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Let's Get Growing: Exploring How Teachers Use Expository Texts in Gardening Lessons for K-1 Students

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Abstract

In this research study, I explored how teachers bring expository texts into their lessons and find ways in which nonfiction children's books are used in science lessons. This project had two goals: to research teachers' use of expository texts in science lessons related to a garden project for students in kindergarten to first grade and to look at the most effective ways to incorporate Massachusetts standards of reading with science in the classroom. Throughout this honors thesis project, I created a book set of nonfiction texts relating to garden topics such as the parts of a plant and how plants grow to be incorporated into lesson plans by kindergarten and first grade teachers. After researching nonfiction texts on a variety of topics in relation to gardening from both the National Science Teachers Association (NSTA) and the International Literacy Association, I compiled books for teachers to utilize within lesson plans. The teachers' use of the books was observed to draw conclusions of how they applied nonfiction texts to science lessons for young students. The thesis contributed to aiding the teachers in connecting science nonfiction literature to a school garden project in addition to meeting the expectations of the new Massachusetts Science and Technology/Engineering Curriculum Framework.

Introduction

In April 2016, the Massachusetts Department of Education constructed new standards for the Massachusetts Science and Technology/Engineering Curriculum Framework. Schools must follow the expectations that the state sets forth in order for students to be prepared to continue on to the next grade level. Teachers across Massachusetts, have been working to implement ways to meet the new framework in addition to the other state standards that they are required to meet. Prior to the new science standards, the lower grade levels, particularly kindergarten, were not exposed to much science. The focus for teachers was centered around the mathematics and English

standards, as students are expected to reach learning outcomes of early reading, writing and mathematics. The push to include more science is overwhelming for teachers to include in addition to curriculum for their young students. Teachers, at the school I was working with, were supplied with many resources but needed support to determine how to include science in their everyday curriculum while meeting all of the standards.

The “Let’s Get Growing” project is helping a kindergarten and first grade school community use the garden space outside the school to engage students with hands-on activities to learn how plants grow and how to maintain and care for the garden. Dr. Glen, in addition to other school personnel and other members of the community with science education backgrounds, worked to create four two-and-a-half-hour professional development days to educate the kindergarten and first grade teachers on how to use the garden in connection to meeting the state’s new frameworks. I was present at each professional development day working with the teachers to create hands-on lessons implementing the use of the book sets I created. At each of the four professional development meetings, there was a guest speaker who shared his or her expertise about a specific garden topic. These included a farmer, beekeeper and other gardening specialists. The discussions included: composting, timing of planting, plant groupings, pollination, the importance of bees and a discussion on how to make the garden project a success not only in the first year, but for many years to come.

Literature Review

Students have the opportunity during hands-on activities to nurture their curious minds and develop a strong feeling of accomplishment after the lesson. (Guha, 2012). The state of Massachusetts established new science standards in 2016 that increased the focus of a variety of science topics starting at the kindergarten level. The learning outcomes that students are developing

are a conceptual understanding of science rather than a procedural understanding. A procedural understanding is a step-by-step knowledge of information while a conceptual understanding is knowing everything about the topic by having a well-rounded and first person experience with the topic. Hands-on learning fosters a conceptual understanding of science topics. Hands-on learning helps students to reach their learning goals on their own through their own knowledge and curiosity (Guha, 2012). The most effective teaching strategy in science is to ask questions and allow students to conduct hands-on activities to answer these questions. When students are engaged in scientific investigations, they observe and explore for themselves (Lee, 2016). Students are not being told science concepts but instead are figuring them out through activities where they are learning from their own observations. Hands-on activities provide visual learning where the eyes and brain of the student work together to make a comprehensive understanding of a given topic including: encoding; processing; and retrieval of information Wesson (2011) noted that 80% of the information going to the brain comes from the eyes. Students develop a strong comprehension of material when they visually see the material and work with the concepts being taught. There needs to be different activities to assess student knowledge of the given topic.

