



Reading and Researching to Discover the Scientific Method

By Amy Thomas, 2017 CTI Fellow
Reedy Creek Elementary

This curriculum unit is recommended for:
First Grade

Keywords: morning meeting, scientific method, scientific inquiry, shared reading

Teaching Standards: See [Appendix 1](#) for teaching standards addressed in this unit.

Synopsis: This curriculum unit is designed to be the framework for multiple science concepts used with the balanced literacy component shared reading. Shared reading will teach the scientific method vocabulary with hand gestures that will lead to meaningful experiences through hands on exploration. Scholars will be taught how to question, grow ideas, observe, and ask questions. They will construct and acquire their own knowledge in different ways so that each scholar can transfer their own learning into other content areas of education and throughout daily encounters in life.

I plan to teach this unit during the coming year to 19 students in First Grade

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Reading and Researching to Discover the Scientific Method

Amy Thomas

Introduction

What is science? Who is a scientist? I am learning in the Doing Science: Hands-On Learning in the Laboratory seminar that science is all about curiosity. Scientists are not afraid to fail, but actually learn best from making mistakes. They enjoy problem solving by investigating and following the scientific method. Walt Disney remarked, “Around here, we don’t look backwards for very long... We keep moving forward, opening up new doors and doing new things because we’re curious...and curiosity keeps leading us down new paths.” I would like for my students to become and know they are truly scientists and the classroom will become our laboratory to build on their natural curiosity. I can visualize students in our lab asking specific questions, experimenting with solutions, sharing results with others, choosing the best tools and researching to find answers to their questions. Once a solution is found, communication is key so others will be able to reproduce the same results. This will help young scientists build speaking and listening skills with others through written and verbal responses as well as through drawings.

Students in first grade are naturally curious, always asking how, why or what if questions. If there is a change in the schedule due to an assembly, performance, or testing it seems that science and social studies are first to be cut from the daily schedule. As more time is needed to teach reading, science is actually used to learn to read instead of reading to learn more about science topics. Taking away open ended science experiments, investigating, and time to observe inhibits the children’s ability to ask questions, experiment, and find solutions. So, if science is about curiosity and finding reproducible results, the young scientists need time to come up with related questions about the topic and time to find answers on their own by hypothesizing and experimenting.

To teach the scientific method, I would like to begin with the “what does a scientist look like” activity. Then, when I reveal that we can all be a scientist in our classroom, outside, at home, in the car, or anywhere, I would have the students each draw themselves as a scientist and write some of the words to become a scientist such as observe, predict, experiment, and communicate. I would like to follow the Whole Brain Teaching idea with new vocabulary. This involves a visual picture with a word and a motion to go along to help remember the vocabulary word. For example, a prediction is a guess about the future and students point straight ahead. For the word observe, the students would say using your five senses to “look at” objects as they use their finger to point in a circle around their face and wiggle fingers. I have used this strategy in literacy and I believe it would be helpful for the students to experience new science vocabulary the same way I teach literacy.

In addition, I would like to teach the scientific method through shared reading, a component in balanced literacy. This can be supported in class when sharing during morning meeting when students ask questions about the shared item. We can review the 5W + H words as who, what, where, when, why, and how. Refer to Appendix 2 for poster. That way they are hearing and using the vocabulary not just in science class, but also at other times of the day.

I believe that the scientific method can be used to teach across subject areas. After completing two previous Charlotte Teachers Institute seminars, the challenge for me as a teacher is to continue to implement the previous units I researched, wrote, and taught while adding the idea of approaching new skills like a scientist. My hope is for this unit to be a framework for other science concepts and used multiple times during the year. In first grade, scholars also study how forces affect motion, recognize the difference in the day and night sky as well as observable changes in the moon's appearance, and needs of plants and animals. Passages and poems can be found on all topics and inquiry based learning can be integrated into many standards throughout the year.

