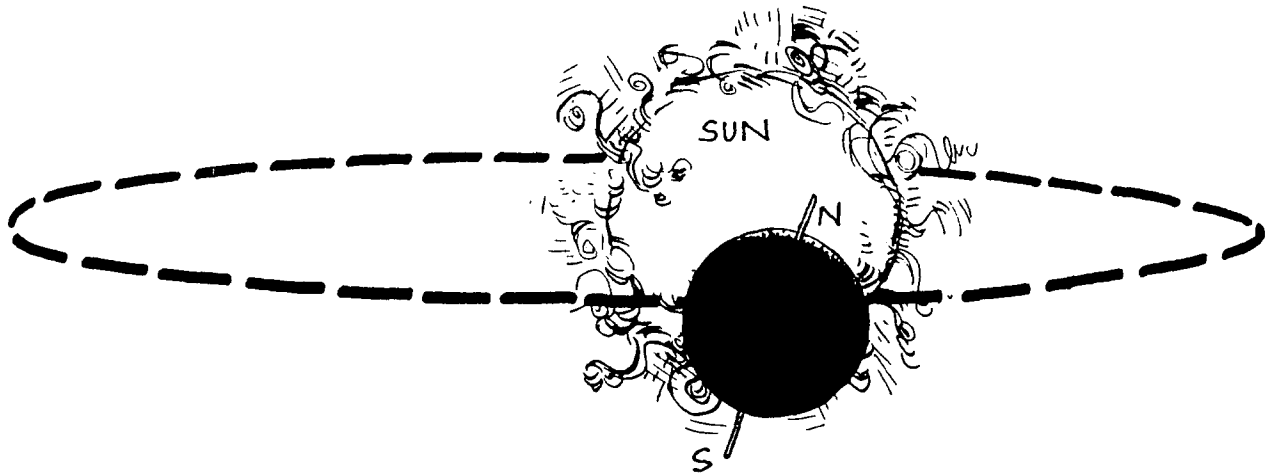


## What and When Is Fall?



Use this activity at the beginning of the unit on fall. It will help students understand that the earth spins on its axis in its orbit around the sun. The earth completes one-quarter of its revolution between September 23 and the first day of winter, around December 21. The North Pole tilts away from the sun in the fall.

In this investigation the students will use a ball to represent the earth. Be sure they have it angled so the North Pole tilts away from the sun for one-quarter of its orbit.

The illustration on page 8 shows what the students will be acting out in the investigation, "What and When Is Fall?"

### EQUIPMENT:

- Globe
- Flashlight, light, or clip light
- Ball to represent the Earth, with North and South Poles marked
- Pencil
- Tape
- Piece of string or rope about 12 feet long

### DIRECTIONS:

1. Look at the globe and locate the North and South Poles and equator.
2. Mark the ball with the Poles and equator using the pencil.
3. The person holding the clip light or flashlight stands in the middle of an ellipse. The ellipse is made by taking the string or rope and placing it on the floor in the shape of an ellipse. Tape the ends of the string together.
4. The person holding the ball representing the earth walks along the rope in an ellipse pattern. Students observe the path of the earth. One quarter of the path represents a season. During fall, the earth must be turned so the North Pole tilts away from the sun.
5. The room is darkened and the sun shines as the clip light or flashlight is turned on. The earth moves in its orbit around the sun.
6. Discuss the different positions of the earth during the four seasons, as shown in the illustration on page 8.

# HERE'S WHAT YOU'RE ACTING OUT:

THE EARTH IS TILTED ON ITS AXIS. IN OTHER WORDS, IF YOU WERE ABLE TO STICK A LONG POLE THROUGH THE EARTH, FROM THE NORTH POLE TO THE SOUTH POLE, IT WOULD LOOK LIKE THIS. AND NOT LIKE THIS. THIS TILTING OF THE EARTH CAUSES THE CHANGES IN TEMPERATURE AND WEATHER DURING THE DIFFERENT SEASONS OF THE YEAR. IT ALSO EXPLAINS WHY OUR DAYS ARE LONGER IN THE SUMMER AND SHORTER IN THE WINTER.

# HERE'S HOW:

<sup>3</sup> SPRING: BY THE BEGINNING OF SPRING, THE EARTH IS ONCE AGAIN EQUALLY AT ALL POINTS BY THE SUN BUT ON ONLY ONE DAY DOES THE LENGTH OF DAY EQUAL THE LENGTH OF A NIGHT. IT TAKES EARTH THAT DAY IS CALLED THE VERNAL EQUINOX. IT MARKS THE START OF SPRING.

PATH OF THE EARTH'S REVOLUTION AROUND THE SUN. ONE REVOLUTION TAKES ONE YEAR.



\* NOTE: THE EARTH IS CLOSEST TO THE SUN DURING WINTER.

<sup>2</sup> WINTER: BY THE BEGINNING OF WINTER, THE EARTH'S TILT CAUSES THE NORTH POLE TO BE POINTED AWAY FROM THE SUN AND TOWARD THE SUN AS YOU CAN SEE. THE NORTH POLE IS NEVER ILLUMINATED BY THE SUN AT THIS TIME AND THE SOUTH POLE RECEIVES CONSTANT SUNLIGHT OF COURSE. THIS EFFECT IS NOT AS DRASTIC WHERE YOU LIVE, BUT THIS TILTING OF THE EARTH IS THE CAUSE OF OUR LONG WINTER NIGHTS. THE FACTORS AWAY FROM THE EQUATOR YOU WILL NOTICE A CHANGE IN THE NUMBER OF DAYLIGHT HOURS DURING THE WINTER MONTHS.

EARTH'S ROTATION ONE ROTATION TAKES ONE DAY

<sup>1</sup> AUTUMN: ON THE AUTUMNAL EQUINOX AT THE BEGINNING OF FALL, THE EARTH IS NOT TILTED AT ALL IN RELATION TO THE SUN AS THE EARTH ROTATES. ALL POINTS ON THE GLOBE GET THE SAME AMOUNT OF SUNLIGHT.

<sup>4</sup> SUMMER: AT THE BEGINNING OF SUMMER, THE NORTH POLE IS TILTED TOWARD THE SUN AND THE SOUTH POLE IS CONTINUALLY MOST PART OF THE GLOBE IS CONSTANTLY LIT BY THE SUN. THIS PROLONGED EXPOSURE TO THE SUN HEATS THE AIR AT THE NORTH POLE. THE WARMED AIR MOVES SOUTH BRINGING "SUMMERY" CONDITIONS TO THE NORTHERN HEMISPHERE.