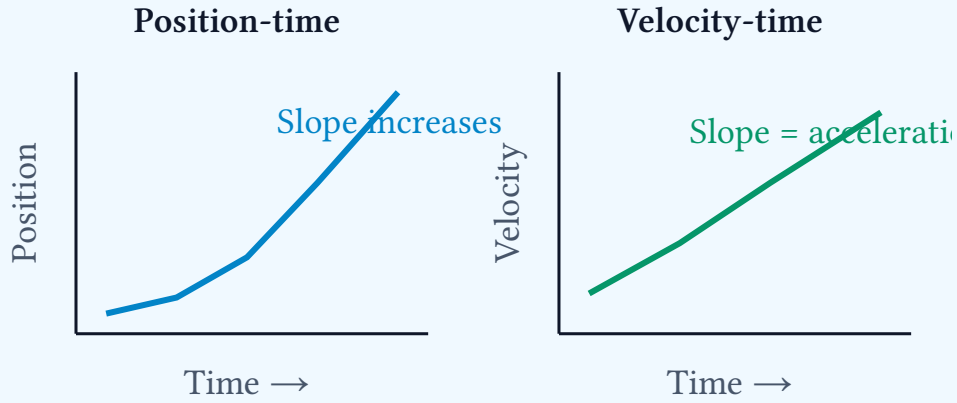
Science 10

Unit B: Energy flow in technological systems

Motion graphs and work

Motion graphs

- A steeper position-time line represents a greater speed.
- The area under a force-distance graph represents energy transferred as work.
- Read the axis labels before you decide whether a steep line means speed or acceleration.



Slope and area

- Meaning depends on the axes; on a position-time graph, the slope gives speed and the height of the line only gives location.
- Slope answers the speed question; area under the force-distance graph answers the work question.
- Interpret graph slope and area to describe motion, acceleration, and mechanical work.

Key terms

slope

Vertical change divided by horizontal change on a graph.

position-time graph

A graph showing position as a function of time.

velocity-time graph

A graph showing velocity as a function of time.

work

Energy transferred when a force acts through a displacement in its direction. (W)

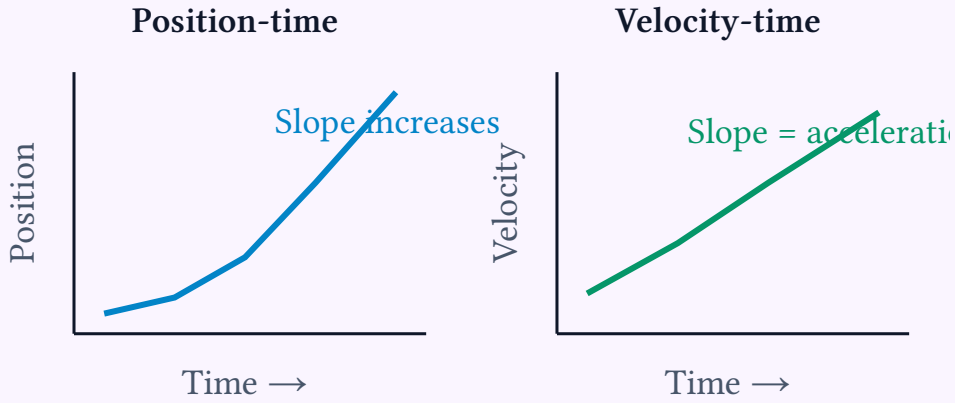
Key terms

area under a curve

The region between a graph line and the horizontal axis over an interval.

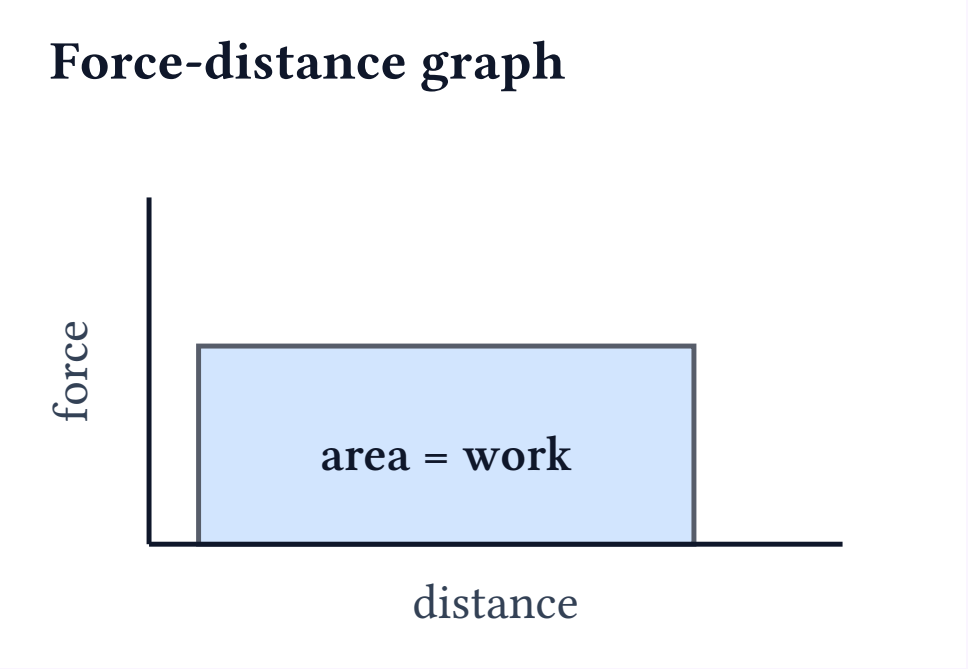
Velocity-time graphs

- On a velocity-time graph, the slope tells how quickly the velocity is changing.
- That change is the acceleration, and its sign depends on the direction you chose as positive.
- A horizontal line means the velocity is steady.



Force-distance graphs

- The area under a force-distance graph is the work done along that distance.
- A rectangle is a steady force. A triangle is a force that grows steadily from zero.
- Report that area in joules, and say which way the displacement points.



Practice

- Plot the points before you calculate.
- On a velocity-time graph, slope is acceleration and the area is displacement.
- On a force-distance graph, the area is work in joules.
- Check the axis labels before treating a slope as speed.

Slope and area

- Calculate one graph slope and one rectangular or triangular area, including units.
- A complete answer shows the rise over the run, the geometric area, and what that quantity means for motion or for joules.