

Reading Strategies for BC Science 10

How will this textbook help me be successful in Science 10?

BC Science 10 is your textbook for grade 10 science in British Columbia. It has been designed to help you understand the science concepts being taught in your Science 10 course.

The next few pages describe some reading and practice strategies that you can use to help you better understand the information presented in each section.

Before Reading

Reading a science textbook is different from reading a novel or magazine. *BC Science 10* contains terms and concepts throughout the book that you need to understand and be able to apply. Each section in the textbook has built-in reading strategies ready for you to use. All you need to do is know how to use them.

Before starting any section, you should review the following features to help prepare you for the concepts you are about to cover.

The **Title** describes the main idea for the section.

The **Section Summary** gives you an overview of what you are going to learn. If there are any words you do not understand, check in the Glossary or ask your teacher.

Words to Know identifies words you will need to know before you start reading. Use the Glossary to help you define these terms.



Other Strategies

Before starting the section, scan or survey the pages. The purpose of scanning is to give you an idea of what to expect in the section. Look at the pictures, tables, and bolded words, and try to predict what you think the section will be about. Ask yourself what you already know about the concepts in this section.

Go back to the Chapter Opener and review the Foldables activity. This activity is designed to help prepare you for the reading and activities you will do in this section.

As You Read

As you read through *BC Science 10*, use these Reading Strategies to help you understand the concepts.

Notes

There are many ways to take notes, but one of the easiest methods is to take each title in a section and change it into a question. Then, as you read and find the answer to the question, you can add the answer to your notes. Make sure you use any bolded terms in your answer. This helps you learn key terms as well.

For example, for the page below, here are two questions that you could use in your notes.

Polyatomic ions
A polyatomic ion is an ion composed of more than one type of atom joined by covalent bonds. Because they contain more than one element, they are electrically charged. They cannot be broken down into simpler ions. An example of a polyatomic ion is carbonate, CO_3^{2-} (Figure 4.24).

Table 4.11 lists some common polyatomic ions. The names of these ions were assigned by the IUPAC. You do not have to memorize them. Simply refer to the ion table to find a name and formula. Table 4.12 explains the steps for writing the formula of a compound with polyatomic ions.

Figure 4.24 Shells, such as clams, use carbonate ions to make their shells.

Table 4.11 Names, Formulas, and Charges of Some Polyatomic Ions

Positive ions		Negative ions	
NH_4^+ ammonium	CN^- cyanide	HCO_3^- hydrogen carbonate, bicarbonate	NO_2^- nitrite
CO_3^{2-} carbonate	ClO_2^- chlorite	HSO_3^- hydrogen sulfite, bisulfite	NO_3^- nitrate
CO_3^{2-} carbonate	ClO_2^- chlorite	HS^- hydrogen sulfide, hydrosulfide	O_2^{2-} peroxide
CO_3^{2-} carbonate	ClO_2^- chlorite	H_2PO_4^- hydrogen phosphate, dihydrogen phosphate	MnO_4^- permanganate
C_4H_9^+ butyl	ClO_2^- chlorite	HPO_4^{2-} hydrogen phosphate, monohydrogen phosphate	PO_4^{3-} phosphate
C_6H_5^+ phenyl	ClO_2^- chlorite	OH^- hydroxide	SO_3^{2-} sulfite
C_6H_5^+ phenyl	ClO_2^- chlorite	O^{2-} oxide	SO_4^{2-} sulfate
C_6H_5^+ phenyl	ClO_2^- chlorite	NO_2^- nitrite	SO_3^{2-} sulfite

Word Connect
“Poly” means many. Hydro-, alk-, and the an- prefixes and suffixes that help indicate the number of oxygen atoms present in some polyatomic ions.

Table 4.12 Writing the Formula of a Compound with Polyatomic Ions

Step	Examples
1. Identify each ion and its charge.	manganese(II) chloride, ammonium sulfate
2. Determine the total charges needed to balance positive with negative.	Mn^{2+} ion, Cl^- ion, NH_4^+ ion, SO_4^{2-} ion
3. Write the ratio of positive ions to negative ions.	1 Mn^{2+} ion for every 2 Cl^- ions, 2 NH_4^+ ions for every 1 SO_4^{2-} ion
4. Use brackets around ions to correctly show the ratio of ions.	$(\text{MnCl})_2$, $(\text{NH}_4)_2\text{SO}_4$
5. Use subscripts and brackets to write the formula. Omit brackets if only one ion is needed.	MnCl_2 , $(\text{NH}_4)_2\text{SO}_4$

What is a polyatomic ion?

