

FOCUSED REVIEW

Focused Review: Phase Changes and Latent Heat

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 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: THM-U04
TOPIC: Phase Changes and Latent Heat
COURSE LEVEL: Algebra-based introductory physics

BEST USED

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

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**

Match phase changes to latent heats.

Which latent heat is used for melting/freezing, and which for vaporization/condensation?

WARM-UP 2**Common Mistakes**

Choose the thermal-energy model.

Choose $Q = mc\Delta T$ or $Q = mL$ for warming water by 15°C and for boiling water at 100°C .

FR-04 • WARM-UP CHECK CONTINUED

WARM-UP 3

Quick Application

Interpret a plateau.

What does a flat segment on a heating curve mean?

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

Latent Heat Calculations

For a phase change at the transition temperature, use $Q = mL$. Choose L_f for melting/freezing and L_v for vaporization/condensation; assign the sign based on whether the sample absorbs or releases energy.

$$Q = mL_f \text{ or } Q = mL_v$$

EXAMPLE 0.20 kg of ice melting with $L_f = 334 \text{ kJ/kg}$ requires 66.8 kJ.

SENSEI NOTE Do not multiply by ΔT during the phase-change plateau.

KEY CONCEPT 2

Heating Curves and Energy Stages

Use $Q = mc\Delta T$ on sloped segments and $Q = mL$ on flat phase-change segments. For a process crossing multiple segments, calculate and add each stage.

$$Q_{\text{total}} = Q_1 + Q_2 + \dots$$

EXAMPLE Ice at 0°C melts, then the liquid warms: $Q_{\text{total}} = mL_f + mc\Delta T$.

SENSEI NOTE Write a stage list before calculating.

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**

Calculate one latent-heat energy.

Find the energy required to melt 0.080 kg of ice if $L_f = 334 \text{ kJ/kg}$.

PRACTICE 2**Independent Check**

Calculate a two-stage process.

A 0.100 kg sample melts with $L_f = 250 \text{ kJ/kg}$, then its liquid warms 20°C with $c = 2.0 \text{ kJ/(kg}\cdot^\circ\text{C)}$. Find the total energy.

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

Latent Heat Choice

Choose the correct L.

Which latent heat appears in the equation for condensation?

CONFIDENCE CHECK 2

Energy Direction

State sign and reason.

If Q is defined positive into the sample, what sign does Q have during freezing?

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 **$Q = mL$ for phase changes**

Use L_f for solid↔liquid and L_v for liquid↔gas.

KEY TAKEAWAY 2**Heating curves are piecewise**

Use $Q = mc\Delta T$ on slopes and $Q = mL$ on plateaus, then add the stages.

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

L_f for solid↔liquid; L_v for liquid↔gas.

WHY IT WORKS The latent heat must match the transition.

WARM-UP • ACTIVITY 2

Common Mistakes

Warming: $Q = mc\Delta T$. Boiling: $Q = mL_v$.

WHY IT WORKS Temperature change and phase change are different stages.

WARM-UP • ACTIVITY 3

Quick Application

A phase change occurs while temperature stays approximately constant.

WHY IT WORKS Energy changes the phase fraction rather than temperature during the plateau.

SOLUTIONS • GUIDED PRACTICE

PRACTICE 1

Guided Example

$$Q = (0.080)(334) = 26.72 \text{ kJ absorbed.}$$

WHY IT WORKS Melting uses L_f and the result is proportional to mass.

PRACTICE 2

Independent Check

$$Q_{\text{melt}} = 25 \text{ kJ}; Q_{\text{warm}} = 4 \text{ kJ}; Q_{\text{total}} = 29 \text{ kJ absorbed.}$$

WHY IT WORKS Add the latent-heat stage and the sensible-heating stage.

SOLUTIONS • CONFIDENCE CHECK

CONFIDENCE CHECK 1

Latent Heat Choice

Use L_v because condensation is gas $\rightarrow$ liquid.

WHY IT WORKS Liquid $\leftrightarrow$ gas transitions use L_v .

CONFIDENCE CHECK 2

Energy Direction

Q is negative because freezing releases energy from the sample.

WHY IT WORKS The sample transfers energy to the surroundings during freezing.

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