The Reasons for the Seasons  
5th Grade  
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References: adapted from:  
http://www.lpi.usra.edu/education/skytellers/seasons/activities/sequences.shtml

Benchmarks:  
ES-3: Describe the characteristics of Earth and its orbit around the sun. In this experiment, the focus will be the Earth’s tilted axis and why it causes the seasons.

Objectives:  
Explain why the Earth has seasons and why different hemispheres experience “opposite” seasons.

Materials  
Alcohol burners or tea light candles  
Objects (apples or Styrofoam balls) to represent the Earth  
Thermometers

Initial Observation/Demonstration:  
I will ask the students: “What causes the seasons?” They will write their hypothesis in their science journals and some will share their answers. We will discuss some hypotheses and then discuss the Earth’s tilt of 23.5°. I will demonstrate the proper way to light and work with the alcohol burners and describe the experiment.

Initial Observations:  
Students will observe using their thermometers that the warmest spot around the “sun” is in a straight line away from it.

Initial Model:  
Students will now write a hypothesis telling where they think the Earth (apple) will be the warmest.

Procedure:  
Students should be broken into groups of 3.  
Candles/burners should be passed out (and lit by you depending on the experience level of the students)  
The worksheet that gives step by step directions and probing questions should be passed out, and the students can work within their groups.

Discussion/Summary:
The students should find that according to the thermometers (and their own sense of touch) that the warmest part of the Earth is the part that is most directly lined up with the sun. (NOTE: in this case, the students will be tilting the Earth 23.5 degrees from the horizontal because the burner or candle will mostly be releasing heat in the vertical direction. So in essence, the position of the Earth and sun are rotated by 90 degrees in this experiment.)

**Revised Model:**

The students will record a new, correct hypothesis in their science journal. “The Earth’s seasons are caused by its tilted axis.

**Discussion/Summary:**

It is important to have them rotate the Earth on its axis to show that rotation does NOT have an affect on the Earth’s seasons.
The Reason for the Season Lab Sheet

Name:_________________
Date:_________________

Directions: Follow the steps below very carefully! Also, be extremely careful when working around the flame, roll up shirt sleeves and pull back long hair. If there are any problems, get your teacher’s attention.

1. Light your “sun” with your teacher’s assistance.

2. The direction of the tilt never changes!! The Earth is tilted approximately 23.5 degrees, draw what the Earth’s tilt looks like:

3. Hold the Earth at the correct tilt directly above your “sun”. (Your teacher will demonstrate this.)

4. Place the thermometer in the Northern hemisphere. What is the temperature? __________

5. Take the Earth away from the flame and touch the Northern hemisphere with your finger. How does it feel? ____________________________

6. What season is it in the Northern hemisphere? ______________

7. Tilt the Earth exactly the same as you had it before. This time, place the thermometer in the Southern hemisphere. What is the temperature? __________
8. Take the Earth away from the flame and touch the Southern hemisphere with your finger. How does it feel? ______________________________

9. What season is it in the Southern hemisphere? ______________________

10. Rotate the Earth on its axis. What is weird about the North Pole? Are their days and nights the same length as ours? ______________________________

11. Orbit your Earth half of the way around the sun. Make sure you keep it tilted the same way.

12. Place the thermometer in the Northern hemisphere. What is the temperature? ______

13. Take the Earth away from the flame and touch the Northern hemisphere with your finger. How does it feel? ______________________________

14. What season is it in the Northern hemisphere? ______________________

15. Tilt the Earth exactly the same as you had it before. This time, place the thermometer in the Southern hemisphere. What is the temperature? ______

16. Take the Earth away from the flame and touch the Southern hemisphere with your finger. How does it feel? ______________________________

17. What season is it in the Southern hemisphere? ______________________

18. What causes the seasons?

_________________________________________________
_________________________________________________
_________________________________________________

19. When it is summer here, what season is it in Australia? ________________