Rationale

After the first few seminars, I realized how important the steps of the scientific method really are when asking and answering questions about a child's natural response at school: curiosity. In the beginning of the year, I only spend a few days on the scientific method. I am realizing now that the scientific method can be used to teach across the curriculum almost daily. Through Morning Meeting Sharing and Whole Brain Teaching beliefs, I trust that students will be involved in cohesive groups to participate in conversations and experiments that will lead to further discussion, and finally decisions that lead to learning and transference. I believe the more a student is exposed to a concept in a variety of ways, the student can then begin to internalize the concept and make connections to what is happening in life. This daily discovery will in turn lead to a student's academic and social growth and development.

Demographics

Reedy Creek Elementary School is a neighborhood elementary school built in 1981. Reedy Creek staff serves approximately 840 students in pre-kindergarten through fifth grade. Approximately 10% of Reedy Creek students are white, 56.0% are African American, 3.9% are Asian/Pacific Islander, 24.7% are Hispanic and 4.9% are multi-racial. The student population is approximately 51% male and 49% female. Students identified as economically disadvantaged account for 65% of our total school population. Students identified as gifted and talented account for 3.4% of our population and students with identified learning disabilities account for 9.2%. Students with Limited English Proficiency make up 10.4% of our total student population.

The overall 2013-2014 End-of-Grade composite was 49.9 percent. In 2015-2016, End-of-Grade composite was 62.01 percent. This is an increase of 12.11 percentage points within three years. We exceeded growth for the past three school years.

I am currently teaching nineteen first graders. Twelve are reading below grade level expectations and seven are meeting grade level standard. There are four students that receive speech therapy, two students identified as Developmentally Delayed, therefore are pulled out during the day for Exceptional Children's Services, and one English as a Second Language (ESL) student that receives support from the ESL teacher. No matter the student's differences or backgrounds, I believe approaching all first grade tasks as a scientist will be beneficial.

Unit Goals

In this curriculum unit, students will work in a cohesive classroom environment to ask and answer questions across content areas. Students will participate in collaborative groups holding academic conversations, asking questions, experimenting and communicating to find the answer, then share results through speaking, writing, and/or drawing.

Shared reading is when all scholars read a passage or poem together with guidance and support from the teacher. In this unit, not only will they learn the scientific method during shared reading, but also build reading foundation skills when using phonics to decode and encode words and quickly recognize sight words. Furthermore, students will be able to ask and answer comprehension questions when reading literature after observing the pictures and making predictions about the text. Finally, the text will be used to identify a specific sound or spelling pattern and a skill for grammar usage when reading, writing, or speaking.

In this unit, students can become scientists and use their knowledge of the scientific method to tell about the physical properties of rocks and identify the many uses of rocks for living things. Students will use their five senses to observe and wonder about rocks. This inquiry should lead to questioning and the desire to find more information about rocks as earth's natural resource for people to use in a variety of ways. One of the jobs of a scientist is to record their findings. In our seminar lab tours I saw many notebooks with words and pictures to record information. This made me think that showing samples of real notes and drawings would be beneficial to my scholars. Refer to Appendix 1 for a list of standards this unit will cover.

This unit will take about 30-40 minutes daily for three weeks. During the first week, students experience science through a shared reading lesson for literacy, however are immersed throughout science class with new vocabulary by reading books, such as *Scientists Ask Questions* to learn and recall new vocabulary, steps of the scientific method, and scientific tools. In addition, there is a video on Discovery Education called Scientific Method: *Thinking Like a Scientist* that reviews the vocabulary from shared reading and models sample kid friendly experiments. Brain Pop has a child friendly video titled *Scientific Method*. GoNoodle is a fun, but also an educational site that leads students through movements/dances that are great for transitions. On GoNoodle under the channel Blazer Fresh is a dance called *Think Like a Scientist* including the steps of the scientific method to review new vocabulary. Since this unit has a literacy and science component it is important to know that this first week of lesson introduction may be followed by or repeated before other science topics throughout the year.

