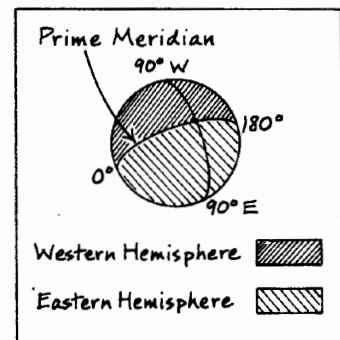
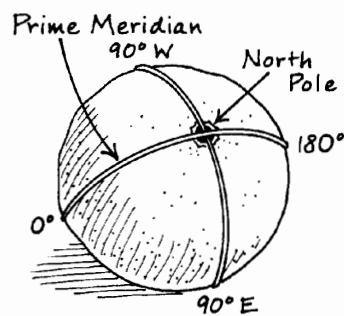
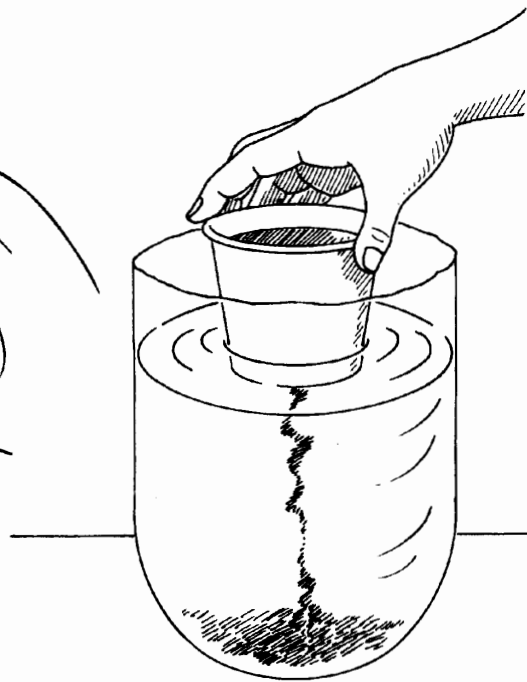

IV

Earth Science



125. Around

Purpose To model meridians on a globe.

Materials orange
two 12-inch (30-cm) pieces of string

Procedure

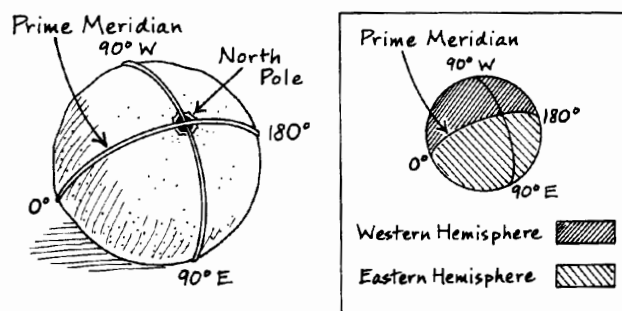
1. Tie one piece of string around the middle of the orange.
2. Tie the other piece of string around the orange perpendicular to the first string.
3. Hold the orange so that the strings cross at the top and bottom. Observe the position of the strings and the distances between them (1) at the ends where the lines cross, and (2) in the center of the orange midway between the ends.

Results The lines approach and cross each other at the top and bottom of the orange and are farthest apart around the center of the orange.

Why? Meridians are imaginary great circles around the Earth from the North Pole to the South Pole. (A **great circle** has the same center point as the sphere it surrounds.) The east-west distance between the meridians on Earth, like the distance between the strings on the orange, is

greatest at the middle and decreases toward the Poles.

Meridians are also called **lines of longitude** because they indicate **longitude** (distance in degrees east or west of the prime meridian). The **prime meridian** is located at 0° longitude, which runs through Greenwich, England. Longitudes 0° and 180° form a **great circle** (circle with the same center point as the sphere it surrounds) and divide the Earth into the Eastern and Western Hemispheres. The **Eastern Hemisphere** includes the meridians from the prime meridian east to 180° . The halfway point is longitude 90°E . The **Western Hemisphere** includes the meridians from the prime meridian west to 180° . The halfway point is longitude 90°W .



126. Only One

Purpose To make a model of Earth's equator.

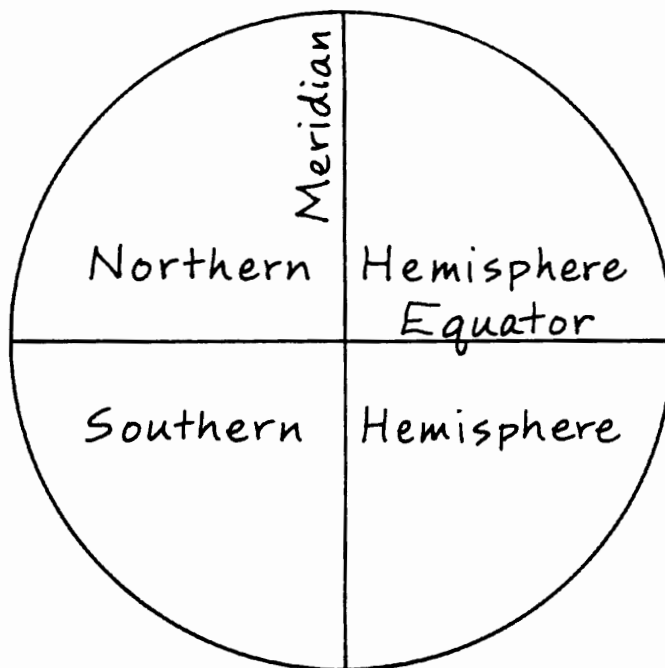
Materials pencil
large lid
sheet of copy paper
scissors
pen
ruler

Procedure

1. Use the pencil to trace around the lid on the paper. Cut out the circle.
2. Fold the circle in half twice, once from top to bottom and then from side to side.
3. Use the pen and ruler to trace the fold lines.
4. Use the pen to label the meridian and the equator, as well as the Northern and Southern Hemispheres.

