AQA GCSE Physics Revision Guide

We have changed the entire specification into question and answers

Anything in red is for higher pupils only.

The specification is the bottom line of what needs to be revised so the document provides an ideal and full aid for your examination preparation.

Topic 1: Energy

What is a system?

A system is an object or a group of objects that are connected and interact with one another.

Describe the energy changes in

- an object projected upwards
- a moving object hitting an obstacle
- an object accelerated by a constant force
- a vehicle slowing down
- bringing water to a boil in an electric kettle.

Object projected upwards:

As an object is projected upwards, it gains potential energy due to its increased height. At the same time, its kinetic energy decreases as it slows down at the highest point of its trajectory. As the object falls back down, its potential energy is converted back to kinetic energy, which increases as the object accelerates downwards.

Moving object hitting an obstacle:

When a moving object hits an obstacle, its kinetic energy is transferred to the obstacle, causing it to deform or move. This results in a decrease in the object's kinetic energy, as well as an increase in the energy stored in the obstacle due to its deformation or movement.

Object accelerated by a constant force:

When an object is accelerated by a constant force, the force does work on the object and increases its kinetic energy. As the object gains speed, its potential energy may also increase if it gains height. The amount of work done on the object is equal to the change in kinetic energy.

Vehicle slowing down:

When a vehicle slows down, its kinetic energy is converted into other forms of energy, such as heat and sound, due to friction between the brakes and the wheels. As a result, the vehicle's kinetic energy decreases, while the

energy lost due to friction is transferred to the environment in the form of heat and sound.

Bringing water to a boil in an electric kettle:

When water is heated in an electric kettle, the electrical energy from the power source is converted into thermal energy in the water. This increases the temperature of the water and its internal energy, which is the sum of its kinetic and potential energy. When the water reaches boiling point, the additional energy is used to turn the water into steam.

Changes in energy

What is the equation used to calculate the kinetic energy of a moving object?

The equation used to calculate the kinetic energy of a moving object is $Ek = 0.5 \times m \times v^2$, where Ek is the kinetic energy in joules (J), m is the mass of the object in kilograms, and v is the speed of the object in metres per second.

What is the equation used to calculate the elastic potential energy stored in a stretched spring?

The equation used to calculate the elastic potential energy stored in a stretched spring is $Ee = 0.5 \times k \times e^2$, where Ee is the elastic potential energy in joules (J), k is the spring constant in newtons per metre, and e is the extension of the spring in metres.

How can the amount of gravitational potential energy gained by an object raised above ground level be calculated?

The amount of gravitational potential energy gained by an object raised above ground level can be calculated using the equation Ep = mgh, where Ep is the gravitational potential energy in joules (J), m is the mass of the object in kilograms, g is the gravitational field strength in newtons per kilogram (which is given), and h is the height above ground level in metres.

What is the unit of measurement for kinetic energy, elastic potential energy, and gravitational potential energy?

The unit of measurement for kinetic energy, elastic potential energy, and gravitational potential energy is the joule (J).

Energy changes in systems

What is the equation used to calculate the amount of energy stored in or released from a system as its temperature changes?

The equation used to calculate this is $\Delta E = m\ c\ \Delta\theta$, where ΔE is the change in thermal energy in joules (J), m is the mass of the system in kilograms, c is the specific heat capacity of the substance in joules per kilogram per degree Celsius (J/kg°C), and $\Delta\theta$ is the temperature change in degrees Celsius (°C).