

National Institute of Open Schooling
Secondary Course : Science And Technology
Lesson 13 : Work and Energy
Worksheet-13

1. Work is a common term we use in our day to day conversations. Ordinarily we include standing, reading, lying etc. in the category of work. But in science, work has a very specific meaning. Define work in terms of science with examples from day to day life.
2. Calculate the work done by the force if the force and displacement are perpendicular to each other. A man is carrying a bag of 4 kg mass on his head and moves 1Km on a levelled road. Calculate the work done against the gravitational force. ($g = 10 \text{ ms}^{-2}$)
3. Derive a relationship between work, force and displacement. Calculate work done if a body of 5 kg is raised to 2m.
4. It is observed that when one does work, s/he spends energy and more energy is required to do more work. Define Energy. Is it practical 100% conversion of energy?
 - a) If Yes, Support your answer with reasons
 - b) If No, Support your answer with reasons
5. You do work by spending muscular energy which you gain from the chemical energy of the food you eat. Your fan runs on electrical energy. While playing with magnets you might have seen that a magnet attracts a piece of iron because it has magnetic energy. Thus energy is available to us in many different forms; observe your surroundings and explain different forms of energy and their importance and limitations.
6. Continue to Q5 we know the various forms of energy get converted from one form to another in different situations. Name and explain the law which states this phenomenon of converting one form of energy to another form. Observe your surroundings and give some examples of energy transformation from daily life.
7. Work is measured as the product of force and the displacement in the direction of the force but we did not consider whether the work is done in one second or in one hour. However, the time taken to perform a particular work is important, in our daily life. Why, it is important to know the rate at which work is done and how will you calculate the rate at which work is done?
8. Two objects of mass 10 kg and of mass 3.5 kg are dropped simultaneously from a tower. Will they have the same acceleration, when they are 10 m above the ground?
 - a) If Yes, Support your answer with reasons
 - b) If No, Support your answer with reasons
9. Why road accidents at high speeds are much worse than the accidents at low speeds?

10. The velocity of a rocket is suddenly tripled. Calculate the ratio of two kinetic energies, if rocket's initial velocity is v .