

Chapter 1: Introduction to Science



- **1.1 The Nature of Science**
- 1.2 The Way Science Works
- 1.3 Organizing Data

1.1: The Nature of Science

■ Vocabulary:

- Science: a system of knowledge based on facts or principles
- Technology: the application of science to meet human needs
- Scientific theory: a tested, possible explanation of a natural event
- Scientific law: a summary of an observed natural event

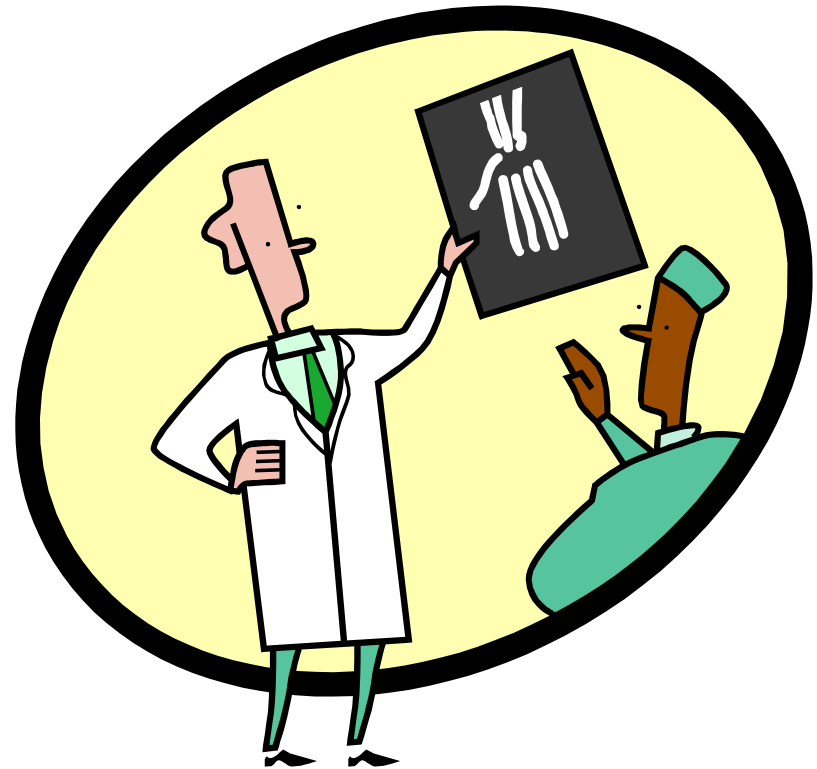
What Scientists Believe:

- The universe can be described by basic rules.
- The rules can be **DISCOVERED** through study and experimentation.
- A scientist may come up with a new hypothesis and experiment or simply check the results of other experiments.

Scientists do many things:

■ Scientists:

- Investigate
- Plan experiments
- Observe
 - Wilhelm Roentgen accidentally discovered X-Rays by following the above procedures
 - Alexander Fleming and penicillin
- Test results



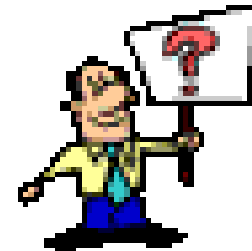
What is Science?

- Science is observing, studying and experimenting to find the nature of things.
- How does science impact your everyday life?

