ODM EDUCATIONAL GROUP
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FORCE AND LAWS OF MOTION

CHAPTER NO.9

SUB: PHYSICS

FORCE AND LAWS OF MOTION

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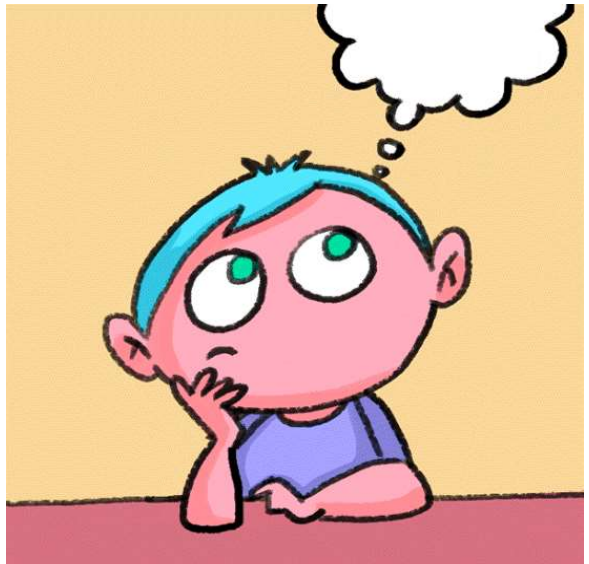
LEARNING OBJECTIVE

Students will be able to

- State the 3rd law of motion.
- Know application of 3rd law of motion



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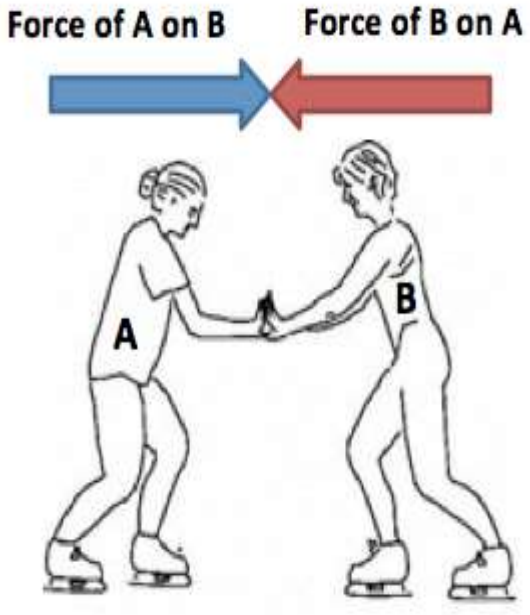
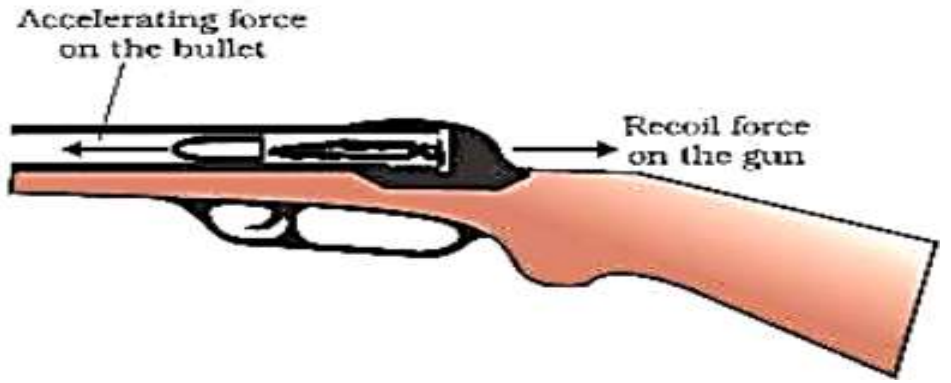
Newton's Third Law of Motion

Newton’s Third Law of Motion states that there is always reaction for every action in opposite direction and of equal magnitude, i.e., action and reaction forces are equal and opposite.

Applications of Newton's Third Law of Motion:

Recoil of gun: When bullet is fired from a gun, it moves ahead. By the Newton's 3rd law of motion, the bullet apply same force on gun in backward direction. Due to this force, gun moves back giving a jerk to the shoulder of the gunman. This is called recoil of gun. Here, gun moves back only by small amount due to its heavy mass.

