

CLASS 9

SCIENCE

NCERT SOLUTIONS

NCERT Solutions for Class 9 Science Chapter 7: Work, Energy and Simple Machines – Free PDF Download

Chapter 7 of Class 9 Science Exploration is Work, Energy and Simple Machines. It formalises the everyday idea of "work" into a precise physics quantity, connects it to energy and power, and shows how simple machines make work easier without violating energy conservation. These Class 9 Science Chapter 7 solutions are...

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Chapter 7 of Class 9 Science *Exploration* is Work, Energy and Simple Machines. It formalises the everyday idea of “work” into a precise physics quantity, connects it to energy and power, and shows how simple machines make work easier without violating energy conservation. These Class 9 Science Chapter 7 solutions are also useful as quick revision notes before exams.

Work Done by a Constant Force

In physics, **work** is done only when a force causes displacement in the direction of the force: $W = F \times d$ (force $\times$ displacement in the direction of force). If there is no displacement, or the displacement is perpendicular to the force, no work is done.

Energy: Kinetic and Potential

Kinetic energy (KE) is the energy of motion: $KE = \frac{1}{2}mv^2$. **Potential energy (PE)** is stored energy due to position or configuration; gravitational $PE = mgh$ (mass $\times$ gravity $\times$ height).

The Work-Energy Theorem

The **work-energy theorem** states that the net work done on an object equals its change in kinetic energy. This links the concept of work directly to the object’s change in speed.

Conservation of Energy

Energy cannot be created or destroyed, only transformed from one form to another (e.g. potential to kinetic, as in a falling object) — the total energy of an isolated system remains constant.

Power

Power is the rate of doing work: $P = W / t$ (work done per unit time), measured in watts (W).

Simple Machines and Mechanical Advantage

Simple machines (pulleys, inclined planes, levers) make work easier by changing the direction or magnitude of the force needed, though they don’t reduce the total work done (ignoring friction).

Mechanical advantage = load / effort, describing how much a machine multiplies the input force.

Pulleys — change the direction of force, and multiple pulleys can reduce the effort needed to lift a load.

Inclined planes — reduce the force needed to raise an object by increasing the distance over which the force is applied.

Levers — multiply force using a pivot (fulcrum), trading distance for force based on where the load, effort, and fulcrum are placed.