



# AQA Physics Checklist - Entry Level

Video

Exam  
Q&A



## Topic 1. Energy

### Video: Energy changes in a system

- To understand the ways in which energy can be stored in a system and can be transferred from one energy store to another within a system
- To understand that energy transfers will occur when a system is changed by heating, the doing of work, or the flow of an electric current
- To be able to perform calculations involving changes in the kinetic energy, elastic potential energy, gravitational potential energy, and thermal energy of an object within a system

### Video: National and global energy resources

- Describe the main energy resources available for use on Earth
- Explain the difference between renewable and non-renewable energy resources
- Discuss the advantages and disadvantages of the main energy resources with reference to their use in transport, electricity generation and heating

## Topic 2. Electricity

### Video: Circuit Symbols

- To learn the common circuit symbols
- To know and understand the uses to which common components are put in an electric circuit

### Video: Introduction to Electricity

- Understand that an electric current is the flow of electric charge
- Learn and apply the equation linking charge, current and time ( $Q = I t$ )
- Understand the effect of increasing the potential difference across a component (in terms of energy transfer)
- Learn and apply the equation linking the potential difference (p.d.) across a component, the current flowing through it, and its resistance ( $V = IR$ )
- Use a circuit diagram to set up a circuit so that some of the factors which affect its resistance can be investigated

### Video: Domestic uses and safety

- Recall that mains electricity is an ac supply of electrical energy (which has a frequency of 50 Hz and an 'average' potential difference of 230 V in the UK)
- Explain the difference between direct and alternating potential difference (and current)
- Draw and interpret potential difference-time graphs for both dc and ac supplies
- Identify and explain the purpose of the live, neutral and earth wires in a three-core cable
- Explain the danger of providing an electrical connection between the live wire and earth
- Explain the operation of earth wires, fuses and double insulation

## Topic 3. Particle model of matter

### Video: Density

- Recall and apply the equation for the density of an object to solids, liquids and gases of fixed mass
- Explain how to measure the density of a solid or liquid

### Video: Solids, liquids and gases

- Use the particle model to explain the differences between solids, liquids and gases
- Explain the meaning of the term 'internal energy', and explain how the internal energy of a sample of a substance changes as changes from one state to another
- Recall and describe the various changes of state which can occur between the solid, liquid and gas states
- Explain the meaning of the term 'physical change'



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## Topic 4. Atomic structure

### Video: Radioactive Decay

- Describe what is meant by the term 'unstable nucleus' and explain the random nature of radioactive decay
- Explain the meaning of the term 'activity' as applied to a radioactive source
- Understand the meaning of the term 'count rate' and recall that the count rate from a source may be measured using a Geiger-Muller (GM) tube
- Recall that the radiation which is emitted from the nucleus in a nuclear decay event may take the form of an alpha particle, a beta particle, a gamma ray or a neutron
- Be aware of the nature of each of these types of nuclear radiation, describe their properties (including their penetration through materials, their range in air and their ionising power)
- Complete balanced nuclear equations to describe the processes of alpha, beta, gamma and neutron decay



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## Topic 5. Forces

### Video: Contact and non-contact forces

- Explain the effects which the action of one or more forces can have on an object
- Recall that force is a vector quantity, and use simple force diagrams to describe the effect which one or more forces will have on an object
- Understand the difference between contact and non-contact forces, and give examples of each

### Video: Gravity

- Explain the difference between the mass on an object (in kilograms) and its weight (in newtons)
- Describe the factors which affect the gravitational force exerted between any two massive objects (objects with mass)
- Recall and apply the equation for the weight of an object ( $W = mg$ )
- Explain the meaning of the term 'centre of mass'

### Video: Work done and energy transfer

- Understand that, when a force causes an object to move through a distance, work is done by the force
- Recognise that the work done by a force is equal to the amount of energy transferred by it
- Recall and apply the equation for the work done by a force on an object ( $W = F s$ )
- Understand that, when work is done against the frictional forces which are acting on an object, its temperature may rise

