Mechanical Actions

GRADE 8

PHYSICS

Mechanical Action & Force

The person is pushing a car.
He is exerting a **mechanical action** on the car.
He is exerting a **force** on the car.

A force is a mechanical action exerted by a body on another.

Effects of a Mechanical Action

Exerting a mechanical action on the play dough:

So, it **deforms its shape**.

Effects of a Mechanical Action

The wheel was at rest.
The boy moved the wheel.
So, there exists a mechanical action.

It **sets the body in motion / creates motion**.

Effects of a Mechanical Action

The ball was already moving.
The boy moved the ball to the second direction.
→ There exists a mechanical action.

So, it **modify the motion**.

State the Effect of each of the following Mechanical Actions.

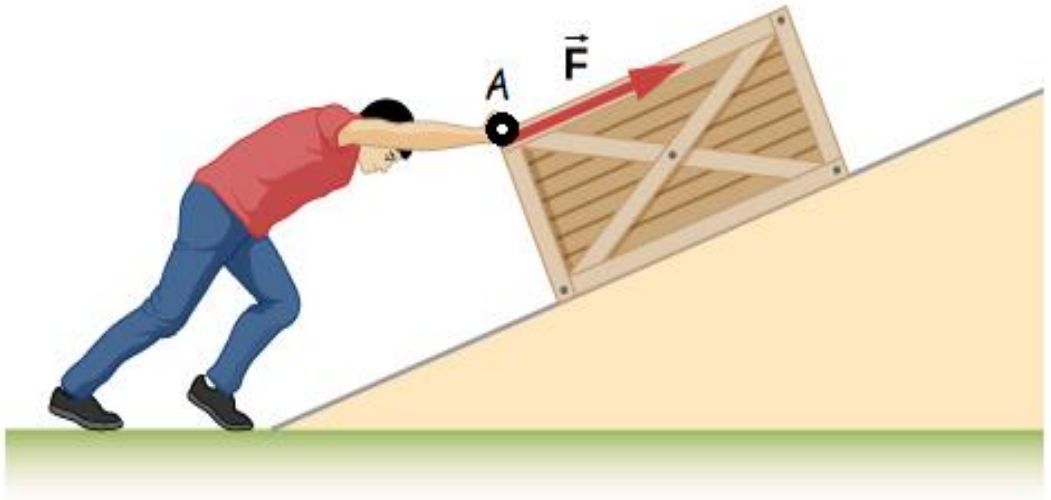
Mechanical Action	Effect
The football player kicks the ball that was initially at rest.	**Set the body in motion**
The football player kicks the moving ball.	**Modify the direction of motion**
The teacher is tearing a paper.	**Deform the shape**
The man's hand exerts a force on the orange.	**Deform the shape**
The worker broke the board.	**Deform the shape**

Characteristics of a Force

Point of application	• It is the place/ point where the force is being exerted.
Line of action	• It is the line along which the action is exerted. • It can be vertical, horizontal, or oblique.
Direction	• It maybe upward, downward, to the left, to the right, etc…
Magnitude	• It is measured by a spring balance or dynamometer. • SI unit of force is expressed in Newton (N)

Application 1

A person is pushing a wooden crate as shown in the figure. The force exerted is of magnitude 250 N.
List the characteristics of the applied force.



- **magnitude:** 250 N
- **Point of application:** A (the point of contact between the man and the crate)
- **Direction:** upward to the right
- **Line of action:** oblique

Application 2

A carpenter hits on the head of a nail by using a hammer.
Specify the line of action and direction of the force.

Line of action: vertical
Direction: downward

Representation of a Force

A force is represented by a **vector** $\vec{F}$, which is a **directed line segment**. It also has a point of application, direction, line of action, and magnitude.

In order to represent a vector, you need to choose a **scale.**

Representing a force by a vector

Given that the magnitude of the exerted force is 10 N.

Scale: **1cm → 5 N**

?? Cm → 10 N

$X = \frac{1 \times 10}{5} = 2$ cm