

Activity 4 - Extra Practice: Evaluating Experiment Designs

Name _____

Date _____

Class _____

The object of this activity is to find the manipulated and responding variables within the questions below. You are *not* expected to answer the questions.

1. In the questions below, circle the manipulating variable and then label it with "MV." Then find the responding variable, put a box around it and label it with "RV." Remember, don't try to answer the questions!
 - a) If the volume of your CD player increases, will that change how long your batteries last?
 - b) If you change the number of batteries you use for a string of lights, will that change the brightness of your light bulbs?
 - c) If you change the type of gas in your car, will that affect how long you can drive before you run out of gas?
 - d) If you change the mass of a ball that you are dropping off your balcony, does that change how long it takes the ball to fall to the ground?
 - e) Does an object's weight change if it's immersed in a liquid (such as water or oil) rather than air?
 - f) By increasing the amount of salt in water, can you change the temperature at which it starts to boil?
 - g) If you decrease the distance of a solar panel from a light source, how much will you increase the amount of energy it can produce?
 - h) Imagine you are rolling a ball down a plank that has one end on the ground and the other in your hand. If you raise or lower your hand to change the angle of the plank with the ground, how will that affect the final speed of the ball rolling down it (starting from rest)?
 - i) How does the diameter of a disk affect its speed when it's rolling down a slope?

2. Read the experiments below carefully, and then write down the manipulated and the responding variables in the spaces provided. Then find the values of the manipulated variable and write those down as well.

Experiment 2:

Your friend wants to find out if an ice cube will melt faster on a hot day or on a cold day. The experiment question she thought of is:

If the temperature outside changes, will it have an effect on how fast an ice cube melts?

To do the experiment, your friend put an ice cube in a bowl and took it out to her backyard and placed it on a table and used a stopwatch to measure the time it took to melt. She did this for five days straight, always at noon. The temperature on each of the five days was: 80°F, 75°F, 82°F, 85°F, and 71°F.

What is the manipulated variable?

What is the responding variable?

What are the values of the manipulated variable?

Experiment 3:

Your friend plays baseball and she wants to know if there is a certain way that she can throw a baseball so that it will go the farthest. She thinks that if she throws it at different angles it might change how far away the baseball lands. She wants you to help her answer the following question:

If you change the angle at which you throw a baseball, what will happen to the distance it travels?

You can assume that your friend is a very good baseball player and that during the experiment she is going to throw the baseball exactly the same, only at different angles. The angles she tries are 0° (straight ahead at eye level), 25°, 45°, 75°, and 90° (straight up).

What is the manipulated variable?

What is the responding variable?

What are the values of the manipulated variable?

Experiment 4:

You decide to do a science project on plants and what color of light is best for their growth. Your experiment question is:

Does changing the color of light affect how tall a plant grows?

You decide to try blue, red, purple, and green light on the plants. You make sure to water them all the same and have the light on them for the same amount of time every day. The kind of seeds, soil, pot size, and environment are the same for all the plants. At the end of three weeks, you measure the heights of the plants. The data table below shows the measurements you made.

Color of Light:	Blue	Red	Purple	Green
Height:	12 cm	14 cm	11 cm	15 cm

What is the manipulated variable?

What is the responding variable?

What are the values of the manipulated variable?
