

Chapter One: The Science of Biology

Lesson 1.1: What is Science?

Science: the use of evidence to construct testable explanations and predictions of natural phenomena, as well as the knowledge generated through this process

- Science is a process
 - An organized way of observing and asking questions about the natural world, developing those questions into testable explanations, and gathering and analyzing data that support or reject those explanations
 - Scientific Method

How science explains how the world works:

1. Deals only with the natural world
2. Scientists collect and organize information in an orderly way
 - a. Look for patterns and connections of cause and effect
3. Propose explanations based on evidence and understanding not belief

Almost every scientific discovery raises more questions than it answers.

- Science rarely “proves” anything
- Uncertainty is always part of scientific processes

INTERESTING!

- Don't memorize science facts and don't believe them because they are in a textbook!

Scientific Methodology (Scientific Method)

- **Observations**: the act of noticing and describing events or processes in a careful, orderly way

- **Inference:** a logical interpretation based on what scientists already know
- **Hypothesis:** a tentative scientific explanation that can be tested by further observation or by experimentation
- **Variables:** changeable factors in an experiment
- **Controlled experiment:** an experiment where only one variable is changed and all other variables are kept unchanged, or controlled
- **Independent variable:** the variable that is changed in an experiment
- **Dependent variable:** the variable that is observed or measured in response to the change
- **Control group:** exposed to the same conditions as the experimental group except for changes in the independent variable
 - Placebo group
- **Data:** information gathered through experimentation
 - *Quantitative data:* numbers obtained by counting or measuring including a label at the end
 - *Qualitative data:* descriptive words and characteristics that cannot be measured

Theory: well tested explanation that unifies a broad range of observations and hypotheses, enabling scientists to make accurate predictions about new situations

- In everyday life, the word theory implies a hunch or guess.

*Draw independent and dependent variable in notebook.