LESSON 5

Wind Erosion

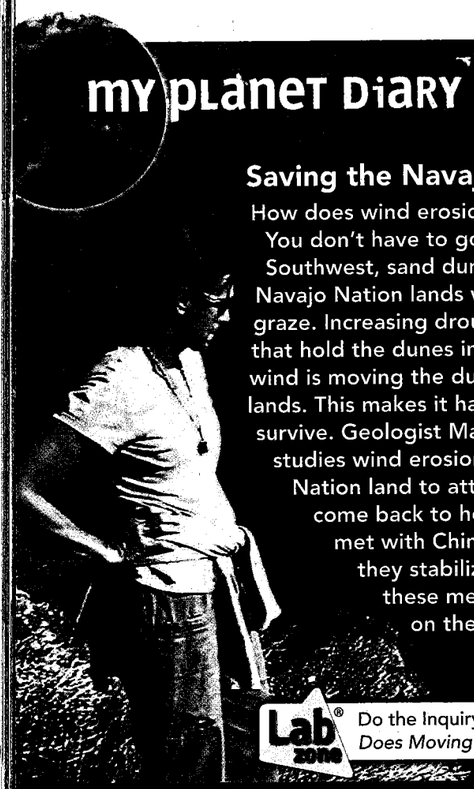
UNLOCK THE BIG ?

How Does Wind Cause Erosion and Deposition?

MY PLANET DIARY

Saving the Navajo Rangelands

How does wind erosion affect humans? You don't have to go far to find out. In the Southwest, sand dunes cover one third of Navajo Nation lands where sheep and cattle graze. Increasing drought is harming the plants that hold the dunes in place. As a result, the wind is moving the dunes on the Navajo rangelands. This makes it harder for living things to survive. Geologist Margaret Hiza Redsteer studies wind erosion. She left the Navajo Nation land to attend college, but she's come back to help. Recently, Dr. Redsteer met with Chinese scientists to learn how they stabilize dunes. Now, she'll use these methods to help slow erosion on the Navajo rangelands.



Lab zone® Do the Inquiry Warm-Up *How Does Moving Air Affect Sediment?*

Read about Dr. Margaret Hiza Redsteer and answer the questions with a classmate.

1. Why are the dunes eroding on the Navajo land?

2. Do you think it's important for scientists to problem solve together? Explain.

PLANET DIARY Go to **Planet Diary** to learn more about wind erosion.

How Does Wind Cause Erosion and Deposition?

Wind can be a powerful force in shaping the land in areas where there are few plants to hold the soil in place. In the east African nation of Eritrea, sandstorms like the one in the photo are common. Strong winds blowing over loose soil can reduce visibility.

Vocabulary
- deflation
- sand dune
- loess

Skills
- Reading: Ask Questions
- Inquiry: Predict

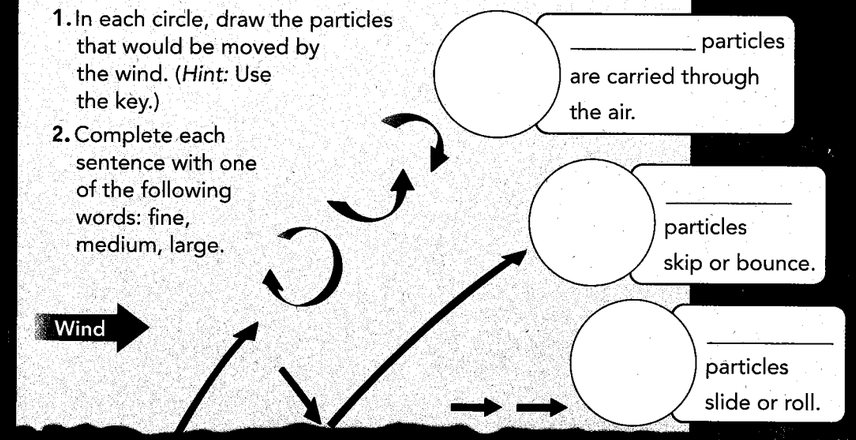
Deflation Wind causes erosion mainly by deflation. Geologists define **deflation** as the process by which wind removes surface materials. You can see the process of deflation in **Figure 1.** When wind blows over the land, it picks up the smallest particles of sediment, such as clay and silt. The stronger the wind, the larger the particles it can pick up. Slightly heavier particles, such as sand, might skip or bounce for a short distance. But sand soon falls back to the ground. Strong winds can roll heavier sediment particles over the ground. In deserts, deflation can sometimes create an area of rock fragments called *desert pavement.* There, wind has blown away the smaller sediment, leaving behind rocky material.

Vocabulary Word Origins
The Latin word *flare* means "to blow." How does *flare* relate to the word *deflation*?

