Chapter 1: Introduction to Earth Science

1. What is science? (p. 6-7)
   1. Thinking like a scientist
      1. Science is a way of learning about the natural world
      2. As scientists seek to understand the natural world, they use skills such as observing, inferring, and predicting.
      3. Successful scientists also possess certain attitudes, or habits of mind.
2. Observing – using one or more of your senses to gather information
3. Inferring – explain or interpret things that you observe
   1. Based on reasoning from what you already know
4. Predicting - making a forecast of what will happen in the future based on past experience or evidence.
5. Scientific attitudes
   1. Curiosity – keep asking questions!
   2. Honesty – report your findings honestly
   3. Open-mindedness – helps you accept new and different ideas
   4. Skepticism – doubt an idea until it has been fully tested
   5. Creativity – new ways of solving problems, thinking, etc.
   6. Scientific Inquiry
      1. Scientific Inquiry refers to the many ways in which scientists study the natural world and propose explanations based on the evidence they gather.
6. Posing questions
7. Develop a hypothesis
   1. Possible explanation for a set or observations or an answer to a scientific question
   2. (ps it’s okay if this ends up being wrong)
8. Design your experiment
   1. Controlled experiment – only one thing being tested
   2. Variables – the things being changed
9. Collecting and Interpreting data
   1. Data – facts and figures or other evidence collected through observations and measurements.
10. Drawing conclusions
    1. Conclusion – decision about how to interpret the data
    2. Does it support your hypothesis?
11. Communication
    1. Tell people about it!
    2. Scientific theories and laws
       1. Theory – well tested scientific concept that explains a wide range of observations
       2. Law – describes an observed pattern in nature but does not explain it.
12. The Study of Earth Science (p. 13-18)
    1. Big ideas of Earth Science
       1. Earth Science – term for knowledge about the earth and its place in the universe
       2. Earth scientists use several big ideas to guide their work: structure of Earth systems, Earth’s history, & Earth in the solar system
          1. The Structure of the Earth System
             1. Earth is divided into 4 parts or spheres

Atmosphere – outermost part – mixture of gases that surrounds earth.

Hydrosphere – Earth’s oceans, lakes, rivers and ice

Lithosphere – Earth’s solid rocky outer layer

Biosphere – all living things (in air, oceans, beneath surface)

* + - * 1. Four spheres are not separate

They make up Earth’s system

System – group of parts that work together as a whole

Change in one affects others

* + - * 1. Matter & energy move around the system

Matter is what makes up everything in the universe

Energy is the ability to do work or cause change

* + - * 1. The sun provides energy for many of the processes on Earth’s surface
        2. Other processes come from Earth’s interior (i.e. melting rocks, volcanoes)
      1. Earth’s History
         1. Earth = 4.6 billion years old (byo)
         2. Earth’s been changed over time

Constructive forces – build up mountains and landmasses

Destructive forces – wear away mtns and other features

* 1. Branches of Earth Science
     + 1. Geology – study of forces that shaped earth
       2. Oceanography – study everything in ocean from chemistry of the water to shape of ocean floor to all living things
       3. Meteorology – gather info about atmosphere conditions around world
       4. Astronomy – focus on the solar system
       5. Environmental Scientists – study earth’s environment and resources
  2. Models in Earth Science
     1. Scientists use models to represent complex objects or processes

1. The Nature of Technology
   1. What is technology?
      1. Technology is how people change the world around them to meet their needs or to solve problems
      2. The goal of technology is to improve the way people live
   2. How does science relate to technology?
      1. Engineer – person who is trained use both technological and scientific knowledge to solve practical problems.
      2. Science is the study of the natural world
      3. Technology changes, or modifies, the natural world to meet the needs of people or to solve problems
      4. NOT THE SAME THING
         1. Areas of technology
            1. Communication: cell phones, internet
            2. Transportation: cars, buses, train
            3. Energy & power: lantern, flashlight
            4. Biological and chemical: insect repellent
            5. Manufacturing: tent
   3. Technology’s impact on society
      1. Society – any group of people who live together in an area and have certain things in common
      2. From the stone age thousands of years ago to the information age today, technology has had a huge impact on society

Stone age: Stones = tools

Iron age: weapons and tools

Information age: cell phones