



A STORY OF SAND

This lesson plan developed by:



Overview:

This activity explores the many sources of sand, from geologic (granite, basalt, lava/magma, etc.) and biologic (shells, corals, exoskeletons) to anthropomorphic (glass, plastic, metal). Students examine sand samples (actual or photos), both local and remote, to determine the origin of sand grains. Students learn that sand is made from many materials such as rocks, minerals, coral, shells, trash, and wood. Depending on where you are in the world, sand may be made up of a combination of broken rocks, corals and/or shells. These differences can be clues about where the sand came from and how it got to its present location.

Materials:

- Hand magnifying lens or sturdy dissection scopes (like brock scopes)
- 5-7 sand samples glued on cards or glued in shallow, clear dishes (petri dishes)
- Matching photos of beaches (samples below)
- OR photos of sand and matching photos of beaches (samples below)
- OR sitting on a sandy beach
- Whiteboard and markers (optional)

Duration:

20 minutes

Physical Activity:

Low

Background:

"Sand" is defined as particles ranging in diameter from 0.062-2 millimeters (0.002-0.08 inches).

A Story of Sand (cont.)

Sand is composed of many different materials such as rocks, corals, trash, wood and shells. It is found all over the world on all of our beaches, including the beaches of lakes and beds of rivers and streams. Rocks have existed for millions of years, and have experienced many changes throughout this time. Rocks can break down due to melting, solidifying (becoming solid after melting), weathering, and transportation to different places by rain and other forms of flowing water to form sand. A scientist who studies sand is called a geologist.

Corals create reefs off of certain coasts around the world. Near-shore waves pound against corals at every moment, breaking off both large and small pieces of coral skeleton. Shells also can be worn down by constant wave action, or crushed in the jaws of predators, such as stingrays. The sandy shore is a very important habitat for many creatures such as sand stars, sand dollars, sea urchins, snails, sand crabs, worms, and clams, just to name a few.

Activity:

Part 1: Introduction to Beaches and Sand

Gather students on the sand, or at a grassy area, or at tables. Begin the activity with a verbal “brainstorm” to assess prior knowledge. (If you have a whiteboard, you can make a list of the answers.) Ask students guiding questions such as:

- Who has been to a sandy beach?
- What have you found on the beach?
- What color was the sand?
- Has anyone visited a black sand or green sand beach?
- If so, where in the world was the beach?
- Was the sand on the beach all the same size and/or shape?
- Besides sand, what other small things did you notice or find in the sand?

Part 2: Analyzing Sand

Tell students that this activity explores where sand comes from and how sandy beaches are made.

1. If you are using real sand samples, distribute the hand magnifying glasses and have students “practice” by looking at their hand or the sleeve of their shirt or jacket. Can they see how the magnifying glass works? How they have to hold it at a certain distance to see clearly?
2. Now distribute sand samples (dishes or cards) and have them look at each one individually, then together as a group.
 - What characteristics are similar? What are different?
 - Can students identify any of the small pieces? snail or clam shells? bits of a crab carapace? coral? different colored rocks?
 - Compare sizes of the grains, are some big? some small?
 - Also, are there any grains that look like they might come from manmade materials such as plastic or glass?

A Story of Sand (cont.)

Discussion:

After about 10 minutes of individual discussion, call everyone's attention back to you. Have student pairs share their observations with other students. Ask students to guess where these items came from. Have them look around the area (while still seated).

- Do they see any rocks or landscape where the sand might have come from?
- Where might the animals that grew the shells live? And for manmade items, where might these have come from?

Tell/show students these common beaches and the sand composition:

- Many of the continental U. S. beaches are quartz and feldspar, the main minerals in granite. There may also be "fool's gold" or mica/pyrites mixed in. Sand grains are relatively large.
- Oregon and Washington beaches are basalt; the sand is gray-green and fine grained.
- On the big island of Hawaii, black sand beaches have grains of lava.
- On the beaches along the southwest African coast, you can find diamonds among the grains of sand.
- Small tropical islands with no rock or lava have white sand beaches composed entirely of broken coral.

Ocean Literacy Principles:

Ocean literacy is an understanding of the ocean's influence on us, and our impact on the ocean. There are seven [Ocean Literacy Essential Principles](#) that all people of our blue planet should have an opportunity to learn and understand. This activity touches upon the following Essential Principles:

2. The ocean and life in the ocean shape the features of Earth
6. The ocean and humans are inextricably interconnected
7. The ocean is largely unexplored

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A Story of Sand (cont.)

Sand Cards



Tahiti



Pismo Beach, California



Santorini, Greece



Kauai, Hawaii

A Story of Sand (cont.)

Sand Beaches



Black sands beach



White sands beach

A Story of Sand (cont.)

Sand Shore Animals



Sand Star



Moon Snail



Clam



Sand Dollar