

Work Done by a Force

Chapter 10: Work and Energy · Topic 1

Key Concept

Work is measured in joules (J), where one joule equals one newton of force causing one metre of displacement. If the force and displacement are in the same direction, work is positive; if displacement occurs opposite to the force direction (like friction acting against motion), work done by that force is negative. This precise scientific definition of work differs from everyday usage, where 'work' might describe any effort, even without resulting movement.

Quick Revision Notes

- Work (W) = Force (F) $\times$ displacement (d), only when displacement occurs in the force's direction.
- No work is done (scientifically) if there is no displacement, even with applied force.
- Work is measured in joules (J); 1 joule = 1 newton $\times$ 1 metre.
- Work can be positive (force and displacement same direction) or negative (opposite directions, like friction).

Practice Questions

- 1 Calculate the work done in moving an object 5m with a force of 10N.
- 2 Explain why pushing against an immovable wall does no scientific work, despite the effort involved.
- 3 Give an example of negative work being done.