Curriculum Plans: Year 10 Physics (separate)

Topic	Knowledge: By the end of the unit students will know:	Skills: What skills will students have developed by the end of this unit?	Key terms: What new key terms and vocabulary will be learnt in this unit?	Summative Assessment: How will pupils be assessed in this unit?
Forces 1	**Forces 1: Forces in balance** **Write down what displacement is.** **Write down what a vector quantity is.** **Write down what a scalar quantity is.** **Describe how to represent a vector quantity.** **Write down what forces can do.** **Write down the unit of force.** **Write down what a contact force is.** **Describe the forces being exerted when two objects interact.** **Describe what a resultant force is.** **Describe what happens if the resultant force on an object is zero.** **Describe what happens if the resultant force on an object is greater than zero.** **Calculate the resultant force when an object is acted by two**	I can interpret a scale diagram to determine the magnitude and direction of a vector. I can translate between vector descriptions and vector diagrams and vice versa using a range of appropriate scales. I can use a scale diagram to add two or more vectors. I can use appropriate SI prefixes and standard form to describe a wide range of forces. I can explain the pairs of forces acting in a wide range of unfamiliar scenarios, including the nature (contact or non-contact), direction, and magnitude of the forces. I can evaluate force measurement techniques in terms of precision and accuracy. I can draw a scaled free-body force diagram showing forces as vectors	**Displacement: distance in a given direction.** **Force: a force (in newtons, N) can change the motion of an object.** **Friction: the force opposing the relative motion of two solid surfaces in contact.** **Load: the weight of an object raised by a device used to lift the object, or the force applied by a device when it is used to shift an object.** **Magnitude: the size or amount of a physical quantity.** **Moment: the turning effect of a force.** **Newton's first law of motion: if the resultant force on an object is zero, the object stays at rest if**	Homework and Independent Study HW: Assessed past-paper questions. Kerboodle / Seneca online task(s). Revision: For topic test at end of the topic (PP-style questions, ~40 mins) IS: Textbook spread questions on each topic, to self-assess. Use of online resources including BBC Bitesize, physicandmathstutor.com, Seneca Learning and Kerboodle textbook. Especially check the "Appendices". YouTube channels – Free Science Lessons, Primrose Kitten. S & C: ZigZag AQA GCSE Stretch and Challenge Packs on Teams / SharePoint. BBC Science and Tech news sections (https://www.bbc.co.uk/news, independent research). End of topic test

	forces acting along the same line. **State what a free-body force diagram is.** **State what the moment of a force measures.** **Calculate the moment of a force.** **Describe how the moment of a force can be increased.** **Describe why levers are force multipliers.** **Describe how levers act as force multipliers.** **Explain how you can tell if a lever is a force multiplier.** **Describe what gears do.** **Explain how gears can give a bigger turning effect.** **State what the centre of mass of an object is.** **State where the centre of mass of a metre ruler is.** **Find the centre of mass of an object suspended from a fixed point.** **Find the centre of mass of a symmetrical object.** **Use your knowledge of forces and moments to explain why objects**	and find the resultant force vector. I can calculate resultant forces from several forces acting in coplanar directions using a range of SI prefixes. I can create a detailed plan to investigate the factors that affect the acceleration of objects acted on by non-zero resultant force. I can explain why a force multiplier requires the effort force to move through a larger distance than the load. I can apply the equation for a moment in a range of novel contexts including rearrangement and changes to and from base units. I can evaluate in detail the accuracy and precision of a set of data based on comparison of measurements and a 'true value'. I can describe the action of gears relating changes in the size of forces to the speed of rotation and the number of teeth in the gear. I can analyse systems of gears of different ratios. I can evaluate the results of a gear experiment, explaining any discrepancies in terms of	**it is stationary, or it keeps moving with the same speed in the same direction.** **Newton's third law: when two objects interact with each other, they exert equal and opposite forces on each other.** **Parallelogram of forces: a geometrical method used to find the resultant of two forces that do that do not act along the same line.** **Principle of moments: for an object in equilibrium, the sum of all the clockwise moments about any point = the sum of all the anti-clockwise moments about that point.** **Resultant force: a single force that has the same effect as all the forces acting on the object.** **Scalars: a physical quantity, such as**	

