Inquiry Investigations™
Earth's Resources MODULE - 1287232
Grades: 6-9

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Massachusetts Curriculum Frameworks
Science
Grade 6

DOMAIN / GENERAL STANDARD	MA.1.	Earth and Space Science
LEARNING STANDARD / OUTCOME	1.2.	Earth's Structure: Describe the layers of the solid earth, including the lithosphere, the hot convecting mantle, and the dense metallic core. • Earth Resources: Unit 1 Lab 1 Activity 1: The Rock Cycle • Virtual Laboratory: Mineral Identification
LEARNING STANDARD / OUTCOME	1.5.	Earth's History: Describe how the movement of the earth's crustal plates causes both slow changes in the earth's surface (e.g., formation of mountains and ocean basins) and rapid ones (e.g., volcanic eruptions and earthquakes). • Earth Resources: Unit 4 Lab 8 Activity 1: Recreating Pangaea • Teacher Resource CD: Rocks, Minerals, and Earth Processes
LEARNING STANDARD / OUTCOME	1.6.	Earth's History: Describe and give examples of ways in which the earth's surface is built up and torn down by natural processes, including deposition of sediments, rock formation, erosion, and weathering. • Earth Resources: Unit 1 Lab 1 Activity 1: The Rock Cycle • Earth Resources: Unit 1 Lab 1 Activity 2: Creating a Sedimentary Rock • Earth Resources: Unit 1 Lab 1 Activity 4: Crystallization • Earth Resources: Unit 1 Lab 2 Activity 1: Igneous Rocks • Earth Resources: Unit 4 Lab 6 Activity 1: Mechanical Weathering • Earth Resources: Unit 4 Lab 6 Activity 2: Chemical Weathering • Teacher Resource CD: Rocks, Minerals, and Earth Processes
LEARNING STANDARD / OUTCOME	1.7.	Earth's History: Explain and give examples of how physical evidence, such as fossils and surface features of glaciation, supports theories that the earth has evolved over geologic time. • Earth Resources: Unit 1 Lab 1 Activity 2: Creating a Sedimentary Rock • Earth Resources: Unit 3 Lab 5 Activity 1: Fossils and Geologic Time • Earth Resources: Unit 3 Lab 5 Activity 2: Fossil Sorting and Identification • Earth Resources: Unit 3 Lab 5 Activity 3: Fossil Formation -

		Preparing Molds and Casts • Earth Resources: Unit 4 Lab 8 Activity 1: Recreating Pangaea • Earth Resources: Unit 5 Lab 9 Activity 1: Geology Dig • Teacher Resource CD: Fossils and Geologic Time
DOMAIN / GENERAL STANDARD	**MA.2.**	**Life Science**
LEARNING STANDARD / OUTCOME	**2.17.**	Changes in Ecosystems Over Time: Identify ways in which ecosystems have changed throughout geologic time in response to physical conditions, interactions among organisms, and the actions of humans. Describe how changes may be catastrophes such as volcanic eruptions or ice storms. • Earth Resources: Unit 1 Lab 1 Activity 1: The Rock Cycle • Earth Resources: Unit 1 Lab 1 Activity 2: Creating a Sedimentary Rock • Earth Resources: Unit 1 Lab 1 Activity 3: Effects of Heat and Pressure on Rock Layers • Earth Resources: Unit 1 Lab 1 Activity 4: Crystallization • Earth Resources: Unit 1 Lab 2 Activity 1: Igneous Rocks • Earth Resources: Unit 2 Lab 4 Activity 1: Idiochromatic and Allochromatic Minerals • Earth Resources: Unit 3 Lab 5 Activity 1: Fossils and Geologic Time • Earth Resources: Unit 3 Lab 5 Activity 2: Fossil Sorting and Identification • Earth Resources: Unit 3 Lab 5 Activity 3: Fossil Formation - Preparing Molds and Casts • Earth Resources: Unit 4 Lab 8 Activity 1: Recreating Pangaea • Earth Resources: Unit 5 Lab 9 Activity 1: Geology Dig • Teacher Resource CD: Fossils and Geologic Time
DOMAIN / GENERAL STANDARD	**MA.3.**	**Physical Sciences**
LEARNING STANDARD / OUTCOME	**3.2.**	Properties of Matter: Differentiate between volume and mass. Define density. • Earth Resources: Unit 2 Lab 3 Activity 6: Specific Gravity
LEARNING STANDARD / OUTCOME	**3.3.**	Properties of Matter: Recognize that the measurement of volume and mass requires understanding of the sensitivity of measurement tools (e.g., rulers, graduated cylinders, balances) and knowledge and appropriate use of significant digits. • Earth Resources: Unit 2 Lab 3 Activity 6: Specific Gravity • Earth Resources: Unit 4 Lab 6 Activity 1: Mechanical Weathering • Earth Resources: Unit 5 Lab 9 Activity 1: Geology Dig
LEARNING STANDARD / OUTCOME	**3.7.**	Elements, Compounds, and Mixtures: Give basic examples of elements and compounds. • Virtual Laboratory: Mineral Identification

