

Ian Ramsey CE Academy: PHYSICS Curriculum Progression Model

CURRICULUM OVERVIEW	Curriculum What we study. Why study it. Why study it now. <i>What we need pupils to have learnt at each point/end of each year and the logical connection and the sequential learning between what is studied in the different terms and between years. This is what is to be covered and when, effectively creating the idea that the intent is the curriculum. The intent is everything up to the point of teaching. The purpose of our curriculum and the knowledge we want our pupils to go away with in their working memory.</i>						How we teach the curriculum <i>How we make learning memorable and how we support our pupils to remember it. How we use rote, retrieval, interleaving, metacognition etc. in our teaching; why we teach in the way we are and justify decisions around how and why it is being taught this way.</i>	What we expect from the curriculum <i>How we make it challenging and ambitious for our pupils. How we assess learning, knowledge and understanding; what have they learnt and how well have they learnt it? Consider what assessments we use, when we use them and how and why we assess this way?</i>
	Setting		Designing		Planning		Delivering	
YEAR 7	What: Energy Stores & Transfers What: Building on ideas of energy at KS2, pupils explore types of energy, how they can be stored and transferred, followed by the developing ideas of energy efficiency and conservation.	What: Understanding Waves What: The idea of energy transfer as a wave is fundamental to the study of physics. Pupils will develop their learning from Year 6, about waves on water and basic properties of light and sound waves.	What: Different Forces What: This topic develops ideas of forces and what forces do. Pupils explore the effect of forces exerted on direction, speed, and shape. Pupils will consider forces of gravity, magnetism, and electricity.	What: Pressure What: This topic builds on forces and Introduces the idea of pressure as force per unit area. Pupils will develop important mathematical and scientific skills such as appropriate use of units.	What: Current Electricity What: Building on KS2 knowledge of circuits, an understand what current is and how it is measured, using different models to describe current flow in series and parallel circuits.	What: Measuring Density What: Pupils are introduced to the relationship between mass, density, volume.	The science curriculum at Ian Ramsey looks at the big ideas within science and re-visits each of these underpinning key concepts each year. This allows for a spiralling curriculum which allows for retrieval and practice before deepening the knowledge and understanding of each key concept. During Years 7-9 science is taught as a combination of biology, chemistry, and physics. At GCSE, these specialisms as individual disciplines, however the key concepts continue to underpin the curriculum across the five years.	Assessment for Learning is used in all lessons to provide evidence for use by pupils and teachers to decide where pupils are in their learning, where they need to go and how best to get there. Formative Assessment This is used to provide information about what pupils know, understand, and can do. This is used by both the teacher and the pupil to determine where pupils are in their learning and how to continue to develop their knowledge and skills within the subject. This will include: <ul style="list-style-type: none"> • Questioning • Effective teacher feedback (written and verbal) • Peer feedback • Pupil self-assessment Summative Assessment This is used at key points in each year to evaluation pupils' achievement. They allow a holistic view of pupils' performance and support identification of areas requiring additional focus to improve learning overall.
	Why now: Energy is not explicitly covered in KS2. Pupils need to develop skills with using thermometers to measure temperature and explore fundamental ideas about energy.	Why now: Introducing a more formal definition of waves and classifications. This topic will be reinforced during Year 8 when light and sound are studied in more depth.	Why now: Pupils revise the concept of force and further develop their understanding from KS2 and allowing pupils to connect understanding of energy transfer.	Why now: Pupils will probably not have met the concept of pressure at KS2, but they will have met ideas of force; extending previous unit of different forces.	Why now: Revising KS2 concepts and extending with a quantitative approach to current electricity and the introduction of measuring current.	Why now: Having studied properties of materials in KS2, learning to compare and group materials, pupils will consider what happens to particles in different states of matter.		
