

Think Like a Scientist

Although you may not know it, you think like a scientist every day. Whenever you ask a question and explore possible answers, you use many of the same skills that scientists do. Some of these skills are described on this page.

Observing

When you use one or more of your five senses to gather information about the world, you are observing. Hearing a dog bark, counting twelve green seeds, and smelling smoke are all observations. To increase the power of their senses, scientists sometimes use microscopes, telescopes, or other instruments that help them make more detailed observations.

An observation must be factual and accurate—an exact report of what your senses detect. It is important to keep careful records of your observations in science class by writing or drawing in a notebook. The information collected through observations is called evidence, or data.

Inferring

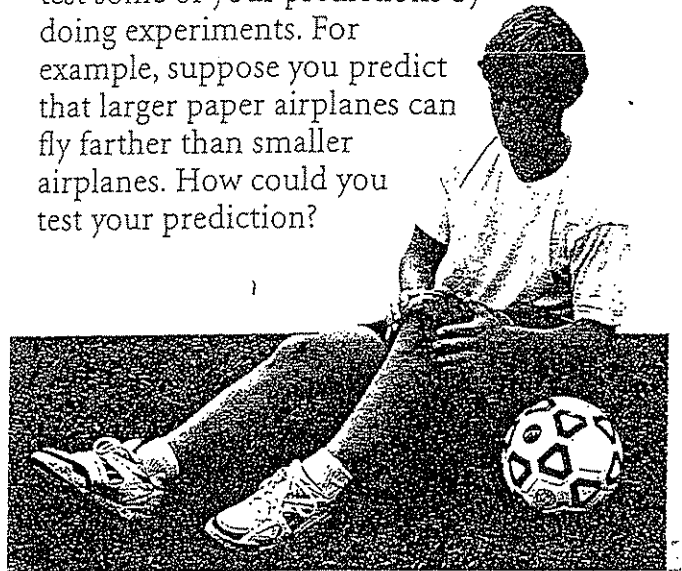
When you explain or interpret an observation, you are inferring, or making an inference. For example, if you hear your dog barking, you may infer that someone is at your front door. To make this inference, you combine the evidence—the barking dog—and your experience or knowledge—you know that your dog barks when strangers approach—to reach a logical conclusion.

Notice that an inference is not a fact; it is only one of many possible explanations for an observation. For example, your dog may be barking because it wants to go for a walk. An inference may turn out to be incorrect even if it is based on accurate observations and logical reasoning. The only way to find out if an inference is correct is to investigate further.

Predicting

When you listen to the weather forecast, you hear many predictions about the next day's weather—what the temperature will be, whether it will rain, and how windy it will be. Weather forecasters use observations and knowledge of weather patterns to predict the weather. The skill of predicting involves making an inference about a future event based on current evidence or past experience.

Because a prediction is an inference, it may prove to be false. In science class, you can test some of your predictions by doing experiments. For example, suppose you predict that larger paper airplanes can fly farther than smaller airplanes. How could you test your prediction?



ACTIVITY

Use the photograph to answer the questions below.

Observing Look closely at the photograph. List at least three observations.

Inferring Use your observations to make an inference about what has happened. What experience or knowledge did you use to make the inference?

Predicting Predict what will happen next. On what evidence or experience do you base your prediction?

Scientific Method

Science Processes

Observation

- Must be _____ and _____
- Must be _____ so others know exactly what you observed
- Information collected through observations is called _____
- Made using one or more of your _____
- Clue words: _____

<u>Sense</u>	<u>Organ</u>
	Eyes
Hear	
Smell	
	Tongue
Touch	

Inference

- An educated _____ that explains or interprets an observation
- May or may not be _____
- Clue words: _____

Prediction

- An inference about a _____ event
- May or may not be _____
- Clue words: _____

Directions:

Place the following statements into the correct category on the graphic organizer.

1. **Based on our 5 senses (sight, hearing, smell, taste, touch)**
2. **Possible explanation of an observation**
3. **Refers to a future event**
4. **May or may not happen**
5. **Must be logical/reasonable based on the evidence and your experience**
6. **Must be factual and accurate**
7. **Information gained is called evidence or data**
8. ***Example:* There are dirty dishes in the sink.**
9. ***Example:* Someone will wash the dishes.**
10. ***Example:* Someone ate a meal.**

OBSERVATIONS

--	--	--	--

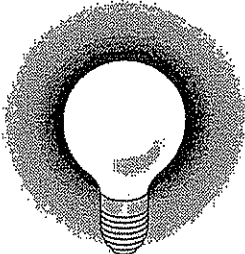
INFERENCES

--	--	--

PREDICTIONS

--	--	--

Making Inferences



Read the following observations. Then make inferences that explain each observation. Remember, there may be more than one logical explanation.

Observation 1: You observe that the sky at noon is darkening.

Your inference: _____

Observation 2: The principal interrupts class and calls a student from the room.

Your inference: _____

Observation 3: All middle school students are bringing lunch from home.

Your inference: _____

Observation 4: A former rock-and-roll band member has poor hearing.

Your inference: _____

Observation 5: You leave a movie theater and see that the street is wet.

