

Skills Worksheet

Directed Reading B

Section: Tools and Models in Science (pp. 42–49)

TOOLS IN SCIENCE

- _____ 1. What is a *tool*?
- a. anything with a handle
 - b. anything that gives off energy
 - c. anything that requires electricity
 - d. anything that helps you do a task
- _____ 2. Which of the following is NOT something that tools are used for?
- a. to evaluate the importance of science
 - b. to collect data
 - c. to evaluate and analyze data
 - d. to take accurate measurements

3. List four examples of tools used for taking measurements.

4. List three examples of tools that help you analyze or communicate data.

MAKING MEASUREMENTS

5. List two examples of units of measure used many years ago.

6. A simple and reliable measurements system called the

_____ is also know as the metric system.

7. Why is changing from one unit to another easy when using the SI system of measurement?

Directed Reading B *continued*

Match the correct description with the correct term. Write the letter in the space provided.

- | | |
|--|-----------------------|
| _____ 8. a measure of the size of an object or region in three-dimensional space | a. mass |
| _____ 9. the ratio of the mass of a substance to the volume of the substance | b. temperature |
| _____ 10. a measure of how hot or cold something is | c. volume |
| _____ 11. a measure of the amount of matter in an object | d. density |

Match the correct description with the correct term. Write the letter in the space provided.

- | | |
|---|-----------------------|
| _____ 12. the basic SI unit of length | a. kilogram |
| _____ 13. the basic SI unit of mass | b. liter |
| _____ 14. a unit used to express liquid volume | c. meter |
| _____ 15. a unit used to express the volume of larger solid objects | d. cubic meter |

16. A cubic meter is equal to 1,000 _____.

17. What unit of measure is used to express the volume of smaller objects?

18. How is density calculated?

19. Name three units that are used to measure temperature.

Directed Reading B *continued*

MODELS IN SCIENCE

- _____ **20.** What is a pattern, plan, representation, or description designed to show the structure or workings of an object, system, or concept called?
- a.** a test
 - b.** a model
 - c.** a hypothesis
 - d.** a scale

- _____ **21.** Which of the following uses something familiar to help you understand something that is not familiar?
- a.** a model
 - b.** a tool
 - c.** data
 - d.** a test

- 22.** List the three common types of scientific models.

- 23.** List three examples of a physical model.

- 24.** What type of model tries to put many ideas together to explain or summarize something?

Directed Reading B *continued*

Match the correct description with the correct type of model. Write the letter in the space provided.

- | | |
|---|------------------------------|
| _____ 25. used to predict the weather | a. conceptual model |
| _____ 26. used to explain why the universe seems to be expanding | b. physical model |
| _____ 27. used to help understand how a real space shuttle blasts off into space | c. mathematical model |

28. What can happen if a mathematical model contains a wrong value for a single variable?

29. What are models often used to represent?

30. Give one example of a model that is used to learn about things that cannot be seen.

31. Why is a model always limited in its usefulness?

USING MODELS FOR SCIENTIFIC PROGRESS

- _____ **32.** Which of the following is NOT a way that models are used by scientists?
- a.** Models are used to communicate difficult information.
 - b.** Models can make a molecule easier to visualize.
 - c.** Models are used to validate inaccurate data.
 - d.** Models can be used to summarize new information.

- _____ **33.** A system of ideas that explains many related observations and is supported by a large amount of scientific evidence is called a(n)
- | | |
|------------------|---------------------|
| a. model. | c. variable. |
| b. law. | d. theory. |

Directed Reading B *continued*

34. Why do scientists use models in their search for new information?

35. A descriptive statement or equation that reliably predicts events under certain conditions is called a(n) _____.

36. What may happen when scientists make new observations that seem to show that a theory is wrong?

37. Define *law*.

38. What does a law tell you, and what does a law not tell you?

39. What law says that the total mass of materials formed during a chemical change is the same as the total mass of the starting materials?

Skills Worksheet

Directed Reading B

Section: Organizing Your Data (pp. 50–55)

CREATING A DATA TABLE

_____ 1. Which of the following can be the first step to take in organizing data?

- a. Choose a topic.
- b. Gather information.
- c. Create a data table.
- d. Analyze data.

