

Rock and Mineral Kit

TEACHER REFERENCE



Exploring the rugged coastline of Nova Scotia's Eastern Shore

About This Kit

This rock and mineral kit is intended to be used in Science 4 with Earth and Space Science: Rocks, Minerals, and Erosion. This kit provides hands-on, minds-on opportunities for students to explore and explain rocks and minerals through a variety of activities. The materials included in this kit are

- rocks (14)
- overflow can
- Iceland spar
- minerals (4)
- magnetite
- streak plate
- *Atlantic Canada Science Curriculum: Science, Grade 4* (Nova Scotia Department of Education 2004)
- *A Geological Guide to Peggy's Cove, Nova Scotia* (pamphlet from Nova Scotia.com n.d.)
- *A Guide to Rocks and Minerals Collecting in Nova Scotia* (pamphlet from Nova Scotia Natural Resources 2008)
- *Nova Scotia Geological Highway Map* (Service Nova Scotia and Municipal Relations / Atlantic Geoscience Society 2005)
- sound tube (for use in Physical Science: Sound unit)

Introduction

In addition to exploring the living things around them, students should become familiar with the non-living earth materials that make up their world. They should be provided with opportunities to learn that rocks are used for many things in our daily lives, and that rock characteristics help determine their use. Students should also explore how landscapes change by examining the processes of erosion, transport, and deposit. An examination of these processes should also lead to discussions of ways that humans prevent a landscape from changing or ways humans adapt to a changing landscape.

Focus and Context

Earth and Space Science: Rocks, Minerals, and Erosion provides many opportunities for students to practise their inquiry skills. From observing, recording descriptions, and classifying the rocks and minerals in their local habitat, to exploring the make-up of soil and the fossils that can be found in it, students can hone their inquiry skills.

Science Curriculum Links

In Science 3, students explored the composition of soil. This exploration will lead into the Science 7 unit, Earth's Crust, in which students investigate how various types of rocks are formed and how the Earth's crust moves.

Earth and Space Science: Rocks, Minerals, and Erosion Specific Curriculum Outcomes

STSE/Knowledge	Skills	Knowledge
<p>Students will be expected to</p> <p>108-3 demonstrate respect for the local environment</p> <p>301-6, 108-6 demonstrate and record a variety of methods of weathering and erosion, including human impact on the landscape</p>	<p>Students will be expected to</p> <p>204-1, 205-7 investigate rocks and minerals and record questions and observations</p> <p>104-4, 206-1, 207-2 classify rocks and minerals by creating a chart or diagram that illustrates the classification scheme and compare results with others</p> <p>204-8, 205-5, 300-5, 300-6 explore physical properties of local rocks and minerals, using appropriate tools to collect and compare with those from other places</p>	<p>Students will be expected to</p> <p>300-7 identify and describe rocks that contain records of Earth's history</p> <p>300-8 relate characteristics of rocks and minerals to their uses</p> <p>301-4, 301-5 describe ways in which soil is formed from rocks and demonstrate and describe the effects of wind, water, and ice on the landscape</p> <p>301-7 describe natural phenomena that cause rapid and significant changes to the landscape</p>

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Rock and Mineral Specimens

Any natural material found in large enough amounts to be an important part of the crust of the Earth is called a **rock**.

Scientifically, a rock is defined as a naturally occurring aggregate of minerals. Rock can be loose and flowing or hard and compact.

A **mineral** is a naturally occurring chemical compound (usually oxygen and silicon combined with other chemicals) found in the crust of the Earth.

Minerals may occur singly in vast deposits or may be combined into large aggregates of minerals to become a “rock” (e.g., limestone and marble rock, which are made up of calcite). Under favourable conditions, minerals form crystals, making them easy to recognize.

The rock and mineral specimens in this kit are examples taken from a number of different locations in Canada. It is important to note that all the rock and mineral specimens in this kit can be found in Nova Scotia.

Rocks

Igneous Rocks (*From Fire*)

Igneous rocks form from a hot liquid rock called **magma**.

Extrusive: cooled and crystallized quickly at surface (i.e., volcanic rocks from lava flows)

Intrusive: cools slowly underground



Basalt

Composition/properties: volcanic; extrusive; found in large flows, dykes, and sills

Colour/texture: grey to black; fine grains

vesicular basalt—grey-brown; holes (vesicles) left by gas bubbles

amygdaloidal basalt—coloured minerals in some of the vesicles



Granite

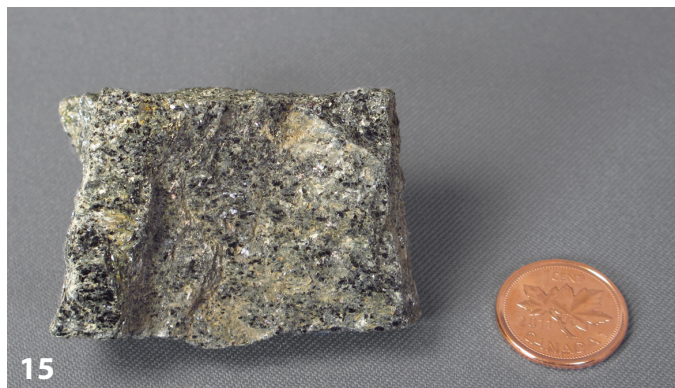
Composition/properties: made up mostly of quartz (at least 20%) and feldspars; intrusive; formed underground

Colour/texture: pink to grey, depending on the minerals and chemistry involved; mineral crystals of quartz (glassy grey), feldspar (white), biotite (black); visibly crystalline in texture

Metamorphic Rocks (*Altered Rocks*)

Metamorphic rocks are produced by high temperature and pressure on pre-existing rocks.

