

Skills Worksheet

Directed Reading B

Section: Science and Scientists (pp. 8–13)

1. What are two steps you can take to start being a scientist?

STARTING WITH A QUESTION

2. What is science?

3. Describe how you might practice science in your own neighborhood.

4. What are three different kinds of environments you might ask questions about?

INVESTIGATION: THE SEARCH FOR ANSWERS

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

- | | |
|---|--------------------|
| _____ 5. carefully looking and recording what you see | a. research |
| _____ 6. performing an activity to answer questions | b. experimentation |
| _____ 7. looking up information in books or on the Internet | c. observation |

Directed Reading B *continued*

APPLYING THE ANSWERS

8. What are two ways science has made automobiles safer?

9. What are three natural resources that are saved by recycling steel?

10. How have chlorofluorocarbons harmed the environment?

11. What are the results of damaging the ozone layer?

SCIENTISTS EVERYWHERE

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

_____ **12.** a person who studies a community of organisms and their environment

_____ **13.** a person who draws scientific diagrams

_____ **14.** a scientist who studies the chemistry of rocks, minerals, and soil

_____ **15.** a person who studies the atmosphere

_____ **16.** a scientist who studies volcanoes

17. What are two careers that a meteorologist might have?

a. meteorologist

b. volcanologist

c. science illustrator

d. ecologist

e. geochemist

Directed Reading B *continued*

18. What are two questions a geochemist might try to answer?

19. What are four fields an ecologist might work in?

20. How can a volcanologist help save lives?

21. What two subjects do most science illustrators have a background in?

Skills Worksheet

Directed Reading B

Section: Scientific Methods (pp. 14–21)

WHAT ARE SCIENTIFIC METHODS?

- _____ 1. What are the steps scientists use to answer questions and solve problems?
- a. observations
 - b. formulations
 - c. flowcharts
 - d. scientific methods
2. List the steps that are included in the scientific methods.

ASKING A QUESTION

- _____ 3. What does asking questions help scientists to do?
- a. find answers with less investigation
 - b. focus the purpose of an investigation
 - c. ask questions and memorize answers
 - d. know where to look up the answers
4. Any use of the senses to gather information is called _____.
5. Observations made with tools are called _____.
6. Efficiency compares energy output with _____.
7. Why is the efficiency of a boat important?

Directed Reading B *continued*

8. What question did the two engineers James Czarnowski and Michael Triantafyllou explore?

FORMING A HYPOTHESIS

_____ **9.** After a scientist has asked questions and made observations, he or she is ready to

- a.** answer the questions.
- b.** explain the answers.
- c.** start a different investigation.
- d.** form a hypothesis.

_____ **10.** What is a hypothesis?

- a.** an observation based on investigation
- b.** a possible explanation based on observations
- c.** a comparison of input and output
- d.** a question based on conclusions

11. A good hypothesis should be _____.

12. What is wrong with a hypothesis that can't be tested?

13. What was the hypothesis that Czarnowski formed?

14. What observations did Czarnowski make before forming his hypothesis?

15. A good way to make a prediction about a hypothesis is by stating it in a(n) _____ statement.

Directed Reading B *continued*

16. How might the MIT scientists have stated their prediction in an if-then statement?

TESTING THE HYPOTHESIS

_____ **17.** Testing a hypothesis helps you determine if the hypothesis is

- a.** a reasonable answer to your question.
- b.** a controlled experiment.
- c.** efficient.
- d.** an adaptation.

_____ **18.** If your tests show that your hypothesis is way off the mark, you may have to

- a.** change the topic you are studying.
- b.** buy new measurement tools.
- c.** repeat the tests until you get the results you want.
- d.** change the hypothesis.

_____ **19.** A controlled experiment compares results from experimental groups with

- a.** results from other experimental groups.
- b.** results from other investigations.
- c.** results from a control group.
- d.** results from past experiments.