	at rest don't turn. **Identify the forces that can turn an object about a fixed point.** **Identify whether a turning force that can turn an object turns it clockwise or anticlockwise.** **Calculate the size of a force (or its perpendicular distance from a pivot) acting on an object that is balanced.** **State what a parallelogram of forces is.** **State what a parallelogram of forces is used for.** **Write down what is needed to draw a scale diagram of a parallelogram of forces.** **Use a parallelogram of forces to find the resultant of two forces.** **Describe what resolving a force means.** **Describe how to resolve a force into two components.** **Define equilibrium.** **Explain why an object at rest is in equilibrium.**	the uncontrolled forces acting on the system. I can evaluate an experimental technique to determine the centre of mass of an object, identifying the likely sources of error leading to inaccuracy. I can apply understanding of the particle model and moments to explain why objects have a point at which the mass seems to act. I can plan a detailed investigation into the stability of three-dimensional objects. I can use calculations to determine if an object with three or more moments is in equilibrium. I can describe the application of moments in balance (equilibrium) in a range of contexts. I can evaluate an experiment to determine the weight of objects in terms of accuracy and precision. I can find the resultant of two forces at an obtuse angle by drawing a scale diagram. I can investigate non-parallel forces acting on a system in equilibrium to verify the parallelogram of forces. I can analyse a wide range of systems of non-parallel forces	**mass or energy that has magnitude only (unlike a vector which has magnitude and direction).** **Vector: a vector is a physical, such as displacement or velocity that has a magnitude and a direction (unlike a scalar which has magnitude only).**	

Curriculum Plans: Year 10 Physics (separate)

		using a parallelogram technique.		
Forces 2	Calculate speed for an object moving at constant speed. Use a distance-time graph to determine whether an object is stationary or moving at constant speed. State what the gradient of the line on a distance-time graph can tell you. Use the equation for constant speed to calculate distance moved or time taken. State the difference between speed and velocity. Calculate the acceleration of an object. State the difference between acceleration and deceleration. Explain that motion in a circle involves constant speed but changing velocity. Measure velocity change. State what the horizontal line on a velocity-time graph tells you. Use a velocity time graph to work out whether an object is accelerating or decelerating. State what the area under a velocity-time graph tells you.	I can calculate the speed of an object by extracting data from a distance-time graph. I can extract data from a distance-time graph to calculate the speed of an object at various points in its motion. I can perform calculations of speed, distance, and time which involve conversion to and from SI base units. I can compare and contrast the features of a distance-time, displacement-time, and velocity-time graph. I can combine equations relating to velocity and acceleration in multi-step calculations. I can calculate a new velocity for a moving object that has accelerated for a given period of time. I can calculate the acceleration of an object	**Acceleration: change of velocity per second (in metres per second per second (m/s2).** **Deceleration: change of velocity per second when an object slows down.** **Displacement: distance in a given direction.** **Distance-time graph: a graph of the distance travelled against time for a moving object. The gradient of the line on a distance-time graph gives us the speed.** **Force: a force (in newtons, N) can change the motion of an object.** **Magnitude: the size or amount of a physical quantity.**	Homework and Independent Study HW: Assessed past-paper questions. Kerboodle / Seneca online task(s). Revision: For topic test at end of the topic (PP-style questions, ~40 mins) IS: Textbook spread questions on each topic, to self-assess. Use of online resources including BBC Bitesize, physicandmathstutor.com, Seneca Learning and Kerboodle textbook. Especially check the “Appendices”. YouTube channels – Free Science Lessons, Primrose Kitten. S & C: ZigZag AQA GCSE Stretch and Challenge Packs on Teams / SharePoint. BBC Science and Tech news sections (https://www.bbc.co.uk/news, independent research). End of topic test

	Calculate speed from a distance-time graph where the speed is constant. Calculate speed from a distance-time graph where the speed is changing. Calculate the acceleration from a velocity-time graph. Calculate the distance from a velocity-time graph.	from values taken from a velocity-time graph. I can calculate the total distance travelled from a multi-phase velocity-time graph. I can evaluate an experiment into the acceleration of an object in term of precision based on the spread of repeat measurements. I can calculate the acceleration of an object by extracting data from a velocity-time graph. I can use the gradient of a velocity-time graph to determine the acceleration of an object. I can apply transformations of the equation v2 – u2 = 2as in calculations involving change in velocity and acceleration where both velocities are non-zero.	**Newton's first law of motion: if the resultant force on an object is zero, the object stays at rest if it is stationary, or it keeps moving with the same speed in the same direction.** **Scalars: a physical quantity, such as mass or energy that has magnitude only (unlike a vector which has magnitude and direction).** **Vector: a vector is a physical, such as displacement or velocity that has a magnitude and a direction (unlike a scalar which has magnitude only).** **Velocity: speed in a given direction (in metres/second, m/s).**	