LEARNING STANDARD / OUTCOME	**3.8.**	Elements, Compounds, and Mixtures: Differentiate between mixtures and pure substances. • Virtual Laboratory: Mineral Identification
LEARNING STANDARD / OUTCOME	**3.10.**	Elements, Compounds, and Mixtures: Differentiate between physical changes and chemical changes. • Earth Resources: Unit 2 Lab 4 Activity 2: Chemical Analysis of Minerals • Earth Resources: Unit 2 Lab 4 Activity 3: Using the Flame Test to Identify Unknown Mineral Samples • Earth Resources: Unit 4 Lab 6 Activity 1: Mechanical Weathering • Earth Resources: Unit 4 Lab 6 Activity 2: Chemical Weathering • Earth Resources: Unit 5 Lab 9 Activity 1: Geology Dig
LEARNING STANDARD / OUTCOME	**3.16.**	Heat Energy: Give examples of how heat moves in predictable ways, moving from warmer objects to cooler ones until they reach equilibrium. • Earth Resources: Unit 1 Lab 2 Activity 1: Igneous Rocks • Earth Resources: Unit 1 Lab 2 Activity 3: Metamorphic Rocks
DOMAIN / GENERAL STANDARD	**MA.4.**	**Technology/Engineering**
LEARNING STANDARD / OUTCOME	**4.2.**	Materials, Tools, and Machines: Identify and explain appropriate measuring tools, hand tools, and power tools used to hold, lift, carry, fasten, and separate, and explain their safe and proper use. • Earth Resources: Unit 1 Lab 1 Activity 1: The Rock Cycle • Earth Resources: Unit 1 Lab 1 Activity 2: Creating a Sedimentary Rock • Earth Resources: Unit 1 Lab 1 Activity 3: Effects of Heat and Pressure on Rock Layers • Earth Resources: Unit 1 Lab 1 Activity 4: Crystallization • Earth Resources: Unit 1 Lab 2 Activity 1: Igneous Rocks • Earth Resources: Unit 1 Lab 2 Activity 2: Sedimentary Rocks • Earth Resources: Unit 1 Lab 2 Activity 3: Metamorphic Rocks • Earth Resources: Unit 2 Lab 3 Activity 1: Identifying Mineral Color • Earth Resources: Unit 2 Lab 3 Activity 2: Mineral Luster • Earth Resources: Unit 2 Lab 3 Activity 3: The Streak of a Mineral • Earth Resources: Unit 2 Lab 3 Activity 4: Testing the Hardness of a Mineral • Earth Resources: Unit 2 Lab 3 Activity 5: Cleavage and Fracture • Earth Resources: Unit 2 Lab 3 Activity 6: Specific Gravity • Earth Resources: Unit 2 Lab 4 Activity 1: Idiochromatic and Allochromatic Minerals • Earth Resources: Unit 2 Lab 4 Activity 2: Chemical Analysis of Minerals • Earth Resources: Unit 2 Lab 4 Activity 3: Using the Flame Test to Identify Unknown Mineral Samples • Earth Resources: Unit 3 Lab 5 Activity 1: Fossils and Geologic

		Time • Earth Resources: Unit 3 Lab 5 Activity 2: Fossil Sorting and Identification • Earth Resources: Unit 3 Lab 5 Activity 3: Fossil Formation - Preparing Molds and Casts • Earth Resources: Unit 4 Lab 6 Activity 1: Mechanical Weathering • Earth Resources: Unit 4 Lab 6 Activity 2: Chemical Weathering • Earth Resources: Unit 4 Lab 7 Activity 1: Soil Structure • Earth Resources: Unit 4 Lab 7 Activity 2: Soil Horizons • Earth Resources: Unit 4 Lab 8 Activity 1: Recreating Pangaea • Earth Resources: Unit 5 Lab 9 Activity 1: Geology Dig
LEARNING STANDARD / OUTCOME	**4.5.**	Engineering Design: Demonstrate methods of representing solutions to a design problem, e.g., sketches, orthographic projections, multiview drawings. • Earth Resources: Unit 3 Lab 5 Activity 3: Fossil Formation - Preparing Molds and Casts