_____ 2. Which of the following should you do before an experiment starts?

- a. Determine what information is going to be gathered.
- b. Draw conclusions about the information before it is gathered.
- c. Miss information that might be important.
- d. Analyze the information after it is gathered.

3. A factor that is deliberately changed in an experiment is called a(n)

_____.

4. Where do you find the independent variable in a data table?

5. The factor that changes as a result of manipulation and is measured is called

a(n) _____.

6. Where do you find the dependent variable in a data table?

Variable and Controlled Parameters

7. What is the difference between controlled parameters and variable parameters?

CREATING A GRAPH

8. Graphs make it easy to do what two things?

Directed Reading B *continued*

Match the correct description with the correct term. Write the letter in the space provided.

- | | |
|---|--------------------------------|
| _____ 9. is one of two or more reference lines that mark the borders of a graph | a. range |
| _____ 10. usually represented by the x -axis in a data table | b. dependent variable |
| _____ 11. usually represented by the y -axis in a data table | c. axis |
| _____ 12. found by subtracting the smallest value of a variable from the largest value of the same variable | d. independent variable |
| _____ 13. is the size used for each box or grid mark on a graph | e. scale |
| _____ 14. plotted by putting a dot on the graph for a pair of data in the table | f. line of best fit |
| _____ 15. shows how data differ from the pattern; a smooth line drawn to include some but not all of the data points | g. data point |
- 16.** The last step when creating a graph is giving the graph a(n)
_____.

17. What two things do scientists often include in the titles of their graphs?

Directed Reading B *continued*

PATTERNS SHOWN BY GRAPHS

Match the correct description with the correct term. Write the letter in the space provided.

- | | |
|--|---------------------------|
| _____ 18. the pattern of data on a graph | a. nonlinear graph |
| _____ 19. a graph in which the relationship between the independent variable and dependent variable can be shown with a straight line | b. linear graph |
| _____ 20. a graph in which the relationship between variables cannot be shown with a straight line | c. inverse |
| _____ 21. a relationship in which the dependent variable increases as the independent variable increases | d. direct |
| _____ 22. a relationship in which one variable increases while the other variable decreases | e. trend |
| 23. How are computers helpful to scientists? | |

Skills Worksheet

Directed Reading B

Section: Analyzing Your Data (pp. 56–61)

WHY MATHEMATICS?

- _____ 1. Which of the following is NOT something that scientists use mathematics for?
- a. learning how to speak a foreign language
 - b. seeing patterns in data to make predictions
 - c. answering questions
 - d. understanding and summarizing large amounts of data

2. How does a meteorologist use mathematics?

3. Why is mathematics often called the “language of science”?

ACCURACY OF DATA

4. Name three reasons why scientists might get an inaccurate reading when conducting an experiment.

REPRODUCIBILITY OF DATA

- _____ 5. Results of an experiment can be supported or accepted by other scientists if the data
- a. are not reproducible.
 - b. are reproducible.
 - c. cannot be converted into SI units.
 - d. are supported only by the French Academy of Sciences.

Directed Reading B *continued*

DESCRIBING THE ENTIRE SET OF DATA

Match the correct definition with the correct term. Write the letter in the space provided.

- _____ **6.** the number obtained by adding up the data for a given characteristic and dividing this sum by the number of individuals
- _____ **7.** the value of the middle item when data are arranged in order by size
- _____ **8.** the most frequently occurring value in a data set
- 9.** When is using the median especially useful?

- a.** mode
b. mean
c. median

SLOPE OF A LINE

- 10.** A measure of the slant of a line is called the _____.
- 11.** What does the rise represent?
- _____
- 12.** What does the run represent?
- _____
- 13.** How is the slope of a straight line calculated?
- _____
- 14.** The value of the slope between any two points on that line will be a(n) _____ number.
- 15.** In the equation $y = kx$, which letter represents the slope of the line, also known as the constant term?
- _____

Match the correct description with the correct term. Write the letter in the space provided.

- _____ **16.** displays a straight line
- _____ **17.** displays a curved line
- a.** nonlinear graph
b. linear graph