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SUBJECT:- PHYSICS

CLASS:- 9th

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SUBJECT TEACHER:- MR. NEEL NIRANJAN

CHAPTER 4. (WORK, ENERGY & POWER) (BASED ON NCERT PATTERN)

Work (W) :- Work is defined as a force acting upon an object to cause a displacement
It is expressed as the product of force and displacement in the direction of force.

$$W = F \times s$$

Here, W= work done on an object, F = Force on the object

s = Displacement of the object

The unit of Work is Newton metre (Nm) or joule (J).

1 Joule is defined as the amount of work done by force of 1 N when displacement is 1 m.

Examples of Scientific Work Done are:

- Moving a chair from one location to another
- Lifting a book from the shelf and placing it on a table
- Pushing a pebble lying on the ground.

In all these situations we are applying a force on an object which is then changing the state of rest or motion of the object.

Necessary Conditions for Work to be done

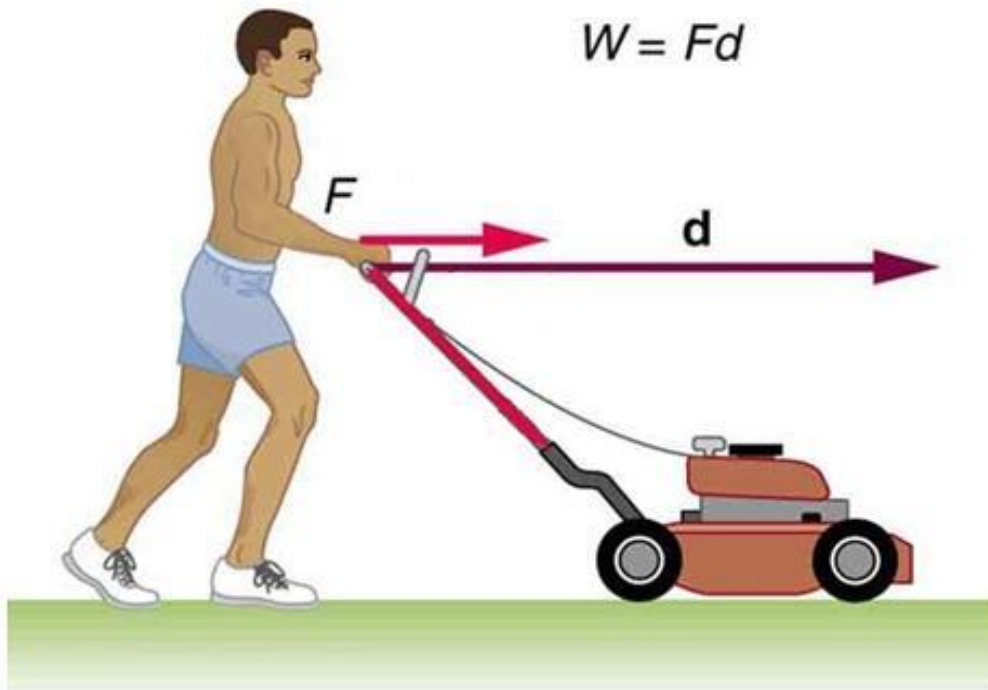
Two conditions need to be satisfied for work to be done:

- Force should act on the object.
- Object must be displaced.

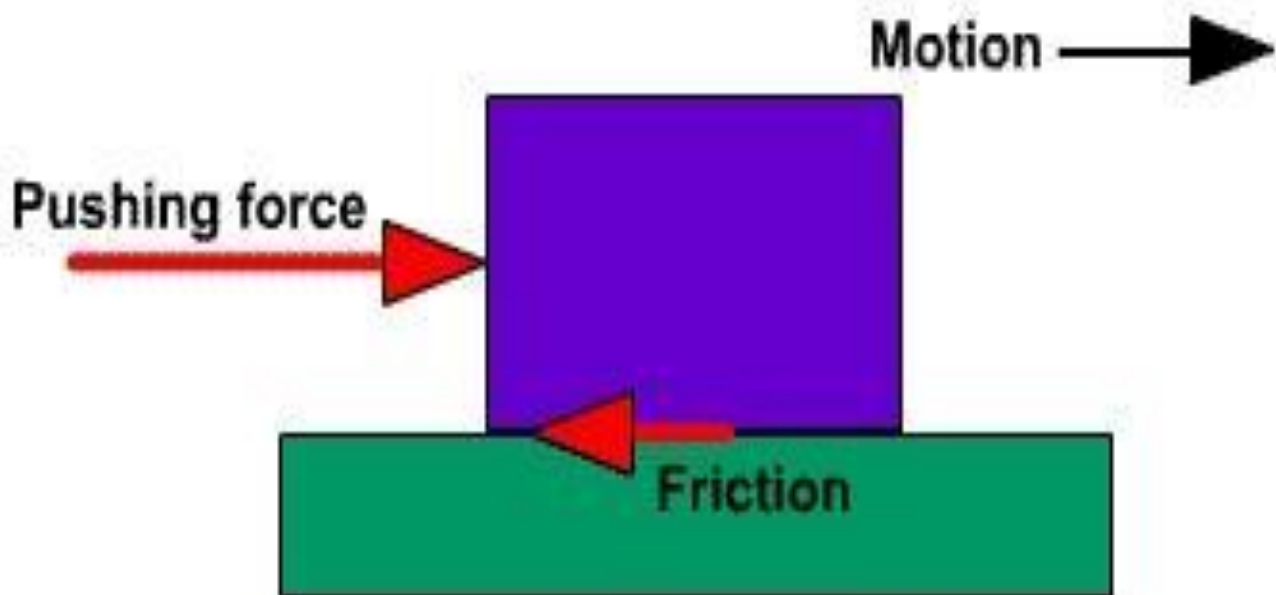
Sign Conventions for Work Done

- when both the force and the displacement are in the same direction, **positive work is done.**

$$W = F \times s$$



- when force acts in a direction opposite to the direction of displacement, the work done is **negative**.
 $W = - F \times s$



- If force and displacement act at an angle of 90° then work done is **zero**

