

## Chapter # 1 The Nature of Science

### Section 1- What is science? (pg. 6-11)

#### *Learning About the World*

Science -a way of learning more about the natural world

Scientist- -anyone who tries to learn something about the natural world, want to know how, why and when  
-ask questions  
-possible explanations

Scientific Theories -an attempt to explain a pattern observed repeatedly in the natural world

Scientific Laws -rules that describe a pattern in nature, must be observed repeatedly

#### *Systems in Science*

System -a collection of structures, cycles, and processes that relate to and interact with each other  
-parts interact  
-made up of other systems

#### *The Branches of Science*

Three main categories:

Life Science -the study of living systems and the ways in which they interact  
-physicians, nurses, physical therapists, dietitians, medical researchers, biologists, zookeepers, botanists, farmers and beekeepers

Earth Science -the study of Earth systems and the systems in space  
-rocks, soil, clouds, rivers, oceans, planets, stars, meteors, black holes, weather, climate, geologists- rocks and geologic features, meteorologists- weather and climate, volcanologist-volcanoes

Physical Science-study of matter and energy  
(Worksheet 1- covering branches of science.)

Matter -anything that has mass and takes up space

Energy -the ability to cause change in matter

Physical Science can be divided into two general fields:

Chemistry -the study of matter and the interactions of matter

Physics -the study of energy and its ability to change matter

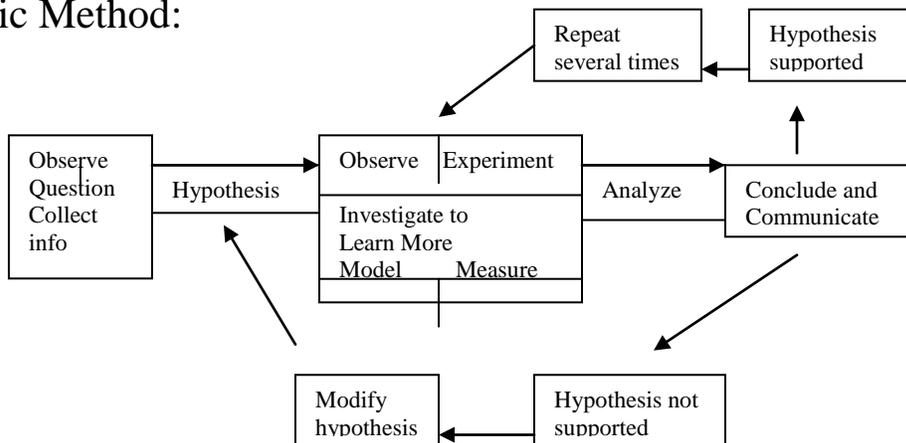
Careers -Physicists and Chemists

Technology -practical use of science or applied science

## Section #2- Science In Action: (pg. 12-20)

### Science Skills

Scientific Method:



Scientific Method -the process that scientists use to carry out an organized investigation

1. Question, observe and collect info
2. Hypothesis -reasonable and educated possible answer based on what you know and what you observe
3. Experiment- test
4. Organize your findings and analyze
5. Draw conclusions: Infer- to draw a conclusion based on what you observe

\*\* (problem, gather information, hypothesis, experiment, record and analyze, conclusion, repeat)

Observation chart (p. 15) and Data table (p. 17)

## *Experiments*

Controlled experiment -involves changing one factor and observing its effect on another while keeping all other factors constant

Variables -factors that can be changed in an experiment

Independent variable -variable that is changed in an experiment

Dependent variable -changes as a result of a change in the independent variable

Constants -factors that are not changed in an experiment

*Laboratory Safety:* Keep yourself and those around you safe (p. 19)

## **Section #3- Models in Science (pg. 21- 26)**

### *Why Are Models Necessary?*

Model-  
-any representation of an object or an event used as a tool for understanding the natural world  
-help you visualize or picture in your mind  
-can show events that occur too slowly or too quickly

### *Types of Models*

3 basic types:

Physical Models -models that you can see and touch

Computer Models -built using computer software  
-can model motions and positions  
-predict the effect of different systems or forces

Idea Models -ideas or concepts that describe how someone thinks about something in the natural world  
-formulas

Drawings, maps, recipes, and globes

Models -communicate-communicate observations and ideas  
-test predictions-engineers using wind tunnels  
-save time, money and lives- crash dummies, space simulator

#### **Section #4- Evaluating Scientific Explanation (pg. 27- 30)**

*Believe It or Not?*

Evaluate or judge the reliability

Critical Thinking -evaluating, combining what you already know with the new facts

*Evaluating the Data*

Data -observations, gathered during a scientific investigation recorded in the form of descriptions, tables, graphs or drawings

Frequency table -shows how many times types of data occur

Take good detailed notes in a science journal so data can be repeated.

*Evaluating the Conclusion:* 1. Does the conclusion make sense?  
2. Are there any other possible explanations?

*Evaluating Promotional Materials:*

1. Carefully evaluate advertising claims.
2. Independent laboratory – one that is not related in any way to the company that is selling the product or service

Lab: Identifying Parts of an Investigation (pg. 32-33)

Study and Review (pg. 35-39)

r-value a measure of the degree each data point in a scatter plot is related as determined by the line of best fit.