Studies have shown that it is essential to provide students with the opportunity to share what they think about a science topic and use texts and hands-on learning to redirect them. Students will comprehend counter-intuitive science texts better when they have misconceptions activated prior to reading a science text (Alvermann, 1989). Teachers should have students look for ideas that might conflict with their prior knowledge. It is most effective to have students share what they know so teachers can evaluate what students need more information about and what areas can be built upon to reach a higher level of conceptual knowledge about science. Learning students' knowledge and misconceptions helps teachers decide what to teach the young people in

front of them as well as decide which methods are most effective at teaching the topic (Barman, 2006). Taking what teachers know or have gathered, they can then provide students with information that they need to know and build upon what they already know using both science texts and hands-on learning.

The heart of science education is to pose questions to students and have them construct predictions. Predictions use previous knowledge, observations and scientific reasoning to guide students (Lockwood, 2002). Many students have a "win or lose" mentality where they do not want to be wrong. Jeff Lockwood (2002) says it is important to expose students to scientific discoveries to help support them in making predictions that could lead to further ideas of science. Science is an opportunity for students to ask questions and then find the answer after making predictions of what they think is the answer based on what they already know. Predictions are important for students to be involved and actively participate in their own learning (Thiel, 1976). When students go out in the world, they will be making observations and predictions. It is important that some of what students do in the classroom needs to encompass what they will be doing in their everyday lives. Being able to learn about topics that students can see in their everyday lives allows them to see that they can apply what they are learning in the classroom to the world around them. Knowing what goes on around students brings the classroom to their life.

Students comprehend best by learning across all subject matters as they are using their knowledge of each subject. Research shows that this provides students with opportunities to discover new ideas and re-examine old ones (Stump, 2016). Only making connections between STEM and literature, history, and mathematics, makes students stronger in all subject areas. It also points out to students that material in one subject can be used in all other subjects as well. Students' knowledge and understanding in literature can be used to read and write about science

with other subjects and write their own observations. Conceptual understanding of science is important so that students know the material and are not just repeating a procedural understanding of the hands-on activities (Stump, 2016). Just knowing the step-by-step process is not enough for students to fully understand what they are learning because they will remember the material for a short period of time or simply for the end assessment. If students can apply what they are learning, they will remember it better and be able to apply their knowledge to the problem at hand.

Methods

I chose this project as it is the school that I grew up attending and wanted to give back to the teachers and students. I knew that bringing science into the kindergarten grade level would be a challenge for the teachers and wanted to use the knowledge I gained from the education and English departments at Bridgewater State University to help support the teachers. I knew that the school had built a large garden at the main entrance of the school a few years back but had yet to maintain it. My mentor and the principal of the school had been in contact to make the garden a place where students and teachers could learn more about plants and incorporate the new science standards. I was asked by Dr. Glen to join her in helping to make the garden project a success for both teachers and students. Knowing the new standards and the emphasis on exposing nonfiction texts to young students, I knew that I had to create a book set for the classes to use in order to provide students with informational texts that also meet the standards for English language and literature.

In January and February, I helped my mentor, Dr. Glen, in setting up four professional development days for March. This included attending meetings with the school principal and participating teachers, creating topic days, and working with local experts to discuss what they

would be presenting. The professional development days at the K-1 school in Southeast Massachusetts were held on March 2, 9, 16 and 23, 2017. During this time, I presented my texts to the eight teachers involved and then continued to help the teachers in creating lessons around the garden topic of the day and the books.

After each meeting, I scheduled days to go into the school to watch two kindergarten teachers teach life science and garden-based lessons. I observed Teacher One in her kindergarten classroom. She had been a special education teacher for many years and had come back to teaching in a general education classroom. This was her first year as a kindergarten teacher. Teacher Two is the other kindergarten teacher I was able to work with. She was a second year kindergarten teacher at the school. I observed these teachers to see how they brought life science to their young students and the best practices in teaching students of diverse learning needs. In the months of April, May and June, I helped out in the garden with the teachers to complete hands-on learning experiences for students. I visited both classrooms five times from late March to the end of the academic year. The purpose was to create a foundation for a garden program that will continue for years to come as it benefits young students by giving them early exposure to science and hands-on learning activities.

