

What is Science?

1.1

I. The Work of Science

- Science is often described as an organized way of studying things and finding answers to questions

A. Types of Science

1. There are many different types of science
 - Energy and matter = physics
 - Animals, plants and other living things are studied in life science
 - Earth and space are studied in Earth Science

I. Critical Thinking

1. Identifying the problem that needs to be solved
2. Using critical thinking to problem solve

II. Solving Problems

1. To solve a problem in Science takes organization and critical thinking
2. Scientist often use a series of procedures called the **scientific method** to solve a problem

A. State the Problem

- Making an observation about something you can't explain

B. Gather Information

- Laboratory experiments and field work are ways to collect information

C. Form a Hypothesis

- A **hypothesis** is a prediction that can be tested

D. Perform Experiments

- The hypothesis is tested by using controlled conditions
- A **control** is the standard to which the outcome of a test is compared
- A **variable** is something in an experiment that can change

Growing a Tree

Hypothesis: I don't think a tree can grow without light

– Variables

- Sunlight



– Controls

- Maple seed
- Plant 6 inches deep
- Soil
- Water



- Variables

- Dark

- Controls

- Maple seed
- Plant 6 inches deep
- Soil
- Water



E. Analyze Data

- Review the information collected

F. Draw Conclusions

- A logical answer to a question based on data and observation
- The scientist must accept or reject their hypothesis

G. Report Results

- It is important to explain the results and how an experiment can be made better if it is preformed again

III. Developing Theories

- After scientist report the results of experiments supporting their hypothesis – the results can be used to propose a scientific theory
- A scientific theory is an explanation of things or events based on scientific knowledge that is the result of many observations and experiments

A. Laws

- A scientific law is a statement about how things work in nature that seems to be true all the time
 - May be modified but are less likely to change than theories
- Gravity – a law of nature

IV. Measuring with Scientific Units

- Scientists use a standard way of measuring data
- The standard system for measurement is called the International System of Units or the SI system

V. Safety First

- Laboratory safety is important and it is always important to follow the rules outlined during a laboratory experiment