Your inference: _____

Observation 6: During a handshake, you feel that the palm of the individual's hand is rough and hard.

Your inference: _____

Observation 7: The classroom lights are off.

Your inference: _____

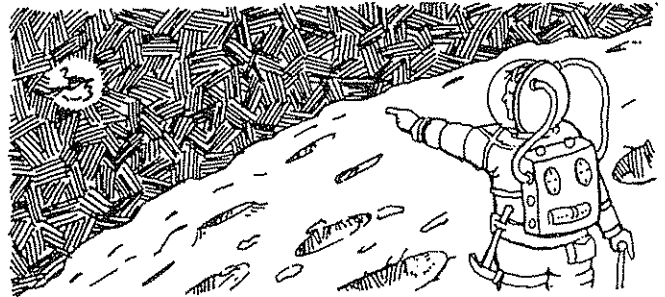
Observation 8: A siren is heard going past the school.

Your inference: _____

Name _____

Observing a Space Creature

Imagine that an intergalactic spaceship stopped on one of six planets revolving around a large star. Astronauts explored the planet. They observed and interacted with a strange organism. In a record of the exploration, an astronaut wrote the following:



1. The organism frowned to show it did not like strangers.
2. The organism is green with brown spots.
3. The organism lives near other organisms.
4. The organism moved away from us because it was afraid.
5. The organism makes gurgling noises.
6. The organism's four toes on each foot are webbed.
7. The organism has one green eye and two blue eyes.
8. The planet must be hot because the creature is sweating.
9. The organism can turn its head in a complete circle.
10. The organism moves slowly, so it must be old.
11. The organism picks up objects with the three fingers on each of its two hands.
12. The organism's arms are longer than its legs.
13. The organism must like to eat yellow plants because it is holding ten of them.
14. The organism has no fingernails or toenails.

Directions:

In the blank space next to each number, tell whether the statement is an inference or an observation. Remember, an observation is something you see, hear, taste, smell, or touch. An inference is something you might decide about a thing or an event after you observe. When were the astronauts observing? When were they deciding something they did not really observe?

E/C*

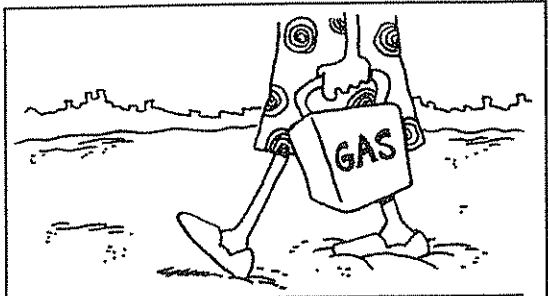
On ~~the back of this page~~ ^{a separate sheet}, make a drawing of the organism. Your drawing should show only what the astronauts observed.




Name _____

Caption Capers

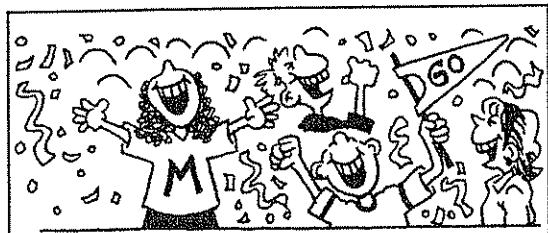
DIRECTIONS: For each picture, write an observation and a logical inference in the space provided.

1. 

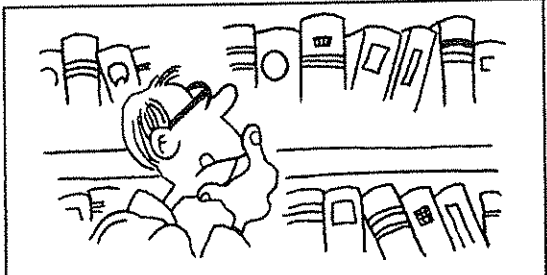
OBS: Person carrying gas can
INF: Their car ran out of gas.

4. 

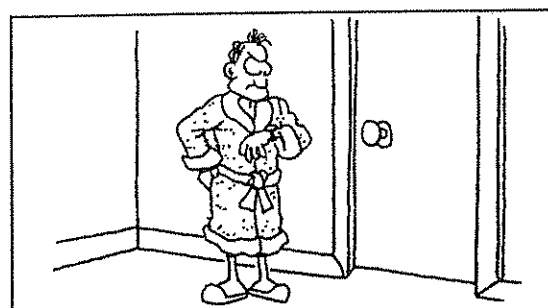
OBS: _____
INF: _____

2. 

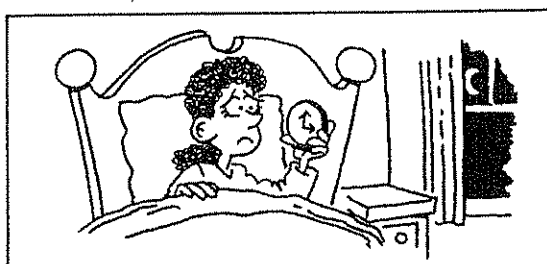
OBS: _____
INF: _____

5. 

OBS: _____
INF: _____

3. 

OBS: _____
INF: _____

6. 

OBS: _____
INF: _____