McGraw-Hill Ryerson

DISCOVERING SCIENCE 8

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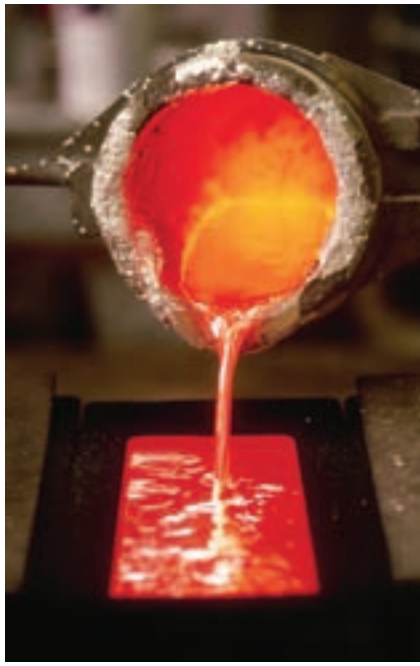
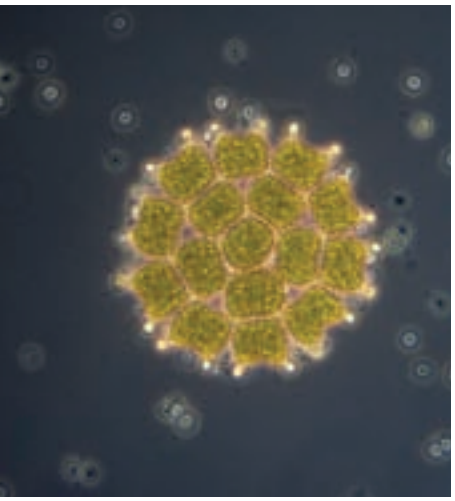
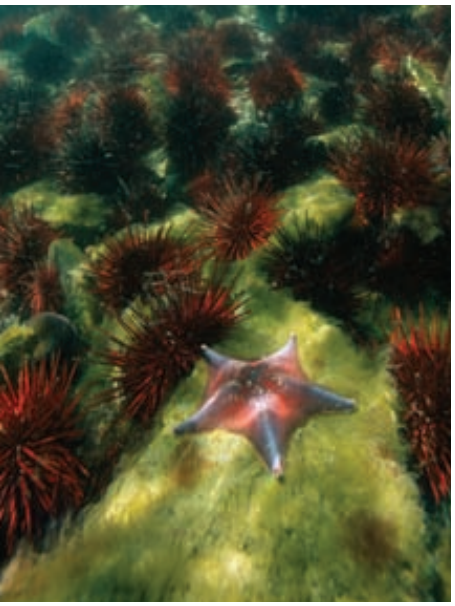
Contents





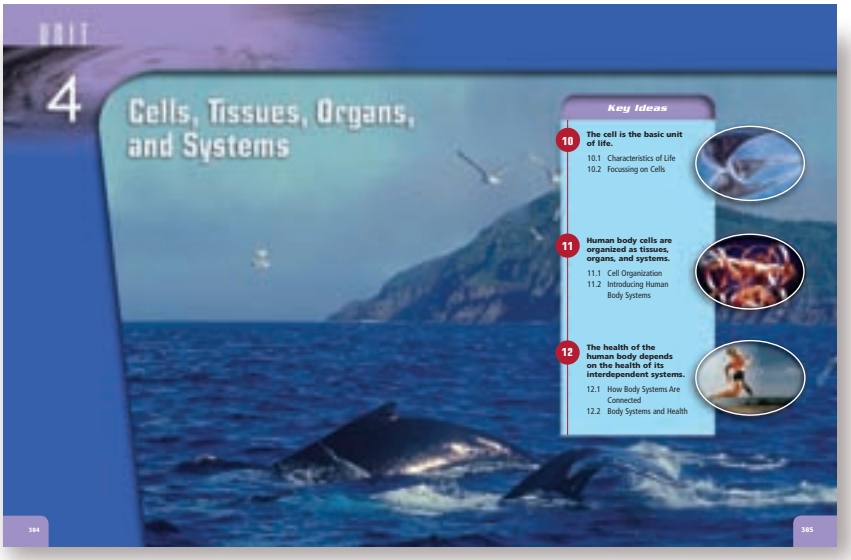


A Tour of Your Textbook

Welcome to ***Discovering Science 8***. This textbook introduces you to the wonders of water systems, optics, fluids, and biological systems. To understand your book and how to use it, begin by taking a brief tour on the following pages. Then do the Scavenger Hunt on page xvii.

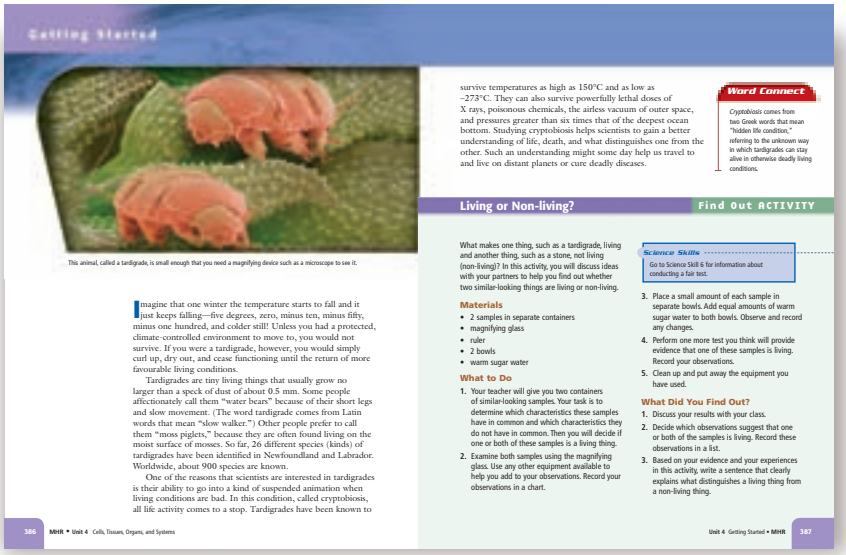
Unit Opener

- ***Discovering Science 8*** has four major units: Water Systems on Earth; Optics; Fluids; and Cells, Tissues, Organs, and Systems.
- Each unit opener photo is a window into the world of the Key Ideas you will study in the unit. The caption explains the photo.
- The unit opener identifies each of the unit's Key Ideas. These are the chapter titles.
- The small photos next to the Key Ideas are from the beginning of each chapter.



