

Simple Machines

Solution 1.a:

The devices with a simple structure are called simple machines. An inclined plane and a lever are examples of simple machines.

Solution 1.b:

The use of a machine helps to reduce the labour and time required to do something, to do work of uniform quality without stoppages and to get difficult work done easily.

Solution 1.c:

A pulley is a type of simple machine which is in the form of a wheel with grooves on its rim fixed on a strong support.

Solution 1.d:

A sloping plank of wood, a strong steel plate or a slope constructed from masonry can be used as an inclined plane.

Solution 1.e:

A rigid rod which turns around a fixed support is called a lever.

Solution 1.f:

A complex machine is a combination of many simple machines. For example, a big crane is a complex machine which has a pulley (simple machine) at the top.

Solution 1.g:

There are three kinds of levers according to the position of the force applied, the fulcrum and the load.

Solution 1.h:

1. Machines should be looked after well.
2. Machines should be wiped and cleaned to prevent settling of dust in their parts.

3. The parts which are rubbed against each other should be oiled at regular intervals of time to reduce their wear and tear.

Solution 2:

- (a) Pulley
- (b) Lever of first order
- (c) Sloping plank or inclined plane
- (d) Lever of second order
- (e) Pulley

Solution 3.a:

Travelling bags have wheels which roll, making it easy to push the luggage with ease than to lift it.

Solution 3.b:

Iron pipes fitted on an inclined plane act as wheels and help to push the heavy loads up easily.

Solution 3.c:

We should take care of machines to minimise wear and tear because of constant use.

Solution 3.d:

We should use a pulley to draw water from a well as a pulley pulls the rope of the bucket diagonally rather than straight up. Thus, a pulley makes it easier to draw water from a well.

Solution 4:

- (a) The inclined plane is a simple machine.
- (b) The wheel and its axle form a simple machine.
- (c) The sewing machine is a complex machine.
- (d) Force must be applied to make a machine work.

Solution 5:

Type of lever	Positions of load, force and fulcrum			Examples
First order	force	fulcrum	Load	1. Beam balance 2. Farmer's lever
Second order	fulcrum	load	force	1. Bottle opener 2. Wheel barrow
Third order	fulcrum	force	load	1. Fishing rod 2. Lifting weight with the hand