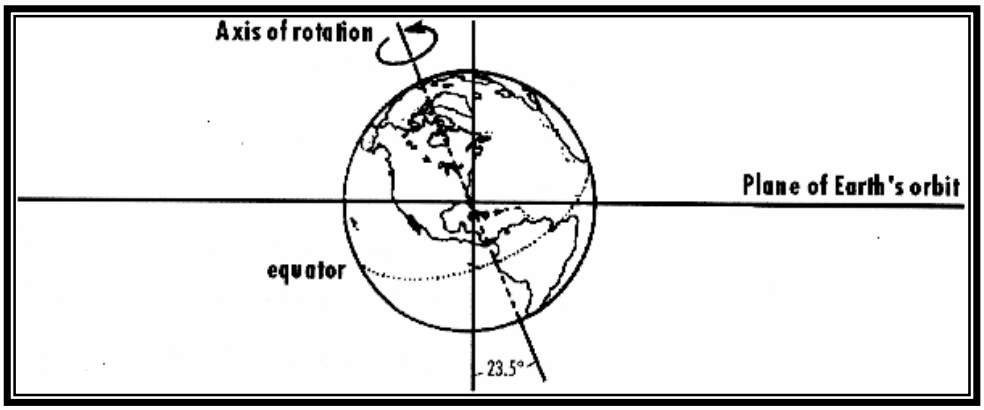
Name _____ Date _____
Mrs. Krieger

Reasons for the Seasons

Introduction:
The reason why Earth has four seasons is often misunderstood. Many people incorrectly conclude that our weather is warmer during the summer, because we are closer to the sun at that time. However, we are actually slightly closer to the sun during the winter months!!
The cause of Earth's seasons is the angle at which it rotates as it revolves around the sun. Most objects rotate around an axis that is straight up and down, just like when a basketball player spins a ball on his finger. But Earth's axis is tilted, as shown in the diagram below, and this tilt causes the seasons.



Materials:
Flashlight
Plastic Ball
Toothpick

Procedure:
Part A. Teacher Demonstration.
1. Observe as Mrs. Krieger shines the flashlight on the plastic ball.
2. Since the ball is tilted away from the flashlight, this is representing winter.
3. Record the shape of the squares at the equator and at the poles.
4. Carefully observe as Mrs. Krieger rotates the "Earth" on its axis
5. Record how the shadow of the toothpick changes.
6. Observe as Mrs. Krieger tilts the "Earth" toward the flashlight to represent summer.
7. Record the shape of the squares at the equator and at the poles.
8. Observe and record how the shadow of the toothpick changes.

Data Table:

