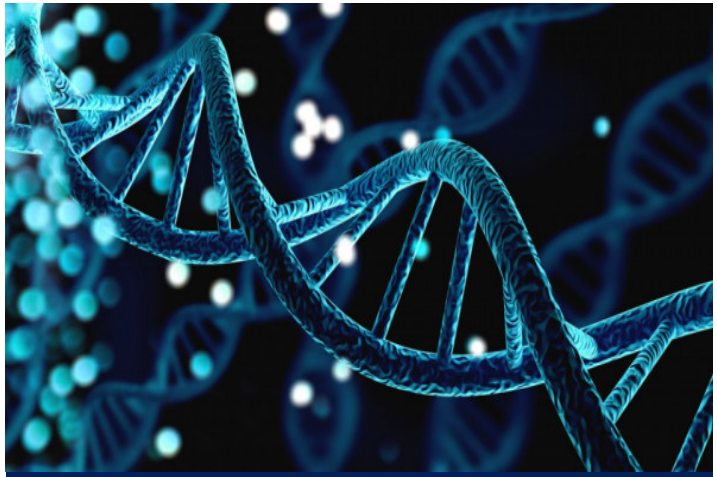
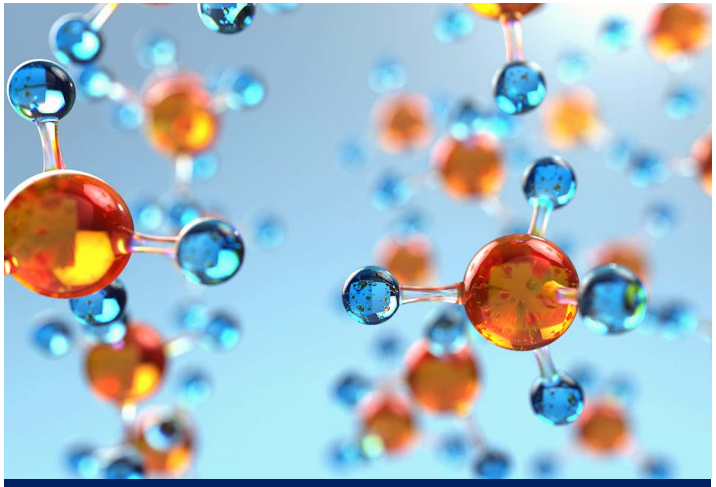
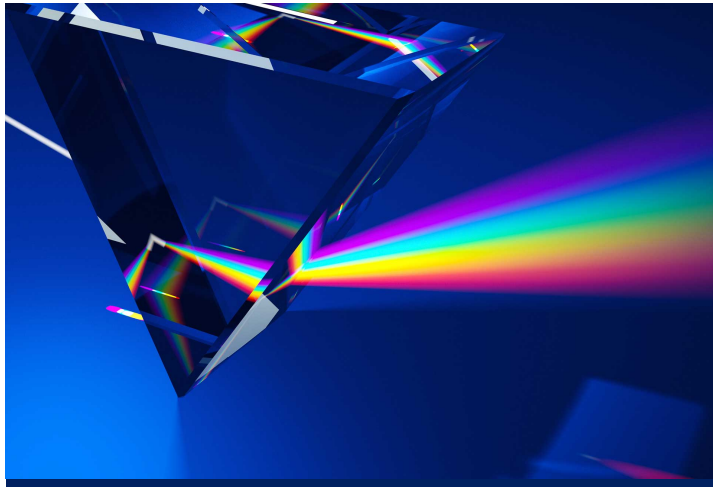
Hessle High School

Science Department







Physics Combined Foundation

This document will help you work with students to assess their understanding of the science curriculum for their exam. The students have their personal learning checklist from their mock exams. They need to revise these topics, then they can use these questions to test their understanding.

