Science - Physics

Year 10 Curriculum Map

Year 10 – Autumn Term
Physics
P1 – Energy and P2 - Electricity

Prior Learning	**P1 - Energy** At key stage 3 pupils should have studied energy transfers and should be able to explain that temperature differences lead to energy transfers and how energy can be transferred by conduction, convection and radiation. Pupils also be able to describe the ways of reducing energy transferred by heating, how energy is conserved and the ways in which energy can be stored and transferred. **P2 - Electricity** At key stage 3 pupils should have studied electricity and should be able to explain that electric current is measured in amps and voltage is measured in volts. They should eb able to explain that circuits can be connected with components in series or in parallel and that conductors have low resistance and insulators have high resistance. They should describe the difference between electric current and voltage and between series and parallel circuits. Pupils should also be able to describe electric fields, how objects become charged and how charged objects behave.
What will I learn?	**P1 - Energy** Pupils will learn about how energy is stored and transferred and be able to represent energy transfers using diagrams. Pupils will be able to calculate efficiency and how to reduce transfers of wasted energy along with calculating the amount of gravitational potential or kinetic energy stored in objects. Pupils will also learn about the different renewable and non-renewable resources, we use to make electricity, for hearing and cooking, and for transport **P2 - Electricity** Pupils will learn about current, charge and potential difference and how to calculate resistance, power and energy transferred. Pupils will develop an understanding of components with changing resistance and about the UK domestic electricity supply and electrical safety features in homes, especially how earthing works and why it is important. Pupils will learn about the shape and size of electric fields and how they explain some phenomena caused by static electricity.
How will I be assessed?	Formative – Recall 5, Cold calling, skills such as graphs in books, retrieval homework task, mid topic assessment. Summative – End of topic assessment.
Next Steps	**P1 – Energy** Aspects from this unit on energy are revisited in P2 – Electricity, P5 - Forces and P7 – Magnetism and Electromagnetism. **P2 - Electricity** Aspects of this unit on Electricity are revisited in P7 – Magnetism and Electromagnetism.
Opportunities for Independent Learning	**P1 - Energy** Focus eLearning by Focus Educational Software ltd. Energy - GCSE Combined Science Revision - AQA Trilogy - BBC Bitesize **P2 - Electricity** Electricity - GCSE Combined Science Revision - AQA Trilogy - BBC Bitesize Seneca Combined Science Physics: https://app.senecalearning.com/classroom/course/a45169f6-0419-4904-816d-963748c2bfba (Foundation) https://app.senecalearning.com/classroom/course/501a009a-2f22-465d-a4ea-1ba453222f58/section/d0ffd564-eb83-463c-9b11-54356a7a64e5 (Higher) https://app.senecalearning.com/classroom/course/a45169f6-0419-4904-816d-963748c2bfba (Foundation)

	Or https://app.senecalearning.com/classroom/course/501a009a-2f22-465d-a4ea-1ba453222f58/section/d0ffd564-eb83-463c-9b11-54356a7a64e5 (Higher)
Personal Development and CEIAG	**P1 - Energy** This unit explores the use of both renewable and non-renewable energy resources, climate change and global warming issues are also addressed. Potential for career pathways, both locally and nationally/internationally in the energy and fuel industry. **P2 - Electricity** Pupils will also develop an appreciation for how the appliances you use every day are powered and possible causes should they fail. There is also an emphasis on the importance of electrical safety, including the safe use of static electricity and its benefits. Pupils will be given the opportunity to consider careers in the electricity industry, such as an electrician, electrical engineer.
Enrichment Opportunities (Cultural Capital)	**P1 - Energy** "Climate change. The facts" BBC, David Attenborough documentary - https://www.bbc.co.uk/programmes/m00049b1 "Get Energised was a science, engineering and technology engagement programme which ran until June 2019. A range of sessions and resources are still available" - https://www.nms.ac.uk/about-us/schools/get-energised/ **P2 - Electricity** "How it works" - https://www.youtube.com/watch?v=2g2M1dndmEg "The Story of electricity" - https://www.youtube.com/watch?v=NUUeGianTKM "Static Electricity – The Mechanical universe" - https://www.youtube.com/watch?v=pyMmRRIB5yw

