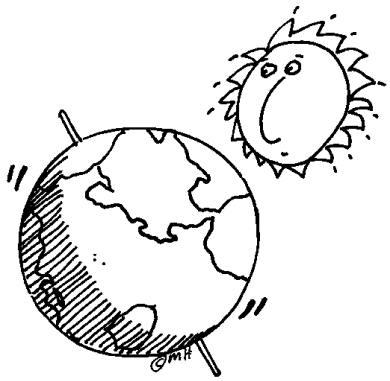


Names _____

_____

Absent _____

Reason for the Seasons

Part One

Read This First!

Today your group will model the Earth's orbit around the Sun!

Look at the position of the stickers on the table. Each dot is labeled with a letter, **"A", "B", "C", or "D"**.

Examine the globe on your table. **Notice how the Earth is tilted on its axis**. The Earth ***ALWAYS*** tilts in the same direction on its axis. Make sure that *your* globe is ***ALWAYS*** tilting in the same direction. **For this activity, position the globe so it tilts toward the *FRONT* of the room**.

You will be moving the Earth ***COUNTER-CLOCKWISE*** around the flashlight "Sun". Observe the Earth in different positions during its yearly **revolution**. Each time you move the globe into a new position on the table, make sure that the globe ***ALWAYS*** tilts toward the front of the room!

Procedure

1. Position the Earth so that the Earth's axis is positioned over the dot labeled "**A**". Have a group member point the flashlight at the dot on the globe (see diagram below).

Front of Classroom ⟶

Where does the Sun appear to shine most intensely when the globe is on "*A*"? Circle the best answer below.

Above the equator **Below the equator** **On the equator**

2. Move the Earth counter-clockwise and place it over the dot labeled "**B**". Remember, ***the globe should be tilted toward the front of the room*** at all times! Turn the globe so the dot is showing. You will be pointing your flashlight at the dot (diagram is as if you are looking down on your globe).

Front of Classroom ⟶

Examine the new position. Where does the Sun appear to shine most intensely when the globe is on dot "B"? Circle the best answer below.

Above the equator **Below the equator** **On the equator**

How many months would it really take the Earth to move $\frac{1}{4}$ of its orbit around the Sun? (Hint: Think of the total number of months in a year). _____ months

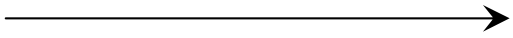
3. Move the Earth counter-clockwise again and position the globe so that it is positioned over the dot labeled "***C***". **Remember to keep the globe tilted toward the front of the room at all times**! Turn the globe so the dot is showing. You will be pointing your flashlight at the dot.

Front of Classroom ⟶

Where does the Sun appear to shine most intensely when the globe is on dot "*C*"? Circle the best answer below.

Above the equator **Below the equator** **On the equator**

4. Move the Earth counter-clockwise and place it over the dot labeled "**D**". Remember, ***the globe should be tilted toward the front of the room*** at all times! Turn the globe so the dot is showing. You will be pointing your flashlight at the dot (diagram is as if you are looking down on your globe).

Front of Classroom 

Examine the new position. Where does the Sun appear to shine most intensely when the globe is on dot "S"? Circle the best answer below.

Above the equator **Below the equator** **On the equator**

5. Discuss the following idea with your group. Come write an answer upon which everyone agrees.

In what position (over dot A, B, C, or D) was the globe and the Sun (flashlight) when Brigham City was experiencing summer? How do you know? Explain your answer.

_____

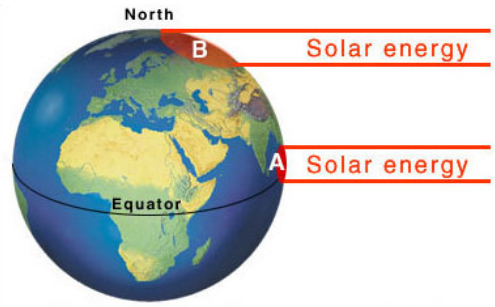
_____

_____

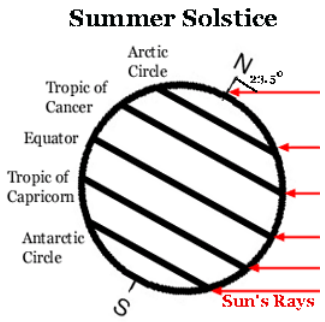
_____

Part Two

You have already investigated what causes the **seasons** and learned that the tilt of the Earth on its axis toward the Sun creates summer in the Northern Hemisphere. Summer means longer days with more hours of sunshine, but that is **only part of the reason** why summer is actually **warmer** than winter.



Look at the pictures on the right. These pictures s show how **the Sun strikes the Earth at different angles in different parts of the world.** Think of the angles of measurement like hours on a clock. 90 degrees is like 12 o'clock 45 degrees is like 1:30 and 30 degrees is like 2 o'clock.



Make a Prediction

Do think the Sun's heat energy is more intense when it comes from directly overhead or when it is slanted at an angle? Why?

_____

_____

_____

For this activity, your group your group will use a model to investigate whether or not the ***angle*** of the sunlight reaching the Earth affects the strength of the Sun's heat.

Directions

1. Lay the graph paper on the table.

2. Turn the flashlight on and hold it straight above the paper so that the ruler touches the table and the edge of the paper and the flashlight shines directly down on the paper.

3. Draw a circle around the bright circle in the center of the light and label it "90 degrees".

4. Make a check mark ✓ in every square of the graph paper that is at least halfway inside that circle. Count the squares.

How many squares did you count? Write the number here _____

5. Now, tilt the ruler and flashlight so that it is at a 45° angle from the paper. Repeat steps 2-4, labeling the new circle (or oval) "45°".

How many squares did you count? Write the number here _____

6. Now, tilt the ruler and flashlight so that it is at a 30° angle from the paper. Repeat steps 2-4, labeling the new circle (or oval) "30°".

How many squares did you count? Write the number here _____

Which circle contained the most checked squares? _____

How did the angle of the ruler and flashlight change the shape of the light on the graph paper?

_____

_____

_____

How do you think the angle would affect the light's warmth if this were real sunlight? Explain your answer.

_____

_____

_____