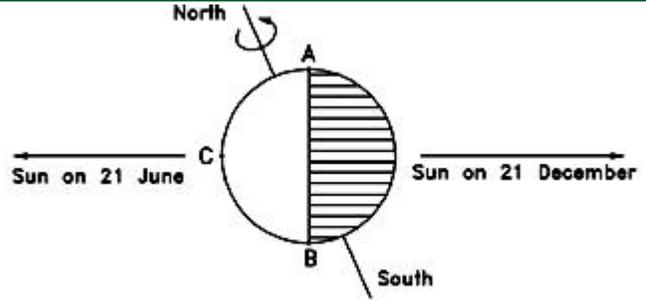


The Reason for the Seasons

By Brandi Waters

¹ If you are like most people living on Earth, you experience four different seasons throughout the year. What each season means to you depends on where you live. To you, winter might mean building snowmen or going ice skating. It could also mean temperatures around sixty degrees. Spring may mean sunshine and melting snow. It might also mean clouds and thunderstorms. For many, summer begins in the month of June. However, in some parts of the world, summer begins in December!



² Why do we have four seasons here on Earth? Why do the four seasons mean different things in different parts of the world? There is more to understanding the seasons than you might think. You need to know about astronomy and geography. To really understand the seasons, you have to look at Earth from space. You need to understand how the Earth is arranged in space, how it spins, and how it orbits around the sun. All of these things are important in understanding why Earth has four seasons. If you look at the Earth from space, you will see that it is tilted. Earth's axis is not vertical. The North Pole is not at the top of the Earth. The Earth's axis is tilted approximately 23.5 degrees. This tilt is what creates the four seasons. As the Earth moves around the sun during the year, the direction in which the axis is pointing changes. Sometimes the North Pole is tilted toward the sun. Sometimes it is tilted away from the sun.

³ The equator is an imaginary line that divides the Earth into northern and southern hemispheres. Each hemisphere has opposite seasons. When the North Pole is tilted toward the sun, the South Pole is tilted away from the sun. In July, it is summer in the northern hemisphere. In the southern hemisphere, it is winter! Summer and winter happen at the same time! They just happen in different parts of the world.

⁴ As the Earth moves around the sun, it also spins on its axis. Earth's axis is an invisible line that runs through the Earth from the North Pole to the South Pole. The Earth spins on its axis to give us day and night. It takes twenty-four hours for the Earth to make a full rotation. Earth's spinning is what makes the sun appear to rise and set each day. Even though it appears to be the sun that is moving each day, it is really the Earth that is moving. As the Earth spins, each place on Earth faces a different direction in space. For part of the day, each place on Earth faces the sun. During the rest of the day, each place faces away from the sun and toward the edge of the solar system. This part of each day is night. This happens everywhere on Earth, except for the poles. The poles are on the Earth's axis. They do not face a new direction as the Earth spins. This means that the sun does not rise and set each day at the poles. Instead, the sun rises and sets with the seasons. The poles only face different directions in space as the Earth orbits around the sun. At the

poles, there is one sunrise and one sunset each year! They occur at the time of the spring and autumnal equinoxes. An equinox occurs when the Earth's axis neither points toward the sun nor away from it. On an equinox, the poles lie on the border where night changes to day. The sun rises on the spring equinox and shines all summer long. It sets on the autumnal equinox during the fall. Winter is like a very long night. There is no sun.

⁵ Summer means warmer weather and longer days in most places on Earth. The amount of daylight in a day varies a lot. It all depends on where you are. Near the equator, the days are about the same length year round. Each day is about twelve hours long. The days last a few minutes longer during the summer and are a few minutes shorter during the winter. As you move from the equator toward the poles, the days during the summer become longer. The days during the winter become shorter. A summer day in Hawaii is about thirteen hours long, while a summer day in Alaska could be twenty hours long! With all of that sunlight, why is it so cold in Alaska?

⁶ The weather near the equator is warm. The weather near the poles is cold. This is because of the way the sun heats the Earth. The sun's energy is made up of light and heat. It moves from the sun to Earth in a direct path. Most of the sun's energy hits the Earth near the equator. The poles only get a small amount of the sun's energy, and never a direct hit. It isn't enough energy to melt the ice and warm the oceans and land, even in the summer. This is why places near the equator are warmer than places near the poles.

⁷ There is one more thing to consider regarding temperatures and weather patterns on Earth. Two different places on Earth with the same latitude often have very different temperatures and weather patterns. Most often, this is because the two places are at different altitudes. Altitude is the distance a place is from sea level. A city near sea level is much warmer than a city in the mountains. Altitude can make the difference between whether a city has a cold, rainy winter or a cold, snowy winter.

⁸ There is a lot to know to understand why the Earth's four seasons happen and why they are so different all over the world. A lot of things work together to determine how you experience each season in the place where you live. One thing you can know for certain though: the tilt of the Earth is the reason for the seasons.

Name _____

Date _____

The Reason for the Seasons

<p>1. The _____ of the Earth's axis is responsible for the four seasons.</p> <p><input type="radio"/> A Heating</p> <p><input type="radio"/> B Orbiting</p> <p><input type="radio"/> C Spinning</p> <p><input type="radio"/> D Tilting</p>	<p>2. In August, _____.</p> <p><input type="radio"/> A It is summer in the southern hemisphere</p> <p><input type="radio"/> B It is winter in the southern hemisphere</p> <p><input type="radio"/> C It is winter at the North Pole</p> <p><input type="radio"/> D All of the above</p>
<p>3. During the year, the amount of daylight each day changes the most _____.</p> <p><input type="radio"/> A In the northern hemisphere</p> <p><input type="radio"/> B At the equator</p> <p><input type="radio"/> C In the southern hemisphere</p> <p><input type="radio"/> D At the poles</p>	<p>4. _____ and altitude both have a big impact on the temperatures and weather patterns that a location experiences in each of the four seasons.</p> <p>_____</p> <p>_____</p>
<p>5. Places near the equator are usually warm because _____.</p> <p><input type="radio"/> A Heat move toward the equator as Earth spins</p> <p><input type="radio"/> B Most of the sun's energy hits the Earth around the equator</p> <p><input type="radio"/> C They are closer to water</p> <p><input type="radio"/> D They always face the sun</p>	<p>6. What is the sun's energy made up of?</p> <p>_____</p> <p>_____</p>