

## THE NATURE AND LIMITS OF SCIENCE

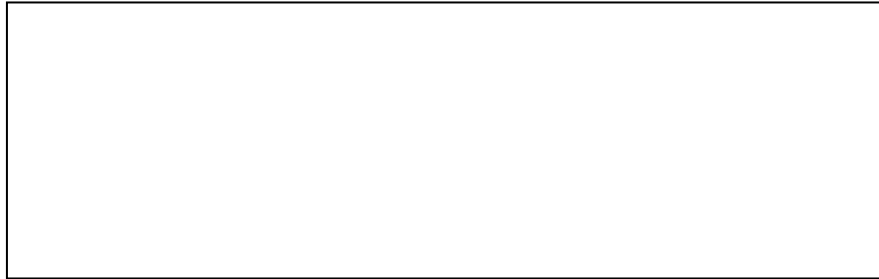
1. Using the sticky notes provided, finish the sentence “Science is...” Use one sticky note for each idea. Each member of your group will share ideas. Please write your four (4) favorite ideas in the space below. Then, place your group’s sticky notes on the class poster.
2. What does science actually do for us?
3. What do the terms “reproducible” and “verifiable” mean to you? What do you think they have to do with science?
4. What is a “theory...”
  - a. in everyday terms?
  - b. in scientific terms?
5. What skills and characteristics do you think a successful scientist should have?
6. What kinds of questions can science answer?
7. What kinds of questions can science *not* answer?

## EXPERIMENTAL DESIGN

The critical experiments of the Italian physicist Francesco Redi (1621-1697) demonstrate the scientific method and also help illustrate the principle of natural causality, on which modern science is based. Redi investigated why maggots appear on spoiled meat. Before Redi, the appearance of maggots was considered to be evidence of spontaneous generation, the production of living things on nonliving matter.

Redi observed that flies swarm around fresh meat and that maggots appear on meat left out for a few days. He formed a tentative explanation: the flies produce maggots. In his experiment, Redi wanted to test just one variable: the access of flies to the meat. Therefore, he took two clean jars and filled them with similar pieces of meat. He left one jar open and covered the other with gauze to keep out flies. He did his best to keep all other conditions the same. After a few days, he observed that maggots swarmed over the meat in the open jar, but no maggots appeared over the meat in the covered jar. Redi concluded that his hypothesis was correct and that maggots are produced by flies, not by the meat itself. Only through controlled experiments could the age-old hypothesis of spontaneous generation be laid to rest.

A. Draw a picture to represent Redi's experiment:



B. In the scenario above, what is/are the:

1. Question?
2. Hypothesis?
3. Independent variable (thing that the scientist manipulated)?
4. Dependent variable (thing that was measured)?
5. Control (thing that was left alone, not manipulated)?
6. Constants (things that stayed the same)?
7. Conclusion?

C. Does this experiment fall in the realm of true science? Why or why not?