FOCUSED REVIEW

Focused Review: Work, Energy, and Power

Review the most important ideas in Work, Energy, and Power, 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…

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 • TOPIC ALIGNMENT

Topic Alignment

This bundle is aligned to the approved Physics Sensei topic specification below. Use it to recover the topic structure, reinforce key decisions, and confirm readiness for the next study task.

ARCHITECTURE: Physics Sensei Independent Mechanics UNIT: MEC-U06 — Work, Energy, and Power TOPIC: Unit Review — Work, Energy, and Power PROFILE: Foundational	BEST USED ✓ Before homework on energy ideas ✓ Before a quiz or exam ✓ When you need to see where the energy goes

Review Prerequisites →

Physics Sensei is an independent educational resource designed to complement independently authored Physics Sensei materials. Physics Sensei content is independently authored and organized under the approved topic architecture.

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

Signs of work

Use direction to decide the energy effect.

A force acts partly along an object's displacement. What makes its work positive, negative, or zero?

WARM-UP 2

Energy forms

Identify where energy is stored.

Name the dominant energy form for a moving cart, a raised object, and a compressed spring.

FR-04 • WARM-UP CHECK CONTINUED

WARM-UP 3

Power

Separate rate from amount.

Two machines do the same work, but one finishes in half the time. Which has greater average power?

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

Energy accounting starts with the system

Choose the system, identify initial and final states, and inventory kinetic, gravitational potential, elastic potential, and thermal/internal energy. Then identify any energy transferred across the system boundary.

Work changes kinetic energy • Potential energy stores energy

EXAMPLE For a falling object and Earth treated as one system, gravity is internal and gravitational potential energy changes within the system.

SENSEI NOTE A clear system choice tells you whether a force appears as internal energy conversion or external work.

KEY CONCEPT 2

Mechanical energy is conserved only under the right conditions

When only conservative interactions redistribute energy inside the system, kinetic and potential energies trade off while their sum remains constant. Friction or external work requires broader energy accounting.

Mechanical energy: K + U • Power = energy transfer rate

EXAMPLE On a frictionless ramp, a decrease in gravitational potential energy appears as an equal increase in kinetic energy.

SENSEI NOTE "Energy conserved" never means every individual energy form stays constant.

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

Energy on a hill

Reason from energy changes without calculating acceleration.

A skateboarder starts from rest at the top of a frictionless hill. Describe the changes in gravitational potential energy and kinetic energy as the rider descends.

PRACTICE 2

Friction and energy

Explain where the mechanical energy goes.

A sliding block slows to rest on a rough horizontal floor. What happens to its kinetic energy and to the total energy of the larger block-floor system?

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

Perpendicular force

Decide whether the force transfers energy through work.

An ideal normal force is perpendicular to a cart's instantaneous displacement. Does that normal force do work on the cart?

CONFIDENCE CHECK 2

Power comparison

Compare rate of energy transfer.

Machine A and Machine B each do the same work. Machine A takes twice as long. Which machine has greater average power?

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

Track the energy story

Identify the system, the initial and final states, and the relevant forms of energy before writing equations.

KEY TAKEAWAY 2

Conservation needs conditions

Mechanical energy is conserved for appropriate conservative systems; friction or external work requires additional energy accounting.

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. Replace each placeholder with a concise answer and the essential explanation.

WARM-UP • ACTIVITY 1

Signs of work

Work is positive when the force has a component along the displacement, negative when opposite, and zero when perpendicular.

WHY IT WORKS Only the component parallel or antiparallel to displacement transfers mechanical energy through work.

WARM-UP • ACTIVITY 2

Energy forms

Moving cart: kinetic energy. Raised object: gravitational potential energy. Compressed spring: elastic potential energy.

WHY IT WORKS Each energy form describes a different physical state or interaction.

WARM-UP • ACTIVITY 3

Power

The machine that finishes in half the time has twice the average power.

WHY IT WORKS Average power is work divided by elapsed time, so the same work in less time means greater power.

SOLUTIONS • GUIDED PRACTICE

PRACTICE 1

Energy on a hill

Gravitational potential energy decreases and kinetic energy increases; total mechanical energy remains constant.

WHY IT WORKS With no friction, the loss of gravitational potential energy becomes kinetic energy.

PRACTICE 2

Friction and energy

The block's kinetic energy decreases to zero, while thermal/internal energy of the block-floor system increases. Total energy remains conserved.

WHY IT WORKS Friction transforms mechanical energy into thermal/internal energy rather than destroying it.

SOLUTIONS • CONFIDENCE CHECK

CONFIDENCE CHECK 1

Perpendicular force

No.

WHY IT WORKS A perpendicular force has no component along the displacement, so its work is zero.

CONFIDENCE CHECK 2

Power comparison

Machine B.

WHY IT WORKS For the same work, the shorter completion time gives the greater average power.

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