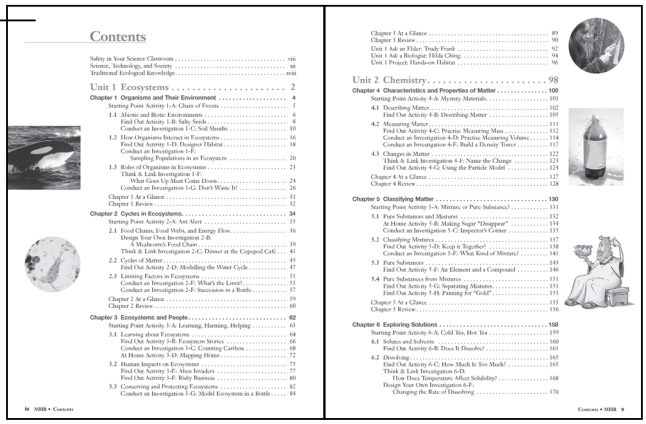
A Tour of Your Textbook

To do the activities in this workbook, it is helpful to understand now your *BC Science* 7 textbook is organized. Take the brief Tour on the next six pages to become familiar with the textbook's structure. You will then be better prepared to review information in your textbook as you complete the workbook.

Contents

- The table of contents at the beginning of the textbook lists everything that you will find in the book. Read the titles of the **three units** and the **nine chapters** in the textbook.
- Note that each chapter is divided into three or four numbered sections.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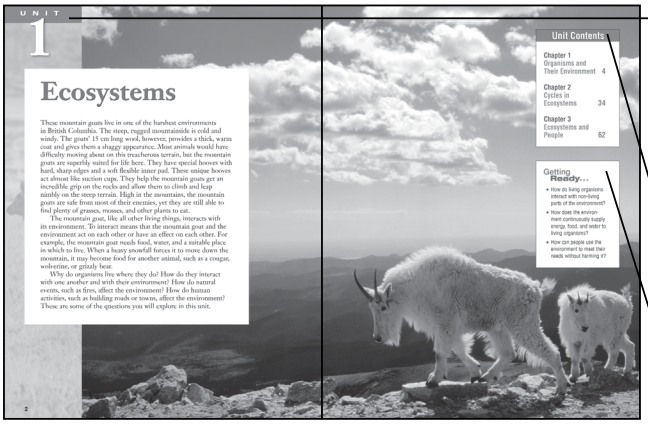
Unit Opener


UNIT 1

Ecosystems

These mountain goats live in one of the harshest environments in British Columbia. The steep, rugged mountainside is cold and windy. The goats' 15 cm long wool, however, provides a thick, warm coat and gives them a shaggy appearance. Most animals would have difficulty moving about on this treacherous terrain, but the mountain goats are superbly suited for life here. They have special hooves with hard, sharp edges and a soft flexible inner pad. These unique hooves act almost like suction cups. They help the mountain goats get an incredible grip on the rocks and allow them to climb and leap nimbly on the steep terrain. High in the mountains, the mountain goats are safe from most of their enemies, yet they are still able to find plenty of grasses, mosses, and other plants to eat.

The mountain goat, like all other living things, interacts with its environment. To interact means that the mountain goat and the environment act on each other or have an effect on each other. For example, the mountain goat needs food, water, and a suitable place in which to live. When a heavy snowfall forces it to move down the mountain, it may become food for another animal, such as a cougar, wolverine, or grizzly bear.

Why do organisms live where they do? How do they interact with one another and with their environment? How do natural events, such as fires, affect the environment? How do human activities, such as building roads or towns, affect the environment? These are some of the questions you will explore in this unit.

