TITLE: Inferences and Observations

AUTHOR:

TEAM MEMBERS:

DATE LESSON TO BE TAUGHT:

GRADE LEVEL: 5

CONCEPT(S): Observations require the use of the five senses to gather information about the world around us. Inference is a mental process by which we reach a conclusion based on specific evidence. Students are expected to utilize appropriate senses in order to make observations, and develop inferences based on these observations.

OBJECTIVES **The student will be able to:**	**Evaluation Question for each Objective**
Identify whether an observation is clear/good or unclear/bad.	Read about the following experiment and then answer the questions below. Three different teams attempted to grow flowers under different conditions. Team A put their flower pot in the sun. Team B watered their flowers and put them in the sun. Team C used fertilizer and watered their plants. Team A's flowers grew to a height of 2 inches. Team B's flowers grew to 5 inches. Team C's flowers grew to 6 inches. Using the story provided, which of the following is the most clearly written observation? (Circle the correct choice) A. The different team's flowers grew to different heights. B. Some teams used fertilizer. C. Team C's flowers grew to a height of 6 inches while team A's flowers only grew 2 inches.
Write or illustrate detailed and descriptive observations	Using the image provided, which of the following statements provides the best descriptive observation of the actions performed in the image? A. There are two girls watering a plant.  B. The girl on the right is using a shovel, while the girl on the left in watering a plant. C. The girl on the left is using a shovel, while the girl on the right in watering a plant. D. The two girls in the picture are taking turns watering a plant and shoveling dirt.
	Using the story provided, Draw and label a detailed diagram of the three team's flower pots (include specific information such as height).
Draw inferences based on observations using at least one of the five senses.	 Using the image provided, which of the following statements provides the best inference one could make from the actions performed in the image? A. The two girls like plants. B. The two girls in the image hate plants, and are about to uproot it. C. The two girls are planting seeds in a school garden as part of a biology assignment. D. The two girls are helping with a school projects to replant trees around the school campus.
	Using the story provided, write an inference about the growth of flowers from observations made during this experiment.

TEKS

(5.1) Scientific processes. The student conducts field and laboratory investigations following home and school safety procedures and environmentally appropriate and ethical practices. The student is expected to:

(A)demonstrate safe practices during field and laboratory investigations; and make wise choices in the use and conservation of resources and the disposal or recycling of materials.

(5.2) Scientific processes. The student uses scientific methods during field and laboratory investigations. The student is expected to:

(B) collect information by observing and measuring;

(C) analyze and interpret information to construct reasonable explanations from direct and indirect evidence;

(D) communicate valid conclusions; and

MATERIALS LIST:

For each student:

- Student activity
- Evaluation questions

For each group:

- 250 ml beaker or clear plastic cups
- Plastic spoon
- 100 ml of water
- Baking soda
- 30 ml of vinegar
- Graduated cylinder
- Goggles
- Raisins

ADVANCED PREPARATIONS: Assemble the materials prior to the lesson for easy dissemination to the students.

SAFETY:

- All students should wear goggles
- Do not taste anything
- No horseplay in the lab

ENGAGEMENT		
What the Teacher Will Do	**Eliciting Questions/ Student Responses**	**What the Students Will Do**
Bring in a beaker filled with dirty water and raisins and	Today I brought something interesting for everyone to	Explain how they could figure out that the

describe the raisins as sewer lice. Once the students believe the raisins are "sewer lice" the teacher will eat a raisin. Start a discussion about how the students should have known through observations that the lice were actually raisins.	observe. In this beaker I have sewer water. The dark objects in it are sewer lice. They live off of waste and certain bacteria typically found in sewers. I'm sure all of you have several questions you would like answered about the sewer lice. I'll allow a few of you to ask a question. I am curious of one thing- what do they taste like? How about I try one. *Students become excited.* They taste very sweet. Would anyone like to try one? *Students will refuse.* I have a confession to make. These sewer lice are actually raisins. Do any of you know what a raisin looks like? *Yes.* Why didn't you know these were raisins? *You told us they were sewer lice, and the water in the beaker looks like sewer water.* What other information would help you realize they were raisins? *Getting a better look or touching the raisins.* How would you know the water was not sewer water? *By smelling it.*	raisins were not sewer lice. Observe the "sewer lice" and discuss their observations.