Content Research

Some science teachers like to teach science through direct instruction. This technique uses lectures and demonstrations of specific standards to teach students the needed material. The emphasis is on recall of specific vocabulary and does not consider student motivation essential.(1) Another way to teach science is through inquiry based learning. This strategy involves posing questions and problems and is facilitated by the science teacher. The importance is application and learner developed explanations.(2) I truly believe at various times both plans are needed to teach science, however the greatest focus should be on inquiry based learning. Rodger W. Bybee defines inquiry, "An outcome of science teaching that is characterized by

knowledge and understanding of the processes and methods of science.”(3) This belief coincides with all the lab tours, discussions, and teachings in the Doing Science: Hands on Learning in the Laboratory seminar. In addition, North Carolina Department of Instruction notes that the best science lessons “engage students in inquiry based instruction to develop conceptual understanding of science content which is vital for success in the twenty first century. A well-planned, thorough science unit should provide “hands-on/ minds on” activities crucial to the scientific inquiry.”(4)

Bybee informs the reader that lessons should link research, instruction, and inquiry. The two phases of research are engagement and exploration. Engagement initiates the learning process and exploration aids in student experiences. In the explanation phase, the teacher may give direct instruction to guide students towards a deeper understanding. The next phases involve inquiry. The elaboration phase involves students applying their understanding in a new situation. In the final phase, evaluation, students understanding and transfer of knowledge are assessed.(5)

I believe that students need to be exposed to a variety of tools. Bybee states, “Use appropriate tools and equipment to gather, analyze, and interpret data.”(6) After the exposure to each individual tool, scholars can then make an individual decision about which tool works best for him/her in the lab. In science, I have hand lens, binoculars, measuring cups, rulers, and balances. So, when using the scientific method across the curriculum the one tool I found to be missing is question words. First grades have a difficult time posing a question. Students tend to make a connection to another student’s comment or thought, however struggle with truly asking a question. I use many Whole Brain Teaching strategies in my classroom. The idea is to have a visual and hand gesture to go with the definition. I found a Power Pix that is an anchor chart posted in the front of the lab. The question is, “What are the 5W + H words?” The class responds with, “The 5W and H words are: who, what, where, when, why, and how.” As the students are answering, they are counting on their fingers holding up one finger for each of the words until six fingers are held up. (7) Reference Appendix 2 for the poster. This idea of including all parts of brain to remember and learn can be used to teach vocabulary about what a scientist does every day. A scientist asks questions, compares, infers, makes models, predicts, draws conclusions, and communicates results. Scholars will be taught these words through visuals, words and gestures.

Morning Meetings provide an opportunity for students to welcome each other, share, play a game and review an academic concept. Sharing is when “Students share some news of interest to the class and respond to each other, articulating their thoughts, feelings, and ideas in a positive manner.”(8) During the share, I would like for three students to bring a toy/item or verbally tell the class about a special event. After the child shares, the class can review the 5W + H words. The speaker will then say, “I am ready for my first question.” Any student that has a question about the sharers topic can raise his/her hand. The speaker will call on a student to ask question. Finally, the speaker will answer the question. This process will be repeated until the speaker asks for three questions and there are a total of three sharers. I believe it is essential to practice asking questions in all content areas, not just when wondering about science. Kriete goes on to mention that some of the purposes for sharing are to “help develop skills of caring communication and involvement with one another, encourages habits of inquiry, and strengthens vocabulary development and reading success.”(9) These are the exact skills needed for scholars to

participate in an academic conversation and think like a scientist. I will use Morning Meetings to lay the foundational skills of rules, listening and speaking in an academic conversation.

Teaching Strategies

Mirror Words - “Powerfully activates students’ visual, auditory, and motor cortices, producing 100% engagement in your lessons.”(10) I use the mirror strategy across all content areas. Hearing, seeing, and creating a movement/hand gesture initiates more parts of the brain creating more memories for recall, leading to the higher levels of thinking, such as analysis, compare/contrast, and deeper explanations.

Morning Meetings – Beginning every day with a Class Meeting, allows scholars to build a safe environment both academically and socially. Scholars have guided practice sharing, speaking, listening, and playing with others. This safe environment allows students to fully participate in learning, fully engaging in class even if mistakes are made during the process.

