

FOCUSED REVIEW

Focused Review — Acceleration and Constant-Acceleration Motion — Foundational

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 [Motion in One Dimension here →](#)

RESOURCE: Physics Sensei Topic Review
TOPIC ID: MEC-U03-T02
TOPIC: Acceleration and Constant-Acceleration Motion
PARENT UNIT: MEC-U03 — Motion in One Dimension
COURSE LEVEL: Foundational

BEST USED

- ✓ After learning the topic
- ✓ 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**

State the meaning in words.

What does an acceleration of -3 m/s^2 tell you about how velocity changes each second?

WARM-UP 2**Common Mistakes**

Check the sign logic before calculating.

A cyclist has $v > 0$ and $a < 0$. Is the cyclist necessarily moving backward? Explain.

FR-04 • WARM-UP CHECK CONTINUED

WARM-UP 3

Quick Application

Estimate the direction of change first.

A ball moving upward has positive velocity. Just before it reaches its highest point, what is the direction of its acceleration?

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**Acceleration and Sign**

Acceleration measures the rate at which velocity changes. Its sign indicates the direction of the velocity change, not whether an object is automatically speeding up or slowing down.

$$a = \Delta v / \Delta t$$

EXAMPLE A velocity change from +10 m/s to +4 m/s over 3 s gives a negative average acceleration.

SENSEI NOTE Always define the positive direction before interpreting signs.

KEY CONCEPT 2**Constant Acceleration**

When acceleration is constant, velocity changes by equal amounts in equal time intervals. Position does not change by equal amounts because the velocity itself is changing.

$$v = v_0 + at$$

EXAMPLE Starting from rest with $a = +2 \text{ m/s}^2$ gives velocities 0, 2, 4, 6 m/s after 0, 1, 2, 3 s.

SENSEI NOTE Constant acceleration does not mean constant velocity.

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**

Follow the sign convention and identify the known quantities.

A scooter moves at $+4 \text{ m/s}$ and accelerates at $+1.5 \text{ m/s}^2$ for 4 s . Find its final velocity.

PRACTICE 2**Independent Check**

Work independently; write the sign of each quantity before substituting.

A car moving at $+12 \text{ m/s}$ slows with constant acceleration -3 m/s^2 . How long does it take to reach $+3 \text{ m/s}$?

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

Velocity Change

Calculate the acceleration.

Velocity changes from -2 m/s to -8 m/s in 3 s. What is the average acceleration?

CONFIDENCE CHECK 2

Speeding Up or Slowing Down

Decide using signs, not position.

At one instant $v = +5$ m/s and $a = -2$ m/s². Is the object speeding up or slowing down?

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**Read the Signs**

Acceleration describes the direction and rate of velocity change. Compare the signs of v and a to decide whether speed increases or decreases.

KEY TAKEAWAY 2**Constant Means Equal Velocity Changes**

For constant acceleration, velocity changes linearly with time. Use a consistent sign convention from start to finish.

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.

WARM-UP • ACTIVITY 1

Key Ideas

Velocity changes by -3 m/s each second.

WHY IT WORKS Acceleration is velocity change per unit time.

WARM-UP • ACTIVITY 2

Common Mistakes

No. Positive velocity means it is still moving in the positive direction; negative acceleration means its velocity is decreasing.

WHY IT WORKS Direction of motion comes from velocity; acceleration describes how that velocity changes.

WARM-UP • ACTIVITY 3

Quick Application

Downward. Gravity remains downward even while the ball is still moving upward.

WHY IT WORKS Acceleration due to gravity does not reverse at the top of the path.

SOLUTIONS • GUIDED PRACTICE

PRACTICE 1**Guided Example**

$$v = 4 + (1.5)(4) = +10 \text{ m/s.}$$

WHY IT WORKS Constant acceleration changes velocity by $a\Delta t$.

PRACTICE 2**Independent Check**

$$3 = 12 - 3t, \text{ so } t = 3 \text{ s.}$$

WHY IT WORKS The negative acceleration reduces the positive velocity by 3 m/s each second.

SOLUTIONS • CONFIDENCE CHECK

CONFIDENCE CHECK 1

Velocity Change

$$a = [-8 - (-2)]/3 = -2 \text{ m/s}^2.$$

WHY IT WORKS The velocity becomes 6 m/s more negative in 3 s.

CONFIDENCE CHECK 2

Speeding Up or Slowing Down

Slowing down.

WHY IT WORKS Velocity and acceleration have opposite signs, so speed decreases at that instant.

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