

Name: _____

Period: _____

Bess Beetles

Science Skill 2: Writing Hypotheses

BACKGROUND

Scientific investigations often begin with a question-prompting observation. Scientists use a hypothesis to describe a possible explanation for their observations. A strong hypothesis takes both the independent and dependent variable into account which then frames the experiment and data collection. Being able to identify the variables in an experiment is a critical science skill that will ultimately make your scientific method process much easier.

VARIABLES

Testing a scientific hypothesis often involves designing an experiment with multiple variables. A variable is any factor of an experiment that can change or be manipulated. Whenever possible, an experiment should test only a single variable, so all others remain unchanged or controlled. A hypothesis then summarizes which variables are being tested and the predicted relationship between them

Why is it important to control variables in a scientific experiment?

TYPES OF VARIABLES

1. Independent Variable: the variable that is deliberately changed or *manipulated*.
2. Dependent Variable: the variable that changes in response to the independent variable. This is often the variable that is *measured*.

For each of the following identify the independent and dependent variables.

Students of different ages were given the same jigsaw puzzle to put together. They were timed to see how long it took to finish the puzzle.

Independent Variable: _____

Dependent Variable: _____

The temperature of water was measured at different depths of a pond.

Independent Variable: _____

Dependent Variable: _____

The higher the temperature of water, the faster an egg will boil.

Independent Variable: _____

Dependent Variable: _____

HYPOTHESIS WRITING

Hypotheses can be written using an expanded version of a traditional “If...then” statement. The IF part shows the relationship between the independent and dependent variable while the THEN part includes your prediction. The following format will help you craft strong hypotheses for any experiment:

If [independent variable] is related to [dependent variable],
then [your prediction].

Compare the following two examples. Is one more clear than the other?

1. Circle the independent variable.
2. Put a box around the dependent variable.
3. Underline the prediction.

Ultraviolet light may cause skin cancer.	If skin cancer is related to ultraviolet light, then people with a high exposure to ultraviolet light will have a higher frequency of skin cancer.
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APPLICATION

Recall the original problem from the Bess Beetle lab: Does beetle mass affect pulling strength? Based on that information, identify the following:

Independent Variable: _____

Dependent Variable: _____

Now, write a strong hypothesis that reflects the experiment you conducted with the beetles.

Go back to your handout for Part 1 (Scientific Method) and compare your new hypothesis to the original you wrote. What are some advantages of the new hypothesis compared to the original one you wrote?