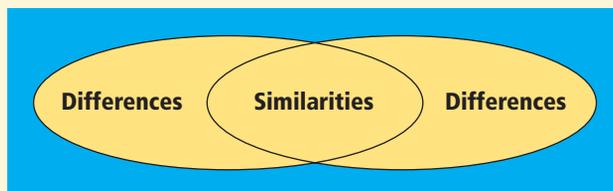
How do you write the formula of a compound that has polyatomic ions?

Science Skills

For more information on graphic organizers, go to Science Skill 11 on page 582.

Graphic Organizers

Graphic organizers are a good way to organize information you are learning. When you use a graphic organizer, you make diagrams and short notes to describe what you know and understand. If you are comparing two different things, you might use a Venn diagram. As the figure below shows, a Venn diagram allows you to show the differences and similarities between the two things.



A concept map is a diagram that represents visually how ideas are related. Examples of different types of concept maps can be found in *Science Skill 11*, beginning on page 582.

Using Your Textbook as a Study Tool

How can you use your textbook effectively to understand science concepts better? This Science Skill will give you strategies to help you better understand what you read. It will also explain how to use textbook visuals and describe different types of graphic organizers that can help you organize your information.

Using Your Textbook to Read for Information

Reading a textbook is different from reading a novel or magazine. A textbook contains many different terms and concepts that you must understand and apply throughout each section. Here are several strategies to help you record the information.

- Before reading a section, scan the pages. While you are scanning, look at the pictures and try to predict what you think the section will be about. Try to figure out the definitions for bolded words with the help of the Glossary or from the sentence the bolded word is in.
- A light brown shaded box at the beginning of each section summarizes the key ideas covered in the section. Read this summary. You may not completely understand everything in the summary at first. When you finish working through the section, reread this summary. If you still do not understand something in the summary, ask your teacher for help.
- Rewrite the section headings and subheadings as questions. Then look for the answer to each question as you read.
- When you finish reading the text under a heading or subheading, think about what you have just read. Then write brief notes that explain the key ideas discussed there. Try to do this without looking at the text. After you make your notes, go back to the text you have just read. Add or change

anything you have just written to help you understand the text better.

- As you read each section, you will encounter Reading Checks. You should be able to answer these questions. If you cannot answer them correctly, go back and review the material you just read.

Using Your Textbook Visuals

As you read each page, look at any photographs, illustrations, or graphs that appear on the page. Read the captions and labels that accompany the photographs as well as the titles of graphs. Think about the information each visual provides, and note how it helps you to understand the ideas presented in the text. For example, look closely at the illustration on this page. What information does it convey to you?



Water on Earth moves in an endless water cycle.

Using the Glossary

Notice the terms that are in bold (dark, heavy) type. These terms are important words that you will need in order to understand and write about the information in each topic. Make sure that you understand these terms and how they are used. Each bolded term appears in the Glossary at the back of this book.

Using the Review Questions

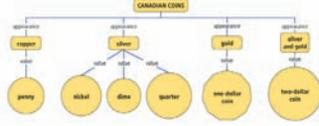
At the end of every section, you will find review questions under the heading Check Your Understanding. At the end of every chapter, there are questions in the Chapter Review. If you are unable to answer the questions at the end of the sections and chapters, reread the material to find the answers. Ask your teacher to explain anything you still do not understand.

Instant Practice—Reading for Information

- Go to the unit that your teacher tells your class will be studying next. Scan the unit to predict the key ideas you will be studying.
- In the first section of the unit, use strategies 1 and 2 on the previous page before you read the section.
- Read the first section of the unit using strategies 3 and 4 to make notes.

Using Graphic Organizers

A great way to organize information you are learning is to use a graphic organizer. One kind of graphic organizer you will find useful is a concept map.



Concept Map

A concept map is a diagram that represents visually how ideas are related. Because the concept map shows the relationships among concepts, it can clarify the meaning of the ideas and terms and help you to understand what you are studying.

Study the construction of the concept map below. Notice how some words are enclosed while others are written on connecting lines. The enclosed words are ideas or terms called concepts, and the words written on them describe relationships between the concepts.

