

# Counting Circles



The Sun

Even though we can't feel it, the Earth is constantly moving. It is rotating eastward, spinning in place like a top. We count each spinning rotation as a twenty-four-hour day. The Earth is also slowly orbiting around the Sun. It takes 365 days—or one year—for the

Earth to complete this immense circle. We count these years by adding candles to our birthday cakes!

We are not the only species on the planet to be marking the days and years. Trees offer one of the most visible accountings. The living cell layer of a tree lies just under its bark. In the spring, these cells start responding to the increase in light and moisture of the warmer months and begin to grow. More sun and more rain encourage the growth of a wider band of cells. In the winter months, the

cells die back, and then, each spring a new ring begins again.

A *dendrochronologist*, a scientist who has learned to read the language of tree rings, finds a detailed weather journal in the cross section of a tree's trunk. (The rings of petrified log slices can reveal seasonal information from



A cedar tree

hundreds of millions of years ago.) Counting the rings of a tree's cross section is like counting birthday candles on a cake—one ring for each year. Similarly, underwater tropical corals add layers of calcium carbonate every day, making

annual rings that can be counted and studied for information about water and light conditions in that part of an ocean.

What living thing has counted more circles around the Sun than any other? Bristlecone pines, some of which have quietly stood on the mountaintops of the western United States recording nearly 5,000 circles around the Sun.

Remember that no matter what, even while you are sleeping, the Earth keeps spinning and traveling around the Sun. Your birthday is always coming around again. Happy birthday to you! Happy birthday to everyone!

## Key to the Map

-  One day
-  First day of each month
-  The days of each month counted in fives (5th, 10th, 15th, 20th, 25th)
-  One for each year's two solstices (when the Sun is farthest from the equator) and two equinoxes (when the Sun crosses the equator, and day and night are approximately equal everywhere on Earth)
-  Leap year day, February 29. This day is added once every four years because the Earth's trip around the sun actually takes slightly longer (about 1/4 day) than 365 days.

**Illustration notes:** Neither the Earth nor the Sun nor the distances between them are pictured to scale in this book. The Sun's diameter is nearly 110 times greater than that of the Earth, and the Sun is 93 million miles (150 million kilometers) away.

Sun photo courtesy NASA/JPL-Caltec

Tree photo by Debra Frasier