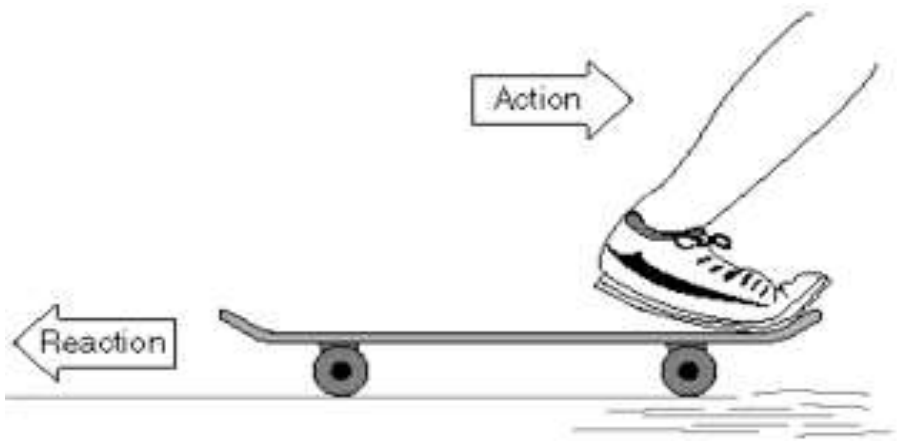


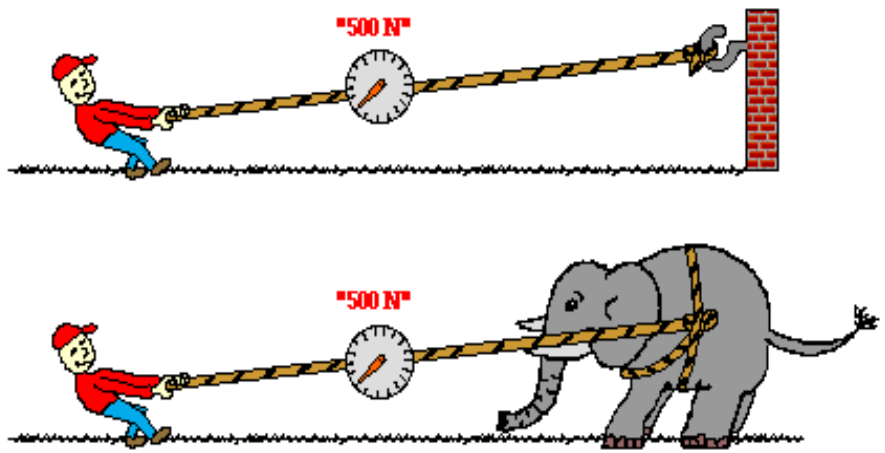


During walking, a person pushes the ground in backward direction and in the reaction the ground also pushes the person with equal magnitude of force but in opposite direction. This enables him to move in forward direction against the push.

Swimming in water: Man pushes water back by applying force. By Newton's 3 Law, water applies equal and opposite force on swimmer. Due to this force man moves ahead.

Propulsion of a boat in forward direction – Sailor pushes water with oar in backward direction; resulting water pushing the oar in forward direction. Consequently, the boat is pushed in forward direction.





Recoiling of gun:

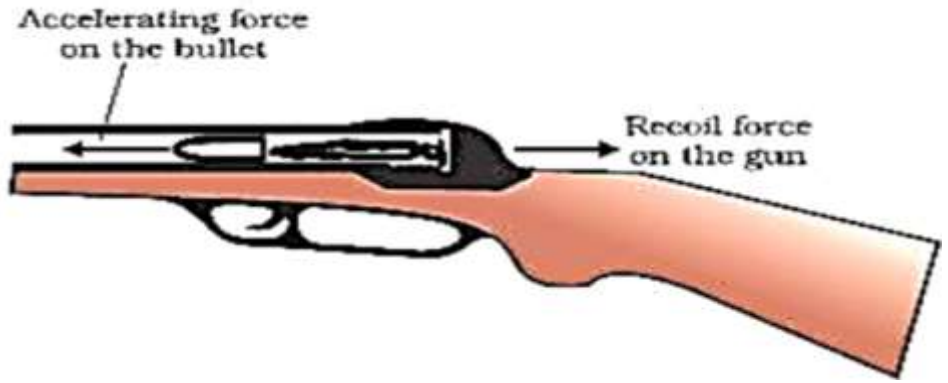
When a bullet is fired from a gun, the gun recoils.

The gun moves backwards through a small distance. Giving jerk to the shoulder of the gun man.

The distance moved by the gun is smaller because gun is much heavier than the bullet.

Momentum of bullet = Momentum of gun

Mass of bullet × Velocity of bullet = Mass of gun × Recoil velocity of gun



HOME ASSIGNMENT

1. Why is it difficult to hold a hose pipe?
2. What is the principle involved in the flying of rockets and jet plane?

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