

CLASS 8 FRICTION

Friction ;- Friction opposes the relative motion between two surfaces in contact. It acts on both the surfaces. The force of friction always opposes the applied force.

FACTORS AFFECTING FRICTION

Friction depends on

1. the nature of surfaces in contact.
2. upon the state of smoothness of those surfaces.
- 3 how hard the two surfaces press together

Activity to show that friction depends on the smoothness of surfaces

PROCEDURE	OBSERVATION	RESULT
Tie a string around a brick. Pull the brick by a spring balance Note down the reading on the spring balance when the brick just begins to move.	We get a measure of the of force of friction between the surface of the brick and the floor.	Friction acts between the bricks and the surface of table
Now wrap a piece of polythene around the brick and repeat the activity.	We need to apply less force than earlier.	Friction between the two surfaces becomes less.

The friction is caused by the interlocking of irregularities in the two surfaces.

Friction is caused by the irregularities on the two surfaces in contact. Even those surfaces which appear very smooth have a large number of minute irregularities on them. Irregularities on the two surfaces lock into one another. When we attempt to move any surface, we have to apply a force to overcome interlocking. On rough surfaces, there are a larger number of irregularities. So the force of friction is greater if a rough surface is involved.

It is easy to drag a mat when nobody is sitting on it, and it is difficult when a person is sitting on it.

We see that the friction is caused by the interlocking of irregularities in the two surfaces. The force of friction will increase if the two surfaces are pressed harder

STATIC FRICTION

The force required to overcome friction at the instant an object starts moving from rest is a measure of static friction.

SLIDING FRICTION; the force required to keep the object moving with the same speed is a measure of sliding friction.

ROLLING FRICTION:

When one body rolls over the surface of another body, the resistance to its motion is called the **rolling friction**. Rolling friction is smaller than the **sliding friction**

SLIDING FRICTION IS SMALLER THAN STATIC FRICTION :

When a box starts sliding, the contact points on its surface, do not get enough time to lock into the contact points on the floor. So, the sliding friction is slightly smaller than the static friction.

Which is easier ? to move the box from rest, or to move it when it is already in motion?

Explain

When a box starts sliding, the contact points on its surface, do not get enough time to lock into the contact points on the floor. So, the sliding friction is slightly smaller than the static friction. Therefore it is easy to move a box when it is already in motion.

FRICTION : A NECESSARY EVIL

FRICTION IS NECESSARY in daily life → examples

1. We can hold a glass firmly – because of friction (if oily / greasy difficult to hold → less friction)
2. We are able walk on a floor – because of friction(if wet marble floor/ muddy → difficult to walk → no friction)
3. We can write on pen or pencil – because of friction(chalk particles stick to board → due to friction)
4. We are able to start/ stop/turn the direction – because of friction
5. We can fix a nail – because of friction
6. We can make a knot – because of friction
7. We can construct a building - because of friction
8. We can make fire by rubbing match stick against a rough surface- because of friction

FRICTION IS AN EVIL → Examples

1. Wear out of materials → due to friction

Methods to increase friction; (examples)

1. The sole of your shoes is grooved to provide the shoes better grip on the floor, so that we can move safely.
2. The tyres of cars, trucks and bulldozers are treaded to provide better grip with the ground.
3. The brake pads in the brake system of bicycles and automobiles increase friction. When we press the brake lever, these pads arrest the motion of the rim due to friction. The wheel stops moving.
4. kabaddi players rub their hands with soil for a better grip of their opponents.
5. . Gymnasts apply some coarse substance on their hands to increase friction for better grip.

Methods to decrease friction; (Examples)

1. When oil, grease or graphite is applied between the moving part of a machine, a thin layer is formed there and moving surfaces do not directly rub against each other. Interlocking of irregularities is avoided to a great extent. Movement becomes smooth.

LUBRICANTS → The substances which reduce friction are called **lubricants**.

Eg → oil, air cushion between moving parts

2. Rolling reduces friction. It is easier to roll than to slide a body over
3. It is convenient to pull the luggages fitted with rollers.
Reason → Rolling reduces friction. It is easier to roll than to slide a body Over
4. The use of ball bearings reduce friction.

FRICTION CAN NEVER BE ZERO : Friction can never be entirely eliminated. No surface is perfectly smooth. Some irregularities are always there.

FLUID → Anything which can flow is called a fluid
Example;- Liquids and gases

FLUID FRICTION →

Air, Water and other liquids exert force of friction when objects move through them. Fluids exert force of friction on objects in motion through them. The frictional force exerted by fluids is also called **drag**.

Factors which affect fluid friction→

The frictional force on an object in a fluid depends on

1. its speed with respect to the fluid.
2. the shape of the object
3. the nature of the fluid.

Objects moving through fluids are given special shapes

Reason→ . It is done to minimize friction

Birds and fishes have stream lined body →. Birds and fishes have to move about in fluids all the time. Their bodies must have evolved to shapes which would make them not to lose much energy in overcoming friction.

shape of aeroplanes and vehicles → are designed to have shapes which reduce fluid friction.