2

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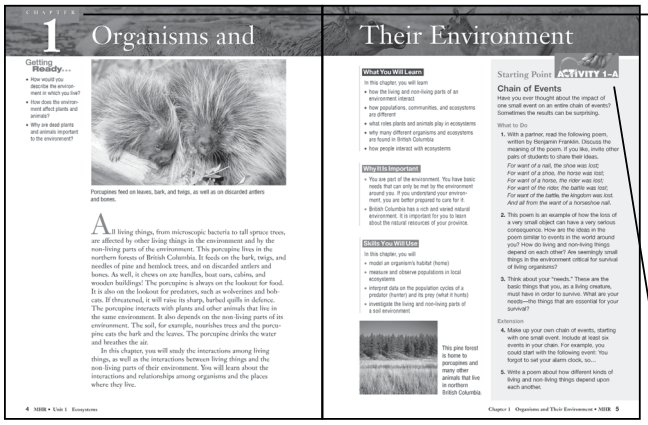
Getting Ready...

- How do living organisms interact with non-living parts of the environment?
- How does the environment continuously supply energy, food, and water to living organisms?
- How can people use the environment to meet their needs without harming it?

- The three units of the textbook are: **Ecosystems**, **Chemistry**, and **Earth's Crust**.
- The Unit Opener text and photograph introduce the main ideas in the unit.
- The **Unit Contents** box lists the three chapters that make up each unit.
- The **Getting Ready**... questions invite you to reflect on what you already know and what you think you will learn in the unit.

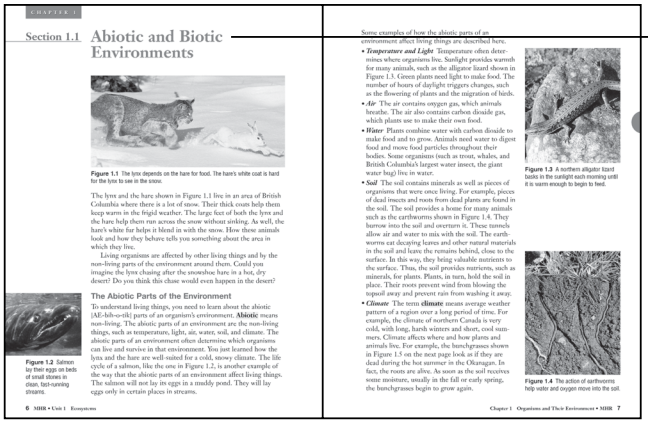


Chapter Opener

- The chapter opener outlines **What You Will Learn**, **Why It Is Important**, and **Skills You Will Use** in the chapter.
- More **Getting Ready**… questions help you recognize that you may already know quite a lot about the main topics in the chapter.

Starting Point Activity

- A short activity at the beginning of each chapter starts you thinking about one or two main ideas in the chapter.



Section Opener and Running Text

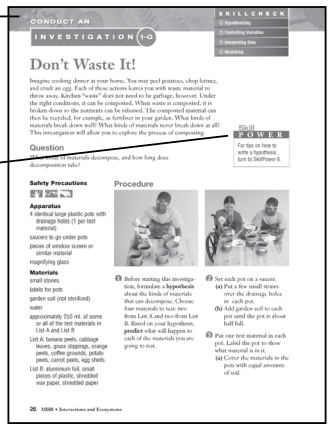
- Each new section in a chapter is clearly flagged.
- The running text is divided into "chunks" to help you understand the content.
- Each picture has a caption that explains what the picture is about.
- Key terms are boldfaced and highlighted in yellow. Each key term is defined within the running text and also in the Glossary at the back of the textbook.

Conduct an Investigation

- This is usually a hands-on experiment in which you practise your science skills. Examples of these skills are hypothesizing, making observations, and obtaining and recording data.

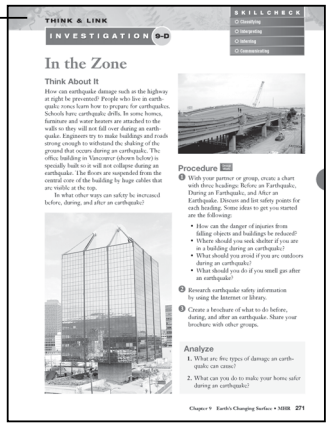
Skill Power

- This box directs you to one of the six Skill Power sections at the back of the textbook. The Skill Power sections can help you with graphing, writing a hypothesis, taking measurements, and other skills.



Think & Link Investigation

- In these investigations, you practise your research or analysis skills.
- These thought-based activities let you explore ideas that might be impractical or dangerous in the science classroom.