Getting Started

- The Getting Started helps you recall what you might already know about the Key Ideas in the unit.
- It helps you prepare for studying the unit by giving you the following:

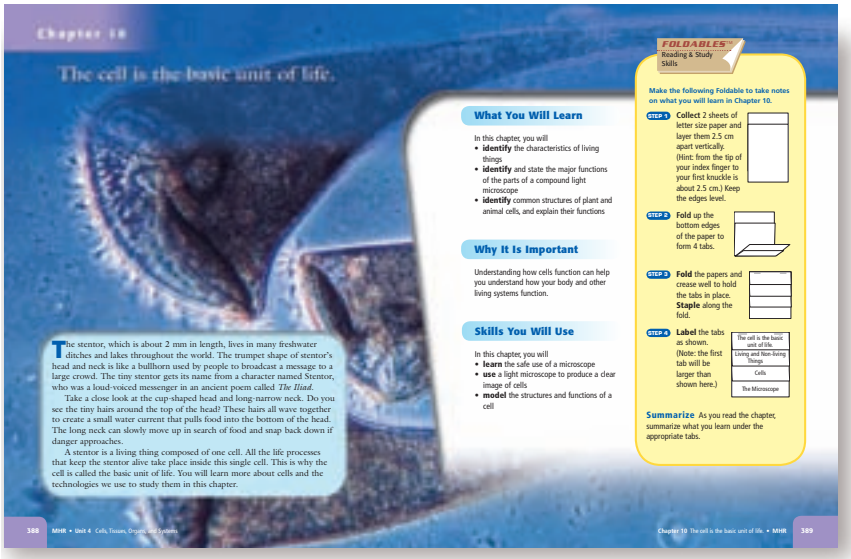


— a short reading about an interesting topic related to the unit

— a short **Find Out Activity** so you can explore an idea related to the unit

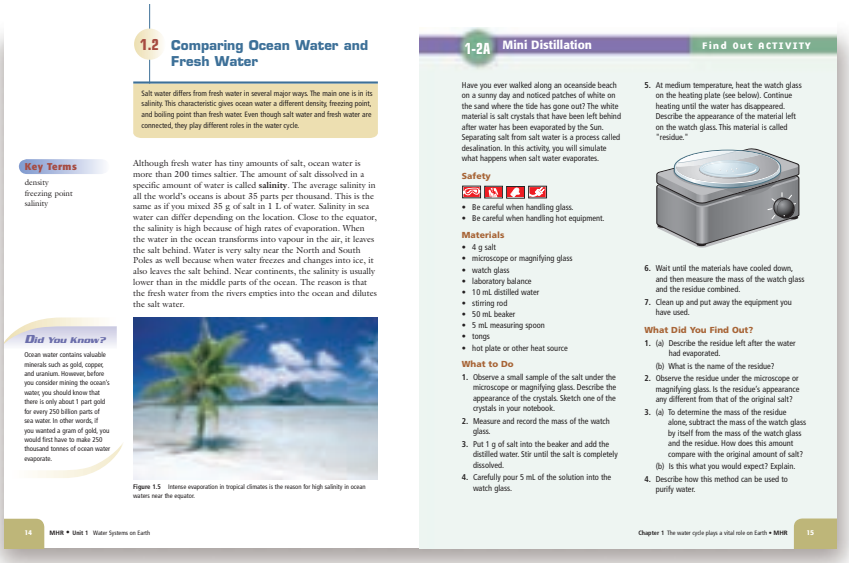
Chapter Opener

- The sentence of the chapter title is the Key Idea that you will study in this chapter.
- The chapter opener outlines What You Will Learn, Why It Is Important, and Skills You Will Use in the chapter.
- The **Foldables** exercise is a fun way to develop your study skills. Look for a Foldables exercise at the beginning of every chapter.



Section Opener

- A number and a short title identify each new section in a chapter.
- The shaded light brown box below the section title contains a summary of the science concepts you will study in the section.
- The list of Key Terms in the margin identifies important new science terms that you will learn in the section.
- The **Did You Know?** margin feature, which appears in some section openers, is an interesting bit of information related to the section's topic.
- Some section openers include a **Find Out Activity** or a **Think About It Activity**.



Find Out Activity

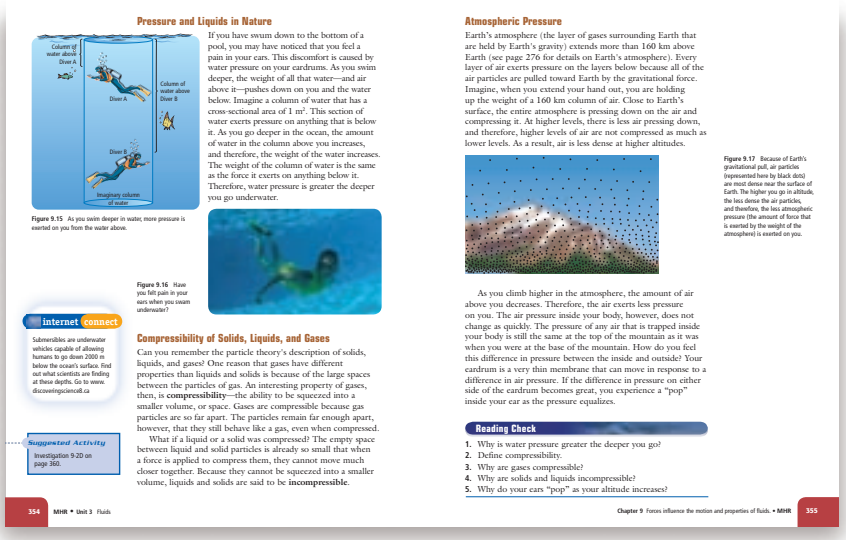
- This informal inquiry activity involves hands-on exploration, using simple materials and equipment.
- In these activities and in the investigations, you will use important science process skills, such as predicting, estimating, and hypothesizing.

Science Skill

- This box directs you to one of ten Science Skills sections at the back of the textbook. The Science Skills sections can help you with graphing, writing a hypothesis, using a microscope, and other skills.

Think About It Activity

- These activities look similar to Find Out Activities in the book but you do them at your desk. They do not require any special equipment.
- For these activities, you think about a particular idea related to the concepts you are studying in the section.
- You work on your own, with a partner, or in a group, and share your thoughts with your group or class.



Pressure and Liquids in Nature

If you have swum down to the bottom of a pool, you may have noticed that you feel a pain in your ears. This discomfort is caused by water pressure on your eardrums. As you swim deeper, the weight of all that water—and air above it—pushes down on you and the water below. Imagine a column of water that has a cross-sectional area of 1 m². This section of water exerts pressure on anything that is below it. As you go deeper in the ocean, the amount of water in the column above you increases, and therefore, the weight of the water increases. The weight of the column of water is the same as the force it exerts on anything below it. Therefore, water pressure is greater the deeper you go underwater.

