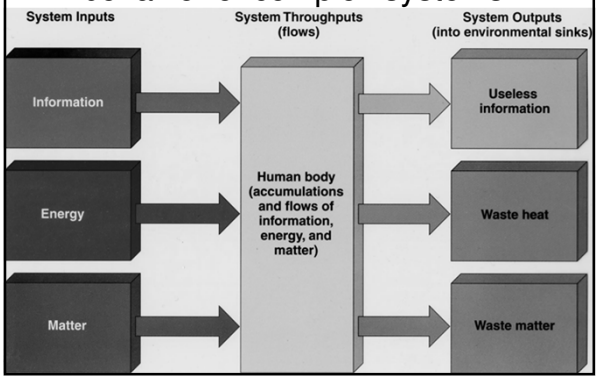
Science, Systems, Matter

And Energy

Chapter 2 Miller

Scientists use Models to predict behavior of complex systems



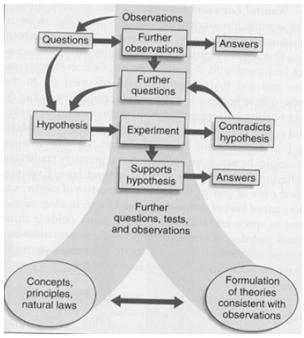
As problems arise scientists must use the scientific method to analyze the situation and formulate theories

Steps of the Scientific Method

- Problem

Sound Science & the Scientific Method

The Null Hypothesis



Sound Science vs. Junk Science

- Widely accepted by scientists who are considered experts in the field
- Subjected to peer review

- NOT SOUND

Major Changes in Scientific Theories

The behavior of substances in nature are explained by several physical laws

- Law of Conservation of Matter-
  - Substances may undergo a physical or a chemical change
  - The
  - It is never “
- This creates pollutants- contaminants

Pollutants are categorized based on their persistence

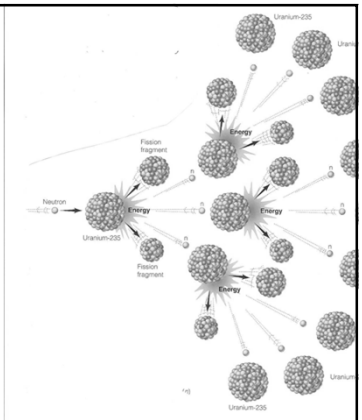
- Degradable
  - Broken
- Biodegradable
  - Broken down by
- Slowly degradable
  - Takes
    - D
- Nondegradable
  - Cannot be
    - M

Forms of nuclear change

- Radioactive Decay
  - Radioactive isotopes change into a different isotope, emits radiation
  - Plutonium -239 has a half-life of 24,000 years, how long will it be before it reaches a safe level of radiation?

Nuclear fission

- Nuclei split apart
- Form of nuclear changes used in nuclear reactors



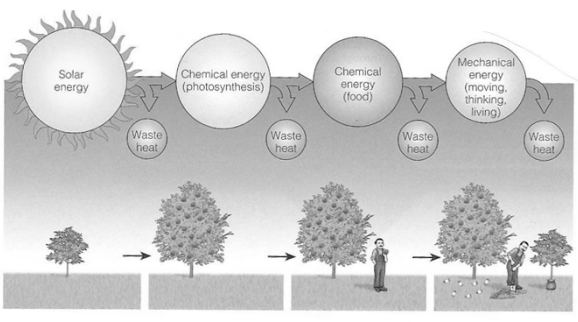
Nuclear Fusion

- Two isotopes are forced together under high temperature to form a heavier nucleus
- Trying to develop as a new form of energy

The Laws of Thermodynamics

- **First Law-**
- **Second Law-**
- This increases

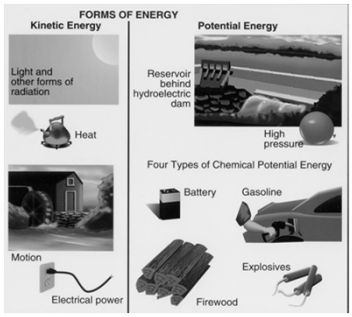
The energy that is lost as you go up an energy pyramid (waste heat = entropy) is explained by the



Energy-

- **How do Potential and Kinetic energy differ?**

Kinetic-



Potential-

In the United States only 16%