFORMATION SHEET
Reading Strategies for the Content Areas

Before Reading:
- Before reading, you should always __________ or __________
  (look at pictures, diagrams, headings, bold-faced words, etc.)
  through the section you are about to read.
  o To find out what you are going to read about
  o To activate any ______________ (what do you already know?)
  o It helps you to get in the right “__________ ________”
  o ______________ what you think the text is about
- Have a ______________ for reading (very important!!!)
  o “I am reading to understand how the Civil War began”.

During Reading:  
BE AN "ACTIVE" READER

- You need to READ WITH _______________ !!!!!
  o You have to READ ______________ (pausing after commas,
    stopping after periods, italicized words, “”, !, ?, etc.)

Which one is better?

It is the bottom of the ninth inning, two outs, and a man on third base. Here comes the wind up the batter swings and SMASHES the ball over the left field fence! The Indians have done it! The Indians have won the World Series!
> ________________ or picture your reading
> Decide what to read closely and what to ignore
> Does the content FIT MY _____________ ????
> When reading becomes difficult........
  o ________________ what you did not understand
  o Read _____________ to help you understand better
  o Use _______________ CLUES to understand unknown words
  - Look at the words around the unknown word to try and get a meaning
  o Change the pace of your reading
    - ______________ DOWN your reading speed
> Use pictures, ________________, charts, ____________, etc. to increase your understanding
> Stop TIME TO ____________ to think about what you just read...
  o "I just read about ........"

After Reading

DID YOU FULFILL YOUR PURPOSE ??

> SUMMARIZE or PARAPHRASE what you just read
> Check UNDERSTANDING with others
> Did you FULFILL YOUR ________________ ???
> Go back and ________________ to improve your
  ________________ of something you did not understand