Expanding Gas Experiment #2

If your heat is not on, this experiment will also show you how heat expands air.

What you need:

a small clear jar with a lid
(a baby food jar)
a clear-plastic bottle
(a plastic juice bottle)
modeling clay
red food coloring
water
a clear plastic straw
ice cubes in a plastic bag

What to do:

1. Wet the top of the lid of the glass jar. Turn the wet top upside down, and place it on the mouth of the jar so the water makes a seal.

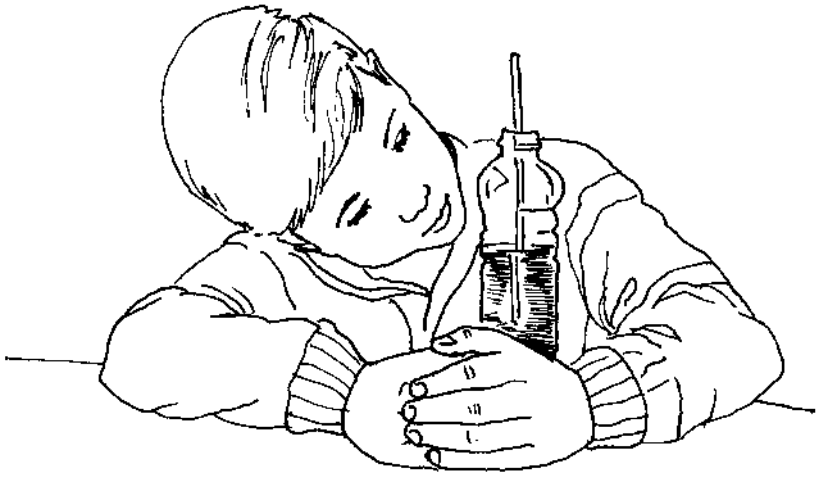
2. Put your hands around the jar and hold it to warm the air inside. Watch the lid. Describe what happens. The warming air is actually doing work. What work did the warming air in the jar do?

3. Now, fill the plastic bottle halfway with colored water. Place the straw in the mouth of the bottle and down into the water. About 2 inches of the straw should be in the water.

4. Plug the mouth of the bottle around the straw with clay so no air gets into the bottle except through the straw. Blow into the water. Describe what happens.

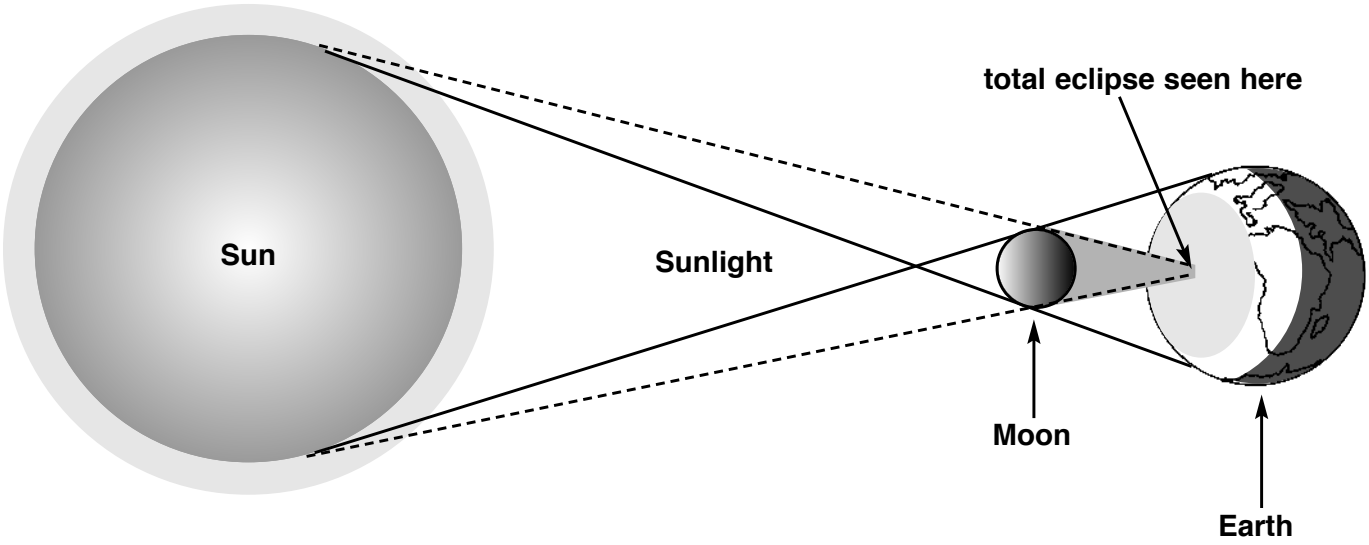
5. Hold your hands around the part of the bottle filled with air. Describe what happens to the water level in the straw.

