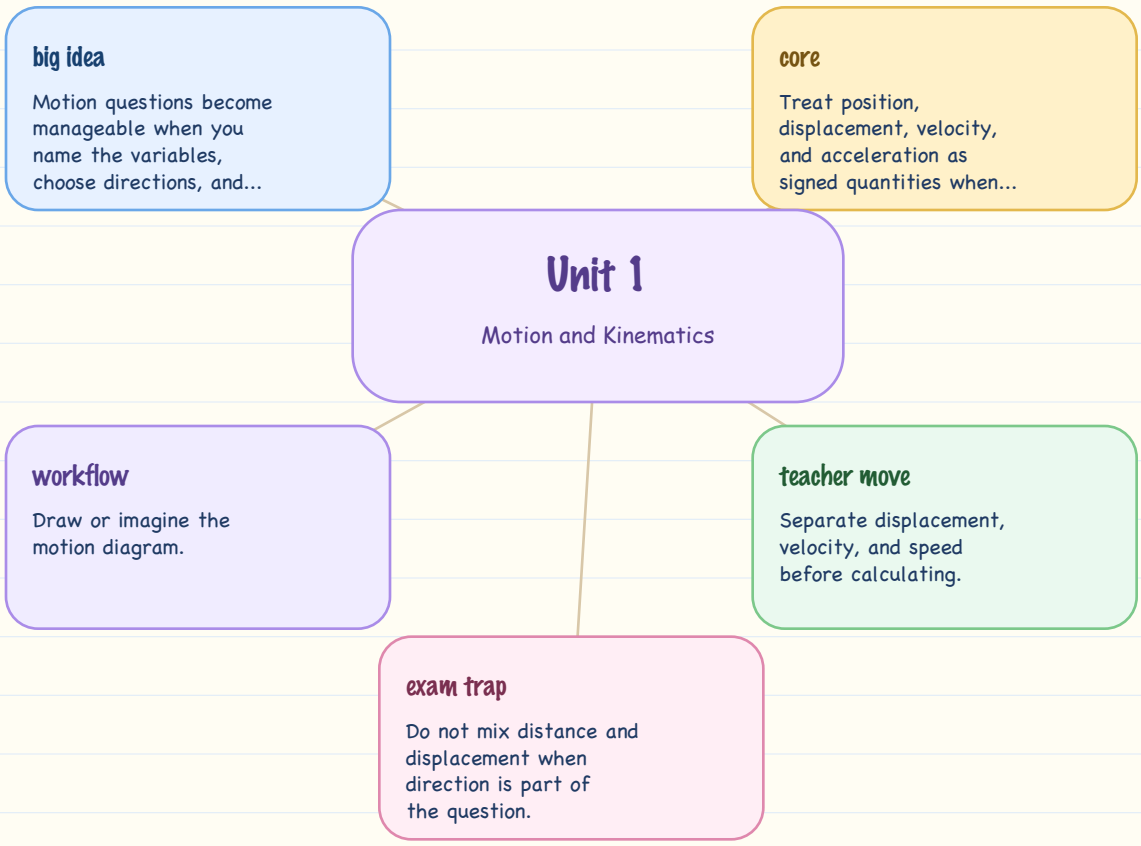
Unit 1 Visual Notebook

Kinematics, Motion Graphs, and Projectile Models

DISTILLED FROM VIDEO

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



Visual Strategy

Step 1 choose + direction → **Step 2** name variables → **Step 3** graph slope / area → **Step 4** check sign and unit

Use this when stuck

- Draw or imagine the motion diagram.
- Choose a positive direction and label known values with signs.
- Decide whether the model is constant velocity, constant acceleration, graph reading, or projectile motion.
- Use the formula or graph relationship that matches the model.
- Check the sign and unit of the final answer.

Video teacher tips

- Separate displacement, velocity, and speed before calculating.
- Read the graph feature first: slope, area, intercept, or trend.
- Choose a positive direction and keep every vector sign consistent.
- Use slope as the meaning-maker on motion graphs.
- Draw the free-body diagram before writing force equations.
- Split projectile motion into horizontal and vertical parts.

Example and Recall

Worked example pattern

Constant-acceleration setup (Unit 1 distilled pattern: uniform-acceleration formula and sign choice)

Choose forward as positive.

If a cart starts from rest with $a = 2.0\ m/s^2$ for 3.0 s, use $v = v_0 + at$.

$v = 0 + (2.0)(3.0) = 6.0\ m/s$.

For displacement, use $\Delta x = v_0t + 1/2\ at^2 = 0 + 1/2(2.0)(3.0^2)$.

Answer pattern: $v = 6.0\ m/s$ and $\Delta x = 9.0\ m$.

Projectile split (Unit 1 distilled pattern: horizontal and vertical motion are solved separately)

Horizontal velocity stays constant if air resistance is ignored in the model.

Vertical motion uses acceleration g downward.

Use vertical motion to find time, then use horizontal motion to find range.

Quick recall prompts

- Read slope and area from x-t and v-t graphs.
- Solve a constant-acceleration problem after choosing signs.
- Break a projectile problem into horizontal and vertical components.