Reason for the Seasons

EN _____

Name _____ Date _____ Class _____

We all know that the seasons are due to the tilt of the earth relative to the sun. In our summer the Northern Hemisphere is tilted toward the sun. But if the distance from the sun is not what is causing the seasons, then why does the tilt toward or away from the sun have such large effect?

Directions- On a piece of graph paper:

1. Using a ruler, make a faint cross in the middle of the paper
2. Using a compass, make a circle that is approximately 5 cm in diameter (the radius should be: _____). The point where the lines cross is the center of the circle. This circle will represent the _____.
3. Using your original cross and a protractor, line up the protractor so that the cross is at 90 degrees (perpendicular). Make a mark on your paper that is 23.5 degrees to the right of perpendicular.
4. Turn your paper over and repeat this for the bottom half of your cross.
5. Use the two points that you just made to line up a straight edge. Along this line, draw a small line that extends from the "earth" on both sides. This will represent the _____ of the earth.
6. Now, using the axis as the horizontal, make a mark that is perpendicular to the axis.
7. Turn the paper and repeat this for the other side.
8. Use the two points that you just made to line up a straight edge. Along this line, draw a dashed line inside the circle. This will represent the _____.
9. Label your diagram with the terms that you listed above.
10. Using a straight edge, "trace" all of the horizontal lines of the graph paper that are to the right of the circle. Make the lines parallel arrows that extend just to the edge of the earth. These arrows represent the _____ _____.
11. Measure the distance between any two adjacent arrows and compare it to the distance between any other two adjacent arrows. What do you notice?

    _____

12. Now measure the distance between two adjacent arrows on the surface of the earth.

    Distance at equator: _____

    Distance close to N. pole: _____

13. Where on earth are the sun's rays most **concentrated**? _____

14. Measure the angle between an arrow and the surface of the earth:

    Angle of sun rays close to equator: _____

    Angle of sun rays close to poles: _____

15. Which has the greatest angle of insolation? _____

16. What season is represented in your diagram? _____

17. Challenge:

    a. Draw a similar diagram that shows the next season.

    b. Explain why the angle of insolation changes even though the rays of the sun are parallel.

Conclusions:

*Fully explain why the tilt of the earth determines the seasons.

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*Circle all of the following that contribute to seasons on earth:

Distance from the sun	Day Length	Tilt of earth	Time of Day
Angle of insolation	Earth's orbit	Earth's rotation	Which hemisphere you are on