Shadow Season Clues

Use Earth's tilt and sunlight angle to explain seasonal change.

E.5.8B.3 "Develop and use models to explain the factors (e.g., tilt, revolution, and angle of sunlight) that result in Earth's seasonal changes."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline where the passage tells how Earth moves and where its axis points, circle the effects of tilting toward or away from the Sun, and label those two tilt positions 1 and 2. Use your marks to help build a model of the seasons.

Two Visits to the Playground

1. Picture two noon visits to a playground in the Northern Hemisphere. On one visit, the Sun seems high, and a flagpole makes a short shadow. On the other, the Sun seems lower, and the shadow stretches farther. The Sun is not switching its power on and off. A model of Earth moving around the Sun can help explain the change.

2. Earth's axis is an imaginary line through the North and South Poles. The axis is tilted, and it keeps pointing in nearly the same direction as Earth travels around the Sun. This trip, called a revolution, takes about one year. At one point in the trip, the Northern Hemisphere tilts toward the Sun. Half a year later, it tilts away.

3. When a hemisphere tilts toward the Sun, sunlight reaches it at a more direct angle and its days are longer. This brings more warming and summer. When that hemisphere tilts away, sunlight arrives at a lower angle and spreads over more ground. Its days are shorter, bringing less warming and winter. The two hemispheres have opposite seasons. Earth's changing distance from the Sun does not cause the seasons.

2 ANSWER WITH EVIDENCE

Use the passage

1. Your model shows the Northern Hemisphere tilted toward the Sun. What season should you label there? Give two sunlight or daylight clues that support your label.

2. Move Earth halfway around its path without changing the way its axis points. How is the Northern Hemisphere tilted toward the Sun now, and what season follows?

3. A classmate moves Earth closer to the Sun to explain the playground's short noon shadow. What should the classmate change in the model instead? Explain.

4. A model shows winter in the Northern Hemisphere. What season should it show in the Southern Hemisphere? Explain using Earth's tilt.

3 YOUR TURN

Your own words

In two panels, draw Earth at opposite points in its trip around the Sun. Show the Sun, sunlight rays, and Earth's axis pointing in the same direction in both panels; label each hemisphere's season and sunlight angle, then write two sentences explaining why the seasons switch.

ANSWER KEY

Shadow Season Clues

GRADE 5 · E.5.8B.3

PART 1 · READ AND MARK

Underline where the passage tells how Earth moves and where its axis points, circle the effects of tilting toward or away from the Sun, and label those two tilt positions 1 and 2. Use your marks to help build a model of the seasons. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Your model shows the Northern Hemisphere tilted toward the Sun. What season should you label there? Give two sunlight or daylight clues that support your label.	**Summer. Sunlight arrives at a more direct angle, and days are longer.**
2	Move Earth halfway around its path without changing the way its axis points. How is the Northern Hemisphere tilted toward the Sun now, and what season follows?	**The Northern Hemisphere tilts away from the Sun, bringing winter.**
3	A classmate moves Earth closer to the Sun to explain the playground's short noon shadow. What should the classmate change in the model instead? Explain.	**Show the Northern Hemisphere tilted toward the Sun. The Sun appears higher at noon, making the flagpole's shadow shorter.**
4	A model shows winter in the Northern Hemisphere. What season should it show in the Southern Hemisphere? Explain using Earth's tilt.	**Summer. When the Northern Hemisphere tilts away from the Sun, the Southern Hemisphere tilts toward it.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Panel 1: Sun on the left, Earth on the right, and the north end of Earth's axis leaning left. Sunlight rays point toward Earth. Northern Hemisphere: summer, more direct sunlight. Southern Hemisphere: winter, lower-angle sunlight. Panel 2: Sun on the right, Earth on the left, and the north end of Earth's axis still leaning left. Sunlight rays point toward Earth. Northern Hemisphere: winter, lower-angle sunlight. Southern Hemisphere: summer, more direct sunlight. As Earth travels around the Sun, its tilted axis keeps pointing nearly the same way. Each hemisphere has summer when it tilts toward the Sun and winter when it tilts away.

Accept models with either panel first if the axis points in the same direction in both and the hemisphere tilted toward the Sun is labeled summer. More direct sunlight may be described as sunlight reaching a smaller area.