Paper 2

Question	Answer	Topic
What is a scalar quantity?	It has magnitude (size) only. For example: time, voltage, energy.	P8.1 Vectors and scalars
What is a vector quantity?	It has a magnitude and a direction. For example: velocity, force, displacement.	P8.1 Vectors and scalars
We represent vectors with arrows. What do the length and direction of the arrow show?	The length represents the magnitude, and the direction shows the direction of the vector.	P8.1 Vectors and scalars
what is the difference between a vector quantity and a scalar quantity?	A vector quantity has both magnitude and direction whereas scalar only has magnitude	P8.1 Vectors and scalars
why is force a vector quantity?	Force is a vector because it has both magnitude and direction	P8.1 Vectors and scalars
Give examples of a vector	Force, velocity, acceleration, momentum, gravitational field strength, displacement	P8.1 Vectors and scalars
Give examples of a scalar quantity	time, distance, speed, mass	P8.1 Vectors and scalars
what is thrust?	a force that pushes something forwards	P8.2 Forces between objects
wat is air resistance/drag/friction?	a force that holds an object back and goes in the opposite direction to movement	P8.2 Forces between objects
what is newton's third law?	every action has an equal and opposite reaction.	P8.2 Forces between objects
what is the difference between a contact force and a non-contact force?	A contact force is between a pair of objects that are physically touching and in non-contact forces they are not touching	P8.2 Forces between objects
give examples of contact forces	friction, air resistance and tension	P8.2 Forces between objects
give examples of non-contact forces	gravitational force, magnetic force and electromagnetic force	P8.2 Forces between objects
What is a resultant force?	A number of forces acting on an object may be replaced by a single force that has the same effect as all the original forces acting together	P8.3 Resultant forces
What instrument do we use to measure weight?	A newton meter (a calibrated spring-balance)	P8.3 Resultant forces
Describe the movement of an object if the resultant force is zero	Object stays at rest or at same speed / direction	P8.3 Resultant forces
Describe the movement of an object if the resultant force is greater than zero	Object changes speed or direction	P8.3 Resultant forces

If the resultant force is greater than zero are the forces balance or unbalance?	Unbalanced	P8.3 Resultant forces
what is the centre of mass?	The position on an object where its mass is concentrated	P8.6 Centre of mass
How can we reduce the chance of an object falling over?	A low centre of mass and a wide base	P8.6 Centre of mass
how can we find the centre of mass of a symmetrical object?	Draw the lines of symmetry and where they overlap is the centre of mass	P8.6 Centre of mass
What is distance?	Distance is a scalar quantity that describes how far an object moves.	P9.1 Speed and distance–time graphs
What is displacement?	distance an object moves (straight line from start to finish) and the direction (vector)	P9.1 Speed and distance–time graphs
What is the typical walking speed?	1.5 m/s	P9.1 Speed and distance–time graphs
What is the typical running speed?	3 m/s	P9.1 Speed and distance–time graphs
What is the word equation for calculating speed?	speed = distance / time	P9.1 Speed and distance–time graphs
How can speed be calculated from a distance-time graph?	The gradient	P9.1 Speed and distance–time graphs
How is velocity different from speed?	Velocity is speed in a given direction.	P9.2 Velocity and acceleration
What is the word equation for acceleration?	acceleration = change in velocity / time	P9.2 Velocity and acceleration
What are the units of acceleration?	m/s2	P9.2 Velocity and acceleration
what is velocity?	the speed something is travelling in a certain direction	P9.2 Velocity and acceleration
What piece of equipment can be used to measure distance?	Ruler, trundle-wheel	P9.1 Speed and distance–time graphs
What piece of equipment can be used to measure time?	Stopwatch, light gates	P9.1 Speed and distance–time graphs
what is acceleration?	the change in an object's velocity per second	P9.4 Analysing motion graphs
how do you calculate acceleration m/s2?	Change in velocity (m/s) / time taken	P9.4 Analysing motion graphs
What is the word equation for uniform acceleration?	final velocity2 - initial velocity2 = 2 x acceleration x distance	P9.4 Analysing motion graphs
State Newton's First Law:	An object at rest will remain at rest and a moving object will continue moving at constant velocity as long as no resultant force acts on the object.	P10.1 Force and acceleration
What is needed for velocity of an object to change?	An unbalanced/resultant force	P10.1 Force and acceleration
State Newton's Second Law:	The acceleration of an object is proportional to the resultant force acting on the object, and inversely proportional to the mass of the object	P10.1 Force and acceleration

