RECOMMENDED LIST OF TRADE BOOKS TO READ ALOUD TO TEACH FIRST GRADE CALIFORNIA SCIENCE STANDARDS

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PROJECT

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RECOMMENDED LIST OF TRADE BOOKS TO READ ALOUD TO TEACH
FIRST GRADE CALIFORNIA SCIENCE STANDARDS

A Project

by

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Department of Teacher Education
Abstract

of

RECOMMENDED LIST OF TRADE BOOKS TO READ ALOUD TO TEACH
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Statement of Problem

While a large number of students entering fourth grade have the reading skills to decode the grade level textbooks, many lack sufficient subject matter knowledge and academic vocabulary to comprehend what they read. Reading aloud informational trade books to students in the primary grades, increases their conceptual understanding in the content areas by building needed background knowledge and vocabulary. This project (a) develops a rubric to evaluate trade books to use as read alouds to teach content-area subjects or supplements regular textbooks and (b) provides an annotated bibliography of informational trade books to teach first grade California science standards through reading aloud to an entire class.

Methodology

After an extensive review of the literature, an evaluative rubric was developed to assess the appropriateness of informational trade books to be used as a read aloud to teach subject-matter content such as science or social studies. The rubric assessed four major areas: accuracy, content, academic language, and visual features. Key aspects of the accuracy section included assessing the accurateness of the textual and visual information. The content category focused on the amount of scientific content and concepts contained in the book and how they were presented. The amount of background knowledge needed and the density of specialized vocabulary were the focus of the academic language criteria. Page layout and the level of connection between the graphics and the text were the visual features’ components that were assessed. The rubric was trial tested against a researched-based science trade book evaluation rubric found in the literature. It was then used to determine the appropriateness of over two hundred informational trade books on topics related to first grade California science standards.
Those that met the majority of the criteria were listed in an annotated bibliography that contained information on the title of the book, author, publisher, date published, ISBN, interest level, book level, informational genre, and a synopsis of the book.

Conclusions Reached

Only 23 books, slightly more than one out of every ten books, met the rubric criteria. Two highly weighted areas of the rubric, accuracy of content and absence of irrelevant details were the most common reasons why books were not considered suitable. Several books were eliminated because they were not appropriate for whole class read alouds due in most cases to the density of information and amount of text the books contained. It should be noted that narratives with science content were not evaluated but might contribute to students’ subject matter knowledge. In addition, books that were deemed unsuitable for whole class read alouds, might be appropriate for small group instruction. Applying the rubric to other grade levels of science and to other subject areas are important areas for further research and study.

_______________________, Committee Chair
John Shefelbine, Ph.D.

_______________________
Date
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DEDICATION

This project is dedicated to my family who supported me all through out this process. A special thanks to my mother, who paid my tuition for a semester or two and asked me constantly if my homework was done, and to my father, who constantly gave me encouraging feedback. A heartfelt thank you to my son in laws, Cory, Jared, and Joffre for putting up with me during this time, and to my three grandchildren, Jillian, Aiden, and Julian who inspire me to be a better person. I could not have finished this project without the encouragement of my three daughters, Windy, Tina, and Janis who kept telling me, “you can do it!” However, most of all this project is dedicated to my husband, Julian Valenzuela, who has sacrificed a lot to ensure that I could pursue my educational dreams. Thank you for always encouraging and supporting me in all of my learning endeavors.
# TABLE OF CONTENTS

| Acknowledgments | vi 
<table>
<thead>
<tr>
<th>Dedication</th>
<th>vii</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Chapter</strong></td>
<td></td>
</tr>
<tr>
<td>1. <strong>INTRODUCTION</strong></td>
<td>1</td>
</tr>
<tr>
<td>Statement of the Problem</td>
<td>1</td>
</tr>
<tr>
<td>Significance of the Project</td>
<td>2</td>
</tr>
<tr>
<td>Methodology</td>
<td>3</td>
</tr>
<tr>
<td>Limitations</td>
<td>3</td>
</tr>
<tr>
<td>Definition of Terms</td>
<td>4</td>
</tr>
<tr>
<td>Organization of the Remainder of the Project</td>
<td>5</td>
</tr>
<tr>
<td>2. <strong>REVIEW OF LITERATURE</strong></td>
<td>7</td>
</tr>
<tr>
<td>The Research on Read Alouds</td>
<td>7</td>
</tr>
<tr>
<td>The Role of Informational Text in Literacy Development</td>
<td>13</td>
</tr>
<tr>
<td>Teaching Science Using Trade Books</td>
<td>18</td>
</tr>
<tr>
<td>Evaluative Criteria for Selecting Trade Books to Teach Science</td>
<td>21</td>
</tr>
<tr>
<td>3. <strong>METHODOLOGY</strong></td>
<td>36</td>
</tr>
<tr>
<td>Establishing a Set of Criteria and Developing the Evaluative Rubric</td>
<td>36</td>
</tr>
<tr>
<td>Identifying and Evaluating Trade Books</td>
<td>40</td>
</tr>
<tr>
<td>Organizing and Creating the Annotated Bibliography</td>
<td>42</td>
</tr>
<tr>
<td>4. <strong>DISCUSSION</strong></td>
<td>44</td>
</tr>
<tr>
<td>Implementation of the Project</td>
<td>44</td>
</tr>
<tr>
<td>Limitations</td>
<td>45</td>
</tr>
<tr>
<td>Ideas for Expanding Project</td>
<td>45</td>
</tr>
<tr>
<td>Future Research</td>
<td>46</td>
</tr>
<tr>
<td>Conclusion</td>
<td>46</td>
</tr>
</tbody>
</table>
APPENDICES .........................................................................................................47
Appendix A.  Evaluative Rubric ............................................................................. 48
Appendix B.  Teacher-Friendly Rubric ................................................................. 50
Appendix C.  Annotated Bibliography ................................................................. 52
Appendix D.  Resource Bibliography ................................................................. 62
References .........................................................................................................67
Chapter 1

INTRODUCTION

Statement of Problem

According to the 2009 Nation’s Report Card (2010), approximately 76 percent of California’s fourth grade students tested could not read at the proficient level with an average of 34 percent of those students reading below even the basic proficiency level. California’s eighth grade students had even higher numbers of students not scoring proficient; 78 percent of all assessed students were unable to read at grade level (National Center for Education Statistics, 2010). These alarming statistics help to explain why there is an extremely large number of incoming high school freshman that are unable to comprehend the information and topic specific vocabulary found in content-area textbooks (National Association of State Boards of Education, 2006).

In order for students to be able to understand, make connections to, extract information from, and apply knowledge learned from text, students must have some prior knowledge of the subject matter and topic specific vocabulary (Hirsch, 2003). Since kindergarten through third grade students’ literacy development centers on “learning to read” with an emphasis on decoding words and practicing reading familiar words to become fluent (Chall & Jacobs, 2003), most primary students do not have the reading ability to read more challenging texts that would introduce them to unfamiliar vocabulary and domain specific knowledge (Biemiller, 2001; Hirsch, 2003). For this reason, many textbooks written for kindergarten through third grade students contain very little specialized vocabulary. One way for primary students to gain this necessary topic
knowledge and vocabulary is through teacher read alouds, an oral reading of a book to students. However, with the current daily instructional demands placed on teachers, there is a very little time left in the primary school day to read aloud books and teach the content area subjects, especially science and social studies, that contain the rich academic language and topic knowledge that students need to comprehend more difficult text in latter grades (Duke, 2000; Hirsch, 2003; Santoro, Chard, Howard, & Baker, 2008).

Significance of the Project

According to Hirsch (2003), there is consensus among educational researchers that domain or topic knowledge increases fluency, expands vocabulary, and allows for more profound comprehension. This principle coupled with Cunningham and Stanovich’s (1997) findings that the amount of vocabulary a first grader has is correlated with the amount of reading comprehension an eleventh grader has, makes it imperative that primary teachers incorporate time during their school day to read aloud texts that contain subject-matter content and more challenging vocabulary.

One of the difficulties teachers face in accomplishing this task, is finding trade books that contain accurate information, that correlate with grade level standards, and that are appropriate to read aloud.

The purpose of this project is to provide teachers with an annotated bibliography of trade books that would be appropriate to read aloud to teach and to enhance the teaching of first-grade science standards organized by first grade California science content standards and subordinate standards. The secondary purpose of this project is to
provide a set of criteria for teachers to use to evaluate other possible trade books to add to the list or to use to teach any content-area subject.

**Methodology**

The first step in creating the annotated bibliography was to establish a method of evaluating trade books. After an extensive and intensive review of the educational literature regarding how to select trade books to teach science or any content area subjects, a set of criteria was developed. Organizing the criteria into a rubric allowed a quantitative value to be assigned to each evaluated trade book.

After developing the rubric, sources of potential trade books to evaluate were identified. These sources included but were not limited to trade books suggested by science curriculum publishers to enhance their curriculum, professional teaching journals’ recommendations, and books traditionally used in first grade classrooms to teach science concepts.

Over 200 books were read and evaluated using the rubric. Once the books met the criteria of the rubric, they were sorted by California first grade science standards. Writing the annotations of each book and creating and organizing the bibliography was the final steps in this project.

**Limitations**

The most critical limitation of this project is that only a relatively small amount of trade books were evaluated. Although several sources were identified to guide the selection of trade books and over 200 books were assessed, there were still many trade
books that were not evaluated and that may be suitable for teaching first grade science content.

A related limitation involved the focus on informational trade books. Since the rubric was designed to select trade books to teach the standards, the rubric was very stringent in regards to the accuracy of the text and graphic information and the absence of irrelevant details. Therefore, the majority of the books selected were informational. Several good examples of fictional literature that would be appropriate to read to further students’ interest of the science topics did not meet the criteria of the rubric. This eliminated an extremely large genre of books

A critical criterion on the rubric was that any trade book selected would be suitable for a whole-class read aloud. This eliminated several books that are appropriate to teach science in a read aloud setting to an individual student or a small group of students.

Regardless of these limitations, the created annotated bibliography provides teachers with a reliable source of accurate, organized trade books to use to teach and to enhance first grade California science standards.

**Definition of Terms**

**Informational text.** A text with a primary purpose to inform, explain or describe information. For the purpose of this project, informational text, expository text, and nonfiction text are synonymous.

**Read aloud.** An activity where a book is read aloud to an individual, a small group, or an entire class or a book that is read aloud.
**Trade books.** Books that are commonly written for the general population and are sold through bookstores and to libraries.

**Organization of the Remainder of the Project**

The remainder of the project is organized into four additional chapters and the appendix. Chapter Two reviews relevant research as it pertains to the four major topics of this project. The first section of the literature review discusses the effects of read alouds on literacy development and the benefits of using them to teach content-area standards. The second section of the chapter summarizes the literature regarding the appropriateness of using informational text with primary students; while, the third section presents evidence of the benefits of using trade books to teach science content. The final section provides the foundation for choosing evaluative criteria needed to select trade books to teach science.