6. Hold the bag of ice cubes against the same part of the bottle. Watch the water level in the straw. Now describe in writing what happens. How do you think changing the temperature of the air affected the water level in the straw?

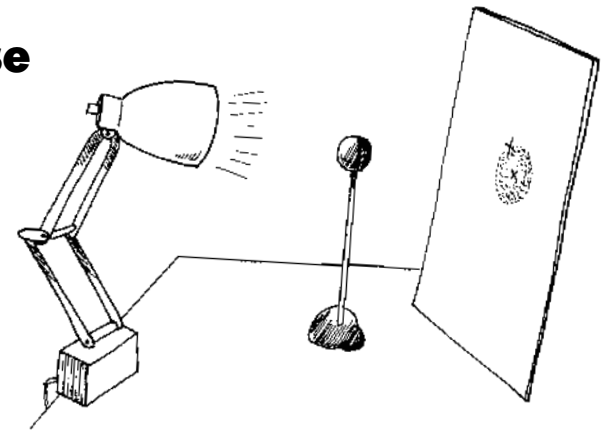


A Solar Eclipse

Once in a while the moon orbits between the sun and Earth in just the right position to block out the light coming from the sun to Earth. This is called a solar eclipse. The positions for an eclipse don't happen very often. But even if they do orbit into the right position, you should NEVER look directly at the sun—especially during an eclipse.



You Can Simulate a Solar Eclipse



What you need:

modeling clay
a wooden or metal skewer
poster board
a ruler
a lamp

What to do:

1. Use the clay to form a model of the moon about 1 to 2 inches in size. Place it on the skewer. Put the other end of the skewer into clay and set the apparatus on a table.
2. Set the lamp up on one side of your moon. Set the poster board on the other side. The lamp (your sun) and the clay (your moon) should be about the same height.
3. Switch on the lamp and look for the shadow on the poster board. Find the shadow's center and mark it. Mark two edges of the shadow, also.
4. Punch holes through the marks. Now, look back through the holes to see what different positions of an eclipse look like.

How do you think a small object like the moon can possibly block out a large object like the sun? Try to design a way to use your finger as a small object like the moon. Find a large object and try your design.

Deserts

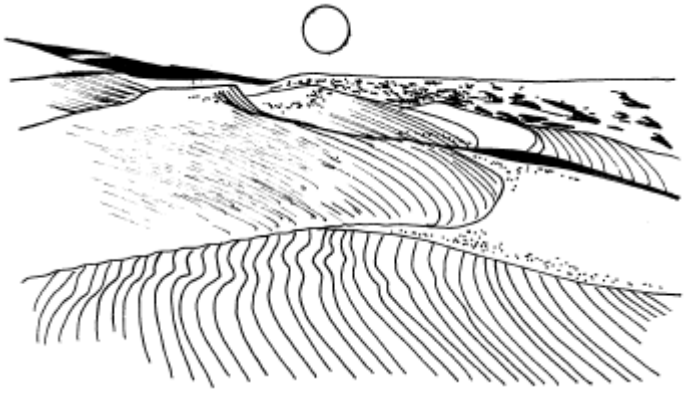
Deserts are harsh ecosystems. They are the driest places on Earth. Only a few animals and plants can survive the heat and dryness. There is not much decomposing material to make the soil rich. Due to the lack of water, animals and plants have adapted ways of storing and making the most efficient use of the water available.

