

FOCUSED REVIEW

Focused Review — Work and the Work–Energy Theorem — Algebra-Based

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 [Work, Energy, and Power here →](#)

RESOURCE: Physics Sensei Topic Review
TOPIC ID: MEC-U06-T01
TOPIC: Work and the Work–Energy Theorem
PARENT UNIT: MEC-U06 — Work, Energy, and Power
COURSE LEVEL: Algebra-Based

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**

Answer before revealing the response.

Write the constant-force work relationship and identify the angle in it.

WARM-UP 2**Common Mistakes**

Answer before revealing the response.

What work is done by a force perpendicular to the displacement? Explain using cosine.

FR-04 • WARM-UP CHECK CONTINUED

WARM-UP 3

Quick Application

Answer before revealing the response.

A 30 N force acts 5 m in the direction of motion. Find the work.

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**Constant-Force Work**

For a constant force, work is the dot product of force and displacement. In magnitude form, the cosine of the angle between them determines how much of the force contributes along the displacement.

$$W = F d \cos \theta$$

EXAMPLE A 40 N force over 2 m at 60° does 40 J of work.

SENSEI NOTE Do not use sine unless the geometry has first been converted to the angle between force and displacement.

KEY CONCEPT 2**The Work–Energy Theorem**

The net work done by all forces equals the change in kinetic energy. This is often faster than solving for acceleration first when the question asks about speed or energy.

$$W_{net} = \Delta K$$

EXAMPLE If net work is +32 J, kinetic energy increases by 32 J.

SENSEI NOTE Use net work in the theorem: include all forces that do work.

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**

Resolve the work directly with the cosine factor.

A 60 N force pulls a box 8 m at 30° above the horizontal. Find the work done by the pulling force.

PRACTICE 2**Independent Check**

Use net work to update kinetic energy.

A 2.0 kg object starts at 4.0 m/s. The net work on it is +20 J. Find its final kinetic energy and final speed.

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**Angled Force**

Solve independently before checking the solution.

A 25 N force acts through 6 m at 90° . What work does it do?

CONFIDENCE CHECK 2**Final Speed from Work**

Solve independently before checking the solution.

A 1.0 kg object starts at 3.0 m/s and receives +8.0 J of net work. What is its final speed?

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**Use the Angle Between the Vectors**

For constant force, use the cosine of the angle between force and displacement to obtain the energy transfer.

KEY TAKEAWAY 2**Net Work Updates Kinetic Energy**

Set net work equal to the kinetic-energy change, then use kinetic energy to connect to speed when needed.

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

Key Ideas

$W = Fd \cos \theta$, where θ is the angle between force and displacement.

WHY IT WORKS The dot product reduces to magnitude times magnitude times cosine of the included angle.

WARM-UP • ACTIVITY 2

Common Mistakes

0 J because $\cos 90^\circ = 0$.

WHY IT WORKS Perpendicular force and displacement give zero dot product.

WARM-UP • ACTIVITY 3

Quick Application

150 J because the angle is 0° and $\cos 0^\circ = 1$.

WHY IT WORKS A parallel force contributes its full magnitude along the displacement.

SOLUTIONS • GUIDED PRACTICE

PRACTICE 1**Guided Example**

About 416 J: $(60 \text{ N})(8 \text{ m})\cos 30^\circ$.

WHY IT WORKS Only the component of the pulling force along the displacement does work.

PRACTICE 2**Independent Check**

Initial kinetic energy is 16 J; final kinetic energy is 36 J; final speed is 6.0 m/s.

WHY IT WORKS Net work changes kinetic energy; then kinetic energy gives speed.

SOLUTIONS • CONFIDENCE CHECK

CONFIDENCE CHECK 1

Angled Force

0 J. A perpendicular force has no component along the displacement.

WHY IT WORKS The cosine factor is zero at 90° .

CONFIDENCE CHECK 2

Final Speed from Work

5.0 m/s. The initial kinetic energy is 4.5 J; after +8.0 J it is 12.5 J.

WHY IT WORKS Use the theorem first, then solve the kinetic-energy expression for speed.

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