Turn and Talk – To allow all students to participate and share ideas during a lesson, give partners the opportunity to discuss answers to questions by turning partner/neighbor and telling thought/ideas before an answer is given by one student. This can lead into an academic conversation where students have the opportunity to agree/disagree with each other, elaborate on one another’s thoughts and ask for clarification on ideas that are not fully understood.

Classroom Activities

Shared Reading Passage 1 Appendix 2

Day 1 Skim and scan the passage for sight words. Point to and discuss what scholars see in the pictures. Allow students to turn and talk to share ideas. Ask for predictions about the passage. Model how to start reading on the left side, pointing across, then return sweep to the next line. Teacher reads the passage all the way through while pointing to each word. Discuss what the author is telling the reader. Teacher and class read the passage together as teacher points.

Day 2 Teacher reads the passage and scholars chime in on the words they know as teacher points to the words. Review verbs as words that you can do. Circle the verbs in the passage, say the word, clap out the syllables, and show the hand gesture. Teacher may add more scientific vocabulary not in the passage, but needed for inquiry.

Observe – look at closely, make a circle with fingers to hold over eyes

Hypothesize - a guess about the future, point forward with finger

Testing – make a plan and try it out, point to chin and think

Classify – group things by how they are alike, hold up two circles with fingers

Draw Conclusion – use what you observe to explain what happened, circles with fingers over eyes then use fingers and thumb to show talking

Compare – observe how things are alike and different, hold hands out in front with one hand lower than the other to show a balance

Infer - use what you know to figure something out, hands on side of head and wiggle fingers

Reference Appendix 2 for sample word cards with gestures.

Day 3 – Read the passage together as a class as teacher points. Today students will hold onto the topic. Teacher and class whisper the word scientist into the palm of hand and close. Students turn and talk about what a scientist does and thinks that they learned from the passage. Teacher calls on a student to share one word about a scientist. Each time a word is discussed repeat the word, show the gesture and pick up one finger from the palm of your hand, until five words are discussed. Ask, “What is this passage all about?” Choral response, “Scientists!” All read the passage in a whisper voice as teacher points so scholars can follow along.

Day 4 This is the inferring day. Begin by everyone reading the passage together as teacher points. Ask the class, “Why is it important to think like a scientist?” Allow students to turn and talk. Teacher says, “I heard this group talking about how scientists are curious and want to learn more information and heard another group discussing that scientists what to check to see if their hypothesis is correct. Now I want to show you how to write this response on paper. Teacher models how to start a complete sentence and writes, It is important to think like a scientist because fill in with student responses in your writing. Repeat the process again asking, “Why or how do scientists use a notebook and pencil?” Allow students to share and practice a written response individually in journal.

Day 5 Read the passage as a class as teacher points. Review base word and suffix. Look for and circle the words that have a base word and suffix. Some of the words are animals, guesses, and testing. There are many base words with a suffix in this passage, so let the students come up to circle the word and ask the class to explain why the word was circled. Read the passage together as class. This time let a student point, so the teacher can monitor the class while reading.

Science Lesson 1

This lesson should be completed after the introductory week of shared reading, videos and reading books about who and what a scientist does while working.

Connect: At the beginning of the year in science class, I would begin by asking “What is a scientist?” In this lesson students draw and write their thoughts about what a scientist looks like and does during the day. Allow students to share their work with others.

Teaching Point: We are reading and discussing a passage in shared reading about scientists. We are learning the things that scientists do. Does this sound like something you want to do this year? Students show thumbs up for yes and thumbs down for no. Now visualize your picture of

a scientist and put yourself in that picture. I believe all of us can be scientists and our classroom can be our lab!

Active Engagement: Review vocabulary and hand gestures from shared reading passage *Thinking Like a Scientist*. Have students create a construction paper scientist. Open the scientist's lab coat and write, I can..., and list verbs from the shared reading passage. Refer to Appendix 2 for an example of the paper scientist.

Link: Today and every day you can be a curious scientist that observes and questions about the world and things around you!

Assessment: Ask each scholar to tell one word, meaning and gesture for what a scientist does or thinks each day.

