

## Mission 1: Scientific Thinking

**LEARNING GOAL:** The student will be able to define a problem, use appropriate reference materials to support scientific understanding, plan and carry out scientific investigations of various types such as: systematic observations; experiments requiring the identification of variables; collecting and organizing data; interpreting data in charts, tables, and graphics; analyze information; make predictions; and defend conclusions.

**STANDARD(S):** SC.5.N.1.1

### WRITING:

Juan has collected data from growing plants. He displays the following table.

Plant Height Data (Centimeters)

Day	Pot A	Pot B	Pot C
15	1.8	2.7	1.6
20	3.2	4.3	3.1
25	4.6	5.9	4.8
30	5.8	7.5	6.3
35	6.8	9.0	7.5
40	8.0	10.4	8.9
45	8.9	12.2	10.1
50	10.0	14.0	11.0

**Pot A:** Tomato, 3 lights, 50 mL water, soil

**Pot B:** Tomato, 3 lights, 50 mL water, soil, fertilizer

**Pot C:** Tomato, 3 lights, 50 mL water, soil, compost

Analyze the data table and explain which conditions would be best to grow a tomato plant and why.

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### MULTIPLE CHOICE:

1. Maurice followed these steps of an investigation:

**Step 1.** Collect five objects made of different types of metal.

**Step 2.** Place them on a large laboratory table.

**Step 3.** Touch each metal object with a magnet and lift slowly.

**Step 4.** Record observations.

Which of the following statements is Maurice **most likely** testing?

A. Metals are attracted to magnets.

B. Each magnet can lift the metal object to the same height.

C. Larger magnets can pick up heavier metal objects than smaller magnets can.

D. Heavier metal objects are more attracted to magnets than lighter metal objects are.

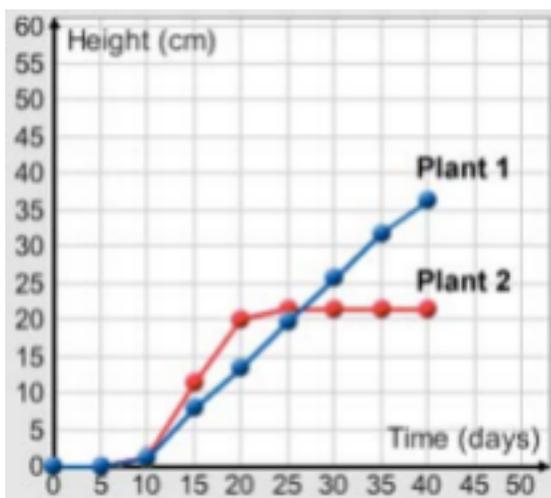
2. Carla went on a nature walk. She sees a bird in a tree. She gathers information about the bird and its habitat. She notes the bird is red, the tree has brown bark and green leaves. What type of investigation is Carla performing?
- Experiment
  - Model
  - Free Exploration or Field Work
  - Lab Work
3. Lucas told his mom he wanted to know how tall the members of his family are. Each family member takes turns measuring each other. His mom is 5 feet 2 inches, his dad is 6 feet, his sister is 3 feet 3 inches tall and he is 4 feet 7 inches tall. What could Lucas do with this data to make it easier to read and analyze?
- Create a data table
  - Ask a Question
  - Make a prediction
  - Draw a conclusion

4. Martha followed these steps of an investigation:

**Step 1:** Gather 3 microwavable cups the same size and material and label the cups A, B, and C. **Step 2:** Add 25 mL of water to Cup A, 50 mL of water to Cup B, 100 mL of water to Cup C  
**Step 3:** Heat each cup for 1 minute in a microwave and measure the temperature of the water.

What is the best choice for what she should do after Step 3?

- Added more water to each cup.
  - Recorded the temperatures as her results.
  - Write a conclusion.
  - Repeat the experiment again
5. What does this graph of plant heights show?



- Plant 2 ended up taller than Plant 1.
- Plant 1 was always taller than Plant 2.
- Plant 1 grew steadily. Plant 2 grew quickly at first and then stopped growing.
- Plant 2 grew steadily. Plant 1 grew slowly at first and then grew quickly.

## Mission 2: Observations

**LEARNING GOAL:** The student will be able to recognize and explain that science is grounded in empirical observations that are testable; explanation must always be linked with evidence.

**STANDARD(S):** SC.5.N.2.1

**WRITING:** Identify an object in the classroom and make an observation about it. Explain why your statement is an observation. How is this the same or different from your personal opinion about the object?

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### MULTIPLE CHOICE:

1. Omar is performing an investigation using several earthworms. He places a rectangular box under a bright lamp and covers one-half of the box so that it is shaded. Then, he puts the earthworms into the box on the side that is still brightly lit. Later, Omar notices that all of the earthworms have crawled over to the shaded side of the box. Based on his investigation, which of the following is an observation and NOT a personal opinion?

- A. Earthworms are afraid of light.
- B. Earthworms like staying together.
- C. Earthworms move away from light.
- D. Earthworms like living in the ground.

2. Sylvia records the following about her pet hamster Mel.

- Mel is 630 grams.
- Mel is 10 centimeters.
- Mel eats carrots.
- Mel likes the color red.
- Mel lives at my house.

Which of the following from Sylvia's list is NOT an observation?

- A. Mel is 630 grams.
- B. Mel lives at my house.
- C. Mel likes the color red.
- D. Mel eats carrots.

