

**SKILLS INTRODUCTION**

## Observing

The first day of school is an exciting time. You find out who your teachers are, who else is in your classes, and where your classrooms are. When you look around to see what the room looks like and who is there, you are making observations.

**Observing** is using one or more of your senses—sight, hearing, smell, taste, and touch—to gather information about the world. For example, seeing a green chalkboard, hearing a bell ring, smelling smoke, tasting a sour lemon, and feeling a smooth desktop are observations. Information gathered from observations is called evidence, or data. Making and recording observations is the most basic skill in science.

When you make observations in science, you want them to be accurate and objective. An accurate observation is an exact report of what your senses tell you. An objective observation avoids opinions, or bias, based on specific points of view.

**Example 1:** Sixteen students were present for roll call, and five other students arrived afterward. (accurate and objective)

**Example 2:** Half the class was late. (not accurate)

**Example 3:** The friendliest people were there first. (not objective)

Observations can be either qualitative or quantitative. Qualitative observations are descriptions that do not use numbers. For example, if you report colors, smells, tastes, textures, or sounds, you are making qualitative observations. Quantitative observations, on the other hand, do include numbers. If you count objects or measure them with standard units, you are making quantitative observations. Quantitative observations are often made using tools.

**Example 4:** The classroom walls are yellow. (qualitative)

**Example 5:** The classroom floor is shiny. (qualitative)

**Example 6:** There are 21 students in the room. (quantitative)

**Example 7:** The chalkboard is 1 meter high and 2 meters wide. (quantitative)

## Observing (*continued*)

In science, observations are usually followed by attempted explanations, or inferences. When scientists make inferences from observations, however, they keep the two processes separate. That's because although an accurate observation is considered to be factual evidence, the inferences may not be correct. When you make and record your observations, write down just what your senses perceive.

**Example 8:** There's an empty aquarium tank in the classroom.  
(observation)

**Example 9:** The tank is 50 cm long, 30 cm wide, and 18 cm deep.  
(observation)

**Example 10:** The tank used to contain live fish. (an inference, not an observation)


**Example 11:** The tank is waterproof (an inference, not an observation)



### Tips for Making Observations

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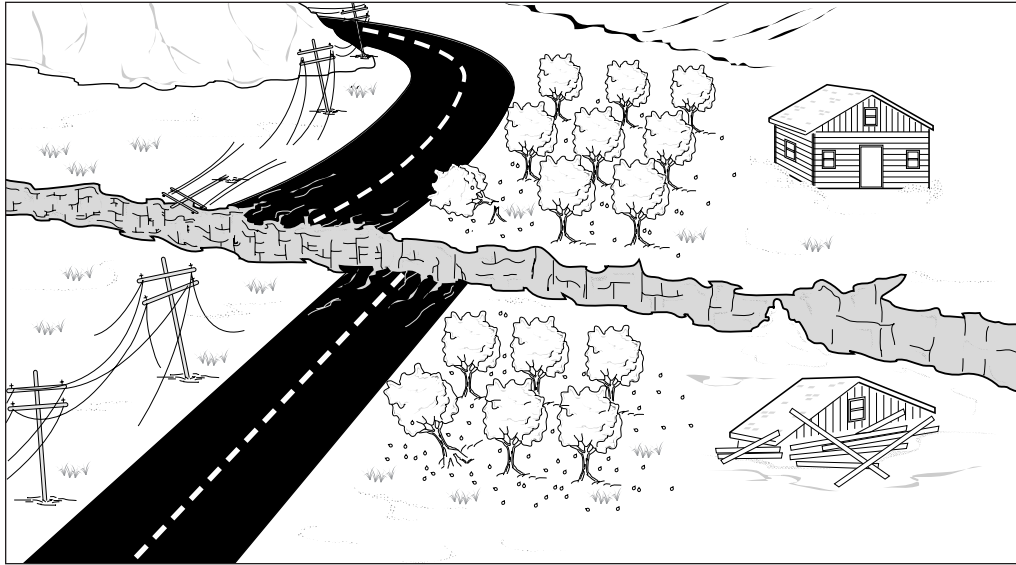
- ◆ Use the senses of sight, hearing, touch, and smell to make qualitative observations. Important: For safety's sake, do not taste any unknown substances.
  - ◆ Review your observations to make sure they are accurate and objective.
  - ◆ Whenever possible, count or use instruments to make quantitative observations. Make sure you include the unit that identifies each measurement, such as a mass measurement of 5 grams or a distance measurement of 15 meters.
  - ◆ If no tools are available to make measurements, try to estimate common quantities by referring to known standards. For example, you might state that an object is about as long as a new pencil or has the mass of a paper clip.
  - ◆ Check your observations to be sure that they are statements about information gained through your senses, not explanations of what you observed.
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 **Checkpoint** Write three observations you have made today. Label each observation as qualitative or quantitative.

## SKILLS PRACTICE

### Observing

Use the illustration to answer the questions that follow. Write your answers on the back of this page or on a separate sheet of paper.



1. Make and record at least five qualitative observations of the scene in the illustration.
2. Explain how you could make at least three quantitative observations if you were able to visit this scene.
3. Examine the observations you wrote for Questions 1 and 2. Are any of them actually explanations, or inferences? If so, which one(s)?
4. Is the following statement an observation or an inference? "The house collapsed at the same time that the poles fell down." Explain.
5. Is the following statement an observation or an inference? "The road damage is serious, and it will be very expensive to repair." Explain.
6. Is the following statement an observation or an inference? "The house is built on unstable land." Explain.
7. Is the following statement an observation or an inference? "The damage at this scene was caused by an explosion." Explain.
8. Think About It Write a few sentences that would explain to classmates how to keep their observations separate from their inferences.