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FORCE AND LAWS OF MOTION

CHAPTER NO.9

SUB: PHYSICS

FORCE AND LAWS OF MOTION

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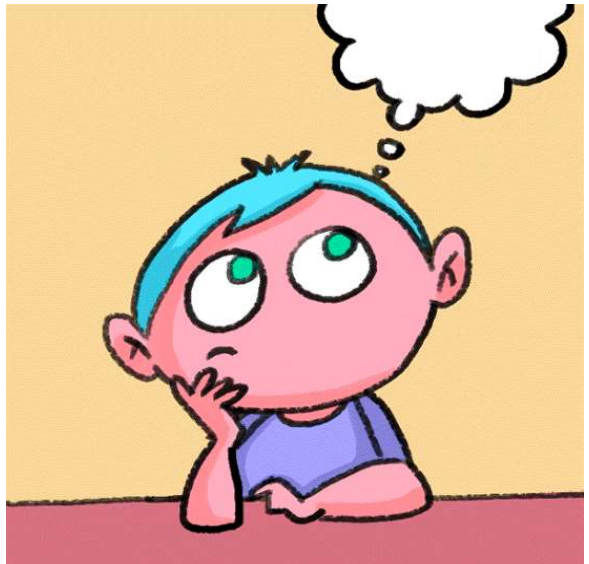
LEARNING OBJECTIVE

Students will be able

- Define force
- Differentiate balance and unbalanced force



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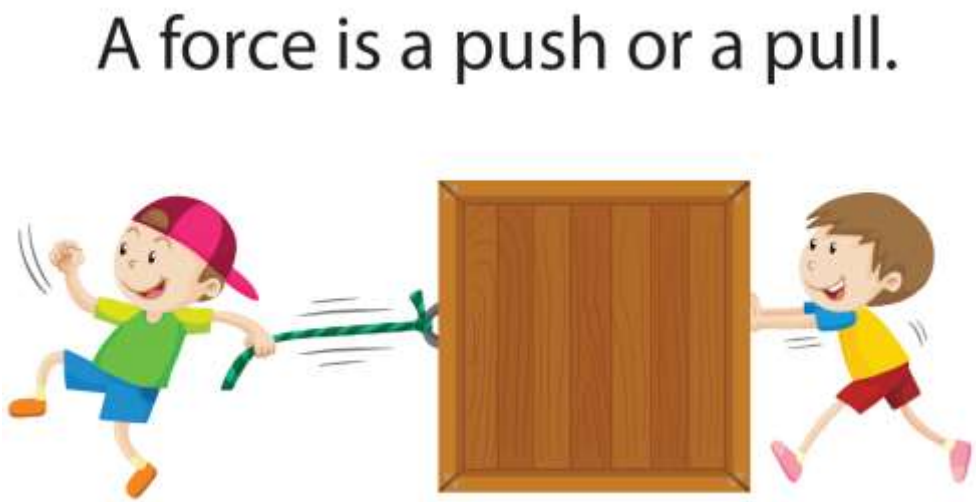
FORCE

- A force is a physical quantity which causes or tends to cause a motion in an object at rest or tends to change the direction of motion of a moving object or changes or tends to change the size and shape of an object or changes or tends to change the speed of an object.
- It is denoted by F.



EFFECTS OF FORCE:

Force can make a stationary body in motion. For example a football can be set to move by kicking it, i.e. by applying a force.

Force can stop a moving body – For example by applying brakes, a running cycle or a running vehicle can be stopped.

Force can change the direction of a moving object. For example; By applying force, i.e. by moving handle the direction of a running bicycle can be changed. Similarly by moving steering the direction of a running vehicle is changed.

Force can change the speed of a moving body – By accelerating, the speed of a running vehicle can be increased or by applying brakes the speed of a running vehicle can be decreased.

Force can change the shape and size of an object. For example -– By hammering, a block of metal can be turned into a thin sheet. By hammering a stone can be broken into pieces.

TYPES OF FORCE: BALANCED AND UN BALANCED FORCE

Balanced Force: If the resultant of all the forces acting on a body is zero, the forces are called balanced force. When two forces of equal magnitude but acting in opposite directions on an object simultaneously then the object continues in its state of rest or of uniform motion in a straight line. Such forces acting on object are known as balanced forces.

Example : -1. In the tug of war if both the teams apply similar magnitude of forces in opposite directions, rope does not move in either side. This happens because of balanced forces in which resultant of applied forces become zero.

2.A stationary object is an example of balanced force.

Tug of War Game-Both teams exert Equal Force

Effects of balanced force:

1. If a number of balanced forces act on a stationary body, the body continues to be at rest.
2. If a number of balanced forces act on a body in uniform motion, the body continues to be in its state of uniform motion.

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UNBALANCED FORCE:

If the resultant of applied forces are greater than zero, the forces are called unbalanced forces.

To move an object unbalanced forces are to be applied from the opposite directions. In case of unbalanced forces acting on a body, it moves a in the direction of the greater force.