Massachusetts Curriculum Frameworks
Science
Grade 7

DOMAIN / GENERAL STANDARD	**MA.1.**	**Earth and Space Science**
LEARNING STANDARD / OUTCOME	**1.2.**	Earth's Structure: Describe the layers of the solid earth, including the lithosphere, the hot convecting mantle, and the dense metallic core. • Earth Resources: Unit 1 Lab 1 Activity 1: The Rock Cycle • Virtual Laboratory: Mineral Identification
LEARNING STANDARD / OUTCOME	**1.5.**	Earth's History: Describe how the movement of the earth's crustal plates causes both slow changes in the earth's surface (e.g., formation of mountains and ocean basins) and rapid ones (e.g., volcanic eruptions and earthquakes). • Earth Resources: Unit 4 Lab 8 Activity 1: Recreating Pangaea • Teacher Resource CD: Rocks, Minerals, and Earth Processes
LEARNING STANDARD / OUTCOME	**1.6.**	Earth's History: Describe and give examples of ways in which the earth's surface is built up and torn down by natural processes, including deposition of sediments, rock formation, erosion, and weathering. • Earth Resources: Unit 1 Lab 1 Activity 1: The Rock Cycle • Earth Resources: Unit 1 Lab 1 Activity 2: Creating a Sedimentary Rock • Earth Resources: Unit 1 Lab 1 Activity 4: Crystallization • Earth Resources: Unit 1 Lab 2 Activity 1: Igneous Rocks • Earth Resources: Unit 4 Lab 6 Activity 1: Mechanical Weathering • Earth Resources: Unit 4 Lab 6 Activity 2: Chemical Weathering • Teacher Resource CD: Rocks, Minerals, and Earth Processes

LEARNING STANDARD / OUTCOME	**1.7.**	Earth's History: Explain and give examples of how physical evidence, such as fossils and surface features of glaciation, supports theories that the earth has evolved over geologic time. • Earth Resources: Unit 1 Lab 1 Activity 2: Creating a Sedimentary Rock • Earth Resources: Unit 3 Lab 5 Activity 1: Fossils and Geologic Time • Earth Resources: Unit 3 Lab 5 Activity 2: Fossil Sorting and Identification • Earth Resources: Unit 3 Lab 5 Activity 3: Fossil Formation - Preparing Molds and Casts • Earth Resources: Unit 4 Lab 8 Activity 1: Recreating Pangaea • Earth Resources: Unit 5 Lab 9 Activity 1: Geology Dig • Teacher Resource CD: Fossils and Geologic Time
DOMAIN / GENERAL STANDARD	**MA.2.**	**Life Science**
LEARNING STANDARD / OUTCOME	**2.17.**	Changes in Ecosystems Over Time: Identify ways in which ecosystems have changed throughout geologic time in response to physical conditions, interactions among organisms, and the actions of humans. Describe how changes may be catastrophes such as volcanic eruptions or ice storms. • Earth Resources: Unit 1 Lab 1 Activity 1: The Rock Cycle • Earth Resources: Unit 1 Lab 1 Activity 2: Creating a Sedimentary Rock • Earth Resources: Unit 1 Lab 1 Activity 3: Effects of Heat and Pressure on Rock Layers • Earth Resources: Unit 1 Lab 1 Activity 4: Crystallization • Earth Resources: Unit 1 Lab 2 Activity 1: Igneous Rocks • Earth Resources: Unit 2 Lab 4 Activity 1: Idiochromatic and Allochromatic Minerals • Earth Resources: Unit 3 Lab 5 Activity 1: Fossils and Geologic Time • Earth Resources: Unit 3 Lab 5 Activity 2: Fossil Sorting and Identification • Earth Resources: Unit 3 Lab 5 Activity 3: Fossil Formation - Preparing Molds and Casts • Earth Resources: Unit 4 Lab 8 Activity 1: Recreating Pangaea • Earth Resources: Unit 5 Lab 9 Activity 1: Geology Dig • Teacher Resource CD: Fossils and Geologic Time
DOMAIN / GENERAL STANDARD	**MA.3.**	**Physical Sciences**
LEARNING STANDARD / OUTCOME	**3.2.**	Properties of Matter: Differentiate between volume and mass. Define density. • Earth Resources: Unit 2 Lab 3 Activity 6: Specific Gravity
LEARNING STANDARD / OUTCOME	**3.3.**	Properties of Matter: Recognize that the measurement of volume and mass requires understanding of the sensitivity of measurement tools (e.g., rulers, graduated cylinders, balances) and knowledge and appropriate use of significant digits.

