

GRAVITY STUDY GUIDE



1. The mighty sun and planets simply pull each other so that the planets continually "fall" around the sun in closed paths. Why don't the planets crash into the sun?
2. "**G**" is known as the _____. Why is **G** needed in the law of universal gravitation?
3. Briefly explain the difference between **big G** and **little g**.
4. Gravitational forces are the _____ of the four fundamental forces found in nature. This means that gravitational effects can only be observed when a large mass is involved.
5. The name for the **force** of attraction between you and the earth is _____.
6. Assume that a grapefruit at the top of a tree is pulled by earth gravity with a force of 2 N. If the tree were **twice** as tall, would the force of gravity on the grapefruit be only 1/4 of 2 N or 0.5 N? **Explain**.
7. What is the magnitude and direction of the gravitational force that acts on a 75-kg woman at the surface of the earth?
8. What is the force of attraction between two asteroids 4.00×10^3 km apart if their masses are 5700 kg and 14,000 kg, respectively?
9. What is the weight of a 66-kg satellite when it is 23,000 km above the surface of the earth? What is the gravitational field strength at this altitude?
10. Anything that has mass is surrounded by a _____ field.

11. The planet Venus has a radius of 6050 km and a mass of 4.87×10^{24} kg.

a) what is the gravitational field strength (g) on the surface of Venus?

b) how much would a 85-kg astronaut weigh on the surface of Venus?

c) what would be the gravitational field strength at an altitude of 2100 km above the surface?

12. The Moon has an orbital period of 27.3 days around Earth and a mean distance of 3.85×10^5 km from Earth's center. Use Kepler's laws to find the orbital period of an artificial satellite orbiting Earth at a distance of 4.48×10^4 km from the center of Earth.

13. **Mars** orbits the Sun with an orbital radius of 2.28×10^{11} m. Given that the mass of the **Sun** is 2.00×10^{30} kg, calculate the orbital velocity of planet.