Scientific Method Unit Study Guide

Important Terms

The variable the scientist *chooses to change*

The results of the experiment, usually a *measurement*

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

- 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.

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

A | B | C

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.

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- 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.

Steps of Scientific Method

1.

Always in the form of a question.
- [Do tomato plants need sunlight to produce tomatoes?]

2.

Research, Prior-Knowledge, Observations
- Edward uses the Internet to learn more about tomato plants.

3.

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

The Scientific Method

Observation / Question
Topic for research and experimentation or question that needs to be answered

Research
Find out about the topic.

Hypothesis
Predict the outcome to the problem.

Experiment
Develop a procedure to test the hypothesis.

Collect Data
Record the results of the experiment.

Analysis
Examine the data.

Conclusion
Compare the hypothesis to the experiments results.
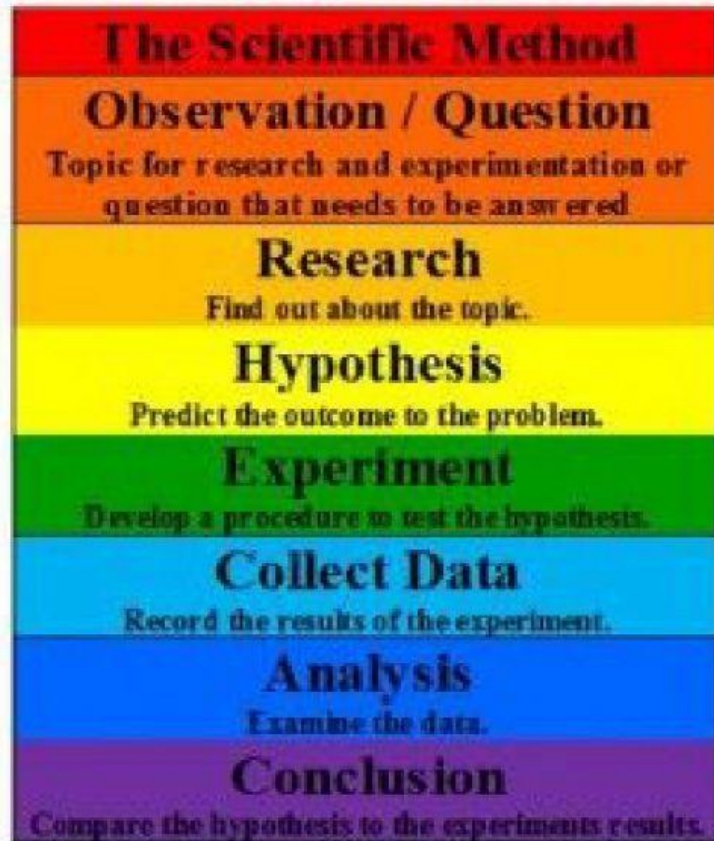
4. **– Procedure: What steps do we do to perform the experiment**

- 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. **– 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. **- Make sense of data using charts, tables, graphs and images.**
- Edward creates a graph of daily plant heights and number of tomatoes.

7. **– 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.