Figure 9.15 As you swim deeper in water, more pressure is exerted on you from the water above.

Figure 9.16 Have you felt pain in your ears when you swam underwater?

internet connect

Submersibles are underwater vehicles capable of allowing humans to go down 2000 m below the ocean's surface. Find out what scientists are finding at these depths. Go to www.discoveringsciencegb.ca

Suggested Activity

Investigation 9-2D on page 360.

Compressibility of Solids, Liquids, and Gases

Can you remember the particle theory's description of solids, liquids, and gases? One reason that gases have different properties than liquids and solids is because of the large spaces between the particles of gas. An interesting property of gases, then, is **compressibility**—the ability to be squeezed into a smaller volume, or space. Gases are compressible because gas particles are so far apart. The particles remain far enough apart, however, that they still behave like a gas, even when compressed.

What if a liquid or a solid was compressed? The empty space between liquid and solid particles is already so small that when a force is applied to compress them, they cannot move much closer together. Because they cannot be squeezed into a smaller volume, liquids and solids are said to be **incompressible**.

Atmospheric Pressure

Earth's atmosphere (the layer of gases surrounding Earth that are held by Earth's gravity) extends more than 160 km above Earth (see page 276 for details on Earth's atmosphere). Every layer of air exerts pressure on the layers below because all of the air particles are pulled toward Earth by the gravitational force. Imagine, when you extend your hand out, you are holding up the weight of a 160 km column of air. Close to Earth's surface, the entire atmosphere is pressing down on the air and compressing it. At higher levels, there is less air pressing down, and therefore, higher levels of air are not compressed as much as lower levels. As a result, air is less dense at higher altitudes.

Figure 9.17 Because of Earth's gravitational pull, air particles (represented here by black dots) are most dense near the surface of Earth. The higher you go in altitude, the less dense the air particles, and therefore, the less atmospheric pressure (the amount of force that is exerted by the weight of the atmosphere) is exerted on you.

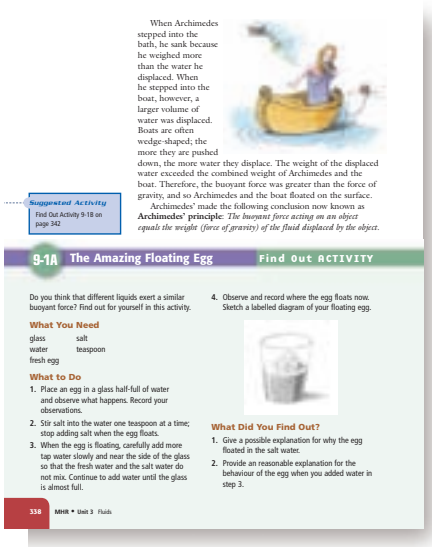
As you climb higher in the atmosphere, the amount of air above you decreases. Therefore, the air exerts less pressure on you. The air pressure inside your body, however, does not change as quickly. The pressure of any air that is trapped inside your body is still the same at the top of the mountain as it was when you were at the base of the mountain. How do you feel this difference in pressure between the inside and outside? Your eardrum is a very thin membrane that can move in response to a difference in air pressure. If the difference in pressure on either side of the eardrum becomes great, you experience a "pop" inside your ear as the pressure equalizes.

Reading Check

1. Why is water pressure greater the deeper you go?
2. Define compressibility.
3. Why are gases compressible?
4. Why are solids and liquids incompressible?
5. Why do your ears "pop" as your altitude increases?

Section Text and Activities

- The text of each section is divided into "chunks" to help you understand the content. Each chunk has a title.
- Each picture has a caption that explains what the picture is about.
- Key Terms and other terms you need to know are boldfaced in the text. Each boldfaced term is defined in the text and in the **Glossary** at the back of the textbook.
- **Reading Checks** contain questions that help you test your understanding of what you have just read.
- Find Out and Think About activities may appear throughout each section of a chapter as well as at the end of a section.



When Archimedes stepped into the bath, he sank because he weighed more than the water he displaced. When he stepped into the boat, however, a larger volume of water was displaced. Boats are often wedge-shaped; the more they are pushed down, the more water they displace. The weight of the displaced water exceeded the combined weight of Archimedes and the boat. Therefore, the buoyant force was greater than the force of gravity, and so Archimedes and the boat floated on the surface.

Archimedes' made the following conclusion now known as **Archimedes' principle**: *The buoyant force acting on an object equals the weight (force of gravity) of the fluid displaced by the object.*

Suggested Activity

Find Out Activity 9-1B on page 342

9-1A The Amazing Floating Egg Find Out ACTIVITY

Do you think that different liquids exert a similar buoyant force? Find out for yourself in this activity.

What You Need

glass, water, fresh egg, salt, teaspoon

What to Do

1. Place an egg in a glass half-full of water and observe what happens. Record your observations.
2. Stir salt into the water one teaspoon at a time; stop adding salt when the egg floats.
3. When the egg is floating, carefully add more tap water slowly and near the side of the glass so that the fresh water and the salt water do not mix. Continue to add water until the glass is almost full.
4. Observe and record where the egg floats now. Sketch a labelled diagram of your floating egg.

What Did You Find Out?

1. Give a possible explanation for why the egg floated in the salt water.
2. Provide an reasonable explanation for the behaviour of the egg when you added water in step 3.

Suggested Activity

- These small margin features indicate where your teacher may have you do one of the activities from the end of the section.

Conduct an Investigation

- These formal labs give you the opportunity to develop science skills using various equipment and materials.
- In these investigations, you can ask questions about science, make observations, and obtain results.
- You then analyze your results to determine what they tell you about the topic you are investigating.
- Safety icons and safety warnings alert you to any special precautions you should take to help maintain a safe classroom environment.
- Each investigation has one of the following focusses: inquiry, decision-making, or problem-solving.
- At least once in every unit, you will see an activity or investigation that is identified as "Core", which means that is an especially important topic of investigation.


9-1C Build a Density Tower

Conduct an INVESTIGATION

Inquiry Focus

SkillCheck

- Observing
- Explaining
- Making conclusions
- Predicting

Do you think density plays a role when a fluid supports an object? Find out in this investigation.

Problem

How can you build a tower out of liquids that support each other as well as solids?

Safety

- Do not pour substances down the drain. Dispose of them as instructed by your teacher.

