Department	SCIENCE (PHYSICS)
Key Stage	KEY STAGE 4
Course Level	GCSE
Exam Board	AQA

Dates Dlivered	Unit Title	End Points	Substantive Knowledge What will they learn about in this topic?	Disciplinary Knowledge What subject concepts will be developed through this topic?	Assessment Method	Key Course Guides & Reading

Year 10 Autumn term And Spring 1	Forces (4.5 on spec)	Students should be able to: • Describe Newton's 3 Laws of motion • Interpret distance-time and velocity-time graphs • Define vector and scalar quantities • Explain rules of proportionality such as F = ke and F=ma • (HT only) explain qualitatively, with examples, that motion in a circle involves constant speed but changing velocity. • (HT only) Students should be able to use vector diagrams to illustrate resolution of forces, equilibrium situations and determine the resultant of two forces, to include both magnitude and direction (scale drawings only) • give examples of the forces involved in stretching, bending or compressing an object • explain why, to change the shape of an object (by stretching, bending or compressing), more than one force has to be applied – this is limited to stationary objects only • describe the difference between elastic deformation and inelastic deformation caused by stretching forces. • calculate the size of a force, or its distance from a pivot, acting on an object that is balanced • explain how levers and gears transmit the rotational effects of forces	4.5.1 Forces and their interactions 4.5.2 Work done and energy transfer 4.5.3 Forces and elasticity 4.5.4 Moments, levers and gears 4.5.5 Pressure and pressure differences in fluids 4.5.6 Forces and motion 4.5.7 Momentum (HT only)	Understanding of Newton's 3 Laws of motion which governs how objects within systems interact and the laws of which the Universe operates. Application to real life scenarios such are gearing systems in a car, the application of pressure in hydraulic systems and linking the conservation of energy (year 9) to further scenarios. Conservation of momentum – a Physics fundamental rule. Students should be able to recall and apply various equations. Students should recognise and be able to use the symbol for proportionality Throughout section 4.5.6 (Forces and motion), students should be able to use ratios and proportional	CAT tests as per the SOW End of half term test End of Unit test	

		• explain why, in a liquid, pressure at a point increases with the height of the column of liquid above that point and with the density of the liquid • calculate the differences in pressure at different depths in a liquid • describe the factors which influence floating and sinking • describe a simple model of the Earth's atmosphere and of atmospheric pressure • explain why atmospheric pressure varies with height above a surface. • (HT only) The tendency of objects to continue in their state of rest or of uniform motion is called inertia • apply Newton's Third Law to examples of equilibrium situations • estimate how the distance for a vehicle to make an emergency stop varies over a range of speeds typical for that vehicle. • factors which affect the distance required for road transport vehicles to come to rest in emergencies, and the implications for safety • (HT only) estimate the forces involved in the deceleration of road vehicles in typical situations on a public road • describe and explain examples of momentum in an event, such as a collision • (physics only) complete calculations involving an event, such as the collision of two objects.		reasoning to convert units and to compute rates.		

		• explain safety features such as: air bags, seat belts, gymnasium crash mats, cycle helmets and cushioned surfaces for playgrounds with reference to the concept of rate of change of momentum.				

Dates Delivered	Unit Title	End Points	Substantive Knowledge What will they learn about in this topic?	Disciplinary Knowledge What subject concepts will be developed through this topic?	Assessment Method	Key Course Guides & Reading
Year 10 remainder of Spring Term and Summer	WAVES STEM Week Space – Life cycle of Stars	Students should be able to: • describe the difference between longitudinal and transverse waves • describe evidence that, for both ripples on a water surface and sound waves in air, it is the wave and not the water or air itself that travels • describe wave motion in terms of their amplitude, wavelength, frequency and period • identify amplitude and wavelength from given diagrams • describe a method to measure the speed of sound waves in air • describe a method to measure the speed of ripples on a water surface. • show how changes in velocity, frequency and wavelength, in transmission of sound waves from one medium to another, are inter-related	4.6.1 Waves in air, fluids and solids 4.6.2 Electromagnetic waves 4.6.3 Black body radiation 4.8.1 Solar system; stability of orbital motions; satellites 4.8.2 Red-shift	Waves transfer energy from one place to another. This is a key concept to a lot of physics in understanding the Universe and also key in equipment used for detection such as satellites, RADAR and communication including Wi-Fi. Knowing the life cycle of stars and that this process if vital as it created the elements that we know of on the periodic table – without the life and death of stars, elements beyond Hydrogen would not exist and hence life as we know it wouldn't exist. Understand that scientific theories can be amended	End of half term test End of term test (Synoptic test on all topics covered so far.)	AQA | Biology | Subject content | Organisms exchange substances with their environment AQA | Biology | Subject content | Genetic information, variation and relationships between organisms