	Year 10 – Spring Term **Physics** **P3 – Particle Model of Matter**
Prior Learning	**P3 – Particle Model of Matter** At key stage 3 pupils should have studied the structure of the atom during the topics Particle Model, Atoms, elements and compounds, Periodic Table and Conservation of Energy. Pupils should have learnt about how mass is conserved during changes of state and about the properties of solids, liquids and gases. Pupils should also be able to explain how particles are arranged in solids, liquids and gases and how this is affected by temperature. They should also be able to explain the particle model of matter and that atoms contain smaller charged particles called electrons as well as Conservation of Energy.
What will I learn?	During this unit, pupils will be able to explain different densities of substances and how to calculate density. They should be able to explain the difference between specific heat capacity and specific latent heat and how to calculate them. Pupils will be able to describe how changing the temperature of a gas affects its pressure and be able to apply the Kelvin and Celsius temperature scales. Pupils will be able to explain how the particles inside atoms are arranged and how to represent atoms using symbols. Pupils will explore the different types of radiation and how they affect atoms along with background radiation that is all around us. Pupils will discover the uses of radioactivity in the home and industry and the dangers of radiation and how we can protect ourselves. Pupils will discover how different radioactive materials are used to diagnose and treat cancer. Pupils will be able to explain the advantages and disadvantages of nuclear power, and explain what fusion and fission nuclear reactions are.
How will I be assessed?	Formative – Recall 5, Cold calling, skills such as graphs in books, retrieval homework task, mid topic assessment.

	Summative – End of topic assessment.
Next Steps	**P3 - Particle Model of Matter** This unit links with bonding, structure and the properties of matter in the GCSE Chemistry course.
Opportunities for Independent Learning	**P3 - Particle Model of Matter** Seneca Combined Science Physics: Focus eLearning by Focus Educational Software ltd. https://app.senecalearning.com/classroom/course/a45169f6-0419-4904-816d-963748c2bfba (Foundation) Or https://app.senecalearning.com/classroom/course/501a009a-2f22-465d-a4ea-1ba453222f58/section/d0ffd564-eb83-463c-9b11-54356a7a64e5 (Higher) https://www.bbc.co.uk/bitesize/topics/zxnvv9q - BBC Bitesize https://app.senecalearning.com/classroom/course/a45169f6-0419-4904-816d-963748c2bfba (Foundation) or https://app.senecalearning.com/classroom/course/501a009a-2f22-465d-a4ea-1ba453222f58/section/d0ffd564-eb83-463c-9b11-54356a7a64e5 (Higher) https://www.bbc.co.uk/bitesize/guides/z32cfcw/revision/1 - BBC Bitesize https://www.youtube.com/watch?v=lvqu6JAbaKc&list=PLAd0MSIZBSsGNWKdHJdQYIndKl3HZUrSB &index=5 – CORE PRACTICAL (Density) https://www.youtube.com/watch?v=loeRLKNeUsc&list=PLAd0MSIZBSsGNWKdHJdQYIndKl3HZUrSB &index=6 – CORE PRACTICAL (Specific heat capacity)
Personal Development and CEIAG	**P3 - Particle Model of Matter** There are some interesting areas of the topic that pupils can explore that might have a personal link to their life, in the form of the detection and treatment of cancer. For anyone with an interest in amateur dramatics or theatrical settings, pupils will be able to apply their knowledge and understanding of changes of state to appreciate how dry ice can be used to set the scene or increase the dramatics of a situation e.g. an illusion on stage. From this unit and area of study potential for career pathways can lead into nuclear medicine or nuclear power.
Enrichment Opportunities (Cultural Capital)	**P3 – Particle Model of Matter** The Real Chernobyl, SKY News documentary - https://www.youtube.com/watch?v=Xw3SFOfbR84 Visit CERN - https://visit.cern/tours/guided-tours-individuals https://www.pbs.org/wgbh/nova/zero/

