

FOCUSED REVIEW

Focused Review: Heat, Specific Heat, and Calorimetry

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-U03
TOPIC: Heat, Specific Heat, and Calorimetry
COURSE LEVEL: Foundational 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**Meaning Match**

Complete the activity, then check your reasoning in the Solutions section.

Match each idea with its meaning.

WARM-UP 2**Sign Check**

Complete the activity, then check your reasoning in the Solutions section.

State whether Q is positive or negative.

FR-04 • WARM-UP CHECK CONTINUED

WARM-UP 3

Quick Calculation

Complete the activity, then check your reasoning in the Solutions section.

A 2.0 kg sample with $c = 500 \text{ J/(kg}\cdot\text{°C)}$ warms by 3.0 °C . Find Q .

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

Heat and Temperature Change

Heat is energy transferred because of a temperature difference. For a substance that stays in one phase, the energy needed for a temperature change depends on its mass, specific heat, and temperature change.

$$Q = mc\Delta T$$

EXAMPLE $Q = mc\Delta T$. A larger mass or larger specific heat requires more energy for the same ΔT .

SENSEI NOTE Do not treat heat and temperature as the same quantity. Heat is energy transfer; temperature describes thermal state.

KEY CONCEPT 2

Calorimetry and Energy Balance

In an insulated calorimetry situation, energy released by warmer objects is absorbed by cooler objects. The total heat transfer for the chosen system is zero.

$$\Sigma Q = 0$$

EXAMPLE For two objects: $Q(\text{hot}) + Q(\text{cold}) = 0$.

SENSEI NOTE Choose signs from temperature change: warming gives $\Delta T > 0$ and cooling gives $\Delta T < 0$.

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**Worked Example**

Solve the problem. Show your setup before checking the solution.

A 0.50 kg sample with $c = 900 \text{ J/(kg}\cdot^{\circ}\text{C)}$ warms from 20°C to 30°C . Find the heat absorbed.

PRACTICE 2**Guided Problem**

Solve the problem. Show your setup before checking the solution.

A 0.20 kg object releases 2400 J while cooling by 20°C . Find its specific heat.

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

Heat or Temperature?

Answer before checking the solution.

Choose the correct statement.

CONFIDENCE CHECK 2

Use the Formula

Answer before checking the solution.

A 1.0 kg sample with $c = 400 \text{ J/(kg}\cdot^{\circ}\text{C)}$ gains 2000 J. Find ΔT .

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**Core relation**

For one substance with constant specific heat and no phase change, $Q = mc\Delta T$.

KEY TAKEAWAY 2**Calorimetry balance**

For an insulated system, add all heat transfers and set the total equal to zero.

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

Meaning Match

heat → energy transferred; specific heat → energy needed per kilogram per degree; calorimetry → using energy balance to study heat exchange

WHY IT WORKS These three ideas organize nearly every calorimetry problem.

WARM-UP • ACTIVITY 2

Sign Check

An object warms: Q is positive. An object cools: Q is negative.

WHY IT WORKS The sign follows whether the object absorbs or releases energy.

WARM-UP • ACTIVITY 3

Quick Calculation

$$Q = (2.0)(500)(3.0) = 3000 \text{ J.}$$

WHY IT WORKS Use $Q = mc\Delta T$ and multiply mass, specific heat, and temperature change.

SOLUTIONS • GUIDED PRACTICE

PRACTICE 1

Worked Example

$\Delta T = 10\text{ }^{\circ}\text{C}$. $Q = mc\Delta T = (0.50)(900)(10) = 4500\text{ J}$. The sample absorbs 4.5 kJ.

WHY IT WORKS A positive temperature change gives positive Q .

PRACTICE 2

Guided Problem

Use $|Q| = mc|\Delta T|$. $c = 2400/[(0.20)(20)] = 600\text{ J/(kg}\cdot^{\circ}\text{C)}$.

WHY IT WORKS Using magnitudes is convenient when the problem asks only for c .

SOLUTIONS • CONFIDENCE CHECK

CONFIDENCE CHECK 1

Heat or Temperature?

Heat is energy transferred between systems; temperature is not energy transferred.

WHY IT WORKS The quantities are related but not interchangeable.

CONFIDENCE CHECK 2

Use the Formula

$$\Delta T = Q/(mc) = 2000/(1.0 \times 400) = 5.0 \text{ }^{\circ}\text{C}.$$

WHY IT WORKS Rearrange $Q = mc\Delta T$.

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