### Video: Distance and Displacement, Speed and Velocity

- Know that distance and speed are scalar quantities and displacement and velocity are vector quantities
- Perform simple calculations with regard to distances traveled and the displacement of an object from a given position
- Recall and apply the equation for the distance travelled by an object which is travelling at uniform speed ( $s = v t$ )
- Recall typical the speeds of walking, running, cycling, driving and a number of different common modes of transportation
- Calculate average speed for non-uniform motion
- (HT) Explain (with examples) how the motion of an object in a circular path can occur at uniform speed but with constantly changing velocity

### Video: Forces and braking

- Understand what is meant by the stopping, thinking and braking distances of a vehicle, and the relationship between each of these measurements
- Describe the factors which affect the reaction time of a driver
- Describe a simple method by which the reaction time of a person can be investigated
- Estimate how the distance over which a vehicle can stop in an emergency varies over a range of initial speeds of the vehicle
- Interpret graphs relating the speed at which a vehicle is travelling to its stopping distance for a range of vehicles, road conditions and driver
- Identify and explain the factors which affect the braking distance of a vehicle
- Explain that, when a force is applied to the brakes of a vehicle, work is done by the frictional force between its brake pads and the wheel, and that this reduces the kinetic energy of the vehicle and causes the temperature of the brakes to increase
- (HT) Estimate the typical forces involved with the deceleration of a vehicle based on given data



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## Topic 6. Waves

### Video: Transverse and longitudinal waves

- Describe what is meant by a wave
- Explain the difference between transverse and longitudinal waves
- Give examples of both transverse and longitudinal waves

### Video: Properties of waves

- Describe the meaning of the amplitude, wavelength, frequency and period of a wave, and measure any one of these quantities from a suitable wave diagram
- Recall and apply the wave equation which links the speed of a wave to its frequency and wavelength
- Apply the equation linking the period of a wave to its frequency
- Describe experimental methods for measuring the speed of sound waves in air, water waves in a ripple tank and waves on a vibrating string, and interpret data relating to each of these experiments
- Use wavefront diagrams to describe the motion of a wave
- Understand and apply the concept that the wavelength of a wave is proportional to its speed, but that its frequency remains constant when it travels from one medium into another

### Video: Electromagnetic waves 1

- Describe the electromagnetic (EM) spectrum, and recall the order of the main types of EM waves (from the shortest to the longest wavelength)
- Recall the properties which all EM waves have in common
- Explain what is meant by the reflection and refraction of an EM wave
- Draw and interpret ray diagrams to describe the reflection and refraction of an EM wave
- (HT) Explain how the colour of an object depends on the fact that EM waves which strike its surface will be transmitted, absorbed and reflected by different amounts when they strike its surface
- Describe and explain the results of an experiment in which the reflection of light from a plane mirror is investigated
- Describe and explain the results of an experiment in which the refraction of light as it travels from one medium to another is investigated
- (HT) Use wavefront diagrams to describe motion of an EM wave from one medium into another

### Video: Electromagnetic waves 2

- Describe the uses and hazards of each of the seven main types of electromagnetic (EM) waves
- (HT) Explain why the properties of EM waves from a given part of the EM spectrum mean that it is suitable for particular applications
- Understand the meaning of the term 'ionising radiation' and interpret dose data related to the extent to which gamma rays, x-rays and short-wavelength ultraviolet waves can lead to the damaging ionisation of the atoms that make up cells within the body
- (HT) Explain the production, transmission and receiving of radio waves using radio antennae
- Know how to perform and interpret the results of an experiment in which the factors that affect the amount of infrared radiation absorbed or radiated (emitted) by a surface is investigated

## Topic 7. Magnetism and electromagnetism

### Video: Magnetism

- Describe the attractive and repulsive forces between the poles of two magnets which are brought close to one another
- Explain the difference between permanent and induced magnets
- Describe a test to check whether a magnet is permanent or induced
- Describe how to determine the magnetic field pattern around a bar magnet using a plotting compass
- Sketch the magnetic field pattern around a bar magnet
- Describe the behaviour of a navigational compass which is placed into a given point in the magnetic field of the Earth