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Worksheet: Gravitation

1. The volume of a 500 g sealed packet is 350 cm^3. Will the packet float or sink in water if the density of water is 1 g/cm^3? What will be the mass of the water displaced by this packet?
2. What is the magnitude of the gravitational force between the Earth and a 1 kg object on its surface? (Mass of Earth = 6 × 10^{2}■ kg, Radius of Earth = 6.4 × 10■ m)
3. Why will a sheet of paper fall slower than one that is crumpled into a ball?
4. What do we call the gravitational force between the earth and an object?
5. The volume of 50 g of a substance is 20 cm^3. If the density of water is 1 g/cm^3, will the substance float or sink?
6. Calculate the force of gravitation between the Earth and the Sun, given that the mass of the Earth = 6 × 10^{2}■ kg and of the Sun = 2 × 10^{3}■ kg. The average distance between the two is 1.5 × 10^{11} m.
7. A stone is thrown vertically upward with an initial velocity of 40 m/s. Taking g = 10 m/s^2, find the maximum height reached by the stone. What is the net displacement and the total distance covered by the stone?
8. How does the force of gravitation between two objects change when the distance between them is reduced to half?
9. In what direction does the buoyant force on an object immersed in a liquid act?
10. A stone is released from the top of a tower of height 19.6 m. Calculate its final velocity just before touching the ground.
11. Why does a block of plastic released under water come up to the surface of water?
12. What is the importance of universal law of gravitation?
13. Gravitational force acts on all objects in proportion to their masses. Why then, a heavy object does not fall faster than a light object?
14. A ball thrown up vertically returns to the thrower after 6 s. Find (a) the velocity with which it was thrown up, (b) the maximum height it reaches, and (c) its position after 4 s.
15. A stone is allowed to fall from the top of a tower 100 m high and at the same time another stone is projected vertically upwards from the ground with a velocity of 25 m/s. Calculate when and where the two stones will meet.
16. Amit buys few grams of gold at the poles as per the instruction of one of his friends. He hands over the same when he meets him at the equator. Will the friend agree with the weight of gold bought? If not, why?
17. What is the acceleration of free fall?

18. Gravitational force on the surface of the Moon is only 1/6 as strong as gravitational force on the Earth. What is the weight in newtons of a 10 kg object on the Moon and on the Earth?

19. If the Moon attracts the Earth, why does the Earth not move towards the Moon?

20. The Earth and the Moon are attracted to each other by gravitational force. Does the Earth attract the Moon with a force that is greater or smaller or the same as the force with which the Moon attracts the Earth? Why?