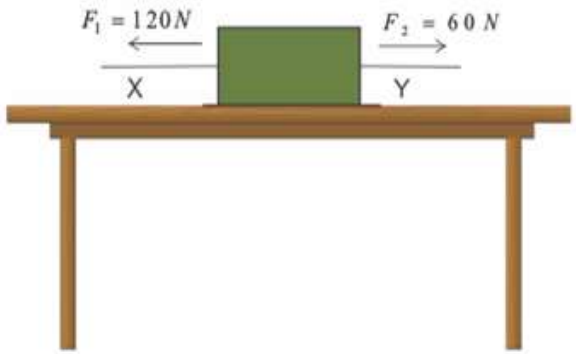
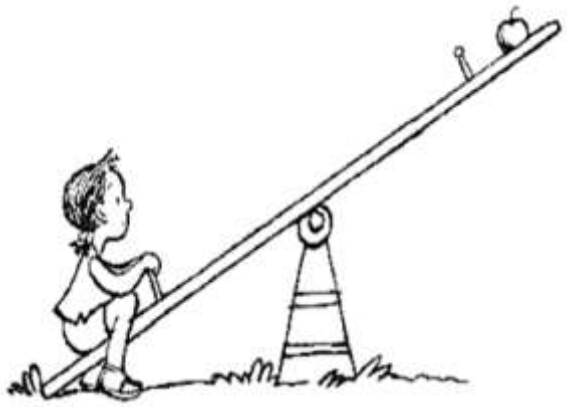
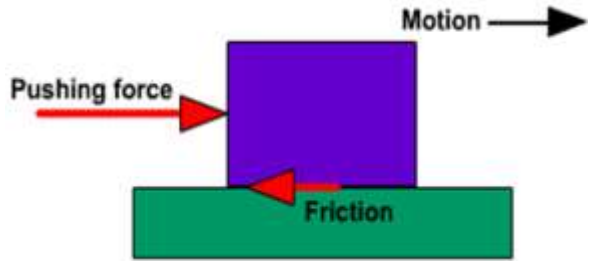


Figure 2. Unbalanced forces acting on the block



What is the force of friction?

It is a force extended when two surfaces are in contact with each other. It always acts in a direction opposite to the direction of motion of the object.



Some Common Forces

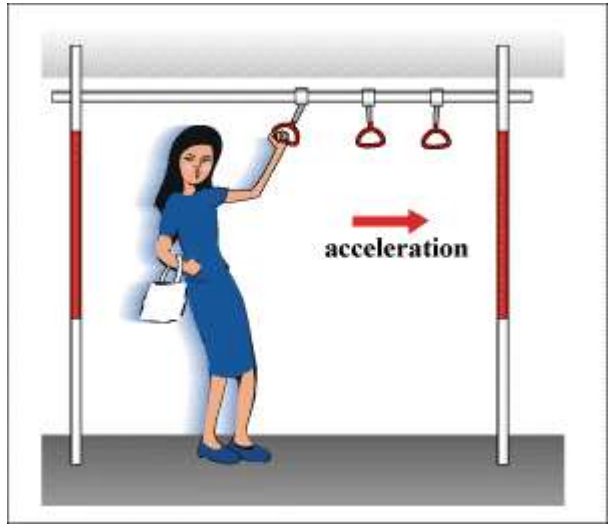
- Muscular Force: The force exerted by the human body muscles is called muscular force.
- Gravitational Force: The attractional force applied by earth on an object in downward direction is called gravitational force.
- Frictional Force: The force which opposes the Force and Laws of Motion of an object while being in contact with the other object, is known as frictional force.
- Air Resistance: Force which is exerted on the objects while flying in air is named as air resistance. It acts in a direction opposite to the velocity of the object.

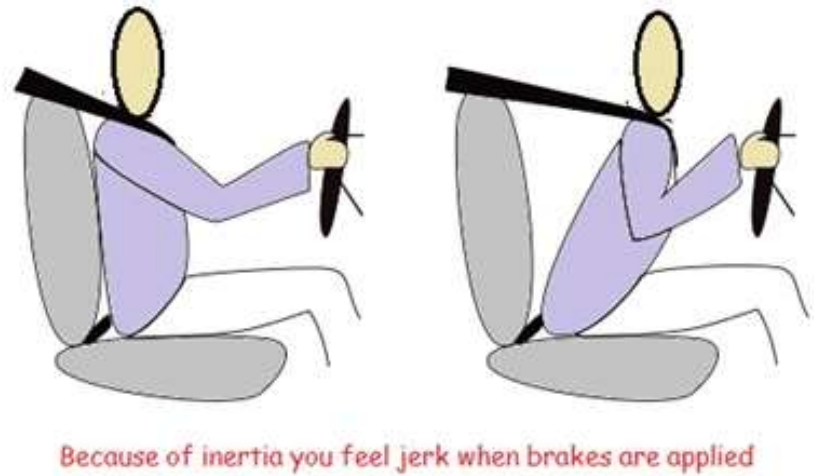
Force of Friction

https://www.youtube.com/watch?v=n2gQs1mcZHA

Inertia

Definition: Inertia is a property or tendency of every object to resist any change in its state of rest or of uniform Force and Laws of Motion.
It is measured by the mass of an object. The heavier the object, the greater will be its inertia.





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HOME ASSIGNMENT

1. An object experiences a net zero external unbalanced force. Is it possible for the object to be travelling with a non-zero velocity? If yes, state the conditions that must be placed on the magnitude and direction of the velocity. If no, provide a reason
2. Differentiate balanced and unbalanced force .

Balanced and unbalanced force

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