FIGURE 1
Wind Erosion
The image shows three ways that wind moves particles.

Apply Concepts After you read, complete the activity.

1. In each circle, draw the particles that would be moved by the wind. (*Hint:* Use the key.)
2. Complete each sentence with one of the following words: fine, medium, large.



Ask Questions Read the headings on this page, then write down one question you have. After you read, try to answer your question.

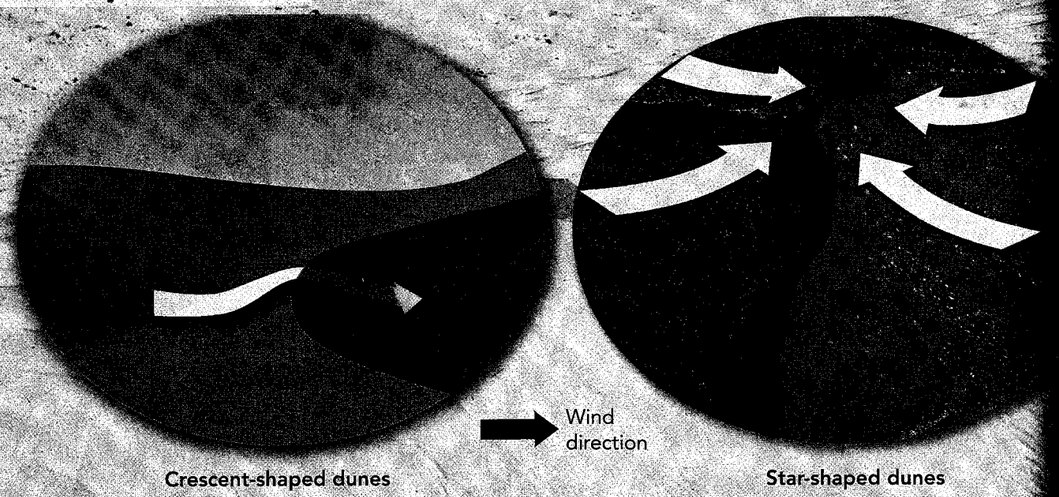
Deposits by Wind

All the sediment picked up by wind eventually falls to the ground. This happens when the wind slows down or an obstacle, such as a boulder or a clump of grass, traps the windblown sand sediment. **Wind erosion and deposition may form sand dunes and loess deposits.** When the wind meets an obstacle, the result is usually a deposit of windblown sand called a **sand dune.** The shape of sand dunes is determined by the direction of the wind, the amount of sand, and the presence of plants.

Sand Dunes You can see sand dunes on beaches and in deserts where wind-blown sediment has built up. Sand dunes come in many shapes and sizes. Some are long, with parallel ridges, while others are U-shaped. They can also be very small or very large. Some sand dunes in China are 500 meters high. Sand dunes move over time. Little by little, the sand shifts with the wind from one side of the dune to the other. Sometimes plants begin growing on a dune. Plant roots can help to anchor the dune in one place.

Loess Deposits Sediment that is smaller than sand, such as particles of clay and silt, is dropped far from its source in large deposits. This fine, wind-deposited sediment is **loess** (LOH es). There are large loess deposits in central China and in states such as Nebraska, South Dakota, Iowa, Missouri, and Illinois. Loess helps to form fertile soil. Many areas with thick loess deposits are valuable farmlands.

FIGURE 2
Dune Formation
Draw Conclusions Why do these dunes have different shapes?



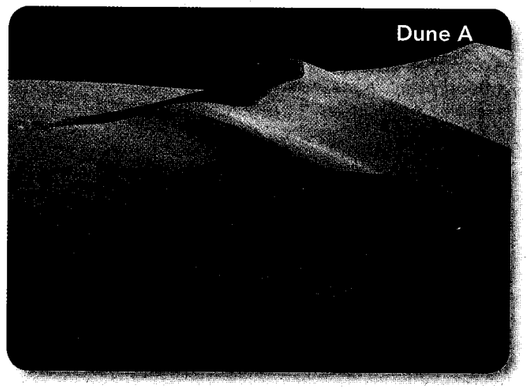
apply it!

Look at the photos and answer the questions with a classmate.

1. **Predict** Which dune do you think is likely to erode faster? Why?

2. Why do you think plants grew on Dune B?

3. How could sand dunes be held in place to prevent them from drifting onto a parking lot?



Lab zone® Do the Quick Lab *Desert Pavement.*

Assess Your Understanding

1a. Review What is deflation?

b. Relate Cause and Effect What causes wind to deposit sand or other sediment?

c. CHALLENGE In a desert, a soil mixture of sand and small rocks is exposed to wind erosion. How would the land surface change over time?

got it?

- ○ **I get it!** Now I know that wind causes erosion through _____
- ○ I need extra help with _____