Chapter Three describes the methodology of how the project was designed and carried out.

Chapter Four discusses the implications and limitations of the project and the possible next steps the project author could take to advance this project or for further projects.

The project is in the appendixes. Appendix A contains the evaluative rubric used, and the teacher-friendly rubric is in Appendix B. Appendix C contains the annotated bibliography of 23 trade books to use to teach first grade California science standards. An additional bibliography of trade books that were not included on the annotated bibliography, because they were not appropriate for a read aloud is included in Appendix
D. The books failed to meet the read-aloud criterion due to the density of information or the size of the visual elements; however, the trade books listed are suitable as a resource for teachers to deepen their knowledge of first grade California science standards. The trade books on this additional bibliography are also appropriate for students to examine to enhance their engagement and interest in the subject matter.
Chapter 2

REVIEW OF LITERATURE

An alarming number of students are unable to comprehend academic text as they enter upper elementary school and high school (National Center for Education Statistics, 2010). Numerous studies point to lack of interaction with informational text, lack of sufficient topic knowledge or vocabulary as possible reasons for this (Biemiller, 2001; Duke, 2003; Hirsch, 2003). While primary students are developing the skills to learn to read, they are not learning the skills or getting the practice with informational text that they need to “read to learn” (Chall & Jacobs, 2003; Guillaume, 1998).

This review of the literature discusses the research supporting the use of read alouds in primary classrooms to teach content area knowledge. It will also explore the scarcity of the use of informational texts with younger children and the crucial role it plays in literacy development. The benefits of using trade books to teach content area subjects will also be discussed. The final section will examine what the literature supports as the critical criteria necessary to evaluate trade books to use to tech content area subjects.

The Research on Read Alouds

“The single most important activity for building the knowledge required for eventual success in reading is reading aloud to children” (Anderson, Hiebert, Scott, & Wilkinson, 1985, p.23). This powerful statement made in Becoming a Nation of Readers published in 1985 prompted more emphasis on the importance of reading aloud to children. This section of the review of the literature will examine the effects of reading
aloud to children on overall literacy and language development, the benefits of teaching content through read alouds, and techniques to use before, during, and after read alouds to maximize their effectiveness.

**Effects of Read Alouds on Overall Language and Literacy Development**

Recent studies have focused on the numerous positive affects on language and literacy development of reading aloud to children (Aram, 2006; Mol, Bus, & de Jong, 2009). In addition to being a highly engaging and motivating activity that introduces students to the pleasure of reading (Morrow, 2003), there is research to support that reading aloud to children can also play a significant role in improving components of alphabetic literacy understanding such as phonemic awareness and letter knowledge (Aram, 2006). Listening to read alouds, children learn how language works; thus, strengthening their language development (Adams, 1990; Barrentine, 1996; Beck & McKeown, 2001).

A considerable amount of literature has supported that read alouds positively influence the acquisition of vocabulary (Elley, 1989; Pullen & Justice, 2003; Wasik & Bond, 2001). In Elley’s (1989) research, seven year old students had a mean incidental vocabulary gain of close to 15 percent after listening to a book read aloud three times in one week without any explanation of the words and were able to maintain the vocabulary acquired up to three months later with a permanent word loss of less than one percent. When given brief explanations of the words during the read alouds, the mean incidental vocabulary gain was 40 percent (Elley, 1989). This gain in vocabulary is substantial enough to warrant reading aloud to students for that reason alone; however, there are
even more compelling reasons when the effects of reading aloud on listening and reading comprehension research are examined.

Researchers have proven that a student’s level of listening comprehension proficiency in the lower grades is a good indicator of reading comprehension proficiency in the later grades (Anderson et al., 1985). There is ample literature to support that reading aloud to children can teach listening comprehension, individual comprehension skills and contribute to overall comprehension development (Santoro et al., 2008, p. 396); thus, improving students’ overall reading comprehension (Dickinson & Smith, 1994).

**Benefits of Teaching Content through Read Alouds**

Comprehending text involves several components, one of which is having sufficient topic or background knowledge in order to construct meaning (Hirsch, 2006). Reading aloud books that contain content-area information or concepts is an effective way to build topic knowledge (Fisher, Flood, Lapp, & Frey, 2004). Incorporating read alouds containing content that addresses state science and history/social studies standards offers opportunities to build topic knowledge and meet state requirements (Santoro et al., 2008). Second and third graders scored higher on a science content knowledge assessment after having been taught science content through a read aloud in comparison to students taught the content without the read aloud (Barber, Nagy-Catz, & Arya, 2006).

Sophisticated content concepts and vocabulary can be taught through read alouds, as teachers are able to scaffold the information and vocabulary contained in the text. In the primary grades while students are gaining the skills needed to decode and comprehend complex text, they can still be gaining a wealth of content concepts and
vocabulary knowledge through their listening comprehension by having content books read aloud to them. While listening comprehension starts as early as one year and continues through sixth grade, reading comprehension does not start until late kindergarten or early first grade and continues to lag behind listening comprehension through middle school for average students (Biemiller, 1999). Thus, using read alouds to teach content contributes to students’ knowledge base until they have the resources and the ability to “read to learn” (Albright, 2002).

Teaching content through read alouds is advantageous for several additional reasons as well. In a research study conducted by Albright (2002), students who were read to “learned as much content as students that received regular instruction” (Albright, 2002, p. 427). These findings support that reading aloud to students to teach content helps to improve conceptual understanding in content areas. In 1998, Alvermann and Phelps (as cited in Albright, 2002) proposed that reading aloud in the content areas offers a motivating and engaging strategy to introduce a new topic or to explain a difficult content-are concept. Reading aloud to students in the content areas encourages them to investigate further topics of interest and may contribute to students reading further informational text (Albright, 2002).

Maximizing the Effectiveness of a Read Aloud

Although ample research demonstrates that reading aloud to children is beneficial and should be a continued practice (Anderson et al., 1985; Beck & McKeown, 2001; Fisher et al., 2004), there are a few studies that indicate that there can be a negative correlation between the amount of time teachers spend reading aloud to students’ and
their overall reading achievement (Lane & Wright, 2007). For this reason, it is imperative that teachers employ researched-based methods or techniques to maximize the effectiveness of read alouds. This will ensure that students will receive the most positive academic benefits of read alouds within a limited amount of time while allowing more time for other activities that increase reading achievement (McGee & Schickedanz, 2007).

Interactive read-alouds, dialogic reading, and Text Talk are read-aloud approaches that produce significant gains in students’ vocabulary and comprehension development (Beck & McKeown, 2001; Fisher et al., 2004; Santoro et al., 2008). All of these afore mentioned approaches, have common factors that contribute to the effectiveness of a read aloud: selection of text, activities prior to reading the text, active discussions and teacher think alouds during and after reading the book, and word explanations during the read aloud (Shedd & Duke, 2008).

**Text selection.** Carefully choosing text that is not oversimplified, engaging to the students, meets the instructional goals, contains age appropriate concepts, and contains accurate information is the first step towards maximizing the effectiveness of a read aloud (Fisher et al., 2004; Lane & Wright, 2007).

Prior to the read aloud, teachers need either provide or activate prior knowledge so that students are prepared to make connections with the text and to set the purpose for the students to listen to the text and (Fisher et al., 2004; Santoro et al., 2008). Allowing students to predict what is going to happen in a narrative text helps to develop comprehension (Shedd & Duke, 2008).
Think alouds, discussions, and questioning. Current research supports actively involving students during and after the read aloud by having them ask and answer both implicit and explicit type questions, and also by making connections between different parts of the text (Dickenson, 2001; Fisher et al., 2004; McGee and Schickedanz, 2007). The teacher’s role is to provide questions and opportunities that increase the amount of time students spend talking about the text and to provide think alouds that help students navigate through confusing or exceptionally complex areas of the test (Shedd & Duke, 2008).

Vocabulary explanations. To capitalize on the acquisition of vocabulary development during a read aloud, teachers need to provide a brief “kid-friendly” explanation of the word as they read aloud (Beck & McKeown, 2001). The California Reading and Literature Project (2008) refers to this as a “step-aside” explanation, a short phrase or sentence explaining the word while reading aloud (i.e. neighbor, someone who lives close to you, but not with you), without stopping the flow of the story.

Reading aloud books to children to entertain, build relationships and to provide information has been an activity engaged in for centuries. As commonplace as reading aloud is, the benefits are not common. Few instructional practices can build literacy and language, develop vocabulary and comprehension, teach skills and content, and motivate and engage students in about 20 minutes a day.
The Role of Informational Text in Literacy Development

Educational researchers have recognized the positive affects of being able to read, write, and discuss informational text on overall literacy development. Informational text as defined by Nell Duke (2003) is “written for the primary purpose of conveying information” and has “particular text features to accomplish this purpose” (p.14). Informational literacy is vitally important to the success of students all throughout their education from elementary to post secondary schooling (Duke, 2000; Guillaume, 1998). Although some older studies would dispute the use and teaching of informational text in primary grades, most of the research done in the past 20 years would refute those studies (Duke, Bennett-Armistead, & Roberts, 2003; Pappas, 1993).

Appropriateness of Using Informational Texts with Primary Students

One of the possible causes of the “fourth-grade slump” is that students in the primary grades are “immersed mostly in narrative or storybook text” (Sanacore & Palumbo, 2009 p.67). Sanacore and Palumbo (2009) go on to say that once these students reach fourth grade where they have to read and comprehend informational text, the students are ill equipped to do so since they have not had extensive experience with informational text and the specialized vocabulary these texts contain. Teachers deprive primary students of learning how to process and analyze information when students are not given the opportunity to construct meaning by interacting with informational text (Guillaume, 1998).

Duke (2004) argues that not only is learning to comprehend informational text “the corner stone” of the upper grades’ curriculum, it is imperative and appropriate to
begin the instruction and exposure to these texts as early as kindergarten (p.40). A number of studies that looked at kindergarten through third grade classrooms demonstrated that when informational text was read and discussed in classrooms, young children were able to interact successfully with the text in sophisticated ways (Moss, Leone, & Dipillo, 1997). First graders were able to make intertextual connections between various informational texts discussing how the information compared, contrasted, or added to what had been previously learned (Oyler & Barry, 1996). Kindergarten students in a study conducted by Pappas (1993) were able to pretend to read informational books using appropriate informational text structures. Duke and Kay (1998) also found that students’ pretend readings of informational text contained several specific features unique to this type of text after having experiences with informational-style text. Other research has concluded that after primary students have been read aloud informational text, the students were able to reproduce the language structures inherently common in informational text when given opportunities to. First grade students were also able to comprehend informational texts skillfully (Moss et al., 1997). According to Richgels (2002), informational texts provide beginning readers with content knowledge and developing writers an opportunity to discover the written language of expository text.