	Year 10 – Summer Term **Physics** **P4 - Atomic Structure and P5 - Forces**
Prior Learning	**P4 - Atomic Structure** **During** key stage 3, pupils should have studied the structure of the atom in the following topics 7G - Particle Model, 7H - atoms, elements and compounds and 8F - Periodic Table. Pupils should have also learnt about the particle model of matter and that atoms contain smaller charged particles called electrons in P3 – Particle Model of Matter unit. **P5 – Forces** At key stage 3, pupils should have studied the structure of the atom in the topics 7K – Forces and 8K Energy Transfers. Pupils should have learnt the different ways in which energy can be stored and transferred. Pupils should also explain resultant forces, the effects of balanced and unbalanced forces and about moments as the turning effects of forces.

What will I learn?	**P4 – Atomic Structure** Pupils will learn about the structure of an atom, including mass number, atomic number and isotopes. Pupils explore when atomic nuclei are unstable with a particular focus on radioactive decay and nuclear radiation. Pupils will be able to calculate nuclear equations that are representing nuclear decay. Pupils will also explore the random nature of radioactive decay and radioactive contamination. **P5 – Forces** During this unit, pupils will explain difference between scalar and vector quantities. Pupils will learn how to calculate the weight of an object from its mass, momentum, and apply ideas about momentum to collisions (higher only). Pupils will be able to explain how the energy in a system can be changed and how to calculate power and work done. They should also be able to explain the relationship between force and extension and how to calculate the extension and spring constant and are able to calculate the work done when stretching a spring.
How will I be assessed?	Formative – Recall 5, Cold calling, skills such as graphs in books, retrieval homework task, mid topic assessment. Summative – End of topic assessment.
Next Steps	**P4 – Atomic Structure** This subject content is not revisited in other units. It will be covered in targeted revision sessions but should also form part of a detailed revision plan at home using the provided revision guides. **P5 – Forces** Aspects from this unit are revisited in P6 - Waves.
Opportunities for Independent Learning	Seneca Combined Science Physics: Focus eLearning by Focus Educational Software ltd. https://app.senecalearning.com/classroom/course/a45169f6-0419-4904-816d-963748c2bfba (Foundation) or https://app.senecalearning.com/classroom/course/501a009a-2f22-465d-a4ea-1ba453222f58/section/d0ffd564-eb83-463c-9b11-54356a7a64e5 (higher) https://www.bbc.co.uk/bitesize/guides/zt9smsg/revision/1 - BBC Bitesize https://www.youtube.com/watch?v=jQAt3e6Bz7U&list=PL-0dZdEk-XsJqjLFQ8CxDYoRh6qYABg1&index=6 – CORE PRACTICAL https://www.youtube.com/watch?v=wI-VkxEelxw&list=PL-0dZdEk-XsJqjLFQ8CxDYoRh6qYABg1&index=5 – CORE PRACTICAL https://www.youtube.com/watch?v=PKsMxaPbaWE – CORE PRACTICAL
Personal Development and CEIAG	This unit of work will provide pupils with an appreciation for the fundamental laws that underpin their understanding of the physical world. It will also help explain some phenomena that pupils experience on a daily basis but take for granted for example; gravity, static. Pupils will be able to apply their knowledge and understanding to real-life situations that they might have a particular interest, for example specialist sports and leisure activities such as pole vaulting or bungee jumping.
Enrichment Opportunities (Cultural Capital)	"BBC Laws of Nature: Hooke's Law" - https://www.bbc.co.uk/programmes/p033wsm9g "BBC: Robert Hooke Victim of Genius" - https://www.youtube.com/watch?v=sZrXv0dHARk "The secret life of Isaac Newton" - https://www.youtube.com/watch?v=Y2s2fyMoCCU BBC Timeline - https://www.bbc.co.uk/teach/isaac-newton-the-man-who-discovered-gravity/zh8792p "At the Edge of Space" Documentary - https://www.dailymotion.com/video/x3oeb9e Felix Baumgartner documentary 'Mission to the Edge of Space' - https://www.theverge.com/2013/10/15/4840200/felix-baumgartner-skydive-documentary-now-streaming-rdio