

FOCUSED REVIEW

Focused Review — Unit Conversions and Dimensional Analysis — Algebra-Based

Review the most important ideas, reinforce the essential skills, and confirm you're ready to move on.

 TIME 15–20 minutes	 BEST FOR Focused review	 FINISH WITH Greater confidence
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After this focused review, you'll be able to...

recognize the key concepts, reinforce your problem-solving skills, and continue with greater confidence.

HOW TO USE THIS GUIDE

Work through the stages in order. Write directly in the spaces provided, check your work in the Solutions 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 15–20 minutes

FR-02 • COURSE ALIGNMENT

Course Alignment

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

Related Unit Review: If you need to review the complete unit material, review [Units and Measurements here →](#)

RESOURCE: Physics Sensei Topic Review TOPIC ID: MEC-U01-T01 TOPIC: Unit Conversions and Dimensional Analysis PARENT UNIT: MEC-U01 — Units and Measurements COURSE LEVEL: Algebra-Based	BEST USED ✓ After learning the topic ✓ Before starting homework ✓ Before a quiz or exam
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FR-03 • YOUR REVIEW PLAN

Your Review Plan

Complete these six focused stages in order. Each stage reinforces your understanding and prepares you for a final confidence check.

6 stages • Approximately 15–20 minutes

1 Warm-Up Check Refresh key ideas.	2 Core Concepts Reinforce the essentials.	3 Guided Practice Strengthen key skills.
4 Confidence Check Confirm your understanding.	5 Summary Remember the essentials.	6 Next Step Choose your next step.

PRINTING TIP

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

FR-04 • STAGE 1 OF 6

Warm-Up Check

Before you begin, take a minute to reactivate what you already know. This quick warm-up will help you focus on the most important ideas before moving on.

WARM-UP 1**Key Ideas**

State the factors for kilo, centi, milli, and micro. Give the dimensions of velocity and acceleration.

WARM-UP 2**Common Mistakes**

Why is 1 m^2 not equal to 100 cm^2 ?

FR-04 • WARM-UP CHECK CONTINUED

WARM-UP 3

Quick Application

Convert 90 km/h to m/s.

Ready to strengthen your understanding?

You've refreshed the most important ideas. Now reinforce the concepts you'll use most often.

Continue to Core Concepts →

FR-05 • STAGE 2 OF 6

Core Concepts

Let's reinforce the most important concepts you'll need to solve problems with confidence. Focus on the ideas that appear most often in homework, quizzes, and exams.

KEY CONCEPT 1

Compound and Powered Unit Conversions

Treat units as algebraic factors. Convert numerator and denominator units separately, and raise conversion factors to the same power as squared or cubed units.

$$(\text{conversion factor})^n \text{ for a unit raised to power } n$$

$$1 \text{ m}^2 = (100 \text{ cm})^2 = 10^4 \text{ cm}^2$$

EXAMPLE $1.0 \text{ g/cm}^3 = 1000 \text{ kg/m}^3$.

SENSEI NOTE The most common area/volume error is forgetting to square or cube the conversion factor.

KEY CONCEPT 2

Dimensional Consistency

Dimensions follow from definitions: velocity $[L/T]$, acceleration $[L/T^2]$, force $[ML/T^2]$. Every term in an equation must have the same dimensions.

$$[\text{left side}] = [\text{right side}]$$

$$[F] = [M][L/T^2] = [ML/T^2]$$

EXAMPLE $x = v_0 t + \frac{1}{2} a t^2$: both terms on the right have dimension $[L]$.

SENSEI NOTE A dimensionally consistent equation can still have the wrong numerical coefficient.

Ready to apply these ideas?

You've reinforced the essential concepts. Now strengthen your problem-solving skills by working through a few guided examples.

[Continue to Guided Practice →](#)

FR-06 • STAGE 3 OF 6

Guided Practice

Now apply the key concepts you've just reviewed. Work through these focused practice activities to reinforce your problem-solving skills before the final confidence check.

PRACTICE 1**Guided Example**

Convert 1.20 g/cm^3 to kg/m^3 .

$$1.20 \text{ g/cm}^3 \times (1 \text{ kg}/1000 \text{ g}) \times (100 \text{ cm}/1 \text{ m})^3 = 1200 \text{ kg/m}^3.$$

PRACTICE 2**Independent Check**

Convert 3.5 m^2 to cm^2 .

$$3.5 \text{ m}^2 \times (100 \text{ cm} / 1 \text{ m})^2 = \text{ ______ } \text{ cm}^2.$$

Ready for a confidence check?