Materials

- tall plastic jar or cup (or transparent container) with lid
- cork
- toothpick or wood chip
- paper clips
- rubber gloves
- water, with food colouring added
- vegetable oil

Procedure

1. Combine the water, oil, cork, woodchip, and paper clips in the container. Allow the substances to settle (stop moving). Sketch and label the tower and its contents.
2. Shake the tower and allow the substances to settle again. If the shaken tower appears different, draw a new labelled sketch. Wash your hands after this investigation.

Analyze

1. Make a data table and rank the substances in the density tower in order from least dense (1) to most dense (5).
2. Which substances are denser than water? Which substances are less dense than water?

Conclude and Apply

3. Can a solid be less dense than a liquid? Use the particle theory to explain your answer.
4. Does the volume of an object determine its density?

Extend Your Skills

5. Add more items of your choice to the density tower, such as a rubber stopper, a small rubber duck, a small plastic toy, and a safety pin. Predict where you think these objects will settle in the tower. Then test your prediction.

344 MHR • Unit 3 Fluids

End-of-Section Features

- These features give you an opportunity to learn about applications or explorations of the topic you have studied in the section.
- The "www" in "**www science**" stands for "wild, weird, and wonderful." These features describe interesting and unusual science.
- **National Geographic Visualizing Science** features are exciting visual representations of a science topic.
- **Science Watch** features provide information on past and current scientific topics and research.
- **Science-Math Connect** features connect the science you learned in the section to math concepts.
- **Career Connect** features are interviews with people who have a career related to the unit.


Wild, Weird, Wonderful

Wave-Weathered Wonders

Newfoundland and Labrador's coasts are home to hundreds of spectacular examples of how wave action weathers and erodes coastal rock. Below are just a few of these incredible features. How many more examples of coastal formations in Newfoundland and Labrador can you think of?

The Arches

Located north of Parsons Pond on the Great Northern Peninsula, the Arches are a spectacular example of rock erosion by the ocean. Wave action eventually separated this piece of limestone from the coast. The two arches were once sea caves and the continuous wear from waves slowly transformed the caves into arches.

The Arches were once sea caves.

The Spout

Located on the East Coast Trail, the Spout is a popular attraction for hikers.

Located midway between Petty Harbour and Bay Bulls, "The Spout" is a natural wave-driven geyser that exists because of the unique combination of several factors. A vertical crevasse in the rock sits above the sea cave far below. Fresh water run-off from the Spout River flows and fills the crevasse. At the same time, wave action from the ocean is flowing into the cave below and exerts pressure on the fresh water in the crevasse above it. The result is the fresh water being forced out of the crevasse and into the air, making it look like a geyser. When the ocean is rough, the wave action can force a spout up to 50 m high!

The Dungeon

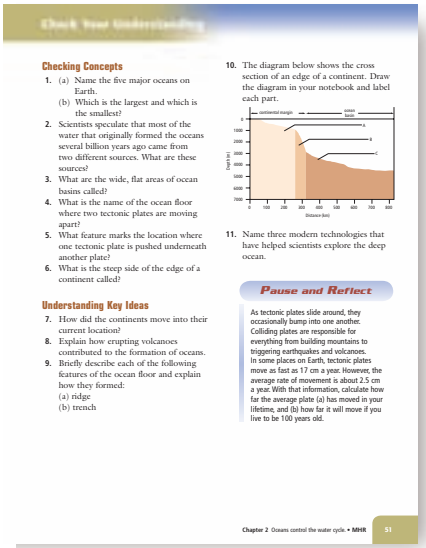
The Dungeon is a huge sea cavern that collapsed. It is located near the tip of the Bonavista Peninsula.

Over thousands of years, the continuous waves of the Atlantic Ocean wore away rock, creating a cavern that was connected by two sea caves. Eventually, the cavern became so wide that it could not support the ground above it, and the roof of the cavern collapsed. Wave action has removed the material from the collapse, leaving a hole that is 250 m in diameter and 15 m deep. It is still connected to the ocean by two sea caves.

The Hole in the Wall

This feature is located near the community of Joe Batt's Arm. Wave and frost action eroded a weak section of rock material, creating a hole in the ocean-side cliff. The hole extends through the other side of the cliff, making it possible to see the valley on the other side.

76 MHR • Unit 1 Water Systems on Earth


Checking Concepts

1. (a) Name the five major oceans on Earth.
   (b) Which is the largest and which is the smallest?
2. Scientists speculate that most of the water that originally formed the oceans several billion years ago came from two different sources. What are these sources?
3. What are the wide, flat areas of ocean basins called?
4. What is the name of the ocean floor where two tectonic plates are moving apart?
5. What feature marks the location where one tectonic plate is pushed underneath another plate?
6. What is the steep side of the edge of a continent called?

Understanding Key Ideas

7. How did the continents move into their current location?
8. Explain how erupting volcanoes contributed to the formation of oceans.
9. Briefly describe each of the following features of the ocean floor and explain how they formed:
   (a) ridge
   (b) trench
10. The diagram below shows the cross section of an edge of a continent. Draw the diagram in your notebook and label each part.

11. Name three modern technologies that have helped scientists explore the deep ocean.

Pause and Reflect

As tectonic plates slide around, they occasionally bump into one another. Colliding plates are responsible for everything from building mountains to triggering earthquakes and volcanoes. In some places on Earth, tectonic plates move as fast as 17 cm a year. However, the average rate of movement is about 2.5 cm a year. With that information, calculate how far the average plate (a) has moved in your lifetime, and (b) how far it will move if you live to be 100 years old.

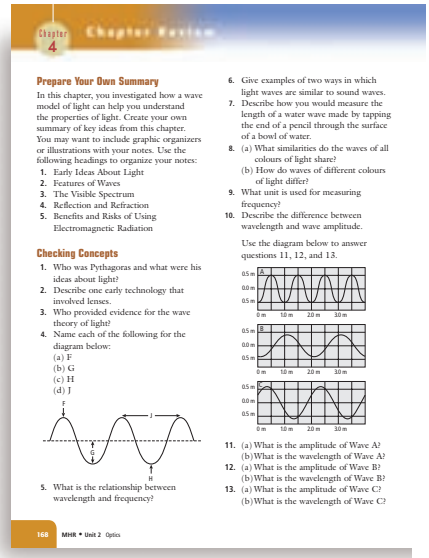
Chapter 2 Oceans control the water cycle • MHR 51

Check Your Understanding

- These section review questions test your new knowledge.

Pause and Reflect

- These features help you stop and think about what you now know about the topics explained in the chapter. They also make connections among ideas throughout your book.