		• Earth Resources: Unit 2 Lab 3 Activity 6: Specific Gravity • Earth Resources: Unit 4 Lab 6 Activity 1: Mechanical Weathering • Earth Resources: Unit 5 Lab 9 Activity 1: Geology Dig
LEARNING STANDARD / OUTCOME	**3.7.**	Elements, Compounds, and Mixtures: Give basic examples of elements and compounds. • Virtual Laboratory: Mineral Identification
LEARNING STANDARD / OUTCOME	**3.8.**	Elements, Compounds, and Mixtures: Differentiate between mixtures and pure substances. • Virtual Laboratory: Mineral Identification
LEARNING STANDARD / OUTCOME	**3.10.**	Elements, Compounds, and Mixtures: Differentiate between physical changes and chemical changes. • Earth Resources: Unit 2 Lab 4 Activity 2: Chemical Analysis of Minerals • Earth Resources: Unit 2 Lab 4 Activity 3: Using the Flame Test to Identify Unknown Mineral Samples • Earth Resources: Unit 4 Lab 6 Activity 1: Mechanical Weathering • Earth Resources: Unit 4 Lab 6 Activity 2: Chemical Weathering • Earth Resources: Unit 5 Lab 9 Activity 1: Geology Dig
LEARNING STANDARD / OUTCOME	**3.16.**	Heat Energy: Give examples of how heat moves in predictable ways, moving from warmer objects to cooler ones until they reach equilibrium. • Earth Resources: Unit 1 Lab 2 Activity 1: Igneous Rocks • Earth Resources: Unit 1 Lab 2 Activity 3: Metamorphic Rocks
DOMAIN / GENERAL STANDARD	**MA.4.**	**Technology/Engineering**
LEARNING STANDARD / OUTCOME	**4.2.**	Materials, Tools, and Machines: Identify and explain appropriate measuring tools, hand tools, and power tools used to hold, lift, carry, fasten, and separate, and explain their safe and proper use. • Earth Resources: Unit 1 Lab 1 Activity 1: The Rock Cycle • Earth Resources: Unit 1 Lab 1 Activity 2: Creating a Sedimentary Rock • Earth Resources: Unit 1 Lab 1 Activity 3: Effects of Heat and Pressure on Rock Layers • Earth Resources: Unit 1 Lab 1 Activity 4: Crystallization • Earth Resources: Unit 1 Lab 2 Activity 1: Igneous Rocks • Earth Resources: Unit 1 Lab 2 Activity 2: Sedimentary Rocks • Earth Resources: Unit 1 Lab 2 Activity 3: Metamorphic Rocks • Earth Resources: Unit 2 Lab 3 Activity 1: Identifying Mineral Color • Earth Resources: Unit 2 Lab 3 Activity 2: Mineral Luster • Earth Resources: Unit 2 Lab 3 Activity 3: The Streak of a

		Mineral • Earth Resources: Unit 2 Lab 3 Activity 4: Testing the Hardness of a Mineral • Earth Resources: Unit 2 Lab 3 Activity 5: Cleavage and Fracture • Earth Resources: Unit 2 Lab 3 Activity 6: Specific Gravity • Earth Resources: Unit 2 Lab 4 Activity 1: Idiochromatic and Allochromatic Minerals • Earth Resources: Unit 2 Lab 4 Activity 2: Chemical Analysis of Minerals • Earth Resources: Unit 2 Lab 4 Activity 3: Using the Flame Test to Identify Unknown Mineral Samples • Earth Resources: Unit 3 Lab 5 Activity 1: Fossils and Geologic Time • Earth Resources: Unit 3 Lab 5 Activity 2: Fossil Sorting and Identification • Earth Resources: Unit 3 Lab 5 Activity 3: Fossil Formation - Preparing Molds and Casts • Earth Resources: Unit 4 Lab 6 Activity 1: Mechanical Weathering • Earth Resources: Unit 4 Lab 6 Activity 2: Chemical Weathering • Earth Resources: Unit 4 Lab 7 Activity 1: Soil Structure • Earth Resources: Unit 4 Lab 7 Activity 2: Soil Horizons • Earth Resources: Unit 4 Lab 8 Activity 1: Recreating Pangaea • Earth Resources: Unit 5 Lab 9 Activity 1: Geology Dig
LEARNING STANDARD / OUTCOME	**4.5.**	Engineering Design: Demonstrate methods of representing solutions to a design problem, e.g., sketches, orthographic projections, multiview drawings. • Earth Resources: Unit 3 Lab 5 Activity 3: Fossil Formation - Preparing Molds and Casts

Massachusetts Curriculum Frameworks
Science
Grade 8

DOMAIN / GENERAL STANDARD	**MA.1.**	**Earth and Space Science**
LEARNING STANDARD / OUTCOME	**1.2.**	Earth's Structure: Describe the layers of the solid earth, including the lithosphere, the hot convecting mantle, and the dense metallic core. • Earth Resources: Unit 1 Lab 1 Activity 1: The Rock Cycle • Virtual Laboratory: Mineral Identification
LEARNING STANDARD / OUTCOME	**1.5.**	Earth's History: Describe how the movement of the earth's crustal plates causes both slow changes in the earth's surface (e.g., formation of mountains and ocean basins) and rapid ones (e.g., volcanic eruptions and earthquakes). • Earth Resources: Unit 4 Lab 8 Activity 1: Recreating Pangaea • Teacher Resource CD: Rocks, Minerals, and Earth Processes
LEARNING STANDARD / OUTCOME	**1.6.**	Earth's History: Describe and give examples of ways in which the earth's surface is built up and torn down by natural processes, including deposition

