Name: _____

REASONS FOR SEASONS

Fill in the blanks. ~~Cross out~~ each term below as you use it!

day	Sun	winter	24	colder	axis
year	Polaris	winter	365	warmer	circle
solstice	orbit	summer	23.5	Southern	elliptical
equinoxes	rotates	summer	Hemisphere	Northern	tilt

Planet Earth _____ once around its axis every _____ hours. We call this period of time a _____. There are _____ days in a _____. It takes one year for Earth to _____ once around the _____. If I am _____ years old [enter your own age], then I have made _____ trips around the Sun during my life [enter your own answer].

Earth's orbit around the Sun traces out an almost perfect _____. Thus the distance between the Sun and Earth does not change very much over the course of a year. So the reason that temperatures are _____ in the summer and _____ in the winter is the tilt of Earth's rotation axis. Earth's seasons are NOT caused by being closer or farther from the Sun.

Earth's rotation axis is tilted _____ degrees toward a distant star called _____ (the North Star). As Earth moves around the Sun, Earth's North Pole stays pointed toward this star, which is 500 light-years from our solar system. Earth's axis remains tilted toward Polaris, but how Earth is leaning relative to the Sun changes as Earth moves in its orbit around the Sun.

When Earth is located on one side of the Sun, the tilt causes the Northern Hemisphere to be leaning toward the Sun. When Earth is on the opposite side of the Sun, this same _____ toward Polaris causes the Northern Hemisphere to be leaning away from the Sun. When the Northern Hemisphere is leaning toward the Sun, the season is _____ in the _____ Hemisphere and winter in the Southern Hemisphere. When the Northern Hemisphere is leaning away from the Sun, the season is _____ in the Northern _____ and summer in the _____ Hemisphere.

REASONS FOR SEASONS

When we are leaning away from the Sun, as in the season of _____, the Sun appears _____ [higher/lower] in the sky. This means the Sun will spend _____ [less/more] time above the horizons (rising later and setting earlier), and thus there will be fewer daylight hours and less time to warm Earth. The day of the year with the _____ [least/most] daylight hours is December 21st, the first day of winter (in the Northern Hemisphere). This day is also called the winter solstice.

When we are leaning toward the Sun, as in the season of _____, the Sun appears _____ [higher/lower] in the sky. This means the Sun will spend _____ [less/more] time above the horizons (rising earlier and setting later), and thus there will be more daylight hours and more time to warm Earth. It is also true, that when the Sun is higher in the sky, the Sun's rays impact Earth at a steeper angle and are _____ [less/more] intense than when the Sun is lower in the sky. This also helps to explain why it is warmer in summer and colder in winter. The day of the year with the _____ [least/most] daylight hours is June 21st, the first day of summer (in the Northern Hemisphere). This day is also called the summer _____.

When Earth is neither leaning toward nor away from the Sun, we have the fall and spring _____, when daylight and nighttime hours are about equal.

For Earth, the following phrase is a way to remember the reason for colder and warmer seasons: "Length of days; Angle of rays; Nothing to do with how far away". But what about the seasons on Mars? Mars' rotation _____ is tilted about the same amount as Earth's, but the orbit of Mars around the Sun is more _____ (like an oval). Thus Mars' distance from the Sun varies a lot more than Earth's distance from the Sun. This means that both the tilt of the Mars' rotation axis and its closer and farther distances from the Sun are important to consider in determining the more extreme nature of Martian seasons.