

scientific method (sī' un tif ik meth' ud). The nine steps a scientist uses in his work.
scientific notation (sī' un tif ik nō ta' shun). A system of writing numbers less than 0.1 and greater than 100 as a multiple of a power of 10.
second (sek' und). The standard unit of time.
significant figures (sig nif' u kunt fig' urz). Those digits in a number that have true value.
species (spe' shez). A group of animals or plants that have characteristics in common and are able to interbreed.
summa (sum' u). An encyclopedia-like document written by a scholastic.
theory (thē' ur 6). A probable solution to a scientific problem.

Note: All vocabulary words in this LIFEPAK appear in boldface print the first time they are used. If you are unsure of the meaning when you are reading, study the definitions given.

Pronunciation **Key**: hat, **ā**ge, c**ā**re, f**ā**r; let, **ē**qual, t**ē**rm; it, ice; hot, **ō**pen, **ō**rder; oil; out; cup, put, rule; child; long; thin; /**TH**/ for then; /**zh**/ for measure; /**u**/ represents /**a**/ in about, /**e**/ in taken, /**i**/ in pencil, /**o**/ in lemon, and /**u**/ in circus.

A DEFINITION OF SCIENCE

Let us develop a definition for the word **science**.

Knowledge. The word *science* comes from a Greek word meaning *knowledge*. It is not enough, however, to state that science is knowledge, for many other areas come under this heading. If we add *orderly* to the word *knowledge*, we have narrowed our definition of science somewhat. Science is orderly knowledge. The statement "Ducks can swim, bears sleep in winter, and skunks smell," is correct; these facts are knowledge. The statement "Different animals have certain characteristics that distinguish them from other animals: for example, ducks can swim, bears sleep in winter, and skunks have an unpleasant odor," is a more orderly way of presenting the same facts. It is more scientific.

Again, science is more than orderly knowledge. Orderly knowledge can be found in fields other than science. The one area in which science differs from other

fields of knowledge is **experimentation**. *Experimentation* means *demonstrating a fact by testing to see if the same result occurs repeatedly*. For example, everyone knows ducks can swim. Some people even know that swimming is a characteristic that makes ducks different from most other birds. A scientist, however, would attempt to prove this fact by placing several ducks in a pool of water. He would then watch to see if they could swim. He would be doing a test or **experiment** to prove that ducks can indeed swim. He would also be able to repeat the experiment with other ducks to show the same fact. Thus, science is *orderly knowledge demonstrated by repeatable experiments*.

Doing an experiment to prove something as well-known as the fact that ducks can swim may seem ridiculous but it is not. Without men who were willing to look ridiculous by doing experiments to prove ideas true or false, we might still believe some very false ideas. We will learn about some of these men in the next section.

Change in phase: liquid/gas. If you were to place a pan of water in the open sun, the water would eventually disappear. Why? The liquid water changes into water vapor, a gas. This change from a liquid to a gas is called **evaporation**. Since the molecules of the liquid are in constant motion, they continually bump into each other. As a result of these collisions, the molecules on the surface of the liquid are constantly gaining enough energy to escape. The escaping molecules form a vapor; that is, they change into the gaseous state.

The change from a gas to a liquid is known as **condensation**. Rain is an example of water vapor changing into a liquid, then falling to the earth. Condensation and evaporation take part in another process called **distillation**. Distillation is the process of heating a liquid or solid to form a gas, then condensing the gas to form a liquid. Purified water is made this way. The product is free of dissolved minerals because they are left behind when the water evaporates.



Complete these sentences.

- 1.35 Most substances exist as a _____, b. _____, or c. _____
- 1.36 The idea that the particles of a substance are constantly in motion is called the _____
- 1.37 The change of a gas into a liquid is called _____
- 1.38 The change of liquid into a gas is called _____
- 1.39 The physical change that involves both evaporation and condensation is called _____



Write true or false.

