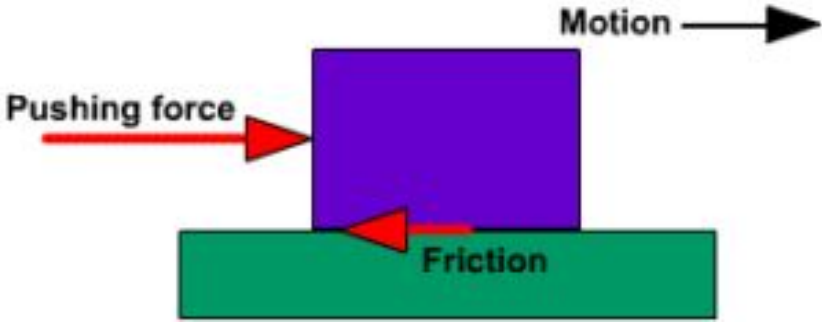
Friction and It's Effects

What is the first thing you do when you feel cold? There are two possibilities here: either you cover yourself with a warm blanket or you rub your hands against each other to feel warm. Now, the question is why? How do our hands get warm when we rub them against each other? Well, 'Friction' is created by rubbing our hands that generates heat. This makes us feel warm. So, what is 'Friction'? Why is it necessary? Let's study more about it.

What is Friction?



'Friction' is a force that resists motion of sliding or rolling of one object moving relative to another. It is a result of the electromagnetic attraction between the charged particles of two touching surfaces. We find and use it everywhere and every day whenever objects come into

contact with each other. Although it always acts in the always acts in the direction opposite to the way an object wants to slide.

For example, we use car brakes if we want to stop or slow down because of the friction created between the brakes and wheels that slow/stop the car down.

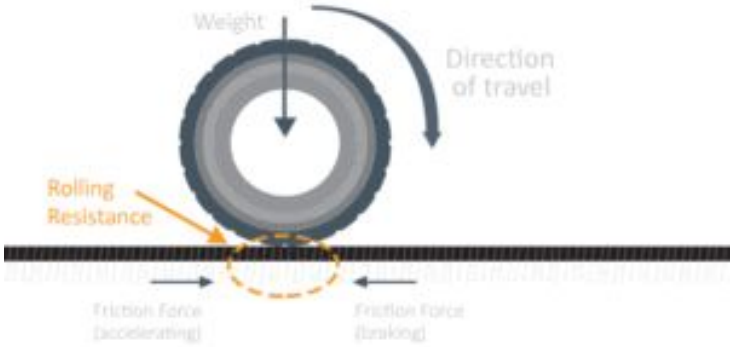
Factors Affecting Friction

The force of friction may alter depending on the following factors that affect it:

- When two smooth surfaces are in contact, then the degree of friction between them is small because the interlocking between smooth surfaces is less.
- When two rough surfaces in contact, then the degree of friction between them is large because the interlocking of between rough surfaces is too much.
- It also depends on the weight of the object or on the amount of force applied on the surface by the object.

Types of Friction

Rolling Friction



Source: Tirebuyer.com

‘Rolling friction’ is the force that resists motion when an object rolls on a surface. Technically it’s not friction; its ‘rolling resistance’ since when a body rolls perfectly upon a surface, on paper, there is no sliding friction between that object and surface. But due to elastic properties in real life, both the bodies and the surface experience deformations due to contact between the bodies. Since the surface of contact is very small in real life hence the net normal force is also small and it is not enough like the static friction to prevent a body from sliding and keep it stationary and static friction increases with the increase in the external force; therefore rolling friction is usually less than the static.

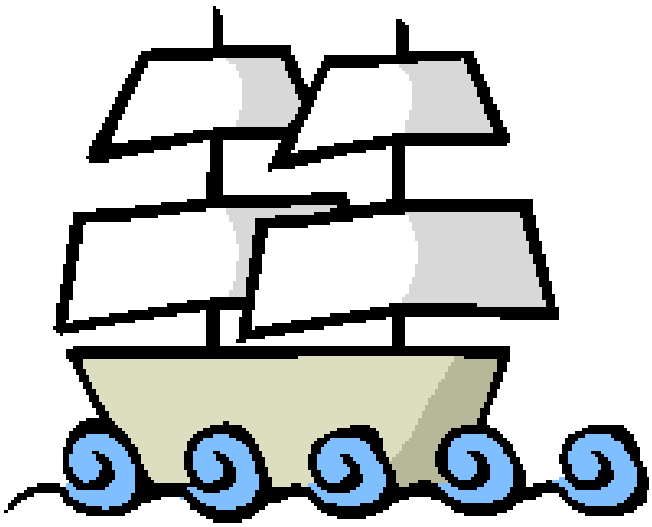
Sliding Friction

Source: Toondoo.com

‘Sliding friction’ is the frictional force between two surfaces that are rubbing against each other. It’s a very easy and common concept. It’s hard to find a perfectly smooth surface in the real life, therefore when an object slides on any surface, it undergoes a backward force because of the relative motion between the two adjacent surfaces. It always acts against the motion. For a static situation, the applied force that tries to slide the object is always equal to the force of friction acting on the object. There comes a certain moment that the object starts

moving in the direction of the external force. This happens when we gradually increase the applied force. The force of friction that acts against the motion remains constant.

Fluid Friction



Source: Sea.edu.com

When fluid layers are moving relative to each other, a type of friction occurs which is known as ‘fluid friction’. The internal resistance to the flow of fluids is termed ‘viscosity’; in simple terms, the viscosity is nothing but ‘thickness’ of a fluid.

Effects of Friction

- It produces heat, that helps in heating parts of any object or to warm ourselves.
- It also causes loss in power.
- It produces noise during any kind of operation.
- It's because of friction that we're able to walk, run, play, etc.

Can you list down more such effects?

Solved Example For You

Q. Alida runs her toy car on a 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

Sol: a.Wet marble floor, dry marble floor, newspaper, and towel

The nature of the surfaces in contact decides the friction force between them. It will be more if the surfaces in contact are rougher. Among them, the wet marble floor is least rough therefore will experience least force. Thus, the increasing order of roughness is wet marble floor, dry marble floor, newspaper and the most rough is towel. Therefore the force will also be in same order.