THINK & LINK

INVESTIGATION 9-D

SKILLCHECK

In the Zone

Think About It

How can earthquake damage such as the highway at right be prevented? People who live in earthquake zones learn how to prepare for earthquakes. Schools have earthquake drills. In some homes, furniture and water heaters are attached to the walls so they will not fall over during an earthquake. Engineers try to make buildings and roads strong enough to withstand the shaking of the ground that occurs during an earthquake. The office building in Vancouver (shown below) is specially built so it will not collapse during an earthquake. The floors are suspended from the central core of the building by huge cables that are visible at the top.

In what other ways can safety be increased before, during, and after an earthquake?

Procedure

1. With your partner or group, create a chart with three headings: Before an Earthquake, During an Earthquake, and After an Earthquake. Discuss and list safety points for each heading. Some ideas to get you started are the following:
   - How can the danger of injuries from falling objects and buildings be reduced?
   - Where should you seek shelter if you are in a building during an earthquake?
   - What should you avoid if you are outdoors during an earthquake?
   - What should you do if you smell gas after an earthquake?
2. Research earthquake safety information by using the Internet or library.
3. Create a brochure of what to do before, during, and after an earthquake. Share your brochure with other groups.

Analyze

1. What are five types of damage an earthquake can cause?
2. What can you do to make your home safer during an earthquake?

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Did You Know?

- Read these boxes in the margin to find out cool facts about science, technology, the environment, and society.

Find Out Activity

- These short, informal activities often involve hands-on exploration and simple materials.

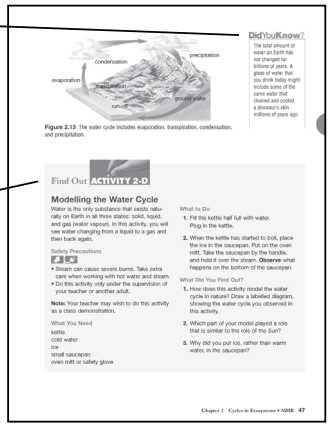

Figure 2.13 The water cycle includes evaporation, transpiration, condensation, and precipitation.

DidYouKnow?

The total amount of water on Earth has not changed for billions of years. A glass of water that you drink today might include some of the same water that cleaned and cooled a dinosaur's skin millions of years ago.

Find Out ACTIVITY 2-D

Modelling the Water Cycle

Water is the only substance that exists naturally on Earth in all three states: solid, liquid, and gas (water vapour). In this activity, you will see water changing from a liquid to a gas and then back again.

Safety Precautions

- Steam can cause severe burns. Take extra care when working with hot water and steam.
- Do this activity only under the supervision of your teacher or another adult.

Note: Your teacher may wish to do this activity as a class demonstration.

What You Need

kettle
cold water
ice
small saucepan
oven mitt or safety glove

What to Do

1. Fill the kettle half full with water. Plug in the kettle.
2. When the kettle has started to boil, place the ice in the saucepan. Put on the oven mitt. Take the saucepan by the handle, and hold it over the steam. **Observe** what happens on the bottom of the saucepan.

What Did You Find Out?

1. How does this activity model the water cycle in nature? Draw a labelled diagram, showing the water cycle you observed in this activity.
2. Which part of your model played a role that is similar to the role of the Sun?
3. Why did you put ice, rather than warm water, in the saucepan?

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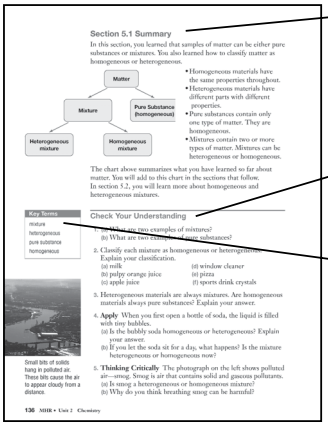
Section 5.1 Summary

In this section, you learned that samples of matter can be either pure substances or mixtures. You also learned how to classify matter as homogeneous or heterogeneous.

