Chapter 1 Notes

Section 1

Objective

- **Describe** the four major branches of Earth science.

- Earth Science can be divided into four major branches:

    1. _____
    2. Oceanography
    3. Meteorology

    4. _____

Geology—Science that Rocks

- **Geology** is the study of the origin, history, and _____ of the Earth and the processes that _____ the Earth.
- Most geologists specialize in a particular aspect of the Earth.

- A *volcanologist* is a geologist who studies _____.

- A *seismologist* is a geologist that studies _____.

- A *paleontologist* is a geologist who studies fossils.

Oceanography—Water, Water Everywhere

- **Oceanography** is the scientific study of the _____.
- **Exploring the Ocean Floor**
    - Oceanographers use miniature research _____ to travel far below the surface of the oceans.

Meteorology—It's a Gas!

- **Meteorology** is the scientific study of the Earth's _____, especially in relation to weather and climate.

Astronomy—Far, Far Away!

- **Astronomy** is the study of the universe.
- Astronomers spend much of their time studying _____.
- Astronomers estimate that there are over _____ billion stars in the universe.
- The star that has been studied the most is the one that is closest to Earth—_____!

Chapter 1 Notes

Section 2

Objectives

- **Explain** how scientists begin to learn about the natural world.
- **Explain** what scientific methods are and how scientists use them.
- **Identify** the importance of communicating the results of a scientific investigation.
- **Describe** how scientific investigations often lead to new investigations.

Learning about the Natural World

- How do scientists recreate what dinosaurs may have looked like? How do they start any investigation in Earth Science?
- Scientists begin to learn about the natural world by asking _____.

What Are Scientific Methods?

- **Scientific Methods** are a series of steps that scientists use to _____ questions and _____ problems.
- Scientists use scientific methods to gain insight into the problems they investigate.

Ask a Question

- Asking a question helps _____ the purpose of the investigation.
- When David D. Gillette, a paleontologist, examined some dinosaur fossils, he asked, "What kind of dinosaur did they come from?"

Form a Hypothesis

- A **hypothesis** is an _____ that is based on prior scientific research or observations that can be _____.
- Based on his observations and what he already knew about dinosaurs, Gillette hypothesized that the bones came from a kind of dinosaur not yet known to scientists.

Test the Hypothesis

- A hypothesis must be _____ for scientists to learn whether an idea can be supported scientifically. Scientists test hypothesis by gathering _____.
- **Controlled Experiments** A *controlled experiment* is an experiment that tests only one factor, or _____ at a time. By changing only the variable, scientists can see the results of just that one change.
- **Making Observations** Because scientists cannot always control all variables, some scientists often _____ nature and collect large amounts of data.
- Gillette took hundreds of measurements of the dinosaur bones and compared them with those of known dinosaurs. He also visited museums and talked with other scientists.
- **Keeping Accurate Records** Scientists keep clear, _____, and accurate records so their expectations do not _____ their observations.

- Many examples are needed to support a hypothesis. One example could prove that a hypothesis is not true.

Analyze the Results

- After they finish their tests, scientists must analyze the results.

- Analyzing the results helps scientists construct _____ based on the evidence that has been collected.
- When Gillette analyzed his results, he found that the bones of the mystery dinosaur were shaped differently and were larger than the bones of any known dinosaur.

Draw Conclusions

After analyzing the results of their tests, scientists must conclude if the results _____ the

_____.

Proving that a hypothesis is not true can be as valuable as proving that it is true.

- Based no his studies, Gillette concluded that the bones were indeed from an unknown dinosaur. He named it *Seismosaurus hallorum*, the "earth shaker."

Communicate Results

- Scientists communicate their results to share what they have learned.

- Science _____ sharing information. Sharing allows other scientists to repeat experiments

  to see if they get the _____ results.

- By sharing, scientists can compare hypotheses. Sometimes, new data lead scientists to change their hypotheses.

Case Closed?

- Even after results are reviewed and _____ by the scientific community, the investigation

  may continue. New evidence may cause the scientists to _____ their hypothesis.

- More questions may arise from the original evidence. What did *Seismosaurus* eat? What environment did it live in?

- Gillette continues to use scientific methods to answer these new questions.

Section 3

Objectives

- **Explain** how models are used in science.
- **Describe** the three types of models.
- **Identify** which type of models are best for certain topics.
- **Describe** the climate model as an example of a mathematical model.

Types Scientific Models

- A **model** is a pattern, plan, _____, or description designed to show the structure or workings of an object, system, or concept.

- Models can be used to represent things that are too _____ or too _____ to see.

- They can be used to explain the past and _____ the future.
- **Physical models** are models you can _____. They look like the thing they are supposed to represent.

- Example: model airplanes, globes, volcanoes
- **Benefits of physical models**
  - They help you _____ things that are too small or too large to see completely.
    - Example: DNA strand
- **Drawbacks of physical models**
  - They may look like the thing they represent but they don't _____ the same way.
    - Example: globe
- **Mathematical models** are made up of mathematical _____ and data. Charts and graphs are examples of mathematical models.
- **Benefits of mathematical models**
  - Allow you to make predictions about the future with a _____ degree of accuracy.
    - Example: climate models, movement of satellites and planets, population growth.
  - They are able to factor in many different _____.
    - Example: Data for carbon dioxide levels, land and ocean temps, and weather patterns can be put into a computer which can use mathematical formulas to calculate future climate patterns.

Section 4

Objectives

- **Explain** the importance of the International System of Units.
- **Determine** the appropriate units to use for particular measurements.
- **Use** appropriate tools to take accurate measurements of length, mass, and volume.

Using the International System of Units

- The **International System of Units** (SI) is the current name for the _____ system. It is used by most scientists and _____ all countries.
- All SI units are based on the number _____.
- **Length** The basic unit of length in the SI is the _____.
- **Volume** is a measure of the size of a body or region in _____ space.
- Volume = Length X Width X Height
- **Mass** is a measure of the amount of _____ in an object. The basic unit for mass is the _____ (kg).
- **Temperature** is a measure of how hot (or cold) something is. The SI unit for temperature is the **_____**

Area = _____ X _____ for a two dimensional object.

- **Density** is the ratio of the mass of a substance to the volume of a substance. You can calculate density by using the following equation:

Density = _____