

Inquiry Lesson Plan

Student:		Date:		
Unit Title: The Nature of Science		Age/Grade Level: 5 th Grade		
Lesson Title: Introduction to the Scientific Method		Order in Learning Segment: 1		
Total # of Students: 21	# IEP Students: 1	# ELL Students: 1		
PREPARATION				
Context of the Lesson:				
<ul style="list-style-type: none"> • The fifth-grade students have three rotational periods where they travel between science, social studies, and math classes. In the homeroom group, there are 21 total students in the classroom - 11 girls and 10 boys. There is one IEP female student who has dyslexia. She has had a specialist that travels with her to classes to aid with assignments and assessments. There is one ELL female student who recently moved from Central America. Her first language is Spanish and speaks a moderate amount of English. There is a teacher assistant that comes for the first three rotational periods. There is no specialist, other than the one for the IEP student, for the science classes. • The essential question for this unit is “How do scientists gather, use, and share information?” The main idea is to explore the steps of the scientific method through an experiment. The unit contains five lessons in total. A common misconception about the scientific method is that it can only be used in a laboratory or experimental situations where someone conducts an experiment. Students may not realize that the scientific method is simply a process of gathering ideas that can be used in any situation and does not necessarily mean that someone must manipulate something for the scientific method to be used. Students may have difficulty understanding the difference between asking a question and “hypothesis” and creating a valid research question and hypothesis. • Students will have prior knowledge of how to pose scientific questions and how to present findings through PowerPoint. • A specific misconception is that “creating a hypothesis” is the first step to an experiment, instead of “asking/posing a question.” Another common misconception is that the “experiment” step is the most important and time-consuming part of the scientific method. • Students in the fifth grade are starting to develop from the concrete operational stage to the formal operational stage of Piaget’s Stages of Cognitive Development. Students will fully be able to solve problems that are concrete and classify specific factors. Students will start to develop more abstract thinking and become more scientific or objective with certain ideas. The science classroom typically uses all three VAK (visual, auditory, kinesthetic) learning styles. Students will see observations and ideas, listen to steps of a process and create questions based on a certain situation. • This lesson will be number one of the five covering the unit. This lesson will cover the “asking a question” and “creating a hypothesis” steps of the scientific method. Students will create questions and hypotheses based on situations. Terms such as “scientific method,” “hypothesis,” and “observation” will be developed in this lesson. • This is the first lesson of the segment; thus, there is no previous lesson to connect with. This will start the connection to all the lesson segments as it introduces the entire unit and overviews the upcoming lessons. 				
Academic Language: scientific method, observation, hypothesis				
Language Demands: define, formulate, explain, record				
Assessment Plan:				
Objectives SWBAT:	Type of Assessment	Description of Assessment Task/Type	Depth of Know-ledge / Bloom’s Taxonomy	Adaptations/ Accommodations to Assessment for ELLs/ SWDs

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<p>1. List the five steps of the scientific method based on the Brain POP video</p> <p>(CCSS:) CCSS.ELA-LITERACY.RST.6-8.1 Cite specific textual evidence to support analysis of science and technical texts. (NGSS:)Science findings are based on a recognizing patterns</p>	<p>formative</p>	<p>Listing steps stated in a video Observation</p>	<p>Remember</p>	<p>ELL - the video will have Spanish subtitles</p> <p>IEP - sit close to the teacher so she may ask to pause the video to keep up with taking notes</p>
<p>2. Work in cooperative groups of 3 or 4 and formulate three to four problems and hypotheses that relate to the pictures shown.</p> <p>(CCSS:) CCSS.ELA-LITERACY.RST.6-8.2 Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions. (NGSS:)Science methods are determined by questions</p>	<p>formative</p>	<p>Formulate problems and hypotheses with others</p>	<p>Analyze Create</p>	<p>ELL - work with a cooperative group where there is another student that is bilingual in Spanish and English, use e-dictionary to translate "hypothesis," pictures will have headings in English and Spanish</p> <p>IEP - pictures will have headings to explain what is happening in the picture</p>
<p>3. Create a problem and hypothesis independently based on a prompt given.</p> <p>(CCSS:) CCSS.ELA-LITERACY.RST.6-8.1 Cite specific textual evidence to support analysis of science and technical texts. CCSS.ELA-LITERACY.RST.6-8.8 Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.</p>	<p>Summative</p>	<p>Formulate a problem and hypothesis</p> <p>Scoring Guide used to grade - available in appendix 2</p>	<p>Understand Create</p>	<p>ELL - student will be given a separate prompt that is translated in Spanish</p> <p>IEP - student will be given a separate sheet of the prompt to highlight and read separately</p>

