

The Nature of Science...



The Nature of Science



Science is a system of knowledge based on facts or principles.

Technology is the application of science to meet human needs.

Math is the language of science.



A <u>scientific model</u> is a representation of an object or event that can be studied to understand the real object or event.

Scientific Law vs. Scientific Theory

Scientific Law: A description of a <u>natural</u> occurrence that has been <u>observed</u> many times (A law describes *what* happens, not *why* it happens) Ex. Newton's Law of Gravitation



Scientific Theory: An explanation for a group of related results, observations, and occurrence. A theory can be used to predict what will happen in new situations. A theory can also be changed if new data or observations cannot be explained Ex. Darwin's Theory of Evolution Big Bang Theory (see next slide...)

Big Bang Theory...

Just read...

The Big Bang Theory states that at one time, the entire universe was confined to a dense, hot, supermassive ball. Then, about 13.7 billion years ago, a violent explosion occurred, hurling this material in all directions.

 Some evidence: Red Shift (away), Cosmic Background Radiation, etc...
 Review...

Theory: An explanation for a group of related results, observations, and occurrence



Variables and Controls

- A variable is anything that can change in an experiment.
 - Independent variable: The variable being controlled by the scientist.
 - Dependent variable: The variable being measured or observed by the scientist. The data your going to take
- Controls-standard of comparison for the experiment *everything that stays the same

An effective experiment tests only <u>ONE</u> variable at a time.



Scientific Experiments...



Trials-replicates of the experiment to reduce error in that experiment

Data-facts collected during the experiment

Analysis-interpret the collected data (what does the data mean?)

Conclusion-was the hypothesis supported or not supported *if supported keep and repeat to verify

*if rejected modify/ change hypothesis

Error-things that lead to incorrect data

The Scientific Method:

a series of logical steps to follow in order to solve problems.

Identify the Problem / Purpose
Gather Information / Research
FORM A HYPOTHESIS
DESIGN AND CONDUCT AN EXPERIMENT
MAKE OBSERVATIONS & RECORD DATA
Organize & Analyze DATA
DRAW CONCLUSIONS
FORMULATE NEW QUESTIONS and REPEAT