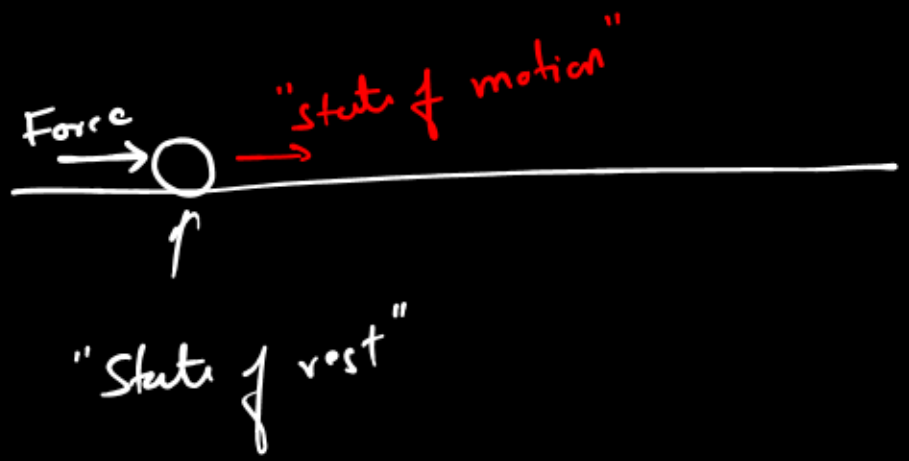
# Force, Work, Energy and Simple Machines

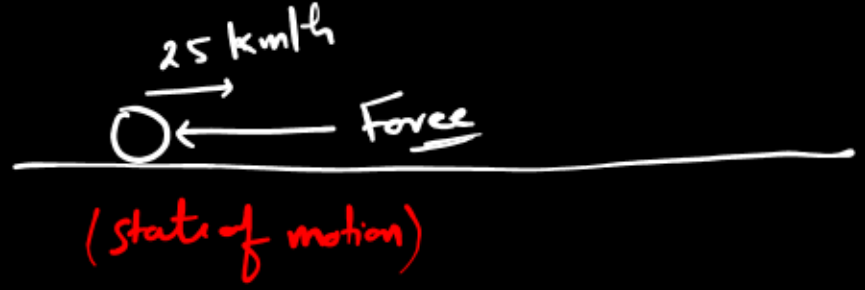
# Force :

Object can be in the "state of rest" (object is not moving)
↳ tree, mountain,

or

it can be in the "state of motion" (object is moving)
↳ moving car, train



→ Force is a push or pull that changes the state of rest or motion, direction of motion & shape of the object.

→ Force is directional.

(Applied force)

⇒ force applied by a person / object on another object

→ Amount of force required to move an object (or to stop a moving object) depends on the mass of object.

⇒ Absolute rest is not possible.

⇒ Because earth is moving

⇒ Sun is moving about centre of Milkyway galaxy.

# Types of force

## Contact Forces

⇒ It requires actual contact between objects.

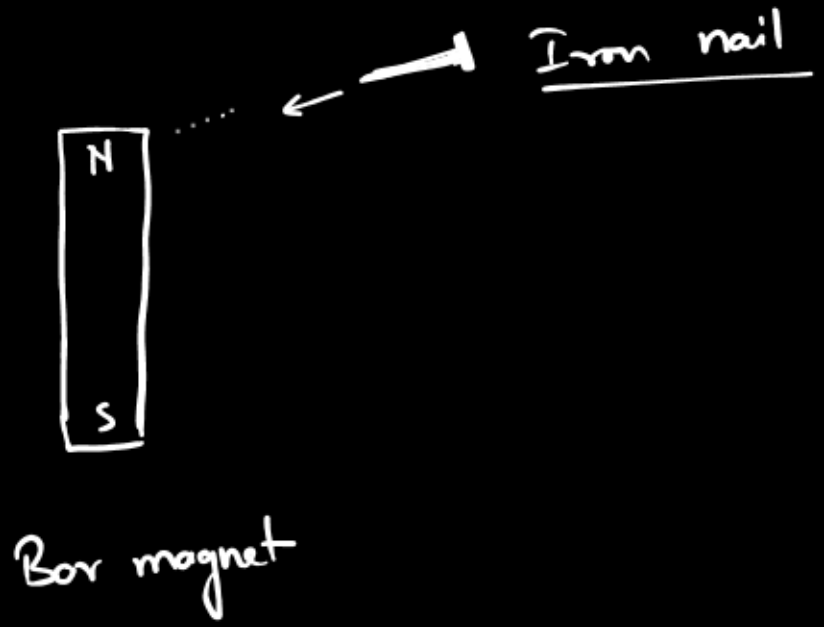
⇒ eg: pushing a book by making contact with it.