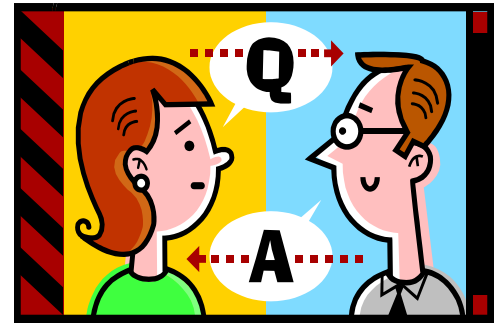
Scientific Inquiry



- Inquiry: A way of seeking information through questioning

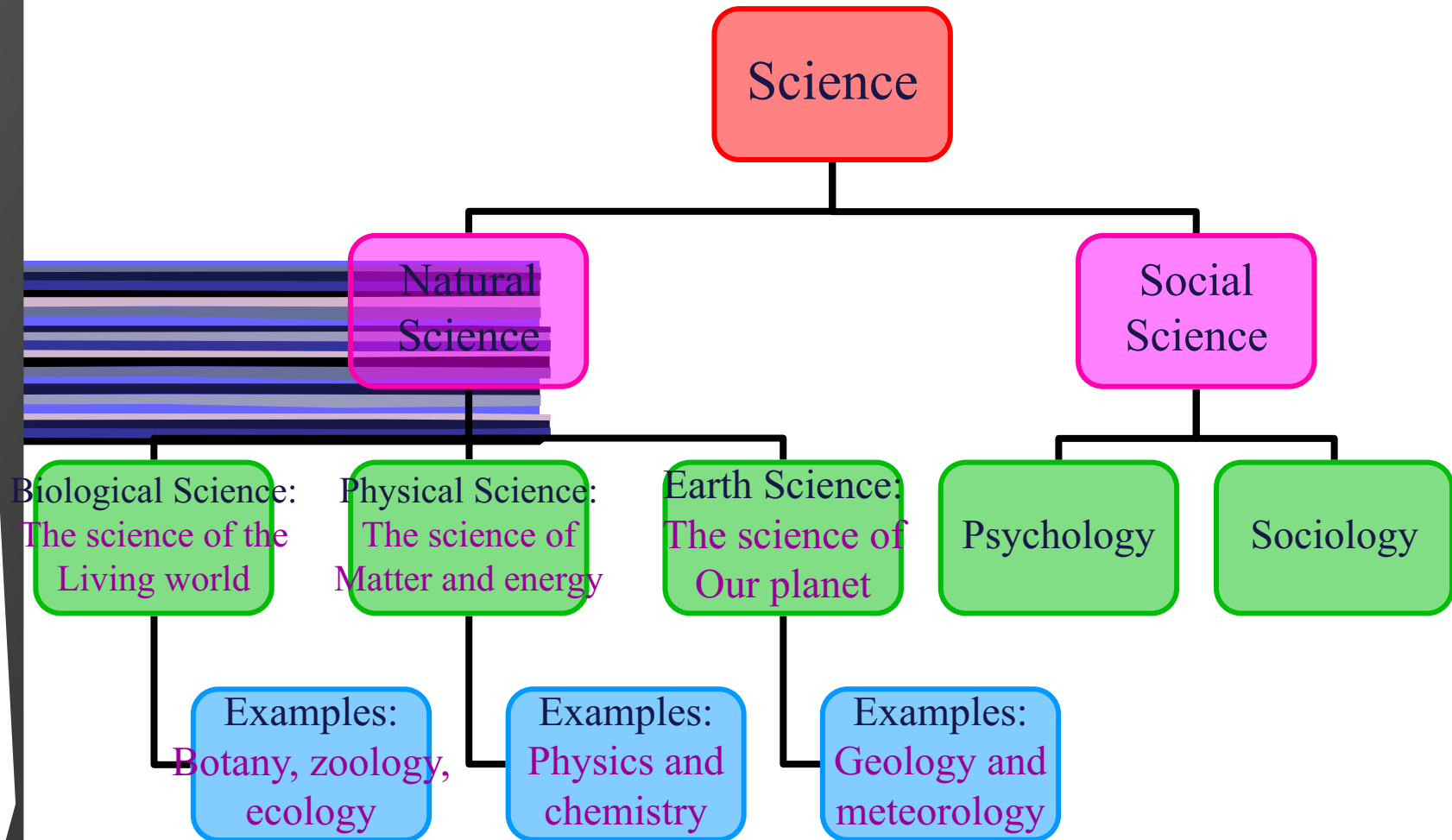


Why a Scientist Performs Experiments



- To find out something new about the natural world.
- To explain something that is already known.
- To check the results of other experiments.
- To test predictions of current theories.