		• construct ray diagrams to illustrate the reflection of a wave at a surface • describe the effects of reflection, transmission and absorption of waves at material interfaces • describe, with examples, processes which convert wave disturbances between sound waves and vibrations in solids. Examples may include the effect of sound waves on the ear drum • explain why such processes only work over a limited frequency range and the relevance of this to human hearing • know that the range of normal human hearing is from 20 Hz to 20 kHz • explain in qualitative terms, how the differences in velocity, absorption and reflection between different types of wave in solids and liquids can be used both for detection and exploration of structures which are hidden from direct observation • able to give examples that illustrate the transfer of energy by electromagnetic waves • construct ray diagrams to illustrate the refraction of a wave at the boundary between two different media • use wave front diagrams to explain refraction in terms of the change of speed that happens when a wave travels from one medium to a different medium		based upon evidence. Theories can only be constructed from evidence we have and this needs to be verified and tested vigorously. STEM Week – a wider look at STEM, STEM careers and project work. How Science, Technology, Engineering and Maths can be applied together in many scenarios, careers and functions.		

		• draw conclusions from given data about the risks and consequences of exposure to radiation • (HT only) Students should be able to give brief explanations why each type of electromagnetic wave is suitable for the practical application. • construct ray diagrams to illustrate the similarities and differences between convex and concave lenses • explain how the colour of an object is related to the differential absorption, transmission and reflection of different wavelengths of light by the object • explain how the effect of viewing objects through filters or the effect on light of passing through filters • explain why an opaque object has a particular colour • Explain that all bodies (objects) emit radiation • Explain that the intensity and wavelength distribution of any emission depends on the temperature of the body. • (HT only) explain how the temperature of a body is related to the balance between incoming radiation absorbed and radiation emitted, using everyday examples to illustrate this balance, and the example of the factors which determine the temperature of the Earth.				

		• (HT only) use information, or draw/ interpret diagrams to show how radiation affects the temperature of the Earth's surface and atmosphere. • Explain how, at the start of a star's life cycle, the dust and gas drawn together by gravity causes fusion reactions • Explain that fusion reactions lead to an equilibrium between the gravitational collapse of a star and the expansion of a star due to fusion energy. • describe the life cycle of a star • explain how fusion processes lead to the formation of new elements. • describe the similarities and distinctions between the planets, their moons, and artificial satellites • (HT only) explain for circular orbits, the force of gravity can lead to changing velocity but unchanged speed • (HT only) explain for a stable orbit, the radius must change if the speed changes. • Explain qualitatively the red-shift of light from galaxies that are receding • Explain that the change of each galaxy's speed with distance is evidence of an expanding universe • Explain how red-shift provides evidence for the Big Bang model • Explain how scientists are able to use observations to arrive at theories such as the Big Bang theory				

Dates Delivered	**Unit Title**	**End Points**	**Substantive Knowledge** **What will they learn about in this topic?**	**Disciplinary Knowledge** **What subject concepts will be developed through this topic?**	**Assessment Method**	**Key Course Guides & Reading**
Summer 2	MAGNETISM Review of all year 10 work	Specified on year 11 curriculum plan			End of Unit test End of year test – synoptic – year 10 topics covered	AQA website for unit AQA | Biology | Subject content | Energy transfers in and between organisms (A-level only) AQA | Biology | Subject content | Organisms respond to changes in

						their internal and external environments (A-level only)