- mechanical force (muscular force)
- Frictional force

## Non-contact forces

⇒ actual contact between the objects is not necessary to apply/feel/exert the force.

eg.: gravitational force
- magnetic force.
- electro-static force



# Contact force

## ↳ Mechanical force

When a force exerted by an object make another object (in contact) move is called mechanical force.

eg: ① Fixing a nail into a wall using a hammer. (muscular force)

② Movement of sailboat due to force exerted by wind.

Mon → Math.

Tue → Sc.

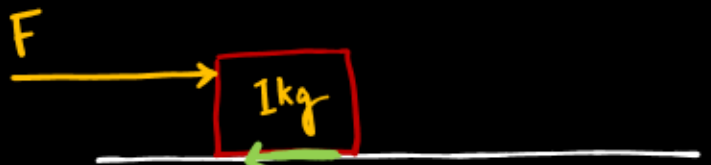
Wed → Math

Thur → Sc

Fri → Math.

# ⑪ Frictional force

→ The force opposes or slows down the motion of a moving object when trying to move over the other surface




Frictional force between box and road surface.


eg: . A rolling ball gradually slows down and finally stops.

. Sliding a book on the table's surface.

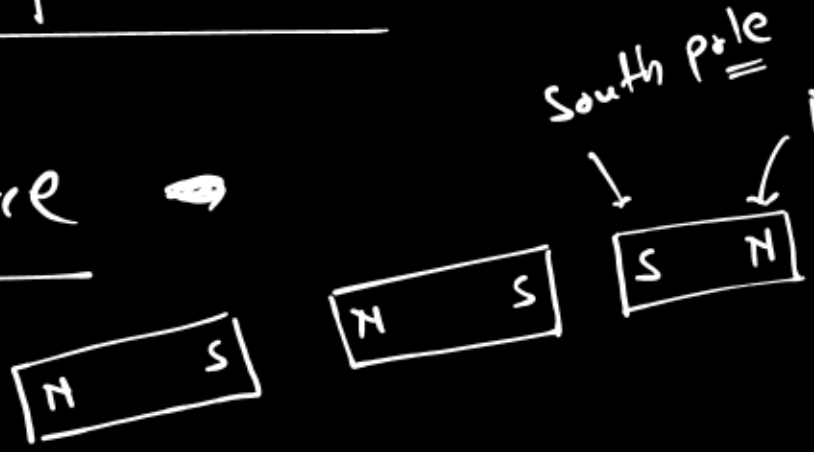
⇒ Frictional force is due to the roughness of the surfaces in contact.

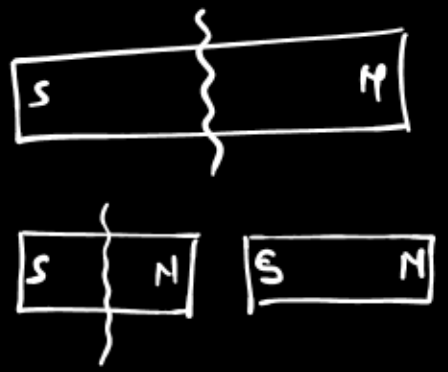
Roughness ↑ , frictional force ↑

⇒ Frictional force is always opposite to the applied force or direction of motion

# Non-Contact forces

## → Magnetic force




- → Exerted by magnets / electrical charges.
- → Like pole repel each other. S↔S N↔N — Magnetic Repulsion
- → Unlike poles attract each. S→←N — Magnetic attraction
- → Magnets also exerts force on metals like iron, nickel, cobalt. steel.
- → Earth is also a giant magnet.

# Gravitational force

- It is the force between any two object in this universe
- This force is because of mass of the object.
- It is always attractive in nature.