



# Note-taking Worksheet

## The Nature of Science

### Section 1 Science All Around

A. Scientists are like Detectives trying to solve mysteries.

1. Scientists gather information and Evidence in their search for answers to questions.

2. A Hypothesis is an educated guess about a possible solution to a mystery.

B. Scientists use a problem-solving procedure called the Scientific Method; it includes identifying a problem, gathering information, making hypotheses, testing the hypotheses, analyzing the results, and drawing conclusions.

C. Science is a process of observing, studying, and thinking about things to gain knowledge to better understand the world.

1. Any attempt to find out How and Why things look and behave the way they do is a performance of science.

2. Earth Science is the study of Earth and space.

D. Testing, or Experimenting, is an important part of science.

1. Variables are the different factors that can change in an experiment.

a. An experiment should be designed so that only 1 variable at a time is tested.

b. The variable that changes, the one being tested in an experiment, is the

Independent Variable

c. Constants are variables that DO NOT change.

d. A Dependent Variable is the variable being measured.

2. A Control is a standard to which results can be compared; the same experiment done with the same variables, except it omits the Independent variable.

3. For results to be valid or reliable, tests should be repeated Several times.

4. Observing and recording data and discoveries are important parts of an experiment.

a. Data and observations must be analyzed to draw Conclusions.

b. Unexpected Results may be important and should be recorded, as well.

## Note-taking Worksheet (continued)

- E. Technology—use of scientific discoveries for practical purposes such as making pottery or extracting metals from rocks
1. Technology is Transferable, meaning it can be applied to new situations.
  2. Earth scientists and biologists use information from Satellites to gather weather data and track animals.

## Section 2 Scientific Enterprise

### Meeting Individual Needs

- A. Early people believed mythological Gods were responsible for natural phenomena such as weather or seasons.
1. Early civilizations used observations of recurring natural events like floods and the appearance of stars to create Calendars.
  2. Civilizations advanced to the use of Instruments to measure things observed and developed a scientific approach for testing inferences, or conclusions.
- B. Meteorology, the study of weather, is a science developed over time.
1. A Rain Gauge, used as early as 321 B.C., was probably the first weather instrument; in the late 1600s, Italian scientists developed the barometer, thermometer, hygrometer, and anemometer.
  2. Benjamin Franklin was the first American to suggest that weather could be Predicted.
    - a. By 1849, volunteer weather observers were telegraphing information to the Smithsonian Institute.
    - b. In 1850, the secretary of the Smithsonian Institution began drawing weather Maps.
  3. The U.S. Weather Bureau was formed and functioning by the late 1800s and was renamed the National Weather Service in 1970 when it became part of the National Oceanic and Atmosphere Administration (NOAA).

**Note-taking Worksheet (continued)**

C. Scientific knowledge Changes as testing procedures and instruments improve.

1. An explanation or model backed by results obtained from many tests or experiments is called

a Scientific Theory

2. A Scientific Law is a rule that describes the behavior of something in nature, usually without explaining why the behavior occurs.

D. Science cannot answer all questions.

1. Ethics deals with moral values about what is good or bad.

2. Belief systems deal with religious questions that science cannot answer, such as: Do humans have more value than other life forms?

E. It is important to prevent Bias, or personal opinion, from influencing scientific observations.

1. Ethical and unbiased scientists keep detailed notes and allow other scientists to

Evaluate their work.

2. Scientific Fraud includes making up data, changing experiment results, or taking credit for another's work.