Chapter 4 Chapter Review

Prepare Your Own Summary

In this chapter, you investigated how a wave model of light can help you understand the properties of light. Create your own summary of key ideas from this chapter. You may want to include graphic organizers or illustrations with your notes. Use the following headings to organize your notes:

1. Early Ideas About Light
2. Features of Waves
3. The Visible Spectrum
4. Reflection and Refraction
5. Benefits and Risks of Using Electromagnetic Radiation

Checking Concepts

1. Who was Pythagoras and what were his ideas about light?
2. Describe one early technology that involved lenses.
3. Who provided evidence for the wave theory of light?
4. Name each of the following for the diagram below:
   (a) F
   (b) G
   (c) H
   (d) J

F J G H

5. What is the relationship between wavelength and frequency?
6. Give examples of two ways in which light waves are similar to sound waves.
7. Describe how you would measure the length of a water wave made by tapping the end of a pencil through the surface of a bowl of water.
8. (a) What similarities do the waves of all colours of light share?
   (b) How do waves of different colours of light differ?
9. What unit is used for measuring frequency?
10. Describe the difference between wavelength and wave amplitude.

Use the diagram below to answer questions 11, 12, and 13.

A B C

0.5 m 0.0 m 0.5 m
0 m 10 m 20 m 30 m

11. (a) What is the amplitude of Wave A?
    (b) What is the wavelength of Wave A?
12. (a) What is the amplitude of Wave B?
    (b) What is the wavelength of Wave B?
13. (a) What is the amplitude of Wave C?
    (b) What is the wavelength of Wave C?

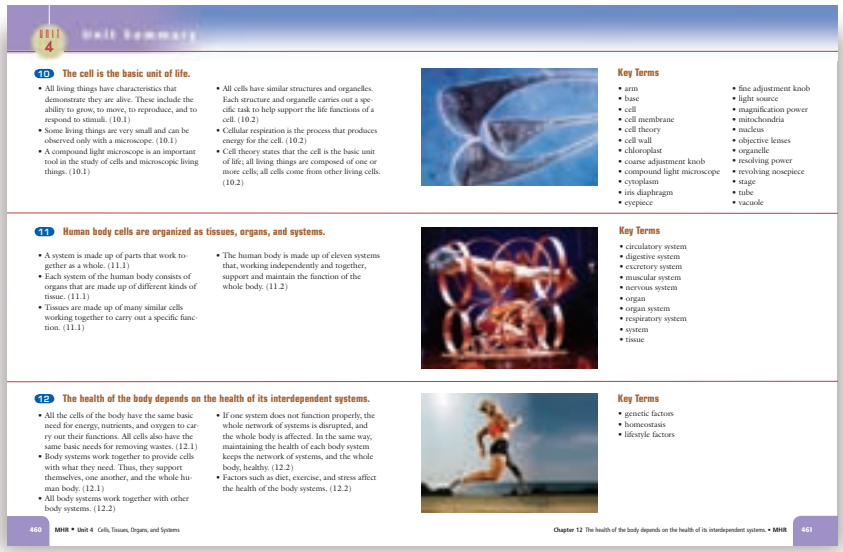
168 MHR • Unit 2 Optics

Chapter Review

- At the end of each chapter, these two pages can help you study for a chapter test.
- The guide under the heading "Prepare Your Own Summary" can help you summarize what you have learned in the chapter.
- The review questions help you recall, think about, and apply what you have learned.

Unit Summary

- This is a summary of the Key Ideas and Key Terms covered in the unit.
- The photographs next to the Key Terms are from the chapter openers to remind you of what you covered in that chapter.



Unit 4 Unit Summary

10 The cell is the basic unit of life.

- All living things have characteristics that demonstrate they are alive. These include the ability to grow, to move, to reproduce, and to respond to stimuli. (10.1)
- Some living things are very small and can be observed only with a microscope. (10.1)
- A compound light microscope is an important tool in the study of cells and microscopic living things. (10.1)
- All cells have similar structures and organelles. Each structure and organelle carries out a specific task to help support the life functions of a cell. (10.2)
- Cellular respiration is the process that produces energy for the cell. (10.2)
- Cell theory states that the cell is the basic unit of life; all living things are composed of one or more cells; all cells come from other living cells. (10.2)

Key Terms

- arm
- base
- cell
- cell membrane
- cell theory
- cell wall
- chloroplast
- coarse adjustment knob
- compound light microscope
- cytoplasm
- iris diaphragm
- eyepiece
- fine adjustment knob
- light source
- magnification power
- mitochondria
- nucleus
- objective lenses
- organelle
- resolving power
- revolving nosepiece
- stage
- tube
- vacuole

11 Human body cells are organized as tissues, organs, and systems.

- A system is made up of parts that work together as a whole. (11.1)
- Each system of the human body consists of organs that are made up of different kinds of tissue. (11.1)
- Tissues are made up of many similar cells working together to carry out a specific function. (11.1)
- The human body is made up of eleven systems that, working independently and together, support and maintain the function of the whole body. (11.2)

Key Terms

- circulatory system
- digestive system
- excretory system
- muscular system
- nervous system
- organ
- organ system
- respiratory system
- system
- tissue

12 The health of the body depends on the health of its interdependent systems.

- All the cells of the body have the same basic need for energy, nutrients, and oxygen to carry out their functions. All cells also have the same basic needs for removing wastes. (12.1)
- Body systems work together to provide cells with what they need. Thus, they support themselves, one another, and the whole human body. (12.1)
- All body systems work together with other body systems. (12.2)
- If one system does not function properly, the whole network of systems is disrupted, and the whole body is affected. In the same way, maintaining the health of each body system keeps the network of systems, and the whole body, healthy. (12.2)
- Factors such as diet, exercise, and stress affect the health of the body systems. (12.2)

Key Terms

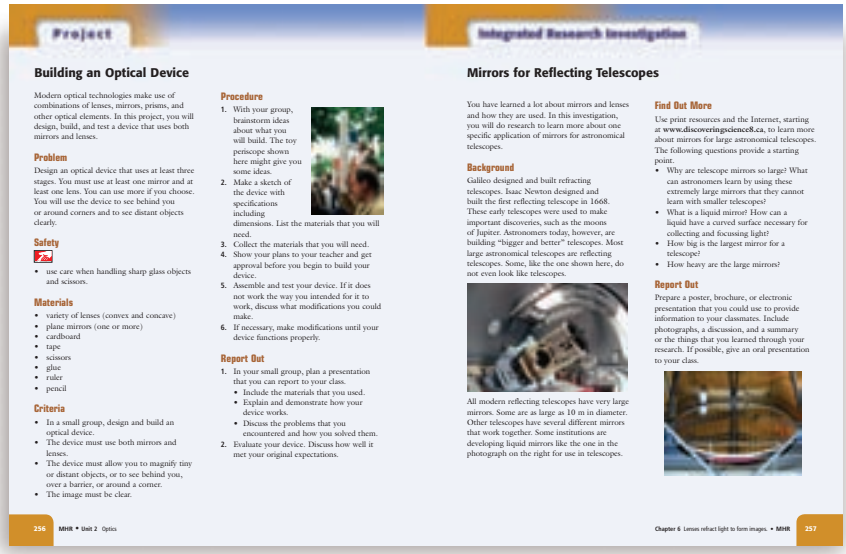
- genetic factors
- homeostasis
- lifestyle factors

