Greater Houston

Activity: Sand dune formation

Learning Objective: What is a desert? How do sand dunes form?

Materials: shaving cream sand, tub

Directions:

- Allow the students to circle around the tub filled with foam sand. Dunes are formed when the wind blows the sand into different shapes, the students' hands will be the wind today! Show them the different types of sand dunes and ask them to build a barchan dune, transverse dune, and star dune. https://www.nps.gov/grsa/learn/nature/dune-types.htm

Fun Facts:

- If conditions were "perfect"—the landscape was flat, winds blew from only one direction, vegetation could not grow, and sand was available but limited —*barchan* dunes would dominate a sandscape.
- Barchan dunes can become aligned together along a plane perpendicular to the wind. If the line becomes somewhat straight, dune scientists refer to these forward marching ridges as *transverse* dunes..
- *Star dunes* have three or more arms, formed from multiple wind directions.Where star dunes are present, an area's wind regime is complex. Star dunes form only in places where wind blows from varied directions over the course of a year.
- Desert environments are defined by rainfall amounts (receiving usually less than 10 inches of precipitation each year)—and can be hot or cold! For comparison, the average rainfall in Houston is 50 inches each year. Use the IPads to discover information about examples of hot and cold deserts.

Discussion Questions:

- Q1: What plants or animals have adaptations to survive in a dry desert climate?
- Q2: What is sand made of?
- Q3: What is the process by which sand is made?

Answer Key:

- A1: Cacti--Widespread root systems that can collect water from a large area. In addition, cacti have spines instead of leaves. These minimise the surface area and so reduce water loss by *transpiration*. The spines also protect the cacti from animals that might eat them. Camels--Thick fur on the top of the body for shade, and thin fur elsewhere to allow easy heat loss. The ability to go for a long time without water (they don't store water in their humps, but they lose very little through urination and sweating). Slit-like nostrils and two rows of eyelashes to help keep the sand out.
- A2: Composed of different materials that vary depending on location, sand comes in an array of colors including white, black, green and even pink.The most common component of sand is silicon dioxide in the form of quartz.

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- A3: Weathering processes — such as wind, rain and freezing/thawing cycles — break down rocks and minerals into smaller grains.The Earth's landmasses are made up of rocks and minerals, including quartz, feldspar and mica.

EARTHS EXTREMES: DESERTS

What are they?

- dry areas of land that are characteristically **desolate**, waterless, and without **vegetation**
- Can be hot OR cold!
- Around 1/3 of the earth is desert
- **Desolate –** empty, hard to live in
- **Vegetation – plant life**

Hot Deserts

- Receive less than 10 inches of rain/year
- Usually really hot during the day, and cold at night
- The largest is the Sahara in North Africa, spanning 12 different countries!

Cold Deserts

- Receive less than 10 inches of rain/year in the form of snow!
- The 2 largest deserts on earth – the Antarctic and Arctic Deserts, are both cold deserts!
- The average temperature in the Antarctic Desert in the winter is -56.2 degrees Fahrenheit!

But even in these crazy earth extremes, animals and plants find a way to survive!

CAMELS

- Habitat: Central Asia, Middle East, North Africa
- Desert Adaptation: Camels coats keep them from sweating to conserve water. Their mouths are also specially adapted to allow them to eat plants with thorns!
- Myth – water is conserved in the humps. The humps are actually fat!
- People living in the desert use camels instead of horse for travel.

KANGAROO RATS

- Habitat: North America
- Desert Adaptation: They can survive without ever actually drinking water – they can get the water they need from the seeds they eat!
- Fun fact: Kangaroo rats jump 6ft on average, but can jump up to 9ft to escape predators!

FENNEC FOX

- Habitat: North Africa, Asia
- Desert Adaptation: Its ears help it stay cool by releasing body heat. They are also sensitive enough to hear bugs crawling in the sand!
- Fun Fact: Fennec Foxes are the national animal of Algeria!

ROAD RUNNER

- Habitat: Southern North America, Central America
- Desert Adaptation: They have glands near their eyes to get rid of extra salt in their bodies, so it looks like they are crying salt! They can also go without drinking water as long as their dinner has enough water!
- Fun fact: Roadrunners can go as fast as 18mph!

MEERKAT

- Habitat: South Africa
- Desert Adaptation: The black spots around their eyes act as sunglasses so they can see better in direct sunlight.
- Fun fact: Meerkats have special calls that signal specific predators and danger levels to the rest of the colony.