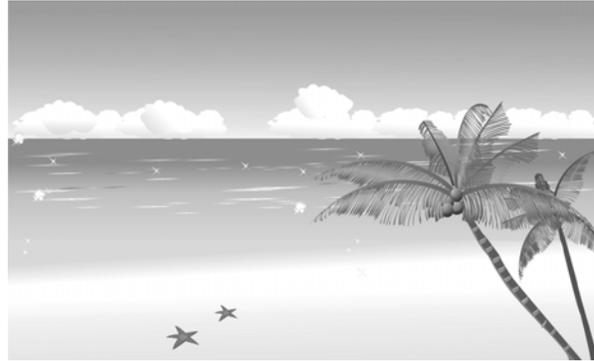


Find Your Beach



Topics

Sand, Geography

Grades

3-5

Site

Indoors

Duration

30 minutes

Materials

- Sand from various locations (enough for one sand sample for each student)
- Photos of sand locations (optional)
- Hand lenses
- World maps or atlases
- Microscopes (optional)

Vocabulary

latitude, longitude, sand

National Science Education Standards

Earth and Space Science (K-4)

Properties of earth materials

Changes in earth and sky

Earth and Space Science (5-8)

Structure of the earth system

Overview

Do all beaches look alike? Students investigate sand by observing characteristics of sand grains and finding other students with matching sand samples. Where did their sand come from? Students find out using provided latitude and longitude to find their beach on a map. They then compare and contrast the characteristics and location of their sand sample with another group.

Objectives

Students will be able to:

- Distinguish between various kinds of sand using grain size, color and mixture of particles.
- Use a chart and writing frame to compare and contrast objects.
- Find a location on a map using latitude and longitude.

Background

Sand consists of loose particles of organic or inorganic matter that are between 0.0625 mm and 2.0 mm in diameter. Sand grains are smaller than gravel but larger than particles of silt. Sand comes from rocks and minerals, including shells and skeletons, that have broken apart and eroded over time.

The composition of sand depends on local rock sources and conditions. Sand found on island beaches tends to have more coral and shell fragments than sand found on continental beaches. Tropical beaches also tend to consist of bright white sand because of the limestone, shell and coral components. Inland and non-tropical sands tend to be composed more of silica, in the form of quartz, because it is hard and more resistant to weathering than other minerals. Black sand is made up of minerals like magnetite or volcanic materials like obsidian and basalt.

Sand is transported by wind and water. Smoother and rounder grains of sand have been transported over longer distances or time. Desert sand has been moved around by the wind so much it is usually fairly round. Smaller grains of sand usually have traveled longer distances because they are lighter and easier to transport. Rivers and streams transport



VOCABULARY

Latitude: the distance north or south of the equator

Longitude: the distance east or west of the prime meridian measured in degrees or time

Sand: small, loose particles of eroded rocks and minerals

sand and other sediment from inland areas to the ocean. Often larger particles of sand settle out of the water before finer particles. Thus beaches often consist of larger sand particles than the ocean floor. The composition and characteristics of sand grains can tell a lot about where and how long ago the sand eroded from its parent rocks as well as the processes that deposited the grains.

Examining the characteristics of sand and finding the corresponding beach, both locally and internationally, is a fun way for students to begin to get familiar with not just the rock cycle but maps and geography as well. Latitude and longitude are imaginary lines of reference that circumscribe the earth. They are used to identify locations in measurements of degrees. **Latitude** measures the distance north or south of the equator while **longitude** tells the distance east or west of the prime meridian, which passes through the Greenwich Observatory in the United Kingdom.

Teacher Preparation

1. Make copies of **Find Your Beach** student sheet (you may choose to have students use their science notebook instead).
2. To make the sand samples, cut index cards in 1" x 3" strips. Cut a diamond-shaped hole in the center of the card. Lay a piece of clear tape over the hole and press the sticky side of the tape that shows through the hole into the sand. Shake off any excess.
3. Decide how many cards to make from each sample based on how many different kinds of sands you have. You will probably want one sample per student. Keep track of the samples by numbering the cards according to a code. Note: don't make this code obvious, or the students might look for the code and not the sand characteristics when finding other students with the same sample. Keep the code hidden on a 3" x 5" card for quick reference. (See sample code on page 4.)
4. Identify the sources where you collected the small amounts of sand. Determine the latitude and longitude of the various beach samples. Use an online calculator for quick reference: www.infoplease.com/atlas/latitude-longitude.html For quick reference, make a list of locations, as well as the latitude and longitude for each set of samples.



TEACHER TIP

Ask your friends and family to collect a small quantity of sand when they travel (and remember where they collected it!). Use an empty 35mm film canister or a zipper lock snack-sized baggie for transporting it. Have them take a photo of the beach to share with students.

Remember that some beaches are protected and no collecting is allowed even for educational purposes.

Procedure

1. AS A CLASS, DISCUSS BEACHES.

Ask students; *Who has visited the beach before? What was it like?* You may choose to have students close their eyes and imagine being on a beach. Use questions to guide the visualization. *What does your beach look like? What color is the sand? What does the sand feel like on your feet? What sounds do you hear? What do you smell?* Tell students they are going to get to visit a beach in the classroom.