**Developing Vocabulary and Content Knowledge Through Informational Text**

Utilizing informational text with emergent readers and writers is not only appropriate, it is essential to developing various components of literacy. In order for students to be successful at comprehending intermediate grade-level text, narrative or informational, they must have substantial vocabulary knowledge (Biemiller, 2001).
Since vocabulary growth occurs more rapidly in younger students (Shonkoff & Phillips, 2000), it is imperative that teachers and parents employ instructional strategies and content that support and develop vocabulary growth in prekindergarten through second grade classrooms (Duke, 2003). Duke et al. (2003) cite other research that states, “…that even young children do learn vocabulary from text including text read aloud to them” (p. 5). Further research describes how parents or teachers take more time to explain and discuss word meanings when reading informational texts aloud as compared to narrative texts (Duke, 2003). Given that a limited vocabulary is often a major factor in a student’s failure to comprehend informational text (Yopp-Edwards, 2003), teachers must provide numerous situations where students are exposed to vocabulary from a variety of genres and multiple opportunities to acquire vocabulary before and while students are learning to read (Biemiller, 2001; Duke, 2003; Richgels, 2002).

Duke and Kay’s (1998) research found that informational text read aloud in kindergarten classrooms advanced the amount of content knowledge a student learns. Duke (2003) referred to research by Anderson and Guthrie (1999) that found third grade students learned more from science-based activities coupled with informational text rather than firsthand experiences alone. Exposure to significant amounts of informational texts assists in facilitating an understanding of a wide range of topics (Moss et al., 1997). Primary students immersed in informational texts are better readers and writers of this type of text, which is critical to the success of later school years (Duke et al., 2003).
Developing Comprehension Skills Through Informational Texts

Researchers generally agree that there is a correlation between students having difficulty comprehending informational texts in the intermediate grades and students having no or limited access to informational text in the primary grades (Biemiller, 2001; Moss et al., 1997). In contrast, there is a study that shows that second and third grade students who had opportunities to write and read informational-type text had overall higher growth in reading comprehension than those who did not (Purcell-Gates & Duke, 2003). Duke et al. (2003) found that a group of first grade students with low sound/letter knowledge that had their reading instruction focused on informational texts had higher comprehension levels at the end of first grade compared to their grade level counterparts that received the majority of their reading instruction with narrative texts. Providing opportunities for primary students to listen to informational text, exposes them to expository text structures for example, description, sequence, cause and effect) and offers situations to practice literacy processes such as predicting, summarizing, and using data to draw conclusions which assists in developing overall comprehension skills (Duke et al., 2003; Moss et al., 1997; Yopp & Yopp, 2006).

The Motivating Factors of Teaching with Informational Texts

A critical factor for using informational texts with primary students is that it assists in the development of vocabulary, content knowledge, and comprehension skills. An additional equally important factor is the motivating aspect informational texts have for many readers (Duke et al., 2003). Yopp-Edwards (2003) wrote that many times informational text is the motivating factor for some students to want to read.
Primary students tend to be very interested in the world around them and this inherent natural curiosity can be a catalyst in developing literacy (Duke, 2003; Granowsky, 2005; Yopp & Yopp, 2006). According to Duke (2003), students in first grade through third grade preferred informational text at least as much as narrative texts with boys and struggling readers preferring informational text to narrative text. Furthermore, students exposed to informational text on topics that interest them often develop an enthusiasm for books and reading. Frequently, even struggling readers will persevere reading a difficult book if they are interested in the topic (Duke, 2003; Meehan, 2006). This is evidenced in 1995 research from Fink (as cited in Duke, 2003, p. 16) that a commonality found among extremely successful adult readers with dyslexia is that they all did massive amounts of reading in informational texts of topics that interested them.

Other motivational factors regarding informational texts are: first, the texts can spark curiosity about a variety of subjects and frequently stimulate questions from students about the content, which actively engages students with the text (Guillaume, 1998; Yopp-Edwards, 2003), and secondly, informational texts predominately are well written and include attractive and colorful photographs and illustrations (Moss et al., 1997). Students’ interest in books influences enthusiasm for reading which in turn supports overall reading development that could prevent reading struggles later on in school (Duke, 2000; Yopp-Edwards, 2003).
The Scarcity of Informational Texts in Primary Classrooms

Nell Duke (2000) conducted a seminal research study investigating the quantity of informational books present in 20 first grade classrooms and the amount of time the students had experiences with those texts. Ten of the 20 classrooms were from the highest socioeconomic status (SES) districts in the study and ten were from the lowest SES districts in the study. All of the school districts chosen were from 10 districts in the greater Boston, Massachusetts area. Duke (2000) found that informational texts comprised a mean of 9.8 percent of the total books available in the classroom libraries of all of the classrooms in the study with only a mean of 6.9 percent of informational texts in the low-SES classrooms. With research suggesting that informational texts should comprise at least 50 percent of classroom libraries in the primary grades (Olness, 2007), the percentages found in the classroom libraries in the study are significantly below the recommended quantity. Of even more concern is that in the 79 days of observations, a mean of just 3.6 minutes per day were spent interacting with informational text in any form and for the low-SES classrooms visited, the mean for any interaction with informational texts was only 1.9 minutes per day (Duke, 2000; Duke, 2004). Duke (2000) conducted this research over 10 years ago in a limited geographical area; however, the experience of this author is that the percentage of informational texts present in classroom libraries is still not at the recommended 50 percent.

Teaching Science Using Trade Books

Trade books, books that are written for and sold to the general public, are becoming increasingly popular to use to teach science content in the classroom (Ford,
However, not all researchers agree on the role that trade books should play in science instruction (Madrazo, 1997). Some studies support trade books with accurate content should take the place of textbooks (Rice, 2002). Lamme and Ledbetter (1990) agree, “Textbooks in the content areas simply cannot match the flexibility, depth, or quality provided by trade books” (p. 737). Other educational research promotes the use of trade books to enhance, support, and compliment the science textbook rather than replace it (Madrazo, 1997; Moss, 1991).

Recent research has found science textbook publishers have made improvements to textbooks by significantly reducing the errors in the content and by diminishing the amount of inconsiderate text contained in the textbooks; thus, increasing the readability of the text (Ford, 2006). Conversely, textbooks inherently still have insufficiencies that make them difficult for teachers to instruct with and for students to comprehend.

**Out of Date Information**

Two of the most critical problems with textbooks are that they frequently contain errors in the content (Rice, 2002) and contain outdated information (Moss, 1991). Hubisz (2003) found that many science textbooks contained errors including pictures of prisms bending light the wrong way, periodic tables not containing new elements, and a compass with East and West reversed. Along with gross errors, much of the science content in textbooks is also outdated. Since science is very dynamic with new knowledge emerging rapidly, it is imperative that textbook content reflect the most current and correct information. Moss (1991) writes, “textbook publishers are often slow to incorporate current information into their texts” (p. 27). Science textbooks are often adopted by
school districts every five to ten years. If new discoveries have been made since the last adoption, many classrooms may have outdated textbooks that contain incorrect information (Moss, 1991).

**Density**

Educators and researchers generally agree that most science textbooks are too dense, cover too great of a number of topics, assume too much background knowledge, and can be unappealing to students (Donovan & Smolkin, 2001; Moss, 1991; Rice, 2002). Students often find the density of information, the difficult text (i.e. unfamiliar vocabulary, sentence structures), and the vast amount of topics covered as daunting especially for struggling readers (Rice, 2002). Ford (2006) and Moss (1991) both found that in order for the publishers to cover the large number of topics, they often only presented the information in a superficial way, many times over simplifying the content.

**Advantages of Trade Books**

In comparison, there is an abundant amount of trade books available that researchers, educators, and students have found to be more relevant and up to date; more interesting, less confusing, and more focused when compared to textbooks (Donovan & Smolkin, 2001; Ford, 2006; Moss, 1991; Rice, 2002). In 1999, there were 120,000 trade books in print (Rice, 2002). With over 1,000 new titles published every year, there is a copious amount of trade books accessible to teachers and students that contain more timely information and topics (Ford, 2006).

Students’ interest in science and motivation to learn more about science increased when trade books were used in place of science textbooks or as a companion to textbooks
(Donovan & Smolkin, 2001; Rice, 2002). One reason that this may be true is that trade books tend to present logically and coherently organized information that is easier for students to understand and remember concepts (Moss, 1991; Rice, 2002). Trade books often contain illustrations and photographs that help to explain abstract ideas or difficult science concepts that make the content less intimidating (Rice, 2002).

Unlike textbooks, which must cover a wide variety of topics, trade books generally focus on a single topic (Donovan & Smolkin, 2001). Trade books are able to provide detailed information; therefore, presenting a more in depth look at the subject matter (Farris & Fuhler, 1994). According to Moss (1991), exploring a topic through trade books, provides students with an affluent framework for understanding concepts and an opportunity to enhance their schema.

One usually associates teaching science with science textbooks; however, the volume of information on using trade books to either supplant or support and to enhance science textbooks, clearly indicates that trade books have the “potential to increase students’ interest and achievement in science” (Rice, Dudley, & Williams, 2001, p. 22).

**Evaluative Criteria for Selecting Trade Books to Teach Science**

In the previous sections of this chapter, the literature supported the importance of using informational trade books in the classroom in a read aloud format to teach and enhance the instruction of science content and concepts. With the vast amount of trade books in print in addition to the 5,500 published yearly, it is imperative that teachers have a resource that facilitates the selection of appropriate, high-quality trade books to instruct and augment their grade level’s science content. Several experts in the fields of science
and literature have developed lists of criteria and sets of guidelines to create evaluation tools to assist in this process (Atkinson, Matusevich, & Huber, 2009; Columba, Kim, & Moe, 2009; Kletzien & Dreher, 2004; Sudol & King, 1996). This section will summarize the most relevant of the recommended universal criteria.

**Content Accuracy**

The only constant criterion in the literature was the critical role of content accuracy (Atkinson et al., 2009; Donovan & Smolkin, 2001; Sudol & King, 1996). Crowson and Hopper (2009) stated that since the purpose of using trade books in science classrooms is to increase content and conceptual knowledge of science, it is imperative that the content be “precise in information.” Atkinson et al. (2009) agreed; if a text has inaccuracies in it, there is no reason to evaluate it further or look at any of the other criteria. Ensuing the accuracy of a trade book includes checking the textual and visual content for misconceptions (Crowson & Hopper, 2009), checking that the information is current and up to date if relevant, and checking for the accurate use of vocabulary (Olness, 2007; Sudol & King, 1996).

Since many elementary teachers do not have the qualifications to determine the accuracy of a trade book’s scientific content, it is helpful to consider the integrity of the author can be determined (Cullinan, 1989, Rice, 2002). The author’s credentials and experience should be listed (Crowson & Hopper, 2009; Sudol & King, 1996. Since most authors lack the necessary science credentials to be an authority, it is critical that legitimate resources of reputable researchers are cited in the trade book (Rice, 2002). According to Kobrin (1988), the book should also contain a “bibliography that reflects
careful and thorough research.” Another way to verify content accuracy according to Atkinson et al. (2009) is to determine if the trade book acknowledges experts who have reviewed and approved the content. Even once the integrity of an author has been established, teachers should still use caution. Not all authors and researchers agree on how rigorously accurate the text should be. Some believe that the content must adhere strictly to proven scientific knowledge while others agree that teachers just need to be aware that there will be misconceptions in trade books due to nature of writing an interesting book (Rice et al., 2001).