I started my project through researching high quality expository texts, from the National Science Teachers Association and the International Literacy Association that were appropriate for the students' reading level and the garden topics. After researching texts that were appropriate to the students' reading levels and topics, the next step was to obtain a copy of the text and make sure it was a well written text and acceptable to use in the classroom. I obtained copies of the texts from surrounding area libraries to make sure they were high-quality and acceptable to use in the classroom. I knew they were high quality expository texts as I found these texts on the

National Science Teachers Association and International Literacy Association database. Once the evaluation was complete, I ordered the texts for each of the classrooms to create a book set of thirty-five texts. (See Appendix A for the full list of books purchased). The texts were purchased for the school with a BSU ATP Semester Grant so that the teachers could use them annually as they continued the program beyond the spring. I presented the books to the teachers during a series of professional development days for use with the school garden. The texts could be used by all of the teachers, and specifically be used in the classrooms where I observed the teachers use of the books. After the professional development days working with the teachers on creating lesson plans, I observed in two of the classrooms. The purpose was to observe how the teachers implemented the books into their garden-based lessons.

After going into my first observation, I realized that I did not want to just focus my thesis study on how they used the texts that I provided, but on how the teachers brought science, particularly gardening, into the kindergarten classrooms. I wrote down all observations of how the teachers handled the lessons on garden topics with the students. I also participated in the hands-on activities with students to gain an understanding of what students know and what misconceptions they have about gardening and science. I knew that I had a great deal of information on teaching strategies and student learning that I had to present from these science lessons in relation to gardening.

Methodology

After ten observation days in the two kindergarten classrooms, I began reading the text Qualitative Research for Education: A Introduction to Theories and Methods written by Robert Bogden and Sari Knopp Biklen. The text provided me with ways to take the observations I have conducted and place them into categories. These categories allowed me to interpret the data that I

had collected and draw conclusions based on my findings. Following the reading, I started to code my observations into categories based on the generalized codes provided by the book. These codes included: setting/context codes, definition of the situation codes, perspectives held by students, subject was of thinking about people and objects, process codes, activity codes and strategy codes. I learned about what was included under each of these code topics and took my observations to code them in a very similar way using what I learned. Through reading this text, I taught myself how to do the first round of coding. The text helped me to make sense of the observations and material that I had in front of me. Working with Dr. Glen, I came up with three strong categories with many subgroups. (See Appendix B).

In this study, I have focused on qualitative research to demonstrate how teachers are successfully bringing science and connecting it to literature in their kindergarten classrooms. After completing ten observations in two kindergarten classrooms, I had pages of observations that I needed to sort into larger observation categories in order to document my findings for both myself and others. I worked to code the information that I had collected into three main categories with subcategories explaining the major occurrences I had seen over the course of my visits into the classrooms. Furthermore, I explored my findings under three topical areas including: activating students prior knowledge, teaching strategies, and student learning. I have found that these three umbrella topics cover all of the key features in teaching science at the kindergarten level. After speaking to additional teachers, administration and my mentor, I have concluded that these observations demonstrate the best teaching methods for science as well as across the curriculum. They would help to meet the science standards across the curriculum in any elementary school in the state of Massachusetts.

Findings

Through the observations I have conducted, the new Massachusetts science standards can be implemented into the everyday classroom routines. Teachers were able to use literature, mathematics, activating prior knowledge, technology and social interaction/team work to bring in the new standards while also working on the grade level standards for mathematics and English. It became evident that bringing science and nonfiction texts into the classroom did not add additional stress on teachers and students. Bringing science, in this case gardening/plant lessons, helped students engage in topics that they are innately curious about. Teachers then were able to create lessons that worked across the curriculum to meet each learning outcome. The three major findings I found in each of the ten observations that made incorporating science lessons successful were: activating students' prior knowledge, teaching strategies and student learning.