Science Lesson 2

Science Lessons 2-5 should be completed after the introductory week of shared reading, videos, and reading kid friendly books about what scientists do for their job.

Connect: We have learned a lot about what a scientist does and how they think. Let's review the vocabulary words and motions. Teacher calls out words and the class repeats the word saying the meaning and the hand gesture.

Teaching Point: Let's dig in deeper with the scientific word observe. Read *My Five Senses* by Alike. Today we will go for a walk around the school collecting rocks. Give each student a bag for their collections.

Active Engagement: Take the class out for a walk around the school to find rocks. Upon return, review the 5W + H words poster, pass out hand lenses, allow students to observe with their five senses, and write or draw wonderings, questions and observations. Teacher may ask leading questions to help guide students, but there is no direct instruction at this time.

Link: I heard great scientific questions and saw cool drawings of rocks. Today and every day we can think like a scientist.

Assessment: Listen in on student's academic conversations to be sure they are using question words and making statements such as "I'm wondering..."

Science Lesson 3

Connect: Yesterday we observed a variety of rocks. Today I want to teach you how to classify rocks.

Teaching Point: To classify rocks means to group the rocks by how they are alike. Students repeat the meaning and hand gesture. Hold up two rocks and explain how they are the same. The two rocks that you hold up are both gray.

Active Engagement: Now hold up two more rocks. Let the students turn and talk about how they would classify the rocks. Say, “I heard this group say these rocks are both shiny.” Allow students to work with a partner and classify the rocks. I would add more rocks from the class kit so students have many types of rocks to classify.

Link: Today and every day, you can be a scientist by classifying objects.

Assessment: Ask each group to explain how they sorted the rocks. Some ways that students can classify the rocks are by shape, color, texture, size, shiny, rings, sparkles, and dots.

Science Lesson 4

This lesson may take two days, so each scholar has the opportunity to visit each station.

Connect: Yesterday we classified rocks by how they are alike. Today I want to give you an opportunity to hypothesize and draw conclusions about rocks using tools.

Teaching Point: There are materials at each station for you to experiment with, ask questions and draw conclusions. Remember to have students repeat the vocabulary word, say the meaning and hand gesture. I want for all of you to become scientists and explore with the materials at hand.

Active Engagement: Allow scholars time to visit each station to explore with tools.

Station 1- Display a variety of rocks and a bucket of water. Let scientists be curious. Perhaps they will hypothesize the rock will sink/float or that putting the rock into water will change the color. After scientists test their hypothesis, allow time for students to record findings in a journal.

Station 2- Scientists work in pairs with 3-5 rocks. One student chooses a rock to describe while the other student must choose the correct rock based on the partners description. Scientists can then have a conversation about how the correct/incorrect rock was guessed based on the description. See Appendix 2 for a worksheet to record description.

Station 3- Show a variety of photos of well-known rocks, such as Natural Bridge, Mount Rushmore, and Half Dome. Scientists may use technology to find other natural and man-made rock formations to help clarify the word big when discussing rocks.(11) I also think that having some table salt, a mineral, and a variety of sizes of rock will help scholars compare and contrast the magnitude of rocks.

Station 4- Let each scientist select and create a “pet” rock. The rocks can be decorated, but then each scientist must give the rock a purpose, how will the pet rock be used in daily life?(12)

Link: Today and every day you can use tools to hypothesize and think as a scientist.

Assessment: Are scientists making a hypothesis before experimenting and recording solutions in journal? This is a great time to make anecdotal notes on each scientist.

Science Lesson 5

This lesson may take two-three days for scholars to have time to read, research, and record findings. You will need a variety of books about rocks and iPads/computers for researching the answers to the many questions scholars asked over the past few days.

Connect: We have spent the last few days observing and asking questions about rocks.

Teaching Point: Now it is time to find out some of the answers to our questions by reading information in books and on the computers. Teacher models finding an answer to a question and recording by reading information on the computer or in science book. For example, how do people use rocks? Remember to record your findings in your journal.