Accuracy of Visual Content

Accuracy of information in trade books’ photographs and illustrations is as crucial as in the accuracy of textual content, perhaps even more so when many students rely on the visual information contained in a trade book as much as the written information (Donovan & Smolkin, 2002). It is essential that illustrations represent the correct color and detail of what they are portraying (Atkinson et al., 2009; Hunsader, 2004). Photographs and illustration must also pay strict attention to size and scale (Atkinson et al., 2009). In order to reduce the possible misconceptions of size, illustrations and photographs should depict the actual size of the object when appropriate and feasible (Kobrin, 1988). Being aware of scale and providing readers with a point of reference will also help the reader glean accurate size information from the visual information. In the book, *Giants of Land, Sea, and Air* (Peters, 1986), the author/illustrator, David Peters, has drawn a picture of a man and woman next to every animal so that the true size of the animals can be realized (Kobrin, 1988).
Current Information

Ensuring content accuracy also includes verifying that selected trade books reflect the most current information available (Atkinson et al., 2009; Kobrin, 1988). Science knowledge is very dynamic. Innovative discoveries are made, new information is gathered, and theories are proven or challenged consistently. Scientific information less than twenty years old has been disproved and revised as the advancement of science continues (Cerullo, 1997).

Accuracy of Vocabulary

Fundamental to learning new concepts and content is the understanding of topic vocabulary. It is essential that students are able to learn the exact meanings of words, understand them when read or heard, and be able to use them correctly (Spence & Guillaume, 2006). When selecting trade books to be used for science instruction, critical attention must also be paid to the accurate use of vocabulary. In Eric Carle’s well-know book, The Very Hungry Caterpillar (Carle, 1969), Carle states that the caterpillar turns into a cocoon. The illustration shows a butterfly and the following text states that the caterpillar, “turns into a beautiful butterfly.” The correct and accurate vocabulary word is chrysalis not cocoon. This book has been read and is still being read in many primary classrooms perpetuating the misconception that caterpillars spin cocoons instead of chrysalis before becoming butterflies.

Rice et al. (2001) concluded that misconceptions are learned when children are young are often retained even after the correct information has been taught. Rice (2002) also surmised that children view content presented during science instruction as truth.
Thus, it is imperative that trade books selected to teach science do not distort or misrepresent the content or concepts (Atkinson et al., 2009; Crowson & Hopper, 2009; Ford, 2006). Accuracy must be the first and most critical criterion in the selection of trade books to teach science.

**Other Content Variables**

Once the scientific accuracy of a trade book as been established, then other components of the content can be evaluated. Does the trade book contain substantial scientific content relevant to the state standards (Atkinson et al., 2009; Broemmel & Reardon, 2006; Columba et al, 2009)? Is the information presented in an organized, explicit, and appropriate format free from gender, ethnicity, and socioeconomic bias (Crowson & Hopper, 2009)? Will the content of the trade book interest and motivate students?

**Standards focused.** Columba et al., (2009) writes that a chosen trade book should, “make the learning meaningful and powerful” (p.32) and “should be able to achieve beyond what was possible without it” (p. 32). The purpose of using trade books in the classroom is to further the understanding of science content and concepts and to enhance instruction (Rop & Rop, 2001). Does the book reinforce the standards and concepts being taught (Albright, 2002)? Trade books selected should contain a significant amount of focused science content to meet the instructional objective. Any book selected must adhere closely to grade-level state standards and provide multiple real-life examples to assist in the explanation of scientific concepts (Atkinson et al., 2009; Costello & Kolodziej, 2006; Crowson & Hopper, 2009; Madrazo, 1997).
Organized and cohesive. The complexity of science content and concepts necessitate that information presented to students is done in an organized and cohesive manner (Saville, 2005). The organization of the trade book content should contribute to the clarity of the text (Atkinson et al., 2009; Kobrin, 1988). The ideas and concepts should be organized in a way that permits relationships among them to be transparent and presented in a logical sequence of ideas (Atkinson et al., 2009; Sudol & King, 1996). Moss (1991) writes that a paramount concern is that the text is comprehensible. Generalizations and concepts should be given, not just a collection of facts (Olness, 2007).

Clear and explicit. In order for a trade book to be considered for selection as a high-quality trade book, it must provide information that is clear and explicitly stated (Santoro et al., 2008). To maintain the clarity of the concept being explained, the text should not make too many “inferential leaps” which make the content confusing (Donovan & Smolkin, 2002). The more implied information contained in a text makes the text more difficult to understand (Donovan & Smokin, 2001). In addition, the implied information could go unnoticed unless it is made explicit by the teacher (Donovan & Smolkin, 2002; Ford, 2006). Often in order to keep an interesting storyline, authors will over simplify information or imply content; however, Columba et al. (2009) caution to be aware of this. They state that content must be explicitly stated when teaching content or concepts (Columba et al., 2009).

Density of information. Density of information within trade books must also be considered (Donovan & Smolkin, 2002). Knowing the amount of informational ideas
contained in a trade book, a teacher can evaluate whether the quantity of information is appropriate for the concept or content to be taught and the age of the students (Columba et al., 2009). Donovan and Smokin (2002) calculated informational density by analyzing the number of informational ideas contained in a book and the relationships among the ideas. The relationships between ideas constituted the depth and breadth of the book. The more subtopics included increased the breadth of the book; whereas, the more examples under each subtopic increased the depth of the book (Donovan & Smolkin, 2002). The amount of explicit and implicit informational ideas contained in a book comprised the density. Donovan and Smolkin (2002) explained how they counted an informational idea in the following excerpt from an article they wrote for the March 2002 journal, *The Reading Teacher*:

> For example, the simple sentence “Plants grow roots” in Colin Walker’s *Seeds Grow* (1992) has one informational idea, whereas “Mount Everest in the Himalayas is the highest mountain above sea level” in Seymour Simon’s *Mountains* (1994) has three. The first idea identifies Mound Everest as located in the Himalayas, the second identifies Mound Everest as the highest mountain above sea level, and the third implies that there may be taller mountains below sea level. (Donovan & Smolkin, 2002, pp. 509-510)

The more informational ideas contained in a text, the denser the text thus making it more difficult for the student to “work through the information” (Donovan & Smolkin, 2001).

**Gender, ethnic, and socioeconomic bias.** Much of the research has literature emphasized the importance of only choosing trade books that are free of gender, ethnic,
and socioeconomic bias (Atkinson et al., 2009; Costello & Kolodziej, 2006; Ford, 2006; Rop and Rop, 2001, Royce & Wiley, 1996). The National Science Education Standards have included a standard that reinforces the necessity that text and visual content should portray diverse and multicultural connections whenever possible (Ford, 2006; Santoro et al., 2008). Rop and Rop (2001) caution that books that only show scientists as “Caucasian males may be sending the wrong message as to how scientists should look” (p.23).

**Developmental level of the writing.** Moss et al. (1997) suggested that one of the five criteria needed for high-quality trade book selection should be appropriateness (e.g., appropriateness of the writing style, developmental level). In order for the trade book to be effective in teaching science content and concepts, it must be intellectually and developmentally appropriate for the intended audience. The listenability and interest levels must be suitable for the grade level (Hunsader, 2004). Although it is quite desirable to select books that contain high-quality writing, it is necessary to determine if the style of writing is appropriate for the age group of the students (Shedd & Duke, 2008). Is the information written in a manner that is enjoyable to listen to, but hard to extract important content from such as rhyming text?

**Engagement.** Despite the teacher’s careful attention to choosing only trade books that meet all of the above mentioned criteria that is accuracy, organization, clarity, and appropriateness, if the book does not engage the students, the desired outcome of learning new science content or concepts will not be accomplished (Hunsader, 2004; Kobrin, 1988; Sudol & King, 1996). The trade book should contain writing that has
verbal appeal and visual information that actively engages the students (Hunsader, 2004). Young and Salley (2003) encourage teachers to choose books that “spark curiosity” and motivate students to want to ask questions to learn more about the topic.

**Visual Features**

The old adage, “a picture is worth a 1000 words,” holds true when discussing the visual features (i.e. photos, illustrations, graphs, charts, typeface, and overall page layout) in trade books (Donovan & Smolkin, 2002). Visual features have the power to either enhance comprehension of the text or to impede it (Broemell & Rearden, 2006; Donovan & Smolkin, 2002). With this kind of power, trade books’ visual features must be considered in evaluating a book for its potential to be used to teach science content and concepts. Although the literature’s discussion of visual features have different foci, three central themes emerge: the accuracy and connection between the textual and visual information, the attractiveness and appropriateness, and the effectiveness of the layout of the visual features.

**Accuracy.** As noted previously in this section, the accuracy of visual features must be precise. Donovan and Smolkin (2002) labeled photographs and illustrations of informational texts as “information-bearing units;” thus, details, color and scale must be represented correctly to avoid students gaining misinformation (Crowson & Hopper, 2009; Kobrin, 1988). Atkinson et al. (2009) stated that there must be compatibility between the textual and visual content contained in a trade book. In order for the visual features to enhance understanding and to clarify the textual information (Moss, 1991; Rop & Rop, 1991; Sudol & King, 1996), there must be a match between what is written
and what is shown (Hunsader, 2004). Donovan and Smolkin (2001) indicated that visual features could reinforce, elaborate, or embellish a text. When a graphic visually represents an idea or concept found in the text, it reinforces it. Whereas, an elaboration is when the visual information enhances or elaborates the text. Both reinforcement and elaboration aid in comprehension. Illustrations that are not related or do not support the textual information are considered embellishments. They are in conflict with each other and can inhibit comprehension (Donovan & Smolkin, 2001). When the illustrations are extensive and pertinent to the content, they facilitate the learning of complicated science content and concepts (Costello & Kolodziej, 2006; Rop & Rop, 2001).

**Attractiveness.** Kobrin (1988) tells her readers to, “Say NO to ugly books” (p. 59). Her first criteria listed for choosing appropriate trade books to use with children is attractiveness (Kobrin, 1988). Shedd and Duke (2008) echo Kobrin’s (1988) sentiments; they believe that the attractiveness of the illustrations can be a very powerful way to capture children’s attention and to engage them in the topic. Often times, the visual features of a text are the hook that stimulates interest in the subject and motivates students to explore the topic and book further (Broemmel & Rearden, 2006).

Columba et al. (2009) wrote that visual features are one aspect that can add to the book’s appropriateness for students. The visual features should clarify concepts for younger students with consideration of their limited background knowledge and should highlight the complexity and interrelationships of concepts for older students (Columba et al., 2009). The illustrations and photographs will be more beneficial if they depict a child’s viewpoint (Hunsader, 2004). In addition, the size of illustrations and the layout of
text and visual features should be suitable for the intended audience (Atkinson et al., 2009).