Cacti store water in their wide stems. The Gila monster, a reptile, stores water in fat cells in its fat tail. A camel can drink more than 20 gallons of water at one time. Then it can go for weeks without needing more water.

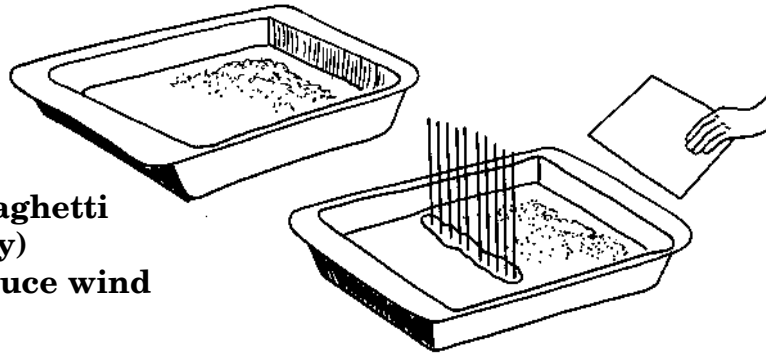
During the day, a desert can be more than 125 degrees F. But at night, the desert can be cool. Night is when many desert animals that burrow underground from the heat in the day come out to hunt.

Winds are harsh on deserts due to the lack of trees or other structures to slow them. As a result of winds, the sands move a great deal.

■ **Desert**



Wind and the Desert



What you need:

modeling clay
a large baking tray
cardboard or poster board to produce wind
thick spaghetti
sand (dry)

What to do:

1. Place a pile of sand on one end of the baking tray. Use the cardboard or poster board like a fan to produce wind. Move the sand with wind made by the board. Record how far the sand moved without a barrier.

2. Return the sand to a pile similar to your first pile. Form a line of clay across the pan in front of the sand pile. Stand spaghetti up in the clay to form a wall like a wall of trees. Use the board to try to move the sand past the spaghetti wall. Record how far the sand moved this time.

How does this simulation show how sand can be contained? Have you ever been at the beach? If so, what kinds of structures can be used to keep the sand on the beach from eroding? What could you design to keep sand from eroding?

Tropical Rain Forests

Tropical rain forests cover less than 10 percent of Earth's surface but contain more than half of the living species on Earth. Tropical rain forests are rich in life because they are warm and wet. Rain falls almost every day in tropical rain forests, as much as 160 inches a year in some.

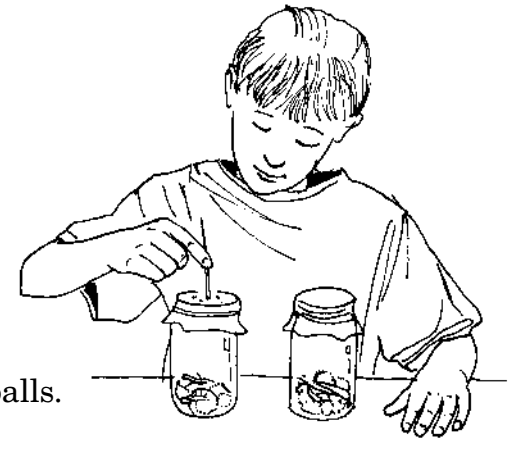
Thousands of species live in tropical rain forests. That's the reason so many ecologists are using tropical rain forests as their laboratories. The climates in tropical rain forests are perfect for many, many plants and animals to live. Dead plants and animals decay quickly, so the nutrients are absorbed by living plants very quickly.

■ **Tropical Rain Forests**

Temperature and Water and Decomposition

What you need:

cotton	**plastic wrap**
toothpick	**fruit skins**
2 jars	**water**
leaves	**rubber bands**



What to do:

1. Cover the bottom of each jar with cotton balls. Moisten the cotton balls with water.
2. Put the same amount of some leaves and fruit skins on the cotton balls.
3. Place plastic wrap over each jar, and attach with rubber bands. In one jar, poke some holes in the plastic wrap with the toothpick. Put the jar with the holes in the plastic wrap in a warm place. Place the other jar without the holes in the plastic wrap in a cold place, like the refrigerator.

Record what happens to the leaves and fruit in each jar. Which simulates a tropical rain forest environment?

