

Anoka Hennepin K-12 Curriculum Unit Plan

Department: Science

Course/Grade Level: 4

Unit Title: Earth Materials

Number of Lessons/Days: About 17 days

Unit Summary: The purpose of this unit is for students to understand that rocks are made of various minerals. This unit is designed to be used in collaboration with hands-on inquiry and direct science instruction. Students will work cooperatively to observe the properties of specific minerals and be able to identify these minerals within rocks. **Mathematics is applied into this unit through metric measurement (linear and mass).**

DESIRED RESULTS (STAGE 1)

Program Understandings:

- I. Students will understand that earth and space are composed of different systems and cycles that influence their daily lives.
- III. Students will understand that scientists use the properties and interactions of energy and matter to explain how the physical world works.
- V. Students will understand that the process of inquiry is the collection of information verified through observation and experimentation which allow scientists to critically analyze, draw conclusions and make inferences about the natural world.
- VI. Students will understand that scientists use various communications to share knowledge and promote understanding about our natural world.

Minnesota State/Local/Core Standards and Technology Standard(s) addressed:

- **4.2.1.1:** Objects have observable properties that can be measured.
 - **4.2.1.1.1 Measurement Tools & Units:** Measure temperature, volume, weight and length using appropriate tools and units.
- **4.3.1.3:** Rocks are Earth materials that may vary in composition.
 - **4.3.1.3.1 Rocks & their Minerals:** Recognize that rocks may be uniform or made of mixtures of different minerals.
 - **4.3.1.3.2 Properties of Minerals:** Describe and classify minerals based on their physical properties.

Overarching Understanding(s) from Curriculum Map/Course Understandings:

Students will understand that...

- scientists experiment and make observations on earth materials to determine chemical and physical properties in order to understand the origin, history and the structure of the earth.
- scientific investigations require us to ask questions, make observations, plan and create tests to verify predictions with evidence and data, and generate further questions to draw logical conclusions.
- scientists work individually and collaboratively to understand the natural world and learn from one another.

Essential Question(s) from Curriculum Map. Course Essential Questions:

To understand, students will need to consider such questions as....

- Why are all rocks so different?
- How do scientists use the inquiry process?
- How do scientists share what they know with others?

<p>Topical Understanding(s) Specific to Unit: <i>Students will understand that...</i></p> <ul style="list-style-type: none"> rocks and minerals have properties that can be observed and described in a variety of ways. rocks are composed of different combinations of minerals, which make them useful. geologists use information learned about the earth to find uses for rocks and minerals. scientists use and interpret data from multiple observations and repeated experiments to identify rock and mineral specimens. 	<p>Topical Essential Questions for Unit:</p> <ul style="list-style-type: none"> How are rocks or minerals different or similar to each other? How do scientists test properties of minerals? How do observations help scientists to understand rocks and minerals? Why do geologists study the earth?
<p><i>To understand, students will need to...</i></p>	
<p>know... Students will need to know the following in order to... (e.g. facts, concepts, generalizations, rules, theories, principles)</p> <ul style="list-style-type: none"> the steps to the scientific process (observe, ask questions, plan investigation, gather evidence) a mineral cannot be reduced to more elementary minerals. the properties of minerals can include: hardness, color, texture, shape, streak and luster. rocks are composed of a mixture of two or more minerals. there are tests that can be conducted to identify rocks and minerals. <p><u>Advanced Learner:</u> Sedimentary, igneous, and metamorphic are the three main types of rocks.</p> <p>ESSENTIAL VOCABULARY</p> <ul style="list-style-type: none"> MCA Essential Vocabulary <ul style="list-style-type: none"> acid - a chemical substance that dissolves metals and other materials composition - the way something is put together Earth's crust – outer layer of the Earth evaporation –when water changes into a gas it can leave behind solids mineral - is an ingredient of rocks that can not be broken down any further physical properties - something you can observe, such as size, color, shape, or texture. (streak, luster, hardness) rock - an earth material made up of different ingredients called minerals. 	<p>be able to... (Students will be able to DO... skills, procedures, processes)</p> <ul style="list-style-type: none"> ask investigable questions (also, introduce terms: testable and experimental questions and use interchangeably) use observing, communicating, comparing and organizing skills to convey findings. construct, test and verify a scientific prediction. measure a rock/mineral in diameter, circumference and depth. measure the mass of a rock/mineral. identify minerals by their unique properties. <p><u>Advanced Learner</u> Identify the different types of rocks and explain how they are formed.</p>

- Earth Materials Essential Vocabulary
 - circumference - the distance around a circular object.
 - depth - how thick an object is from top to bottom
 - diameter - the distance across a circular object through the midpoint.
 - geologist - a scientist who studies the materials that make up the Earth
 - geology - the scientific study of Earth's history and structure
 - mass - the measure of how much matter there is in an object
- Common misunderstanding(s):
 - Rocks are made of the same materials.
 - All rocks are hard.
 - All rocks are heavy.
 - All minerals are rocks.
 - Minerals are always small.