460 MHR • Unit 4 Cells, Tissues, Organs, and Systems

Chapter 12 The health of the body depends on the health of its interdependent systems. • MHR 461

End-of-Unit Project and Integrated Research Investigation

- Each **Project** lets you apply key concepts and skills from the unit. You complete the Project as part of a team.
- For the **Integrated Research Investigation**, you explore a unit-related topic. You have an opportunity to use current information that you have researched to do a report or presentation about that topic.



Project

Building an Optical Device

Modern optical technologies make use of combinations of lenses, mirrors, prisms, and other optical elements. In this project, you will design, build, and test a device that uses both mirrors and lenses.

Problem

Design an optical device that uses at least three stages. You must use at least one mirror and at least one lens. You can use more if you choose. You will use the device to see behind you or around corners and to see distant objects clearly.

Safety

- use care when handling sharp glass objects and scissors.

Materials

- variety of lenses (convex and concave)
- plane mirrors (one or more)
- cardboard
- tape
- scissors
- glue
- ruler
- pencil

Criteria

- In a small group, design and build an optical device.
- The device must use both mirrors and lenses.
- The device must allow you to magnify tiny or distant objects, or to see behind you, over a barrier, or around a corner.
- The image must be clear.

Procedure

1. With your group, brainstorm ideas about what you will build. The toy periscope shown here might give you some ideas.
2. Make a sketch of the device with specifications including dimensions. List the materials that you will need.
3. Collect the materials that you will need.
4. Show your plans to your teacher and get approval before you begin to build your device.
5. Assemble and test your device. If it does not work the way you intended for it to work, discuss what modifications you could make.
6. If necessary, make modifications until your device functions properly.

Report Out

1. In your small group, plan a presentation that you can report to your class.
   - Include the materials that you used.
   - Explain and demonstrate how your device works.
   - Discuss the problems that you encountered and how you solved them.
2. Evaluate your device. Discuss how well it met your original expectations.

Integrated Research Investigation

Mirrors for Reflecting Telescopes

You have learned a lot about mirrors and lenses and how they are used. In this investigation, you will do research to learn more about one specific application of mirrors for astronomical telescopes.

Background

Galileo designed and built refracting telescopes. Isaac Newton designed and built the first reflecting telescope in 1668. These early telescopes were used to make important discoveries, such as the moons of Jupiter. Astronomers today, however, are building "bigger and better" telescopes. Most large astronomical telescopes are reflecting telescopes. Some, like the one shown here, do not even look like telescopes.

All modern reflecting telescopes have very large mirrors. Some are as large as 10 m in diameter. Other telescopes have several different mirrors that work together. Some institutions are developing liquid mirrors like the one in the photograph on the right for use in telescopes.

Find Out More

Use print resources and the Internet, starting at **www.discoveringscience8.ca**, to learn more about mirrors for large astronomical telescopes. The following questions provide a starting point.

- Why are telescope mirrors so large? What can astronomers learn by using these extremely large mirrors that they cannot learn with smaller telescopes?
- What is a liquid mirror? How can a liquid have a curved surface necessary for collecting and focussing light?
- How big is the largest mirror for a telescope?
- How heavy are the large mirrors?

Report Out

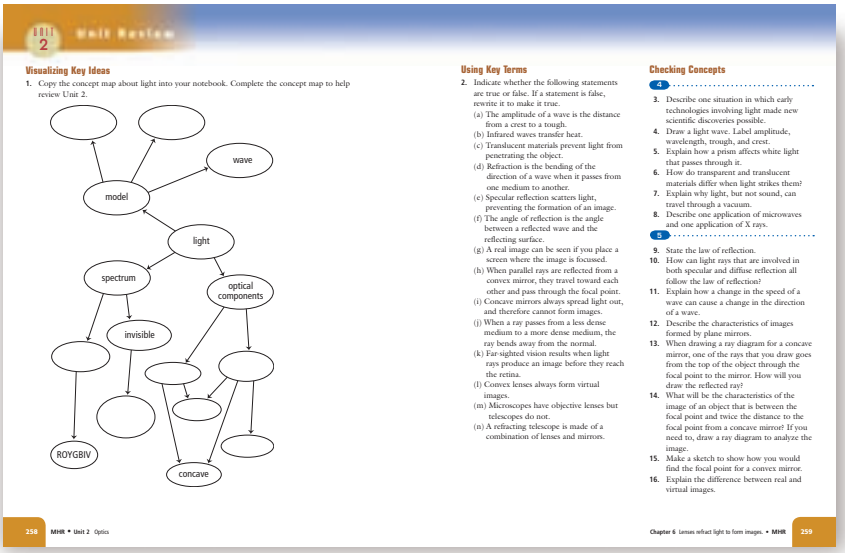
Prepare a poster, brochure, or electronic presentation that you could use to provide information to your classmates. Include photographs, a discussion, and a summary or the things that you learned through your research. If possible, give an oral presentation to your class.

256 MHR • Unit 2 Optics

Chapter 6 Lenses refract light to form images. • MHR 257

Unit Review

- At the end of each unit, these pages can help you study for a unit test.
- The review questions help you recall, think about, and apply what you have learned.



Other Features

Word Connect

- The Word Connect margin feature gives you additional information on scientific terms.

Explore More

- You can "Explore More" by following the suggestions in these features to investigate further a topic you have studied.

internet connect

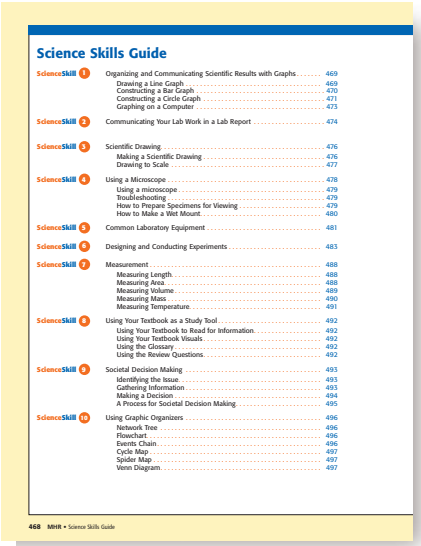
- These features help you research more information about a topic.
- The ***Discovering Science 8*** web site links you to other web sites related to the topic you are researching.