20. The purpose of a controlled experiment is to _____ a hypothesis.

21. In a controlled experiment, the control group and the experimental groups are the same except for a factor in the experimental groups called a(n)

_____.

22. In a controlled experiment, the factors that are kept the same between groups are called _____.

23. How did Czarnowski and Triantafyllou decide to test their hypothesis?

24. Pieces of information gathered through observation or experimentation are called _____.

Directed Reading B *continued*

25. What was the only parameter the scientists changed in the *Proteus* experiment?

26. What could the scientists tell from changing this parameter?

ANALYZING THE RESULTS

27. After you run an experiment and collect data, you must

_____ the data to see if the results support your hypothesis.

28. Organizing data into _____ and _____ can make information easier to use.

DRAWING CONCLUSIONS

_____ **29.** What must you do at the end of an experiment?

- a.** Draw a conclusion.
- b.** Analyze a graph.
- c.** Draw a picture.
- d.** Analyze a chart.

30. Give examples of general conclusions you might draw after an investigation.

31. What did the two scientists conclude after the trials of the *Proteus*?

32. Why were the scientists able to reach this conclusion?

Directed Reading B *continued*

COMMUNICATING RESULTS

33. What are some ways to communicate the results of a scientific investigation?

34. Why is it important to communicate the results of a scientific investigation?

Skills Worksheet

Directed Reading B

Section: Safety in Science (pp. 22–27)

KEEPING YOURSELF SAFE

1. What are three ways to take responsibility for your safety?

2. Besides paying attention and watching what you are doing, how can you help avoid accidents?

3. What should you do if you have even a minor accident?

ELEMENTS OF SAFETY

_____ 4. What should you learn about safety symbols?
a. how to draw them and where to find them
b. how to recognize them and what they mean
c. when to use them and who invented them
d. where to find them and how to use them

_____ 5. What should you do when you see a safety symbol?
a. Take the precautions that the symbol requires.
b. Ignore the symbol.
c. Discuss what you should do with your lab partner.
d. Stop doing the activity and leave the room.

_____ 6. What is the most common cause of accidents in the laboratory?
a. telling the teacher about accidents
b. failing to read and follow directions
c. handling hot objects
d. paying attention to what is going on

Directed Reading B *continued*

- _____ **7.** If you can't complete some activity directions, you should
- a.** keep on working, and do what you think is correct.
 - b.** keep on working, but ask your friend for help.
 - c.** stop working, and start over.
 - d.** stop working, and ask your teacher for help.
- _____ **8.** Why should you arrange your equipment and materials neatly during an experiment?
- a.** because working in a cluttered area is unsafe
 - b.** because it makes your work area look nice
 - c.** because your teacher likes neatness
 - d.** so you can finish more quickly
- _____ **9.** What should you wear whenever you enter the lab area?
- a.** your headphones
 - b.** heat-resistant gloves
 - c.** rubber boots
 - d.** safety goggles
- _____ **10.** If you handle hot objects, you should
- a.** use your apron as a pot holder.
 - b.** get someone else to hold them for you.
 - c.** wear heat-resistant gloves.
 - d.** stop working on the activity.
- _____ **11.** What should you do about burners and hot plates at the end of an activity?
- a.** Ask your lab partner what to do.
 - b.** Leave them on for the next class.
 - c.** Make sure they are turned off.
 - d.** Turn them to a low setting.

12. What are some rules for handling animals in the science laboratory?

Directed Reading B *continued*

Match the correct example with the correct element of safety. Write the letter in the space provided.

- | | |
|--|--|
| _____ 13. wearing goggles and an apron | a. recognizing safety symbols |
| _____ 14. knowing what a picture of an electrical plug means | b. reading and following directions |
| _____ 15. returning materials and chemicals to their original places | c. practicing neatness |
| _____ 16. clearing books off the experiment work area | d. using proper safety equipment |
| _____ 17. reading the instructions before starting a science activity | e. cleaning up properly |

RESPONDING TO ACCIDENTS

18. Why should you know where emergency equipment for an accident is located?

19. What are two things you should do if an accident happens?

20. What is first aid?

21. What is the treatment for a heat burn?

Directed Reading B *continued*

22. What should you do if a chemical gets in your eyes?

23. What should you do if someone gets a cut?