- Homogeneous materials have the same properties throughout.
- Heterogeneous materials have different parts with different properties.
- Pure substances contain only one type of matter. They are homogeneous.
- Mixtures contain two or more types of matter. Mixtures can be heterogeneous or homogeneous.

The chart above summarizes what you have learned so far about matter. You will add to this chart in the sections that follow. In section 5.2, you will learn more about homogeneous and heterogeneous mixtures.

Key Terms

mixture
heterogeneous
pure substance
homogeneous

Check Your Understanding

1. (a) Name two examples of mixtures?
   (b) What are two examples of pure substances?
2. Classify each mixture as homogeneous or heterogeneous. Explain your classification.
   (a) milk
   (b) pulpy orange juice
   (c) apple juice
   (d) window cleaner
   (e) pizza
   (f) sports drink crystals
3. Heterogeneous materials are always mixtures. Are homogeneous materials always pure substances? Explain your answer.
4. **Apply** When you first open a bottle of soda, the liquid is filled with tiny bubbles.
   (a) Is the bubbly soda homogeneous or heterogeneous? Explain your answer.
   (b) If you let the soda sit for a day, what happens? Is the mixture heterogeneous or homogeneous now?
5. **Thinking Critically** The photograph on the left shows polluted air—smog. Smog is air that contains solid and gaseous pollutants.
   (a) Is smog a heterogeneous or homogeneous mixture?
   (b) Why do you think breathing smog can be harmful?

Small bits of solids hang in polluted air. These bits cause the air to appear cloudy from a distance.

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Section Summary

- This feature summarizes the **main ideas in each section** in a chapter.

Check Your Understanding

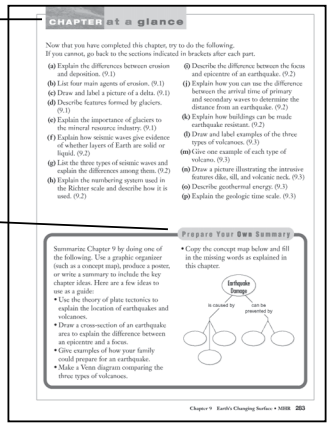
- These section review questions test your new knowledge.
- The **Key Terms** for each section are listed in a box to help you answer the review questions.

Chapter at a Glance

- These activities allow you to check your understanding of the main ideas in the chapter. The chapter section numbers are given to help you review.

Prepare Your Own Summary

- Summarize what you have learned in the chapter by following the guidelines given here. You can choose from a variety of ways to summarize your learning.


CHAPTER at a glance

Now that you have completed this chapter, try to do the following.
If you cannot, go back to the sections indicated in brackets after each part.

(a) Explain the differences between erosion and deposition. (9.1)
(b) List four main agents of erosion. (9.1)
(c) Draw and label a picture of a delta. (9.1)
(d) Describe features formed by glaciers. (9.1)
(e) Explain the importance of glaciers to the mineral resource industry. (9.1)
(f) Explain how seismic waves give evidence of whether layers of Earth are solid or liquid. (9.2)
(g) List the three types of seismic waves and explain the differences among them. (9.2)
(h) Explain the numbering system used in the Richter scale and describe how it is used. (9.2)
(i) Describe the difference between the focus and epicentre of an earthquake. (9.2)
(j) Explain how you can use the difference between the arrival time of primary and secondary waves to determine the distance from an earthquake. (9.2)
(k) Explain how buildings can be made earthquake resistant. (9.2)
(l) Draw and label examples of the three types of volcanoes. (9.3)
(m) Give one example of each type of volcano. (9.3)
(n) Draw a picture illustrating the intrusive features (dike, sill, and volcanic neck. (9.3)
(o) Describe geothermal energy. (9.3)
(p) Explain the geologic time scale. (9.3)

Prepare Your Own Summary

Summarize Chapter 9 by doing one of the following. Use a graphic organizer (such as a concept map), produce a poster, or write a summary to include the key chapter ideas. Here are a few ideas to use as a guide:
- Use the theory of plate tectonics to explain the location of earthquakes and volcanoes.
- Draw a cross-section of an earthquake area to explain the difference between an epicentre and a focus.
- Give examples of how your family could prepare for an earthquake.
- Make a Venn diagram comparing the three types of volcanoes.
- Copy the concept map below and fill in the missing words as explained in this chapter.