Curriculum Plans: Year 10 Physics (separate)

			Velocity-time graph: a graph of velocity against time for a moving object. The gradient of the line on a velocity-time graph gives us the acceleration. The area under the graph gives us the distance travelled.	
Forces 3	Describe how the acceleration of an object depends on the size of the resultant force acting upon it. Describe the effect that the mass of an object has on its acceleration. Describe how to calculate the resultant force on an object from its acceleration and its mass. State what the inertia of an object means. Describe the difference between mass and weight. Describe and explain the motion of a falling object acted on only by gravity. State what terminal velocity means. State what can be said about the resultant force acting on an object that is falling at terminal velocity. Describe the forces that oppose the driving force of a vehicle.	I can define the inertial mass of an object in terms of force and acceleration. I can calculate the acceleration of an object acted on by several forces. I can evaluate an experiment by identifying sources of error and determining uncertainty in the resulting data. I can apply the mathematical relationship between mass, weight, and gravitational field strength in a range of situations. I can explain the motion of an object falling through a fluid by considering the forces acting through all phases of motions.	**Braking distance: the distance travelled by a vehicle during the time it takes for its brakes to act.** **Conservation of momentum: in a closed system, the total momentum before an event is equal to the total momentum after the event. Momentum is conserved in any collision or explosion, provided no external forces act**	Homework and Independent Study HW: Assessed past-paper questions. Kerboodle / Seneca online task(s). Revision: For topic test at end of the topic (PP-style questions, ~40 mins) IS: Textbook spread questions on each topic, to self-assess. Use of online resources including BBC Bitesize, physicandmathstutor.com, Seneca Learning and Kerboodle textbook. Especially check the “Appendices”. YouTube channels – Free Science Lessons, Primrose Kitten. S & C: ZigZag AQA GCSE Stretch and Challenge Packs on Teams / SharePoint. BBC Science and Tech news sections (https://www.bbc.co.uk/news, independent research). End of topic test

	State what the stopping distance of a vehicle depends on. State what can cause the stopping distance of a vehicle to increase. Describe how to estimate the braking force of a vehicle. Calculate momentum and state the unit of momentum Describe what momentum means in a closed system. Describe what happens when two objects push each other apart. Explain how momentum can be described as having direction as well as size. Explain why two objects that push each other apart always move away at different speeds. Explain what happens to the momentum of two objects when they collide. Explain what affects the force of impact when two vehicles collide. Describe how the impact force depends on the impact time. Explain what can be said about the impact forces and the total momentum when two vehicles collide. Explain why the impact force depends on the impact time.	I can evaluate the repeatability of an experiment by considering the spread of the results. I can categorise factors which affect thinking distance, braking distance and both. I can calculate the braking distance of a car. I can describe the relationship between speed and both thinking and braking distance. I can fully describe the motion of objects after an explosion accounting for any frictional effects. I can apply principle of conservation of momentum to a range of calculations involving the velocities of objects. I can evaluate the data produced from an investigation and compare this to a theoretical framework. I can apply the law of conservation of momentum to find velocities of objects.	**on the objects that collide or explode.** **Directly proportional: a graph will show this if the line of best fit is a straight line through the origin.** **Elastic: a material is elastic if it is able to regain its shape after it has been squashed or stretched.** **Gravitational field strength: the force of gravity on an object of mass 1kg (in newtons per kilogram, N/kg). It is also the acceleration of free fall.** **Hooke's Law: the extension of a spring is directly proportional to**	