Activating Students Prior Knowledge

The first major piece in bringing science into the kindergarten classrooms was activating students' prior knowledge of the topics being covered. I found in each class that the teachers encouraged students to share their prior experiences and/or knowledge of the topic they were covering. This was to bring about discussion and to see what students already knew and what they need to learn over the course of the lessons. Students were also more engaged as they were able to make connections and learn from their peer experiences as well. In one of the classes I was observing in, the teacher set up a poll to share what type of vegetables the students liked to eat. The discussion for the day was about vegetables, particularly the two they were going to be planting in the garden. The teacher got the students thinking about vegetables and had a few students sharing how they liked to eat that vegetable or if they have planted them at their own

homes. This discussion then worked into the lesson; but the teacher already had her students engaged as they were thinking about the topic and seeing what background knowledge they already had.

The second reoccurring theme related to students' prior knowledge was having students make predictions. This opened up conversation about science and got students thinking, even at the lower grade levels, about why things are the way they are. Students were also learning key science vocabulary as the teachers asked them to share their predictions. This allowed students to understand what each word meant as well as practice making their own sentences or uses of the word. Students listened to a read-aloud and the teacher asked them during reading what would happen to the seed next. Students were making predictions while listening to a read-aloud and using their prior knowledge.

Teaching Strategy

The key component to any successful classroom lesson, especially science, is to establish and hold high expectations for behavior to ensure the highest safety of all students. The garden project particularly was important to set rules as it was outside with a road nearby. In both of the classrooms I observed in, the teacher had the class come up with the rules for the garden. These included: no running in the garden, having listening ears on at all times, not picking any of the plants that are outside, staying inside the fence and taking care of the plants and animals that make up the garden. They continued as well to use their call and response strategies to make sure each student would stop, look and listen when they were outside or inside engaged in an activity. These included clapping and "one, two, three all eyes on me". A reoccurring theme in the science lessons was the calling out of students or the questions. In both classrooms, teachers

worked to reinforce good classroom behavior and gave reminders. When working with hands-on activities or anything in science, it is good when students are very engaged in the lessons and want to learn more; but it is important to establish rules and maintain them so that the lesson continues to be structured and safe for all students.

Group sharing and recall is important in the lower grades especially as students are able to work with their peers and learn from one another. The teachers set up the science lessons on the rug in order to be not a lecture of what is happening in the garden, but more of a conversation between peers and the teacher learning together. In both classes, teachers would make anchor charts that students filled in. At the top would be a question or statement such as “What would you see in the garden?” and “What could you hear?”. Students then worked to come up with a list of what they would expect. This was an opportunity to share as a group and recall what they already knew before going out into the garden. These discussions also included looking at the classroom plants and discussing what they saw or recalled from what they read about earlier in the text of the day. These times of recall help to scaffold the lesson by bringing in what was already discussed and adding in an additional piece. A major part of the discussions was working on KWL charts. This allowed students to share and recall what they know and think about what they want to learn. At the end of the lesson, students filled in the learned sections to share what they learned. These were additional ways that teachers were able to see what students understood and could recall to determine what they needed additional lessons on.

