Name _____ Date _____

Reasons for the Seasons: Earth's Tilt, Not Distance from the Sun

Directions: Answer each question. Many of them test a popular idea about the seasons, so check each idea against the facts given in the question.

1. Earth's orbit is not a perfect circle. In early January, Earth is about 147 million kilometers from the Sun, the closest it gets all year. In early July, Earth is about 152 million kilometers away, the farthest it gets. What do these facts show about the seasons in the United States?

A. The United States has summer in January, when Earth is closest to the Sun.

B. Being closer to the Sun is not what causes summer, because the United States has winter when Earth is closest.

C. Earth stays the same distance from the Sun all year.

D. Earth's distance from the Sun is the main cause of summer and winter.

2. Each term below is used in explaining Earth's seasons. Match each term to its meaning. Write the letter of the matching answer on each line.

1. _____ Axis
2. _____ Hemisphere
3. _____ Solstice
4. _____ Equinox

Choices for question 2

A. The path Earth follows on its trip around the Sun

B. A day in June or December when one half of Earth leans the most toward the Sun

C. The day when Earth comes closest to the Sun

D. One half of Earth, such as everything north of the equator

E. A day in March or September when day and night are close to equal in length in most places

F. The invisible line Earth spins around, running from the North Pole to the South Pole

3. Read this sentence from a science lesson: "Earth completes one revolution about every 365 days." What does *revolution* mean in this sentence?

A. A sudden, major change in how a country is governed

B. One complete trip of Earth around the Sun

C. A change from one season to the next

D. One complete spin of Earth on its axis

4. In January, it is winter in Minnesota, in the Northern Hemisphere. Which choice gives the season in Argentina, in the Southern Hemisphere, at the same time, along with the correct reason?

A. Winter, because the whole planet has the same season at the same time

B. Winter, because the southern half of Earth is tilted away from the Sun in January

C. Summer, because the southern half of Earth is tilted toward the Sun in January

D. Summer, because Earth is closest to the Sun in January

5. Kayla thinks summer is warm because the Sun gives off more energy during the summer months. Which fact shows that her idea cannot explain the seasons?

A. Summer days have more hours of daylight than winter days.

B. The Sun is much larger than Earth.

C. When it is summer in the Northern Hemisphere, it is winter in the Southern Hemisphere, even though the same Sun lights both halves at the same time.

D. The Sun looks dimmer at sunset than it does at noon.

6. Talia shines a flashlight straight down at a table and sees a small, bright circle. When she tilts the flashlight to a low angle, the same light spreads into a larger, dimmer oval. What does this model show about summer?

A. In summer, the Sun is closer, so its light makes a brighter spot on the ground.

B. In summer, sunlight arrives at a low angle and spreads out, which heats the ground more.

C. In summer, sunlight strikes the ground more directly, so the same energy falls on a smaller area and heats it more.

D. In summer, the Sun shines brighter, like turning up a flashlight.

7. Chicago gets about 15 hours of daylight in late June but only about 9 hours in late December. What causes the difference?

A. Earth turns more slowly in June, which stretches out each day.

B. Earth is closer to the Sun in June, so sunlight reaches farther around the planet.

C. The Sun gives off light for more hours each day in June.

D. In June, the northern half of Earth leans toward the Sun, so Chicago spends more of each day on Earth's sunlit side.

8. In June, the Northern Hemisphere is tilted toward the Sun. Jordan says the north is warmer then because the tilt brings it closer to the Sun. Earth is about 150 million kilometers from the Sun, and the tilt moves the northern half closer by only a few thousand kilometers. What does this tell you about Jordan's idea?

A. Jordan is wrong: a few thousand kilometers is tiny compared with 150 million kilometers, so it cannot explain summer.

B. Jordan is right: even a few thousand kilometers closer makes the north much warmer.

C. Jordan is wrong, because the tilt moves the northern half farther from the Sun in June.

D. Jordan is right, but only near the North Pole, which gets the closest.

9. All year long, Earth's axis points toward almost the same spot in space, close to the North Star. So why does the northern half of Earth lean toward the Sun in June but away from it in December?

A. By December, Earth has moved to the opposite side of its orbit, so the same tilt now points the north away from the Sun.

B. Earth's axis flips to point the other way every six months.

C. Earth rocks back and forth on its axis once a year, like a rocking chair.

D. Earth's tilt grows larger in June and smaller in December.

10. On the June solstice, the Sun climbs higher over Denver, Colorado, than on any other day of the year. Where is the Sun when it reaches its highest point that day?

A. High in the northern sky

B. High in the southern sky, but not straight overhead

C. Low in the southern sky, just above the horizon

D. Straight overhead, so a flagpole casts no shadow