

FOCUSED REVIEW

Focused Review: Static Equilibrium and Stability

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...

reinforce the equilibrium conditions, apply torque and stability reasoning, and solve representative foundational problems with 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: MEC-U23
TOPIC: Static Equilibrium and Stability
COURSE LEVEL: Foundational

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**

Define static equilibrium, torque, center of mass, and base of support.

Define static equilibrium, torque, center of mass, and base of support.

WARM-UP 2**Common Mistakes**

Which statement is wrong? A) Zero net force alone guarantees static equilibrium. B) A low center of mass usually improves stability. C) A wider support base usually improves stability.

Which statement is wrong? A) Zero net force alone guarantees static equilibrium. B) A low center of mass usually improves stability. C) A wider support base usually improves stability.

FR-04 • WARM-UP CHECK CONTINUED

WARM-UP 3

Quick Application

A tall cabinet and a short cabinet have the same base width. Which is usually harder to tip, and why?

A tall cabinet and a short cabinet have the same base width. Which is usually harder to tip, and why?

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

Two Conditions for Static Equilibrium

An object is in static equilibrium only when its forces balance and its turning effects balance. These are separate requirements: one prevents sliding or accelerating, the other prevents rotation.

$$\Sigma F = 0 \quad \bullet \quad \Sigma \tau = 0$$

EXAMPLE A sign hanging motionless from two supports has balanced forces and balanced turning effects.

SENSEI NOTE Check both balance conditions; "not moving" is the result, not the calculation.

KEY CONCEPT 2

Stability and the Center of Mass

A stable object tends to return after a small displacement. A wider support base and lower center of mass usually improve stability. Tipping starts when the line of action of the weight moves beyond the support edge.

$$\Sigma F = 0 \quad \bullet \quad \Sigma \tau = 0$$

EXAMPLE A wide, low stool is generally more stable than a narrow, tall stool of similar mass.

SENSEI NOTE Think about the weight line relative to the support edge, not simply how heavy the object is.

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**

Solve the problem and show the equilibrium reasoning.

A 300 N person stands at the center of a light horizontal board supported equally at both ends. Find each upward support force.

PRACTICE 2**Independent Check**

Solve the problem and show the equilibrium reasoning.

A box is slowly tilted to the right. Describe the critical condition at which it is just about to tip.

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

Balanced or Not?

Decide whether the situation can be static equilibrium.

Two equal opposite horizontal forces act at different heights on a box.

CONFIDENCE CHECK 2

More Stable Design

Choose the better design.

For the same mass, which is more stable: A) narrow base, high center of mass or B) wide base, low center of mass?

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**Two balances are required**

Static equilibrium requires both zero net force and zero net turning effect.

KEY TAKEAWAY 2**Stability depends on geometry**

A wider base and lower center of mass generally make tipping less likely.

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. Focus on the method and the physical meaning of each result.

WARM-UP • ACTIVITY 1

Key Ideas

Static equilibrium: no linear or rotational acceleration. Torque: turning effect of a force. Center of mass: effective point where weight acts. Base of support: area bounded by contact points.

WHY IT WORKS The response uses the defining conditions for force, torque, and stability.

WARM-UP • ACTIVITY 2

Common Mistakes

A is wrong. Zero net force does not guarantee zero net turning effect.

WHY IT WORKS The response uses the defining conditions for force, torque, and stability.

WARM-UP • ACTIVITY 3

Quick Application

The short cabinet, because its center of mass is generally lower, so a larger tilt is needed before the weight acts beyond the support edge.

WHY IT WORKS Apply the relevant equilibrium or stability relationship directly.

SOLUTIONS • GUIDED PRACTICE

PRACTICE 1**Guided Example**

The two supports share the load equally, so each support force is 150 N.

WHY IT WORKS Use force balance, torque balance, or the stability criterion appropriate to the problem.

PRACTICE 2**Independent Check**

It is at the tipping threshold when the vertical line through the center of mass passes through the right edge of the support base.

WHY IT WORKS Use force balance, torque balance, or the stability criterion appropriate to the problem.

SOLUTIONS • CONFIDENCE CHECK

CONFIDENCE CHECK 1

Balanced or Not?

No. The net force may be zero, but the separated forces create a net turning effect.

WHY IT WORKS The classification follows directly from the equilibrium and stability conditions.

CONFIDENCE CHECK 2

More Stable Design

B. A wider base and lower center of mass increase the tilt needed before the weight line passes beyond the support edge.

WHY IT WORKS The classification follows directly from the equilibrium and stability conditions.

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