The location for any lesson I observed was well thought out to make sure each student was successful in being able to be key members in the discussions or experiments. Most of the large discussions were on the rug during read-alouds. This small space allowed for a conversation to happen between students and the teacher. If there was something to be observed, both

teachers had the students sit on the edges of the rug and put the object(s) in the center of the rug. Each student had the opportunity to make observations and the students were also able to pass around the objects so that they could get a closer look. It also helped to make sure each student got a turn and it was conducted in an orderly fashion. When students were out in the garden, they would sit in the same position of a circle on the benches in the outside classroom. During planting time, students would circle around the classroom garden. The first row of students would sit while the back row would stand. During planting, five students at a time would go to the garden boxes. The rest of the students would sit on the picnic tables. It was important that not every student was at the garden at the same time due to the fact that space was limited around the garden boxes. To prevent behavioral problems and have more of a small class discussion, it was best to not have all students coming over to the garden boxes at the same time. This meant that the teacher had to plan for what the rest of the students would be doing. Thus, centers were used to make sure each student was able to participate and also made sure the planting time in the garden was safe for all. One center would be students matching the seed and seed size to the plant while another center would have students counting the different parts of the mini artificial garden. There were many centers that also included writing plant names to practice letters and spelling while others worked on numbers.

Science notebooks and technology served as learning tools for students to share their thoughts and test their knowledge of what they were learning. Each student had their own science notebook that they drew pictures of what they saw as part of their observations as well as writing short sentences of what their picture was showing them. One of the days, students had to draw what the plant would look like when they went out the next day and write a short description. This incorporated writing as well as making predictions. Another day after reading about

stems, the teacher used the same book about stems which she placed out at each of the tables. Students had to write on one page of their journal, “Stems are important because _____”. Students used the text in their group to finish writing one sentence of why stems were important. This allowed students to write on their own based on a sentence they researched in the book that was just read aloud to them. This journal also stayed with them over the course of gardening so they could keep track of the plants’ progress. The use of technology in the classrooms such as videos also reinforced what was being taught in the classroom. Both teachers used the Scholastic News website to read the magazine and listen to the audio. The audio would say “roots grow” and students would respond back “down”. The interactive video and magazine helped students become engaged while reinforcing what they had already been taught. It would not have been productive to use these videos before the lesson as students would not know the answers resulting in lack of participation on their part. There were also games of building your own flower and, as a class, students were able to work together to identify all that they needed to make the flower.

While reading the expository texts to students during read-alouds, the teachers worked on content reading skills. Teachers were reinforcing reading skills that they already covered. In both classes the teacher would ask what the author’s and illustrator’s jobs were. Both teachers would then hold the book open and read to the students which allowed for the students to read along and look at the pictures in the text. This was another example of working across the curriculum with additionally bring in new science topics for students. In the kindergarten classroom, each teacher had students work in centers. The teachers continued this teaching strategy for students to work together and each have an equal amount of time to work on the individual activity to avoid having too many students trying to do something at one time. An example of centers I saw on more than one occasion was: Group One-Planting, Group Two-Drawing/Sorting Seeds,

Group 3-Look for Letters in Carrots and Group Four-Seek and Find Plastic Gardens. Center work is a teaching technique that is very effective in maintaining a safe learning environment while each student is engaged in a variety of activities that meet the learning objectives of the lesson. My observations made it evident that this same technique, that is typically used for mathematics and reading, can be easily implemented for science lesson and works just as effectively.

Student Learning

The best way to learn something is by doing. Science allows students to participate in hands-on activities and make observations about what they are seeing. Students were not just given a lesson and told what the parts of the plant are or how they grow. Hands-on learning offered students the opportunity of discovery and understanding on their own. Both classrooms started with an outdoor scavenger hunt where students saw a picture of a butterfly, for example, and had to find one in the garden. Students were able to move around and make observations about what they could hear, see, and smell. Students also planted plants in their own classrooms and in the garden. Both were opportunities for students to take what they learned and apply it by doing. It was not the students watching the teacher plant, but an opportunity for students to get their hands dirty and learn about plants by planting them and watching them grow. In each class, students would go and look at the plants they had planted to make observations about their plants. They were also the ones that had to take care of their plants by providing them with what they needed. This reinforced for the students what they learned of the basic needs for plants. When students are actively participating, they will be able to make connections to the lessons in the classroom, as well as, have a conceptual knowledge of the material as they have been a part of the science. Observations are important as they could see what was going on and make sense

of what was happening to the plants. It also helps students at this young age to start making observations and thinking about science as they will continue this practice throughout their lives. Hands-on activities and observations also provide time for students to learn from one another as they are working together to discover new things. The connections they make during these activities are far more memorable for students than simply teaching them the plant topics. In addition, while introducing new topics about plants, the students would recall information from the hands-on activities and observations that helped them retain the new information quickly.

