

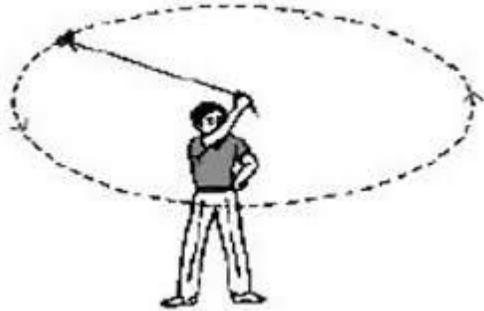
National Institute of Open Schooling
Senior Secondary
Lesson 5 – Gravitation
Worksheet-5

- Q1.** Throw different objects of different matter and different volume; vertically or horizontally and you will observe that all objects thrown upward comes back to the ground after reaching a point. Have you ever thought about this phenomenon? Explain the phenomenon. Is it same for all objects?
- a) If Yes, Support your answer with reasons
 - b) If No, Support your answer with reasons
- Q2.** Universal Law of Gravitation states that every particle attracts every other particle in the universe with a force which varies as the product of their masses and inversely as the square of the distance between them. It is observed that falling apple attracted towards the earth; as the law stated above why don't we see the earth moving towards the apple?
- Q3.** Suppose gravitational constant G is ten times smaller and mass of Sun is ten times bigger. Comment, will the acceleration due to gravity on earth will change.
- a) If Yes, Support your answer with reasons
 - b) If Yes, Give some impact of change of acceleration due to gravity on earth
 - c) If No, Support your answer with reasons
- Q4.** Take two objects of different mass and separate them by any distance. Note down the M_1 and M_2 and distance between them. Calculate the gravitational force between them. Now observe what will happen to gravitational force between them if you make following changes
- a) Distance is four times but masses M_1 and M_2 are same
 - b) The masses M_1 and M_2 are doubled but the distance remains the same
 - c) Distance is four times and the masses M_1 and M_2 are also doubled
- Q5.** The acceleration produced by the force of gravity is called the acceleration due to gravity and is given by $g = G \frac{M}{R^2}$
 The quantity R^2 in the denominator gives that the magnitude of g decreases as square of the distance from the centre of the earth increases. Comment about
- a) Variation of g with Latitude
 - b) Variation of g with Depth
 - c) Variation of g with Height
- Q6.** The force with which an object is pulled towards the earth is called its weight. Comment why weight of any object on the Moon is $1/6$ times that on the earth? Suppose you can lift an object of mass 20 kg on earth, what can be the maximum mass of object which can be lifted by you on the Moon?

Q7. Continue to Q6. Comment

- a) Is the mass of an object stays constant wherever the body may be situated in the universe?
- b) Is the weight of an object stays constant wherever the body may be situated in the universe?
- c) Is the weight of an object stays constant wherever the body may be situated on earth?
- d) What will be the weight of an object at centre of earth of radius R ?

Q8. Take a stone tied with a string and whirl the stone in a horizontal circular path as shown in figure. Observe the path of stone if the string breaks suddenly. Will it continue to move in same circular path or will change the path? Explain your answer with reasons.



Q9. Kepler's laws apply to any system where the force binding the system is gravitational in nature. State Kepler's Laws of Planetary Motion and comment why Earth and other Planet doesn't fall into the Sun while Earth and other Planet is acted upon by gravitation of Sun.

Q10. A cricket match is played in Sydney in Australia but we can watch it live in India. A game of Tennis played in America is enjoyed in India. What you think what makes it possible? Find out the Minimum number of satellites that are required to cover entire earth so that at least one satellite is visible from any point on the equator.