

Name \_\_\_\_\_

## Asking & Answering Questions

**Background Information:** Scientists ask questions and then try to answer them using a scientific method. Different kinds of questions need different kinds of scientific investigations. Some investigations involve observing and describing objects, organisms, or events; some involve collecting specimens; some involve researching more information; some involve doing a fair test or experimenting; some involve discovery of new objects and phenomena; and some involve making models.

We can divide investigations into two general categories:

***Descriptive/qualitative*** or ***Experimental/quantitative***.

- ***Descriptive / qualitative*** investigations include building models, inventing, dissecting, making observations and describing them, interviewing, collecting specimens among others. Although these are sometimes called experiments, they are not really experimental.
- ***Experimental / quantitative*** investigations involve the control or manipulation of variables. Variables are the parts of the experiment that can change, or vary.
  - **Independent variables** are those that can cause changes in other variables. This means it is the ONE thing that has been chosen to be changed or manipulated by the scientist. It is what the investigator is testing; the difference between groups.
  - **Dependent variables** are those that change in response to the manipulation of another variable. It is the response that can be observed and measured.
  - **Controlled variables** or **constants** are those that are kept the same or constant. They could be changed, but the scientist keeps them constant so that they will not interfere with the investigation.

**Given this Question:** *Does the color of a Tootsie Roll Pop affect how long it takes to get the chocolate center?*

What kind of investigation would you use to answer this question; descriptive or experimental? Explain your answer.

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