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	BEST FOR	FINISH WITH
15–20 minutes	Focused review	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: Algebra-Based	BEST USED ✓ Before algebra-based energy homework ✓ Before a quiz or exam ✓ When you need a fast equation-selection strategy

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

Constant-force work

Use the angle between force and displacement.

Write the constant-force work equation and identify when the work is zero.

WARM-UP 2

Mechanical-energy conservation

Recognize the frictionless model.

Write the initial-to-final equation used when only conservative interactions matter.

FR-04 • WARM-UP CHECK CONTINUED

WARM-UP 3

Power

Connect work and time.

Write the average-power equation and the force-speed form for parallel force and velocity.

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

Work changes kinetic energy

For a constant force, $W = Fd\cos\theta$. Sum the work of all forces to obtain net work, then use $W_{net} = \Delta K$.

$$W = Fd\cos\theta \quad \bullet \quad W_{net} = \Delta K$$

EXAMPLE A 50 N force acts 60° above the displacement for 8.0 m. Its work is (50)(8.0)cos60° = 200 J.

SENSEI NOTE Do not confuse the work of one force with net work.

KEY CONCEPT 2

Energy conservation connects states directly

Use $K_i + U_i = K_f + U_f$ when only conservative interactions redistribute mechanical energy. Include friction or external work explicitly when needed.

$$K + U = \text{constant} \quad \bullet \quad P = W/\Delta t$$

EXAMPLE A 2.0 kg object dropped 5.0 m from rest has $v = \sqrt{(2gh)} \approx 9.90$ m/s just before impact if air resistance is neglected.

SENSEI NOTE Choose the zero level for gravitational potential energy wherever it simplifies the algebra.

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

Work by an angled force

Resolve the force through the cosine factor.

A 50 N force acts 60° above the horizontal while an object moves 8.0 m horizontally. Find the work done by that force.

PRACTICE 2

Speed from energy conservation

Connect gravitational potential energy to kinetic energy.

A 2.0 kg object is released from rest 5.0 m above the ground. Neglect air resistance. Find its speed just before reaching the ground.

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

Spring energy

Use elastic potential energy.

A spring with k = 200 N/m is compressed 0.10 m. How much elastic potential energy is stored?

CONFIDENCE CHECK 2

Average power

Use work divided by time.

A motor does 900 J of work in 3.0 s. What is its 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

Match the model to the question

Use $W_{net} = \Delta K$ for net-work problems and conservation of mechanical energy for conservative initial-to-final problems.

KEY TAKEAWAY 2

Track signs and units

Work and energy are measured in joules; power is measured in watts, and the sign of work matters.

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

Constant-force work

$W = Fd \cos \theta$. The work is zero when $\theta = 90°$.

WHY IT WORKS Only the force component parallel to displacement contributes to work.

WARM-UP • ACTIVITY 2

Mechanical-energy conservation

$K_i + U_i = K_f + U_f$.

WHY IT WORKS Kinetic and potential energies may change individually while their sum remains constant.

WARM-UP • ACTIVITY 3

Power

$P_{avg} = W/\Delta t$ and $P = Fv$ for parallel force and velocity.

WHY IT WORKS Power measures the rate of energy transfer.

SOLUTIONS • GUIDED PRACTICE

PRACTICE 1

Work by an angled force

200 J.

WHY IT WORKS $W = Fd\cos\theta = (50\text{ N})(8.0\text{ m})\cos 60° = 200\text{ J}$.

PRACTICE 2

Speed from energy conservation

9.90 m/s.

WHY IT WORKS $mgh = \frac{1}{2}mv^2$, so $v = \sqrt{(2gh)} = \sqrt{(98.0)} = 9.90$ m/s.

SOLUTIONS • CONFIDENCE CHECK

CONFIDENCE CHECK 1

Spring energy

1.0 J.

WHY IT WORKS $U_s = \frac{1}{2}kx^2 = \frac{1}{2}(200)(0.10)^2 = 1.0$ J.

CONFIDENCE CHECK 2

Average power

300 W.

WHY IT WORKS $P_{avg} = W/\Delta t = 900/3.0 = 300$ W.

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