3. Which of the following is **not** a scientific explanation supported by evidence or observation?

- A. Object A measures 5 cm. and object B measures 10 cm. Object B is longer than object A because of the difference in measurements.
- B. The fire truck that passed us on the street was red.
- C. Sally ran faster than Billy around the track. Sally ran in 45 seconds while Billy ran in 55 seconds.
- D. All students like candy.

## Mission 3: Evidence and Replication

**LEARNING GOAL:** The student will be able to recognize and explain that when scientific investigations are carried out, the evidence produced by those investigations should be replicable by others.

**STANDARD(S):** SC.5.N.2.2

### WRITING:

Why is it so important for scientists to do repeated trials and have other scientists replicate the same experiment as other groups of scientists? \_\_\_\_\_

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### MULTIPLE CHOICE:

1. Gabriel is designing an experiment to see whether sugar or artificial sweeteners will attract more ants. Which statement **best** describes why Gabriel should write down his experimental procedure?
  - A. The exact experiment can be repeated by others and the results compared.
  - B. The experiment can be changed by others to get different results.
  - C. The data will help people decide what type of sweetener to use.
  - D. The data will show people which ants are more common.
2. Samantha's science class is experimenting. They need to gather the following materials: three pieces of string all the same length (200 centimeters long), 1 large paper clip, and 6 small paper clips. Her classmate Martin, who is in a different group, cannot find 6 small paper clips, so he takes 6 large paper clips. At the end of the experiment, Samantha's group and Martin's group data are very different. What caused the data to be different?
  - A. Martin's group had better data
  - B. Samantha's group's data is wrong
  - C. Martin should have used 6 small paper clips like the materials listed.
  - D. Samantha could not have followed the procedures correctly.
3. Sometimes scientists replicate the research of other scientists. Which of the following is the **most likely** reason scientists do this?
  - A. to form new theories
  - B. to improve the research
  - C. to win prizes for their work
  - D. to verify that the work is accurate
4. Why is it important to measure very carefully in an investigation?
  - A. to practice measuring skills
  - B. to keep good records
  - C. so others can replicate the work
  - D. to test the accuracy of our tools



## Mission 8: Weathering and Erosion

**LEARNING GOAL:** The student will describe the basic difference between physical weathering (breaking down of rock by wind, ice, temperature change, and plants) and erosion (movement of rock by gravity, wind, water, and ice).

**STANDARD(S):** SC.4.E.6.4

Alyson and her family are hiking in the mountains. Along the trail, she sees the broken rocks shown below. What might Alyson infer caused the rocks to break apart? Think about what happened.



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View the picture and then describe what has happened to the sand on this beach in terms of natural erosion and/or weathering.

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### MULTIPLE CHOICE:

1. Which of the following describes the meaning of erosion?
  - A. The processes that involve the breaking down of rock into smaller pieces.
  - B. The processes that involve the change of rock from one category to another (ex. igneous to metamorphic).
  - C. The processes that involve the movement of soil and rock.
  - D. All of the above.
2. Which of the following is not an example of weathering?
  - A. Tree roots breaking a nearby sidewalk.
  - B. Water freezing inside the crack of a rock and breaking it.
  - C. Sand being moved in a child's bucket at the beach.
  - D. Water dripping from a building and wearing a hole in the concrete below.
3. Which of the following is true about weathering and erosion?
  - A. Erosion breaks rocks down into smaller pieces.
  - B. Erosion can be caused by ice but weathering cannot.
  - C. Weathering moves sediment to new locations.
  - D. Weathering and erosion can both be caused by flowing water.

## Mission 10: Factors that Determine the Weather

**LEARNING GOAL:** The student will recognize how air temperature, barometric pressure, humidity, wind speed and direction, and precipitation determine the weather in a particular place and time. Distinguish among the various forms of precipitation (rain, snow, sleet, and hail), making connections to the weather in a particular place and time. Recognize that some of the weather related differences, such as temperature and humidity, are found among different environments, such as swamps, deserts, and mountains.

**STANDARD(S):** SC.5.E.7.3, SC.5.E.7.4, SC.5.E.7.5

### MULTIPLE CHOICE

- To predict the weather, meteorologists make careful observations and monitor the weather conditions in an area. Which is a weather condition monitored by meteorologists? A. air odor B. soil moisture  
C. cloud type  
D. plant type
- Precipitation is water that falls to Earth. Hail, rain, sleet, and snow are four types of precipitation. Which type of precipitation is **most likely** to occur when the cloud and air temperatures are above freezing?  
A. hail  
B. rain  
C. sleet  
D. snow
- There are swamps in the Everglades of Florida. In Arizona, there are deserts. These two environments can have high temperatures in the summer. How would the weather in a swamp in the Everglades most likely **differ** from the weather in an Arizona desert? A. The swamp would have higher humidity.  
B. The swamp would have hotter winds.  
C. The swamp would have more snowfall.  
D. The swamp would have less precipitation.
- Tai's class was doing a project on weather in different environments in North America. Tai's assignment was to research common weather conditions in one type of environment. Tai made the table below to show what he found.

<b>Temperature</b>	low to moderate temperatures
<b>Rainfall</b>	low to moderate rainfall
<b>Snowfall</b>	snowfall common in winter
<b>Winds</b>	light cool winds common

Which type of environment was Tai **most likely** researching?

- A. desert                      C. rain forest  
B. mountain                 D. swamp