

## Scientific Method Unit Study Guide

### Important Terms

**[Independent Variable]:** The variable the scientist *chooses to change*

**[Dependent Variable]:** The results of the experiment, usually a *measurement*

**[Constants]:** The things that remain the *[same]*

- Constants are important because good scientists only change [one] thing during an experiment. This helps us see that whatever happens is because of the one thing we decided to change.
- On our twirlers, we only changed [blade length] If we changed both length and width, how would we know which thing slowed our twirler down?
- Other constants: drop height, how we hold the twirler, the person who uses the timer, type of paper

**[Control group]:**

- The group within the experiment where [nothing] is changed.
- It provides something to [compare] the experimental group with.
- Think about the Control Twirler! This was the first twirler we made when we [did not] change the blades at all.

**[Experimental Group]:**

- The group within the experiment where we [change] one variable.
- It is the group we are [“experimenting”] on.
- Second Twirler we made where we [changed] the blade length or blade width.

### Types of Variables

#### Independent

The one thing you change. Limit to only one in an experiment.

Example:  
The liquid used to water each plant.

#### Dependent

The change that happens because of the independent variable.

Example:  
The height or health of the plant.

#### Controlled

Everything you want to remain constant and unchanging.

Example:  
Type of plant used, pot size, amount of liquid, soil type, etc.

#### Independent Variable



#### Dependent Variable



#### Controlled Variables



#### Control Group

What is the control group in this experiment?

The control group consists of the 25 plants that are receiving plain water.



#### Experimental Group



What is the experimental group in this experiment?

The experimental group consists of the 75 plants that are receiving various concentrations of fertilizer.

## Steps of Scientific Method

### 1. Identify the Problem -

Always in the form of a question.

- [Do tomato plants need sunlight to produce tomatoes?]

### 2. Gather Information-

Research,  
Prior-Knowledge,  
Observations

- Edward uses the Internet to learn more about tomato plants.

### 3. State the Hypothesis -

Prediction using  
"If..., Then"

- If the plants receives the full 10 hours of sunlight, then it will produce a lot more tomatoes.

### 4. Test the Hypothesis - Procedure: What steps do we do to perform the experiment

- 1. Edward puts two plants in the window of his living room.
- 2. Edward puts another two plants in his bedroom.
- 3. Edward records the amount of sunlight each plant receives

### 5. Make Observations – Collect data using measuring tools and the 5 senses

- For two months, Edward looks at plants daily and records observations. He records the plant height each day.

### 6. Analyze Data- Make sense of data using charts, tables, graphs and images.

- Edward creates a graph of daily plant heights and number of tomatoes.

### 7. State the Conclusion – Summarize Results. Should clearly state if hypothesis was supported or not supported. Uses data to explain if hypothesis was supported or not.

- If the plants receives the full 10 hours of sunlight, then it will produce a lot more tomatoes. My hypothesis was supported. The plants that received 10 hours of light grew 10 tomatoes. The plants that received 5 hours of light only grew 5 tomatoes.

