Rocks

Earth & Space Science | Lesson Guide

Kindergarten

Photo Description

This picture shows a house with big rocks stacked up in front of it. The rocks are different sizes and colors. Some rocks are flat and some are round. There are plants growing around the rocks.

Scientific Phenomena

The anchoring phenomenon here is natural weathering and erosion processes that created these diverse rock formations over long periods of time. The rocks show different compositions, textures, and weathering patterns because they formed under different conditions and have been exposed to various environmental forces like water, wind, and temperature changes. This rock garden demonstrates how Earth materials vary in their properties and how humans can arrange natural materials in organized ways.

Core Science Concepts

1. Rock Properties and Characteristics - Rocks come in different sizes, shapes, colors, and textures based on how they formed and what they're made of.

2. Natural vs. Human-Made Arrangements - While rocks form naturally in the Earth, humans can collect and arrange them in patterns for decoration or construction.

3. Earth Materials in Our Environment - Rocks are natural materials that come from the Earth and can be found everywhere around us.

4. Observable Properties - We can use our senses to describe and compare different rocks by looking at their color, size, shape, and texture.

Pedagogical Tip:

Use a "rock hunt" approach where students collect and sort rocks by observable properties before introducing scientific vocabulary. This hands-on exploration builds concrete understanding before abstract concepts.

UDL Suggestions:

Provide multiple ways for students to express their observations - drawing, verbal descriptions, physical sorting, or using simple comparison charts with pictures to accommodate different learning styles and abilities.

Zoom In / Zoom Out

1. Zoom In: At the microscopic level, rocks are made up of tiny mineral crystals and grains that fit together like puzzle pieces. These tiny parts determine the rock's color, hardness, and texture.

2. Zoom Out: These rocks are part of the larger rock cycle system where rocks form deep in the Earth, get pushed to the surface, break down into smaller pieces through weathering, and eventually form new rocks over millions of years.

Discussion Questions

1. What do you notice that is the same about these rocks? What is different? (Bloom's: Analyze | DOK: 2)

2. How do you think these rocks got to be different shapes and sizes? (Bloom's: Apply | DOK: 2)

3. If you were going to sort these rocks into groups, what groups would you make? (Bloom's: Create | DOK: 3)

4. Why do you think someone arranged these rocks this way instead of leaving them scattered around? (Bloom's: Evaluate | DOK: 3)

Potential Student Misconceptions

1. Misconception: All rocks are the same, just different sizes.
Clarification: Rocks are made of different materials (minerals) and formed in different ways, which makes them have different properties like color, weight, and hardness.

2. Misconception: Rocks don't change - they stay the same forever.
Clarification: Rocks slowly change over very long periods of time due to weather, water, and other natural forces breaking them down into smaller pieces.

3. Misconception: Only big rocks are "real rocks."
Clarification: Sand, pebbles, and tiny rock pieces are all rocks too - just smaller versions that have been broken down over time.

Cross-Curricular Ideas

1. Math - Sorting and Patterns: Students can sort rocks by size (big, medium, small) or color and create simple patterns with them. They can also count rocks and compare quantities ("Which pile has more rocks?"). This builds early number sense and classification skills.

2. ELA - Descriptive Language and Storytelling: Students can use sensory words to describe rocks in their writing or drawings (smooth, rough, round, flat). They can also create simple stories about rocks, such as "Where did this rock come from?" or "What adventure did this rock have?" This develops vocabulary and narrative thinking.

3. Art - Rock Painting and Sculpture: Students can paint rocks with designs, faces, or patterns, or create their own rock stacks and arrangements like in the photo. This allows creative expression while exploring how materials can be arranged and transformed.

4. Social Studies - Community Builders: Discuss how people in our community use rocks and stones to build homes, pathways, and gardens. Students can learn that different jobs (gardeners, builders, landscapers) use rocks in their work and help create our neighborhoods.

STEM Career Connection

1. Geologist - A scientist who studies rocks and stones to learn about how the Earth works and what it's made of. Geologists explore caves, mountains, and dig in the ground to find different types of rocks and learn their stories. Some geologists even look for rocks that contain valuable materials!

Average Annual Salary: $93,000 USD

2. Landscape Designer/Gardener - A person who plans and creates beautiful outdoor spaces using plants, rocks, soil, and other natural materials—just like the rock garden in this photo! They decide where to place rocks, plants, and pathways to make yards and parks look nice and healthy.
Average Annual Salary: $67,000 USD

3. Construction Worker - A person who uses rocks, stones, and other materials to build homes, buildings, and pathways. Construction workers know how to select the right rocks and materials for different jobs and how to stack and arrange them safely and strongly.
Average Annual Salary: $68,000 USD

NGSS Connections

- Performance Expectation: K-2-ETS1-1 - Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.
- Disciplinary Core Ideas: K-ESS2.E - Plants and animals can change their environment
- Crosscutting Concepts: Patterns - Patterns in the natural and human designed world can be observed and used as evidence

Science Vocabulary

* Rock: A hard, natural material that comes from the Earth
* Property: Something you can observe about an object, like its color or size
* Natural: Something that comes from nature, not made by people
* Texture: How something feels when you touch it - smooth, rough, bumpy
* Arrange: To put things in a certain order or pattern
* Material: What something is made of

External Resources

Children's Books:
- Let's Go Rock Collecting by Roma Gans
- Rocks and Minerals by Rebecca Hirsch
- If You Find a Rock by Peggy Christian