An effective layout of a book would include the arrangement of text and visual features that are not too cluttered (Albright, 2002; Olness, 2007). There must be enough white space on the page in order for the vital content to not go unnoticed (Olness, 2007). In Joanna Cole’s *Magic School Bus* series (Scholastic), the combination of story text and illustrations, speech bubbles, and text boxes containing factual content about the topic leaves no white space on the page. It contributes to information density (Donovan & Smolkin, 2002). It can be very confusing to know where to begin reading.

Headings, sidebars, boldface and italicized type, and captions also help organize the layout and clarify the content (Atkinson et al., 2009). Effective captions do more than just label the visual feature; they direct the reader to focus on what is relevant (Peeck, 1993). According to Peeck (1993), the ability to assimilate visual information with textual information is developmental. The inclusion of captions facilitates this process by pointing out what is important.

Visual features have the capability of either assisting or hindering comprehension; therefore, the category must be included when evaluating trade books to use when teaching science.

**Background Knowledge**

Since the ultimate goal of using trade books is to make complex science content and concepts comprehensible to students, then all aspects of a book that could affect comprehension must be evaluated. According to Shefelbine’s (Reading/Language Arts
Framework for California Public Schools, 2007) framework for literacy, academic language is a factor that influences comprehension. The literature recognizes the importance of evaluating three of the major components of academic language: background knowledge, vocabulary, and grammatical structures when selecting trade books to use to teach with (Donovan & Smolkin, 2002; Sudol & King, 1996).

According to Sudol and King (1996), the content of the book must respect the intended audience’s background knowledge. If a trade book is to be selected, then the amount of prior knowledge required to understand the new content or concepts must be appropriate for the grade level or provided in the trade book. A reader must have sufficient background knowledge in order to make connections between what they already know and what is being taught in the trade book (Donovan & Smolkin, 2002; Sudol & King, 1996).

The vast amount of topic-specific vocabulary for example, precipitation rather than rain in science provides many opportunities for rich vocabulary development (Spencer & Guillaume, 2006). This in itself leads to necessary interrelated cautions when assessing trade books. The first caution is to be aware of the amount of specialized vocabulary contained in the trade book, and the second caution is how the specialized vocabulary is defined within the trade book.

Rop and Rop (2001) advise evaluators to select books that limit the use of technical vocabulary; however, according to Sudol and King (1996), “By necessity, nonfiction contains much technical vocabulary” (p. 424). As mentioned earlier in the section, content should not be over simplified. The same is true for vocabulary. The
majority of science vocabulary labels major science concepts; thus, limiting technical vocabulary can also lead to the limited understanding of science content (Spencer and Guillaume, 2006). However, it is critical that there is a balance between enhancing vocabulary development with the use of topic-specific words and not overly increasing the lexical density of the book so that it overwhelms the student with the amount of new vocabulary introduced (Donovan & Sudol, 2002; Halliday, 1993; Shedd & Duke, 2008).

Another area of vocabulary to evaluate is whether or not the vocabulary words are defined in the trade book, and if they are, in what the manner were the words defined within the text (Sudol & King, 1996). Burke and Glaser (1994) list three ways that nonfiction trade books usually define vocabulary: in a glossary, with a captioned picture, and within the text as the word is introduced. Although having topic-specific definitions in trade books selected to teach science is important, the way they are defined is even more crucial. The topic-specific words must be defined using “kid-friendly” language (Beck & McKeown, 2001). The language used to explain the new vocabulary must be in words easy for the intended audience to understand (Vacca & Vacca, 1993). When evaluating trade books’ vocabulary, another factor to consider is the amount of examples given to explain new vocabulary words; the more complex the vocabulary word is the higher the number of examples needs to be (Sudol & King, 1996).

Another criterion to consider when evaluating academic language is grammatical structures or syntax. The complexity of the sentences and how ideas are related within and across sentences both add to the linguistic complexity of the text. Linguistic features, including syntax, define the linguistic genre or structure of a text (Donovan & Smolkin,
According to Donovan and Smolkin (2002), linguistic genre is a key category to consider when selecting trade books to teach science.

**Read Aloud Readability**

Accuracy, content, visual features, and grammatical structures are criteria that should be evaluated with any book for any reading purpose; however, when selecting books to be used as read alouds to teach science content and concepts there are other criteria to consider: (a) the size of the visual information in the book, (b) the length of the book, and (c) the flow of the text. The visual features for example, illustrations, photographs) must be large enough for the entire audience to see clearly. Santoro et al. (2008) suggested that books that are about 32 pages long are appropriate for 20 to 30 minute read-aloud lessons. The third criterion for read alouds is the language of the text. Is the language of the book connected and cohesive? Does the language and sentence structure of the book lend itself to a read aloud? Does the book encourage questions? While book length and flow of language are extremely important criteria, the visual feature size must be foremost in considering a book to be selected to read aloud to teach science.

The review of the literature presents strong evidence that incorporating informational text read alouds in primary classrooms is an appropriate instructional strategy that has the potential to increase overall literacy skills, the acquisition of vocabulary, and content knowledge (Elley, 1989). Therefore, providing students with the topic knowledge they need in order to comprehend more difficult text as they enter the
upper elementary grades and high school perhaps preventing the “fourth-grade slump” (Chall & Jacobs, 2003; Hirsch, 2003).

The last section of this review covered evaluative criteria that was used to develop a rubric for selecting informational trade books to teach first grade California science standards by reading aloud.
Chapter 3

METHODOLOGY

The intent of this project was to provide teachers with two resources. The first is a list of appropriate trade books to read aloud to teach first grade California science content. The second is an evaluative rubric to facilitate the selection of accurate informational trade books to teach science content. This chapter describes the methodology used to create the project. There were three distinct components to the project: (a) establishing a set of criteria and developing a rubric to evaluate trade books, (b) identifying trade books and evaluating them using the developed rubric, and (c) organizing and creating the annotated bibliography and resource bibliography.

Establishing a Set of Criteria and Developing the Evaluative Rubric

Establishing a Set of Criteria

The review of the literature provided an exhaustive list of criteria to be used to evaluate trade books. The first step was to classify and categorize each criterion. Choosing the main themes that were present in the majority of the research articles, four major categories were established: accuracy, content, academic language, and visual features (Atkinson et al., 2009; Donovan & Smolkin, 2002; Sudol & King, 1996). Each criterion was then sorted into a category. Duplicate criteria or criteria not applicable to the type of books or purpose of the evaluation were removed from the list.

To test the proposed criteria, twelve books that had been read aloud in the project author’s classroom and in the past to teach first grade California science standards were evaluated against an established researched-based science trade book rubric (Atkinson et
The intent was to calibrate the proposed criteria against an established rubric. Nine of the twelve books met the established rubric point range to be considered acceptable for classroom use. These nine books were then evaluated against the proposed criteria. Any criterion that received a non-applicable score for each book was removed from the initial list.

**The Evaluative Criteria**

The evaluative rubric is in appendix A; however, a synopsis of each major category is presented here. There is a more comprehensive explanation of the criteria in the review of the literature in chapter two.

**Accuracy.** The criteria in accuracy focused on the accuracy of both text and visual features of the text and the credentials of the author or reviewer. There is also criteria regarding how current the information is and that facts and theories are clearly distinguished (Atkinson et al., 2009; Crowson & Hopper, 2009; Rice, 2002).

**Content.** The content category had the largest amount of criteria since it covered the broadest range of topics. (Saville, 2005; Donovan & Smolkin, 2002). Does the book address the standards adequately (Broemmel & Reardon, 2006; Columba et al., 2009)? Does it contain scientific content that is explicitly stated with examples to explain new concepts (Donovan & Smolkin, 2002)? Is there no or very little irrelevant information (Rice, 2002)? Although organization and density of information were included in this category, the main emphasis was on the content.

**Academic language.** The importance that background knowledge, sentence complexity, and vocabulary plays in comprehension are considered in the academic
language category (Biemeiller, 2001; Donovan & Smolkin, 2002; Hirsch, 2003). The selected criteria assess the density of specialized vocabulary and the amount of explanations in the text (Shedd & Duke, 2008; Sudol & King, 1996). The amount of background knowledge required is also evaluated (Sudol & King, 1996).

**Visual features.** The final category addresses the visual features of the text. Do the visual features explain or clarify the text? Does the layout of the page support comprehension? Are the illustrations large enough for the audience to see during a read aloud (Albright, 2002; Donovan & Smolkin, 2001? 

**Developing the Evaluative Rubric**

The first step in developing the rubric was to analyze several rubrics and checklists from the literature reviewed (Atkinson et al., 2009; Hunsader, 2004; Olness, 2007; Rice et al., 2001; Sudol & King, 1996). Ease of use and time efficiency were two major considerations when choosing the final format of the rubric. Thus, the rubric is a combination of a checklist and a quantitative evaluative tool. The checklist format was chosen to streamline the process of completing the rubric. The evaluator checks the criteria if it is present, leaves it blank if it is not, or writes in n/a for any criteria that is not applicable to the trade book being evaluated. Once the checklist of criteria is complete, a numeric value is added to the category based on the amount of criteria that were present in the book. The intention of assigning a numeric value to each major category was an attempt to reduce the subjectivity of the evaluator.

Given that the main purpose of this rubric is to evaluate trade books that will be used to teach first grade California science standards, an essential evaluative question
was created (Atkinson et al., 2009). Evaluators must answer yes to whether or not the book addresses first grade California science standards or the evaluation is discontinued.

Accuracy of the textual and visual information of the trade books were critical features of the literature, so this category was weighted more heavily than the other categories. The category was listed first in the rubric so that it is evaluated first. The category must receive the highest score possible, three, in order for the trade book to be considered for recommendation to be used in the classroom to teach science content.

In order for a trade book to be placed on the annotated bibliography, the project author felt that the book must meet most of the criteria of the rubric. Therefore, a book must receive a score of 11 or 12 out of 12 to be included on the list.

Once the rubric was developed, it was applied to the nine previous books that were evaluated with the criteria only, and on six more trade books that had been recommended from the literature as appropriate books to use to teach science (Salley & Young, 2004). At that point, two criteria from the accuracy section were removed: reliable research is cited in text or contained in the bibliography and facts and theories are clearly distinguished. To clarify further the intent of rubric, four criterions were reworded.

A few books that had met the point value to be included on the list did not meet the criteria that would make the book a good read aloud for a whole class, for example the length of the book, and the size of the book, or visual features. This resulted in one last revision to the rubric. Three criteria were identified as key read aloud criteria: length of book is appropriate for reading aloud, text is conducive to read aloud, and size of
illustrations and photographs are large enough for audience to see clearly. If the book did not meet these criteria, it would not be added to the read aloud annotated bibliography. The key criteria were bolded and starred to denote read aloud criteria and a footnote was added for explanation. The decision was made to not make a separate read aloud category. This allowed the rubric to be used to evaluate books with a purpose other than to read aloud and to keep the same format and point values. Over 200 trade books were evaluated with the rubric without any other revisions being made to it.

