

Nature of Science

Spaced Learning

Standards

1. I can create a hypothesis that has the correct independent and dependent variables and a logical explanation.
2. I can make accurate and complete qualitative and quantitative observations.
3. I can accurately measure and write units for length, volume, and mass and demonstrate accurate use of Metric units.
4. I can interpret data from a graph to create a hypothesis with a logical explanation of what occurred.

Hypothesis

What we do before starting any lab so we know why we are doing it

Hypothesis

Independent Variable - What you specifically change in the lab. The “**Cause**”

Dependent Variable - What happens because the independent variable is changed. The “**Effect**”

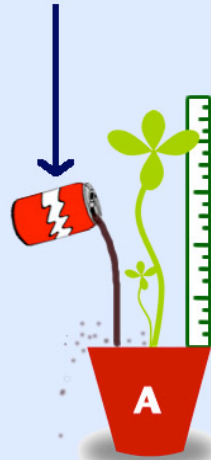
Control Variable - What you keep the exact same

Hypothesis

Independent

Example:
The liquid used to water each plant.

Independent Variable



Dependent

Example:
The height or health of the plant.

Dependent Variable



Controlled

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

Controlled Variables



Hypothesis

If...

Then...

Because...

Hypothesis

Say you are interested in how sprinting 100 meters affects heart rate in humans.

Independent Variable - Running Distance

Dependent Variable - Heart Rate

Hypothesis - **if** humans run for 100 meters, **then** their heart rate will increase, **because** blood needs to travel quickly to the muscles to help them work harder.

BRAIN BREAK - Sculpting!



Observations

What we do during a lab to see what is happening to the variables

Observations

To clarify:

Observations are what actually happened.

Inferences are what you believe caused the observations.

Observations



Observations

Observations are made with our senses:
Sight, Smell, Sound, Taste, Touch...

There are two main types:

Qualitative Observations and Quantitative
Observations

Observations

Quantitative Observations - Observations that involve numbers and typically some type of measurement.

Qualitative Observation - Observations with no numbers but are descriptive.

Observations

Quantitative Examples

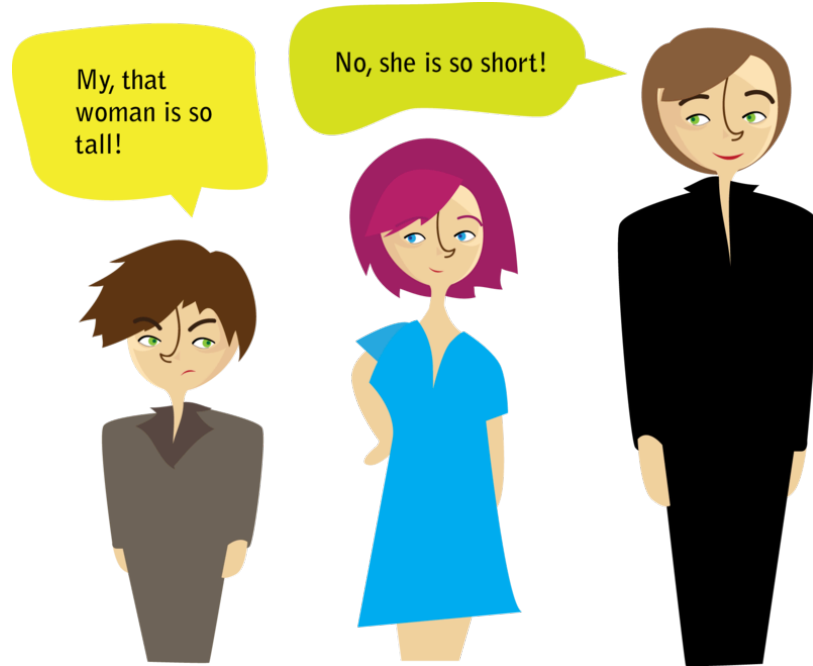
- 20 cats
- 15 cm pencil
- 124 grams of salt
- 130 mL of soda

Qualitative Examples

- Black & white cats
- Short pencil
- A lot of salt
- Almost empty can

Observations

Which type is more accurate?



BRAIN BREAK - Sculpting!



Measurements

What we do in the lab to get accurate observations

Measurements

Four main types for this class:

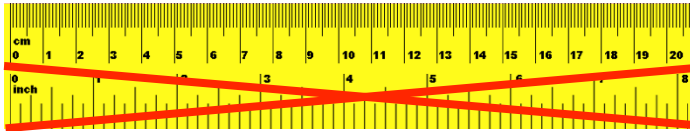
- Distance/Length
- Mass
- Volume
- Temperature

Measurements

Distance/Length

Measured in: Meters,
centimeters,
millimeters

Measured by:



Mass

Measured in: Grams,
kilograms

Measured by:



Measurements

Volume

Measured in: Milliliters,
centimeters cubed (cm³)

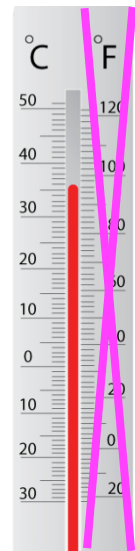
Measured by:



Temperature

Measured in: Celsius

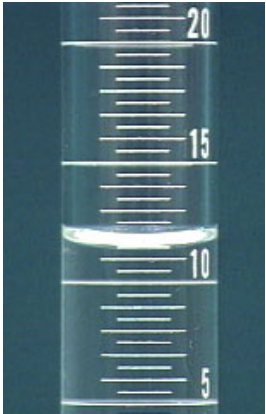
Measured by:



Measurements

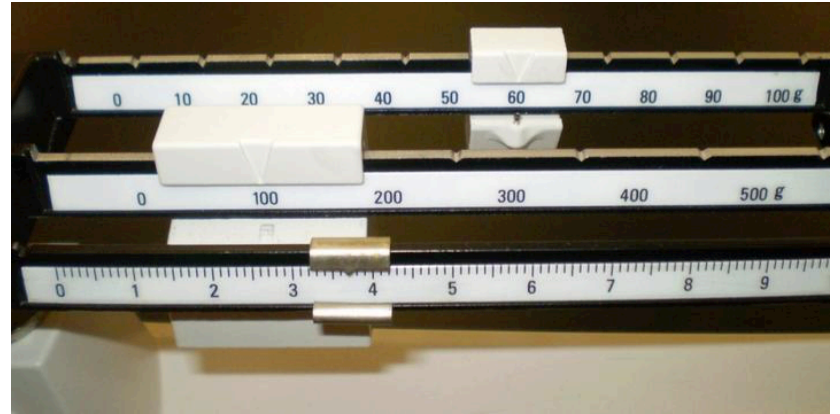
Volume

Example Reading



Mass

Example Reading



BRAIN BREAK - Sculpting!



Your Favorite Animal!

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Collecting Data

- Quantitative Basketball Observations:
- # times white T-shirt team passes the ball

<u>Trial 1</u>	<u>Trail 2</u>

- Qualitative Observations: The Lit Candle
- 1.
- 2.
- 3.
- 4.