

FOCUSED REVIEW

Focused Review: Projectile 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
--	---	--

After this focused review, you'll be able to...

use component methods for projectile motion, interpret circular acceleration, and combine frame-labeled velocities.

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 bundle is designed to complement the chapter listed below. Use it to reinforce key concepts, prepare for homework, or review before a quiz or exam.

TEXTBOOK: Independent Physics Sensei Unit Review CHAPTER: MEC-U15 TOPIC: MEC-U15 — Projectile Motion COURSE LEVEL: Foundational introductory physics	BEST USED ✓ After reading the chapter ✓ Before starting homework ✓ Before a quiz or exam
---	---

Visit Physics Sensei →

Physics Sensei is an independent educational resource for college physics review and practice.

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 — page 4 Refresh key ideas.	2 Core Concepts — page 6 Reinforce the essentials.	3 Guided Practice — page 7 Strengthen key skills.
4 Confidence Check — page 8 Confirm your understanding.	5 Summary — page 10 Remember the essentials.	6 Next Step — page 14 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**

Identify what gravity changes in the ideal model.

During ideal projectile motion, which velocity component stays constant and which changes?

WARM-UP 2**Common Mistakes**

Check the common apex misconception.

At the highest point, is the projectile stopped and is gravity zero?

FR-04 • WARM-UP CHECK CONTINUED

WARM-UP 3

Quick Application

Compare identical vertical starting conditions.

A dropped ball and a horizontally launched ball leave the same height together. Which lands first?

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 — page 6 →

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

Separate Horizontal and Vertical Motion

An ideal projectile combines constant horizontal motion with downward-accelerated vertical motion. The two components share the same elapsed time.

$$a_x = 0; a_y = -g; \text{ one shared time } t.$$

EXAMPLE A ball launched horizontally travels equal horizontal distances in equal times while its vertical drops grow larger.

SENSEI NOTE Horizontal speed does not control how quickly an object falls when the vertical starting conditions are unchanged.

KEY CONCEPT 2

Read the Trajectory and the Apex

Velocity is tangent to the curved path. At the top only vertical velocity reaches zero; horizontal velocity remains and acceleration still points downward.

$$\text{At apex: } v_y = 0, v_x \neq 0 \text{ in general, } a_y = -g.$$

EXAMPLE A rising projectile has a forward/upward velocity arrow; at the apex it points forward; on descent it points forward/downward. Acceleration points down throughout.

SENSEI NOTE The apex is not a point of zero total velocity or zero acceleration.

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 — page 7 →

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**

Use vertical independence.

A ball is launched horizontally from a balcony while another is dropped from the same height. Which has the greater downward speed at impact?

PRACTICE 2**Independent Check**

Use vector directions at the top of the path.

At the apex of an angled projectile, state the directions of velocity and acceleration.

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 — page 8 →

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

Fall-Time Check

Focus only on vertical conditions.

If horizontal launch speed doubles from the same height, what happens to fall time?

CONFIDENCE CHECK 2

Apex Check

Identify the zero quantity.

At the top, which is zero: v_x , v_y , or acceleration?

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 — page 10 →](#)

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

Separate the Components

Horizontal and vertical motions follow different rules but occur over the same elapsed time.

KEY TAKEAWAY 2

Gravity Never Switches Off

At the apex, vertical velocity is zero only momentarily; acceleration remains downward.

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 — page 14 →](#)

ANSWER KEY • CHECK AFTER ATTEMPTING

Solutions and Explanations

Use these solutions to check your reasoning—not only your final answer. Use each answer and explanation to check both the setup and the physical interpretation.

WARM-UP • ACTIVITY 1

Key Ideas

Horizontal velocity stays constant; vertical velocity changes because of gravity.

WHY IT WORKS There is no horizontal acceleration in the ideal model, while vertical acceleration is constant and downward.

WARM-UP • ACTIVITY 2

Common Mistakes

No. It still has horizontal velocity, and gravity still accelerates it downward.

WHY IT WORKS Only vertical velocity is momentarily zero at the top.

WARM-UP • ACTIVITY 3

Quick Application

They land at the same time.

WHY IT WORKS Their vertical motions are identical and horizontal motion does not alter the fall time.

SOLUTIONS • GUIDED PRACTICE

PRACTICE 1

Guided Example

They have the same downward speed.

WHY IT WORKS Their vertical initial conditions, vertical displacement, and vertical acceleration are identical.

PRACTICE 2

Independent Check

Velocity is horizontal; acceleration is downward.

WHY IT WORKS The vertical velocity is momentarily zero, but gravity is still present.

SOLUTIONS • CONFIDENCE CHECK

CONFIDENCE CHECK 1

Fall-Time Check

It stays the same.

WHY IT WORKS The vertical motion is unchanged.

CONFIDENCE CHECK 2

Apex Check

Only v_y is zero.

WHY IT WORKS Horizontal motion continues and gravity remains downward.

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: return to Warm-Up Check on page 4.	🕒 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 →
--	--	--

RECOMMENDED LINKS

Review again: return to Warm-Up Check on page 4.

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