Curriculum Map: Physics year 12 summer term

	Teacher 1	Teacher 2
Content Declarative knowledge 'I Know'	**4.5 – Quantum Physics** To define the photon, electron volt, planck constant, the photoelectric, work function, threshold frequency, wave particle duality, de Broglie wavelength To know the requirements of when the photoelectric effect happens To know that electrons have both wave like and particle like properties **5.5 – astrophysics and cosmology** To define astronomical unit, parsec, stellar parallax, light year, doppler effect, red shift, hubble's law, hubble constant, the cosmological principle, cosmic microwave background radiation, dark matter, dark energy To know the evolution of the universe. To provide information on how the universe has expanded and the forces involved for different stages. To know the 3 different fates of the universe and what they look like on a graph	Revision of content in preparation for the mocks Recalling the key definitions in the course and the laws of physics Practising units of variables, prefixes of units and the letters for each variable **5.5 – astrophysics and cosmology** To define galaxy, planet, star, comet, satellite, fusion, radiation pressure, gravitational collapse, red giant, white dwarf, electron degeneracy pressure, neutron star, black hole, supernova, luminosity, main sequence, nebula, emission spectra absorption spectra, energy levels To know the stages in a stars life cycle depending on their mass To know the wavelengths of light for visible light To know the diagram for when white light is passed through a diffraction grating To know Wein's law and Stefan's law
Skills Procedural Knowledge 'I know how to'	**4.5 – quantum physics** To calculate the energy of a photon To experimentally determine a value for the Planck's constant To know how to use a graph of the results to give the value for Planck To convert between Joules and electron volts Describe the photoelectric effect and when the electrons will be able to escape the material To use the photoelectric equation to determine the work function or kinetic energy of an electron. To explain how intensity affects the rate of emission of electrons Calculate the maximum kinetic energy of photoelectrons Describe the evidence that supports the particle like nature of electrons To calculate the wavelength of electrons using their momentum or mass To link kinetic energy to electrical energy to derive how the wavelength is linked to the mass and charge. To explain the practical that looks at diffraction of electrons and the requirements necessary to get results. **5.5 – astrophysics and cosmology**	Revision of content in preparation for the mocks Application of knowledge and calculation practise using exam papers and quizzes. Looking at revising the assessed practical methods and how to calculate variables based on this experimental data. **5.5 – astrophysics and cosmology** Describe the fate of star depending on its mass To explain why a star moves between phases in terms of the element formation and changes in forces at each stage To explain the Hertzsprung Russell diagram and how it surface area and luminosity are linked together Describe what happens to the energy of a photon when it is absorbed into an atom. Explain an energy level diagram To connect the theory of how emission spectra works to the emission diagram for an element To compare absorption with emission spectra To calculate luminosity and temperature using Wein's and Stefan's law

	To calculate the distances away stars are using parsecs, astronomical units, stellar parallax and light years. To know how to convert between different astronomical distances To explain how the doppler effect can be used to calculate the speed of recession of a galaxy and what the effect is on the wavelength/frequency during this recession. To connect the doppler effect to red shift and spectral lines. Explain how an emission spectra can change after red shift. To convert MPc^{-1} into km/s in Hubble's constant Relate Hubble's constant to the age of the universe. To calculate Hubble's constant using Hubble's law of from a graph of results To explain how CMBR and red shift can be used as evidence of the expansion of the universe Explain the different fates of the universe using the forces involved and the density of the Universe Describe the difference between dark matter and dark energy	To explain the graph for luminosity against wavelength showing how it can be used to determine the temperature.
Strategies Conditional Knowledge 'I know when to'	**4.5 – quantum Physics** Evaluate the data collected on the Planck's constant practical and to comment on the reliability of data with any relevant uncertainties. To look at the problems or questions associated with wave particle duality and analyse the evidence behind it To review the evidence on the history of the photon and critically evaluate it. **5-5 – astrophysics and cosmology** To interpret data using a multitude of astronomical units and draw conclusions about it To analyse and evaluate emission line spectra where red shift has occurred To review evidence for the expansion of the universe and evaluate the effectiveness of it. Make your own conclusions based on information provided.	Revision of content in preparation for the mocks Evaluating data practise, uncertainty calculations. Looking at multiple step calculations and knowing when to apply certain equations. Application of knowledge to unfamiliar situations. This is mainly done through exam question exposure and mark scheme analysis **5.5 – astrophysics and cosmology** To interpret a Hertzsprung Russell diagram and draw conclusions from it To evaluate an emission spectra diagram to identify what elements are in that gas To apply knowledge of an energy level diagram to explain how an emission spectra is formed. To evaluate the graphs formed from Wein's law to draw conclusions about the star
Key Questions	What is the photoelectric effect? What happens when radiation is incident on the metal? Is the universe expanding? How do we know? How old is the universe?	What is in the universe? How are stars formed and how do they die? How can we tell what stars are made from?
Assessment topics	End of topic test module 4.5 at end of module and whole years mock in June.	Whole years mock un June
Cross curricular links/Character Education	Maths – graphical skills and equation practise. Astronomical distances DT electronics – photon behaviour Chemistry – electron behaviour	Maths – kinematic equations, projectile motion, trigonometric functions. Algebraic fractions. Biology – reaction times Chemistry – materials, fusion in stars