

QUICK REVIEW

Quick Review: Mechanical Waves and Wave Speed

Refresh the most important ideas, relationships, and problem-solving strategies for mechanical waves and wave speed in just a few minutes.

 TIME 5–10 minutes	 BEST FOR A rapid refresh	 FINISH WITH Key ideas refreshed
--	---	--

After this quick review, you'll be able to...

use wave variables, calculate wave speed, and connect medium properties to mechanical-wave behavior with confidence.

HOW TO USE THIS GUIDE

Work through the four stages in order. Write directly in the spaces provided, check your work in the Quick Answers section, and finish by choosing the next resource that matches your confidence.

Choose how you want to review: work through this guide, follow the online review, or watch the video review.

Start the Review Online →

Watch the Video Review →

YOU WILL NEED

Pencil or pen • Calculator if needed • Approximately 5–10 minutes

FR-02 • COURSE ALIGNMENT

Course Alignment

This bundle is designed to complement the chapter listed below. Use it to reinforce key concepts, prepare for homework, or review before a quiz or exam.

TEXTBOOK: OpenStax University Physics Volume 1 CHAPTER: Volume 1, Chapter 16 TOPIC: Mechanical Waves and Wave Speed COURSE LEVEL: Algebra-based introductory college physics	BEST USED ✓ After reading the chapter ✓ Before starting homework ✓ Before a quiz or exam
---	---

Read the OpenStax Chapter →

Physics Sensei is an independent educational resource designed to complement OpenStax materials. OpenStax® is a registered trademark of Rice University.

FR-03 • YOUR REVIEW PLAN

Your Review Plan

Complete these four stages to quickly refresh the essential ideas and confirm you're ready to continue.

4 stages • Approximately 5–10 minutes

1 Quick Recall — page 4 Refresh what you already know.	2 Essential Idea — page 5 Review the most important concept.
3 Confidence Check — page 6 Confirm you're ready to move on.	4 Next Step — page 8 Continue your learning.

PRINTING TIP

For student copies, print double-sided and keep the Quick Answers section after the student activities so learners attempt each activity before checking their work.

FR-04 • STAGE 1 OF 4

Quick Recall

Let's quickly refresh what you already know. This short recall activity will bring the most important ideas back to mind before you review them.

QUICK RECALL**Recall Activity**

Complete the three statements from memory before revealing the answer.

1) Frequency and period satisfy _____. 2) Wave speed is related to frequency and wavelength by _____. 3) For a string, wave speed depends on tension and _____.

Ready to refresh the essentials?

Great! Now review the most important idea you'll want to remember.

Continue to Essential Idea — page 5 →

FR-05 • STAGE 2 OF 4

Essential Idea

Take one last look at the most important concept from this topic. If you remember this idea, the rest will come back much more easily.

ESSENTIAL IDEA

Connect the Wave Equation to the Medium

Mechanical waves transfer energy through a medium. Describe a sinusoidal wave with amplitude A , wavelength λ , frequency f , period T , and speed v . The core kinematic relation is $v = f\lambda$. On a stretched string, the medium sets the speed through the tension F_T and linear mass density μ : $v = \sqrt{F_T/\mu}$.

$$T = \frac{1}{f}; v = f\lambda; v_{string} = \sqrt{\frac{F_T}{\mu}}$$

EXAMPLE A 12 Hz wave on a string travels at 36 m/s. Its wavelength is $\lambda = v/f = 3.0$ m.

SENSEI NOTE Changing frequency at a fixed medium does not change wave speed; it changes wavelength.

Ready to check your memory?

You've refreshed the essential idea. Now see how much you remember before moving on.

Continue to Confidence Check — page 6 →

FR-06 • STAGE 3 OF 4

Confidence Check

You've refreshed the essential idea. Now answer this quick confidence check to confirm you're ready to move on.

CONFIDENCE CHECK

Five-Minute Readiness Check

Answer all three without notes.

A 20 Hz wave travels at 80 m/s. Find its wavelength. Then state how the string-wave speed changes if tension is quadrupled while μ stays constant.

Ready for your next step?

Great work! You've refreshed the essential idea. Now choose the resource that best matches what you'd like to do next.

Continue to Next Step — page 8 →

QUICK ANSWERS • CHECK AFTER ATTEMPTING

Quick Answers and Explanations

Use these concise answers to check your recall and confidence—not only your final response.

QUICK RECALL

Recall Activity

1) $T = 1/f$; 2) $v = f\lambda$; 3) linear mass density μ .

WHY IT WORKS Frequency and wavelength describe the wave; the medium determines the propagation speed.

CONFIDENCE CHECK

CONFIDENCE CHECK

Five-Minute Readiness Check

$\lambda = 80/20 = 4.0$ m. Quadrupling the tension doubles the wave speed because $v \propto \sqrt{F_T}$.

WHY IT WORKS Use $v = f\lambda$ for the traveling wave and $v = \sqrt{(F_T/\mu)}$ for a stretched string.

READINESS GUIDE

3 correct: You're ready to continue. • 2 correct: Review the missed idea. • 0–1 correct: Revisit the Essential Idea or choose more practice.

FR-07 • STAGE 4 OF 4

Next Step: Continue Learning

Great work! You've completed this quick review. Choose the next resource that best matches how confident you feel.

? I'm Still Unsure Review the essential idea again. Review again: return to Essential Idea on page 5.	🕒 I Need More Practice Continue with additional practice for this topic. Go to Practice →	✓ I'm Ready Continue to the next recommended resource. Continue →
--	--	--

RECOMMENDED LINKS

Review again: return to Essential Idea on page 5.

Find additional practice →

Choose another type of physics help →

Continue reviewing with these companion resources.

Start the Review Online →

Watch the Video Review →

PHYSICS HELP THAT MAKES SENSE

A Physics Sensei review never ends at the last question. It always guides you toward the next useful step.

PhysicsSensei.com