

Wind Shapes Landscapes

The Making of Sand

Most sand that ends up in **dunes** begins as part of a mountain. As the mountain rocks weather, sediment washes downhill into rivers or streams. The sediment breaks into smaller and smaller pieces as it bounces, rolls, and abrades in the flowing water.

Some sediment eventually becomes small enough to be called sand. The moving water of rivers and streams polishes the sand. Some sand flows all the way to the ocean. Some ends up on shores of lakes. Some is deposited in desert regions.

Then wind helps sand grains attain their final shape. As the wind blows sand grains into obstacles and each other, they become shaped like tiny balls.

Our Geosphere Fact

It can take millions of years for a sand grain to form and travel to the ocean.

Types of Sand

There are a number of different types of sand. The shape, color, and size of the sand grains depend on the rocks the sand came from.

- The black sand beaches of Hawaii are made of particles of volcanic rock.
- The white dunes of White Sands, New Mexico are made of the mineral **gypsum**.
- Many dunes throughout the world are made of the golden-colored mineral quartz.



Beaches with volcanic rock and sand can be found in many places on the Hawaiian Islands.



This close up of white sand dunes makes them look as soft as pillows.

Although most sand comes from weathered rocks and minerals, sand can also be made of the skeletons of animals. For example, some beaches in the Caribbean and other areas are made from shells and coral that have been crushed by ocean waves.



It takes a lot of crushed coral to make a beach.

Wind and Sand

If you've ever been on a sandy beach or a dusty field during a wind storm, you've probably experienced how the wind can erode bits of sediment.

A gentle breeze of 10 miles per hour (16 km/hr), about as fast as you can run, can erode fine sand grains. Wind speeds of about 20 miles per hour (32 km/hr), or about as fast as an average dog can run, can erode most sand grains.

The smallest grains might be carried for long distances by the wind. The larger grains tend to lift a few feet off the ground and fall back to Earth. Then they bounce along before being lifted again.

Sand Dunes

Like water and ice, wind plays an important role in shaping landscapes. One interesting and beautiful way that wind sculpts the Earth is by creating sand dunes. Sand dunes form throughout the world in deserts, near ocean beaches, on lake shores, and along rivers. In fact, dunes may form anytime there are the following conditions:

- Dry and loose sand
- A strong and steady wind
- An area large enough for sand to blow around



There's plenty of sand, wind, and space for these dunes to form.

You may think of deserts as being covered with sand. In fact, less than one-fifth of Earth's total desert area is covered with sand. And sand dunes only make up a tiny fraction of deserts in North America.



These dunes are located in California in the Mohave Desert.

Our Geosphere Fact

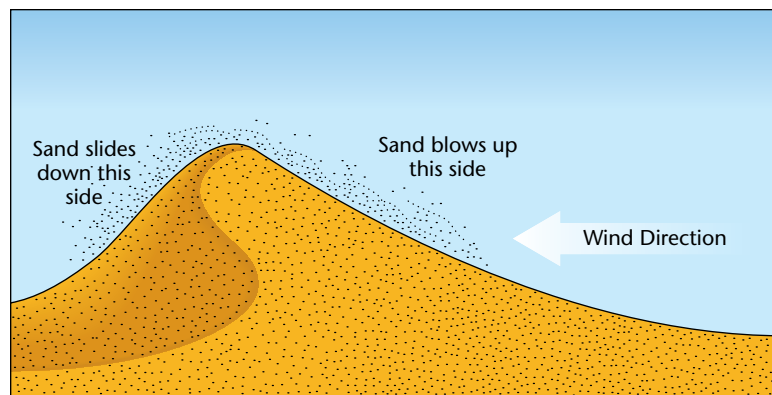
The largest desert area in the world is the Sahara in northern Africa. Dunes cover about 15 percent of the entire desert area.

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The Making of a Dune

Some dunes form when the wind meets an obstacle, like a rock or a plant. This deposits the sand in front of the obstacle, like a soccer ball is blocked by a goalie. Eventually, a small mound of sand piles up in front of the obstacle. As the sand piles up, it blocks more wind. This deposits more sand.

If the wind continues to blow, the sand will move to the top of the pile. This continues until the dune is so steep that it collapses and the sand flows down the other side.



Our Geosphere Fact

The tallest dunes in the world, about 350 meters (1100 ft) tall, are in the Namib Desert, in Namibia, Africa.



Dunes Can Walk

A dune can grow and begin to move, or “walk” in the same direction as the wind. Sand erodes from one side of the dune and rolls and bounces up to its top. When it reaches the top of the dune, it tumbles down the other side and forms a steep slope. When the slope gets too steep, a layer of sand breaks free and slides down the face. When this process happens over and over, the growing dune inches forward.

Our Geosphere Fact

Astronomers think that the phenomena of booming dunes may even be common in the extremely dry sand dunes on Mars!

Dunes “Boom” and “Bark”

People throughout the world have noticed strange sounds coming from sand dunes. In some areas, a noise similar to thunder results when sand slides down the face of a dune. Other sliding dunes tend to make noises like barking dogs or sea lions. What causes some dunes to produce these unusual sounds? Geologists are not sure, but they think the sand must be very dry, very rounded, and finely polished compared with normal, silent sand for barking or booming to occur.

Booming dunes are located all over the world. You can find them in Africa, the Middle East, South America, and North America.

Plants and Dunes

Dunes provide habitats for **native plants** that are adapted to the weather and soil conditions of their regions. Grasses that grow in the dunes along a number of coastal regions get nutrients from tiny organisms and minerals that the ocean breezes bring in. Also, seaweed and organic debris along the beach are blown inland. When they decompose, they provide nutrients for the plants.

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The grasses growing in these dunes help to hold the sand in place.

Often the first plants able to grow on any dune can thrive in the sandy soil. As these plants take hold, they send down deep roots to use the small amounts of available water. When these plants die, the breakdown of this plant material helps change the sand into a more plant-friendly soil.

Glossary

dune

A sand hill or sand ridge formed by the wind, usually in desert regions or near lakes and oceans.

gypsum

A colorless, white, or yellowish mineral used to make a variety of plaster products and fertilizers.

native plan

A plant that is found naturally in a given local area, rather than one that is brought in from another region.

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