TRANSITION
Everything you all have suggested- getting a closer look at the raisins and the water, smelling the water, and in this case tasting the raisins- are ways of making observations. When we make observations, we use our senses. What are the five senses? *Touching, seeing, hearing, tasting, and smelling.* Once we make observations, we can produce inferences. We're going to do an activity

EXPLORATION		
What the Teacher Will Do	**Eliciting Questions/ Student Responses**	**What the Students Will Do**
First explain the materials used in the experiment and how they must be handled. Explain that the students will be observing the behavior of raisins in different solutions and making inferences based on their observations.		
Have students make predictions of the behavior of the raisins in water and baking soda. Have students predict what will happen when vinegar is added to the baking soda and water.	Students may say that the raisins will sink or float. What happened when the vinegar hit the baking soda? What caused the bubbles? Why would the raisin sink? Why would the raisin float?	Students will make various predictions as to what the raisins will do in each solution.
Disseminate the activity to each group of 3 or 4 students Ask students to read directions to ensure that the procedures are clear.	How many people form a group? How many raisins should we put it?	Students will start the activity in their groups.
Monitor the groups and ask questions about their findings. Help students make clear observations by asking probing questions.	Do your observations agree with your predictions? Why do you think… Remind students to label the important parts on the drawing.	Students will fill out the activity sheet.

TRANSITION
Now that you've done some experimenting you will get the opportunity to explain and share your observations with the class.

EXPLANATION		
What the Teacher Will Do	**Eliciting Questions/ Student Responses**	**What the Students Will Do**
Ask student groups to share their observations from the activity. The students will go up to the board and draw a sketch of the experiment and explain their observations. Ask scaffolding questions during group presentations Ask students to share their inferences from the activity.	What is an observation? What is an inference? Why is it important to make clear observations? How do your observations help you make inferences? How can you tell if it's a clear observation or a poor observation? Why do you think the raisin reacted in a certain way?	Student groups will share their understanding of observation and inferences through summarizing and explaining their explorations. The students will discuss their findings, analyze their thoughts, and one student from each group will come up and write on the board.

TRANSITION
Now you can show me what you really know.

ELABORATION		
What the Teacher Will Do	**Eliciting Questions/ Student Responses**	**What the Students Will Do**
Have students form definitions for observation and inference and put it on a sentence strip.	Ask probing questions to help students form good definitions.	Complete their definitions and place them on a sentence strip. Each group will have one student read their definition (two groups will define "observation" and two groups will define "inference")

Mysterious Journeys in the Life of a Raisin

Part 1:

You are going to observe the behavior of raisins in a solution and make inferences based on what you observe. Use as many of your senses as you can while making your observations. Make sure your observations are clearly written.

1. Pour 120 ml tap water into the 250 ml beaker.
2. Add 1 teaspoon of baking soda.
3. Add several raisins.
4. Add 15 ml vinegar.
5. Observe what happens for several minutes. Record your observations below.
6. Add another 20 ml vinegar.
7. Again, observe for several minutes. Write what happened below.

Observations:

Part 2:

Make a drawing that shows the activity of the raisins in the liquid. Be sure to label the important parts.

Part 3:

1. Consider the following observation.

   The water smelled funny.

   This observation is not written clearly. It doesn't tell much about what the observer experienced.

   Consider another observation.

   The solution in this activity smelled like vinegar.

   This observation is written clearly. It gives a good description of what was observed.

2. Read the following observations. Circle the letter next to the one that is most clearly written.

   A. The raisins moved around.

   B. Three raisins with bubbles attached rose to the top of the solution.

C. There were raisins and lots of bubbles. Both the raisins and the bubbles were moving up and down.

3. Review the observations that you wrote in Part 1. Find the one that you believe is written clearly and write it on the lines below

Find one of your observations that needs improvement. Write it on the lines below.

Rewrite the observation to make it more descriptive and more exact.

Part 4:

Make some inferences about your observations. Explain the activities of the raisins in the solution by completing the following statements.

Some of the raisins floated because

After rising, most of the raisins sank because

After rising, some raising turned or flipped over as they sank because

After a period of time, most raisins stopped rising because _____

_____

_

Some raisins did not rise because _____

_____

_____

Some raising bumped and turned around on the bottom of the container because

_____

_____

Bubbles are round (spherical) in shape because _____

_____

_

Raisins with a lot of bubbles rise but raisins with fewer bubbles don't rise because

_____

_____