What is the word equation for Newton's Second Law?	force = mass x acceleration	P10.1 Force and acceleration
why are formula 1 cars designed to be so light?	F =ma . The lighter the car the less force is needed to achieve the greatest acceleration and therefore the greatest speed	P10.1 Force and acceleration
What is the word equation that links resultant force (f), mass (m) and acceleration (a)	Resultant = mass x acceleration	P10.1 Force and acceleration
how do we calculate weight?	weight (N) = mass (kg) x gravitational field strength (N/kg)	P10.2 Weight and terminal velocity
what is the gravitational field strength on earth	10N/kg	P10.2 Weight and terminal velocity
what is the acceleration of free fall?	how fast a falling object accelerates due to gravity	P10.2 Weight and terminal velocity
what value does acceleration of free fall have?	10m/s2	P10.2 Weight and terminal velocity
what is the difference between mass and weight?	mass is the amount of matter of an object. Weight is a force caused by gravitational field strength.	P10.2 Weight and terminal velocity
what forces act on a falling object	Weight is the force that acts downwards on a falling object due to gravity. Air resistance is the force that resists downwards movement	P10.2 Weight and terminal velocity
describe fully the forces acting on a falling apple and the effect that has on its motion	1. air resistance -forces are unbalanced = acceleration. 2. weight stays the same, but air resistance increases until = forces are balanced.3. steady speed because the resultant force is zero	P10.2 Weight and terminal velocity
what happens to the size of the air resistance force as speed increases?	As speed increases this causes force of air resistance to increase until terminal velocity reached.	P10.2 Weight and terminal velocity
What is terminal velocity?	An object falling through a fluid initially accelerates due to the force of gravity. Eventually the resultant force will be zero and the object will move at its terminal velocity.	P10.2 Weight and terminal velocity
What is the stopping distance of a vehicle?	driver's reaction time (thinking distance) + distance it travels under the braking force (braking distance).	P10.3 Forces and braking
How does stopping distance change with speed of the vehicle?	The greater the speed of the vehicle, the greater the stopping distance.	P10.3 Forces and braking
What is a typical human reaction time?	0.2 - 0.9 s	P10.3 Forces and braking
What can affect a driver's reaction time?	Tiredness, drugs and alcohol. Distractions may also affect a driver's ability to react.	P10.3 Forces and braking
What physical changes to the vehicle happen when brakes are applied?	Work done by the friction force (brakes + wheel) temperature of the brakes increases.	P10.3 Forces and braking
what two factors make up stopping distance?	Thinking distance and braking distance	P10.3 Forces and braking
what is thinking distance?	how far you travel between detecting the hazard and hitting the brakes	P10.3 Forces and braking

what is braking distance?	How far you travel after applying the brakes	P10.3 Forces and braking
what factors affect braking distance?	Speed, the road conditions and the mass of the vehicle	P10.3 Forces and braking
what is the extension of a spring?	the difference between the original length of the spring and its length when being stretched	P10.8 Forces and elasticity
what does elastically deformed mean?	when an object returns to its original length after being extended and the force has been removed	P10.8 Forces and elasticity
what does inelastically deformed mean?	When an object does not return to its original shape after the force has been removed	P10.8 Forces and elasticity
Why are some objects described as plastic?	Because they can be inelastically deformed	P10.8 Forces and elasticity
what is Hooke's law?	The extension of a spring is directly proportional to the force applied, as long as the limit of proportionality is not exceeded	P10.8 Forces and elasticity
what is Hooke's law formula?	Force applied (N) = spring constant (N/m) x distance (m)	P10.8 Forces and elasticity
how do you calculate elastic potential energy?	0.5 x spring constant x extension2	P10.8 Forces and elasticity
What is Hooke's Law?	The extension of an elastic object, such as a spring, is directly proportional to the force applied, provided that the limit of proportionality is not exceeded.	P10.8 Forces and elasticity
What is the word equation for Hooke's Law?	force = spring constant x extension	P10.8 Forces and elasticity
What are the units of spring constant?	N/m	P10.8 Forces and elasticity
How can we apply the equation to compression of an elastic object?	The relationship is the same, where "e" is in compression of the object.	P10.8 Forces and elasticity
What is elastic potential energy related to?	A force that stretches (or compresses) a spring does work and elastic potential energy is stored in the spring.	P10.8 Forces and elasticity
When work is done to stretch a spring, how much elastic potential energy is stored?	Provided that the spring is not inelastically deformed, the work done on the spring and the elastic potential energy stored are equal.	P10.8 Forces and elasticity
What is the word equation for elastic potential energy?	elastic potential energy = 0.5 x spring constant x extension2	P10.8 Forces and elasticity
How can the spring constant be extracted from this graph?	The spring constant is equal to the gradient of the graph.	P10.8 Forces and elasticity
How can the elastic potential energy be extracted from this graph?	The area under the graph.	P10.8 Forces and elasticity
In the required practical related to Hooke's Law, why should the extension of the spring be 0 m when no force is applied?	With no force applied, the spring is unstretched so has no extension. Any other value would be a measurement of length, not extension.	P10.8 Forces and elasticity
What are the two types of waves?	Longitudinal and transverse.	P12.1 The nature of waves
Describe a transverse wave.	Oscillations are at right angles to the direction of energy travel.	P12.1 The nature of waves
What is an example of a transverse wave?	Water and electromagnetic waves.	P12.1 The nature of waves

