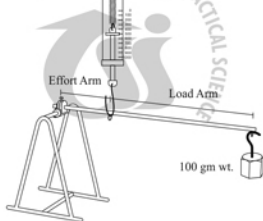


Fig.7

100 gm wt.

**Step 2:**

Take the spring balance of 0-1000gm range and hook it to the hook provided between fulcrum and the load.

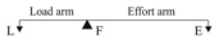


**Step 3:**

Now lift the spring balance. While lifting it, please hold the metal frame firmly with another hand. Now reading in the spring balance gives you effort required to lift the load of 100 gm wt.

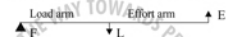
**What is going on?**

**First kind of lever :** In this kind of lever fulcrum (F) is situated between the effort (E) and the load (L).



When the effort arm is longer than the load arm, the mechanical advantage is greater than 1. Such levers are used to lift a large load by applying a small effort. eg: crowbar

**Second kind of lever :** In this kind of lever the load is situated between effort and the fulcrum.



Since the load is in between effort and fulcrum, the effort arm is always longer than the load arm. So the mechanical advantage of this kind lever is always more than 1. Thus this kind of levers always acts as force multipliers. Applying less effort a large load is lifted using these kind of levers. eg: wheel barrow

**Third kind of lever :** In this kind of lever the effort is situated between the fulcrum and the load.



Since the effort is in between F and L, the effort arm is always smaller than load arm. So the mechanical advantage of this type of lever is less than 1. For this kind of lever effort is higher than the load, which is different for first and second kind of levers. This type of levers are used to move a load through a large distance than through the effort distance.

eg: A bread knife cuts the entire bread slice by moving less effort distance.

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



# LEVER KIT

(Mechanical Advantage)

**TARANG SCIENTIFIC INSTRUMENTS**

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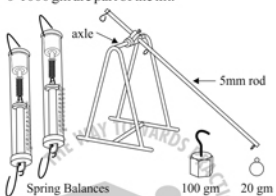
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## LEVER KIT

Observe the Mechanical Advantages in all the three kinds of levers

**Assembly :**

The Apparatus consists of a 5mm rod which can be turned around a fixed point (fulcrum) with the help axle in a blue coloured metal frame. Arrangement is made to vary the length of this rod using screw, so that the length of the effort arm and load arm can be varied. A load of 100 gm., an effort of 20 gm and 2 spring balances of 0-100 gm and 0-1000 gm are part of the kit.



**To do and observe :**

**First kind of lever :**

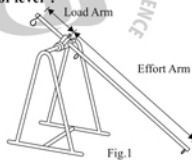


Fig.1

**Step 1:**

Arrange the red coloured rod as shown in fig.1, so that you can have load arm and effort arm.

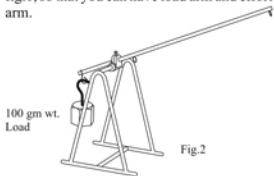


Fig.2

**Step 2:**

Insert the load in the hook provided to the load arm as shown in fig.2.

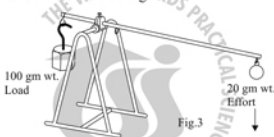


Fig.3

**Step 3:**

Now insert 20 gm wt. effort in the hook provided at the end of the effort arm as shown in fig.3. You will observe that the load is lifted easily.

**Second kind of lever :**

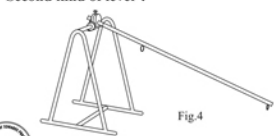


Fig.4

**Step 1:**

Move the red coloured rod at one end of the fulcrum as shown in fig.4 by adjusting the screw.

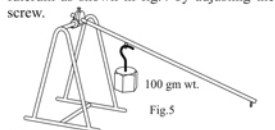


Fig.5

**Step 2:**

Insert the 100 gm wt. load in the hook provided as shown in fig.5

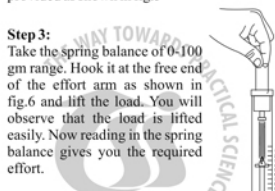


Fig.6

**Third kind of lever :**

**Step 1:**

Now place the load of 100 gm wt. in the hook provided at the free end as shown in fig.7

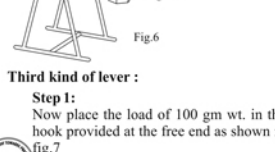


Fig.7