

# Friction



## 1) Fill in the blanks

(a) Friction opposes the \_\_\_\_\_ between the surfaces in contact with each other.

Ans: Motion

(b) Friction depends on the \_\_\_\_\_ of surfaces.

Ans: Nature

(c) Friction produces \_\_\_\_\_.

Ans: Heat

(d) Sprinkling of powder on the carom board \_\_\_\_\_ friction.

Ans: Reduce

(e) Sliding friction is \_\_\_\_\_ than the static friction.

Ans: Lesser

## 2) Four children were asked to arrange forces due to rolling, static and sliding frictions in a decreasing order. Their arrangements are given below. Choose the correct arrangement.

(a) rolling, static, sliding

(b) rolling, sliding, static

(c) static, sliding, rolling

(d) sliding, static, rolling

Ans: (c) Static, sliding, rolling.

Static friction: When we move an object which is at rest. Sliding

friction: Acts on a body when it is moving.

Rolling friction: Here the area of contact is smallest when compared to static and sliding friction.

**3) Alida runs her toy car on dry marble floor, wet marble floor, newspaper and towel spread on the floor. The force of friction acting on the car on different surfaces in increasing order will be**

- (a) Wet marble floor, dry marble floor, newspaper and towel.
- (b) Newspaper, towel, dry marble floor, wet marble floor.
- (c) Towel, newspaper, dry marble floor, wet marble floor
- (d) Wet marble floor, dry marble floor, towel, newspaper

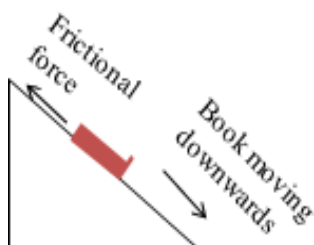
**Ans :** (a) Wet marble floor, dry marble floor, newspaper and towel.

Friction will be more if the surface is rough and it will be less if the surface is smooth. Hence, wet marble floor, dry marble floor, newspaper and towel is the correct sequence of these surfaces when arranged according to the increase in the force of friction acting on the car.

**4) Suppose your writing desk is tilted a little. A book kept on it starts sliding down. Show the direction of frictional force acting on it.**

**Ans:** When a book slides down a table, frictional force always acts always opposite to the direction of motion and along the incline.

Force of friction will be always parallel to the surfaces in contact.



**5) You spill a bucket of soapy water on a marble floor accidentally. Would it make it easier or more difficult for you to walk on the floor? Why?**

**Ans:** It would be difficult to walk on the floor when soapy water falls on floor then the friction reduces therefore the chances to slip increases, as a result it becomes difficult to walk.

When there is no soapy water then there will be interlocking between the foot and the ground.

When soap water spills the interlocking gets spoilt as a result friction reduces.

**6) Explain why sportsmen use shoes with spikes.**

**Ans:** Spikes present on the shoes make the surface of the shoes rough. This increases the friction. As friction increases, the grip on the ground increases. This makes it easier for them to walk or run.

**7) Iqbal has to push a lighter box and Seema has to push a similar heavier box on the same floor. Who will have to apply a larger force and why?**

**Ans:** Friction is directly proportional to mass. Heavier an object more force to be applied to move it.

Heavier box will press floor surface harder as compared to the lighter box.

The two surfaces are pressed harder against each other, so the force required to overcome the interlocking is more in case of the heavier box.

So Seema has to apply more force as compared Iqbal.

**8) Explain why sliding friction is less than static friction.**

**Ans:** During sliding, contact points do not get enough time to get interlocked properly. Friction forces come into play when irregularities present in the surface of the two objects in contact get interlocked with each other. When an object is in motion, the sliding friction is smaller than the static friction as the interlocking during motion is very small. Thus, sliding friction is less than static friction.

**9) Give examples to show that friction is both a friend and a foe.**

**Ans:**

Friction is a friend in the below ways:

- a) It helps us to walk.
- b) It helps us to hold things.
- c) It helps in grinding.
- d) It helps in construction purposes.
- e) It makes matchstick ignition possible.

Friction as a foe in the below ways:

- a) It opposes motion.
- b) It produces a lot of heat which results in wastage of energy.
- c) It brings about wear and tear of machinery parts.
- d) It leads to the application of more power in machines.
- e) It produces noise in the machines.

**10) Explain why objects moving in fluids must have special shapes.**

**Ans:** Special shapes experience less fluid friction therefore can move easily through fluids. When an object moves in fluid, fluid friction opposes the motion. So, to reduce the friction between object and fluids, the object is given special shape known as streamlined shape.

An aeroplane is a good example for this. The air exerts some friction when the aeroplane moves through the air. This will be opposed by the motion of the aeroplane. In order to overcome this friction, the aeroplane has to apply a lot of force. This force is in turn a waste of energy. So, it is necessary to design the shape of the aeroplane in such a way that it experiences less fluid friction.

**Extended Learning — Activities and Projects**

- 1) What role does friction play in the sport of your choice? Collect some pictures of that sport in action where friction is either supporting it or opposing it. Display these picture with proper caption on the bulletin board of your classroom**

**Ans:** Supporting friction:

- 1) Cycling - the friction between the tires and the road are necessary for the bike to function
- 2) Running - the friction between the athlete's feet and the ground surface is necessary otherwise the runner would fall over
- 3) Swimming - the friction in the water is required for t

- 2) Imagine that friction suddenly vanishes. How would life be affected? List ten such situations.**

**Ans:** Friction is called a necessary evil for human beings. It is useful as well as harmful for us. There are so many things that are not possible without friction.

If friction vanishes:

1. Any time you apply brakes of the car, there would be no effect on the car, since brake cannot be applied without friction.
2. We would not be able to walk properly.
3. We would not be able to hold things properly.
4. We will not able to write properly, the pencil will slip off the page.
5. Moving things cannot be stopped without friction (because no resistance).
6. We would not be able to play games.
7. Matchsticks wouldn't work.
8. In a frictionless world Shoes would not wear down.
9. Knives would be less effective.
- 10 We would not be able to eat.

**3) Visit a shop which sells sports shoes . observe the soles of shoe meant for various sports . describe your observations in five points**

**Ans:** SHOP : I went to a branch of the international brand called Nike.

Nike as a brand has always attracted many people for the variety of sports goods present over there. One of the greatest profit maker for Nike is their unique selling point for shoes and sports shoes.

Explanation:

SOLES OF DIFFE

