

Caily Bridgeland

Earth's Seasons and Axial Tilt

Grade: Fourth

SOL: The student will investigate and understand

- b) The causes for the Earth's seasons
- a) The motions of the Earth, the moon, and the sun.

Objective: Students will understand how the Earth's tilted axis and its yearly revolution around the sun causes the changing seasons. Students will also be able to differentiate the Earth's *revolution* from the Earth's *rotation*.

Materials: loose leaf sheet of paper and pencil, blue playdough, 50 yellow mini balloons, paper plates, toothpicks

Anticipatory Set:

- 1) Ask students: Do you have a favorite season of the year? Why is it your favorite?
What is the order of the seasons? Has anyone ever wondered what causes the seasons?

Procedure:

- 1) Solicit input from the students, asking what they believe causes the seasons. Write a list up on the board.
- 2) Explain that the two most important factors that determine seasons are the Earth's *revolution* around the sun and its *axial tilt*.
- 3) Clarify the difference between *revolution* and *rotation*. (Pick students to engage in the motions of each in front of the class.)
 - Revolution** = the movement where an object circles another, synonym "orbit"
 - *Follow-up: How long does it take the EARTH to revolve around the sun? (365 days). **This** is a crucial part for why the seasons occur.
 - *Remind students that the orbit is an **ellipse**, or flattened circle
 - *Challenge question: How long does it take the moon to revolve around the Earth?
 - Rotation** = the movement where an object spins on its axis.
 - *How long does it take the Earth to make 1 full rotation? (24 hours)
 - *What are examples of when an object rotates?
 - Ex. a ballerina spinning on one toe, a basketball player spinning a ball on his finger, a spinning top
- 4) Explain the second important part of the Earth's changing seasons: the Earth's axis.

*What is the Earth's axis? (an imaginary line through the middle of the planet)

*What is special about the Earth's axis? (it is tilted to one side (about 23 degrees) and the north end of the axis is always pointed toward the North Star (Polaris) --important to know that the Earth's axis is always tilted in the same direction.

*a way to remember the Earth's axis is the right-hand rule (the thumb points in the direction of the North Pole/North Star

5) Draw the Sun in the middle of the white board with four Earths surrounding it. Draw the axial tilt and emphasize that it is always in the same direction.

6) Place a dot to represent Northern Virginia on each of the Earths. Explain that when the Earth is in a position where the axis is tilted **toward** the sun, that is when it receives the most sunlight. What month do you think it is? When the axis is tilted **away** from the sun, where we live barely gets any light. What season do you think it is now?

7) Have students gather around the model of the Earth-Sun-Moon. Place a sticky on the part of the Earth that represents where they live and follow that point as you show them each of the seasons. Ask a student what his or her birthday is? Show the students how they can tell how much sunlight there will be on the student's birthday.

8) Have students return to their seats to complete an investigating interactive activity. Students will create their own model of the Sun, with four versions of the Earth, one representing each season. They will use a small, yellow balloon to represent the Sun, and blue playdough to represent the Earth. The most important part will be the four toothpicks, and students will need to show their understanding of the lesson by placing the toothpicks on a tilted axis in the proper direction. Finally, students will need to label what season it is.

Formative Assessment: Students answering questions in class and responding to questions when showing them the model of the Sun-Earth-Moon.

Summative Assessment: Student's finished model will show their knowledge of the material.

Closure: Students will have a debrief discussion about their models, saying why they labeled each version of the earth a certain season. Ask them extension questions such as: Why do certain places near the equator have the same temperature and climates year round?