Name _____ Class _____ Date _____

Chapter 1 Science Skills

Summary

1.1 What Is Science?

Science begins with curiosity and often ends with discovery.

Science and technology depend on each other. Advances in one lead to advances in the other.

- **Science** is a system of knowledge and the methods you use to find that knowledge.
- **Technology** is the use of knowledge to solve practical problems.

Natural science is generally divided into three branches: physical science, Earth and space science, and life science.

- The two main areas of physical science are physics and chemistry.
- **Chemistry** is the study of the composition, structure, properties, and reactions of matter.
- **Physics** is the study of matter and energy and the interactions between the two through forces and motion.
- The foundation of Earth science is **geology,** the study of the origin, history and structure of Earth.
- The foundation of space science is **astronomy,** the study of the universe beyond Earth, including the sun, moon, planets and stars.
- The study of living things is known as **biology,** or life science.

1.2 Using a Scientific Approach

The goal of any scientific method is to solve a problem or better understand an observed event.

- An organized plan for gathering, organizing, and communicating information is called a **scientific method.**
- An **observation** is information that you obtain through your senses.
- A **hypothesis** is a proposed answer to a question.
- A variable that causes change in another variable is called a **manipulated variable.**
- The **responding variable** is the variable that changes in response to the manipulated variable.
- A **controlled experiment** is an experiment in which only one variable, the manipulated variable, is deliberately changed at a time.
- A **scientific theory** is a well-tested explanation for a set of observations or experimental results.

A scientific law describes an observed pattern in nature without attempting to explain it. The explanation of such a pattern is provided by a scientific theory.

Scientific models make it easier to understand things that might be too difficult to observe directly.

Name _____ Class _____ Date _____

1.3 Measurement

Using scientific notation makes very large or very small numbers easier to work with.

Scientists use a set of measuring units called SI, or the International System of Units.

- **Scientific notation** is a way of expressing a value as a product of a number between 1 and 10 and a power of ten.
- In SI, the base unit for **length,** or the straight-line distance between two points is the meter (m).
- The base unit for **mass,** or the quantity of matter in an object or sample, is the kilogram (kg).
- **Volume** is the amount of space taken up by an object.
- **Density** is the ratio of an object's mass to its volume.
- A **thermometer** is an instrument that measures temperature, or how hot an object is. The SI base unit for temperature is kelvin (K). A temperature of 0 K, or 0 kelvin, refers to the lowest possible temperature that can be reached.

The precision of a calculated answer is limited by the least precise measurement used in the calculation.

- **Precision** is an assessment of how exact a measurement is.
- **Significant figures** are all the digits that are known in a measurement, plus the last digit that is estimated.
- Another important quality of measurement is **accuracy,** which is the closeness of a measurement to the actual value off what is being measured.

1.4 Presenting Scientific Data

Scientists can organize their data by using data tables and graphs.

Scientists can communicate results by writing in scientific journals or speaking at conferences.

- A bar graph is often used to compare a set of measurements, amounts, or changes.
- A circle graph shows how a part or share of something relates to the whole.
- A line graph shows changes that occur in related variables.
- A relationship in which the ratio of two variables is constant is called a **direct proportion.**
- A relationship in which the product of two variables is a constant is called an **inverse proportion.**
- Occasionally, the data points in a line graph produce a straight line. The steepness or **slope** of this line is the ratio of a vertical change to the corresponding horizontal change.