

Scientific Process Notes

What is the scientific process?

- It's a logical, problem solving technique. _____ is an excellent example of scientific process.

1. Observation vs Inference

- **Observation** is important in the scientific process
- An _____ is a _____ or _____ fact. There is **NO OPINION** involved.
- An _____ is an _____, or conclusion, based on observed facts.

2. Problem Statement

- Careful observations lead to questions.
- A **problem statement** is a question that compares _____.
 - *Example:* Does the drop height affect the bounce height of a superball?
 - Example:* How does the percent of dissolved oxygen in water affect the life span of algae?

3. Variables

- A _____ is something that _____ during your experimental procedure.
 - There are independent variables and dependent variables.

4. Independent Variable

An _____ **variable** is a variable that we manipulate - _____.

An **independent variable** is the variable whose value _____ an experiment.

Example: Does the **drop height** affect the *bounce height* of a superball?

*We know the **drop heights** we will use.*

Example: How does the percent of dissolved oxygen in water affect the life span of algae?

*We know the **different percentages** of oxygen we will use.*

5. Dependent Variable

A _____ **variable** is a variable that changes _____
_____ (depends on the independent variable).

The **dependent variable** is the variable whose value _____ – it's the
" _____ " we are looking for at the _____ of the experiment.

Example: Does the drop height affect the **bounce height** of a superball?

*We **do not know** the **bounce heights** before we start.*

Example: How does the percent of dissolved oxygen in water affect the life span of algae?

*We **do not know** how long the algae will live.*

6. What is a Constant?

A _____ is a variable that _____ for the duration of an experiment; a value that remains the same.

Example: Does the drop height affect the bounce height of a **superball**?

The **superball** does not change during the experiment.

Example: How does the percent of dissolved oxygen in water affect the life span of **algae**?

The **amount and type of algae** used does not change during the experiment.

Other constants in the experiment:

* _____ of water

* _____ of water

* _____ of aquarium

*time of day measurement taken

7. Hypothesis vs Theory

- A _____ is a suggested explanation based on research and knowledge.
- A _____ is a tested, well-substantiated, unifying explanation for a set of verified, proven factors. It has NEVER been disproven. Theories hold more weight than facts in science.

Why do we use graphs?

- Graphs help us _____ numerical data.
- There are several different types of graphs:
- Bar graph - Bar graphs are used to show a _____ of multiple objects.
- Pie graph - Pie graphs are used to compare the _____ of a _____.
- Line graph - Line graphs are used to show the _____ between _____.