	Describe how cycle helmets and cushioned surfaces reduce impact forces. Explain why seat belts and air bags reduce the force on people in car accidents. Explain how side impact bars and crumple zones work. Explain how we can work out if a car in a collision was speeding. State what elastic means. Describe how to measure the extension of an object when it is stretched. Describe how the extension of a spring changes with the force applied to it. State what the limit of proportionality of a spring means.	I can analyse the velocities of objects in a wide range of collisions. I can evaluate an experimental technique and discuss in detail the factors which lead to differences between experimental data and an accepted law. I can apply the concept of equal and opposite forces in collisions to explain why momentum is conserved in impacts. I can calculate changes in velocity and momentum during impacts using the force involved in the impact and the impact time. I can plan an investigation into the impact forces involved in a collision and how they can be reduced. I can use scientific principles such as rate of change of momentum to explain detail the operation of a range of change of momentum to explain in detail the operation of a range of car safety features. I use data about an accident to discuss its likely cause.	**the force applied, as long as its limit of proportionality is not exceeded.** **Inertia: the tendency of an object to stay at rest or to continue in uniform motion.** **Limit of proportionality: the limit for Hooke's law applied to the extension of a stretched spring.** **Mass: the quantity of matter in an object – a measure of the difficulty of changing the motion of an object (in kilograms, kg).** **Momentum: this equals mass (kg) x**	

		I can evaluate a range of optional safety features based on their costs and effectiveness. I can find the spring constant of a spring using a graphical technique. I can Hooke's law equation in a wide of situations. I can evaluate an investigation into the extension of materials in terms of the precision of the data.	**velocity (m/s).** **Newton's Second Law of motion: the acceleration of an object is proportional to the resultant force on the object, and inversely proportional to the mass of the object.** **Stopping distance: the distance travelled by the vehicle in the time it takes for the driver to think and brake.** **Terminal velocity: the velocity reached by an object when the drag force on it is equal and opposite to the force making it move.**	

			Thinking distance: the distance travelled by the vehicle in the time it takes the driver to react. **Weight: the force of gravity on an object (in newtons, N).**	
Forces 4	**Define the term pressure.** **State the unit of pressure.** **Use the pressure equation.** **Explain why the area of contact is important in pressure applications.** **Describe how the pressure in a liquid increases with liquid depth.** **Explain why the pressure along a horizontal line in a liquid is constant.** **State what the pressure in a liquid depends on.** **Calculate the pressure caused by a liquid column.** **Explain why the atmosphere exerts a pressure.** **Explain how and why atmospheric pressure changes with altitude.**	I can apply the concept of pressure in explaining the effect on a surface in a wide range of contexts. I can perform pressure calculations including conversion of areas and forces with SI multiplier prefixes. I can estimate uncertainty in values for pressure using experimental data. I can use algebraic techniques to derive the equation p = hρg. I can rearrange the equation p = hρg to	**Density: mass per unit volume of a substance.** **Force: a force (in newtons, N) can change the motion of an object.** **gas pressure: the force on a surface caused by the collisions of gas particles with the surface. Gas pressure acts at right angles to a surface.** **pascals (Pa): a unit of pressure. 1 Pa = 1 N/m2**	Homework and Independent Study HW: Assessed past-paper questions. Kerboodle / Seneca online task(s). Revision: For topic test at end of the topic (part 4) (PP-style questions, ~40 mins) IS: Textbook spread questions on each topic, to self-assess. Use of online resources including BBC Bitesize, physicandmathstutor.com, Seneca Learning, GCSEPod and Kerboodle textbook (pages given at end of each lesson). YouTube channels – Free Science Lessons, Primrose Kitten. S & C: ZigZag AQA GCSE Stretch and Challenge Packs on Teams / SharePoint. BBC Science and Tech news sections (https://www.bbc.co.uk/news, independent research).

	Explain how the density of the atmosphere changes with altitude. **Calculate the force on a flat object due to a pressure difference.** **Explain why the atmosphere exerts a pressure.** **Explain how and why atmospheric pressure changes with altitude.** **Explain how the density of the atmosphere changes with altitude.** **Calculate the force on a flat object due to a pressure difference.** **State what is meant by an upthrust on an object in a fluid.** **Describe what causes upthrust.** **Describe what the pressure in a fluid depends on.** **Explain whether an object in a fluid floats or sinks.**	solve a range of questions involving the pressure in a liquid. I can apply the equation for pressure in a liquid to explain the design of dams or other structures. I can use the particle model to explain in detail the changes in atmospheric pressure. I can explain a range of phenomena in terms of pressure difference. I can explain why the relationship p = hρg is not suitable for calculating changes in pressure in the atmosphere over a large change in height. I can calculate the upthrust acting on a submerged object by using the pressure to the upthrust provided. I can use algebraic techniques to show that the weight of liquid displaced is equal to the upthrust provided.	**Pressure: force per unit cross-sectional area for a force acting on a surface at right angles to the surface. The unit of pressure is the pascal (Pa) or newton per square metre (N/m2).** **Upthrust: the upward force that acts on a body partly or completely submerged in a fluid.**	End of topic test