		of sediments, rock formation, erosion, and weathering. • Earth Resources: Unit 1 Lab 1 Activity 1: The Rock Cycle • Earth Resources: Unit 1 Lab 1 Activity 2: Creating a Sedimentary Rock • Earth Resources: Unit 1 Lab 1 Activity 4: Crystallization • Earth Resources: Unit 1 Lab 2 Activity 1: Igneous Rocks • Earth Resources: Unit 4 Lab 6 Activity 1: Mechanical Weathering • Earth Resources: Unit 4 Lab 6 Activity 2: Chemical Weathering • Teacher Resource CD: Rocks, Minerals, and Earth Processes
LEARNING STANDARD / OUTCOME	**1.7.**	Earth's History: Explain and give examples of how physical evidence, such as fossils and surface features of glaciation, supports theories that the earth has evolved over geologic time. • Earth Resources: Unit 1 Lab 1 Activity 2: Creating a Sedimentary Rock • Earth Resources: Unit 3 Lab 5 Activity 1: Fossils and Geologic Time • Earth Resources: Unit 3 Lab 5 Activity 2: Fossil Sorting and Identification • Earth Resources: Unit 3 Lab 5 Activity 3: Fossil Formation - Preparing Molds and Casts • Earth Resources: Unit 4 Lab 8 Activity 1: Recreating Pangaea • Earth Resources: Unit 5 Lab 9 Activity 1: Geology Dig • Teacher Resource CD: Fossils and Geologic Time
DOMAIN / GENERAL STANDARD	**MA.2.**	**Life Science**
LEARNING STANDARD / OUTCOME	**2.17.**	Changes in Ecosystems Over Time: Identify ways in which ecosystems have changed throughout geologic time in response to physical conditions, interactions among organisms, and the actions of humans. Describe how changes may be catastrophes such as volcanic eruptions or ice storms. • Earth Resources: Unit 1 Lab 1 Activity 1: The Rock Cycle • Earth Resources: Unit 1 Lab 1 Activity 2: Creating a Sedimentary Rock • Earth Resources: Unit 1 Lab 1 Activity 3: Effects of Heat and Pressure on Rock Layers • Earth Resources: Unit 1 Lab 1 Activity 4: Crystallization • Earth Resources: Unit 1 Lab 2 Activity 1: Igneous Rocks • Earth Resources: Unit 2 Lab 4 Activity 1: Idiochromatic and Allochromatic Minerals • Earth Resources: Unit 3 Lab 5 Activity 1: Fossils and Geologic Time • Earth Resources: Unit 3 Lab 5 Activity 2: Fossil Sorting and Identification • Earth Resources: Unit 3 Lab 5 Activity 3: Fossil Formation - Preparing Molds and Casts • Earth Resources: Unit 4 Lab 8 Activity 1: Recreating Pangaea • Earth Resources: Unit 5 Lab 9 Activity 1: Geology Dig • Teacher Resource CD: Fossils and Geologic Time

DOMAIN / GENERAL STANDARD	**MA.3.**	**Physical Sciences**
LEARNING STANDARD / OUTCOME	**3.2.**	Properties of Matter: Differentiate between volume and mass. Define density. • Earth Resources: Unit 2 Lab 3 Activity 6: Specific Gravity
LEARNING STANDARD / OUTCOME	**3.3.**	Properties of Matter: Recognize that the measurement of volume and mass requires understanding of the sensitivity of measurement tools (e.g., rulers, graduated cylinders, balances) and knowledge and appropriate use of significant digits. • Earth Resources: Unit 2 Lab 3 Activity 6: Specific Gravity • Earth Resources: Unit 4 Lab 6 Activity 1: Mechanical Weathering • Earth Resources: Unit 5 Lab 9 Activity 1: Geology Dig
LEARNING STANDARD / OUTCOME	**3.7.**	Elements, Compounds, and Mixtures: Give basic examples of elements and compounds. • Virtual Laboratory: Mineral Identification
LEARNING STANDARD / OUTCOME	**3.8.**	Elements, Compounds, and Mixtures: Differentiate between mixtures and pure substances. • Virtual Laboratory: Mineral Identification
LEARNING STANDARD / OUTCOME	**3.10.**	Elements, Compounds, and Mixtures: Differentiate between physical changes and chemical changes. • Earth Resources: Unit 2 Lab 4 Activity 2: Chemical Analysis of Minerals • Earth Resources: Unit 2 Lab 4 Activity 3: Using the Flame Test to Identify Unknown Mineral Samples • Earth Resources: Unit 4 Lab 6 Activity 1: Mechanical Weathering • Earth Resources: Unit 4 Lab 6 Activity 2: Chemical Weathering • Earth Resources: Unit 5 Lab 9 Activity 1: Geology Dig
LEARNING STANDARD / OUTCOME	**3.16.**	Heat Energy: Give examples of how heat moves in predictable ways, moving from warmer objects to cooler ones until they reach equilibrium. • Earth Resources: Unit 1 Lab 2 Activity 1: Igneous Rocks • Earth Resources: Unit 1 Lab 2 Activity 3: Metamorphic Rocks
DOMAIN / GENERAL STANDARD	**MA.4.**	**Technology/Engineering**
LEARNING STANDARD / OUTCOME	**4.2.**	Materials, Tools, and Machines: Identify and explain appropriate measuring tools, hand tools, and power tools used to hold, lift, carry, fasten, and separate, and explain their safe and proper use. • Earth Resources: Unit 1 Lab 1 Activity 1: The Rock Cycle