- The safety icons are extremely important. They alert you to any safety precautions you should take, such as wearing safety glasses or a lab coat. Other safety icons used in ***Discovering Science 8*** are shown on page xxi.

At the Back of Your Textbook

Science Skills Guide

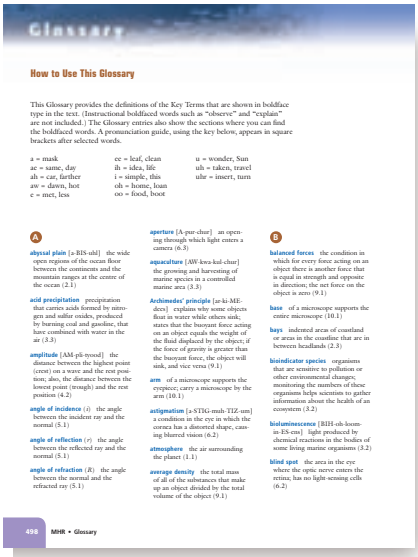
- At the back of ***Discovering Science 8***, you will find the Science Skills appendix. It will help you review and develop the skills and knowledge that you need to be successful in this course.



Science Skills Guide

Glossary

- Each boldfaced term in your textbook is defined in the Glossary at the back of the book.
- The Glossary is organized alphabetically.



Glossary

How to Use This Glossary

This Glossary provides the definitions of the Key Terms that are shown in boldface type in the text. (Instructional boldfaced words such as "observe" and "explain" are not included.) The Glossary entries also show the sections where you can find the boldfaced words. A pronunciation guide, using the key below, appears in square brackets after selected words.

a = mask
ae = same, day
ah = car, farther
aw = dawn, hot
e = met, less
ee = leaf, clean
ih = idea, life
i = simple, this
oh = home, loan
oo = food, boot
u = wonder, Sun
uh = taken, travel
uhr = insert, turn

A

abyssal plain [a-BIS-uhl] the wide open regions of the ocean floor between the continents and the mountain ranges at the centre of the ocean (2.1)

acid precipitation precipitation that carries acids formed by nitrogen and sulfur oxides, produced by burning coal and gasoline, that have combined with water in the air (3.3)

amplitude [AM-pli-tyood] the distance between the highest point (crest) on a wave and the rest position; also, the distance between the lowest point (trough) and the rest position (4.2)

angle of incidence (*i*) the angle between the incident ray and the normal (5.1)

angle of reflection (*r*) the angle between the reflected ray and the normal (5.1)

angle of refraction (*R*) the angle between the normal and the refracted ray (5.1)

aperture [A-pur-chur] an opening through which light enters a camera (6.3)

aquaculture [AW-kwa-kul-chur] the growing and harvesting of marine species in a controlled marine area (2.3)

Archimedes' principle [ar-ki-ME-deez] explains why some objects float in water while others sink; states that the buoyant force acting on an object equals the weight of the fluid displaced by the object; if the force of gravity is greater than the buoyant force, the object will sink, and vice versa (9.1)

arm of a microscope supports the eyepiece; carry a microscope by the arm (10.1)

astigmatism [a-STIG-muh-TIZ-um] a condition in the eye in which the cornea has a distorted shape, causing blurred vision (6.2)

atmosphere the air surrounding the planet (1.1)

average density the total mass of all of the substances that make up an object divided by the total volume of the object (9.1)

B

balanced forces the condition in which for every force acting on an object there is another force that is equal in strength and opposite in direction; the net force on the object is zero (9.1)

base of a microscope supports the entire microscope (10.1)

bays indented areas of coastland or areas in the coastline that are in between headlands (2.3)

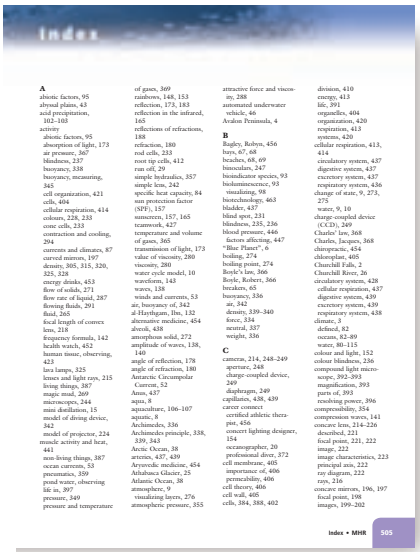
bioindicator species organisms that are sensitive to pollution or other environmental changes; monitoring the numbers of these organisms helps scientists to gather information about the health of an ecosystem (3.2)

bioluminescence [BIH-oh-loom-in-ES-ens] light produced by chemical reactions in the bodies of some living marine organisms (3.2)

blind spot the area in the eye where the optic nerve enters the retina; has no light-sensing cells (6.2)

Index

- The Index at the back of the book helps you locate a particular topic in the book.
- The Index is organized alphabetically.



Index

Exploring Discovering Science 8

A Scavenger Hunt

Use your ***Discovering Science 8*** textbook to answer the following questions.

1. What is the web address for the textbook?
2. What four units will you study in ***Discovering Science 8***?
3. How many Key Ideas are there in ***Discovering Science 8***?
4. What is a Key Idea? How can the Key Ideas help you study?
5. Where can you find examples of the study tool called Foldables?
6. At the beginning of each section, there is a light brown shaded box containing text. What is the purpose of this shaded text?
7. Name four different margin features and describe what each one is about.
8. What is the purpose of the Reading Checks?
9. Activities have a green background. What are three different types of activities in this textbook?
10. What do the three w's stand for in "www science"?
11. If you needed information on how to make a graph, where would you look?
12. Where can you find the definitions for the bolded words in the text?
13. Before a unit test, what parts of the book could you use to review the concepts covered in the unit?
14. On a sheet of paper or in your notebook, sketch an outline of your classroom. Mark the location and types of safety equipment there. What pages in ***Discovering Science 8*** provide safety information?
15. Scan through ***Discovering Science 8*** to look for something you find interesting and did not know before you read it in this textbook.

Safety in Your Science Classroom

Become familiar with the following safety rules and procedures. It is up to you to use them and your teacher's instructions to make your activities and investigations in ***Discovering Science 8*** safe and enjoyable. Your teacher will give you specific information about any other special safety rules that need to be used in your school.

