

Subject: Science

Activity - Static friction

Chapter- Friction

Class: VIII

Duration: 30 minutes

Nature of the activity: Group

Learning Outcome: Students will be able to demonstrate the effect of increase in weight on the force.

What we have to do?

To show the relation between the weight of an object and static friction.

What do we require?

A wooden block with a hook (a nail can be fixed to the block and used as a hook), a medium sized (8-10 cm long) soft rubber band, some weights e.g., 1/2 kg, 1 kg, 2 kg, etc. and a meter scale.

What do we need to know?

Friction opposes the state of motion of any object. Static friction is a force that keeps an object at rest. It must be overcome to start a moving object. It depends on the weight of the object.

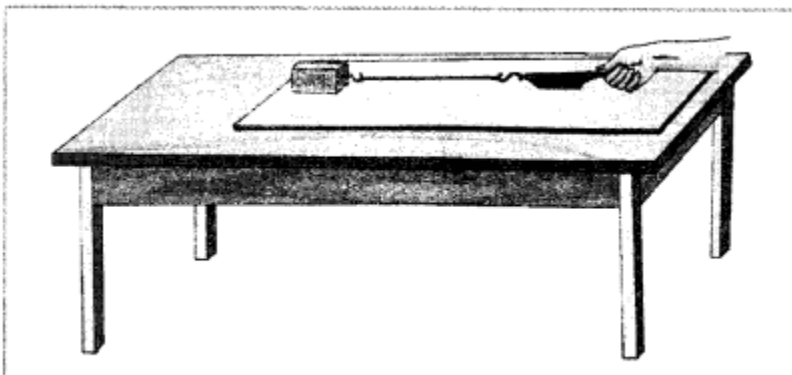
How do we proceed?

- **Teacher's activity:**

Teacher will arrange activity kits with the above mentioned material(except the plastic bottle) and will give instructions to the students for the activity.

- **Student's activity:**

1. Take the wooden block with the hook.
2. Tie the rubber band to the hook.
3. Place the block along a meter scale as shown in the figure below, and try to pull and block.



4. Measure the length of the stretched rubber band when the block just start to move.

5. Put $\frac{1}{2}$ kg weight on the block and repeat the same step again. Measure the length of the stretched rubber band.
6. Now put 1 kg weight and 2 kg weight one by one and measure the length of the stretched rubber band, when the block just starts to move.
7. Record your observations in the table given below:

What have you observed?

Mass of the weight placed on the block (Kg)	Length of the stretched Rubber (cm)
0	
1	
1.5	
2	
2.5	

1. What can you say about the lengths recorded by you? Is there any relation between the amount of weight put on the block and the stretching of the rubber band?

2. Draw a graph between the weight and the length of the stretched rubber band.

What have you learnt?

According to the above activity, friction depends on the _____.

The interlocking of the irregularities between the surfaces of the block and the table _____ when the surfaces were pressed harder by putting weight on the block. Hence, the static friction increases with the _____ in weight.

What more can we do?

Teacher will guide the student to perform the following activity

Interlock the two similar sized books by overlapping the pages. Once your books are fully interlocked each person should hold the book by its cover. Now pull firmly to separate the books. (Remember to check around you to ensure that you won't hit anything in case you fall!) What do you find? Are you able to separate the books?

EXTENDED LEARNING WORKSHEET:

1. In the above activity what changes will you make to move the block easily.

2. A father and son pushed their car to bring it to the side of the road as it had stalled in the middle of the road. They experience that although they has to push with all their might initially to move the car, the push required to keep the car rolling was smaller, once the car started rolling. Explain.

3. Is there any type of friction acting in the following cases? If yes, name the type of friction:

(i) A heavy box pushed by a person, which does not move.

(ii) An object moving with a constant speed.

4. Why does it become difficult for a rickshaw puller to pull the rickshaw when three people are sitting on it compared with the situation when only one person is sitting on it?

5. Two blocks of iron of different masses are kept on a cemented floor as shown in Fig.2.1. Which one of them would require a larger force to move it from the rest position?