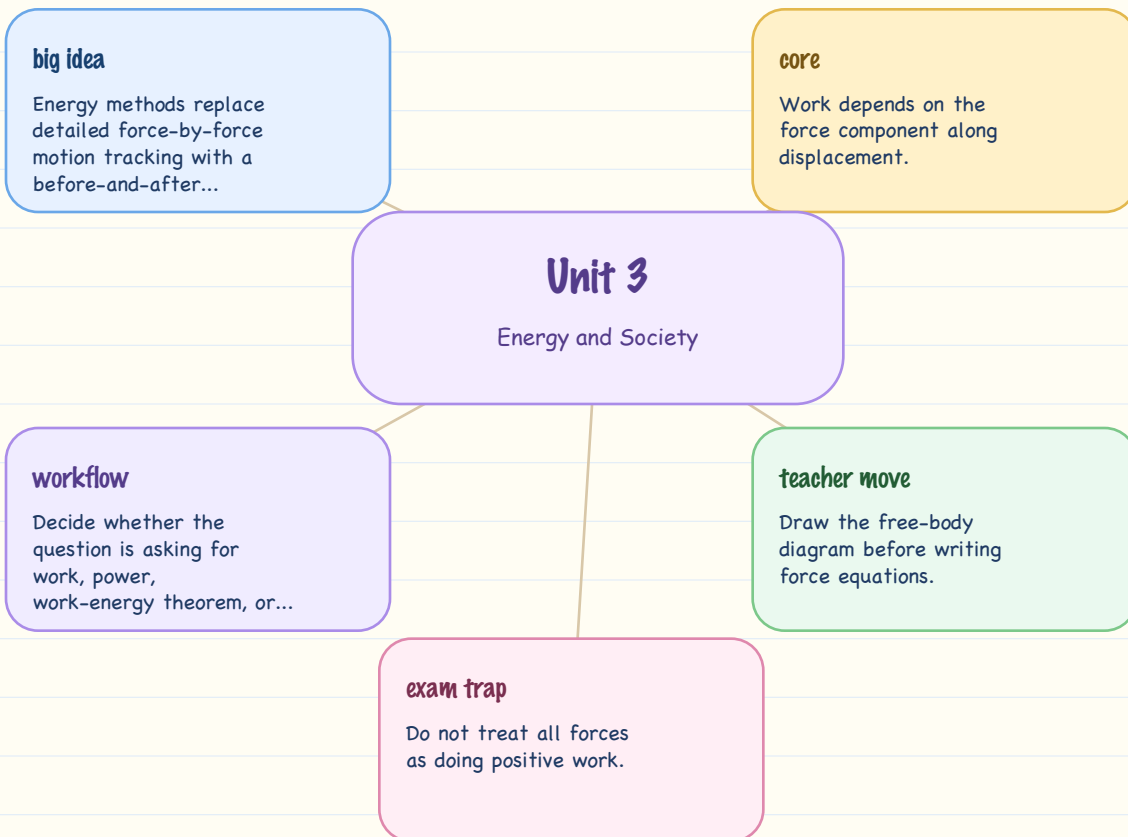


Unit 3 Visual Notebook

Work, Power, Kinetic Energy, and Mechanical Energy

DISTILLED FROM VIDEO

Diagram-first study pages using the same source-locked SPH3U workflows and teacher moves.



Visual Strategy



Use this when stuck

- Decide whether the question is asking for work, power, work-energy theorem, or conservation.
- Mark the initial state and final state.
- List kinetic energy, gravitational potential energy, elastic potential energy, and external work as needed.
- Write the energy equation before substituting numbers.
- Check whether friction, engine power, or another non-conservative process changes the total mechanical energy.

Video teacher tips

- Draw the free-body diagram before writing force equations.
- Use net work to track the change in kinetic energy.
- Read the graph feature first: slope, area, intercept, or trend.
- Keep power, force, and velocity relationships distinct in car-start problems.
- Connect spring force to deformation and restoring direction.
- Choose a positive direction and keep every vector sign consistent.

Example and Recall

Worked example pattern

Work-energy theorem (Unit 3 distilled pattern: net work changes kinetic energy)

Write $W_{\text{net}} = \Delta E_k$.

For an object starting from rest, initial kinetic energy is 0.

If $W_{\text{net}} = 50 \text{ J}$, then final kinetic energy is 50 J.

Use $E_k = 1/2 mv^2$ if speed is requested.

Answer pattern: Final kinetic energy is 50 J before any speed conversion.

Mechanical energy before and after (Unit 3 distilled pattern: compare state 1 and state 2)

Write the energy types present in the initial state.

Write the energy types present in the final state.

If mechanical energy is conserved, set initial total equal to final total.

Quick recall prompts

- Decide whether work is positive, negative, or zero.
- Use the work-energy theorem for a multi-stage motion.
- Compare constant-power and constant-acceleration car-start patterns.