**Teacher Friendly Generic Rubric**

The original rubric was then revised to create a more user-friendly rubric for classroom teacher use. The detailed information required for each book at the top of the rubric was reduced. In addition, the essential question and criteria specific to first grade California standards were modified to be more generic. This allowed the rubric to be used for other content areas and other grade levels. The total score necessary to be considered for use in the classroom was modified as well by reducing it from 11 out of 12 to 10 out of 12. This was done with the belief that any teacher that took the time to apply the rubric would be cognizant of the weaknesses in the trade book and would compensate for them during the instruction.

**Identifying and Evaluating Trade Books**

**Identifying Trade Books to be Evaluated**

The first step taken to identify books to go through the evaluation process was to compile trade books from sources that had been recommended through the review of the literature. If books were readily available, they were collected. A list was created for
any books that needed to be purchased or borrowed. Sources included, searches using popular web-based search engines, searches through web-based book retailers, the project author’s collection of trade books, school libraries, the children’s section of the local city library, and recommendations from first grade teachers. Books were also identified through published lists from professional science organizations and web-based search engines such as the California Department of Education website where books to support science instruction can be searched for based on various criteria selected for example genre, grade level span and standard. The identification process continued for several months over the entire course of the project and books were added frequently. Collected books were sorted into four categories physical science, life science, earth science, and investigation and experimentations.

**Evaluating the Trade Books**

Each book was read thoroughly and evaluated against the rubric. If a book did not meet most of the criteria in the accuracy category, the book was not evaluated further. Since the project author does not have a strong scientific background, accuracy was assumed correct based on the expertise of the author or that experts in the field had reviewed the book. However, for most books the project author felt comfortable determining if the scientific information was accurate, because of the grade level of the content.

Comments were added for several of the books. In most cases they explain why the book was not chosen. In some instances they point out extraordinary features of books. The comments ranged from, “The entire book is too long for a read aloud;
however, pages 26-29 would be appropriate to read aloud” to “The text is accurate; however, the illustrations do not match the text and are confusing. Book could be used as a read aloud if pictures are not shown.” The comments were later used to help determine if a book was to be added to the resource bibliography.

Once a book met the point value to be recommended for the annotated bibliography, the detailed information about the book on the top portion of the rubric was completed. Books that met the point value, but did not meet the read-loud key criteria were set aside to be included on a resource bibliography.

**Organizing and Creating the Annotated Bibliography and Resource Bibliography**

**Organizing and Creating the Annotated Bibliography**

Once the books met the point value to be added to the annotated bibliography, they were sorted by individual major standards and subordinate standards under each science strand.

The annotated bibliography was organized by first, the three major science strands: physical, life, and earth science. Then, the three major science standards for example, “Weather can be observed, measured, and described.” Finally, by each subordinate standard under the major standards: “Students know the sun warms the land, air, and water” (Science Content Standards for California Public Schools, 2003, p. 4) All standards are listed; however, books were not found for all standards. In some cases, there were books that fit the major standard, but were not specific enough to fit the subordinate standards. If a book fit more than one subordinate standard, the full
annotation was included in all of the standards it applied to with a reference made to the other standards.

Detailed information is given for each book: title, author, publisher, publishing date, ISBN, interest and reading level if available, and informational genre. The annotations include a synopsis of the book and at times commentary on different features of the book.

**Organizing and Creating the Resource Bibliography**

Several books did not meet the selection criteria for the annotated bibliography. Some of the books were not appropriate for whole-class read alouds or the text was too dense. However, these books were suitable resources for teachers to use to further their knowledge of the subject matter, to read to a small group, or to be included in books that students could look at to further their knowledge or interest in a topic. The organization of the resource bibliography is the same as the annotated bibliography. The resource bibliography does not contain annotations for each book; however, in some instances the comments from the rubric are included.

Applying the rubric to over 200 trade books was a time consuming endeavor. The amount of time spent on the entire evaluation process could have been reduced by initiating a quick visual evaluation of the length of the book and the page layout. However, several books would have been unnecessarily eliminated and the need for the resource bibliography would not have been realized.

Chapter Four discusses the implications and limitations of the project and ideas for further projects.
Chapter 4

DISCUSSION

This chapter discusses the implementation and the limitations of this project. It will also address what next steps could be taken to further the work that was started with this project. It concludes with ideas for future research and reflections of the author on the project.

Implementation of the Project

At the beginning of the school year, the annotated bibliography, resource bibliography, and teacher-friendly rubric were given to and explained to 12 first grade teachers at three Northern California elementary schools. Although no formal feedback was collected, several teachers expressed their gratitude at receiving the bibliographies and rubric. Comments were made by one of the school’s first grade team that they were going to use the books off the annotated bibliography to teach a science unit on habitats instead of using the textbook.

The project author taught the different properties of solids, liquids, and gases to two different first grade classrooms using the adopted science textbook in one and a suggested book off the annotated bibliography in the other classroom. Again, no formal data was collected; however, the students asked three times as many questions and the discussion after the read aloud lasted more than 10 minutes longer in the classroom where the trade books were read aloud versus the classroom where the textbook was read aloud. Students in the classroom where the trade book was read aloud also asked if they could borrow the book to look at.
Limitations

As stated in Chapter One, there were several limitations to this project. Compared to the massive number of trade books available, a relatively small sample of books was actually evaluated. Since the purpose of the annotated bibliography was to teach or enhance science instruction, the majority of the books selected were nonfiction. This excluded other genres of books that could be used to spark further interest in the topic or to make connections between literacy and science.

Related limitations involved the small amount of books that are included on the annotated bibliography and the lack of a fictional bibliography.

The absence of any formal research data to support the use of the trade books selected in the classroom was an additional limitation.

In spite of these limitations, the created annotated bibliography and rubric provided teachers with a reliable source of accurate, organized trade books to use to teach and to enhance first grade California science standards and a tool to aid the selection process of further books to teach or to enhance science and other content area standards.

Ideas for Expanding the Project

There are several opportunities to duplicate this project by creating annotated bibliographies for other content areas and standards and for other grade levels. Also, the project can be expanded by adding to the rubric or creating a new rubric that could evaluate books for their literary value or focus on selecting books for the purpose of motivating students to investigate the topic further (Atkinson et al., 2009; Hunsader, 2004). Another expansion of the project would be to create an annotated list organized
by standards that would include different types of trade books: books to use to teach the
standard, resource books for the teacher, books from various genres to enhance the topic,
books for the students to look at, or books for students to read.

A further expansion of the project would be to add lesson plans for each trade
book on the annotated bibliography. The lesson plans would include activities to build or
activate background knowledge, along with graphic organizers, selected vocabulary with
kid friendly definitions provided, and discussion prompts and questions.

**Future Research**

The purpose of the annotated bibliography of this project is to provide teachers a
list of trade books to teach science standards. The next logical step in the process would
be to conduct research to see if students learn as much or more topic knowledge from the
books selected as they do from the adopted science curriculum. Further research could
study whether or not adding lesson plans with the selected read aloud books would
further student learning of the standards and increase the retention of the information..

**Conclusion**

It is the hope of this project author that this annotated list of trade books will
facilitate the process of incorporating teaching science content into the first grade school
day, thus encouraging more teachers to take the time to read aloud informational books
with their students. It is quite possible that in just 20 minutes a day, teachers could have
the power to prevent the “fourth grade plunge” (Chall & Jacobs, 2003).
APPENDIX A

Rubric for Selecting Trade Books to Read Aloud to Teach

First Grade California Science Standards
Rubric for Selecting Informational Trade Books to Read Aloud to Teach Content-Area Standards

Book Title _____________________________________________________________________________
Author ________________________________ Illustrator/Photographer____________________________
Publisher _______________________________ Date __________ ISBN ___________________________
Book Level _____________________ Science Content/Standard _______________________________

Does the book adequately address the intended standard? If not, do not continue the evaluation.

Check all that apply, or write N/A if not applicable. Then, select an overall score for each category and
total category scores. A book must earn a total score of at least “11” with a score of “3” in the accuracy
category to be considered for recommendation.

0 = meets no criteria  1 = meets few criteria  2 = meets some criteria  3 = Meets all or most criteria

____ Accuracy
   ___ information (text, vocabulary, graphics) is accurate
   ___ information is current
   ___ author’s credentials and experience are listed or information has been reviewed
   ___ information is not misrepresented or distorted

____ Content
   ___ contains substantial scientific content and concepts
   ___ examples are provided to explain concepts
   ___ contains nonfiction text features (e.g. subheadings, table of contents, index, glossary)
   ___ density of information is appropriate for grade level
   ___ content is free of ethnic, gender, socioeconomic bias
   ___ contains very little irrelevant information
   ___ ideas and concepts are presented in a logical and sequential order
   ___ text is conducive to read aloud*
   ___ length of book is appropriate for reading aloud *

____ Academic Language
   ___ background knowledge required is limited or supplied if necessary
   ___ scientific vocabulary is explained when introduced in text using kid-friendly definitions
   ___ scientific vocabulary is defined in glossary
   ___ density of scientific vocabulary is appropriate for grade level
   ___ “tier two” words are present, but not overwhelming
   ___ sentence complexity is appropriate for grade level

____ Visual Features (e.g. photos, illustrations, graphics, typeface, page layout)
   ___ visual features help to explain or clarify the text
   ___ visual features are clearly labeled
   ___ layout of page (arrangement of text and visual features) is not cluttered
   ___ size of graphics are large enough for audience to see clearly*

____ Total Score

Recommend?  ____ Yes  ____ No

*To be used as a whole-class read aloud, the book must meet these criteria

Comments:
APPENDIX B

Teacher Friendly Rubric for Selecting Informational Trade Books to Read Aloud to Teach Content Area Standards
Rubric for Selecting Informational Trade Books to Read Aloud to Teach Content-Area Standards

Book Title ____________________________________________
Author ____________________________ Illustrator/Photographer________________________
Book Level ___________ Science Content/Standard __________________________________

Does the book adequately address the intended standard? If not, do not continue the evaluation.

Check all that apply, or write N/A if not applicable. Then, select an overall score for each category and total category scores. A book must earn a total score of at least “10” with a score of “3” in the accuracy category to be considered for recommendation.