- 1.40 _____ Boiling causes a physical change.
- 1.41 _____ Rain is an example of evaporation.
- 1.42 _____ The molecules of a liquid must be heated to be in motion

Phase boundaries. For every substance a special relationship exists between the amount of heat added (or taken away) and the temperature change produced. This relationship is called *heat capacity*. Heat capacity is the amount of heat that is needed to raise the temperature of one gram of a substance one Celsius degree. Heat capacity is also called *specific heat*. The specific heat of several substances is given in Figure 2.

<u>Substance</u>	<u>Specific Heat</u>
Water	1.0
Ice	0.5
Glass	0.16
Silver	0.06

Figure 2: Specific Heats

SELF TEST 1

Write the letter of the correct choice (each answer, 2 points).

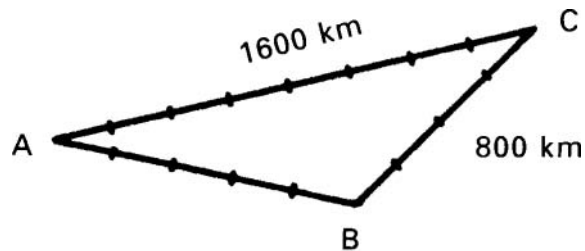
- 1.01 The cubit was known as early as _____.
 a. 1750 c. A.D. 1
 b. 1400 d. 2500 B.C.
- 1.02 The metric system was devised by _____.
 a. Sophocles c. the Romans
 b. Moses d. the French
- 1.03 The system of measurements that includes the foot, yard, and mile is the _____ system.
 a. English c. metric
 b. French d. electric
- 1.04 A mile contains _____ feet.
 a. 63,360 c. 1,492
 b. 5,280 d. 1,000
- 1.05 In the United States the metric system is most commonly used by _____.
 a. auto mechanics c. scientists
 b. grocers d. bus drivers

Make these conversions (each answer, 3 points).

- 1.06 10 cm = _____ m m
 1.07 100 cm = _____ m
 1.08 25 m = _____ cm
 1.09 73 m = _____ m m
 1.010 147 m m = _____ m

Calculate these distances (each answer, 5 points).

- 1.011 Use the scale drawing to find the actual distance AB.



SCIENCE 810: LIFE PAC TEST

Match these items (each answer, 2 points).

- | | | | |
|-----|-------|--------------------------------|------------------------|
| 1. | _____ | heat transfer | a. Science Record |
| 2. | _____ | current | b. energy |
| 3. | _____ | check out scientific facts | c. buoyancy |
| 4. | _____ | mass divided by volume | d. electrons in orbit |
| 5. | _____ | an account of an investigation | e. convection |
| 6. | _____ | water pushes up against mass | f. density |
| | _____ | ability to do work | g. repel |
| 8. | _____ | 55 mph | h. verify |
| 9. | _____ | like poles | i. flow of electricity |
| 10. | _____ | found in molecules | j. attract |
| | | | k. 88 km/h |

Write true or false (each answer, 1 point).

11. _____ Science and technology are growing areas of opportunity for jobs.
12. _____ A Christian has an obligation to work faithfully.
13. _____ The universe is filled with disorder leading to destruction.
14. _____ Tests given in school have little relation to choosing a job.
15. _____ The health sciences have many job opportunities.
16. _____ God created the universe with the purpose of having it destroyed.
17. _____ A resume tells about you.
18. _____ Nothing you can do now will prepare you for a career.
19. _____ Good work should be rewarded.
20. _____ The carbon-oxygen cycle is an example of destruction in nature.

Match the letter to the item. The letter may be used more than once (each answer, 2 points).

- | | | | |
|-----|-------|--------------------------------|---------------------|
| 21. | _____ | water behind the dam | |
| 22. | _____ | river eroding rock | |
| 23. | _____ | student sleeping | a. potential energy |
| 24. | _____ | loose rock on mountainside | b. kinetic energy |
| 25. | _____ | water released against turbine | |