Active Engagement: Allow scholars to read, record, discuss, and collaborate while working to discover the answers to some of their questions/wonderings. At this time, the teacher will guide scholars on making the best choice of book or website.

Link: Today and every day, we can find out answers to our questions by experimenting or reading books to find out more information.

Formal Assessment

Quick Write: Scholars record in words and pictures a fact they learned about rocks. This recording should be presented to a small group to continue the practice of speaking and listening.

Informal Assessment

1. Have students practice the word, meaning and gesture to see if they can recall the vocabulary.
2. Each lesson has a quick assessment at the end to be sure students are on track.
3. Play Yes/No Way- Teacher makes a statement about rocks or scientific vocabulary and the class responds accordingly. Rocks come from the Earth – Yes. Hypothesize means to look closely at an object – No Way!

Appendix 1

In this curriculum unit, students will work in a cohesive classroom environment through morning meetings, take frequent educational and fun brain breaks to foster an environment that will build questioning skills and convey a sense of curiosity when approaching assignments and learning as a scientist.

Earth Systems, Structures and Processes

1.E.2.1 Summarize physical properties of Earth materials, including rocks, minerals, soils, and water that make them useful in different ways. Students will observe and classify a variety of rocks to draw conclusions about how people use rocks.

Speaking and Listening

Comprehension and Collaboration

SL.1.1 Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups. Scholars will engage in a meaningful conversation with a partner, small group and/or teacher.

a. Follow agreed upon rules for discussion (listening with care, speaking one at a time). Through Morning Meeting, scholars will set boundaries to listen to other's thoughts and speak one at a time.

b. Build on other's talk in conversation by responding to the comments of others through multiple exchanges. Scholars will learn through practice how to listen to others and elaborate on their ideas.

c. Ask questions to clear up any confusion about the topics and texts under discussion. Part of an academic conversation is to ask for clarification when needed. Scholars are taught to inquire, "Will you tell me more?"

SL1.2 Ask and answer questions about key details in a text read aloud or information presented orally or through other media. Whether it is a literacy passage or science topic, scholars are taught to read and respond verbally or in writing about the information presented.

SL1.3 Ask and answer questions about what a speaker says in order to gather additional information or clarify something that is not understood. To clarify means to give clear information about the topic so the listener is less confused. Students are taught ways to clarify in order to have full comprehension of the topic in the discussion.

