

FALMOUTH PUBLIC SCHOOLS

SCIENCE CURRICULUM

Unit Overview: Earth Science (ES) Rocks and Minerals

Grade 4

Science Curriculum Goals

1. SCIENTIFIC LITERACY. Provide all students with science experiences that are appropriate to their cognitive stages of development and serve as a foundation for more advanced ideas that prepare them for life in an increasingly complex scientific and technological world.
2. INSTRUCTIONAL EFFICIENCY. Provide all teachers with a comprehensive, flexible, attainable science curriculum based upon current research on learning; including collaborative learning, student discourse, and embedded assessment, and uses effective instructional methodologies including: hands-on active inquiry-based learning, integration of disciplines and content areas, and multisensory methods.
3. SYSTEMIC REFORM. Aligned to the Massachusetts State Curriculum Frameworks Science Standards and societal expectations that will prepare students with the knowledge, skills and understandings to succeed in the 21st century.

Pedagogy

Young people need an understanding of basic scientific concepts and methods in order to comprehend the scientific issues that will shape their lives. It is equally important for students to develop and apply the concepts and process skills used in scientific inquiry so that they will be prepared to solve problems encountered in other areas of study and in dealings with the everyday world.

This unit emphasizes basic science concepts and skills presented through a range of engaging, inquiry-based, hands-on instructional experiences that focus on the processes and techniques of discovery. This unit is designed to promote scientific literacy and provide opportunities for students to satisfy their innate curiosity as they develop techniques for observing, questioning, and testing basic scientific concepts.

Unit Summary

The Rocks and Minerals kit provides the tools to motivate students, build science concepts, and address real-world science problems. The curriculum is designed to provide opportunities to classify and sort minerals and other objects using physical qualities, identify rocks, and compare how different rocks weather, both physically and chemically, while observing the effects of erosion on rocks and minerals.

(adapted from lhsfoss.org)

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Suggested timeframe: 8 sessions and assessment(s)

Curriculum Standards and Enduring Understandings

- ES1 Describe what a mineral is
- ES2 Identify the physical properties of a mineral and test for those
- A mineral is a naturally occurring solid that is neither a plant nor an animal
- ES3 Compare and contrast the formation of the three types of rock (metamorphic, igneous, and sedimentary)
- All rocks are either metamorphic, igneous or sedimentary. Each type of rock is uniquely formed.
- ES4 Understand how soil is formed
- ES5 Understand the properties of soil and how it supports the growth of plants
- Soil is formed by underlying bedrock and organic, decaying matter which supports the growth of plants
- ES12 Understand that slow (erosion and weathering) and rapid (extreme weather) processes shape the Earth
- The Earth's surface is shaped by both slow and rapid processes (weathering, erosion, landslides, volcanic eruptions and earthquakes)

Essential Questions

- How do minerals fit into our natural world?
- How do the physical properties of a mineral determine its characteristics?
- How does the formation of a rock determine its classification?
- How does soil affect plant growth?
- How does living matter contribute to the formation of soil?
- What affects the shape of the Earth's surface?

Unit Vocabulary

chemical weathering	magma
cleavage	metamorphic
crystal	mineral
foliated	nonfoliated
hardness	physical weathering
igneous	sedimentary

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Evidence of Scientific Method within Instruction

- ✓ Reading (shared, guided, independent) - *share information, collaborate*
- ✓ KWL - *activate, predict, analyze, hypothesize*
- ✓ Think - Pair - Share - *share information, collaborate*
- ✓ Modeling - *share information, observe, experiment*
- ✓ Participating in experiments - *share information, procedure, measure, record, compare, sort & classify*

Assessments

- ❖ Observations
- ❖ Anecdotal notes
- ❖ Class discussions
- ❖ Activity sheets
- ❖ Lab report(s)
- ❖ ORQ(s) *from Essential Questions
- ❖ Unit Test *draft