0=meets no criteria  1=meets few criteria  2=meets some criteria  3=Meets all or most criteria

____ Accuracy
_____ information (text, vocabulary, graphics) is accurate and current
_____ author’s credentials and experience are listed or information has been reviewed and approved by experts in the field (only necessary if evaluator cannot determine accuracy of information)
_____ information is not misrepresented or distorted

____ Content
_____ contains substantial scientific content and concepts
_____ examples are provided to explain concepts
_____ contains nonfiction text features (e.g. subheadings, table of contents, index)
_____ content is free of ethnic, gender, socioeconomic bias
_____ contains very little irrelevant information
_____ text is conducive to read aloud*
_____ length of book is appropriate for reading aloud *

____ Academic Language
_____ background knowledge required is limited or supplied if necessary
_____ scientific vocabulary is explained when introduced in text
_____ scientific vocabulary is defined in glossary
_____ density of scientific vocabulary is appropriate for grade level
_____ sentence complexity is appropriate for grade level

____ Visual Features (e.g. photos, illustrations, graphics, typeface, page layout)
_____ visual features help to explain or clarify the text
_____ visual features are clearly labeled
_____ layout of page (arrangement of text and visual features) is not cluttered
_____ size of graphics are large enough for audience to see clearly*

____ Total Score
Recommend?  ____ Yes  ____ No

*To be used as a whole-class read aloud, the book must meet these criteria

Comments:
APPENDIX C

Annotated Bibliography of Informational Trade Books to Read Aloud to Teach First Grade California Science Standards
Annotated Bibliography of Informational Trade Books to Read Aloud to Teach First Grade California Science Standards

Physical Sciences

1. Materials come in different forms (states), including solids, liquids, and gases. As a basis for understanding this concept:
   a. Students know solids, liquids, and gases have different properties.
   b. Students know the properties of substances can change when the substances are mixed, cooled, or heated.

* The following books are appropriate to teach physical science standards 1.0, 1.a and b

**Book Title:** Change It! Solids, Liquids, Gases and You  
**Author:** Adrienne Mason  
**Publisher:** Children’s Press Scholastic  
**Date Published:** 2006  
**ISBN:** 978-1-55337-838-9  
**Interest Level:** K-3  
**Book Level:** 3.6  
**Informational Genre:** Nonnarrative

Defines the properties of liquids, solids, and gases and how these properties can be changed. There is a simple experiment provided for each concept taught.

**Book Title:** It’s Science! Solid, Liquid, or Gas?  
**Author:** Sally Hewitt  
**Publisher:** Compass Point Books  
**Date Published:** 1998  
**ISBN:** 0-516-26393-5  
**Interest Level:** K-3  
**Book Level:** 3.8  
**Informational Genre:** Nonnarrative

Describes the properties of liquids, solids, and gases and how these properties can be changed. Photographs and activities help to explain the concepts.

**Book Title:** Rookie Read-About Science: Solids, Liquids, and Gases  
**Author:** Ginger Garrett  
**Publisher:** Children’s Press Scholastic  
**Date Published:** 2004  
**ISBN:** 0-516-24663-1  
**Interest Level:** K-3  
**Book Level:** 2.0  
**Informational Genre:** Nonnarrative

Simplified text describes the properties of liquids, solids, and gases and discusses how water can be changed into a solid and gas.
Physical Sciences 1.a & 1.b continued

Book Title: Simply Science Solids, Liquids, Gases  
Author: Charnan Simon  
Publisher: Compass Point Books  
Date Published: 2001  
ISBN: 978-0-7565-0976-7  
Interest Level: K-3  
Book Level: 3.6  
Informational Genre: Nonnarrative

Defines matter and the properties of liquids, solids, and gases and these properties can be changed. Photographs and text use common kid (e.g. bike, balloon) items as example to explain the concepts.

Author: Kathleen Weidner Zoehfeld  
Publisher: HarperCollins  
Date Published: 1998  
Interest Level: K-3  
Book Level: 3.7  
Informational Genre: Narrative

Describes the attributes of liquids, solids, and gases discusses how water can be changed into a solid and gas. Three simple experiments are included at the back of the book.

Life Sciences

2. Plants and animals meet their needs in different ways. As a basis for understanding this concept:

   a. Students know different plants and animals inhabit different kinds of environments and have external features that help them thrive in different kinds of places.

Book Title: The ABCs of Habitats  
Author: Bobby Kalman  
Publisher: Crabtree Publishing  
Date Published: 2008  
ISBN: 978-0-7787-3431-4  
Interest Level: K-3  
Book Level: 3.9, GR: K  
Informational Genre: Nonnarrative

This ABC book describes several habitats and the animals that live in them. Photographs clarify and extend the textual information.  
Note: There are several other types of ABC books by the same author and publisher.

Book Title: Plants in Different Habitats  
Author: Bobby Kalman & Rebecca Sjonger  
Publisher: Crabtree Publishing  
Date Published: 2006  
ISBN: 0-7787-2282-1  
Interest Level: K-3  
Book Level: 4.8  
Informational Genre: Nonnarrative

Defines what a plant is, the parts of a plant, what photosynthesis is, and describes different habitats of plants.  
Note: This book would be best read by sections to reduce the density of information.  
This book is also appropriate to teach standards LS 1.e.
Life Sciences 2.a continued

**Book Title:** Time for Kids Science Scoops: Plants!  
**Author:** Brenda Iasevoli  
**Publisher:** HaperCollins  
**Date Published:** 2006  
**ISBN:** 978-0-06-078218-4  
**Interest Level:** K-3  
**Book Level:** 2.0, GRL: E-F  
**Informational Genre:** Nonnarrative

Simple text and close-up photographs describe how plants grow, different habitats where they can be found and how they can interact with animals and other plants.  
**Note:** This book is also appropriate to teach standards **LS 1.b, 1.c, and 1.e**

**Book Title:** Wetland Food Chains  
**Author:** Bobby Kalman and Kylie Burns  
**Publisher:** Crabtree Publishing  
**Date Published:** 2007  
**ISBN:** 978-0-7787-1999-1  
**Interest Level:** 4-8  
**Book Level:** 5.5, GRL: L  
**Informational Genre:** Nonnarrative

Defines what a wetland and a food chain are. Discusses the different levels of food chains, and gives an example of one. Photographs clarify and extend the textual information.  
**Note:** This book would be best read by sections to reduce the density of information. Although there is a good amount of topic specific vocabulary, it is defined in the text with kid-friendly definitions. Even though this book is at a higher interest and book level, the content and sentence structure are suitable for first grade students. There are several other types of habitat food chain books by the same author and publisher. This book is also appropriate to teach standards **LS 1.c**.

**Book Title:** A Wetland Habitat  
**Author:** Molly Aloin and Bobby Kalman  
**Publisher:** Crabtree Publishing  
**Date Published:** 2007  
**ISBN:** 978-0-7787-2983-9  
**Interest Level:** K-3  
**Book Level:** 3.1, GRL: K  
**Informational Genre:** Nonnarrative

Defines what a habitat is, and describes a wetland habitat. Discusses the different types of plants and animals that live in a wetland and how they interact with each other. Photographs clarify and extend the textual information.  
**Note:** There are several other types of habitat books by the same author and publisher.
Life Sciences 2 continued

**Book Title:** Would You Survive? Living Things in Habitats  
**Author:** John Townsend  
**Publisher:** Raintree  
**Date Published:** 2006  
**ISBN:** 1-4109-1969-2  
**Interest Level:** 4-8  
**Book Level:** 4.0  
**Informational Genre:** Nonnarrative

Describes how severe habitats and climate affect animals and the features these animals have that help them to live in these harsh habitats.  
**Note:** This book would be best read by sections to reduce the density of information. Although there is a good amount of topic specific vocabulary, it is defined in the text with kid-friendly definitions. Even though this book is at a higher interest level, the content and sentence structure are suitable for first grade students. Students will find this book very interesting.

b. Students know both plants and animals need water; animals need food, and plants need light.

**Book Title:** Time for Kids Science Scoops: Plants!  
**Author:** Brenda Iasevoli  
**Publisher:** HaperCollins  
**Date Published:** 2006  
**ISBN:** 978-0-06-078218-4  
**Interest Level:** K-3  
**Book Level:** 2.0, GRL: E-F  
**Informational Genre:** Nonnarrative

Simple text and close-up photographs describe how plants grow, different habitats where they can be found and how they can interact with animals and other plants.  
**Note:** This book is also appropriate to teach standards LS 1.a, 1.c, and 1.e

c. Students know animals eat plants or other animals for food and may also use plants or even other animals for shelter and nesting.

**Book Title:** Time for Kids Science Scoops: Plants!  
**Author:** Brenda Iasevoli  
**Publisher:** HaperCollins  
**Date Published:** 2006  
**ISBN:** 978-0-06-078218-4  
**Interest Level:** K-3  
**Book Level:** 2.0, GRL: E-F  
**Informational Genre:** Nonnarrative

Simple text and close-up photographs describe how plants grow, different habitats where they can be found and how they can interact with animals and other plants.  
**Note:** This book is also appropriate to teach standards LS 1.a, 1.b, and 1.e
Life Sciences 2.c continued

**Book Title:** Wetland Food Chains  
**Author:** Bobby Kalman and Kylie Burns  
**Publisher:** Crabtree Publishing  
**Date Published:** 2007  
**ISBN:** 978-0-7787-1999-1  
**Interest Level:** 4-8  
**Book Level:** 5.5, GRL: L  
**Informational Genre:** Nonnarrative

Defines what a wetland and a food chain are. Discusses the different levels of food chains, and gives an example of one. Photographs clarify and extend the textual information.

**Note:** This book would be best read by sections to reduce the density of information. Although there is a good amount of topic specific vocabulary, it is defined in the text with kid-friendly definitions. Even though this book is at a higher interest and book level, the content and sentence structure are suitable for first grade students. There are several other types of habitat food chain books by the same author and publisher. This book is also appropriate to teach standards **LS 1.a.**

Life Sciences 2.c continued

**Book Title:** Who Eats What? Food Chains and Food Webs  
**Author:** Patricia Lauber  
**Publisher:** HaperCollins  
**Date Published:** 1995  
**ISBN:** 978-0-06-445130-7  
**Interest Level:** K-3  
**Book Level:** 3.8  
**Informational Genre:** Narrative

Explains the concept of a food chain and shows how plants, animals and humans are connected to each other.

**Book Title:** Whose Food Is This  
**Author:** Nancy Kelly Allen  
**Publisher:** Picture Window Books  
**Date Published:** 2005  
**ISBN:** 1-4048-0607-5  
**Interest Level:** K-3  
**Book Level:** 3.4  
**Informational Genre:** Narrative

In a question answer format, this book looks at what animals eat.

d. Students know how to infer what animals eat from the shapes of their teeth  
(e.g., sharp teeth: eats meat; flat teeth: eats plants).

**Book Title:** Animal Teeth  
**Author:** Daniel Shepard  
**Publisher:** Steck-Vaughn  
**Date Published:** 2003  
**ISBN:** 0-7398-5917-X  
**Interest Level:** K-3  
**Book Level:** Emergent  
**Informational Genre:** Nonnarrative

Large photographs and simple text explain how to tell what animals eat by the shape of their teeth.
Life Sciences continued

e. Students know roots are associated with the intake of water and soil nutrients and green leaves are associated with making food from sunlight.

**Book Title:** From Seed to Plant  
**Author:** Gail Gibbons  
**Publisher:** Holiday House  
**Date Published:** 1991  
**ISBN:** 0-8234-0872-8  
**Interest Level:** K-3  
**Book Level:** 3.4  
**Informational Genre:** Nonnarrative

Explains where seeds come from, how they grow, and what a plant needs to live and grow.