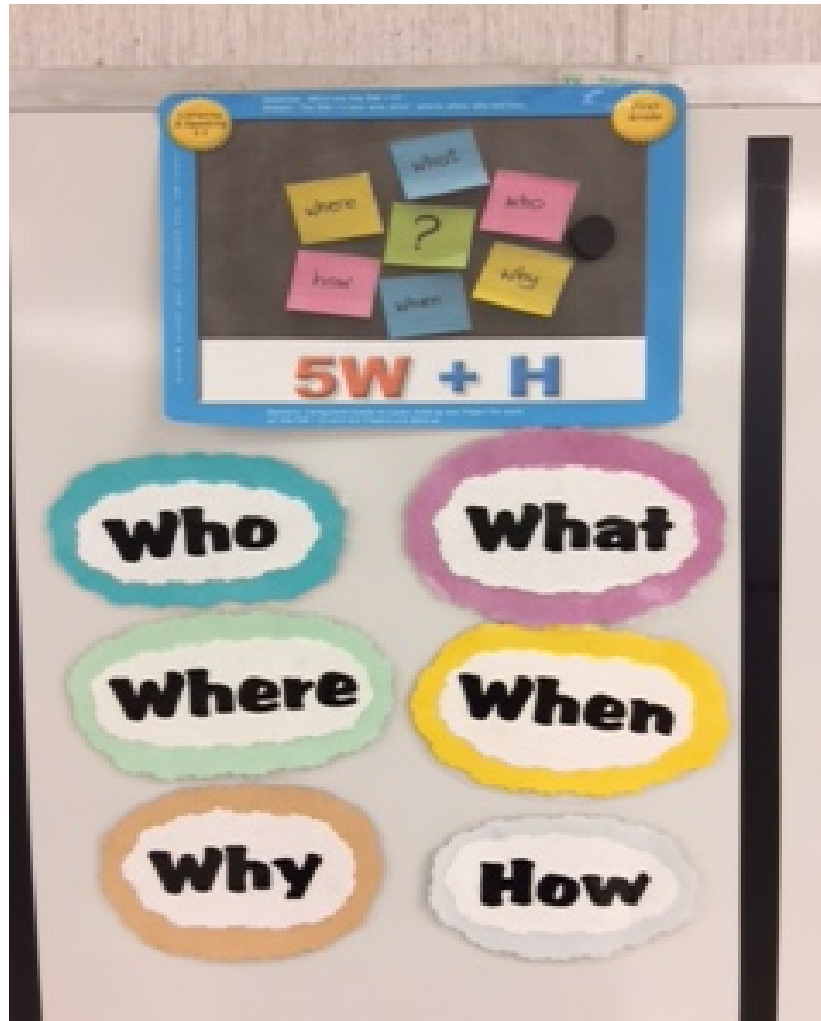
Language Standards

Conventions of Standard Language

L.1.1 Demonstrate command of the conventions of standard English grammar and usage when writing and speaking. During shared reading, scholars are taught about nouns, verbs, and adjectives. Also, we look for noun verb agreement.

Appendix 2

Anchor Chart for “What are the 5W and H words?”





Thinking Like a Scientist



By Jennie Manson



I want to think like a scientist
Observing animals, earth, or sky.

I want to ask good questions
Wondering how, and what, and why.



I want to make smart guesses
Hypothesizing what might happen and when.

I want to do cool experiments
Testing my thinking again and again.

I want to write up all my data,
Recording pictures, charts, or words.
I want to think through all I've done
Drawing conclusions about what I've learned.



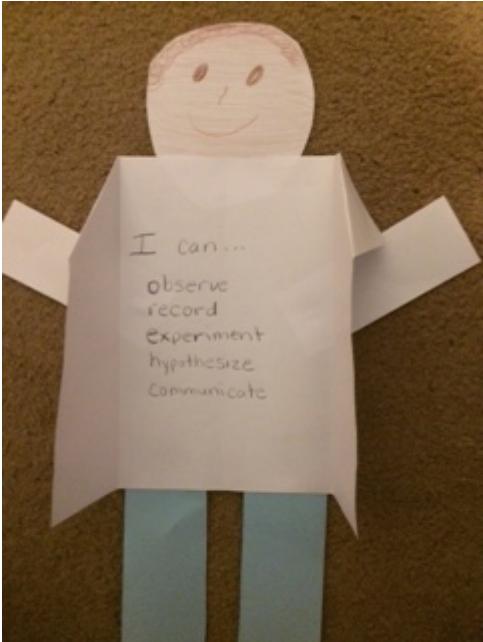
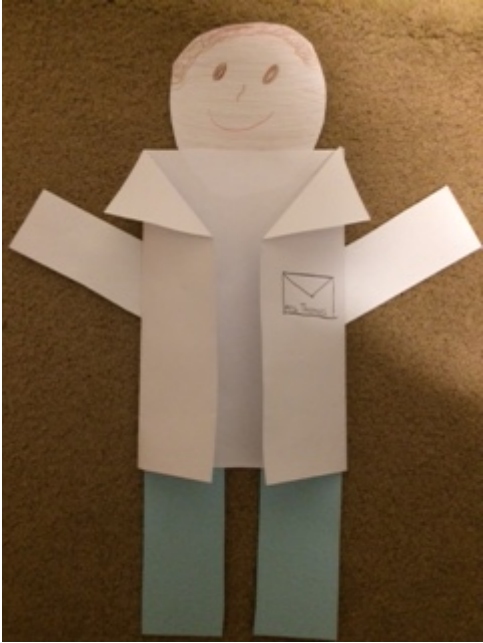
Wondering, asking, testing, concluding.

This is what scientist do.
If you want to think like a scientist
Then you must do them too!