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(NGSS:)Science theories are based on a body of evidence and many tests.			
Materials/Resources/Media Technology Needed:			
<ul style="list-style-type: none"> • SMARTboard • Brain POP video - https://www.brainpop.com/science/scientificinquiry/scientificmethod/ 			
INSTRUCTION AND ASSESSMENT			
Time	Engage		Accommodatio ns
8 min	<ul style="list-style-type: none"> • While students are clearing their desks, the teacher will prepare materials in the front so that everyone will be able to see. • When desks are cleared, the teacher will present the new unit by asking the class, "Who in the class has heard of the term scientific method?" For students who have heard of the term, the teacher will ask, "What do you know about the scientific method?" • Once the class has answered, the teacher say, "Today we are going to start class with a Brain POP video! Before the video starts, I would like everyone to take out their science notebooks. While the video is playing, I would like everyone to write down the five steps of the scientific method Tim and Moby state. Also write the definition of each step and the example of the step the characters use in the video. Afterwards we will go over the steps as a class." • While the video is playing, the teacher will go around and make sure students are taking notes during the clip. • When the clip is over, the teacher will ask the class "What were the five steps of the scientific method?" and "Have you ever gone through this process in real life? When and how?" Two students can give examples and then the teacher will move on. 		<ul style="list-style-type: none"> • ELL - video will have Spanish subtitles • IEP - teacher will pause the video after each step to give the student time to take notes
Time	Explore (typically cooperative groups)		Accommodatio ns
2 min	<ul style="list-style-type: none"> • After the initial discussion, the teacher will state, "Today we are going to be taking a closer look at the first step of the scientific method: define a problem and create a hypothesis. To explore this step, I would like everyone to form a group of two or three. Before you go into your groups, if you look around the classroom, there are pictures posted about different science phenomena. Each group will start at one picture and think of a question about the phenomena that you may want to later explore. Once the group defines a problem, the group will then make a guess about what may happen next in the picture. Tell each other what questions you come up with. After 3-5 minutes at a picture, I will ring a bell, which means to move on to the next picture. Let's start!" 		<ul style="list-style-type: none"> • ELL - pictures will have headings in English and Spanish • IEP - pictures will have headings to explain what is happening in the picture
20 min	<ul style="list-style-type: none"> • As students form groups and go to each picture, the teacher will go around to listen and assess the discussion happening in each group. If students are stuck, the teacher may facilitate by asking "What is happening in this picture? Do you know anything about the process happening in the 		

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	<p>picture? If you saw this in person, what would be happening in the scenario? What would you further like to explore from this picture?"</p>	
	<ul style="list-style-type: none"> Once each group has finished, everyone will go back to their seats. 	
Time	Explain	Accommodations
10 min	<ul style="list-style-type: none"> When the groups are done, each group will share their observations and hypothesis to the problem. The class will determine if the observations made were correct and if the hypothesis made was correct. The teacher will explain, "As stated in the video earlier in class, the scientific method is a process that scientists use to answer and explain the wonders of science. The definition of a hypothesis is an educated guess/explanation based on given observation, or something you see or sense with any of the five senses. For a hypothesis to be "correct," it must be testable solution or reason to the posed problem. Testable means that results can be measured and observed from an experiment. For our future lessons, we will be using an "if, then" statement to create a hypothesis. The "if" part will state a process or what will be done and the "then" part will state what would result from the process. For example, 'If a bike is left out in the rain for days, then rust will form on the chains.'" <ul style="list-style-type: none"> As students are sharing, the teacher will record data based on groups that understood the concept of observation and hypothesis based on what they have shared. 	<ul style="list-style-type: none"> ELL - use e-dictionary to translate "scientific method," "hypothesis," "observation"
Time	Elaborate	Accommodations
10 min	<ul style="list-style-type: none"> Based on what they have learned from what a hypothesis is, the teacher will ask students to create an example of an incorrect hypothesis to the posed question. As students are working, the teacher will go around and ask "Why is this hypothesis incorrect? What part of the sentence makes the statement not a hypothesis?" Afterwards, each group will explain why the hypothesis is incorrect and the class to either agree or disagree to the statement. The teacher will again record on how each group does. 	<ul style="list-style-type: none">
Time	Evaluate	
5 min	<ul style="list-style-type: none"> Students will go back to their individual desks. Once students are back, the teacher will bring up a scenario on the SmartBoard. Students will define a problem and create a hypothesis using the "if, then" statement based on the scenario. When they are done, students will turn in their work. At the end of class, the teacher will explain that in the next class we will continue to explore the scientific method by moving on to the next step. 	<p>ELL - student will be given a separate prompt that is translated in Spanish</p> <p>IEP - student will be given a separate sheet of the prompt to highlight and read separately</p>

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Appendix:

1. Exit Card Prompt

After a rainy day, Tom went outside to play. When he walked out, he saw a penny on the ground! He was excited and went to pick it up but noticed a small bubble on the penny. What question do you think Tom had when he first saw the penny? Then create a hypothesis, or educated guess, on how the bubble sat on the penny?

2. Scoring Guide

Complete - Student correctly defines a problem that can be made from an observation in the prompt and create an if, then hypothesis that is testable.

Partial - Student correctly defines a problem that can be made from an observation in the prompt.

Incorrect - Student does not define a problem or create a valid hypothesis.