The gardening/plant lessons were taught with an integration of mathematics, language arts and additional science topics. A simple way of including mathematics was to have the students count up all of the plants. For those students who did not have a plant, they had to subtract to see how many flowers were growing or present in the garden. This is a simple way to bring in mathematics standards of counting and adding/subtracting numbers. Another way I observed was bringing in a blank calendar that students were going to use to show the growth of their plants over the month. Students had to write the month, day, year and the numbers for each day. They had to count the numbers and write them down in each spot. Students were able to use their counting skills to help support their science lessons. Teachers also worked with language arts to incorporate sight words, matching pictures to the words, writing prompts of one thing they learned, and reading the expository texts. For the most part, this was the students first encounter with nonfiction texts. Students were engaged in the texts and used them to find words they could recognize and to write down information from the texts. Students were using what they had learned in language arts to actively use the skills in their science lessons as well. These moments help showcase how science does not have to be an additional subject lesson, but a time where teachers can build on what students have learned in other subjects and connect it with science

topics. Instances like these provided additional learning opportunities to expand the lessons across the curriculum and meet many standards, even with just one topical area of science -gardening.

Conclusion

In conclusion, the new Massachusetts science standards are very effective in helping bring science to young students as it promotes hands-on learning and working across the curriculum. Educators are able to successfully incorporate other standards such as English and mathematics to meet the necessary learning outcomes. Exposing students to nonfiction literature and hands-on activities helps students develop a conceptual understanding of the world around them and they can make connections between what they are learning and their everyday lives. The garden-based texts and professional development days helped teachers by providing them with a basis of how to start the lessons and then they were able to incorporate additional elements of learning to make the lessons successful.

I would encourage the “Lets Get Growing” project to continue. The school is fortunate to have the garden right in front of their school and the teachers need to continue to use it to provide a rich hands-on experience and observations for students. The texts that I had collected for the school will continue to be a resource for classrooms for years to come. I observed that it is important for even the younger grades to be exposed to expository texts as they contain important information about topics students are innately curious about. Nonfiction texts open the doors to an understanding of the world around them and provide information students can learn from. I found students also liked to look at the images from the expository texts as they were real

photographs or realistic drawings. This was exciting to students who were then making connections between the new information they were listening to or reading, to their real-life experiences in the garden with plants and the pictures they were seeing.

In order to expand this project further, I would recommend coordinating garden care in the summer and fall so that students are able to see the results of their vegetable crops. Students were unable to see much results of what they grew due to the fact that we started planting in April. It is important that students see their plants all the way through to harvest so that they can see if their prediction about how plants grow makes sense and to bring closure to their science investigations. When students return to the school for the fall, it would be nice to see the growth from the year before. It may also help if students would be able to start the garden project earlier in the spring. I think it would also be more productive to have additional classrooms involved in the garden to create more vegetable crops and a project for the whole school community. It would be great for multiple grades to be able to participate in the garden. All students and teachers can benefit from working together to grow an abundance of plants to be proud of as a school. If we plant the “seed” we will all benefit from the growth of the garden as well as that of a child.