Curriculum Plans: Year 10 Physics (separate)

		I can carry out and evaluate in detail an investigation into the relationship between the average density of an object and the distance it submerges.		
Waves 1	Describe what waves can be used for. Describe what transverse waves are. State what longitudinal waves are. State which types of wave are transverse and which are longitudinal. Define the amplitude, frequency, and wavelength of a wave mean. Describe how the period of a wave is related to its frequency. State the relationship between the speed, wavelength, and frequency of a wave. Use the wave speed equation in calculations. Draw the patterns of reflection and refraction of plane waves in a ripple tank. Determine whether plane waves that cross a boundary	I can explain the features of a longitudinal wave in terms of compressions and rarefactions by using a particle model. I can discuss the features of a transverse wave in terms of particle or field behaviour. I can compare mechanical waves and their particulate nature with electromagnetic waves and their field oscillations. I can explain how the wave speed equation can be derived from fundamental principles. I can perform calculations involving rearrangements of the	**Amplitude: the size of vibrations or the maximum distance a particle moves away from its resting position when a wave passes.** **Compression: squeezing together.** **Electromagnetic waves: a group of waves that all travel at the same speed in a vacuum, and are all transverse.** **Frequency: the number of cycles of a wave per second, measured in hertz (Hz).** **hertz (Hz): the unit for frequency, 1**	Homework and Independent Study HW: Assessed past-paper questions. Kerboodle / Seneca online task(s). Revision: For topic test at end of the topic (PP-style questions, ~40 mins) IS: Textbook spread questions on each topic, to self-assess. Use of online resources including BBC Bitesize, physicandmathstutor.com, Seneca Learning and Kerboodle textbook. Especially check the "Appendices". YouTube channels – Free Science Lessons, Primrose Kitten. S & C: ZigZag AQA GCSE Stretch and Challenge Packs on Teams / SharePoint. BBC Science and Tech news sections (https://www.bbc.co.uk/news, independent research). End of topic test

	between two different materials are refracted. Explain reflection and refraction using the behaviour of waves. Describe what can happen to a wave when it crosses a boundary between two different materials. State what sound waves are. State what echoes are. Describe how to measure the speed of sound in air. State what affects the loudness of a musical note. Explain how sound waves are detected by the ear. Explain why human hearing is limited. State what ultrasound waves are. Explain why ultrasound waves can be used to scan the human body. Describe how ultrasound waves are used to measure distances in medicine and in industry. Describe why an ultrasound scan is safer than taking an x-ray image. State what seismic waves are. Explain how seismic waves are produced.	period equation and the wave speed equation. I can perform multi-stage calculations linking period, frequency, wave speed, and wavelength. I can use a wavefront model to explain refraction and reflection. I can describe the relationship between the angle of incidence and angle of refraction. I can explain refraction in terms of changes in the speed of waves when they move between one medium and another. I can calculate distances between objects by using the concept of echo location. I can describe the behaviour of sound waves in terms of vibrations and regions of compression and rarefaction. I can evaluate data from speed of sound	**hertz is 1 wave per second.** **Longitudinal wave: a wave where the vibrations are parallel to the direction in which the wave is travelling, i.e. in a sound wave.** **Mechanical wave: vibration that travels through a substance.** **Medium: material through which electromagnetic waves travel.** **Period: the time taken for one complete wave to pass a point. It is measured in seconds.** **Rarefaction: stretched apart.** **Reflection: the change in direction of a light ray or wave at a boundary when the ray or wave**	

	Describe what primary seismic waves and secondary seismic waves are. Explain what information seismic waves give about the structure of the Earth.	experiments to discuss the range of possible speeds for sound. I can outline the structure of the human ear in terms of transfer of waves and vibrations. I can explain why the human ear has a limited range of frequencies it can detect. I can compare the propagation of a sound wave in a solid and a gas. I can investigate the reflection and absorption of ultrasound waves. I can calculate the positions of objects or flaws in metal objects using data from an ultrasound trace. I can compare A- and B-type ultrasound scans. I can explain in detail how the internal structure of the Earth can be determined by waves passing through it.	**stays in the incident medium.** **Refraction: the change in direction of light ray when it passes across a boundary between two transparent substances (including air).** **Seismic wave: vibrations in the rocks of the Earth caused by earthquakes or explosions. There are transverse and longitudinal seismic waves.** **Speed: the speed of an object (metres per second) = distance moved by the object (metres) ÷ time taken to move the distance travelled (seconds).** **Transmission: A wave passing through a substance.**	