		• Earth Resources: Unit 1 Lab 1 Activity 2: Creating a Sedimentary Rock • Earth Resources: Unit 1 Lab 1 Activity 3: Effects of Heat and Pressure on Rock Layers • Earth Resources: Unit 1 Lab 1 Activity 4: Crystallization • Earth Resources: Unit 1 Lab 2 Activity 1: Igneous Rocks • Earth Resources: Unit 1 Lab 2 Activity 2: Sedimentary Rocks • Earth Resources: Unit 1 Lab 2 Activity 3: Metamorphic Rocks • Earth Resources: Unit 2 Lab 3 Activity 1: Identifying Mineral Color • Earth Resources: Unit 2 Lab 3 Activity 2: Mineral Luster • Earth Resources: Unit 2 Lab 3 Activity 3: The Streak of a Mineral • Earth Resources: Unit 2 Lab 3 Activity 4: Testing the Hardness of a Mineral • Earth Resources: Unit 2 Lab 3 Activity 5: Cleavage and Fracture • Earth Resources: Unit 2 Lab 3 Activity 6: Specific Gravity • Earth Resources: Unit 2 Lab 4 Activity 1: Idiochromatic and Allochromatic Minerals • Earth Resources: Unit 2 Lab 4 Activity 2: Chemical Analysis of Minerals • Earth Resources: Unit 2 Lab 4 Activity 3: Using the Flame Test to Identify Unknown Mineral Samples • Earth Resources: Unit 3 Lab 5 Activity 1: Fossils and Geologic Time • Earth Resources: Unit 3 Lab 5 Activity 2: Fossil Sorting and Identification • Earth Resources: Unit 3 Lab 5 Activity 3: Fossil Formation - Preparing Molds and Casts • Earth Resources: Unit 4 Lab 6 Activity 1: Mechanical Weathering • Earth Resources: Unit 4 Lab 6 Activity 2: Chemical Weathering • Earth Resources: Unit 4 Lab 7 Activity 1: Soil Structure • Earth Resources: Unit 4 Lab 7 Activity 2: Soil Horizons • Earth Resources: Unit 4 Lab 8 Activity 1: Recreating Pangaea • Earth Resources: Unit 5 Lab 9 Activity 1: Geology Dig
LEARNING STANDARD / OUTCOME	**4.5.**	Engineering Design: Demonstrate methods of representing solutions to a design problem, e.g., sketches, orthographic projections, multiview drawings. • Earth Resources: Unit 3 Lab 5 Activity 3: Fossil Formation - Preparing Molds and Casts

Massachusetts Curriculum Frameworks

Science

Grade 9

DOMAIN / GENERAL STANDARD	**MA.ES.1.**	**Earth and Space: Matter and Energy in the Earth System: The entire Earth system and its various cycles are driven by energy. Earth has both internal and external sources of energy. Two fundamental energy concepts included in the Earth system are gravity and electromagnetism.**
LEARNING STANDARD / OUTCOME	**1.8.**	Read, interpret, and analyze a combination of ground-based observations, satellite data, and computer models to demonstrate Earth systems and their interconnections.

