

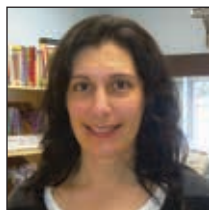
Earth & Space Science

—— Grade 7 ——

Written by Tracy Bellaire

The activities in this book have two intentions: to teach concepts related to earth and space science and to provide students the opportunity to apply necessary skills needed for mastery of science and technology curriculum objectives.

The experiments in this book fall under eleven topics that relate to three aspects of earth and space science: **The Planet Earth, Earth's Crust and Resources, and Heat in the Environment.** In each section you will find teacher notes designed to provide you guidance with the learning intention, the success criteria, materials needed, a lesson outline, as well as provide some insight on what results to expect when the experiments are conducted. Suggestions for differentiation are also included so that all students can be successful in the learning environment.



Tracy Bellaire is an experienced teacher who continues to be involved in various levels of education in her role as Differentiated Learning Resource Teacher in an elementary school in Ontario. She enjoys creating educational materials for all types of learners, and providing tools for teachers to further develop their skill set in the classroom. She hopes that these lessons help all to discover their love of science!

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At A Glance

Learning Expectations	Inside the Earth	The Tectonic Plates	Mountain Formation	Earthquakes	Volcanoes	Rock Types	Exploring Minerals	Fossils	Erosion	Temperature Change	Heat Transfer
Knowledge and Understanding Content											
Identify the layers of the Earth's composition and describe the characteristics of each layer.	•										
Identify the major tectonic plates of the world and describe their movement.		•									
Identify the different types of mountains in the world and describe how they are formed.			•								
Describe the occurrence, detection, and measurement of earthquakes; and research the role of a seismologist.				•							
Explain the formation process and describe the activity of volcanoes; and research the role of a volcanologist.					•						
Identify different rock types and discover the types that are where students live; explain the rock cycle.						•					
Identify the properties of minerals and explore some of their uses in our daily lives.							•				
Describe fossil formation and how they are discovered; describe the tools and techniques used in paleontology.								•			
Describe the processes of weathering and erosion, and recognize their effects on rocks, soils, and landscapes.									•		
Use the particle theory of matter to compare how heat affects the motion of particles in a solid, a liquid, and a gas.										•	
Explain the process of heat transfer through conduction, convection, and radiant heat; relate the process to nature.											•
Thinking Skills and Investigation Process											
Make predictions, formulate questions, and plan an investigation.		•		•	•				•	•	•
Gather and record observations and findings using drawings, tables, written descriptions.	•	•	•	•	•	•	•	•	•	•	•
Recognize and apply safety procedures in the classroom.	•	•	•	•	•	•	•	•	•	•	•
Communication											
Communicate the procedure and conclusions of investigations using demonstrations, drawings, and oral or written descriptions, with use of science and technology vocabulary.	•	•	•	•	•	•	•	•	•	•	•
Application of Knowledge and Skills to Society and the Environment											
Analyze the science of paleontology and how it helps us to identify changes in the Earth's surface.								•			
Assess the environmental benefits of technologies that reduce heat loss and heat transfer.											•
Evaluate the environmental and societal impacts of heat energy source harvesting, production, and usage.											•

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MOUNTAIN FORMATION

LEARNING INTENTION:

Students will learn about the types of mountains in the world and how they are formed.

SUCCESS CRITERIA:

- identify three main mountain types
- describe how different mountain types are formed
- research and compile information about a mountain range in the world
- record findings with the use of diagrams and written responses

MATERIALS NEEDED:

- a copy of “The Great Four!” Worksheet 1 and 2 for each student
- a copy of “Making Mountains” Worksheet 3 and 4 for each student
- a copy of “A Mountain Ranging We Go!” Worksheet 5, 6, and 7 for each student
- access to the internet
- a video camera, an iPod, or an iPad
- clipboards, pencils, modeling clay

PROCEDURE:

***This lesson can be done as one long lesson, or be divided into three shorter lessons.**

1. Using Worksheet 1, 2, 3, and 4, do a shared reading activity with the students. This will allow for reading practice and learning how to break down word parts in order to read the larger words in the text. Along with the content, discussion of certain vocabulary words would be of benefit for students to fully understand the passage.