Curriculum Plans: Year 10 Physics (separate)

		I can calculate the speed of different types of seismic waves. I can interpret seismographs to determine the difference in speeds of seismic waves.	**Transverse wave: a wave where the vibration is perpendicular to the direction of energy transfer.** **Ultrasound: sound wave at a frequency greater than 20 000 Hz (the upper frequency limit of the human ear).** **Wavelength: the distance from one wave crest to another.**	
Waves 2	State the parts of the electromagnetic spectrum. Explain the range of wavelengths within the electromagnetic spectrum that the human eye can detect. Describe how energy is transferred by electromagnetic waves. Calculate the frequency or wavelength of electromagnetic waves. Describe the nature of white light.	I can apply the wave model of electromagnetic radiation as a pair of electric and magnetic disturbances that do not require a medium for travel. I can use standard form in calculations of wavelength, frequency, and wave speed. I can explain the interactions between an	**Charge-coupled device (CCD): an electronic device that creates an electronic signal from an optical image formed on the CCD's array of pixels.** **Contrast medium: an x-ray absorbing substance used to fill a body organ so the organ can be**	Homework and Independent Study HW: Assessed past-paper questions. Kerboodle / Seneca online task(s). Revision: For topic test at end of the topic (PP-style questions, ~40 mins) IS: Textbook spread questions on each topic, to self-assess. Use of online resources including BBC Bitesize, physicandmathstutor.com, Seneca Learning and Kerboodle textbook. Especially check the "Appendices". YouTube channels – Free Science Lessons, Primrose Kitten. S & C: ZigZag AQA GCSE Stretch and Challenge Packs on Teams / SharePoint.

	List some uses of infrared radiation, microwaves, and radio waves. State what mobile phone radiation is. Explain why these types of electromagnetic radiation are hazardous. Explain why radio waves of different frequencies are used for different purposes. State which waves are used for satellite TV. Describe how to decide whether or not mobile phones are safe to use. Describe how fibre optics are used in communications. Describe what a carrier wave is. Describe the differences between ultraviolet and visible light. List some uses of X-rays and gamma rays. State ionising radiation. Explain why ultraviolet waves, X-rays, and gamma rays are dangerous. Describe what x –rays are used for in hospitals. State which parts absorb x-rays when they pass through the body.	electromagnetic wave and matter. I can determine the wavelength of radio waves in air. I can describe the interactions between a range of waves and matter, including the effect of absorption. I can plan, carry out, and evaluate in detail an investigation into the penetrating power of microwaves. I can describe in detail how carrier waves are used in the transfer of information. I can describe the structure of a radio communication system, including the effect of a radio wave on the current in the receiver. I can discuss the relationship between wavelength data transmission and range to explain to explain why particular frequencies are chosen	**seen on a radiograph.** **Gamma rays: a high frequency electromagnetic wave emitted from the nucleus of a radioactive atom. Gamma rays have the highest frequency in the electromagnetic spectrum.** **Infrared radiation: electromagnetic waves between visible light and microwaves in the electromagnetic spectrum.** **Ionisation: a process in which atoms become charged.** **Microwaves: electromagnetic waves between infrared radiation and radio waves in the electromagnetic spectrum.**	BBC Science and Tech news sections (https://www.bbc.co.uk/news, independent research). End of topic test

	Explain the difference between the uses of low- and high-energy X-rays in hospitals.	for particular transmissions. I can describe in detail the interaction between ionising radiation and inorganic materials. I can compare different regions of the electromagnetic spectrum in terms of their potential harmfulness. I can explain how the process of ionisation can lead to cell death or cancer through damage to DNA. I can compare the operation of a CT-scanner and that of a simple X-ray device. I can evaluate the doses of ionising radiation received in a variety of occupations or medical treatments. I can explain in detail how various safety features reduce exposure to ionising radiation.	**Radiation dose: amount of ionising radiation a person receives.** **Radio waves: electromagnetic waves of wavelengths greater than 0.10m.** **Ultraviolet radiation: electromagnetic waves between visible light and x-rays on the electromagnetic spectrum.** **Visible light: electromagnetic waves that can be detected by the human eye.** **Wave speed: the distance travelled per second by a wave crest or trough.** **X-rays: electromagnetic waves smaller in wavelength than ultraviolet**	

