SCIENTIFIC METHOD

Understand our World

- In science we are constantly attempting to understand the world around us.
- In order to understand the world we need to have a goal in mind, this is where the **scientific method** comes in.

What is the Scientific Method?

- The Scientific Method is a logical approach to solving problems.
- There are 6 steps to the scientific method
  1. Ask a question/See a Problem
  2. Background Research
  3. Construct a Hypothesis
     - **Hypothesis** is a tentative explanation, that can be tested to determine if it is valid. "If, then statement"
  4. Test Hypothesis
  5. Analyze data and draw conclusion
  6. Repeat

How to use Scientific Method

- Step 1: Ask a question/Observe a Problem
- You go to your car in the morning and when you try to crank the car it won't start.
- What is the question/problem?

How to use Scientific Method

- Step 2: Background Research
- What is the first thing you are likely to do?

How to use Scientific Method

- Step 3: Construct a Hypothesis
- After talking to your parents or the internet, you believe that the battery is dead.
- What might your hypothesis be? (Must write hypothesis as an "if, then" statement)

How to use Scientific Method

- Step 4: Test Hypothesis
- How might you test your hypothesis?

How to use Scientific Method

- Step 5: Analyze Data
- If after you replace the battery the car still won't start then what can you deduce?

How to use Scientific Method

- Step 6: Repeat
- After your first hypothesis failed to be correct you must go back and create a new hypothesis.

Variables

- Everything in your experiment can be labeled as a variable or a constant.
- In your experiment you had two types of variables, **independent** and **dependent**.

Variables

- The independent variable is what you manipulated
  - What was the independent variable in your experiment?
- The dependent variable "depends" on the independent.
  - What was the dependent variable in the experiment?

Constants and Control

- In your experiment things that change (Variables) and things that don't change (Constants).
- **Constants** are all the other factors not manipulated.
  - Spark Plugs, Gas, Alternator etc.
- **Control** is a completely separate group that you compare your results against.
  - Think about a placebo and how it is used in medical experiments

Law's and Theories

- True or False, a scientific theory can one day turn into a law?

FALSE!!!!!!!!!!

Law's and Theories

- A **law is used to predict** what will happen, while a **theory tries to explain** phenomena.
- Ex.
- You drop a pencil.
  - The LAW of gravity states that it will fall, it does not matter why it falls
- You find a fossil of a half reptile/half bird.
  - The THEORY of evolution tries to explain why.

One- Step Problems

1. 4.5 ft = _____ inches
2. 267 days = _____ hours
3. 8 gallons = _____ L (1 gallon = 3.8 L)

Two Step Problems

1. 410 g = _____ lbs (2.2 lbs = 1 kg)
2. 7600 s = _____ hours
3. 2 km = _____ ft

(1 mile = 5280 ft) (1.6 km = 1 mile)

Multi-step problem

- 3.55 years = _____ mins

BONUS

- 65 mph = _____ km/day

(1.6 km = 1 mile)