Simple Machine

1. **What is simple machine?**
   Ans. The simple tools that we use our daily work easy are called Simple Machine.

2. **How a machine can make the work easier for us?**
   Ans. Machines can make the work easier for us in the following ways:
   a. Multiplying the magnitude of the force
   b. Changing the direction of the force applied
   c. Changing the point of application of the force.
   d. Gaining the speed.

3. **What is Load (L)?**
   Ans. It is the weight of the object or the body on which the work is to be done. It is also the force acting against the applied Force.

4. **What is Fulcrum (F)?**
   Ans. It is a fixed point about which the simple machine can move.

5. **What is Effort (E)?**
   Ans. It is the force applied to do the work.

6. **What is Mechanical Advantage (MA)?**
   Ans. Mechanical Advantage od a machine is defined by the ratio of Load to Effort.

   $$\text{Mechanical Advantage (MA)} = \frac{\text{Load}}{\text{Effort}}$$

7. **What is Efficiency?**
   Ans. Efficiency of a simple machine is its ability to convert the amount of energy supplied to it into work.

   $$\text{Efficiency} = \frac{\text{Workdone by the machine}}{\text{Energy Supplied}}$$

   Efficiency is usually written as a percentage:

   $$\text{Efficiency} = \frac{\text{Workdone by the machine}}{\text{Energy Supplied}} \times 100\%$$

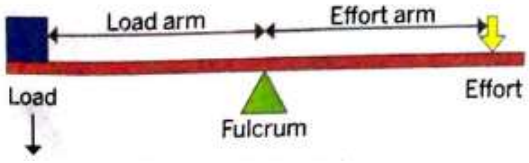
8. **Why the efficiency of a machine cannot be more than 100%?**
   Ans. Efficiency of any machine cannot be more than 100% because a machine cannot be more work than the given supply of energy.
   Generally, efficiency of a machine is always less than 100% because some energy is lost while operating the machine, such as energy loss due to friction.

9. **What is Lever? And How is it works?**
   Ans. A lever is a simple machine where we apply force at one end of the machine and the other end helps us to do work.
   It is a simple rod fixed at a point and moves about it.
   Some example: Scissor, Bottle opener etc.

10. **How Liver works?**

Ans. The length or distance between the load and the fulcrum is called Load Arm. The length or distance between the effort and the fulcrum is called the Effort Arm.

A lever works on the principle that the product of effort arm is always equal to the product of load and load arm.



That is,

Effort × Effort Arm = Load × Load Arm

Or

$$\frac{\text{Load}}{\text{Effort}} = \frac{\text{Effort Arm}}{\text{Load Arm}}$$

Or

$$\text{Mechanical Advantage MA} = \frac{\text{Effort Arm}}{\text{Load Arm}}$$

Therefore, Mechanical Advantage of a liver is the Ratio of Effort arm to the Load Arm.

This is known as Principle of Mechanical Advantages of Liver.

11. **What is Principle of Mechanical Advantages of Levers?**

Ans. Mechanical Advantages of a Lever is given by the ratio of the effort arm to the load arm.

12. **What is Pulley?**

Ans. A pully is a simple machine that has a grooved wheel which is capable of rotating about its axis and rope to move a load. One end of the rope is attached to the load and effort is applied on the other end to move the load.

Pullies are used in Motors, Cranes etc.

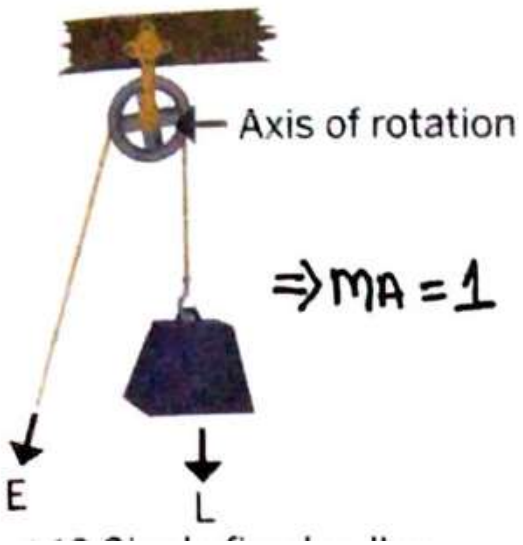
13. **Pullies are how many types?**

Ans. Pulleys are two types:

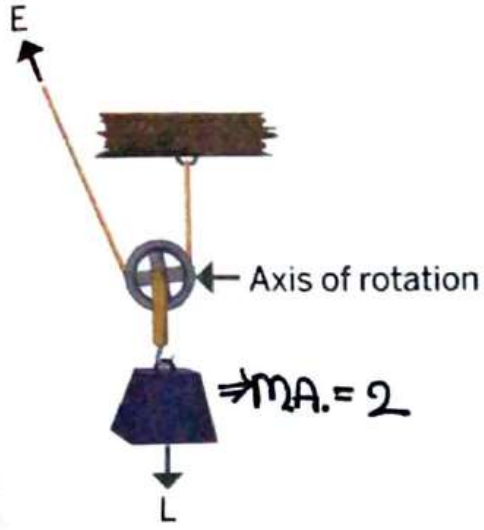
a. Single Fixed Pulley
b. Single Movable Pulley

14. **What is Single Fixed Pulley?**

Ans. A single fixed pulley is fixed on a support and has a fixed axis of rotation. It helps to lift a load easily by changing the direction of force does not increase or decrease the effort required to move the load.



15. **What is Single Movable Pulley?**
Ans. A single movable pulley is able to move over the rope through the groove. Its axis of rotation is not fixed. One end of the rope is fixed and effort is applied on the other end of the rope. The load that is to be moved is hung on a hook of the pulley. It is used to move or lift heavy loads Movable pulley decreases the effort required to move the load. Mechanical advantage of a single movable pulley is two.



16. **What is Inclined Plane?**
Ans. An inclined plane is a rigid sloping surface on which load can be pushed up or pulled up to reach the raised platform.
For example, loading heavy carton boxes on to a truck using an inclined plane is easier than lifting the boxes and placing them in the truck.

17. **What is Wheel and Axel and what are the advantages of it?**
Ans. Simple machine is a combination of a wheel and an axle where the wheel moves as per the motion of the axle. The axle is a rod of smaller radius fixed to the centre of the wheel which is of larger radius. A wheel and axle make it easy to move heavy things. Vehicles that run on wheels use wheel and axle.
Steering of vehicles. door knob, screwdriver. giant wheel. fly wheel and wheels of sewing machines are examples of wheel and axle.

18. **What is Wedge?**
Ans. A wedge is a simple machine with two planes that meet at a sharp edge. One end of the wedge is sharp and the other end is blunt. The sharp edge of the wedge helps to multiply the force applied at the blunt surface. Consequently, the sharp edge easily penetrates into objects.
So, wedges are used to cut things.
Knife and axe are examples of wedges.