

Hands On Earth Science Activity No. 1

Crystal Garden

This activity can be used to help teach the Ohio Academic Content Standards' Earth and Space, Life and/or Physical Sciences Grade-Level Indicators below:

Kindergarten, Earth and Space Sciences 3: *Explore that sometimes change is too fast to see and sometimes change is too slow to see.*

Grade 4, Physical Sciences 1: *Identify characteristics of a simple physical change (e.g., heating or cooling can change water from one state to another and the change is reversible).*

Grade 7, Earth and Space Sciences 1: *Explain the biogeochemical cycles that move materials between the lithosphere (land), hydrosphere (water) and atmosphere (air).*

Grade 12, Physical Sciences 1: *Explain how atoms join one another in various combinations in distinct molecules or in repeating crystal patterns.*

Hands On Earth Science Activity No. 2

Egg Tectonics

This activity can be used to help teach the Ohio Academic Content Standards' Earth and Space, Life and/or Physical Sciences Grade-Level Indicators below:

Grade 9, Earth and Space Sciences 6, 7 and 8: *Explain the results of plate tectonic activity (e.g., magma generation, igneous intrusion, metamorphism, volcanic action, earthquakes, faulting and folding).; Explain sea-floor spreading and continental drift using scientific evidence (e.g., fossil distributions, magnetic reversals and radiometric dating).; Use historical examples to explain how new ideas are limited by the context in which they are conceived; are often initially rejected by the scientific establishment; sometimes spring from unexpected findings; and usually grow slowly through contributions from many different investigators (e.g., heliocentric theory and plate tectonics theory).*

Grade 11, Earth and Space Sciences 15 and 16: *Use historical examples to show how new ideas are limited by the context in which they are conceived; are often rejected by the social establishment; sometimes spring from unexpected findings; and usually grow slowly through contributions from many different investigators (e.g., global warming, Heliocentric Theory and Theory of Continental Drift).; Describe advances in Earth and space science that have important long-lasting effects on science and society (e.g., global warming, Heliocentric Theory and Plate Tectonics Theory).*

Hands On Earth Science Activity No. 3

Everyone Loves Fossils

This activity can be used to help teach the Ohio Academic Content Standards' Earth and Space, Life and/or Physical Sciences Grade-Level Indicators below:

Grade 3, Life Sciences 5: *Observe and explore how fossils provide evidence about animals that lived long ago and the nature of the environment at that time.*

Grade 4, Life Sciences 4: *Observe and explore that fossils provide evidence about plants that lived long ago and the nature of the environment at that time.*

Grade 6, Earth and Space Sciences 2: *Explain that rocks are made of one or more minerals.*

Grade 11, Life Sciences 14: *Describe how geologic time can be estimated by observing rock sequences and using fossils to correlate the sequences at various locations. Recognize that current methods include using the known decay rates of radioactive isotopes present in rocks to measure the time since the rock was formed.*

Hands On Earth Science Activity No. 4 Ohio Geology Word Search

This activity can be used to help review Ohio Academic Content Standards' Grade-Level Indicators for **Grade 6** Physical Sciences and **Grade 7** Earth and Space Sciences.

Hands On Earth Science Activity No. 5 Ohio Geology Crossword Puzzle

This activity can be used to help review Ohio Academic Content Standards' Grade-Level Indicators for **Grade 10** Earth and Space Sciences.

Hands On Earth Science Activity No. 6 Rocks and Minerals Are Everywhere

This activity can be used to help teach the Ohio Academic Content Standards' Earth and Space, Life and/or Physical Sciences Grade-Level Indicators below:

Grade 4, Physical Sciences 3: *Describe objects by the properties of the materials from which they are made and that these properties can be used to separate or sort a group of objects (e.g., paper, glass, plastic and metal).*

Grade 5, Earth and Space Sciences 5: *Explain how the supply of many non-renewable resources is limited and can be extended through reducing, reusing and recycling but cannot be extended indefinitely.*

Grade 6, Physical Sciences 2, 3 and 4: *Describe that in a chemical change new substances are formed with different properties than the original substance (e.g., rusting, burning).; Describe that in a physical change (e.g., state, shape and size) the chemical properties of a substance remain unchanged.; Describe that chemical and physical changes occur all around us (e.g., in the human body, cooking and industry).*

Grade 11, Earth and Space Sciences 14: *Conclude that Earth has finite resources and explain that humans deplete some resources faster than they can be renewed.*