		• Earth Resources: Unit 1 Lab 1 Activity 1: The Rock Cycle • Earth Resources: Unit 1 Lab 1 Activity 2: Creating a Sedimentary Rock • Earth Resources: Unit 1 Lab 1 Activity 3: Effects of Heat and Pressure on Rock Layers • Earth Resources: Unit 1 Lab 1 Activity 4: Crystallization • Earth Resources: Unit 1 Lab 2 Activity 1: Igneous Rocks • Earth Resources: Unit 1 Lab 2 Activity 2: Sedimentary Rocks • Earth Resources: Unit 1 Lab 2 Activity 3: Metamorphic Rocks • Earth Resources: Unit 4 Lab 6 Activity 1: Mechanical Weathering • Earth Resources: Unit 4 Lab 6 Activity 2: Chemical Weathering • Earth Resources: Unit 4 Lab 7 Activity 1: Soil Structure • Earth Resources: Unit 4 Lab 7 Activity 2: Soil Horizons • Earth Resources: Unit 4 Lab 8 Activity 1: Recreating Pangaea • Earth Resources: Unit 5 Lab 9 Activity 1: Geology Dig • Virtual Laboratory: Mineral Identification
DOMAIN / GENERAL STANDARD	**MA.ES.3.**	**Earth and Space: Earth Processes and Cycles: Earth is a dynamic interconnected system. The evolution of Earth has been driven by interactions between the lithosphere, hydrosphere, atmosphere, and biosphere. Over geologic time the internal motions of Earth have continuously altered the topography and geography of the continents and ocean basins by both constructive and destructive processes.**
LEARNING STANDARD / OUTCOME	**3.1.**	Explain how physical and chemical weathering leads to erosion and the formation of soils and sediments, and creates the various types of landscapes. Give examples that show the effects of physical and chemical weathering on the environment. • Earth Resources: Unit 1 Lab 1 Activity 1: The Rock Cycle • Earth Resources: Unit 1 Lab 1 Activity 2: Creating a Sedimentary Rock • Earth Resources: Unit 4 Lab 6 Activity 1: Mechanical Weathering • Earth Resources: Unit 4 Lab 6 Activity 2: Chemical Weathering • Earth Resources: Unit 4 Lab 7 Activity 1: Soil Structure • Earth Resources: Unit 4 Lab 7 Activity 2: Soil Horizons • Earth Resources: Unit 5 Lab 9 Activity 1: Geology Dig • Teacher Resource CD: Rocks, Minerals, and Earth Processes
LEARNING STANDARD / OUTCOME	**3.6.**	Describe the rock cycle, and the processes that are responsible for the formation of igneous, sedimentary, and metamorphic rocks. Compare the physical properties of these rock types and the physical properties of common rock-forming minerals. • Earth Resources: Unit 1 Lab 1 Activity 1: The Rock Cycle • Earth Resources: Unit 1 Lab 1 Activity 4: Crystallization • Earth Resources: Unit 1 Lab 2 Activity 1: Igneous Rocks • Earth Resources: Unit 1 Lab 2 Activity 2: Sedimentary Rocks • Earth Resources: Unit 1 Lab 2 Activity 3: Metamorphic Rocks • Earth Resources: Unit 2 Lab 3 Activity 1: Identifying Mineral Color • Earth Resources: Unit 2 Lab 3 Activity 2: Mineral Luster

		• Earth Resources: Unit 2 Lab 3 Activity 3: The Streak of a Mineral • Earth Resources: Unit 2 Lab 3 Activity 4: Testing the Hardness of a Mineral • Earth Resources: Unit 2 Lab 3 Activity 5: Cleavage and Fracture • Earth Resources: Unit 2 Lab 3 Activity 6: Specific Gravity • Earth Resources: Unit 2 Lab 4 Activity 1: Idiochromatic and Allochromatic Minerals • Earth Resources: Unit 2 Lab 4 Activity 2: Chemical Analysis of Minerals • Earth Resources: Unit 2 Lab 4 Activity 3: Using the Flame Test to Identify Unknown Mineral Samples • Earth Resources: Unit 5 Lab 9 Activity 1: Geology Dig • Teacher Resource CD: Rocks, Minerals, and Earth Processes • Virtual Laboratory: Mineral Identification
LEARNING STANDARD / OUTCOME	**3.7.**	Describe the absolute and relative dating methods used to measure geologic time, such as, index fossils, radioactive dating, law of superposition, and crosscutting relationships. • Teacher Resource CD: Fossils and Geologic Time
LEARNING STANDARD / OUTCOME	**3.8.**	Trace the development of a lithospheric plate from its growth at a divergent boundary (mid-ocean ridge) to its destruction at a convergent boundary (subduction zone). Recognize that alternating magnetic polarity is recorded in rock at mid-ocean ridges. • Earth Resources: Unit 1 Lab 1 Activity 1: The Rock Cycle • Earth Resources: Unit 4 Lab 8 Activity 1: Recreating Pangaea • Teacher Resource CD: Rocks, Minerals, and Earth Processes
LEARNING STANDARD / OUTCOME	**3.9.**	Explain the relationship between convection currents in Earth's mantle and the motion of the lithospheric plates. • Teacher Resource CD: Rocks, Minerals, and Earth Processes
LEARNING STANDARD / OUTCOME	**3.10.**	Relate earthquakes, volcanic activity, tsunamis, mountain building and tectonic uplift to plate movements. • Earth Resources: Unit 1 Lab 1 Activity 1: The Rock Cycle • Earth Resources: Unit 4 Lab 8 Activity 1: Recreating Pangaea • Teacher Resource CD: Rocks, Minerals, and Earth Processes
LEARNING STANDARD / OUTCOME	**3.11.**	Explain how seismic data are used to reveal Earth's interior structure and to locate earthquake epicenters. • Earth Resources: Unit 1 Lab 1 Activity 1: The Rock Cycle • Virtual Laboratory: Mineral Identification
LEARNING STANDARD / OUTCOME	**3.12.**	Describe the Richter scale of earthquake magnitude and the relative damage that is incurred by earthquakes of a given magnitude.

