The Reasons for the Seasons

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In most places on Earth, the weather changes with the seasons. We generally associate winter with cold, ice, and snow. We think of showers, green grass, and new flowers when we think of spring. Summer brings to mind hot, humid, sunny weather. Autumn means falling leaves with cooler temperatures. A **season,** then, is one of the four parts of the year (winter, spring, summer, and fall), each associated with a particular type of weather and happenings in nature.

Most of us have been comfortable with this knowledge since we were very young. We've observed it year after year. But how many of us have thought about why? (Or how many of us parents have forgotten why?) Why do we have the seasons?

To understand the reason for seasonal temperature differences, we must consider the following diagram. (See figure for seasons in the Northern hemisphere.) Specifically, we must pay attention to the angle of the tilt of the Earth as it relates to the sun in each of the four seasons. It helps to start with this information: The Earth's **axis** is not sitting perfectly vertical. That is, if the Earth were a big, fat, juicy apple and you stuck a popsicle stick (axis) through its South Pole and passed it up through its North Pole, it wouldn't sit flat. It would lean over. The amount it would lean is 23.5 degrees from vertical. Our big, fat, juicy Earth is leaning 23.5 degrees from vertical, too, regardless of the season. What changes from one season to the next is not the amount or the direction the Earth is tilted, but the orientation of the Earth's tilt *with respect to the sun*.

Look at the diagram again. Notice that the Earth is spinning on its axis. (The big, fat, juicy apple is spinning on its popsicle stick.) This is called **rotation**. It has nothing to do with the seasons, but makes a night and day difference in our lives! When our part of the Earth rotates to face the sun (regardless of the season), it's day. When we face away (again regardless of the season), it's night.

Getting back to the reason for the seasons, we now know what the reason for the seasons is NOT. It's not the rotation of the Earth on its axis. And it's not the tilt of the Earth *by itself*; the Earth tilts 23.5 degrees from vertical all the time. Look at the diagram again. Notice that as we go from one season to the next, the Earth revolves around the sun.