

Unit 5

Mechanical Waves and Sound

SOURCE LOCK

Built from SPH3U video-distilled notes. Teacher moves, examples, and practice prompts are pulled from the local distilled packets.

Big idea

- Wave questions are about repeated motion spreading through space; sound is a mechanical-wave application.

Lesson map

- Mechanical waves - 13 source lessons
- Sound and thermal review - 1 source lessons

Core Notes

What to know

- Distinguish transverse and longitudinal wave descriptions.
- Wave speed connects frequency and wavelength through $v = f\lambda$ in the simple source pattern.
- A wave transfers energy while the medium particles oscillate around equilibrium positions.
- Propagation-direction questions require reading the waveform and the motion direction carefully.
- For sound, frequency connects to pitch and amplitude connects to loudness in the review source.

Problem-solving workflow

- Identify whether the wave is transverse or longitudinal.
- Label wavelength, frequency, period, speed, and amplitude.
- Use $v = f\lambda$ only after units and quantities are clear.
- For waveform direction, compare the particle's motion with the shape of the wave.
- For sound, translate the physical quantity into what a listener hears.

Common traps

- Do not say the medium travels with the wave; particles oscillate locally.
- Do not confuse amplitude with wavelength.
- Do not confuse pitch and loudness.
- For wave graphs, read the axis labels before choosing a quantity.

Teacher Moves

HOW TO THINK

These notes preserve the teacher's problem-solving moves: how to decide the model before calculating.

Move 1

- Read the graph feature first: slope, area, intercept, or trend. | Source: L164 00:08:20, L165 00:02:48, L166 00:04:53.

Move 2

- For equilibrium, set net force to zero and use geometry or components. | Source: L167 00:00:52, L168 00:02:33, L173 00:04:53.

Move 3

- Connect sound quantities to what a listener hears. | Source: L170 00:05:32, L177 00:01:49.

Move 4

- Describe what oscillates and what propagates before using wave formulas. | Source: L164 00:01:00.

Move 5

- Set directions before assigning signs or writing equations. | Source: L166 00:00:39.

Move 6

- For wave-direction problems, compare waveform shape with particle motion. | Source: L176 00:08:50.

Worked Examples

Distilled example patterns

Wave speed (Unit 5 distilled pattern: wave description and $v = f\lambda$)

Identify frequency and wavelength.

Use $v = f\lambda$.

If $f = 3 \text{ Hz}$ and $\lambda = 2 \text{ m}$, $v = (3)(2)$.

Use m/s as the unit.

Answer pattern: $v = 6 \text{ m/s}$.

Sound interpretation (Unit 5 distilled pattern: sound review source)

Frequency connects to pitch.

Amplitude connects to loudness.

Changing frequency changes how high or low the sound seems.

Practice prompts

- Label wavelength and amplitude on a wave diagram.
- Calculate wave speed from frequency and wavelength.
- Explain how pitch and loudness relate to the physical wave.

Source quality note

OCR review flags in this unit: 4 / 814.

Printed slide text is usually reliable; dense handwritten equations should be verified against source frames.

This packet is polished for student reading, but it keeps the source trace instead of inventing missing formulas.