What is the amplitude of a wave?	The maximum height of the wave from the centre line.	P12.1 The nature of waves
What is the wavelength of a wave?	The distance from one point on a wave to the same point on the next wave. E.g. peak to peak or trough to trough.	P12.1 The nature of waves
What is the unit of wavelength?	Metres	P12.1 The nature of waves
Describe a longitudinal wave.	Oscillations are along the same direction as the direction of travel.	P12.1 The nature of waves
What is an example of a longitudinal wave?	Sound	P12.1 The nature of waves
What is an area of compression on a longitudinal wave?	Where the waves are close together.	P12.1 The nature of waves
What is an area of rarefaction on a longitudinal wave?	Where the waves are far apart.	P12.1 The nature of waves
What is the frequency of a wave?	The number of waves per second.	P12.2 The properties of waves
What is the unit of frequency?	Hertz (Hz)	P12.2 The properties of waves
What is the equation for wave speed?	Wave speed = frequency x wavelength	P12.2 The properties of waves
what do all waves transfer?	energy	P12.4 More about waves
Through what state does sound travel the fastest?	Solid	P12.4 More about waves
Why can't you hear a scream in space	Sound needs a medium to travel	P12.4 More about waves
In the waves on a string practical - what would happen to the wavelength as you increase the frequency?	Length decreases	P12.4 More about waves
What type of waves are electromagnetic waves?	Transverse	P13.1 The electromagnetic spectrum
List the electromagnetic waves in order of increasing frequency	Radio waves, microwaves, infrared, visible light, ultraviolet, x-rays, gamma rays	P13.1 The electromagnetic spectrum
Electromagnetic waves transfer energy from a _____ to an _____	Source Absorber	P13.1 The electromagnetic spectrum
What part of the electromagnetic spectrum has the shortest wavelength	Gramma waves	P13.1 The electromagnetic spectrum
What part of the electromagnetic spectrum do our eyes detect?	Our eyes only detect visible light.	P13.1 The electromagnetic spectrum
What speed do all electromagnetic waves travel at?	3.0x10^8 m/s	P13.1 The electromagnetic spectrum
What is the equation that links Frequency wavelength and speed	wave speed = frequency x wavelength	P13.1 The electromagnetic spectrum
What is the speed of electromagnetic radiation?	300 000 000 m/s	P13.1 The electromagnetic spectrum
What is the EM radiation with the longest wavelength?	Radio	P13.1 The electromagnetic spectrum

