

Name: Key  
Scientific Process Practice

Period: \_\_\_\_\_  
Date: \_\_\_\_\_

### Experiment:

Five tomato plants of the same height were placed in the same size pots, in the same type of soil and each was given the same amount of water. Each plant was under a light bulb of the same intensity as the others but each light was of a different color. Each day, the plants were given light (each its own color) for 12 hours and left in darkness for 12 hours. The height of each plant was measured in centimeters at the end of each week for 10 weeks.

Light Color	Week Number									
	1	2	3	4	5	6	7	8	9	10
Yellow	4	5	6	7	8	9	10	11	12	13
Green	4	4	4	3	3	2	2	1	0	0
Blue	4	4	4	5	5	5	5	6	6	6
Purple	4	4	5	5	6	6	7	7	8	8
Red	4	5	6	7	8	9	10	11	12	13

1. What question is tested by this experiment?

*Does the color of light affect plant growth?*

2. Write a hypothesis for this experiment.

If *plants are exposed to different colors of light*,  
then *plants in green light will grow the least*,  
because *plants reflect green light*.

3. An **independent variable** (also called *manipulative variable*) is the variable that is changed by the scientist.

In this Experiment, what is the Independent Variable? *Different colors of light*

4. A **dependent variable** (also called the *responding variable*) is the variable being tested and measured in a scientific experiment.

In this Experiment, what is the Dependent Variable? *Height of plant*

5. What are the control variables in this experiment?

- Same type of plant*
- Same size pots*
- Same light intensity*
- Same height to start*
- Same type of soil*
- Same amount of time in light/darkness*

6. Is there a control group? If not, what control would you suggest?

*No - White light*

7. Write a conclusion for this experiment.

*Plants exposed to yellow and red light grew taller, while plants exposed to green light grew the least.*

## Identifying Variables and Writing Hypotheses

For each of the problems described below write down:

- The independent variable
- The dependent variable
- Control Variables (Provide at least 3)
- Hypothesis \*\*Be sure each hypothesis is in the proper "If...,then..., because..." format

1. Jacob wanted to test the projectile motion of a pumpkin. He bought three orange pumpkins and tested them all on the same day. The pumpkins had a mass of 5 kg, 10 kg and 15 kg. He threw each pumpkin using the same technique and then measured the distance they travelled.

- Independent Variable: Mass of Pumpkins
- Dependent Variable: Distance they travelled
- Control Variables: Same color pumpkins, same day, same technique
- Hypothesis: IF pumpkins of different masses are thrown, then the lighter (5kg) pumpkin will travel farther, because there is less air resistance on the pumpkin

2. A dog owner wants to test how exercise affects how his dog sleeps. On day 1, he exercises his dog for 2 hours and then records the amount of sleep the dog experiences that evening. The next day he exercises the dog for 4 hours and records the amount of sleep experienced by the dog and finally he records the amount of sleep with 6 hours of exercise. He was careful to give his dog the same amount of food on the days he did the experiment.

- Independent Variable: Amount of exercise
- Dependent Variable: Amount of Sleep
- Control Variables: Same dog, same amount of food, same type of exercise
- Hypothesis: IF a dog is exposed to more exercise then the dog will sleep longer because the dog will have used more energy.

3. Does the amount of butter on the popcorn kernels affect the number of kernels that pop?

- Independent Variable: Amount of Butter
- Dependent Variable: Number of Kernels that pop
- Control Variables: Same size bag, same amount of time to cook, Same microwave
- Hypothesis: IF there is more butter on popcorn, then more kernels will pop, because the butter helps heat the kernel.

4. How does drinking juice before bed affect how many hours you sleep?

- Independent Variable: Amount of Juice
- Dependent Variable: How many hours you sleep
- Control Variables: Same bed, same type of juice, same person
- Hypothesis: IF you drink more juice before bed then you will sleep less because juice contains sugar.