QUIZIZZ Worksheets

Name

Exploring Newton's Law of Gravitation

Total questions: 15

Worksheet time: 8mins

Instructor name: Dr. Ramanathan Saitechinfo

Class

Date

1. What is the definition of gravitational force?

a) Gravitational force is the force that repels two masses.

b) Gravitational force is the energy produced by a mass in motion.

c) Gravitational force is the force of attraction between two masses.

d) Gravitational force is the force that acts only on objects in space.

2. What is the value of the universal gravitational constant (G)?

a) 6.67430 × 10^-10 m^3 kg^-1 s^-2

b) 3.14159 m^3 kg^-1 s^-2

c) 9.81 m/s^2

d) 6.67430 × 10^-11 m^3 kg^-1 s^-2

3. How does gravitational potential energy depend on mass and height?

a) Gravitational potential energy is independent of mass and height.

b) Gravitational potential energy depends directly on mass and height.

c) Gravitational potential energy only depends on the mass of the object.

d) Gravitational potential energy decreases with increasing mass and height.

4. State Kepler's First Law of Planetary Motion.

a) The orbit of a planet is a perfect circle with the Sun at the center.

b) The orbit of a planet is a spiral path around the Sun.

c) The orbit of a planet is an ellipse with the Sun at one focus.

d) The orbit of a planet is a straight line from the Sun.

5. What does Kepler's Second Law state about planetary motion?

a) The distance between a planet and the Sun remains unchanged.

b) A line joining a planet and the Sun sweeps out equal areas in equal times.

c) The speed of a planet is constant throughout its orbit.

d) Planets move in circular orbits around the Sun.

6. Explain Kepler's Third Law in terms of orbital periods and distances.

a) The distance of a planet from the sun is proportional to its orbital speed.

b) The cube of a planet's orbital period is proportional to the square of its distance from the sun.

c) The square of a planet's orbital period is proportional to the cube of its average distance from the sun.

d) The average distance from the sun has no effect on a planet's orbital period.

7. What is the formula for calculating gravitational field strength?

a) g = F * r^2

b) g = m/F

c) g = F/m or g = G * (M/r^2)

d) g = 2 * (M/r)

8. How does the gravitational field strength vary with distance from the center of a mass?

a) Gravitational field strength remains constant regardless of distance from the center of a mass.

b) Gravitational field strength varies directly with the distance from the center of a mass.

c) Gravitational field strength increases with distance from the center of a mass.

d) Gravitational field strength varies inversely with the square of the distance from the center of a mass.

9. What are some practical applications of gravitational principles in technology?

a) Underwater exploration devices

b) Television broadcasting technology

c) Applications include satellite positioning systems, structural engineering, and aerospace trajectory calculations.

d) Weather forecasting systems

10. How does gravitational force affect the motion of satellites?

a) Gravitational force has no effect on satellite motion.
b) Gravitational force keeps satellites in orbit by providing the necessary centripetal force.
c) Satellites move faster when gravitational force is weaker.
d) Gravitational force causes satellites to fall to Earth.

11. What role does gravity play in the formation of planets and stars?

a) Gravity is essential for the accumulation of matter, leading to the formation of stars and planets.
b) Gravity has no effect on the formation of celestial bodies.
c) Gravity only influences the orbits of existing planets and stars.
d) Gravity prevents the formation of matter in space.

12. Describe how gravitational potential energy is converted to kinetic energy in free fall.

a) Gravitational potential energy is converted to kinetic energy as an object falls, increasing its speed and energy of motion.
b) Gravitational potential energy remains constant as the object falls.
c) An object gains gravitational potential energy as it falls, slowing down.
d) Kinetic energy is converted to gravitational potential energy during free fall.

13. What is the relationship between gravitational force and the masses of two objects?

a) Gravitational force is independent of the masses of two objects.
b) Gravitational force is directly proportional to the product of the masses of two objects.
c) Gravitational force is inversely proportional to the masses of two objects.
d) Gravitational force decreases with the increase in the masses of two objects.

14. How does the concept of gravitational field strength relate to weight?

a) Weight is independent of gravitational field strength.
b) Weight is the product of mass and gravitational field strength.
c) Gravitational field strength is the same everywhere on Earth.
d) Weight is the same as mass regardless of location.

15. Explain how Newton's law of gravitation applies to objects in orbit.

a) Newton's law of gravitation explains that objects in orbit are in free fall towards a larger mass, balanced by their tangential velocity, resulting in a stable orbit.

b) Objects in orbit are stationary and do not experience any forces.

c) Orbits are caused by the repulsion between two objects of equal mass.

d) Gravity only affects objects on the ground, not those in space.

Answer Keys

1. c) Gravitational force is the force of attraction between two masses.
2. d) 6.67430 × 10^-11 m^3 kg^-1 s^-2
3. b) Gravitational potential energy depends directly on mass and height.
4. c) The orbit of a planet is an ellipse with the Sun at one focus.
5. b) A line joining a planet and the Sun sweeps out equal areas in equal times.
6. c) The square of a planet's orbital period is proportional to the cube of its average distance from the sun.
7. c) g = F/m or g = G * (M/r^2)
8. d) Gravitational field strength varies inversely with the square of the distance from the center of a mass.
9. c) Applications include satellite positioning systems, structural engineering, and aerospace trajectory calculations.
10. b) Gravitational force keeps satellites in orbit by providing the necessary centripetal force.
11. a) Gravity is essential for the accumulation of matter, leading to the formation of stars and planets.
12. a) Gravitational potential energy is converted to kinetic energy as an object falls, increasing its speed and energy of motion.
13. b) Gravitational force is directly proportional to the product of the masses of two objects.
14. b) Weight is the product of mass and gravitational field strength.
15. a) Newton's law of gravitation explains that objects in orbit are in free fall towards a larger mass, balanced by their tangential velocity, resulting in a stable orbit.