What is the EM radiation with the highest frequency?	Gamma	P13.1 The electromagnetic spectrum
What is the EM radiation with the lowest frequency?	Radio	P13.1 The electromagnetic spectrum
List the EM spectrum from long to short wavelength.	Radio, microwave, infrared, visible, UV, X-rays, gamma	P13.1 The electromagnetic spectrum
Can EM waves travel through space?	yes	P13.1 The electromagnetic spectrum
White light contains all the colours of the spectrum? T/F	TRUE	P13.2 Light, infrared, microwaves, and radio waves
What part of the EM spectrum is used for fibre optic communications?	Visible light	P13.2 Light, infrared, microwaves, and radio waves
Name an example of a use of Infrared radiation?	Electrical heaters, cooking food, infrared cameras	P13.2 Light, infrared, microwaves, and radio waves
Why are microwaves used for satellite TV?	Microwaves pass through the ionosphere to reach stellates	P13.2 Light, infrared, microwaves, and radio waves
Which EM wave do all objects emit and absorb?	Infrared radiation. The hotter the object the more radiation it emits.	P13.2 Light, infrared, microwaves, and radio waves
What are carrier waves?	Waves used to carry a signal	P13.3 Communications
What are the uses of microwaves?	satellite communications, cooking food	P13.3 Communications
what are produced by oscillations in electrical circuits.	Radio waves	P13.3 Communications
Mobile phones use what type of EM wave?	Radio waves	P13.3 Communications
Which radiation is used in sun tanning?	UV	P13.4 Ultraviolet waves, X-rays, and gamma rays
Give one use of X-rays.	Medical imaging	P13.4 Ultraviolet waves, X-rays, and gamma rays
Give one use of gamma rays	Medical treatments	P13.4 Ultraviolet waves, X-rays, and gamma rays
Why are X-rays good for taking images of bone?	absorbed by bone but transmitted through soft tissue	P13.4 Ultraviolet waves, X-rays, and gamma rays
Why are gamma rays used in medical treatment?	Can kill cancer cells	P13.4 Ultraviolet waves, X-rays, and gamma rays
What are the risks of exposure to UV radiation?	Premature skin aging, increased risk of skin cancer	P13.4 Ultraviolet waves, X-rays, and gamma rays
What are the risks of exposure to gamma rays?	Gamma rays are ionising so can cause mutations which may result in cancer	P13.4 Ultraviolet waves, X-rays, and gamma rays

What factors effect whether an EM wave will damage the body?	The type of EM wave and the dosage.	P13.4 Ultraviolet waves, X-rays, and gamma rays
Which EM waves can have hazardous effects on the human body?	Gamma, x-ray, ultraviolet.	P13.4 Ultraviolet waves, X-rays, and gamma rays
What damage can x-ray, and gamma waves have to the body?	They can ionise atoms causing mutations of genes which could lead to cancer.	P13.4 Ultraviolet waves, X-rays, and gamma rays
When will two magnets attract?	When the poles are opposite.	P15.1 Magnetic fields
When will two magnets repel?	When the poles are the same.	P15.1 Magnetic fields
What is a permanent magnet?	A magnet that produces its own magnetic field.	P15.1 Magnetic fields
What is an induced magnet?	A magnetic material that is only a magnet when placed in a magnetic field.	P15.1 Magnetic fields
What materials are magnetic?	Iron, nickel, cobalt and steel.	P15.1 Magnetic fields
Do induced magnets attract, repel or both?	Attract only.	P15.1 Magnetic fields
What is a magnetic field?	The area around a magnet where it can act on another magnet or magnetic material.	P15.1 Magnetic fields
Where is a magnet the strongest? Why?	At the poles as this is where the field lines are concentrated.	P15.1 Magnetic fields
How does a compass work?	The needle is a permanent magnet so points towards the magnetic South pole (near the geographical North pole).	P15.1 Magnetic fields
What factors affect the strength of a magnetic field around a wire?	The current and the distance from the wire.	P15.2 Magnetic fields of electric currents
How can you determine the direction of a magnetic field around a wire?	Using the right-hand rule- thumb pointing towards the negative terminal of the battery. Curl hand around the wire- this is the direction of the field from North to South.	P15.2 Magnetic fields of electric currents
What is a solenoid?	Conductive wire that has been coiled.	P15.2 Magnetic fields of electric currents
Which will have a stronger magnetic field- a wire or a solenoid?	A solenoid.	P15.2 Magnetic fields of electric currents
Describe the magnetic field inside a solenoid.	Strong and uniform.	P15.2 Magnetic fields of electric currents
Describe the magnetic field around a solenoid.	Shaped like the magnetic field around a bar magnet.	P15.2 Magnetic fields of electric currents
What is an electromagnet?	A solenoid with an iron core.	P15.2 Magnetic fields of electric currents
Which will have a stronger magnetic field- an electromagnet or a solenoid?	An electromagnet.	P15.2 Magnetic fields of electric currents
What type of magnet is an electromagnet? Why?	Induced as it will not keep its magnetic field once the current is removed.	P15.2 Magnetic fields of electric currents