

QUICK REVIEW

Quick Review: Damping, Driving, and Resonance — Foundational

Refresh the most important ideas about damping, driving, and resonance from the Foundational perspective in just a few minutes.

 TIME 5–10 minutes	 BEST FOR A rapid refresh	 FINISH WITH Key ideas refreshed
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After this quick review, you'll be able to...

explain how damping and periodic driving change an oscillator and recognize resonance from graphs and physical behavior.

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 Physics Sensei Unit Review supports MEC-U10 — Damping, Driving, and Resonance. Use it to reinforce concepts, prepare for homework, or review before a quiz or exam.

UNIT: MEC-U10 TOPIC: Damping, Driving, and Resonance TREATMENT: Foundational RESOURCE: Physics Sensei Unit Review	BEST USED ✓ After reading the chapter ✓ Before starting homework ✓ Before a quiz or exam
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Explore Physics Sensei →

Physics Sensei is an independent physics learning resource. This review uses original Physics Sensei organization, explanations, examples, and practice.

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) Damping removes mechanical _____. 2) A driven oscillator's steady motion follows the _____ frequency. 3) Resonance occurs when energy transfer from the driver is especially _____.

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

Damping Controls Decay; Driving Controls the Steady Response

A real oscillator loses energy, so free oscillations shrink with time. A periodic external force can keep the system moving. After transients fade, the oscillator responds at the driving frequency. When the driver is timed near the system's natural response, the amplitude can become large: resonance.

$$\mathbf{v} = d\mathbf{r}/dt; \mathbf{a} = d\mathbf{v}/dt; \text{projectile: } \mathbf{a}_x = 0 \text{ and } \mathbf{a}_y = -\mathbf{g}; \text{circular: } \mathbf{a}_{\text{rad}} = \mathbf{v}^2/r; \text{relative:}$$

$$\mathbf{v}_{A/C} = \mathbf{v}_{A/B} + \mathbf{v}_{B/C}.$$

EXAMPLE A lightly damped swing pushed once each cycle can build a large amplitude. The same swing pushed at a badly mismatched rhythm responds much less.

SENSEI NOTE Resonance does not create energy. The large motion comes from repeated energy transfer from the driver.

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 damped oscillator is driven periodically. After the transient dies away, which frequency does it follow, and what happens to the resonance peak when damping is increased?

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) energy; 2) driving; 3) effective.

WHY IT WORKS Damping dissipates energy, while a periodic driver supplies it. The steady-state oscillator follows the driver, and resonance describes especially effective energy transfer.

CONFIDENCE CHECK**CONFIDENCE CHECK****Five-Minute Readiness Check**

It follows the driving frequency. Increasing damping lowers and broadens the resonance peak.

WHY IT WORKS The steady-state motion is forced by the driver. Stronger energy loss prevents the oscillator from building as large a resonant response and makes the response less sharply frequency-selective.

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 →
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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.

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