

# Unit Overview

The *Unit Overview* describes the key student expectations for the unit. Concept development, inquiry and design skills, and expectations from the curriculum are synthesized in an easy-to-understand format. Three *Design Challenges* are introduced in the *Unit Overview*. The *Design Challenges* can be used later in the unit as performance assessment tasks.

## Design Challenge

The *Design Challenge* provides students with an opportunity to demonstrate their learning by solving a technology problem. Lessons throughout the unit develop concepts and skills students will need to successfully complete the Challenge.

**Unit 4 Overview**

**The Water Cycle**  
Whatever form or side trips it takes, water is continuously moving above, on, and below Earth's surface.

**You will be able to:**

- describe the distribution of the world's water resources and explain how water in its three physical states circulates through the water cycle
- demonstrate differences in the physical characteristics of fresh and salt water
- identify methods developed to limit damage caused by water
- explain how water is processed to make it fit for human consumption
- understand the relationship between changes in the water table and the water cycle
- evaluate human water use and identify solutions for managing its impact on the water cycle effectively

**Water Features**  
Earth's physical features and its weather patterns are due, in large part, to the effects of water.

**You will be able to:**

- compare the formation of geological features on land with those of the ocean floor
- investigate how oceanic currents are influenced by changes in temperature
- explain how currents affect the distribution of organisms
- examine the effects of water features, such as glaciers, lakes, and oceans, on regional climates
- describe how water is formed and their impact on land features
- investigate how geological features affect tides

**Design Challenge**

**You will be able to ...**  
Demonstrate your learning by completing a Design Challenge.

**Design: Allowing Humans to Live Safely with Water**  
Humans face many challenges in safe living and maintaining water systems. In solving other problems faced by humans, creative use of technology helps us meet these challenges. In this unit you will be able to design and build:

- A Water Purifier**  
Design and build a device to make safe drinking water from salty or organic water.
- A Shoreline Stabilizer**  
Design and build a device to stabilize shorelines and prevent damage from waves.
- An Oil Spill Contactor**  
Design and build a device to contain and absorb a simulated oil spill in water.

To start your Design Challenge, see page 54.  
Record your thoughts and design ideas for the Challenge when you see **Design Challenges**.

## Curriculum Expectations

The *Unit Overview* states the learning expectations in student language.

## Skills Handbook

References indicate to students where they can find added information and extra help in the skills handbook for conducting investigations, activities, and answering questions.

# Getting Started

The *Getting Started* feature introduces the unit by providing discussion and reflection opportunities for students that focus on the concepts that will be explored throughout the unit. Each unit begins with a series of questions designed to elicit students' prior knowledge and to identify students' misconceptions.

## Reflecting Questions

Students reflect on what they already know about the topic and questions for further study.

**Getting Started**

**Where Do Rocks Come From?**

**1** All of the metal objects that you see around you originally came from minerals that formed millions, even billions, of years ago in the Earth's crust. Many of these minerals are found deep in the crust, mixed with other minerals. How are they removed from the Earth and purified so that they can be made into things like copper wire?

**2** Moving water is very powerful and can carry large amounts of soil and stones with it as it flows downstream. How does moving water affect farmland? Where does soil come from? What's the connection between soil and rock?

**Reflecting**  
Think about the questions 1 and 2. What other questions do you have about the Earth's crust? As you progress through this unit, reflect on your answers and revise them based on what you have learned.

**Try This: The Great Rock Investigation**

Before beginning this activity, find two or three small, ice-cream-size rocks in the schoolyard or on the way home. Each should have some features that make it different from the others. Examine and record the properties of your rocks. In doing so, you might ask the following questions:

- What colour(s) are they?
- (a) What do they feel like?
- (b) Are they round or sharp? How do you think they got their shape?
- Do they look the same throughout, or do they have different types of rock mixed in?
- Do they feel heavy or light in comparison to their size?
- Do they have any natural fractures (for example, colour, shape, markings)?
- Do any of your rocks have pieces that sparkle or reflect light?
- Do your rocks look like most other local rocks? If not, speculate on why they are different, and how they got where you found them.

## Try This

*Try This* activities use readily available materials and appear periodically throughout each unit. These activities provide students with experiences to help them develop specific skills and/or understand the concepts being learned. *Try This* activities also enable students to engage in group discussions or to reflect on their observations.