Science Has Many Branches

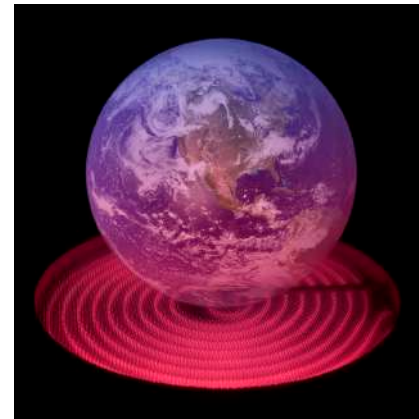
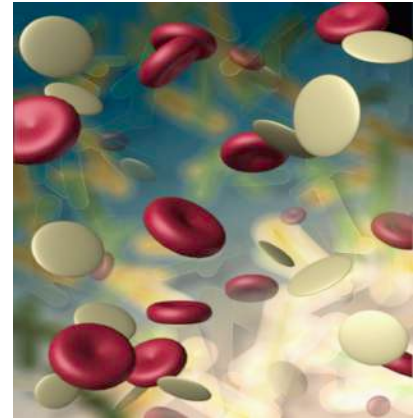


Branches of Science:

- These branches can intertwine:

Biochemistry: study of matter of living things

- Geophysics: study of forces that affect Earth



Branches of Science

Branch of Science	Area of Study
Social science	Human behavior
Natural science	How the whole universe behaves
Biology	Living things
Botany	Plants
Zoology	Animals
Ecology	Balance in nature

Physical science	Matter and energy
Chemistry	Matter and its changes
Physics	Forces and energy
Geology	Earth's physical nature and history
Meteorology	The atmosphere and weather

Science and Technology

- They work together and depend on one another.
- Science: observing, studying, & experimenting to find the nature of things
- Technology: using science to make human lives easier
 - Computers, cell phones, cars, answering machines
- Leonardo da Vinci: described and sketched ideas for many inventions years ahead of their time.

Scientific Theories and Laws are supported by Observation:

- Scientific Theory: An possible explanation of a natural event

Example: Kinetic Theory of energy: explains why a saw blade gets hot when used.

- A theory must pass the following tests:

- Explain observations simply and clearly.
- Be repeatable.
- You must be able to predict from a theory.

- Scientific Law: repeated observation about nature, but does not explain why or how something happens

Theories and Laws

- Theories and laws are NOT ABSOLUTE; they can change as new discoveries are made.
 - Example: People thought the world was flat for thousands of years.



Qualitative vs. Quantitative Statements:

- A *qualitative statement* describes an event with words.

- Examples:

- The chalkboard is black.
- There are posters on the wall.

- A *quantitative statement* describes with numbers or mathematical equations.

- Examples:

- There are 10 posters on the wall.
- The room has an area of 400 ft².

Scientific Models

- A representation of an object or event used to understand concepts when the real object is too large, too small, or even too dangerous

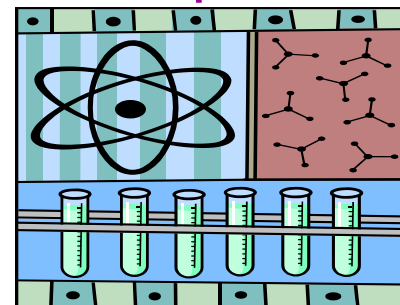
- Examples:

- Globe
- Model of an atom
- Crash tests

Models can be:

- Drawings on paper
- A real object (spring to represent sound wave)

- Mental “picture”



Chapter 1 Vocabulary Words

- Science
- Technology
- Scientific theory
- Scientific law
- Critical thinking
- Scientific method
- Variable
- length
- Mass
- Volume
- Weight
- Scientific notation
- Precision
- Significant figures
- accuracy

Homework Assignment

- Write at least 5 complete sentences describing how science and technology depend on one another. Include how they work together to make your everyday life easier.