

Section 2

Wind Erosion and Deposition

Key Concept Wind can cause erosion and can move and deposit sediment.

What You Will Learn

- Wind erosion happens through saltation, deflation, and abrasion.
- Wind can erode and deposit differing amounts and sizes of material, depending on the wind speed.

Why It Matters

Wind erosion and deposition are continually active throughout California and the rest of the world in shaping landscapes.

Have you ever been outside and had a gust of wind blow a stack of papers all over the place? Every time that you caught up with the papers, they moved. If this has happened to you, you have seen how wind erosion works. In the same way that wind moved your papers, wind moves soil, sand, and rock particles. When wind moves soil, sand, and rock particles, it acts as an agent of erosion.

Wind Erosion

Some areas are more vulnerable to wind erosion than other areas are. An area that has little plant cover can be severely affected by wind erosion. These areas lack plant roots, which anchor sand and soil in place. Deserts and coastlines that are made of fine, loose rock material and that have little plant cover are shaped most dramatically by wind.

Saltation

Wind moves material in different ways. Larger grains of soil, sand, and rock are moved by saltation. **Saltation** is the skipping and bouncing movement of sand-sized particles in the direction that wind is blowing. As shown in **Figure 1**, wind causes the particles to bounce. When moving sand grains knock into one another, some grains bounce up in the air, fall forward, and bump other sand grains. These impacts cause other grains to roll and bounce forward.

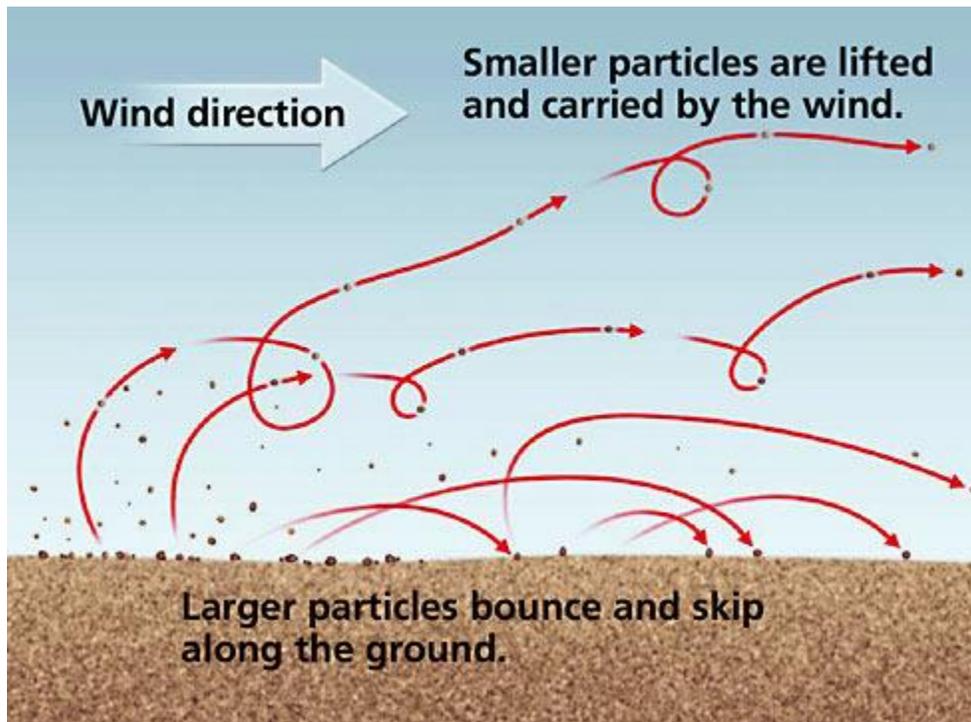


Figure 1 Sand grains move by making low, arcing jumps when blown by the wind. Dust is light enough to be carried by the wind.

Deflation

The removal of fine sediment by wind is called **deflation**. This process is shown in **Figure 1**. During deflation, wind removes the top layer of fine sediment or soil. Deflation leaves behind rock fragments that are too heavy to be lifted by the wind. Deflation may cause the formation of *desert pavement*, which is a surface that is made of pebbles and small, broken rocks. An example of desert pavement is shown in **Figure 2**.