As you learn more about a topic, your concept map will grow and change. There is no single "correct" concept map; there are only the connections that make sense to you. Make your map as neat and clear as possible. Make sure you have reasons for suggesting the connections between the concepts.

When you have completed the concept map, you may have dozens of interesting ideas. Your map is a record of your thinking. Although it may contain many of the same concepts as other students' maps, your ideas may be recorded and linked differently. You can use your map for study and review. You can refer to it to help you recall concepts and relationships. At a later date, you can use your map to see what you have learned and how your ideas have changed.

Reading Checks

Reading Checks are questions located at various points in the textbook. The purpose of these questions is to check if you have understood what you have read in the previous pages. If you cannot answer these questions, you need to reread the previous section. If, after rereading, you still do not know the answers, ask your teacher.

Reading Check

- How can you recognize an acid by its chemical formula?
- State which acid is present in:
 - your stomach;
 - vinegar;
 - automobile batteries
- State another name for aqueous hydrogen fluoride, HF(aq).
- State another name for aqueous hydrogen perchlorate, HClO₄(aq).
- What does corrosive mean?

Practice Problems

In units 1, 2, and 3, there are Practice Problems. These problems are related to a concept you just covered in the text. The answers are provided to help you check your work. For these questions, it is more important that you understand how you got your answer than it is just to get the correct answer.

Practice Problems

Try the following average velocity problems yourself.

- What is the average velocity of a dog that runs 35 m [S] in 4.5 s?
- If a baseball is thrown at 25 m/s toward home plate, what would be the ball's displacement after 0.65 s?
- Two friends want to paddle their canoe 450 m across a lake. If they head across the lake at 2.5 m/s, how long does it take them to cross?

Answers

1. 7.8 m/s south
2. 16 m toward home plate
3. 180 s

After Reading

When you have finished your reading, there are different ways you can check your understanding. These include section reviews, chapter reviews, and unit reviews.

Check Your Understanding

At the end of each section is a series of questions related to the concepts you have covered. There are three categories of questions.

Checking Concepts

- List the information about a compound given by the name of:
 - an ionic compound
 - a covalent compound
- Explain the following terms related to chemical naming:
 - multivalent
 - polyatomic
 - ratio of ions
- List the prefixes used in covalent naming that represent the numbers 1 through 10.
- Name each of the ions in the list below:
 - Na^+
 - SO_4^{2-}
 - K^+
 - NH_4^+
 - V^{5+}
 - O^{2-}
- List which of the following words describes each ion in question 4: polyatomic ion, multivalent metal, negative ion, positive ion.
- Copy and complete the following chart about polyatomic ions in your notebook.

Formula	Name	Number of Each Kind of Atom	Total Number of Atoms	Electric Charge on the Ion
(a) ClO_3^-				
(b) NO_2^-				
(c) PO_4^{3-}				
(d) CO_3^{2-}				
(e) ClO_2^-				
(f) MnO_4^-				

Understanding Key Ideas

- Write the formula of each of the following ionic compounds:
 - sodium bromide
 - calcium fluoride
 - iron(II) bromide
 - gold(II) selenide
 - vanadium(V) oxide
 - magnesium(II) nitride
 - ammonium phosphate
 - potassium nitrate
 - manganese(II) perchlorate
- Write the formula of each of the following covalent compounds:
 - lithium chloride
 - barium sulfate
 - iron(III) cyanide
 - nitrogen trioxide
 - diboron monoxide
 - silicon dioxide

Pause and Reflect

Reflect on the similarities and differences between ionic compounds and covalent compounds. Draw a mind map that shows both types of compounds and the steps for writing their chemical formulae. Include examples of compounds in your mind map.

Chapter 4 Atomic theory explains the formation of compounds. • MHR 281

Checking Concepts asks questions about key ideas in the section. You should be able to answer all of these questions.

Understanding Key Ideas asks questions that require connecting two or more concepts covered in the section.

Pause and Reflect questions ask you to think about and apply what you learned to other situations in your life.

Chapter Reviews

The Chapter Review asks questions similar to those in the Check Your Understanding review. It also asks you to prepare a summary of the key concepts covered in the chapter. This summary is an excellent study tool.

Unit Reviews

Unit Reviews begin with a Unit Summary. The summary lists the key ideas and the main concepts covered in each chapter. If you do not understand the information in this summary, you need to review your notes and your chapter summaries or check with your teacher.

The Unit Review asks a variety of different questions for you to check your understanding of the concepts covered in the unit.