

FULL REVIEW

Full Review — Work and the Work–Energy Theorem — Foundational

Review the essential ideas, relationships, and problem-solving tools for Work and the Work–Energy Theorem.

 TIME 45–60 minutes	 BEST FOR A complete topic review	 FINISH WITH A readiness check
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After this full review, you'll be able to...

recall the essential ideas, apply them to representative problems, and determine what to study next.

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 45–60 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: 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 stages in order. Each stage builds on the previous one and prepares you for the final readiness check.

6 stages • Approximately 45–60 minutes

1 Warm-Up Check Activate prior knowledge.	2 Core Concepts Review the essential ideas.	3 Guided Practice Apply what you learned.
4 Confidence Check Confirm your understanding.	5 Summary Review the key ideas.	6 Next Step Continue your learning.

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 moment to see what you already remember. Do not worry about getting everything right. This is only a starting point.

ACTIVITY 1**Recall Activity 1**

Answer before revealing the response.

State the difference between positive and negative work in terms of energy transfer.

ACTIVITY 2**Recall Activity 2**

Answer before revealing the response.

Can a large force do zero work? Give one situation where this happens.

FR-04 • WARM-UP CHECK CONTINUED

ACTIVITY 3

Recall Activity 3

Answer before revealing the response.

A 25 N horizontal force moves an object 2 m forward. Find the work done by that force.

Ready to strengthen your understanding?

You've refreshed what you already know. Next, reinforce the essential concepts that will help you solve problems with confidence.

Continue to Core Concepts →

FR-05 • STAGE 2 OF 6

Core Concepts

Let's rebuild the key ideas one step at a time. Focus on understanding the relationships before worrying about solving problems.

KEY CONCEPT 1**Work as Energy Transfer**

A force does work when it acts through a displacement. The sign depends on whether the force component along the displacement points with or against the motion.

$$W = F d$$

EXAMPLE A 30 N forward push through 4 m does +120 J of work when force and displacement are parallel.

SENSEI NOTE Always compare force direction with displacement before assigning the sign.

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

The net work done by all forces equals the change in kinetic energy. This lets you connect the combined effect of forces directly to a change in motion.

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

EXAMPLE If net work is -18 J, kinetic energy decreases by 18 J.

SENSEI NOTE Add the work from all relevant forces before using the theorem.

FR-05 • CORE CONCEPTS CONTINUED

KEY CONCEPT 3

Kinetic Energy and Speed

Kinetic energy depends on mass and on the square of speed. Increasing speed therefore changes kinetic energy more rapidly than a simple one-to-one change.

$$K = \frac{1}{2} m v^2$$

EXAMPLE A 2 kg object moving at 3 m/s has 9 J of kinetic energy.

SENSEI NOTE Because speed is squared, doubling speed makes kinetic energy four times as large.

Ready to apply these ideas?

You've reinforced the essential concepts. Now put them into practice by working through guided examples and building your problem-solving confidence.

Continue to Guided Practice →

FR-06 • STAGE 3 OF 6

Guided Practice

Now it's time to apply what you've reviewed. Work through each activity in order. The examples become gradually more challenging, and each prepares you for the final readiness check.

PRACTICE 1**Worked Example**

Calculate the work done by one force and explain its sign.

A 18 N push moves a crate 6 m forward. Find the work done by the push.

FR-06 • GUIDED PRACTICE CONTINUED

PRACTICE 2

Guided Problem

Use net work to find the final kinetic energy.

A cart starts with 50 J of kinetic energy. The net work on it is +35 J. Find the final kinetic energy.

PRACTICE 3

Independent Problem

Use kinetic energy to connect mass and speed.

A 4 kg object moves at 5 m/s. Find its kinetic energy.

Ready to check your understanding?

You've practiced the essential skills with guidance. Now solve a few short problems on your own and confirm you're ready to move forward.

Continue to Confidence Check →

FR-07 • STAGE 4 OF 6

Confidence Check

You've rebuilt the key ideas and practiced them with guidance. Now try these short questions on your own to check your understanding before moving on.

QUICK CHECK 1**Work Sign**

Solve independently before checking the solution.

A force points opposite the displacement. What sign is the work done by that force?

QUICK CHECK 2**Work–Energy Update**

Solve independently before checking the solution.

An object begins with 70 J of kinetic energy and experiences -20 J of net work. What is its final kinetic energy?

FR-07 • CONFIDENCE CHECK CONTINUED

QUICK CHECK 3

Kinetic Energy

Solve independently before checking the solution.

What happens to kinetic energy if speed doubles while mass stays constant?

HOW DID IT GO?

I answered ____ of 3 questions correctly.

Use the Solutions section to check your reasoning, then take one final look at the essential ideas.

You've checked your understanding.

Take one final look at the essential ideas before deciding what to do next.

Continue to Summary →

FR-08 • STAGE 5 OF 6

Summary

Before moving on, take one final look at the most important ideas from this review.

KEY TAKEAWAY 1**Work Transfers Energy**

Work is energy transferred by a force acting through displacement; its sign depends on direction.

KEY TAKEAWAY 2**Net Work Changes Motion**

Net work equals the change in kinetic energy, providing a direct energy route from forces to motion.

KEY TAKEAWAY 3**Speed Matters Strongly**

Kinetic energy grows with the square of speed, so speed changes have a strong energy effect.

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

Recall Activity 1

Positive work adds energy; negative work removes energy from the object.

WHY IT WORKS The sign describes the direction of energy transfer.

WARM-UP • ACTIVITY 2

Recall Activity 2

Yes. For example, a force can be perpendicular to the displacement, or the object may not move.

WHY IT WORKS Work can be zero when there is no force component along the displacement.

WARM-UP • ACTIVITY 3

Recall Activity 3

50 J. The force and displacement are parallel, so work is 25×2 .

WHY IT WORKS For a parallel force, work equals force times displacement.

SOLUTIONS • GUIDED PRACTICE

PRACTICE 1**Worked Example**

108 J, positive. The push is parallel to the displacement.

WHY IT WORKS Parallel force and displacement produce positive work.

PRACTICE 2**Guided Problem**

85 J. Add the +35 J net work to the initial 50 J.

WHY IT WORKS The theorem says net work equals the kinetic-energy change.

PRACTICE 3**Independent Problem**

50 J. One-half times 4 kg times (5 m/s) squared gives 50 J.

WHY IT WORKS Kinetic energy is one-half mass times speed squared.

SOLUTIONS • CONFIDENCE CHECK

QUICK CHECK 1

Work Sign

Negative. The force opposes the displacement.

WHY IT WORKS Opposing force and displacement produce negative work.

QUICK CHECK 2

Work–Energy Update

50 J. The net work removes 20 J from the initial 70 J.

WHY IT WORKS Negative net work decreases kinetic energy by the same amount.

QUICK CHECK 3

Kinetic Energy

It becomes four times as large.

WHY IT WORKS Kinetic energy depends on the square of speed.

READINESS GUIDE

3 correct: You're ready to continue. • 2 correct: Review the missed idea, then continue. • 0–1 correct: Revisit Core Concepts or choose more practice.

FR-09 • STAGE 6 OF 6

Next Step: Continue Learning

Great work! You've completed this review. Choose the next resource that best matches how confident you feel.

 I'm Still Unsure Review the key ideas and examples again. Review Again →	 I Need More Practice Continue with additional practice for this topic. Go to Practice →	 I'm Ready Continue to the next recommended 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