		• Teacher Resource CD: Rocks, Minerals, and Earth Processes
DOMAIN / GENERAL STANDARD	**MA.C.1.**	**Chemistry: Properties of Matter: Physical and chemical properties reflect the nature of the interactions between molecules or atoms and can be used to classify and describe matter.**
LEARNING STANDARD / OUTCOME	**1.1.**	Identify and explain physical properties (such as density, melting point, boiling point, conductivity, and malleability) and chemical properties (such as the ability to form new substances). Distinguish between chemical and physical changes. • Earth Resources: Unit 2 Lab 3 Activity 6: Specific Gravity • Earth Resources: Unit 2 Lab 4 Activity 2: Chemical Analysis of Minerals • Earth Resources: Unit 2 Lab 4 Activity 3: Using the Flame Test to Identify Unknown Mineral Samples • Earth Resources: Unit 4 Lab 6 Activity 1: Mechanical Weathering • Earth Resources: Unit 4 Lab 6 Activity 2: Chemical Weathering
LEARNING STANDARD / OUTCOME	**1.2.**	Explain the difference between pure substances (elements and compounds) and mixtures. Differentiate between heterogeneous and homogeneous mixtures. • Virtual Laboratory: Mineral Identification
DOMAIN / GENERAL STANDARD	**MA.C.4.**	**Chemistry: Chemical Bonding: Atoms bond with each other by transferring or sharing valence electrons to form compounds.**
LEARNING STANDARD / OUTCOME	**4.1.**	Explain how atoms combine to form compounds through both ionic and covalent bonding. Predict chemical formulas based on the number of valence electrons. • Virtual Laboratory: Mineral Identification
LEARNING STANDARD / OUTCOME	**4.6.**	Name and write the chemical formulas for simple ionic and molecular compounds, including those that contain the polyatomic ions: ammonium, carbonate, hydroxide, nitrate, phosphate, and sulfate. • Virtual Laboratory: Mineral Identification
DOMAIN / GENERAL STANDARD	**MA.C.5.**	**Chemistry: Chemical Reactions and Stoichiometry: In a chemical reaction, one or more reactants are transformed into one or more new products. Chemical equations represent the reaction and must be balanced. The conservation of atoms in a chemical reaction leads to the ability to calculate the amount of products formed and reactants used (stoichiometry).**
LEARNING STANDARD / OUTCOME	**5.4.**	Determine percent compositions, empirical formulas, and molecular formulas. • Virtual Laboratory: Mineral Identification
DOMAIN / GENERAL STANDARD	**MA.C.8.**	**Chemistry: Acids and Bases and Oxidation-Reduction Reactions: Acids and bases are important in numerous chemical processes that occur around us, from industrial procedures to biological ones, from the**

		laboratory to the environment. Oxidation-reduction reactions occur when one substance transfers electrons to another substance and constitutes a major class of chemical reactions.
LEARNING STANDARD / OUTCOME	**8.1.**	Define the Arrhenius theory of acids and bases in terms of the presence of hydronium and hydroxide ions in water and the Bronsted-Lowry theory of acids and bases in terms of proton donor and acceptor. • Earth Resources: Unit 5 Lab 9 Activity 1: Geology Dig
LEARNING STANDARD / OUTCOME	**8.2.**	Relate hydrogen ion concentrations to the pH scale, and to acidic, basic, and neutral solutions. Compare and contrast the strength of various common acids and bases such as vinegar, baking soda, soap, and citrus juice. • Earth Resources: Unit 5 Lab 9 Activity 1: Geology Dig
DOMAIN / GENERAL STANDARD	**MA.T/E.1.**	**Technology/Engineering: Engineering Design: Engineering design involves practical problem solving, research, development, and invention/innovation and requires designing, drawing, building, testing, and redesigning. Students should demonstrate the ability to use the engineering design process to solve a problem or meet a challenge.**
LEARNING STANDARD / OUTCOME	**1.3.**	Produce and analyze multi-view drawings (orthographic projections) and pictorial (isometric, oblique, perspective) drawings using various techniques. • Earth Resources: Unit 3 Lab 5 Activity 3: Fossil Formation - Preparing Molds and Casts
DOMAIN / GENERAL STANDARD	**MA.T/E.2.**	**Technology/Engineering: Construction Technologies: The construction process is a series of actions completed to build a structure including: preparing a site, setting a foundation, erecting a structure, installing utilities, and finishing a site. Various materials, processes, and systems are used to build structures. Students should demonstrate and apply the concepts of construction technology through building and constructing either full-size models or scale models using various materials commonly used in construction. Students should demonstrate the ability to use the engineering design process to solve a problem or meet a challenge in construction technologies.**
LEARNING STANDARD / OUTCOME	**2.1.**	Identify and explain the engineering properties of materials used in structures, such as, elasticity, plasticity, R value, density, and strength. • Earth Resources: Unit 2 Lab 3 Activity 6: Specific Gravity