Chapter 7 Earth's Climate System

Materials

Please see the teaching notes for each activity for a list of the materials required. Please see page TR-31 for a summary of the materials required in this chapter and other chapters.

Advance Preparation

- Gather dry, dark sand and light-coloured soil, sticky notes, stopwatches, coffee creamer, small aquarium, vinegar, chalk and/or eggshell, soft drink, lamps, and 100 W incandescent light bulbs.
- Activity 7-4 requires that the eggshell or chalk be allowed to sit in solution overnight. Ensure that there will be adequate time two days in a row. Alternatively, you may wish to start a demonstration set of experimental conditions and time them to have already sat overnight on the day of the activity.

In this chapter, students will learn about climate and how climate is affected by natural events and human activities. Students will explore climate zones and other climate classification systems. They will use climatographs to study and compare climates. Global warming and other indicators of climate change will be introduced. Students will explore how global warming will impact different natural and human systems. Students will be introduced to some of the programs that citizens and government groups are using to address climate change.

Using the Chapter Opener (Student textbook pages 266 and 267)

- Have students discuss what it would mean to the individual shown in the chapter opener if the ice were to melt even more. What possible sources of food could he access? How could he move around? This example may seem very remote to students in the southern parts of Canada. Have a class discussion on the impacts of diminishing sea ice on organisms and humans living in Arctic areas. Challenge students to consider other parts of the world, such as tropical forests and desert areas.
- One of the concerns about Arctic warming is the opening of circumpolar shipping routes. Show students a map. Have a discussion about how shipping and transportation could change if the Arctic ice diminishes to the point where year-round shipping could happen. What would this mean to Canada? How could we protect our northern border?
- Conduct a class discussion on the What You Will Learn and Why It Matters sections. You may wish to have students brainstorm what they already know. This list can be expanded and/or corrected as students work through the chapter.

Alternative Context

Ask students questions to help engage them actively in the text and give them a purpose for continuing reading. For example, the impacts of global warming are much more immediate for northern communities. Challenge students to consider the impacts of global warming on Arctic communities. Ask them what it would be like if those impacts were happening in their community, representing an equivalent change in their lives. For example, if students list loss of sea ice transportation routes for Arctic communities as a significant impact, have them consider the impact of losing access to highways or main roads in their community. Similarly, the loss of hunting grounds for the Inuit could be similar to losing all the stores in urban areas.

Activity 7-1 Views on Climate Change (Student textbook page 267)

Pedagogical Purpose

The purpose of this activity is to draw out students' personal beliefs about climate change. The activity allows class discussion about students' views on climate change, what students already know, and what they would like to know. This activity sets the context for learning the material in the chapter and the unit. It will highlight significant misconceptions that students may have.

Planning	
Materials	Chart paper Markers or pens Sticky notes Stopwatches **BLM G-43 Venn Diagram** Begin gathering materials several days in advance. Ensure you have enough for the number of groups you will have. Have backup sticky notes.
Time	20–30 min

Background

Usually, people feel passionate about climate change one way or the other. Personal views are not always aligned with science. Climate change refers to global variability in any part of climate, including precipitation, temperature, or wind patterns. There may be differences in how different people use the term *climate change.* Some people incorrectly believe that climate change is the same as global warming. However, global warming may not happen uniformly. Climate change may result in some areas becoming cooler. Some organizations, however, define climate change as global warming caused by human activities.

Activity Notes and Troubleshooting

- Expect students to come up with conflicting comments. Engage them in a discussion about how to treat apparent contradictions. Encourage respectful discussion. Ask students why they think there is so much contradictory information.
- Develop a class list of information in the three categories in the Venn diagram. You may wish to provide **BLM G-43 Venn Diagram,** which scaffolds this process. It will be a valuable tool as you progress through the unit.
- Students may differ on which section of the Venn diagram they feel most connected to. Encourage individual rather than group alignment of personal beliefs.

Additional Support

- ELL Allow students to demonstrate their beliefs about climate change in alternative ways, such as diagrams. Alternatively, allow time for students to write their ideas in their first language and translate the ideas into English.
- DI This is a good activity for linguistic learners. They can help record the ideas on sticky notes if other students are not as strong with written language.
- This activity provides the opportunity to start interest centres in the classroom. Students can pursue activities based on their interests and continue to add to the centres.
- You could draw the Venn diagram on the board and solicit class input. You may wish to make an overhead of **BLM G-43 Venn Diagram** for this process. The diagram could be drawn with the different colours and statements made by people could be "voted on" using corresponding coloured markers or small stickers.

Study Toolkit

Strategy	Page Reference	Additional Support
Interpreting Climatographs	Have students read the title, labels, and accompanying text for Figure 7.15 on page 280. Ask what the graph shows about rainfall and temperature in Manokwari. Students can write a sentence about average precipitation in each biome based on patterns shown in the climatographs on pages 284 and 285.	Refer students to the Study Toolkit Overview, in particular the section Reading Graphic Text on page 560 of the student textbook.
Making Inferences	After reading the first paragraph on page 274 under Winds Affect Precipitation, students can create a chart and make an inference about air masses or fronts.	Refer students to the Study Toolkit Overview, in particular the section Reading Effectively on page 560 of the student textbook.
Word Origins	Students can find the origin of words such as *climate* and *atmosphere* on page 269. Students can explain how knowing the origin can help them understand the current meaning of the word.	Refer students to the Study Toolkit Overview, in particular the Word Study section on page 561 of the student textbook. They may find it useful to identify the base word in order to isolate the origins. Refer them to Study Toolkit 3 on page 564 of the student textbook for guidance in identifying the root of each word.