

## Photo Description



Big waves crash into dark rocks by the ocean. The water splashes high into the air. Sand covers the ground near the rocks.

## Scientific Phenomena

This image shows the Anchoring Phenomenon of wave erosion and weathering. Ocean waves carry tremendous energy that constantly pounds against rocky coastlines. The force of moving water breaks off small pieces of rock over time, gradually wearing them down and changing their shape. The splashing action also moves sand and smaller rock pieces around the beach, demonstrating how water can transport materials from one place to another.

## Core Science Concepts

1. Forces and Motion: Moving water creates a pushing force that can move rocks and sand
2. Weathering: Water breaks down rocks into smaller pieces over long periods of time
3. Energy Transfer: Waves carry energy from the ocean and release it when they hit the shore
4. Material Properties: Some materials (like rocks) are harder to move than others (like sand)

### Pedagogical Tip:

Use sensory experiences to help kindergarteners understand forces. Have students push against a wall to feel how they create force, then connect this to how waves push against rocks.

### UDL Suggestions:

Provide multiple ways to represent wave motion through body movements, sound effects, and visual demonstrations. Let students act out being waves crashing into "rock" students to engage kinesthetic learners.

## Zoom In / Zoom Out

1. Zoom In: At the tiny level, water molecules are constantly bumping into the rock surface, loosening microscopic pieces and carrying them away grain by grain.
2. Zoom Out: This beach is part of a massive ocean system where waves travel thousands of miles, carrying energy from storms and wind patterns across entire continents before reaching this shore.

### Discussion Questions

1. What do you think happens to the rocks when waves hit them every day? (Bloom's: Analyze | DOK: 2)
2. How might the beach look different after many years of waves? (Bloom's: Evaluate | DOK: 3)
3. What other things in nature can change rocks? (Bloom's: Apply | DOK: 2)
4. Why do you think some rocks are smooth and others are rough? (Bloom's: Analyze | DOK: 2)

### Potential Student Misconceptions

1. Misconception: "Rocks never change because they are hard."  
Clarification: Even hard rocks change over time when water hits them again and again.
2. Misconception: "Waves only move water."  
Clarification: Waves can move sand, shells, and small rocks too because they are very strong.
3. Misconception: "The ocean stays in one place."  
Clarification: Ocean water is always moving and can carry things from far away places.

### NGSS Connections

- Performance Expectation: K-2-ETS1-1 Ask questions, make observations, and gather information about a situation people want to change
- Disciplinary Core Ideas: K-2-ETS1.A (Asking Questions and Defining Problems)
- Crosscutting Concepts: Cause and Effect, Patterns

### Science Vocabulary

- \* Wave: Moving water that goes up and down in the ocean
- \* Force: A push or pull that can move things
- \* Erosion: When water or wind wears away rocks and soil
- \* Weathering: When rocks break into smaller pieces over time
- \* Energy: The power to make things move or change

### External Resources

Children's Books:

- Waves by Suzy Lee
- The Magic School Bus on the Ocean Floor by Joanna Cole
- A House for Hermit Crab by Eric Carle

YouTube Videos:

- "How Waves Work - Simple Science for Kids" - Educational animation showing wave formation and movement: <https://www.youtube.com/watch?v=XuBdf9jYj7o>
- "Rock Cycle Song for Kids" - Catchy song explaining how rocks change over time: <https://www.youtube.com/watch?v=hPS7dEcw6rk>