2. STUDENTS OBSERVE SAND SAMPLES.

Pass out a sample of sand and hand lens to each student. If you have microscopes, you may want to have them available. Have students take a couple of minutes to examine their sample. *What do you notice about your sand? What color is it? Are all the grains the same color, shape and size?*

3. STUDENTS MATCH SAND SAMPLES AND FORM "BEACH" GROUPS.

Tell students that some of the sand samples come from the same beaches. They need to compare their sample to those of their classmates to find samples that match. Then they need to form a group. (You may want to tell them how many other students or samples come from one beach so they know how many of them will be in a group.)

4. GROUPS EXAMINE THE CHARACTERISTICS OF THEIR SAND SAMPLE.

Once all students are in a group, call out the codes so students know they are in the correct group. As a group, have students examine their samples and discuss the characteristics that helped them to decide their sand samples matched. Have them record their data in the appropriate column on the **Find Your Beach** student sheet. You may challenge them to guess where in the world their sand came from.

5. GROUPS FIND THEIR BEACH ON A WORLD MAP.

Pass out world maps and give groups the latitude and longitude of their beaches. (You may provide the country and beach name to younger students.) They should find their beach, identify the country it is in (if applicable) and the closest town or city. Have them think about how the location of their beach affects the characteristics of their sand. *Where is their beach? What is the closest town or city? How do they think the location of their beaches affects the characteristics of their sand?* Have them write their answers on the student sheet. You may choose to pass out photos of their beaches (if you have them) at this time.

6. GROUPS COMPARE AND CONTRAST SAND SAMPLES WITH ANOTHER GROUP.

Have each group compare and contrast their sample with a group with a different sample. Students should record their observations in the correct column on the student sheet. *Where was the other group's beach? Why might the samples look and feel differently?*

7. DISCUSS GROUPS' FINDINGS AS A CLASS.

You may choose to have one map at the front of the classroom and have groups mark the location of their beaches with a sticker or push pin. Discuss students' observations. Ask questions like; *Why do you think each beach has different sand? What is sand made of? Besides a beach, where might you find sand? How might location affect the characteristics of sand?*

Extensions

- Host an "International Beach Day" in the classroom. Students can share the location of their beach. They may also share information about the culture (food, music, customs and so on) of the people who live nearby. Even if the beach is close, it can be fun to share local events and history.
- Research the area where the sand samples were collected. Is there a lot of development nearby? Might the beach be impacted by construction of large hotels or runoff from agriculture or industry?
- Participate as a class in a beach cleanup. Many agencies host cleanup events, even in other parts of the watershed (beaches near creeks, rivers, lakes and estuaries).
- Use the Monterey Bay Aquarium's *Sands of the World* activity for a more in-depth look at sand.



CONSERVATION TIPS

Research confirms that children who explore nature with an adult are more likely to care about the environment as adults.

Teachers who guide students investigating their world will help them become caring citizens. What's more fun than looking at sand up-close while dreaming of a faraway beach?



ELL TIPS

Using realia is a great way for English language learners to expand their vocabulary.

Comparing the sand sample attributes helps them practice color words, as well as size and shape descriptions.

Resources

Website

Monterey Bay Aquarium. www.montereybayaquarium.org

Learn more about beaches and the organisms that make their home there in the sandy shore exhibit featured on the Aquarium's website.

Books

Eyewitness Books: Seashore. Parker, Steve. Alfred A. Knopf, 1990.

One Small Square: Seashore. Silver, Donald M. Learning Triangle Press, 1993.

Standards

California Science Standards

Grade 3: 3a

Grade 4: 3a; 4a; 5a, b, c; 6a, c, f

Grade 5: 6a, c, f, h, i

California History-Social Science Standards

Grade 3: 3.1

Grade 4: 4.1

**THE MISSION OF THE
MONTEREY BAY
AQUARIUM
IS TO INSPIRE
CONSERVATION OF THE
OCEANS.**

Example of a Sand Samples Code (see Teacher Preparation on page 2)

Sand Sample	Location (Latitude, Longitude)	Origin of Sand
A	34n, 119w	Santa Barbara, CA
B	17s, 177e	Castaway Island, Fiji
C	29n, 81w	Daytona Beach, FL
D	43n, 86w	Lake Michigan, Muskegon, MI
E	22n, 114e	Repulse Bay, Hong Kong
F	20n, 156w	Kauai
G	36n, 10e	Tunis, Tunisia
H	15n, 86w	La Ceiba, Honduras
I	43n, 70w	Scarborough, ME

Sand Samples

	A	B	C	D	E	F	G	H	I
Numbers on the back of each sample	1	2	3	4	5	6	7	8	9
	10	11	12	13	14	15	16	17	18
	19	20	21	22	23	24	25	26	27
	28	29	30	31	32	33	34	35	36
	37	38	39	40	41	42	43	44	45

Find Your Beach

Name: _____

1. Record your data about characteristics of sand in the chart below.

	Your Sand Sample Beach Name: _____	Other Sand Sample Beach Name: _____
Color (dark, light)		
Grain Size and Shape (fine or coarse)		
Mix (different kinds of minerals and rocks in the sample)		
Other		

2. Complete the following sentences.

The sand samples are the SAME because they both _____ . In addition, they both _____ .

They are DIFFERENT because our sample _____ , but the other sample _____ .

Also, our sample _____ , whereas the other sample _____ .

3. Look at your map to answer the following questions.

Where in the world is your beach? Latitude: _____ Longitude: _____ Country: _____

What is the closest city or town to your beach? _____

How do you think the beach location affects the characteristics of the sand? _____