Metamorphic rocks have been exposed as a result of surface erosion.



Schist

Composition/properties: highly metamorphosed shale; contains minerals such as mica, talc, graphite, and others

Colour/texture: colour varies, depending on its composition; individual mineral grains, drawn out into flaky scales by heat and pressure, which can be seen with naked eye



Gneiss

Composition/properties: alternating layers of minerals; made from sedimentary and igneous rocks

Colour/texture: colours vary, with pink sometimes exposed; mostly elongated and granular structures rather than sheets or plates



Slate

Composition/properties: slate is formed from shale; formed when the sedimentary rock, shale, is heated and compressed

Colour/texture: grey, green, purple, or other colours, however grey is most common in Nova Scotia; fine-grained; brittle; breaks easily into layers



Marble

Composition/properties: marble is formed from limestone; composed of recrystallized carbonate minerals; formed when the sedimentary rock, limestone, is heated and compressed; reacts to acid

Colour/texture: white or blue grey, grey, greyish white, pink, salmon, rose, pure white, purple, green, pale pink to cedar red, uniform pure white, and yellow; fine-grained

Sedimentary Rocks (*From Water*)

Sedimentary rocks are originally from sediments—layers or beds—called **strata** (like a layered cake)
They are original rocks eroded by rain, wind, and waves.

Clastic sediments (clay, sand, gravel) have been washed or blown away and redeposited in rivers, lakes, or oceans.
These sediments have been compacted and cemented into rock (e.g., sandstone, shale).

Evaporites: are sedimentary rocks that are formed by chemical precipitation (e.g., limestone, salt, gypsum).

Clastic (Wind and Water Deposits)



Shale

Composition/properties: most abundant of all sedimentary rocks; composed of mud that is a mix of flakes of clay minerals and tiny fragments of other minerals; may have fossil imprints (*Neuropteris ovata*)

Colour/texture: grey, yellow, black, purple; thin layers; fine-grained



Conglomerate

Composition/properties: composed of pebbles rounded by erosion that have been cemented together

Colour/texture: colours vary, depending on sediments; coarse-grained texture



Sandstone (layered)

Composition/properties: composed of sand-sized minerals such as quartz crystals and/or feldspar; seasonal lake deposits—red oxidized layer deposited when it was dry, grey layer deposited when it was wet

Colour/texture: may be any colour, but most are tan, brown, yellow, reddish-brown, grey, pink, white, and black; fine-grained

Evaporites (Chemical Precipitation)



Dolomite

Composition/properties: similar to limestone but less soluble; also considered a rock when composed primarily of dolomite; carbonate mineral

Colour/texture: white, grey to pink in colour; coarse, medium, or fine grained; compact, sometimes earthy



Gypsum

Composition/properties: result of evaporating seawater; also sometimes considered a mineral; used for wallboard (gyprock), etc.

Colour/texture: white, opaque; with impurities may be reddish brown, yellow, blue, pink, or grey; soft sulfate mineral



Coal

Composition/properties: remains of dead plants; formed when large thicknesses of peat (organic plant material) deposited in swampy areas was compressed; combustible

Colour/texture: black or brownish; soft; fine-grained



Limestone

Composition/properties: formed mostly of calcium carbonate and skeleton fragments; reacts to mild HCl (fizzes)

Colour/texture: grey, fine-grained



Halite (Salt)

Composition/properties: sodium chloride mineral; rock salt—readily soluble in water, salty taste; also sometimes considered a mineral

Colour/texture: colourless or white; with impurities; glassy; may be blue, purple, red, pink, or yellow; can form cubic crystals; very soft; coarse

Minerals



Quartz

Composition/properties: second-most-abundant mineral in Earth's crust; made of a continuous framework of silicate material

Colour/texture: ranges from colourless to various colours to black; hard; coarse-grained



Barite

Composition/properties: commonest barium-bearing mineral (barium sulfate); used in radiography

Colour/texture: white or colourless; crystals shaped like slender prisms



Talc

Composition/properties: soft mineral made of magnesium silicate; in loose form known as talcum powder

Colour/texture: ranges from light to dark green, brown, and white; "1" on hardness scale; sheet or layered



Calcite

Composition/properties: calcium carbonate mineral; major constituent of limestone

Colour/texture: colourless or white, unless it contains impurities; soft; fine-grained

Science 4 Activities

This rock and mineral kit can be used with the following activities, found in *Atlantic Canada Science Curriculum: Science 4*:

- Activity 61: My Favourite Rock
- Activity 62: Looking at Rocks and Minerals
- Activity 63: Streak
- Activity 64: Taste
- Activity 65: Lustre
- Activity 66: Colour
- Activity 67: Hardness
- Activity 68: Magnetite
- Activity 69: Crystals
- Activity 70: The Acid Test
- Activity 71: Made from Minerals
- Activity 72: Mass and Volume of Rocks and Minerals
- Activity 73: The Three Rock Groups
- Activity 74: A Research Project
- Activity 75: Rocks or Minerals?
- Activity 76: Weathering and Erosion Overview
- Activity 77: How Does the Soil Stack Up?
- Activity 78: Fossils—Records of the Earth's History
- Activity 79: A Research Project and Presentation