Curriculum Plans: Year 10 Physics (separate)

			radiation produced by x-ray tubes.	
Waves 3	Identify the normal in a diagram of light rays. State the law of reflection of a light ray at a plane mirror. Describe how an image is formed by a plane mirror. Describe what is meant by specular reflection and diffuse reflection. Identify where refraction of light can happen. Describe how a light ray refracts when it goes from air into glass or from glass into air. Describe how the wavelength of light changes across the visible spectrum. Explain what determines the colour of a surface. Define what a translucent object is. Explain the difference between a translucent object and a transparent object. Define what a convex lens is. Define what a concave lens. Calculate magnification. Find the position and nature of an image formed by a lens.	I can draw a ray diagram showing the position of an image in a plane mirror. I can use a ray diagrams to discuss why some surfaces form images during reflection but others do not. I can evaluate the data from an investigation to discuss the precision and accuracy of any results. I can explain how the refraction of light can cause the depth of a material to appear less than it actually is. I can explain the dispersion of light as it passes through a prism in terms of different changes of speed for different wavelengths of light. I can analyse the data from a refraction investigation to test different substances to	**Angle of incidence: angle between the incident ray and the normal.** **Angle of reflection: angle between the reflected ray and the normal.** **Concave (diverging) lens: a lens that makes parallel rays diverge (spread out).** **Convex (converging) lens: a lens that makes light rays parallel to the principal axis converge (meet at a point).** **Diffuse reflection: reflection from a rough surface – the light rays are scattered in different directions.**	Homework and Independent Study HW: Assessed past-paper questions. Kerboodle / Seneca online task(s). Revision: For topic test at end of the topic (PP-style questions, ~40 mins) IS: Textbook spread questions on each topic, to self-assess. Use of online resources including BBC Bitesize, physicandmathstutor.com, Seneca Learning and Kerboodle textbook. Especially check the "Appendices". YouTube channels – Free Science Lessons, Primrose Kitten. S & C: ZigZag AQA GCSE Stretch and Challenge Packs on Teams / SharePoint. BBC Science and Tech news sections (https://www.bbc.co.uk/news, independent research). End of topic test

	Identify what type of image is formed by a convex lens when the object is between the lens and its principal focus (you may be required to draw this). Describe what type of lens is used in a camera and in a magnifying glass. Identify what type of image is formed in a camera and what type in a magnifying glass.	determine whether it fits a suggested relationship. I can explain the apparent colour of surfaces using the concept of reflection and absorption when illuminated by white light or combinations of primary colours. I can describe the effects of combinations of coloured light and filters on the appearance of a variety of coloured objects. I can determine the apparent colour of a coloured surface when illuminated by different combinations of red, green, and blue light. I can explain ray paths through a lens in terms of refraction and the focal point. I can perform calculations involving the rearrangement of the magnification equation.	**Focal length: the distance from the centre of a lens to the point where light rays parallel to the principal axis are focused (or, in the case of a diverging lens, appear to diverge from).** **Magnification: the image height divided by the object height.** **Normal: straight line through a surface or boundary perpendicular to the surface or boundary.** **Principal focus: the point where light rays parallel to the principal axis of a lens are focused (or, in the case of a diverging lens, appear to diverge from).** **Real image: an image formed by a**	

		I can construct complete ray diagrams showing image formation by a convex lens with a variety of object positions. Form first principles, I can construct ray diagrams showing the formation of images by a convex lens and a concave lens. I can describe fully the properties of an image (real, virtual, magnified, diminished, upright, and inverted) based on a ray diagram. I can use scale diagrams to determine the size of an image produced by a lens.	**lens that can be projected onto a screen.** **Refraction: the change of direction of a light ray when it passes across a boundary between two transparent substances (including air).** **Specular reflection: reflection from a smooth surface. Each light ray is reflected in a single direction.** **Virtual image: an image, seen in a lens or a mirror, from which light rays appear to come after being refracted by a lens or reflected by a mirror.**	