Hands On Earth Science Activity No. 7 Modeling Ohio's Geology

This activity can be used to help teach the Ohio Academic Content Standards' Earth and Space, Life and/or Physical Sciences Grade-Level Indicators below:

Grade 3, Earth and Space Sciences 2: *Observe and investigate that rocks are often found in layers.*

Grade 8, Earth and Space Sciences 11, 13 and 14: *Use models to analyze the size and shape of Earth, its surface and its interior (e.g., globes, topographic maps, satellite images).; Describe how landforms are created through a combination of destructive (e.g., weathering and erosion) and constructive processes (e.g., crustal deformation, volcanic eruptions and deposition of sediment).; Explain that folding, faulting and uplifting can rearrange the rock layers so the youngest is not always found on top.*

Hands On Earth Science Activity No. 8

Understanding Geologic Time

This activity can be used to help teach the Ohio Academic Content Standards' Earth and Space, Life and/or Physical Sciences Grade-Level Indicators below:

Grade 10, Earth and Space Sciences 3 and 7: *Explain how geologic time can be estimated by multiple methods (e.g., rock sequences, fossil correlation and radiometric dating).; Describe advances and issues in Earth and space science that have important long-lasting effects on science and society (e.g., geologic time scales, global warming, depletion of resources and exponential population growth).*

Grade 11, Life Sciences 13 and 14: *Describe how the process of evolution has changed the physical world over geologic time.; Describe how geologic time can be estimated by observing rock sequences and using fossils to correlate the sequences at various locations. Recognize that current methods include using the known decay rates of radioactive isotopes present in rocks to measure the time since the rock was formed.*

Hands On Earth Science Activity No. 9

How to Determine True North

This activity can be used to help teach the Ohio Academic Content Standards' Earth and Space, Life and/or Physical Sciences Grade-Level Indicators below:

Grade 5, Earth and Space Sciences 1: *Describe how night and day are caused by Earth's rotation.*

Grade 8, Earth and Space Sciences 1: *Describe how objects in the solar system are in regular and predictable motions that explain such phenomena as days, years, seasons, eclipses, tides and moon cycles.*

Grade 11, Earth and Space Sciences 2: *Analyze how the regular and predictable motions of Earth, sun and moon explain phenomena on Earth (e.g., seasons, tides, eclipses and phases of the moon).*

Hands On Earth Science Activity No. 10

Two Scale Models of the Earth-Moon System

This activity can be used to help teach the Ohio Academic Content Standards' Earth and Space, Life and/or Physical Sciences Grade-Level Indicators below:

Grade 5, Earth and Space Sciences 2: *Explain that Earth is one of several planets to orbit the sun, and that the moon orbits Earth.*

Grade 8, Earth and Space Sciences 11: *Use models to analyze the size and shape of Earth, its surface and its interior (e.g., globes, topographic maps, satellite images).*

Grade 11, Earth and Space Sciences 2: *Analyze how the regular and predictable motions of Earth, sun and moon explain phenomena on Earth (e.g., seasons, tides, eclipses and phases of the moon).*

Hands On Earth Science Activity No. 11

Is it a Rock or a Mineral?

This activity can be used to help teach the Ohio Academic Content Standards' Earth and Space, Life and/or Physical Sciences Grade-Level Indicators below:

Grade 1, Earth and Space Sciences 1: *Identify that resources are things that we get from the living (e.g., forests) and nonliving (e.g., minerals, water) environment and that resources are necessary to meet the needs and wants of a population.*

Grade 6, Earth and Space Sciences 1, 2 and 3: *Describe the rock cycle and explain that there are sedimentary, igneous and metamorphic rocks that have distinct properties (e.g., color, texture) and are formed in different ways.; Explain that rocks are made of one or more minerals.; Identify minerals by their characteristic properties.*

Hands On Earth Science Activity No. 12

Do Rocks Last Forever?

This activity can be used to help teach the Ohio Academic Content Standards' Earth and Space, Life and/or Physical Sciences Grade-Level Indicators below:

Grade 3, Earth and Space Sciences 3 and 4: *Describe that smaller rocks come from the breakdown of larger rocks through the actions of plants and weather.; Observe and describe the composition of soil (e.g., small pieces of rock and decomposed pieces of plants and animals, and products of plants and animals).*

Grade 4, Earth and Space Sciences 8, 9 and 10: *Describe how wind, water and ice shape and reshape Earth's land surface by eroding rock and soil in some areas and depositing them in other areas producing characteristic landforms (e.g., dunes, deltas and glacial moraines).; Identify and describe how freezing, thawing and plant growth reshape the land surface by causing the weathering of rock.; Describe evidence of changes on Earth's surface in terms of slow processes (e.g., erosion, weathering, mountain building and deposition) and rapid processes (e.g. volcanic eruptions, earthquakes and landslides).*

