

AQA GCSE Physics Energy Calculations Worksheet | Kinetic, Potential & Elastic Energy

Question 1: The Speedy Squirrel

A squirrel with a mass of 0.5 kg leaps from a tree branch with a speed of 4 m/s.

- Calculate the kinetic energy of the squirrel as it falls.

Question 2: The Stretching Spring

A spring with a spring constant of 100 N/m is stretched by 0.2 meters.

- Calculate the elastic potential energy stored in the spring.

Question 3: The Climbing Cat

A cat with a mass of 4 kg climbs a tree to a height of 5 meters. (Assume gravitational field strength = 9.8 N/kg)

- Calculate the gravitational potential energy gained by the cat.

Question 4: The Rolling Ball

A ball rolls down a hill, converting gravitational potential energy into kinetic energy.¹ At the top of the hill, the ball has 20 J of gravitational potential energy. At the bottom of the hill, the ball has 15 J of kinetic energy.

- How much energy was lost due to friction?

Question 5: The Bouncing Ball

A bouncy ball with a mass of 0.1 kg is dropped from a height of 2 meters. (Assume gravitational field strength = 9.8 N/kg)

- Calculate the gravitational potential energy of the ball before it is dropped.
- Assuming no energy is lost, what is the kinetic energy of the ball just before it hits the ground?
- Assuming no energy is lost, what is the speed of the ball just before it hits the ground?

Question 6: The Sliding Child

A child with a mass of 30 kg slides down a frictionless slide that is 3 meters high. (Assume gravitational field strength = 9.8 N/kg)

- Calculate the gravitational potential energy of the child at the top of the slide.
- What is the kinetic energy of the child at the bottom of the slide?
- What is the speed of the child at the bottom of the slide?

Question 7: The Stretched Elastic Band

An elastic band with a spring constant of 50 N/m is stretched 0.1 meters.

- Calculate the elastic potential energy stored in the elastic band.

Question 8: The Falling Apple

An apple with a mass of 0.2 kg falls from a tree branch that is 2 meters high. (Assume gravitational field strength = 9.8 N/kg)

- Calculate the gravitational potential energy of the apple before it falls.
- What is the kinetic energy of the apple just before it hits the ground?
- What is the speed of the apple just before it hits the ground?

Question 9: The Pendulum Swing

A pendulum bob has a mass of 0.5 kg and is raised to a height of 0.1 meters. (Assume gravitational field strength = 9.8 N/kg)

- Calculate the gravitational potential energy of the pendulum bob at its highest point.
- What is the kinetic energy of the pendulum bob at its lowest point? (Assume no energy is lost.)
- What is the speed of the pendulum bob at its lowest point?

Question 10: The Compressed Spring

A spring with a spring constant of 200 N/m is compressed by 0.15 meters.

- Calculate the elastic potential energy stored in the spring.