

Reasons for the Seasons

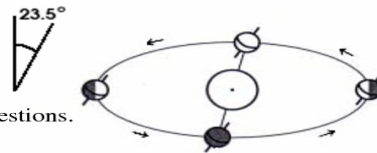
Key Question: How does the tilt of the Earth on its axis create seasons?

Materials: globe, light source, toothpick, tape measure

Procedure:

1. Place a large white piece of paper on your lab table. Mark the center and draw a circle around the center with a radius of 40 cm. This will represent the orbit of the Earth.
2. Place the light source (the sun) in the center of the circle. Place the light at the same height as the equator of your globe. If it is not, use books to raise it.
3. Set up the Earth globe so that its axis is **always** 23.5° to Polaris; the North Star.
** Remember that no matter where the Earth moves around the sun it is always tilted towards Polaris.

For this class, North is toward the lunch court



4. Move the globe as indicated for each time and answer questions.

Observations/Results:

All observations will be made so that California is facing the sun (day time in Ca)

Winter Solstice: December 21: Place globe on the north side of Earth's orbit.

1. Which pole is in the darkness? Which is receiving light?
2. Use your tape measure and measure (in cm) the length of sunlight on a day in California.
3. Using your toothpick, place it on the globe where it will not make a shadow. Where is the sun directly overhead (noon)?

Vernal Equinox: March 20: Move the globe counterclockwise around $\frac{1}{4}$ of the Earth's orbit.

4. Using your tape measure, measure the length of sunlight on a day in Ca.
5. Use the toothpick to find where the sun directly overhead (noon- where there is no shadow).

Summer Solstice: June 20: Move the globe another $\frac{1}{4}$ on its orbit.

6. Which pole is in the dark? Receiving the most light?
7. What is the length of day in Ca?
8. Which part of the globe has the longest day? The shortest day?
9. Use the toothpick to find where the sun is directly overhead (noon- where there is no shadow).
10. What is the reason for the summer?

Autumnal Equinox: September 22: Move the globe another $\frac{1}{4}$ on its orbit.

11. What is the length of day at the equator?
12. What is the length of night at the equator?

Conclusion Questions:

1. What are the two reasons for the seasons?
2. How does the angle of the sun affect the temperature on different parts of the world?