



Sandy Shores

Concepts

Sand grains can be made up of animals, plants, rocks, minerals, and other debris. Grains of sand come in many different shapes, sizes, and colors.

Observational differences in sand grains can provide information about where it came from and how it got to the beach.

HCPS III Benchmarks

SC 2.1.1

SC 2.1.2

SC 2.5.1

LA.2.1.4

Duration

1 hour

Source Material

MARE Sandy Shores

Vocabulary

erosion

observations

sand grain

What is Sand?

Summary

Students will make observations using digital microscopes or hand lenses and identify the different types of things that make up the sand on Hawaii's beaches. They will also explore the living and nonliving components that make up all the tiny grains of sand. They will gain a better understanding of how sand is formed and what it is made of.

Objectives

- Students will make observations of different types of sand.
- Students will explore and identify different materials that make up individual sand grains.
- Students will understand how sand is formed and moved from one place to another.

Materials (based on groups of four students)

4 bags of different types of sand per group

4 hand lenses per group or 1 microscope (digital) for the entire class

4 index cards for the entire class

Glue

Crayons, markers, or colored pencils

Sand on Stage worksheets (1 per student)

2 or more magnets per group (scientific supply-grade magnets needed)

Rock/mineral kit (substitute with examples of rocks/other materials)

Making Connections

Students may recall personal experiences when they have visited Hawaii's sandy shores. Learning about the different types of materials that make up the sand on the shore will provide students with a firm understanding of where sand comes from and how it is formed.

Teacher Prep for Activity

Set up four working stations (more may be needed for larger classes) in the classroom. There should be one station for each group and each station should have all the materials listed above. Make sand slides of each type of sand by making a circle of glue on an index card, then sprinkling sand on top of the glue. Let it sit for a couple minutes, then shake off excess sand into bag from which it came. Make an anticipatory chart on the board. Use the following titles for the two columns:

- Some things we think we know about sand
- Some questions we have about sand



Background

Sand is formed by the **erosion** of living and nonliving material by wind and water. **Sand grains** can be all different sizes. Usually they are about the size of a grain of salt. Sharp pieces of broken materials become smooth and round like tiny pebbles after years of rubbing together in the wind or water. Individual sand grains can be made of rocks, shells, coral, plastic, glass, plastic, and many other materials. Sand can also be made by living animals such a parrotfish who eat pieces of coral and excrete it as sand. Almost all the materials in the world can be eroded into sand. The sand on most of the world's beaches is made of quartz and clay.

In Hawaii we have different colors of sand because it is made of different materials. White sand can be made up right at the shore, where waves crash into coral reefs and shells that are broken down into white sand. Black sand beaches in Hawaii are formed from eroded lava rock. As Hawaii's mountains erode, their fragments will make their way to the beach from rivers. On the shore sand grains of all types, colors, and sizes may move hundreds or thousands of miles down the shore or to other beaches from waves, currents, and tides. The movement of the ocean causes sand to shift to and from the shore keeping the tiny grains of sand in constant motion. The constant movement of sand changes the shape and make up of our beaches everyday day. The sand on the beach today may not be the same tomorrow.

Procedure

Activity 1: Up Close Observations and Recording

1. Read aloud the background information with the students. Read, define, and write the new vocabulary words on your sandy shore vocabulary list.
2. Go through the anticipatory chart on the board with the students meanwhile discussing what they know and why it would be helpful to learn certain things about sand.

Give each student a Sand on Stage worksheet and each group 4 bags of different sand types. Work through the sheet one question or task at a time with the students. Have them record their observations and answers to each question as they go. While they work, call one group up to the digital microscope (if available) station and let students look at the sand slides under the microscope (TIP: cover the keyboard of laptop with plastic wrap because sand will damage the computer if it gets under the keys or mouse pad.)

The following is one way you might guide the students through the activity:

Question 1: Look closely at your sand with a magnifier (lens or microscope). List or use crayons to show all the different colors you see. Encourage students who have a difficult time with writing to use crayons.

Question 2: Draw a big picture of some of your sand grains. They can use the examples pictures in question #3 as a guide.

Question 3: Circle the pictures that have shapes like your sand. Have the students examine their sand slide using the lens or microscope and pay special attention to the shape of each grain.

Question: Why are some grains smooth and others are sharp?

Answer: Round grains have be worn smooth over many years and sharp or angular grains were broken more recently.

Question 4: Gently rub a magnet on the outside of your sand bag. Are any of your grains attracted to the magnet? If so, what color are the magnetic sand grains? Have the students gently move the magnets around their bag of sand. If any grains are



attracted, this is evidence that their sand contains some magnetic minerals like iron. These grains are usually black

Question 5: Which of the following things can you find in your sand? Have the students work together and help one another determine what makes up their sand sample.

Question 6: Look at the rock kit or substituted materials. Does your sand have pieces or grains that match any of the materials? List the kinds of rocks or materials. Have students work together and help one another match materials to their sand.

Question 7: Which sand in your group is the lightest color? Which one is the darkest? Put them in order from lightest to darkest. Have the students pass their sand slides around to the other members of their group.

Question: What can we learn by observing the color of your sand?

Answer: Colors give you clues about where your sand is made of. Dark colors are often volcanic and light colors are usually made of animals like shells, corals, or quartz from mountains.

Question 8: Compare your sand slide to the size chart below. Imagine the black dots are grains of sand. Color the group of dots that are about the size of your sand grains. If your sample does not look like any of the examples, use the empty box to draw your own. This could be confusing for students who have different sizes of grains within their sample. You may need to provide assistance to these students and help them determine which group of dots resembles most of their sample.

Question 9: Which sand in your group has the biggest grains? Which has the smallest? Put them on order from smallest to largest. Have the students pass their sand slides among their group members. Once each student has seen them all, have them put the cards in order from smallest to largest grain size.

3. Once the students complete their worksheet, have a discussion on the floor/carpet about their observations about sand. Discuss as a class: Why might some people have gotten different answers? What do the differences tell you about different types of sand? Review their questions about sand from the anticipatory chart and provide answers from their observations for as many as possible.

Assessments

Questions Formed/Answered

Worksheets Completed

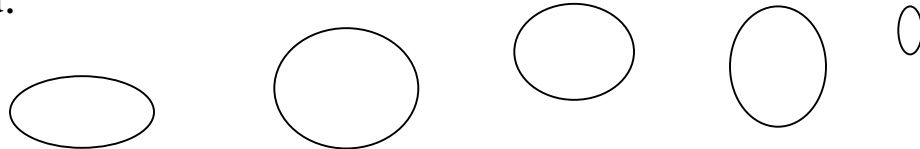


Name _____

Date _____

SAND ON STAGE!

1. Color the sand pieces below with the colors you see in the sand.

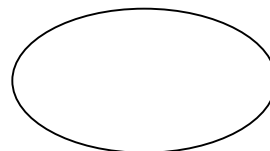


2. Draw the **SHAPE** of a single piece of sand. Draw it **BIG!**

3. Rub a magnet on the outside of each sand bag. Do any pieces of sand stick to the magnet?

What color are the pieces that stick?

Color the circle with the color →





4. What do you see in your sand? Circle the answers.

Small rocks

Shells

Glass

Wood

Plants

Plastic

5. Do any of the pieces of your sand match the rocks in the rock kit? Which ones?



6. Fill in the table with the **PLACE** the sand is from, how **DARK** the grains are (1-4 and 4 = **DARKEST**), and how **BIG** the grains are (1-4 and 4 = **BIGGEST**).

The sand is from....	How dark?	How big?