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Appendix A

Honors Thesis Books

Title	Author	Price	ISBN	Year Published	Publisher
Every Breath We Take: A Book About Air	Maya Ajmera and Dominique Browning	$12.75	9781580896160	2012	Charlesbridge
It's Our Garden: From Seeds to Harvest In a School Garden	George Ancona	$6.99	9780763653927	2013	Candlewick
Tomatoes to Ketchup	Lisa Herrington	$5.95	9780531247099	2013	Scholastic
In The Garden	Elizabeth Lang	$4.90	9781623235420	2013	Child's World
Natures Super Secrets: How Do Seeds Sprout?	Evan Rhodes	$8.15	9781433981661	2013	Gareth Stevens Publishing
First Garden: The White House Garden and How It Grew	Robbin Gourley	$14.44	9780547482248	2011	Clarion Books
What's in the Garden	Marianne Berkes	$8.28	9781584691907	2013	Dawn Pubns
Harvest Season	Helen Gregory	$22.65	9781476500423	2013	Capstone Publishers
Nature's Patchwork Quilt: Understanding Habitats	Mary Miche	$8.01	9781584691709	2012	Dawn Pubns
Plants!	Brenda Iasevoli	$13.55	9780060782184	2006	Harper Collins Publisher
Seed to Plant	Kristin Baird Rattini	$3.99	9781426314704	2014	National Geographic Children's Books
How a Seed Grows	Helene J. Jordan	$5.21	64451070	1960	Festival
From Seed to Plant	Gail Gibbons	$6.65	9780823410255	1991	Holiday House
How a Plant Grows	Bobbie Kalman	$6.95	865057281	1996	Crabtree Publishing Company
What is a Plant?	Bobbie Kalman	$7.95	865059594	2000	Crabtree Publishing Company
Plants Feed Me	Lizzie Rockwell	$6.30	9780823425266	2015	Holiday House
Living Sunlight: How Plants Bring the Earth to Life	Molly Bang and Penny Chisholm	$16.93	9780545044226	2009	Blue Sky Publisher
Seed Soil Sun	Cris Peterson	$7.91	9781590787137	2012	Boyds Mills Press
Vegetables	Emily Green	$3.99	9781600140020	2006	Bellweather Media
Exploring Flowers	Kristin Sterling	$6.95	9780761357797	2011	Lerner Publishing Group
Exploring Roots	Kristin Sterling	$6.95	9780761357810	2011	Lerner Publishing Group

Honor Thesis Books Continued

How Plants Grow	Claire Liewellyn	$25.65	9781597710213	2006	Sea To Sea Publications
How Do Plants Grow	Melissa Stewart	$16.54	9780761421115	2006	Cavendish Square Publisher
A Tree is a Plant	Clyde Robert Bulla	$5.85	64451968	2001	Harper Collins Publisher
Vegetables	Nancy Dickmann	$6.29	9781432969813	2012	Heinemann
What if There Were No Bees	Suzanne Slade	$8.67	9781404860193	2010	Capstone Publishers
Buzz About Bees	Kari-Lynn Winters	$12.04	9781554552023	2013	Fitzhenry and Whiteside
Flowers are Calling	Rita Gray	$14.30	9780544340121	2015	Houghton Mifflin Harcourt
What is Pollination	Bobbie Kalman	$8.95	9780778733065	2010	Crabtree Publishing Company
Pollination	Mary Hoff		1583412700	2004	Creative Education
Dirt-The Scope on Soil	Natalie Resinsky	$8.95	1404800123	2002	Picture Window Books
Dig In! Hands on Soil Investigations	NSTA	$19.95	HAVE THE TEXT		NSTA
Different Kinds of Soil	Molly Aloian	$26.60	9780778754138	2010	Crabtree Publishing Company
A Handful of Dirt	Raymond Bial	$13.75	802786987	2001	Bloomsbury USA Childrens

Appendix B

	Figure 1: Coded Categories	
Students Prior Knowledge	**Teaching Strategy**	**Student Learning**
Sharing Prior Experiences Predicition	Behavioral Strategies Group Sharing and Recall	Hands-On and Observation Bringing In Other Science Topics
	Location for Lesson	Math Integration
	Science Notebooks	Making Models
	Use of Technology (Videos) Content Reading Skills	Use of Language Arts
	Center Work	