

Name \_\_\_\_\_

## The Dance of Planets: How Gravity Shapes Their Orbits Around the Sun

### Short Answer Key

1. Gravity pulls the planet toward the Sun, while the planet's inertia makes it move forward. The balance between these forces results in the planet's elliptical orbit.
2. Kepler's first law states that planets orbit the Sun in elliptical paths, with the Sun at one of the two foci of the ellipse. This law explains the shape of planetary orbits, moving away from the earlier belief that orbits were perfect circles.
3. Kepler's second law, the law of equal areas, states that a line connecting a planet to the Sun sweeps out equal areas in equal times. This means that planets move faster when they are closer to the Sun (perihelion) and slower when farther away (aphelion), ensuring that they cover equal areas in their orbits.
4. Kepler's third law states that the square of the orbital period is directly proportional to the cube of the semi-major axis (half the length of the longest diameter of the ellipse) of a planet's orbit. This law allows us to calculate the relative distances and periods of planets in our solar system.