YEAR 8	What: Sound What: Exploring the concept of sound waves, pupils build on prior learning, considering its transmission through states of matter; representation of sounds as waves and the structure/function of the ear.	What: Light What: Developing understanding of waves, pupils move from sound to light waves. They will look at how light travels, how it can be reflected, transmitted, or absorbed. Pupils will also develop an understanding of refraction.	What: Earth and Space What: Prior KS2 knowledge and understanding of space linked to the Year 7 forces unit, is developed through considering the Earth and the solar system. Pupils builds on prior learning of mass and gravitational force	What: Magnets/Electromagnets What: Pupils continue to develop understanding of forces and fields using magnetic. Pupils are Introduced the motor effect, to establish a key fundamental concept which is built on in later learning.	What: Static Electricity What: Pupils develop and apply their understanding of static charge and electrical conductors/insulators to develop idea around static electricity and positive and negative charges and atoms	What: Solids, liquids, and gases What: Pupils build and develop understanding of atoms. This furthers the particle model taught in Year 7 chemistry and will support its teaching in Year 9 chemistry, looking at thermodynamics.	Physics: <ul style="list-style-type: none"> • Energy and waves • Forces and fields • Matter and materials 	
	Why now: Pupils study sound at KS2 and, in Year 7, pupils have been introduced to both longitudinal and transverse waves, extending their knowledge and understanding.	Why now: Pupils will have studied light during Year 6 and in Year 7 pupils have considered light as part of a wider topic. This focuses on light and introduces pupils to refraction.	Why now: Learning about the solar system in KS2 is developed using knowledge of forces and pressure from Year 7, deepening pupils' understanding.	Why now: Pupils will build on their knowledge of magnets, making potential connections with their prior learning on forces and magnets linked to their learning of the Earth.	Why now: In the Year 7 pupils have explored static forces as well as electrical conductors and insulators. This unit will connect the two and build on previous knowledge.	Why now: Pupils build on prior learning about the density of solids, liquids, and gases and how they apply to different states of matter, supporting preparation for Year 9 Chemistry.		
YEAR 9	What: Energy Transfer What: Introducing thermal energy /temperature and factors affecting energy in a heated substance. Pupils consider energy transfer by radiation, conduction, and convection based on particle model.	What: Energy and efficiency What: Graphical representation of energy transfer using energy and Sankey diagrams. Energy conservation is revisited as well as revisiting renewable and non-renewable energy resources.	What: Waves and EM What: Pupils will build on their understanding that waves transfer energy and will be able to describe waves and the difference between longitudinal and transverse waves introduced in Year 8.	What: Describing motion What: Understanding of vector and scalar quantities differences, presenting pupils directional quantities, calculating speed as well as acceleration, representing distance moved and speed change on graphs.	What: Forces and Matter What: Building on knowledge of forces causing objects to change size and shape and the understanding between force exerted and the amount of deformation.	What: Describing atoms What: This topic builds on previous knowledge of particles and begins to look at the internal structure of atoms and how our model of the atom has developed.		
	Why now: It provides opportunities to revisit and revise ideas concerning the particle theory of solids liquids and gases.	Why now: This topic builds on previous work on energy stores and transfers and a formalised and quantitative approach is taken.	Why now: This topic extends previous learning about waves, studying the wave equation. Pupils learn the order of the EM spectrum of frequency and wavelength.	Why now: This builds on learning around forces, allowing pupils to revisit prior learning and develop skills how this is presented.	Why now: Providing an opportunity to revise ideas of density and pressure from Year 7, extending this by considering pressure in fluids and floating and sinking.	Why now: By now, pupils are familiar with the particle model of matter within chemistry. Pupils recap and consolidate ideas from the Year 9 Chemistry.		

