



## **Shedding Light on Scientific Inquiry**

Adapted from *Adventures in Paleontology*, Chapter 2 Introduction, p.14.

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Grade Level: Grades K-8

Preparation Time: less than 5 minutes

Activity Duration: 10-20 minutes

### Concepts Addressed

- Science is a process by which we learn about the natural world using our senses and extensions of our senses.
- Science follows a process guided by certain parameters.
- Science relies on the observation physical evidence from the natural world
- Physical evidence is examined and interpreted through logic.
- An observation is a description of the physical evidence based on what we see, feel, hear, smell, or taste.
- An inference is a logical conclusion based on observation of physical evidence.
- A hypothesis is a scientific idea supported by physical evidence.
- Science advances as scientific theories are supported, modified, or replaced as new evidence is found.

### Objectives

The student will:

- Make observations about an object.
- Make a hypothesis based on observations of an object.
- Test the hypothesis.

### Materials Included

- Lamp
- Working light bulb
- Burnt out light bulb

### Materials Not Included

- Electrical Outlet

### Background

The main points of this activity are:

1. Scientific inquiry is not mysterious or intimidating, we use it every day.

2. Scientific inquiry deals only with observable natural phenomena and does not invoke supernatural causes (e.g. a ghost is making the light not work).
3. Scientific inquiry is a series of processes and its conclusions are tentative. We must be willing to alter our hypotheses to accommodate new evidence.

#### Procedure

1. Prior to this activity, “disable” a table lamp by putting in a bad bulb or loosening the bulb.
2. Place lamp on a desk at the front of the room, leaving it unplugged.
3. Turn the lamp switch and ask the students to make observations (e.g. the lamp does not work. Students may tend to jump ahead to making hypothesis about why the lamp does not work at this stage. Encourage them to stick with observations about the lamp).
4. Now have them propose hypotheses for why the lamp does not work. For example:
  - a. Hypothesis 1. The lamp is not plugged in.
  - b. Hypothesis 2. The bulb is bad.
  - c. Hypothesis 3. The bulb is not screwed in.
  - d. Hypothesis 4. The electricity is not working.
5. Now test each hypothesis by plugging in the lamp, screwing in the bulb, testing the bulb in another lamp, etc., until the correct hypothesis is found.

#### Assessment

- Repeat the above activity asking students to explain what part of the process of science they are participating in at any given moment.
- Ask students to individually write about each of the following parts of the process of science in relation to the above activity: observation, hypothesis, testing of hypothesis, physical evidence on which hypothesis is based.

#### Extensions

- Construct similar science activities using other household items.
- Ask each student to find a model of the process of science in their everyday lives and explain in detail.
- Ask students to construct other tests to attempt to disprove the hypothesis and possibly support a scientific theory.