

Kinetic Potential Energy Worksheet Answer Key PDF

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Part 1: Building a Foundation

What is the formula for calculating kinetic energy?

undefined. A) $KE = mv^2$

undefined. A) $KE = 1/2 mv^2$ ✓

undefined. A) $KE = mgh$

undefined. A) $KE = mg$

The correct formula for calculating kinetic energy is $KE = 1/2 mv^2$.

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

undefined. A) Gravitational potential energy ✓

undefined. A) Elastic potential energy ✓

undefined. A) Thermal energy

undefined. A) Chemical energy ✓

Gravitational potential energy, elastic potential energy, and chemical energy are forms of potential energy.

Explain in your own words what is meant by the law of conservation of energy.

The law of conservation of energy states that energy cannot be created or destroyed, only transformed from one form to another.

List two factors that affect the kinetic energy of an object.

1. Factor 1

Mass

2. Factor 2

Velocity

The two factors that affect kinetic energy are mass and velocity.

What unit is used to measure energy in the International System of Units (SI)?

undefined. A) Newton

undefined. A) Joules ✓

undefined. A) Watt

undefined. A) Pascal

The unit used to measure energy in the SI system is the Joules.

Part 2: comprehension and Application

If a ball is held at a height of 10 meters, what type of energy is primarily associated with it?

undefined. A) Kinetic energy

undefined. A) Gravitational potential energy ✓

undefined. A) Elastic potential energy

undefined. A) Thermal energy

The type of energy primarily associated with the ball at a height of 10 meters is gravitational potential energy.

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

undefined. A) It increases with the square of the velocity. ✓

undefined. A) It is dependent on the mass of the object. ✓

undefined. A) It can be negative.

undefined. A) It is the energy of motion. ✓

The true statements about kinetic energy are that it increases with the square of the velocity, it is dependent on the mass of the object, and it is the energy of motion.

Describe how potential energy can be converted into kinetic energy using a real-world example.

Potential energy can be converted into kinetic energy, for example, when a roller coaster descends from a height, converting gravitational potential energy into kinetic energy.

A 2 kg object is moving at a velocity of 3 m/s. What is its kinetic energy?

undefined. A) 3 Joules

undefined. A) 6 Joules

undefined. A) 9 Joules ✓

undefined. A) 18 Joules

The kinetic energy of the object is 9 Joules.

A spring is compressed, storing 10 Joules of elastic potential energy. What happens to this energy when the spring is released? (Select all that apply)

undefined. A) It is converted into kinetic energy. ✓

undefined. A) It remains as potential energy.

undefined. A) It is lost as heat.

undefined. A) It is converted into sound energy. ✓

When the spring is released, the elastic potential energy is converted into kinetic energy and may also produce sound energy.

Calculate the gravitational potential energy of a 5 kg object located 4 meters above the ground. Assume $g = 9.8 \text{ m/s}^2$.

The gravitational potential energy is calculated as 196 Joules.

Part 3: Analysis, Evaluation, and Creation

Which scenario best illustrates the conversion of potential energy to kinetic energy?

undefined. A) A car accelerating on a flat road.

undefined. A) A pendulum swinging from its highest point to its lowest point. ✓

undefined. A) A book resting on a table.

undefined. A) A light bulb emitting light.

The scenario that best illustrates the conversion of potential energy to kinetic energy is a pendulum swinging from its highest point to its lowest point.

Analyze the following situations and identify which involve the conservation of mechanical energy. (Select all that apply)

undefined. **A) A satellite orbit in a vacuum. ✓**

undefined. A) A car braking to a stop.

undefined. **A) A roller coaster moving down a frictionless track. ✓**

undefined. **A) A pendulum swinging in a vacuum. ✓**

The situations that involve the conservation of mechanical energy are a satellite orbit in a vacuum, a roller coaster moving down a frictionless track, and a pendulum swinging in a vacuum.

Analyze how friction affects the total mechanical energy of a system, providing a specific example.

Friction reduces the total mechanical energy of a system by converting kinetic energy into thermal energy, for example, when a sliding object comes to a stop.

Which of the following best describes a system where energy is not conserved due to external forces?

undefined. A) A pendulum in a vacuum.

undefined. **A) A ball rolling down a hill with friction. ✓**

undefined. A) A satellite in space.

undefined. A) A swinging pendulum in a frictionless environment.

The scenario that best describes a system where energy is not conserved due to external forces is a ball rolling down a hill with friction.

Evaluate the following statements and identify which are correct regarding energy transformations. (Select all that apply)

undefined. A) Energy can be completely converted from one form to another without any loss.

undefined. **A) Energy transformations often result in some energy being converted to heat. ✓**

undefined. **A) Potential energy can be fully converted into kinetic energy in an ideal system. ✓**

undefined. A) Kinetic energy can be converted into potential energy without any external influence.

The correct statements regarding energy transformations are that energy transformations often result in some energy being converted to heat, and potential energy can be fully converted into kinetic energy in an ideal system.

Design an experiment to demonstrate the conversion of potential energy to kinetic energy, describing the materials needed and the procedure.

An experiment could involve dropping a ball from a height to demonstrate the conversion of gravitational potential energy to kinetic energy.