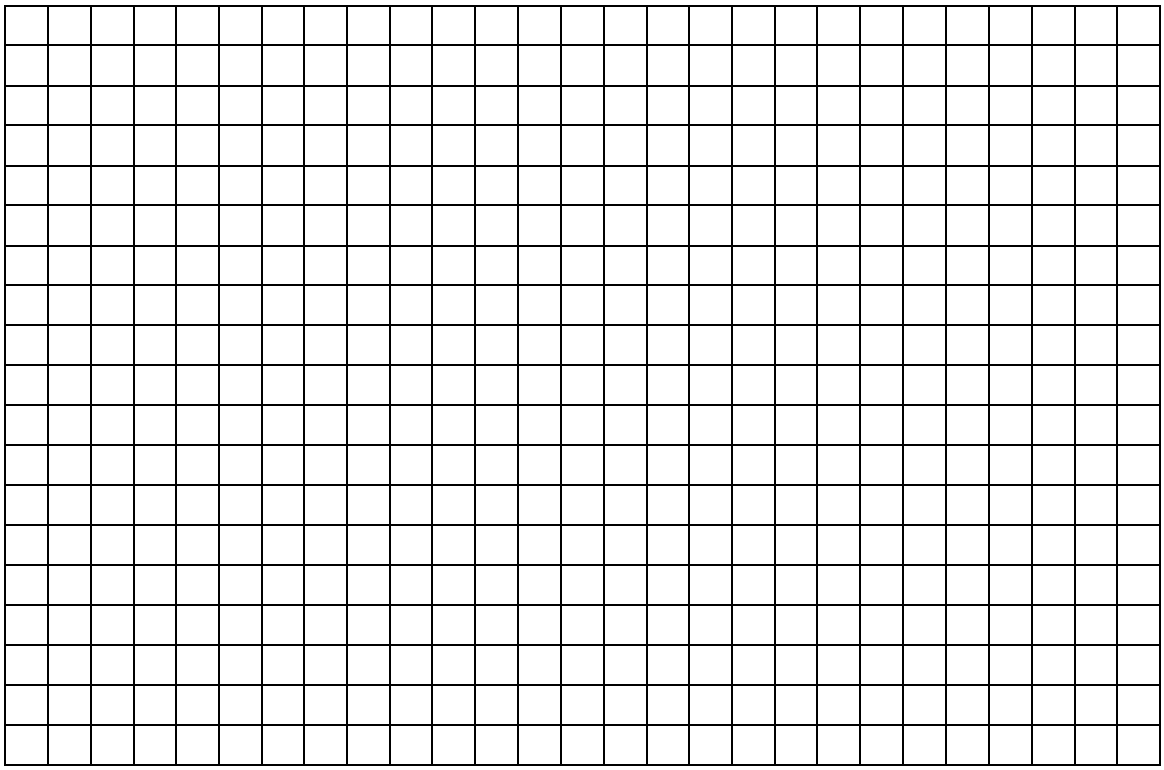
Winter	**Observations**
Shape of Squares At Equator	
Shape of Squares At Poles	
Shadow of Toothpick	
Summer	**Observations**
Shape of Squares At Equator	
Shape of Squares At Poles	
Shadow of Toothpick	

Questions:

1. When it is winter in the Northern Hemisphere, which areas on Earth get the most concentrated amount of light? Which areas get the most concentrated light when it is summer in the Northern Hemisphere?
   _____
   _____
2. If the squares projected on the ball become larger, what can you conclude about the amount of heat distributed in each square? _____
   _____
3. What time of year will the toothpick's shadow be longest? When will the shadow be shortest? _____
   _____
4. How are the amounts of heat and light received in a square related to the angle of the sun's rays? _____
   _____
5. How can you use your observations to explain what causes the seasons?
   _____
   _____

Part B.

1. From a height of 15 cm, shine the flashlight straight down at the grid on the following page (90° angle).
2. Trace the lighted area with a pencil and label it #1.
3. Keeping the flashlight 15 cm above your paper, change the angle of the flashlight to about 30°.
4. Trace the lighted area and label it #2.



Questions:

1. Determine the number of blocks that were lightened by the flashlight.

   (1) # of Full Blocks + Half the # of Partial Blocks = Approximate Area

   (2) # of Full Blocks + Half the # of Partial Blocks = Approximate Area

2. At which angle did the flashlight illuminate the most area? _____
3. What does this say about the intensity of light at each angle? _____
   _____
4. Explain how this activity demonstrates the cause of seasons on Earth.
   _____
   _____
   _____

Lesson Plan – Science 8
Mrs. Heather Krieger
Earth's Seasons

Objectives:

1. The students will be able to explain why Earth's tilt is responsible for seasonal changes in climate.
2. The students will be able to infer that direct radiation is more intense than slanted radiation.

Procedure:

1. Show animation on the internet, illustrating the relationship between Earth's tilt and revolution around the sun. This results in seasonal changes.
2. Students will observe a demonstration showing how the sun's rays are scattered when slanted.
3. Students will complete the lab "Reasons for the Seasons". (See Attached document)

Closure:

1. Students will respond to some conclusion questions using the CPS system. Feedback from their responses will indicate to me whether or not they are grasping the concept of seasons.