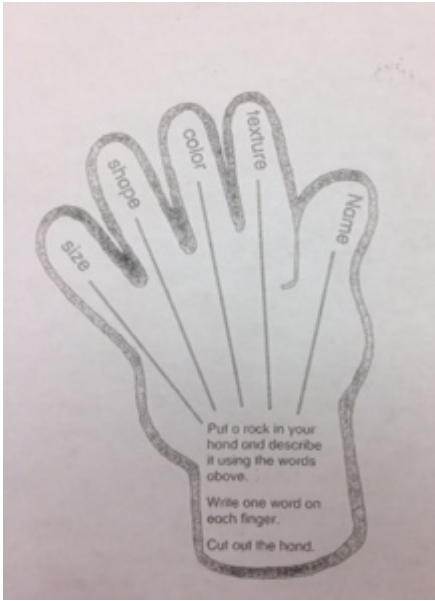
Sample Vocabulary Word Cards with Gestures

Word Card with Picture	Picture of Gesture
<p data-bbox="186 308 300 342">Observe</p> 	
<p data-bbox="186 655 300 688">Testing</p> 	
<p data-bbox="186 907 300 940">Compare</p> 	
<p data-bbox="186 1159 332 1192">Hypothesis</p> 	

Paper Scientist- Science Lesson 1



Rock Description Recording Sheet



Bibliography for Teachers

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Bynum, William. *Little History of Science*. Cumberland: Yale University Press, 2014. Learn about the first scientific ideas and how these thoughts helped to shape current science discoveries.

Butzow, Carol M. *Science Through Children's Literature An Integrated Approach*. Englewood, CO: Teacher Ideas Press; 2000. This resource includes fiction books with strong scientific concept along with ideas for hands on science.

Bibliography for Students

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Curran, Anthony. *Rock Hunting*. Reading A-Z. Follow a little girl on her rock hunt as she asks her dad the name of the rock and he explains how people use the material.

Ginger, Garrett. *Scientists Ask Questions*. Danbury, Connecticut: Children's Press, 2004. The teacher reads the class this book to focus on the job of a scientist. Students learn about the scientific method and tools a scientist might use while experimenting.

Notes

1. Butzow, *Science Through Children's Literature*, 3
2. Butzow, *Science Through Children's Literature*, 4
3. Bybee, *The Teaching of Science: 21st Century Perspectives*, 87
4. North Carolina Department of Public Instruction, K-2 Science
5. Bybee, *The Teaching of Science: 21st Century Perspectives*, 93
6. Bybee, *The Teaching of Science: 21st Century Perspectives*, 134
7. Biffle, 122 Amazing Games, 165
8. Kreite, *The Morning Meeting Book*, 3
9. Kreite, *The Morning Meeting Book*, 50
10. Biffle. 122 Amazing Games, 8, 10-11
11. Butzow, *Science Through Children's Literature*, 113
12. Butzow, *Science Through Children's Literature*, 112

Bibliography

Aliki. *My Five Senses*. New York, NY: Harper, 1989.

Students become aware that they use all five senses to observe and sometimes they use more than one sense at time.

Biffle, Christopher. *Whole Brain Teaching for Challenging Kids (and the Rest of Your Class, Too!)*. Yucaipa, CA: [Whole Brain Teaching LLC], 2013.

This book explains the scientific research of how students learn best when they are actively involved in class.

Bybee, Rodger W. *The Teaching of Science: 21st Century Perspectives*. Arlington, VA: NSTA Press, 2010.

Bybee provides information for teachers explaining that if the *why* and *what* are known to the science teacher, only then can they figure out the *how* to teach science.

Connolly, Melissa. *99 Activities and Greetings: Great for Morning Meeting-- and Other Meetings, Too!* Turners Falls, MA: Northeast Foundation for Children, 2004.

Read to find games that help students follow rules and work as a team.

Kreite, Roxann. *The Morning Meeting Book*. Northeast Foundation for Children, Inc., 2002.

This book was developed to as an approach to teaching that fosters safe, challenging, and joyful class meetings to begin each day.