Exercise A8: The Year and Seasons

Student name: _____ Class: _____ Date: _____

Check the box with the correct answer.

Question 1: The Earth is closest to the Sun on June 21 and furthest from the Sun on December 21.

- ☐ **a.** True
- ☐ **b.** False

Question 2: What is the approximate percentage change in the Earth-Sun distance between June 21 and December 21?

- ☐ **a.** 15%
- ☐ **b.** 7%
- ☐ **c.** 3%
- ☐ **d.** 25%

Question 3: Which of the following statements is correct:

- ☐ **a.** Earth's orbit is a perfect circle.
- ☐ **b.** Earth's orbit is highly elliptical.
- ☐ **c.** The Earth's orbit is nearly circular and the variation in the Earth-Sun distance has a negligible effect on the cycle of the seasons.
- ☐ **d.** The Earth's orbit only affects the seasons in the Northern Hemisphere.

Question 4: Which of the following statements is correct on June 21?

- ☐ **a.** The Southern Hemisphere is tilted towards the Sun.
- ☐ **b.** The Northern Hemisphere is tilted towards the Sun.
- ☐ **c.** The Southern Hemisphere is titled away from the Sun.
- ☐ **d.** Both b and c

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Question 5: Which of the following statements is correct on December 21?

- ☐ **a.** The Northern Hemisphere is tilted away from the Sun.
- ☐ **b.** The Southern Hemisphere is tilted away from the Sun.
- ☐ **c.** The Southern Hemisphere is tilted towards the Sun.
- ☐ **d.** Both a and c

Question 6: As the Earth orbits the Sun; observe the tilt and direction of the Earth's rotation axis. Which of the following statements is true?

- ☐ **a.** The Earth's tilt remains the same and the rotation axis maintains the same orientation.
- ☐ **b.** The Earth's tilt remains the same but the rotation axis changes orientation.
- ☐ **c.** Both the angle and orientation of Earth's rotation axis change.
- ☐ **d.** Earth's degree of tilt changes but the orientation of the axis remains the same.

Question 7: Based on your observations, as the Earth revolves around the Sun:

- ☐ **a.** The hemisphere tilted towards the Sun experiences summer and the hemisphere tilted away from the Sun experiences winter.
- ☐ **b.** The hemisphere tilted away from the Sun experiences summer and the hemisphere tilted towards the Sun experiences winter.
- ☐ **c.** The tilt and direction of the Earth's rotation axis remain constant.
- ☐ **d.** Both a and c

Question 8: How many hours of daylight does New York City receive (time between sunrise and sunset) and how high does the Sun get in the sky? Hint: The Sun is highest in the sky when it crosses the meridian.

- ☐ **a.** 15 hours of daylight and the Sun reaches an altitude of 72 degrees.
- ☐ **b.** 8 hours of daylight and the Sun reaches an altitude of 27 degrees.
- ☐ **c.** 18 hours of daylight and the Sun reaches an altitude of 90 degrees.
- ☐ **d.** 12 hours of daylight and the Sun reaches an altitude of 49 degrees.

Exercise A8: The Year and Seasons

Question 9: How many hours of daylight does New York City receive and how high does the Sun get in the sky?

- ☐ **a.** 18 hours of daylight and the Sun reaches an altitude of 90 degrees.
- ☐ **b.** 12 hours of daylight and the Sun reaches an altitude of 49 degrees.
- ☐ **c.** 15 hours of daylight and the Sun reaches an altitude of 72 degrees.
- ☐ **d.** 9.5 hours of daylight and the Sun reaches an altitude of 26 degrees.

Question 10: Which of the following statements explains why we experience the annual cycle of seasons?

- ☐ **a.** Earth's orbit is slightly elliptical.
- ☐ **b.** The tilt of Earth's rotational axis changes the flux of sunlight hitting Earth's surface.
- ☐ **c.** The tilt of Earth's rotational axis changes the number of hours of daylight over the seasons.
- ☐ **d.** Both b and c combine to produce Earth's seasons.

Question 11: Which of the following statements is correct?

- ☐ **a.** Daytime and nighttime hours are equal.
- ☐ **b.** The Sun is found on the celestial equator as seen from Earth.
- ☐ **c.** The Northern and Southern Hemispheres receive equal amounts of sunlight.
- ☐ **d.** All of the above.

Question 12: Does Mars experience seasons?

- ☐ **a.** Mars has seasons because its orbit is similar to the Earth's orbit.
- ☐ **b.** Mars does not have seasons because it is too far from the Sun.
- ☐ **c.** Mars has seasons because its rotation axis is tilted with respect to the ecliptic.
- ☐ **d.** Mars does not have seasons because its orbit is not as circular as Earth's orbit.