Earthquake Damage
is caused by
can be prevented by

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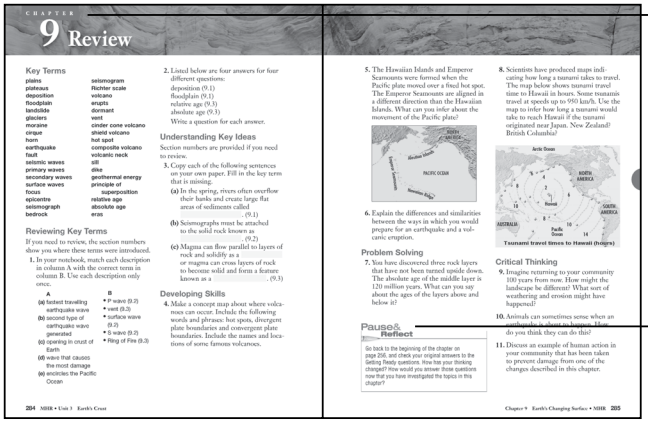
Chapter Review

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

Pause & Reflect

- These features help you stop and think about what you now know about the topics explained in the chapter. You can compare your new learning with what you knew at the beginning of the chapter.


CHAPTER 9 Review

Key Terms

plains, plateaus, deposition, floodplain, landslide, glaciers, moraine, cirque, horn, earthquake, fault, seismic waves, primary waves, secondary waves, surface waves, focus, epicentre, seismograph, bedrock, seismogram, Richter scale, volcano, erupts, dormant, vent, cinder cone volcano, shield volcano, hot spot, composite volcano, volcanic neck, sill, dike, geothermal energy, principle of superposition, relative age, absolute age, eras

Reviewing Key Terms

1. In your notebook, match each description in column A with the correct term in column B. Use each description only once.

A	B
(a) fastest travelling earthquake wave	• P wave (9.2)
(b) second type of earthquake wave generated	• vent (9.3)
(c) opening in crust of Earth	• surface wave (9.2)
(d) wave that causes the most damage	• S wave (9.2)
(e) encircles the Pacific Ocean	• Ring of Fire (9.3)

2. Listed below are four answers for four different questions:
deposition (9.1)
floodplain (9.1)
relative age (9.3)
absolute age (9.3)
Write a question for each answer.

Understanding Key Ideas

Section numbers are provided if you need to review.

3. Copy each of the following sentences on your own paper. Fill in the key term that is missing.
(a) In the spring, rivers often overflow their banks and create large flat areas of sediments called _____. (9.1)
(b) Seismographs must be attached to the solid rock known as _____. (9.2)
(c) Magma can flow parallel to layers of rock and solidify as a _____ or magma can cross layers of rock to become solid and form a feature known as a _____. (9.3)

Developing Skills

4. Make a concept map about where volcanoes can occur. Include the following words and phrases: hot spots, divergent plate boundaries and convergent plate boundaries. Include the names and locations of some famous volcanoes.

5. The Hawaiian Islands and Emperor Seamounts were formed when the Pacific plate moved over a fixed hot spot. The Emperor Seamounts are aligned in a different direction than the Hawaiian Islands. What can you infer about the movement of the Pacific plate?

6. Explain the differences and similarities between the ways in which you would prepare for an earthquake and a volcanic eruption.

Problem Solving

7. You have discovered three rock layers that have not been turned upside down. The absolute age of the middle layer is 120 million years. What can you say about the ages of the layers above and below it?

8. Scientists have produced maps indicating how long a tsunami takes to travel. The map below shows tsunami travel time to Hawaii in hours. Some tsunamis travel at speeds up to 950 km/h. Use the map to infer how long a tsunami would take to reach Hawaii if the tsunami originated near Japan, New Zealand/British Columbia?

Tsunami travel times to Hawaii (hours)

Critical Thinking

9. Imagine returning to your community 100 years from now. How might the landscape be different? What sort of weathering and erosion might have happened?

