

Whitehead

Seasons

Grade Level: 2nd -3rd Grade

Time: 30-45 minutes in several lessons

Standards

CCSS

ELA/Literacy —

- RI.3.1** Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. (3-ESS2-2)
- RI.3.9** Compare and contrast the most important points and key details presented in two texts on the same topic. (3-ESS2-2)
- W.3.8** Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories. (3-ESS2-2)

Mathematics —

- MP.2** Reason abstractly and quantitatively. (3-ESS2-2)
- MP.4** Model with mathematics. (3-ESS2-2)

NGSS

3-ESS2-2. Obtain and combine information to describe climates in different regions of the world.

Science and Engineering Practices

Obtaining, Evaluating, and Communicating Information

- Obtaining, evaluating, and communicating information in 3–5 builds on K–2 experiences and progresses to evaluating the merit and accuracy of ideas and methods.
 - Obtain and combine information from books and other reliable media to explain phenomena.

Disciplinary Core Ideas

ESS2.D: Weather and Climate

- Climate describes a range of an areas typical weather conditions and the extent to which those conditions vary over the years.

Crosscutting Concepts

Patterns

- Patterns of change can be used to make predictions.

Colorado State Standards

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- SC09-Gr.2-S.3-GLE.1
 - Weather and the changing seasons impact the environment and organisms such as humans, plants, and other animals.

Objectives

Students will be able to:

- Gather data using simple devices.
- Organize, represent and interpret data.
- Report their findings to peers.
- Make observations of changing temperature.
- Explain why seasons occur.

Materials

- 3 heat lamps
- 10 thermometers
- Recording sheets
- Materials to make models
- Books on seasons
- Globe
- Direct light flashlight

Justification

Science, math, public speaking, technology and engineering are all used in this lesson. Students will be using a ruler to measure length as well as a thermometer. They will also be presenting their data to each other, so they will be using public speaking. Doing a model as a final project can use engineering skills or technology depending on the choice of the student.

Engage

Ask students, “What are the four seasons?” (fall, winter, summer, spring)

“What makes each season different?” (weather, length of day, plants and animals, ect) List the answers on the board for each season.

What do you think causes seasons? (distance from the sun, how the earth faces the sun, length of time the sun shines on the earth) Have students come up with why they think we have seasons. Write these down.

Explore

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Have a few stations set up with thermometers and heat lamps. One group will be recording data based on time. Another will be recording data based on distance. The last group will be recording data based on direction of light.

Distance set up- heat lamp set up for students to use as a heat source/sun. Have heat lamp set up facing out. Give students some thermometers, rulers, and a recording sheet. Have students measure 6 inches from the heat source and lay a thermometer there. Do this with the other thermometers at 1 foot, 1.5 feet, and 2 feet. Have students leave the thermometers there for 10 minutes and then have them record the temperature on the thermometers on their recording sheet.

Direction set up- heat lamp set up for students to use as a heat source/sun. Have heat lamp facing directly down on a flat surface. Give students thermometers, rulers, and recording sheet. Have students put one thermometer directly below the lamp, one 6 inches to the side, one 1 foot to the side, and the last one 1.5 feet to the side. Have students leave the thermometers there for 10 minutes and then have them record the temperature from each thermometer on their recording sheet.

Time set up- heat lamp set up for students to use as a heat source/sun. Give students some thermometers, a time and a recording sheet. Have heat lamp facing directly down on a flat surface. Explain to students in this group that one day is going to equal ten minutes. We are going to place a thermometer below the heat lamp for set periods of time to represent day and then remove it to represent night for each season as follows:

Summer- 7 minutes on/ 3 minutes off

Winter- 3 minutes on/ 7 minutes off

Fall and Spring- 5 minutes on/ 5 minutes off

Have students record the temperatures for each thermometer on their recording sheets.

- While students are waiting to collect data have some books out for them to read and to research seasons. Have them record anything that they find interesting.
- Have students pick how they would like to present what they learned (model, poster, ect).

Explain

Students will present their data. What does the data show us? Distance from the heat source matters. Time matters. Direction matters.

Since all three experiments showed a difference in heat, we need to narrow down what might be causing seasons on Earth. Ask the students, “Right now it is _____, is it that same season everywhere, or is it a different season somewhere else?” Also ask, “Are there places on Earth that don’t really have much of a change in temperature from seasons?” Point out that having different seasons in different places means distance can’t be the cause of seasons.

Elaborate/ Extend

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In small groups with teacher guidance place a globe on the floor or table. Have another student hold a direct beam flashlight pointed at the globe to represent the sun. (Set up the demonstration so the northern hemisphere is tilted away from the sun first.) Ask questions such as “Where is the sun shining?” “What do you think the season is on that part of Earth?” Spin the globe around slowly. Ask students to watch where the light falls and make observations. Point out that the light is always shining directly on the southern hemisphere. Show the students that as the globe rotates, the light shines longer on the southern hemisphere than on the northern hemisphere. Move the globe to a new position, tilted in a different direction (a different time of year). Repeat the demonstration asking students to make observations about what has changed.

Evaluate

Have students create a presentation using what they have learned. This could be a poster with models on them or they could make a 3D model using different materials. SCRATCH could also be an option to demonstrate.

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Distance

Measure the lengths below from the heat lamp and put a thermometer at that length. Wait ten minutes and then record the temperature next to the appropriate length.

6 inches _____

1 foot _____

1.5 feet _____

2 feet _____

What do you notice?

Direction

Measure the lengths below from the heat lamp and put a thermometer at that length. Wait ten minutes and then record the temperature next to the appropriate length.

In front of: _____

6 inches to the side: _____

1 foot to the side: _____

What do you notice?

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Time

Place thermometer under heat lamp for the specified times. Record the temperature.

Summer: 7 minutes on/ 3 minutes off _____

Winter: 3 minutes on/ 7 minutes off _____

Spring/ Fall: 5 minutes on/ 5 minutes off _____

What do you notice?