Grade 8, Earth and Space Sciences 13: *Describe how landforms are created through a combination of destructive (e.g., weathering and erosion) and constructive processes (e.g., crustal deformation, volcanic eruptions and deposition of sediment).*

Hands On Earth Science Activity No. 13

Playing Robinson's Wall Game

This activity can be used to help teach the Ohio Academic Content Standards' Earth and Space, Life and/or Physical Sciences Grade-Level Indicators below:

Grade 3, Earth and Space Sciences 1: *Compare distinct properties of rocks (e.g., color, layering and texture).*

Grade 4, Earth and Space Sciences 9: *Identify and describe how freezing, thawing and plant growth reshape the land surface by causing the weathering of rock.*

Hands On Earth Science Activity No. 14

Just How Big Is the Sun?

This activity can be used to help teach the Ohio Academic Content Standards' Earth and Space, Life and/or Physical Sciences Grade-Level Indicators below:

Grade 2, Physical Sciences 3: *Explore with flashlights and shadows that light travels in a straight line until it strikes an object.*

Grade 5, Earth and Space Sciences 4: *Explain that stars are like the sun, some being smaller and some larger, but so far away that they look like points of light.*

Grade 8, Earth and Space Sciences 6 and 8: *Explain interstellar distances are measured in light years (e.g., the nearest star beyond the sun is 4.3 light years away).; Name and describe tools used to study the universe (e.g., telescopes, probes, satellites and space-craft).*

Hands On Earth Science Activity No. 15

Locating the Position of the Setting Sun

This activity can be used to help teach the Ohio Academic Content Standards' Earth and Space, Life and/or Physical Sciences Grade-Level Indicators below:

Grade 2, Earth and Space Sciences 2: *Observe and describe how the sun, moon and stars all appear to move slowly across the sky.*

Grade 5, Earth and Space Sciences 1 and 2: *Describe how night and day are caused by Earth's rotation.; Explain that Earth is one of several planets to orbit the sun, and that the moon orbits Earth.*

Grade 8, Earth and Space Sciences 1: *Describe how objects in the solar system are in regular and predictable motions that explain such phenomena as days, years, seasons, eclipses, tides and moon cycles.*

Hands On Earth Science Activity No. 16

Rock Sculpture

This activity can be used to help teach the Ohio Academic Content Standards' Earth and Space, Life and/or Physical Sciences Grade-Level Indicators below:

Grade 4, Physical Sciences 2: *Identify characteristics of a simple chemical change. When a new material is made by combining two or more materials, it has chemical properties that are different from the original materials (e.g., burning paper, vinegar and baking soda).*

Grade 6, Physical Sciences 2 and 4: *Describe that in a chemical change new substances are formed with different properties than the original substance (e.g., rusting, burning).; Describe that chemical and physical changes occur all around us (e.g., in the human body, cooking and industry).*

Grade 9, Physical Sciences 7 and 15: *Show how atoms may be bonded together by losing, gaining or sharing electrons and that in a chemical reaction, the number, type of atoms and total mass must be the same before and after the reaction (e.g., writing correct chemical formulas and writing balanced chemical equations).; Trace the transformations of energy within a system (e.g., chemical to electrical to mechanical) and recognize that energy is conserved. Show that these transformations involve the release of some thermal energy.*

Hands On Earth Science Activity No. 17

Shake, Rattle, and Liquefy

This activity can be used to help teach the Ohio Academic Content Standards' Earth and Space, Life and/or Physical Sciences Grade-Level Indicators below:

Grade 3, Earth and Space Sciences 5: *Investigate the properties of soil (e.g., color, texture, capacity to retain water, ability to support plant growth).*

Grade 4, Earth and Space Sciences 8 and 10: *Describe how wind, water and ice shape and reshape Earth's land surface by eroding rock and soil in some areas and depositing them in other areas producing characteristic landforms (e.g., dunes, deltas and glacial moraines).; Describe evidence of changes on Earth's surface in terms of slow processes (e.g., erosion, weathering, mountain building and deposition) and rapid processes (e.g. volcanic eruptions, earthquakes and landslides).*

Grade 8, Physical Sciences 5: *Demonstrate that vibrations in materials may produce waves that spread away from the source in all directions (e.g., earthquake waves and sound waves).*