# Curriculum Map Year 10 Science – Physics

| Topic Name | | Scientific Skills | Essential Knowledge (misconceptions or really tricky bits are highlighted in red) | Prior Learning (KS3 or Y10) | Assessment | Link to future learning |
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| **Particle Model of Matter** | *Autumn HT1 (approx.9 lessons)* | **In this topic I can:**<br>**Use the density equation**<br><br>**Use practical techniques to find the density of regular and irregular objects**<br>• **AT 1 – use appropriate apparatus to make and record measurements of length, area, mass and volume accurately. Use such measurements to determine the density of solid objects and liquids.**<br><br>**Use the SHC equation to calculate the SHC of solids and liquid.**<br>• **AT 1 – use appropriate apparatus to make and record measurements of mass, time and temperature accurately.**<br>• **AT 5 – use, in a safe manner, appropriate apparatus to measure energy changes/transfers and associated values such as work done.**<br>• **plan experiments or devise procedures to make observations, produce or characterise a substance, test hypotheses, check data or explore phenomena.**<br>• **make and record observations and measurements using a range of apparatus and methods.**<br>*change in thermal energy = mass × specific heat capacity × temperature change*<br>$[\Delta E = m\, c\, \Delta\theta]$ | **In this topic I will know:**<br>• **Use the particle model of matter to explain changes of state**<br>• **Describe the role of particles when thinking about density, changes between states of matter, pressure and volume.**<br>• **Know the arrangement, movement, forces and energy of particles in the three states of matter**<br>• **The definition of SHC and latent heat**<br>• **Use particle theory to explain pressure in gases.** | **Before I start this topic, I need to know:**<br>• **About solids liquids and gases the properties of the different states of matter (solid, liquid and gas) in terms of the particle model, including gas pressure**<br>• **changes of state in terms of the particle model.** | **Knowledge and skills will be assessed by:**<br><br>**The topics highlight in PURPLE will be assessed in the topic booklet. This will be looking at the quality of practical work and any methods/graphs or tables produced. They may also be reassessed in the end of topic tests where appropriate.**<br><br>**The topics highlighted in BLUE will be assessed through questions during the end of topic assessment.** | **Year 13: Thermal physics**<br>**Specific heat capacity**<br>**Specific latent heat**<br>**Pressure of an ideal gas** |