1. **Working with your teacher …**
   - Listen carefully to any instructions your teacher gives you.
   - Inform your teacher if you have any allergies, medical conditions, or other physical problems that could affect your work in the science classroom. Tell your teacher if you wear contact lenses or a hearing aid.
   - Obtain your teacher's approval before beginning any activity you have designed for yourself.
   - Know the location of the nearest fire exit, safety blanket, eyewash station, first-aid kit, and fire alarm.
   - Know the evacuation procedure for the science laboratory.

2. **Starting an activity or investigation …**
   - Before starting an activity or investigation, read all of it. If you do not understand how to do any step, ask your teacher for help.
   - Be sure you have checked the safety icons and have read and understood the safety precautions.
   - Begin an activity or investigation only after your teacher tells you to start.

3. **Wearing protective clothing …**
   - When you are directed to do so, wear protective clothing, such as a lab coat and safety glasses. Always wear protective clothing when you are using materials that could pose a safety problem, such as unidentified substances, or when you are heating anything.
   - Tie back long hair, and avoid wearing scarves, ties, or long necklaces.
   - Avoid wearing loose or baggy clothing in the science lab.
   - Shorts, short skirts, sandals, and open-toed shoes are not permitted in the science lab.

4. **Acting responsibly …**
   - Work carefully with a partner and make sure your work area is clear.
   - Handle equipment and materials carefully.
   - Make sure stools and chairs are resting securely on the floor.

- If other students are doing something that you consider dangerous, report it to your teacher.

5. **Handling edible substances …**
   - Do not chew gum, eat, or drink in your science classroom.
   - Do not taste any substances or draw any material into a tube with your mouth.
   - Treat all substances in the lab as potentially dangerous or poisonous.
   - This includes common household substances such as sugar and salt.

6. **Working in a science classroom …**
   - Make sure you understand all safety labels on school materials or those you bring from home. Familiarize yourself, as well, with the WHMIS symbols and the special safety symbols used in this book, found on page xxi.
   - When carrying equipment for an activity or investigation, hold it carefully. Carry only one object or container at a time.
   - Be aware of others during activities and investigations. Make room for students who may be carrying equipment to their work stations.

7. **Working with sharp objects …**
   - Always cut away from yourself and others when using a knife or razor blade.
   - Always keep the pointed end of scissors or any pointed object facing away from yourself and others if you have to walk with such objects.
   - If you notice sharp or jagged edges on any equipment, take special care with it and report it to your teacher.
   - Dispose of broken glass in the glass disposal container as directed by your teacher.

8. **Working with electrical equipment …**
   - Make sure your hands are dry when touching electrical cords, plugs, or sockets.
   - Pull the plug, not the cord, when unplugging electrical equipment.
   - Report damaged equipment or frayed cords to your teacher.
   - Place electrical cords where people will not trip over them.

9. **Working with heat …**
   - When heating an item, wear safety goggles and any other safety equipment that the text or your teacher advises.

- Always use heatproof containers.
- Point the open end of a container that is being heated away from yourself and others.
- Do not allow a container to boil dry.
- Handle hot objects carefully. Be especially careful with a hot plate that looks as though it has cooled down.
- If you use a Bunsen burner, make sure you understand fully how to light and use it safely.
- If you do receive a burn, inform you teacher, and apply cold water to the burned area immediately.

10. Working with various chemicals …

- If any part of your body comes in contact with a iquid substance, wash the area immediately and thoroughly with water. If you come in contact with dry or powdered chemicals, brush off as much of the substance as possible and then wash thoroughly with water.
- Always handle substances carefully. If you are asked to smell a substance, never smell it directly. Hold the container slightly in front of and beneath your nose, and waft the fumes toward your nostrils.
- Hold containers away from your face when pouring liquids.

11. Working with living things …

- Wash your hands after handling living organisms.

On a field trip:

- Try not to disturb the area any more than is absolutely necessary.
- If you move something, do it carefully, and always replace it carefully.
- If you are asked to remove plant material, remove it gently, and take as little as possible.

In the classroom:

- Treat living creatures with respect.
- Make sure that living creatures receive humane treatment while they are in your care.
- If possible, return living creatures to their natural environment when your work is complete.

12. Cleaning up in the science classroom …

- Clean up any spills, according to you teacher's instructions.
- Clean equipment before you put it away.
- Wash your hands thoroughly after doing an activity or an investigation.
- Dispose of materials as directed by your teacher. Never discard materials in the sink unless your teacher requests it.

Safety

Safety Symbols

The following safety symbols are used to alert you to possible dangers. Be sure you understand each symbol used in an activity or investigation before you begin.

Disposal Alert
This symbol appears when care must be taken to dispose of materials properly.

Thermal Safety
This symbol appears as a reminder to use caution when handling hot objects.

Sharp Object Safety
This symbol appears when a danger of cuts or punctures caused by the use of sharp objects exists.

Electrical Safety
This symbol appears when care should be taken when using electrical equipment.

Skin Protection Safety
This symbol appears when use of caustic chemicals might irritate the skin or when contact with micro-organisms might transmit infection.

Clothing Protection Safety
A lab coat must be worn when this symbol appears.

Fire Safety
This symbol appears when care should be taken around open flames.

Eye Safety
This symbol appears when a danger to the eyes exists. Safety goggles must be worn when this symbol appears.

Instant Practice—Safety Symbols

Find four of the safety symbols in activities or investigations in this textbook. Record the page number and the title of the investigation or activity in which you found the symbol. What are the possible dangers in the activity or investigation you have identified that relate to each symbol?

WHMIS Symbols

Look carefully at the WHMIS (Workplace Hazardous Materials Information System) safety symbols shown here. The WHMIS symbols are used throughout Canada to identify dangerous materials used in all workplaces, including schools.

Make certain you understand what these symbols mean. When you see these symbols on containers in your classroom, at home, or in a workplace, use safety precautions.

 Compressed Gas	 Flammable and Combustible Material
 Oxidizing Material	 Corrosive Material
 Poisonous and Infectious Material Causing Immediate and Serious Toxic Effects	 Poisonous and Infectious Material Causing Other Toxic Effects
 Biohazardous Infectious Material	 Dangerously Reactive Material

Instant Practice—WHMIS

Find any two WHMIS symbols on containers in your school, or ask a parent or guardian to look for WHMIS symbols in a workplace. Record the name of the substance on which the symbols are used, and where you or your parent or guardian saw the containers stored. What dangers are associated with the substance in each container?