Some interesting vocabulary words to focus on are:

- | | | |
|-----------|----------|-----------|
| • region | • dense | • magma |
| • crumple | • valley | • ridge |
| • rift | • molten | • collide |

2. Give students Worksheets 5, 6, and 7. With access to the internet, students will research a mountain range of their choosing. The finished assignments could be displayed on a bulletin board to highlight the students’ learning about different mountain ranges.
3. Using modeling clay, students can make a model of each mountain type. An option is to have students orally explain how the different mountain types are formed, using their models to demonstrate.

Teaching option:

- a) Using an iPod, iPad, Macbook, or video camera, set up an oral response recording station in the classroom. Students can take turns recording their oral responses to demonstrate their knowledge about differences in the types of mountain formations.

Guiding questions at this station could be:

- What are the three main types of mountains?
- Where does each type typically form?
- Explain how each type is formed.

DIFFERENTIATION:

Slower learners may benefit by working with a strong peer in order to ‘navigate’ the research required to complete Worksheet 5, 6, and 7.

For enrichment, faster learners could locate their mountain range on a large flat map of the world, and identify the tectonic plates that would have been involved in the mountain formation.

The Great Four!

Most mountains are part of long chains that run for hundreds of kilometres across the surface of the Earth. Mountains affect the wind, temperature, and water supply of huge areas. This controls what can be grown in certain areas of the world, and the animals that live in a particular region.

There are four great ranges of really high mountains on the surface of the Earth. These mountain ranges are **the Himalayas, the Andes, the Rockies,** and **the Alps.**

Mount Everest, Nepal



The Himalayan Mountain range extends about 2400 km long. The Himalayas span across six countries, these being Bhutan, India, Nepal, China, Afghanistan, and Pakistan.

Mount Everest, the highest mountain in the world, is part of the Himalayan Mountain Range. The peak of Mount Everest is about 8850 metres above sea level.

Fitz Roy Mountain, Argentina



The Andes Mountain range is the longest in the world. It extends about 7000 km long.

This mountain range spans through seven countries, these being Venezuela, Colombia, Ecuador, Peru, Bolivia, Chile, and Argentina.



Canadian Rockies, Banff Alberta

The Rocky Mountain range is located in the western part of North America.

The Rockies stretch about 4800 km in distance from British Columbia, Canada to New Mexico, USA.



The Alps, France



The Alps is a mountain range located in Europe that extends about 1200 km long.

The Alps span across eight countries, these being Austria, Slovenia, Switzerland, Liechtenstein, Germany, France, Italy, and Monaco.

By studying the structure of mountain ranges, geologists have discovered how the powerful forces inside the Earth have been shaping the face of our planet for millions of years. These pressures shape the continents by causing earthquakes and volcanoes and by building mountains. Geologists have discovered that mountains are formed where the crust of the Earth is distributed by the great pressure inside the Earth. All over the world, mountains are being formed.

Making Mountains

Geologists divide mountains into three main types. These types are **fold mountains**, **volcanic mountains**, and **fault block mountains**.

As the large plates of the Earth drift on the molten layer of rock beneath the crust, the edges of the lithospheric plates sometimes collide with one another and place great pressure on the rocks.

If rocks are under pressure for a long time, they become hot. These hot rocks may slowly bend or fold, which makes waves in the rock, and creates fold mountains and valleys.

If the pressure on rock is too great or too sudden, the rock will break. This causes faults or large cracks in the Earth's crust. Faults may be small or they may be hundreds of kilometres long.

Some mountains are formed when blocks of land slide up or down along fault lines in the Earth's crust. Faults are very unstable areas and there are frequent earthquakes and sometimes volcanic activity along fault lines.

Did you know that the bending and folding of rock usually takes millions of years? However, a fault or crack in the earth can appear very suddenly during a violent earthquake!

▼ This fold mountain range is part of the Alps in Switzerland.



▶ This landscape shows a fault area between the European and American tectonic plates. Block fault mountains have formed.