10. Animals can sometimes sense when an earthquake is about to happen. How do you think they can do this?

11. Discuss an example of human action in your community that has been taken to prevent damage from one of the changes described in this chapter.

Pause & Reflect

Go back to the beginning of the chapter on page 256, and check your original answers to the Getting Ready questions. How has your thinking changed? How would you answer those questions now that you have investigated the topics in this chapter?

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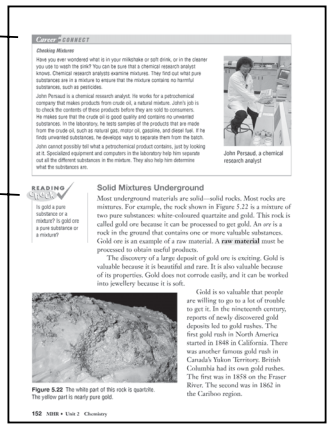
Career Connect

- These features portray people with varying levels of education who apply science and technology in their jobs.

Reading Check

- These brief questions help ensure that you understand the concepts in the text.


Career CONNECT

Cleaning Mixtures

Have you ever wondered what is in your milkshake or soft drink, or in the cleaner you use to wash the sink? You can be sure that a chemical research analyst knows. Chemical research analysts examine mixtures. They find out what pure substances are in a mixture to ensure that the mixture contains no harmful substances, such as pesticides.

John Persaud is a chemical research analyst. He works for a petrochemical company that makes products from crude oil, a natural mixture. John's job is to check the contents of these products before they are sold to consumers. He makes sure that the crude oil is good quality and contains no unwanted substances. In the laboratory, he tests samples of the products that are made from the crude oil, such as natural gas, motor oil, gasoline, and diesel fuel. If he finds unwanted substances, he develops ways to separate them from the batch.

John cannot possibly tell what a petrochemical product contains, just by looking at it. Specialized equipment and computers in the laboratory help him separate out all the different substances in the mixture. They also help him determine what the substances are.

John Persaud, a chemical research analyst

READING CHECK

Is gold a pure substance or a mixture? Is gold ore a pure substance or a mixture?

Solid Mixtures Underground

Most underground materials are solid—solid rocks. Most rocks are mixtures. For example, the rock shown in Figure 5.22 is a mixture of two pure substances: white-coloured quartzite and gold. This rock is called gold ore because it can be processed to get gold. An *ore* is a rock in the ground that contains one or more valuable substances. Gold ore is an example of a raw material. A **raw material** must be processed to obtain useful products.

The discovery of a large deposit of gold ore is exciting. Gold is valuable because it is beautiful and rare. It is also valuable because of its properties. Gold does not corrode easily, and it can be worked into jewellery because it is soft.

Gold is so valuable that people are willing to go to a lot of trouble to get it. In the nineteenth century, reports of newly discovered gold deposits led to gold rushes. The first gold rush in North America started in 1848 in California. There was another famous gold rush in Canada's Yukon Territory. British Columbia had its own gold rushes. The first was in 1858 on the Fraser River. The second was in 1862 in the Cariboo region.

Figure 5.22 The white part of this rock is quartzite. The yellow part is nearly pure gold.

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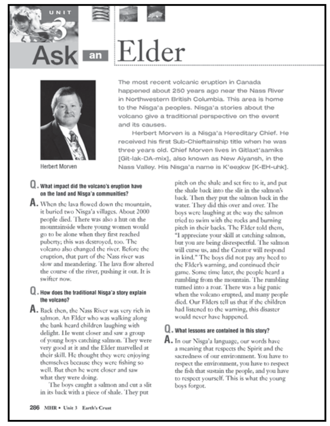
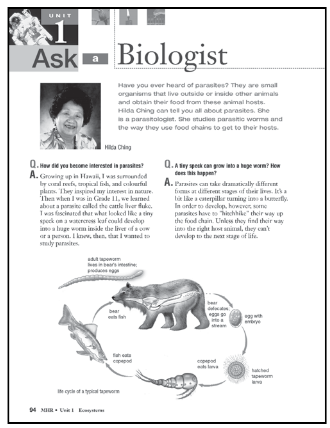
End-of-Unit Features