**Book Title:** Plants in Different Habitats  
**Author:** Bobby Kalman & Rebecca Sjonger  
**Publisher:** Crabtree Publishing  
**Date Published:** 2006  
**ISBN:** 0-7787-2282-1  
**Interest Level:** K-3  
**Book Level:** 4.8  
**Informational Genre:** Nonnarrative

Defines what a plant is, the parts of a plant, what photosynthesis is, and describes different habitats of plants.  
**Note:** This book would be best read by sections to reduce the density of information.  
This book is also appropriate to teach standards **LS 1.a.**

**Book Title:** Time for Kids Science Scoops: Plants!  
**Author:** Brenda Iasevoli  
**Publisher:** HaperCollins  
**Date Published:** 2006  
**ISBN:** 978-0-06-078218-4  
**Interest Level:** K-3  
**Book Level:** 2.0, GRL: E-F  
**Informational Genre:** Nonnarrative

Simple text and close-up photographs describe how plants grow, different habitats where they can be found and how they can interact with animals and other plants.  
**Note:** This book is also appropriate to teach standards **LS 1.a, 1.b, and 1.c**
Earth Sciences

3. Weather can be observed, measured, and described.

**Book Title:** Clouds  
**Author:** Anne Rockwell  
**Publisher:** HaperCollins  
**Date Published:** 2008  
**ISBN:** 978-0-06-445220-5  
**Interest Level:** K-3  
**Book Level:** 3.9  
**Informational Genre:** Narrative

Describes how clouds are formed, the different types of clouds, and how different weather brings about different types of clouds. Includes how to make a cloud.

**Book Title:** Flash, Crash, Rumble, and Roll  
**Author:** Franklyn M. Branley  
**Publisher:** HaperCollins  
**Date Published:** 1999  
**ISBN:** 978-0-06-445179-6  
**Interest Level:** K-3  
**Book Level:** 3.3  
**Informational Genre:** Narrative

Describes what causes lightning and thunder. This colorfully illustrated book includes a simple experiment to make rain.

a. Students know how to use simple tools (e.g., thermometer, wind vane) to measure weather conditions and record changes from day to day and across the seasons.

**Book Title:** What Will the Weather Be?  
**Author:** Lynda DeWitt  
**Publisher:** HaperCollins  
**Date Published:** 1991  
**ISBN:** 978-0-06-445113-0  
**Interest Level:** K-3  
**Book Level:** 3.6  
**Informational Genre:** Narrative

Discusses how meteorologists predict weather and what causes weather changes.  
**Note:** This book is also appropriate to teach standards **ES 3.b.**

b. Students know that the weather changes from day to day but that trends in temperature or of rain (or snow) tend to be predictable during a season.

**Book Title:** Down Comes the Rain  
**Author:** Franklyn M. Branley  
**Publisher:** HaperCollins  
**Date Published:** 1997  
**ISBN:** 978-0-06-445166-6  
**Interest Level:** K-3  
**Book Level:** 3.5  
**Informational Genre:** Narrative

Explains how rain is formed. This illustrated book includes a simple experiment to change water vapor into water.
Earth Science 3b continued

**Book Title:** Rain, Snow, and Ice  
**Author:** Ted O’Hare  
**Publisher:** Rourke Publishing LLC  
**Date Published:** 2003  
**ISBN:** 1-58952-571-X  
**Interest Level:** K-3  
**Book Level:** 3.6  
**Informational Genre:** Nonnarrative

Explains how rain, snow, and ice are formed. Colorful photographs and a glossary help explain the topic-specific vocabulary.  
**Note:** This book would be best read by sections to reduce the density of information.

**Book Title:** The Reasons for Seasons  
**Author:** Gail Gibbons  
**Publisher:** Holiday House  
**Date Published:** 1995  
**ISBN:** 978-0-8234-1238-9  
**Interest Level:** K-3  
**Book Level:** 4.2  
**Informational Genre:** Narrative

Explains what causes the seasons and the typical weather associated with each season.  
**Note:** This book is also appropriate to teach standards ES 3.c.

**Book Title:** Sunshine Makes the Seasons  
**Author:** Franklyn M. Branley  
**Publisher:** HaperCollins  
**Date Published:** 2005  
**ISBN:** 978-0-06-059205-9  
**Interest Level:** K-3  
**Book Level:** 3.6  
**Informational Genre:** Narrative

Explains how the seasons are determined by the position of the sun. Includes an experiment that shows how the sun causes the changes in light, temperature, and the seasons.  
**Note:** This book is also appropriate to teach standards ES 3.c.

**Book Title:** The Weather and Us  
**Author:** Ted O’Hare  
**Publisher:** Rourke Publishing LLC  
**Date Published:** 2003  
**ISBN:** 1-58952-574-4  
**Interest Level:** K-3  
**Book Level:** 4.1  
**Informational Genre:** Nonnarrative

Explains what causes the weather and why it changes. It also describes climate and atmosphere. Colorful photographs and a glossary help explain the topic-specific vocabulary.  
**Note:** This book would be best read by sections to reduce the density of information.

**Book Title:** What Will the Weather Be?  
**Author:** Lynda DeWitt  
**Publisher:** HaperCollins  
**Date Published:** 1991  
**ISBN:** 978-0-06-445113-0  
**Interest Level:** K-3  
**Book Level:** 3.6  
**Informational Genre:** Narrative

Discusses how meteorologists predict weather and what causes weather changes.  
**Note:** This book is also appropriate to teach standards ES 3.c.
Earth Science continued

c. Students know the sun warms the land, air, and water.

Book Title: The Reasons for Seasons  
Author: Gail Gibbons  
Publisher: Holiday House  
Date Published: 1995  
Interest Level: K-3  
Book Level: 4.2  
Informational Genre: Narrative

Explains what causes the seasons and the typical weather associated with each season.  
Note: This book is also appropriate to teach standards ES 3.b.

Book Title: Sunshine Makes the Seasons  
Author: Franklyn M. Branley  
Publisher: HaperCollins  
Date Published: 2005  
Interest Level: K-3  
Book Level: 3.6  
Informational Genre: Narrative

Explains how the seasons are determined by the position of the sun. Includes an experiment that shows how the sun causes the changes in light, temperature, and the seasons.  
Note: This book is also appropriate to teach standards ES 3.b.
APPENDIX D

Resource Bibliography of Informational Trade Books

First Grade California Science Standards
Resource Bibliography of Informational Trade Books

First Grade California Science Standards

**Physical Sciences**

1. Materials come in different forms (states), including solids, liquids, and gases. As a basis for understanding this concept:
   a. Students know solids, liquids, and gases have different properties.
   b. Students know the properties of substances can change when the substances are mixed, cooled, or heated.

**Book Title:** Science, Liquids, and Gases From Ice Cubes to Bubbles  
**Author:** Carol Ballard  
**Publisher:** Heinemann  
**Date Published:** 2004  
**ISBN:** 140343552-9  
**Interest Level:** 4-8  
**Book Level:** 5.5  
**Informational Genre:** Nonnarrative

**Life Sciences**

2. Plants and animals meet their needs in different ways. As a basis for understanding this concept:
   a. Students know different plants and animals inhabit different kinds of environments and have external features that help them thrive in different kinds of places.

**Book Title:** How Do Animals Adapt  
**Author:** Bobby Kalman  
**Publisher:** Crabtree Publishing  
**Date Published:** 2000  
**ISBN:** 978-0-86505-957-3  
**Interest Level:** 4-8  
**Book Level:** 5.7  
**Informational Genre:** Nonnarrative

**Book Title:** Wild America Habitats: Arctic  
**Author:** Melissa Cole  
**Publisher:** Blackbirch Press  
**Date Published:** 2003  
**ISBN:** 1-56711-798-8  
**Interest Level:** 4-8  
**Book Level:** 5.8  
**Informational Genre:** Nonnarrative

**Book Title:** Wild America Habitats: Forests  
**Author:** Melissa Cole  
**Publisher:** Blackbirch Press  
**Date Published:** 2003  
**ISBN:** 1-56711-802-X  
**Interest Level:** 4-8  
**Book Level:** 5.5  
**Informational Genre:** Nonnarrative
b. Students know both plants and animals need water; animals need food, and plants need light.

c. Students know animals eat plants or other animals for food and may also use plants or even other animals for shelter and nesting.
Life Sciences continued

d. Students know how to infer what animals eat from the shapes of their teeth (e.g., sharp teeth: eats meat; flat teeth: eats plants).

* No books listed for this standard.

e. Students know roots are associated with the intake of water and soil nutrients and green leaves are associated with making food from sunlight.

**Book Title:** Photosynthesis: Changing sunlight into Food  
**Author:** Bobby Kalman  
**Publisher:** Crabtree Publishing  
**Date Published:** 2005  
**ISBN:** 0-7787-2274-0  
**Interest Level:** K-3  
**Book Level:** 4.6  
**Informational Genre:** Nonnarrative

**Book Title:** Wonders of Plants and Flowers  
**Author:** Laura Damon  
**Publisher:** Troll Associates  
**Date Published:** 1990  
**ISBN:** 0-8167-1762-1  
**Interest Level:** K-3  
**Book Level:** 4.0  
**Informational Genre:** Narrative

Earth Sciences

3. Weather can be observed, measured, and described.
   a. Students know how to use simple tools (e.g., thermometer, wind vane) to measure weather conditions and record changes from day to day and across the seasons.
   b. Students know that the weather changes from day to day but that trends in temperature or of rain (or snow) tend to be predictable during a season.

**Book Title:** The Best Book of Weather  
**Author:** Simon Adams  
**Publisher:** Kingfisher  
**Date Published:** 2001  
**ISBN:** 978-0-7534-6172-3  
**Interest Level:** K-3  
**Book Level:** 5.4  
**Informational Genre:** Nonnarrative

**Book Title:** Weather Forecasting  
**Author:** Gail Gibbons  
**Publisher:** Aladdin Paperbacks  
**Date Published:** 1987  
**ISBN:** 0-689-71683-4  
**Interest Level:** K-3  
**Book Level:** 4.0  
**Informational Genre:** Nonnarrative

**Book Title:** Scholastic Atlas of Weather  
**Writer:** D. Vekteris & Marie-Claude Ouellet  
**Publisher:** Scholastic  
**Date Published:** 2004  
**ISBN:** 0-439-41902-6  
**Interest Level:** 4-8  
**Book Level:** 7.1  
**Informational Genre:** Nonnarrative
Earth Sciences continued

**Book Title:** Eyewitness Books: Weather  
**Author:** Brian Cosgrove  
**Publisher:** DK Publishing  
**Date Published:** 2004  
**ISBN:** 0-329-39617-X  
**Interest Level:** 4-8  
**Book Level:** 7.6  
**Informational Genre:** Nonnarrative

**Book Title:** 100 Things You Should Know About Weather  
**Author:** Clair Oliver  
**Publisher:** Barnes & Noble  
**Date Published:** 2005  
**ISBN:** 0-7607-5393-8  
**Interest Level:** 3-6  
**Book Level:** 6.0  
**Informational Genre:** Nonnarrative
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