

## Photo Description



This image shows a house with a beautiful rock garden made of stacked flat stones. The rocks are piled in different heights and shapes, creating a natural-looking landscape. Many green plants grow around the rock piles, and trees hang over the house with their leafy branches.

## Scientific Phenomena

The anchoring phenomenon here is weathering and erosion creating the flat, layered rocks we see stacked in this garden. Over millions of years, natural forces like wind, water, ice, and temperature changes broke down larger rock formations into these smaller, flat pieces. The layered appearance suggests these rocks were formed through sedimentary processes, where materials settled in layers over time and were compressed into rock. Humans then collected and arranged these naturally-shaped stones to create this decorative garden feature.

## Core Science Concepts

1. Weathering Processes: Physical and chemical weathering break down rocks over long periods of time through forces like freezing water, plant roots, and chemical reactions.
2. Rock Formation: These flat stones likely formed as sedimentary rocks, created when layers of sediment were pressed together over millions of years.
3. Erosion and Transport: Moving water, wind, and ice carried rock fragments from their original locations to new places where humans could collect them.
4. Human Impact on Landscapes: People modify natural environments by moving rocks and planting gardens, showing how humans interact with Earth's materials.

### Pedagogical Tip:

Have students bring in small rocks from home or the schoolyard to examine with magnifying glasses. This hands-on observation helps them connect the abstract concept of weathering to real objects they can touch and study.

### UDL Suggestions:

Provide multiple ways for students to show their understanding of rock formation - through drawing diagrams, building with clay layers, or acting out the slow process of sediment settling. This supports different learning preferences and abilities.

## Zoom In / Zoom Out

1. Zoom In: At the microscopic level, chemical weathering occurs when minerals in rocks react with water and acids, causing the rock's crystal structure to weaken and break apart grain by grain.

2. Zoom Out: This rock garden is part of a larger watershed system where weathered rock materials eventually flow into streams, rivers, and oceans, contributing to the continuous rock cycle that shapes our planet's surface over geological time.

### Discussion Questions

1. What clues in these rocks tell us about how they formed long ago? (Bloom's: Analyze | DOK: 3)
2. How do you think these rocks traveled from where they first formed to this garden? (Bloom's: Apply | DOK: 2)
3. What would happen to these rocks if they stayed in this garden for 100 more years? (Bloom's: Evaluate | DOK: 3)
4. Why do you think some rocks in the pile are different colors and textures? (Bloom's: Analyze | DOK: 2)

### Potential Student Misconceptions

1. Misconception: Rocks don't change - they stay the same forever.  
Reality: Rocks are constantly changing through weathering and erosion, just very slowly over long periods of time.
2. Misconception: These flat rocks were made by people cutting them.  
Reality: Natural weathering processes create flat, layered rocks when sedimentary rocks break along their natural layer lines.
3. Misconception: Weathering only happens during bad weather like storms.  
Reality: Weathering happens continuously through daily temperature changes, plant growth, and chemical reactions, even on calm days.

### NGSS Connections

- Performance Expectation: 4-ESS1-1 - Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time.
- Disciplinary Core Ideas: 4-ESS1.C - Local, regional, and global patterns of rock formations reveal changes over time due to earth forces.
- Crosscutting Concepts: Patterns - Patterns can be used as evidence to support an explanation.
- Science Practice: [[NGSS:SEP:Analyzing and Interpreting Data]] - Analyze and interpret data to make sense of phenomena.

### Science Vocabulary

- \* Weathering: The slow breaking down of rocks by wind, water, ice, and temperature changes.
- \* Erosion: The movement of broken rock pieces from one place to another by water, wind, or ice.
- \* Sedimentary rock: Rock formed when layers of sand, mud, or other materials get pressed together over time.
- \* Minerals: The natural materials that make up rocks, each with their own colors and properties.
- \* Landscape: The shape and features of the land in an area, including rocks, hills, and valleys.

### External Resources

#### Children's Books:

- "Rocks and Minerals" by Steve Tomecek
- "The Magic School Bus Inside the Earth" by Joanna Cole
- "National Geographic Readers: Rocks and Minerals" by Kathleen Weidner Zoehfeld

### YouTube Videos:

- "Weathering and Erosion for Kids" - Simple explanation with animations showing how rocks break down over time: <https://www.youtube.com/watch?v=XW8yIZ9abYU>
- "Types of Rocks | Science for Kids" - Educational video explaining igneous, sedimentary, and metamorphic rocks with clear examples: <https://www.youtube.com/watch?v=ZNyKNTCg3nA>