Figure 2 Desert pavement, such as that found in the Painted Desert in Arizona, forms when wind removes all of the fine materials.

If you have ever blown on a layer of dust on a shelf, you may have noticed that a little scooped-out depression formed in the dust. Similarly, in areas that have little plant cover, the wind may scoop out depressions in the landscape. These depressions are called *deflation hollows*.

Abrasion

The grinding and wearing down of rock surfaces by other rock or by sand particles is called **abrasion**. Abrasion happens in areas where there are strong winds, loose sand, and soft rocks. The blowing of millions of sand grains creates a sandblasting effect. This effect helps erode, smooth, and polish rocks.

Standards Check Describe three different ways that wind shapes landscapes.



Wind-Deposited Materials

Wind carries sediment in much the same way that rivers do. And just as rivers deposit their loads, wind drops all of the material that it carries over time. The amount and size of the particles that wind can carry depend on wind speed. The faster wind blows,

the more material and the heavier the particles that wind can carry. As wind speed slows, particles are deposited according to weight, from heaviest to lightest. So, heavy particles are deposited first.

Dunes

When wind hits an obstacle, such as a plant or a rock, the wind slows down. As it slows, the wind deposits, or drops, the heaviest material that it is carrying on top of the obstacle. As the material builds up, the obstacle gets larger. This obstacle causes the wind to slow more and deposit more material, which forms a mound. Eventually, the original obstacle is buried. Mounds of wind-deposited sand are called **dunes**.

Dunes are common in sandy deserts and along the sandy shores of lakes and oceans. **Figure 3** shows sand dunes in California.



Figure 3 These dunes in Death Valley, California, migrate with the wind.

California Dunes

California is home to several major dune formations. Dunes are popular for recreational activities like camping. These dune formations are in coastal areas and in desert areas.

A major coastal dune system is the Monterey Bay Dunes, which covers forty square miles. The Algodones Sand Dunes, in southeast California, is the largest desert sand dune system in the state, covering one thousand square miles.

The Movement of Dunes

Generally, dunes move in the same direction the wind is blowing. Wind conditions decide the dune's shape and size. A dune usually has a gently sloped side and a steeply sloped side, as shown in **Figure 4**. Usually, the gently sloped side faces the wind. Wind constantly moves material up this side of the dune. As sand moves over the crest, or peak, of the dune, the sand slides down the slip face and makes a steep slope.

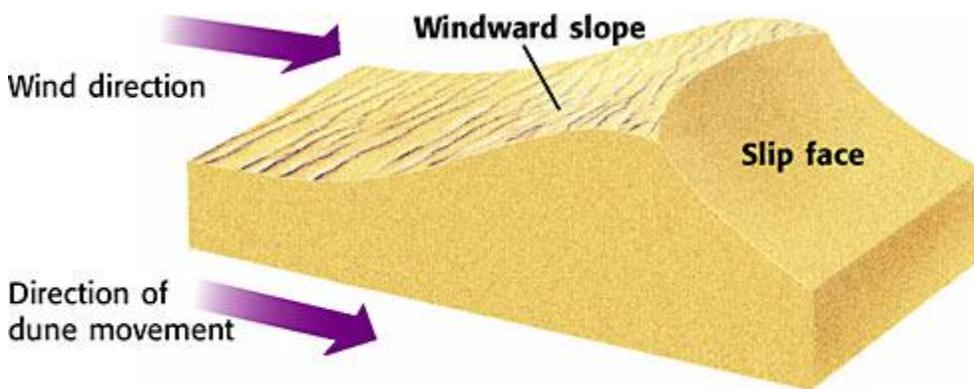


Figure 4 Dunes form from material deposited by wind. The gently sloped side of the dune is called the windward slope. The steeply sloped side of the dune is called the slip face.

Standards Check How are dunes an example of wind shaping landscapes?



Section Summary

- Areas that have little plant cover and desert areas that are covered with fine rock material are more vulnerable to wind erosion than other areas are.
- Saltation is the process in which sand-sized particles move in the direction of the wind.
- Desert pavement, deflation hollows, and dunes are landforms that are created by wind erosion and deposition.
- Dunes move in the direction that the wind blows.