You've reinforced the essential skills through focused practice. Now confirm your understanding with two short questions.

Continue to Confidence Check →

FR-07 • STAGE 4 OF 6

Confidence Check

You've reinforced the key concepts and practiced the essential skills. Now confirm you're ready to move forward by completing these short confidence checks.

CONFIDENCE CHECK 1

Compound Conversion

Answer without looking back.

Convert 108 km/h to m/s.

CONFIDENCE CHECK 2

Equation Check

Use units or dimensions to justify your answer.

Is $v^2 = v_0^2 + 2a\Delta x$ dimensionally consistent?

HOW DID IT GO?

I answered ____ of 2 questions correctly.

Use the Solutions section to check your reasoning, then take one final look at the essential ideas.

You've confirmed your understanding.

Take one final look at the essential ideas before choosing your next step.

Continue to Summary →

FR-08 • STAGE 5 OF 6

Summary

Before moving on, take one final look at the essential ideas you'll want to remember.

KEY TAKEAWAY 1**Track Every Unit Factor**

Compound, squared, and cubed units require explicit factor-by-factor conversion.

KEY TAKEAWAY 2**Use Dimensions to Test Equations**

Every term that is added or equated must have the same dimensions.

MY ONE-SENTENCE SUMMARY

In my own words, the most important idea is:

Ready for your next step?

You've reviewed the essential ideas one last time. Now choose the resource that best matches how confident you feel.

Continue to Next Step →

ANSWER KEY • CHECK AFTER ATTEMPTING

Solutions and Explanations

Use these solutions to check your reasoning—not only your final answer. Replace each placeholder with a concise answer and the essential explanation.

WARM-UP • ACTIVITY 1

Key Ideas

10^3 , 10^{-2} , 10^{-3} , 10^{-6} ; velocity $[L/T]$, acceleration $[L/T^2]$.

WHY IT WORKS These are the standard factors or dimensions needed for the topic.

WARM-UP • ACTIVITY 2

Common Mistakes

Because $1 \text{ m} = 100 \text{ cm}$, so $1 \text{ m}^2 = (100 \text{ cm})^2 = 10,000 \text{ cm}^2$.

WHY IT WORKS Unit cancellation or dimensional compatibility reveals the correct choice.

WARM-UP • ACTIVITY 3

Quick Application

$90 \times 1000/3600 = 25 \text{ m/s}$.

WHY IT WORKS The conversion factors cancel the original units and leave the requested units.

SOLUTIONS • GUIDED PRACTICE

PRACTICE 1

Guided Example

$$1.20 \text{ g/cm}^3 \times (1 \text{ kg}/1000 \text{ g}) \times (100 \text{ cm}/1 \text{ m})^3 = 1200 \text{ kg/m}^3.$$

WHY IT WORKS Writing every factor makes the unit logic visible and checkable.

PRACTICE 2

Independent Check

$$3.5 \text{ m}^2 \times (100 \text{ cm} / 1 \text{ m})^2 = \text{ ______ } \text{ cm}^2.$$

WHY IT WORKS The same factor-label logic applies; the final unit and dimension provide a check.

SOLUTIONS • CONFIDENCE CHECK

CONFIDENCE CHECK 1

Compound Conversion

30 m/s.

WHY IT WORKS The setup is correct when the unwanted unit cancels and the requested unit remains.

CONFIDENCE CHECK 2

Equation Check

Yes. Every term has dimension L^2/T^2 .

WHY IT WORKS Dimensional consistency is a fast physical reasonableness test.

READINESS GUIDE

2 correct: You're ready to continue. • 1 correct: Review the missed idea, then continue. • 0 correct: Revisit Core Concepts or choose more practice.

FR-09 • STAGE 6 OF 6

Next Step: Continue Learning

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

? I'm Still Unsure Review the focused review again to strengthen the essential concepts. Review Again →	🎯 I Need More Practice Build confidence with additional practice problems. Go to Practice →	✓ I'm Ready Continue to the next topic or learning 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