

ANCIENT ALBERTA ROCKS

Teacher Resource Guide

Program Overview

TOPIC: Geology of Alberta

THEME: Understanding how events in the past have affected what we see and do in Alberta today.

PROGRAM DESCRIPTION: Discover Alberta's geology through an interactive game where students work in teams and move around a floor-sized game board shaped like the province. As they answer questions, do demonstrations and complete tasks, they learn how geologic processes have shaped the land and how these processes have impacted us today. Through engaging, hands-on learning, students will gain a greater understanding and appreciation for geology.

AUDIENCE: Grades 3 - 6

Curriculum Connections

Grade 3 **Science:** Rocks and Minerals

Grade 4 **Social Studies:** Alberta: A Sense of the Land

Grade 5 **Social Studies:** Physical Geography of Canada

Grade 6 **Science:** Evidence and Investigation

Program Objectives

Students will be able to:

1. Recognize examples of rocks from each rock group (sedimentary, igneous, metamorphic).
2. Describe fossilization and recognize examples of types of fossils.
3. Explain other forces that helped shape the topography of Alberta (glaciation, erosion, deposition).
4. Identify the basic principles of geology (superposition, fossilization, erosion/deposition, plate tectonics).
5. Describe some of the industries in Alberta that are connected to geology (agriculture, oil and gas, tourism).

Suggested Pre-Visit Activity

1. PROGRAM TERMINOLOGY

Following are some terms to introduce to your class before attending your program at the Royal Tyrrell Museum. These terms will prepare the students so they will get the full benefit of the program.

Deposition: the accumulation of sediment.

Erosion: the group of processes that loosen or dissolve rock material and transport it, mainly by water, ice, wind, and gravity.

Fossilization: the process that preserves the remnants, impressions or traces of an organism in rock, over time.

Geology: the scientific study of the origin, history and structure of the Earth.

Glacial erratic: a piece of rock that differs from the size and type of rock native to the area in which it rests. They are carried by glacial ice, often over distances of hundreds of kilometres. Erratics can range in size from pebbles to large boulders.

Glacier: a large persistent body of ice that forms where the accumulation of snow exceeds its melting over many years, often centuries.

Hoodoo: a mushroom-shaped rock formation which is formed by differential resistance to erosion.

Igneous rock: rock formed from the solidification of cooled magma (molten rock).

Law of Superposition: a law formulated in the 17th century by Danish scientist Nicolas Steno that states that sedimentary layers are deposited in a time sequence, with the oldest layer on the bottom and the youngest on the top.

Metamorphic rock: sedimentary or igneous rocks that have been altered by heat and/or pressure.

Palaeoenvironment: the environment of the ancient past.

Palaeontology: the study of ancient plant and animal life through the fossil record.

Permineralization: a type of fossilization involving deposits of minerals within the cells of organisms. Permineralization is different from petrification in that the organic material is only filled with minerals and not completely replaced.

Petrifaction: the process by which the organic material is replaced with minerals ("turns to stone"). The most common form is petrified wood,

but other organisms can also become petrified.

Plate tectonics: the theory that describes the large scale motions of the Earth's crust, which is divided into tectonic plates.

Quarry: an area where fossils are excavated.

Replacement: occurs when the shell, bone, or other tissue is replaced with another mineral. In some cases, mineral replacement of the original shell occurs so gradually and at such fine scales that micro structural features are preserved despite the total loss of original material.

Rock cycle: a series of events through which a rock changes, over time, between igneous, sedimentary, and metamorphic forms.

Sedimentary rock: rocks formed by the accumulation and consolidation of mineral and organic fragments that have been deposited by water, wind, or ice.

Sinkhole: an underground tunnel formed by extensive erosion of the sedimentary rock layers.

Stratigraphy: the study of rock layers, their formation, composition and sequence.

Topography: is the study of Earth's surface shape and features.

Trace fossils: also called ichnofossils, are geological records of biological activity. Trace fossils provide proof of animal life from the past. They include things like foot prints, burrows, and coprolites (fossilized feces).

Volcanism: is the eruption of material from deep within the Earth to the surface.

Weathering: the group of processes, both chemical (e.g. air, rain, plants, bacteria) and mechanical (e.g., changes in temperature) that change the character of a rock, but does not move it.

2. GEOLOGICAL SURVEY OF CANADA /ALBERTA GEOLOGICAL SURVEY WEBSITES

In preparation for your program at the Royal Tyrrell Museum, you may want to check out the educational resources, activities, and information on the following websites:

Geological Survey of Canada: <http://www.nrcan.gc.ca/earth-sciences/resources/10778>

Alberta Geological Survey: <https://ags.aer.ca/index.htm>

Keywords: Geological Survey of Canada, Alberta Geological Survey, Alberta geology

Post-Program Activity

1. REVIEW

The following websites contain information and activities related to the material that was delivered in the Ancient Alberta Rocks program. You may want to have your students participate in these activities as a review of the subject.

<http://www.rocksandminerals4u.com/>

<http://www.sciencekids.co.nz/geology.html>

<http://geology.com/teacher/rocks.shtml>

<http://www.enchantedlearning.com/geology/>

<http://www.uleth.ca/edu/currlab/handouts/geology/>

In depth:

Geological Survey of Canada: <http://www.nrcan.gc.ca/earth-sciences/resources/10778>

Alberta Geological Survey: <https://ags.aer.ca/index.htm>

Keywords: Alberta badlands, Alberta glacial history, Alberta fossils, sedimentary rocks, rock cycle, geology for kids, geography for kids, fossils for kids

Note: Links were last accessed February 2020.

Links to websites are provided solely for your convenience. The Royal Tyrrell Museum does not endorse, authorize, approve, certify, maintain, or control these external Internet addresses and does not guarantee the accuracy, completeness, efficacy, or timeliness of the sites listed.