Results You have made a model of Earth's equator.

Why? Imaginary circles around Earth that run parallel to each other and perpendicular to the meridians are called **parallels**. The parallel that runs around the center of the globe, equidistant from the Poles and perpendicular to any meridian, is called the equator. The equator is the only parallel that is a great circle. Parallels are also called lines of latitude. The equator divides the globe into the Northern and Southern Hemispheres. The latitude in each hemisphere ranges from 0° at the equator to 90° at the Poles. Latitudes are labeled "N" in the Northern Hemisphere and "S" in the Southern Hemisphere.



127. Time Line

Purpose To construct a scale model of the Earth's geologic eras.

Materials meterstick
scissors
adding machine tape
masking tape
pencil

Procedure

1. Measure and cut a 460-cm piece of adding machine tape.
2. Stretch the paper strip out on an uncarpeted floor and use tape to secure the ends.
3. Draw a line across the tape 5 cm from the top. Write the label "Present" above this line.
4. Draw a second line 6.5 cm from the first line. Label this line "65 million" and write "(65)" vertically on the right side of the tape in this section.
5. Draw a third line 16 cm from the second line. Label the line "225 million" and write "(160)" on the right side as in the previous step.
6. Draw a fourth line 37.5 cm below the third line. Label the line "600 million" and write "(375)" on the right side as before.
7. Write "Beginning" at the bottom of the tape. Write "4,500 million" above the word and "(3,900)" on the right side.
8. Use the diagram to label these eras on the tape: "Cenozoic," "Mesozoic," "Paleozoic," and "Precambrian."

Results A time line comparing the length of time of the four different geologic eras of the Earth's history is constructed.

Why? The paper scale uses length to compare the differences in time between the Earth's four geologic eras. The length of the eras can be compared at a glance by studying the size of each section. A more accurate length of time for each era appears in the numbers along the side. The shortest section and the youngest era is the Cenozoic era, which so far has lasted about 65 million years. The era of the dinosaurs is second in age and lasted for about 160 million years. The eras preceding the Mesozoic era increase in length of age, with the Precambrian era being the largest section, the longest era, and the oldest era.



Present	
Cenozoic	(65)
65 million	
Mesozoic	(160)
225 million	
Paleozoic	(375)
600 million	
Precambrian	(3900)
4,500 million	
Beginning	

128. Drifters

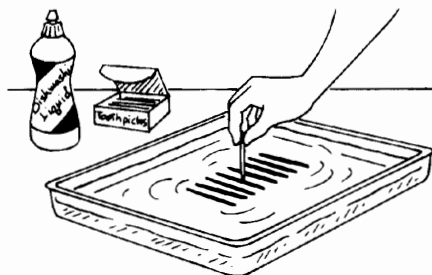
Purpose To demonstrate how the continents may have drifted apart.

Materials large shallow baking pan
tap water
9 round toothpicks
dishwashing liquid

Procedure

1. Cover the bottom of the pan with water.
2. Place eight of the toothpicks side by side on the surface of the center of the water.
3. Wet one end of the ninth toothpick with dishwashing liquid and put the wet end in the center of the floating toothpicks.
4. Wet the toothpick again with dishwashing liquid, and put the wet end in the center of each group of floating toothpicks.
5. Repeat step 4, wetting the toothpick each time before you put it in the center of a group.

Results When you put the toothpick with the dishwashing liquid between the eight floating toothpicks, they separate, forming two groups with four toothpicks in each group. When you put the toothpick



with dishwashing liquid in the center of the two groups, the toothpicks divide into four groups. Touching the toothpick with dishwashing liquid between the remaining groups results in toothpicks quickly moving away from each other.

Why? The group of eight toothpicks represents the single landmass called **Pangaea** (the name given to the large, single landmass believed to have existed before it broke apart into separate landmasses), and the water in the pan represents the single ocean called **Panthalassa** (the name given to the large, single ocean believed to have existed before Pangaea broke apart). The first separation of the toothpicks can be compared to the breaking apart of Pangaea into a northern landmass called Laurasia and a southern landmass called Gondwanaland. While not exact, the remaining separations of the toothpicks can be compared to the formation of present-day landmasses, or **continents** (the seven major landmasses of the Earth: North America, South America, Africa, Australia, Antarctica, Europe, and Asia). Laurasia is believed to have separated into the continents of North America, Europe, and Asia. Gondwanaland is believed to have separated into the continents of Australia, Africa, South America, and Antarctica. The eighth toothpick represents the country of India, which broke off of Gondwanaland and, over time, moved and became attached to Asia.