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| **energy** | *Autumn HT2*<br><br>*(approx.9 lessons* | **Demonstrating that I can:**<br>**MS 3b, c Students should be able to recall and apply this equation.**<br>$kinetic\ energy = 0.5 \times mass \times (speed)^2$<br>$[E_k = \frac{1}{2} m v^2]$<br><br>**MS 3b, c Students should be able to apply this equation which is given on the Physics equation sheet.**<br>$elastic\ potential\ energy = 0.5 \times spring\ constant \times (extension)^2$<br>$[E_e = \frac{1}{2} k e^2]$<br><br>**MS 3b, c Students should be able to recall and apply this equation.**<br>$g.p.e. = mass \times gravitational\ field\ strength \times height$<br>$[E_p = m g h]$<br><br>**MS 3b, c Students should be able to recall and apply both equations.**<br>$power = \frac{energy\ transferred}{time}$<br>$\left[P = \frac{E}{t}\right]$<br>$power = \frac{work\ done}{time}$<br>$\left[P = \frac{W}{t}\right]$ | **In this topic I will know how to:**<br>• Describe what is meant by GPE and Ek<br>• Calculate GPE and Ek<br>• What is meant by work done<br>• Define power<br>• Explain ways of reducing unwanted energy transfer<br>• Understand that energy is dissipated<br>• Explain efficiency<br>• Evaluate energy resources<br>• Know the difference between renewable and non-renewable energy resources<br>• Describe energy changes in a system<br>• State energy stores and types<br><br>• Change the subject of an equation.<br>• Give an answer using an appropriate number of significant figures. | **Before I start this topic, I need to know:**<br>• Difference between temperature and heat<br>• comparing amounts of energy transferred (J, kJ, kW hour)<br>• fuels and energy resources.<br>Energy in matter<br>• changes with temperature in motion and spacing of particles<br>• internal energy stored in materials. | **Knowledge and skills will be assessed by:**<br><br>**The topics highlight in PURPLE will be assessed in the topic booklet. This will be looking at the quality of practical work and any methods/graphs or tables produced. They may also be reassessed in the end of topic tests where appropriate.**<br><br>**The topics highlighted in BLUE will be assessed through questions during the end of topic assessment.** | **HT1: Particle model of matter**<br>**Specific heat capacity**<br><br>**Year 11: Forces**<br>**Forces and energy in springs**<br>**Kinetic energy and momentum** |
| **electricity** | *Spring HT3 and Spring HT4*<br><br>*(approx. 20 lessons* | Demonstrating that I can:<br>**Complete calculations that show how resistors affect current in series and parallel circuits.-**<br><br>**Required prac – resistance of a wire**<br>• **AT 1 – use appropriate apparatus to measure and record length accurately.**<br>• **AT 6 – use appropriate apparatus to measure current, potential difference and resistance.**<br>• **AT 7 – use circuit diagrams to construct and check series and parallel circuits.**<br>• **carry out experiments appropriately having due regard for the correct manipulation of apparatus, the accuracy of measurements and health and safety considerations.** | **In this topic I must know:**<br>• Know circuit symbols<br>• Define electric current<br>• Distinguish between series and parallel circuits<br>• Describe the features of mains supply<br>• Structure of national grid<br>• Power and energy transfer of domestic appliances<br>• Calculate Power | **Before I start this topic, I must know:**<br>• **Electric current, measured in amperes, in circuits, series and parallel circuits**<br>• **currents add where branches meet and current as flow of charge**<br>• **potential difference, measured in volts**<br>• **resistance, measured in ohms, as the ratio of potential difference (p.d.) to current**<br>• **differences in resistance between conducting and insulating components (quantitative).** | **Knowledge and skills will be assessed by:**<br><br>**The topics highlight in PURPLE will be assessed in the topic booklet. This will be looking at the quality of practical work and any methods/graphs or tables produced. They may also be reassessed in the end of topic tests where appropriate.** | **Year 11: Electromagnetism**<br>**Electromagnets**<br>**Electric motors**<br><br>**Year 12: Electricity**<br>**Circuit diagrams**<br>**Current, p.d. and resistance**<br>**I-V graphs**<br>**Power and electrical energy**<br>**resistivity of a wire**<br>**Year 13**<br>**Electric fields** |

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| | | • **make and record observations and measurements using a range of apparatus and methods.**<br>• **translate data from one form to another.**<br>• **present observations and other data using appropriate methods**<br>• **plot two variables from experimental or other data.**<br>• **use an appropriate number of significant figures.**<br><br>**Required prac i-v characteristics**<br>**Function of thermistor, ldr, diode**<br>• **WS 3.5 – interpret observations and other data (presented in verbal, diagrammatic, graphical, symbolic or numerical form), including identifying patterns and trends, making inferences and drawing conclusions.** | | | **The topics highlighted in BLUE will be assessed through questions during the end of topic assessment.** | |
| **Atomic structure** | *Summer HT5 (approx.9 lessons* | Demonstrating that I can:<br>**WS 1.1, 1.6 Describe how scientific methods and theories develop over time by discussing the results from the alpha particle scattering experiment.**<br><br>**Determine the half-life of a radioactive isotope from given information.** | **In this topic I must know:**<br>• **Know how the model of the atom has changed of time**<br>• **Describe the current model of the atom**<br>• **Describe alpha, beta and gamma radiation in terms of structure, range penetrating power, ionising power, uses and dangers**<br>• **Describe the sources of background radiation**<br>• **Write balanced equations for alpha and beta decay**<br>• **Explain what is meant by half-life of a radioisotope**<br>• **Know the hazards of radioactive contamination**<br>• **Know the difference between contamination and irradiation**<br>• **Uses of gamma rays and x-rays in medicine**<br>• **Benefits and risks of nuclear energy** | **Before I start this topic, I must know:**<br>**Atoms, elements and compounds**<br>**§ a simple (Dalton) atomic model**<br>**§ differences between atoms, elements and compounds** | **Knowledge and skills will be assessed by:**<br><br>**The topics highlight in PURPLE will be assessed in the topic booklet.**<br>**This will be looking at the quality of practical work and any methods/graphs or tables produced. They may also be reassessed in the end of topic tests where appropriate.**<br><br>**The topics highlighted in BLUE will be assessed through questions during the end of topic assessment.** | |
| **Examination period** | *Summer HT6* | | | | | |