

Name: _____ Date: _____

Answer Key: Your Celestial Flight Plan: 9th Grade Orbital Mechanics Quiz

Ground control needs your help verifying orbital data and planetary alignment as we transition from foundational astronomy to high school astrophysics.

1. Which specific phenomenon is responsible for the slightly bulging shape of Earth at the equator, known as an oblate spheroid?

Answer: A) Centrifugal force from Earth's rotation

As Earth rotates on its axis, the centrifugal force causes the planet's midsection to push outward, creating an equatorial bulge.

2. True or False: Earth travels at a constant speed throughout its entire 365.25-day revolution around the Sun.

Answer: B) False

According to Kepler's Second Law, Earth moves faster when it is closer to the Sun (perihelion) and slower when it is further away (aphelion).

3. During a ____ tide, the gravitational forces of the Moon and the Sun are at right angles to each other, resulting in the lowest tidal range.

Answer: C) Neap

Neap tides occur during the first and third quarter moon phases when the Sun's gravity partially cancels out the Moon's gravity.

4. Foucault's Pendulum is a famous experiment used specifically to provide physical evidence of what Earthly motion?

Answer: B) Axial rotation

As the pendulum swings, the floor beneath it moves due to Earth's rotation, causing the path of the pendulum to appear to shift over time.

5. True or False: A total solar eclipse can only occur during the New Moon phase.

Answer: A) True

Name: _____ **Date:** _____

For a solar eclipse to happen, the Moon must be positioned directly between the Earth and the Sun, which is the New Moon phase.

6. The imaginary line in the sky that the Sun appears to follow throughout the year is called the ____.

Answer: C) Ecliptic

The ecliptic represents the plane of Earth's orbit around the Sun, appearing as the Sun's path from our perspective on Earth.

7. Which of the following would happen if Earth's axial tilt were 0 degrees instead of 23.5 degrees?

Answer: B) There would be no distinct seasons

Seasons are caused by the tilt of the Earth; without a tilt, the Sun's rays would consistently hit the same latitudes with the same intensity year-round.

8. The point in Earth's orbit where it is farthest from the Sun, occurring around July 4th, is known as ____.

Answer: B) Aphelion

Aphelion is the position in the orbit of a planet or comet where it is at its greatest distance from the Sun.

9. True or False: The same side of the Moon always faces Earth because the Moon rotates at the same rate that it revolves.

Answer: A) True

This phenomenon is known as synchronous rotation or tidal locking, which is why we never see the 'far side' of the Moon from Earth.

10. Why does a lunar eclipse not happen every single month during a full moon?

Answer: C) The Moon's orbit is tilted 5 degrees relative to Earth's orbit

Because the Moon's orbit is slightly tilted, it usually passes above or below Earth's shadow during a full moon.