

QUICK REVIEW

Quick Review: Stress, Strain, and Elasticity

Refresh the most important ideas, formulas, and problem-solving strategies for stress, strain, and elasticity 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...

identify stress and strain, interpret elastic stiffness, and make a quick prediction about material deformation.

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 is an independent learning resource. Use it to reinforce key concepts, prepare for homework, or review before a quiz or exam.

RESOURCE: Physics Sensei Unit Review
UNIT ID: MEC-U24
TOPIC: Stress, Strain, and Elasticity
COURSE LEVEL: Algebra-Based

BEST USED

- ✓ After learning the unit
- ✓ Before starting homework
- ✓ Before a quiz or exam

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 Refresh what you already know.	2 Essential Idea Review the most important concept.
3 Confidence Check Confirm you're ready to move on.	4 Next Step 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**

Recall the three equations that connect load, deformation, and stiffness.

Complete: $\sigma = \underline{\hspace{1cm}}$; $\varepsilon = \underline{\hspace{1cm}}$; $Y = \underline{\hspace{1cm}}$. Then state the SI unit of stress and Young's modulus.

Ready to refresh the essentials?

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

Review the Essential Idea →

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

Linear elasticity links force and extension

For axial loading, $\sigma = F/A$ and $\epsilon = \Delta L/L_0$. In the linear elastic region, $\sigma = Y\epsilon$, so $\Delta L = FL_0/(AY)$. This form shows how force, length, area, and material stiffness control extension.

$$\sigma = F/A \quad \epsilon = \Delta L/L_0 \quad \Delta L = FL_0/(AY)$$

EXAMPLE Doubling the rod length doubles ΔL ; doubling its area or Young's modulus halves ΔL , if the load stays the same.

SENSEI NOTE Use consistent SI units before substituting into $\Delta L = FL_0/(AY)$.

Ready to check your memory?

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

[Start the Confidence Check →](#)

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

Predict the extension

Compare without calculating.

A rod is replaced by one of the same material and length but twice the cross-sectional area. Under the same force, how does its extension change?

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.

Choose Your Next Step →

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**

$\sigma = F/A$; $\epsilon = \Delta L/L_0$; $Y = \sigma/\epsilon$. Stress and Young's modulus are measured in pascals (Pa).

WHY IT WORKS Combining these equations gives $\Delta L = FL_0/(AY)$.

CONFIDENCE CHECK**CONFIDENCE CHECK****Predict the extension**

The extension is cut in half.

WHY IT WORKS ΔL is inversely proportional to cross-sectional area when F , L_0 , and Y are fixed.

READINESS GUIDE

1 correct: You're ready to continue. • 0 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 →	🎯 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 this topic again →

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