

Work Power And Energy Worksheet Answer Key PDF

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Part 1: Foundational Knowledge

What is the unit of work in the International System of Units (SI)?

undefined. Newton

undefined. Joule ✓

undefined. Watt

undefined. Pascal

The correct answer is Joules, which is the SI unit of work.

Which of the following are types of energy? (Select all that apply)

undefined. Kinetic Energy ✓

undefined. Thermal Energy ✓

undefined. Potential Energy ✓

undefined. Magnetic Energy

Kinetic Energy, Thermal Energy, and Potential Energy are all types of energy.

Define work in the context of physics and provide the formula used to calculate it.

Work is defined as the product of force and the distance moved in the direction of the force, calculated using the formula $W = F \times d$.

List the formulas for calculating kinetic energy and potential energy.

1. Kinetic Energy Formula

$KE = 1/2 mv^2$

2. Potential Energy Formula

PE = mgh

Kinetic energy is calculated using $KE = \frac{1}{2} mv^2$, and potential energy is calculated using $PE = mgh$.

What is the formula for power in terms of work and time?

undefined. Power = Force x Distance

undefined. Power = Work / Time ✓

undefined. Power = Mass x Acceleration

undefined. Power = Energy x Time

The correct formula for power is Power = Work / Time.

Part 2: comprehension

If a force is applied at an angle to the direction of motion, which trigonometric function is used in the work formula?

undefined. Sine

undefined. Cosine ✓

undefined. tangent

undefined. Secant

The cosine function is used in the work formula when a force is applied at an angle.

Which of the following statements about energy conservation are true? (Select all that apply)

undefined. Energy can be created or destroyed.

undefined. Energy can only be transformed from one form to another. ✓

undefined. The total energy in a closed system remains constant. ✓

undefined. Energy conservation applies only to mechanical systems.

Energy can only be transformed from one form to another, and the total energy in a closed system remains constant.

Explain the concept of mechanical advantage and provide an example of a simple machine that uses it.

Mechanical advantage is the ratio of output force to input force, and an example is a lever.

Part 3: Application

A 10 kg object is lifted to a height of 5 meters. What is the potential energy of the object? (Assume $g = 9.8 \text{ m/s}^2$)

undefined. 49 Joules

undefined. 98 Joules

undefined. 490 Joules ✓

undefined. 980 Joules

The potential energy is calculated as $PE = mgh$, resulting in 490 Joules.

Which of the following scenarios involve work being done? (Select all that apply)

undefined. Holding a book still in the air.

undefined. Pushing a box across the floor. ✓

undefined. Carrying a backpack up a hill. ✓

undefined. Standing still on a moving escalator.

Pushing a box across the floor and carrying a backpack up a hill involve work being done.

Calculate the power output if 200 Joules of work is done in 10 seconds.

Power is calculated as $Power = Work / Time$, resulting in 20 Watts.

Part 4: Analysis

Which factor does not affect the amount of work done on an object?

undefined. Force applied

undefined. Distance moved

undefined. Time taken ✓

undefined. Angle of force application

Time taken does not affect the amount of work done on an object.

Analyze the following situations and identify which involve kinetic energy transformation. (Select all that apply)

undefined. A car accelerating on a highway. ✓

undefined. A book resting on a table.

undefined. A pendulum swinging. ✓

undefined. A compressed spring.

A car accelerating on a highway and a pendulum swinging involve kinetic energy transformation.

Discuss how the efficiency of a machine is affected by friction and provide an example.

Friction reduces the efficiency of a machine by converting useful energy into heat, an example is a car engine.

Part 5: Evaluation and Creation

Which scenario best demonstrates the principle of energy conservation?

undefined. A light bulb converting electrical energy to light and heat. ✓

undefined. A battery losing charge over time.

undefined. A car engine running out of fuel.

undefined. A solar panel generating electricity only during the day.

A light bulb converting electrical energy to light and heat best demonstrates energy conservation.

Evaluate the following statements and select those that correctly describe energy transformations. (Select all that apply)

undefined. A wind turbine converts kinetic energy to electrical energy. ✓

undefined. A toaster converts electrical energy to thermal energy. ✓

undefined. A hydroelectric dam converts potential energy to kinetic energy. ✓

undefined. A flashlight converts chemical energy to light energy. ✓

A wind turbine converts kinetic energy to electrical energy, a toaster converts electrical energy to thermal energy, and a hydroelectric dam converts potential energy to kinetic energy.

Design a simple experiment to demonstrate the conversion of potential energy to kinetic energy, and describe the expected outcomes.

An example experiment is dropping a ball from a height to demonstrate potential energy converting to kinetic energy, expected outcome is the ball accelerating as it falls.