FOCUSED REVIEW

Focused Review: Rotational Motion — Foundational

15-minute foundational review of rotational motion, emphasizing concept-first reasoning about angular motion, torque, rotational energy, and angular momentum.

◷ TIME	◎ BEST FOR	✓ FINISH WITH
15 minutes	Focused Review	Greater confidence

After this review, you'll be able to…

explain angular motion, connect radius to tangential motion, reason about torque and rotational inertia, and recognize when angular momentum is conserved.

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 optional • Approximately 15 minutes

FR-02 • UNIT ALIGNMENT

Unit Alignment

This Physics Sensei Unit Review covers MEC-U08 — Rotational Motion using the Foundational treatment. Use it to reinforce the unit, prepare for homework, or review before a quiz or exam.

UNIT ID: MEC-U08 **UNIT: Rotational Motion** **TREATMENT: Foundational** **RESOURCE: Unit Review**	**BEST USED** ✓ After reading the chapter ✓ Before starting homework ✓ Before a quiz or exam

Explore Rotational Motion Online →

Physics Sensei Unit Reviews use independent organization, wording, examples, and explanations.

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 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

Radius and Tangential Speed

Compare two points on the same rotating disk.

Point B is twice as far from the axis as point A. If the disk rotates rigidly, compare angular speeds and tangential speeds.

WARM-UP 2

Torque Direction

Use the force line of action.

A force is applied directly through the rotation axis. What rotational effect does it have about that axis?

FR-04 • WARM-UP CHECK CONTINUED

WARM-UP 3

Rotational Inertia

Reason about mass distribution.

Two wheels have the same mass and radius. More of wheel 2's mass is near the rim. Which is harder to angularly accelerate?

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

Angular motion and radius dependence

All points of a rigid body share angular position, angular velocity, and angular acceleration. Linear quantities depend on radius: farther points move faster tangentially for the same ω.

$$v_t = r\omega;\ a_t = r\alpha;\ a_r = r\omega^2.$$

SENSEI NOTE Use radians when connecting angular and linear quantities.

KEY CONCEPT 2

Torque, inertia, energy, and angular momentum

Torque describes a force's rotational effectiveness about an axis. Moment of inertia describes resistance to angular acceleration. Rotational kinetic energy depends on I and ω; angular momentum changes only through external torque.

$$\Sigma\tau = I\alpha;\ K_{rot} = \tfrac{1}{2}I\omega^2;\ L = I\omega \text{ for fixed-axis rigid-body motion.}$$

SENSEI NOTE Always name the axis before comparing torque, I, or angular momentum.

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

Outer-Rim Speed

Work the problem and justify the model.

A disk rotates at 5 rad/s. Compare tangential speeds at 0.20 m and 0.40 m.

PRACTICE 2

Same Torque, Different Wheel

Work the problem and justify the model.

The same net torque acts on two wheels. Wheel B has twice the moment of inertia of wheel A. Compare angular accelerations.

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

Rigid-Body Motion

Answer without notes and justify the reasoning.

Do all points on a rigid rotating disk have the same tangential speed? Explain.

CONFIDENCE CHECK 2

Angular Momentum

Answer without notes and justify the reasoning.

When can total angular momentum be treated as conserved?

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

Angular and tangential are different

Rigid-body points share angular quantities; tangential quantities depend on radius.

KEY TAKEAWAY 2

Axis choice controls the model

Torque, moment of inertia, and angular momentum must all refer to the same axis or origin.

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

Radius and Tangential Speed

Same angular speed; B has twice the tangential speed.

WHY IT WORKS Same angular speed; B has twice the tangential speed.

WARM-UP • ACTIVITY 2

Torque Direction

Zero torque about that axis.

WHY IT WORKS Zero torque about that axis.

WARM-UP • ACTIVITY 3

Rotational Inertia

Wheel 2; it has larger rotational inertia.

WHY IT WORKS Wheel 2; it has larger rotational inertia.

SOLUTIONS • GUIDED PRACTICE

PRACTICE 1

Outer-Rim Speed

1.0 m/s and 2.0 m/s.

WHY IT WORKS The result follows from the rotational model identified in the activity.

PRACTICE 2

Same Torque, Different Wheel

Wheel B’s angular acceleration is half as large.

WHY IT WORKS The result follows from the rotational model identified in the activity.

SOLUTIONS • CONFIDENCE CHECK

CONFIDENCE CHECK 1

Rigid-Body Motion

No. They share ω, but $v_t = r\omega$ depends on radius.

WHY IT WORKS This checks the core rotational decision rather than a memorized keyword.

CONFIDENCE CHECK 2

Angular Momentum

When net external torque about the chosen origin or axis is zero or negligible.

WHY IT WORKS This checks the core rotational decision rather than a memorized keyword.

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	**I Need More Practice**	**I'm Ready**
Review the focused review again to strengthen the essential concepts.	Build confidence with additional practice problems.	Continue to the next topic or learning resource.
Review again: return to Warm-Up Check on page 4.	**Go to Practice →**	**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