Ask an Elder

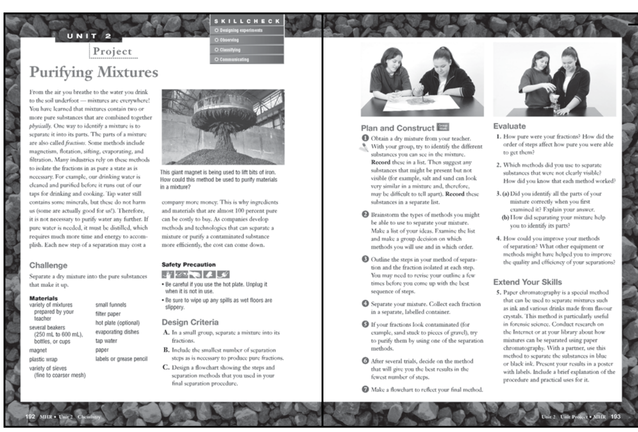


- Each unit features an interview with an Elder from a particular place in British Columbia.
- The content of each interview ties in with the overall theme of the unit.
- In these interviews, Elders share their knowledge, understanding, experience, and wisdom. They answer questions about the roles and responsibilities of Elders in Aboriginal communities in British Columbia.
- A follow-up activity at the end of each interview gives you an opportunity for further learning.

Ask a Scientist



- These career profiles feature an interview with a science specialist.
- The features are: Ask a Biologist, Ask an Oil Spill Adviser, and Ask a Geophysicist.
- A follow-up activity at the end of each interview provides an opportunity for further learning.



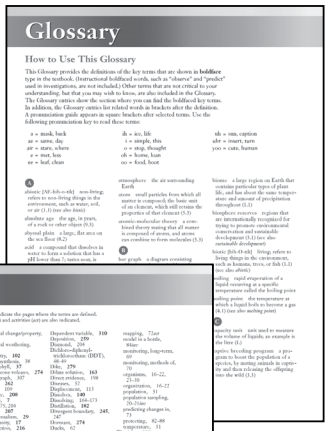
Project

- Each project lets you apply key concepts and skills from the unit to design and create a device, system, or model of your own.
- You will complete the project as part of a team.

At the Back of Your Text...

Glossary

- Note the boldfaced key terms highlighted in yellow that appear in your textbook. Each key term is defined in the Glossary at the back of the textbook. The Glossary is organized alphabetically.

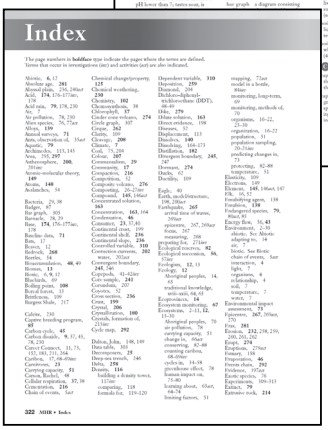

Glossary

How to Use This Glossary

This Glossary provides the definitions of the key terms that are shown in **boldface** type in the textbook. (Instructional boldfaced words, such as "observe" and "predict" used in investigations, are not included.) Other terms that are not critical to your understanding, but that you may wish to know, are also included in the Glossary. The Glossary entries show the section where you can find the boldfaced key terms. In addition, the Glossary entries list related words in brackets after the definition. A pronunciation guide appears in square brackets after selected terms. Use the following pronunciation key to read these terms:

Index

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


Index

The page numbers in **boldface** type indicate the pages where the terms are defined. Terms that occur in investigations (inv) and activities (act) are also indicated.

Other Important Features

INTERNET CONNECT

- These features help you research more information about a topic.
- The *BC Science 7* web site links you to other web sites related to each Internet Connect.

- Read these features to learn some weird science facts.

Special Icons

- The Group Work icon signals that you will be working as a member of a team.

- The pencil icon reminds you to write your predictions and observations on paper.

- The safety icons are extremely important. They alert you to any safety precautions you should take, such as wearing safety goggles or a lab apron. Other safety icons that are used in *BC Science 7* are shown on page xi of the textbook.