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Year 10 and Year 11	What: Using Reflection and Refraction What: Pupils revisit prior learning looking at waves and consolidating understanding of reflection and refraction, considering how waves will reflect and refract given the right circumstances and the differences in transmission and absorption at material boundaries depend on the materials.	What: Forces and Work Done What: Pupil will develop their understanding of what is meant by work done – the scientific way of saying energy has been transferred, power, kinetic energy, gravitational potential and efficiency, and how it can be measured and calculated. Pupils will build on their prior knowledge and introduce a quantitative approach and key formulae.	What: Using Electricity What: This topic links builds on prior learning by exploring in more depth the relationship with voltage and current. It Pupils explore resistance both quantitatively and qualitatively.	What: Particles and Gases What: Pupils will build on knowledge of states of matter and the particle model. This unit deepens understanding of how particles behave in a gas relates to its properties such as pressure, volume and temperature and that doing work on a gas can cause an increase in temperature.	What: Using EM Waves What: Pupils will know about the properties associate with electromagnetic waves and the EM spectrum to understand that all bodies emit radiation and that the emission of radiation depends on temperature. This topic builds on prior knowledge of the EM spectrum and the vibrations being a result of changes in electrical and magnetic fields.	What: Movement What: Pupils build on previous knowledge of force and acceleration. Newton’s Laws are introduced, which are fundamental within physics and their understanding of the world, leading to a study of momentum including collisions and of car safety.	The science curriculum at Ian Ramsey looks at the big ideas within science and re-visits each of these underpinning key concepts each year. This allows for a spiralling curriculum which allows for retrieval and practice before deepening the knowledge and understanding of each key concept. During Years 7-9 science is taught as a combination of biology, chemistry, and physics. At GCSE, these specialisms as individual disciplines, however the key concepts continue to underpin the curriculum across the five years. Physics: <ul style="list-style-type: none"> • Energy and waves • Forces and fields • Matter and materials 	Assessment for Learning is used in all lessons to provide evidence for use by pupils and teachers to decide where pupils are in their learning, where they need to go and how best to get there. Formative Assessment This is used to provide information about what pupils know, understand, and can do. This is used by both the teacher and the pupil to determine where pupils are in their learning and how to continue to develop their knowledge and skills within the subject. This will include: <ul style="list-style-type: none"> • Questioning • Effective teacher feedback (written and verbal) • Peer feedback • Pupil self-assessment Summative Assessment This is also used at key points in each year to evaluation pupils’ achievement. They allow a holistic view of pupils’ progress and support the identification of areas requiring additional focus to improve learning overall.
	Why now: The key ideas and concepts underpinning this topic were introduced in KS3. The predominantly supports separate sciences route, but provides opportunity for the combined science to revisit and revise the previous topics.	Why now: This topic explores the link between energy transfer, work done, and efficiency and prepares pupils for a more in-depth look at the using electricity and how its power is calculated and measured.	Why now: During this topic concepts previously covered are revisited to consolidate understanding. The effect of resistance in circuits and the resistance characteristics of several circuit components will be studied in greater depth.	Why now: Pupils will have met the particle and kinetic theory and linked these to the properties of solids liquids and gases and changes of state. They are familiar with density and pressure.	Why now: This topic pulls together lots of ideas concerning waves from previous topics, providing an ideal opportunity to revise key ideas and terminology about waves.	Why now: Pupils have considered ways to describe and represent using calculations of speed and acceleration and with velocity/time graphs. This topic looks at the link between force and motion.		
	What: Electromagnetic Effects What: Pupils build on the concept of electromagnetism and extend this knowledge to encompass the motor effect and electromagnetic induction. They will also develop an understanding of how transformers work and how to calculate the current and voltage produced by a transformer.	What: Using Radioactivity What: Pupils build on the concept of radioactivity they will understand that radioactive decay is a natural process and know the origin of background radiation and how radiation can be detected. They will also revisit the types of radiation, introduce radioactive decay and half-life and the uses and dangers of radioactivity.	What: Key Concept Review and CORE PRACTICAL and CONSOLIDATION What: Pupils will re-visit the key concepts to aid retrieval for examinations. Pupils will also re-visit each core practical to re-enforce the practical skills to consolidate the key knowledge and understanding of each.	Separate Physics units: <ul style="list-style-type: none"> • Astronomy • Nuclear Physics These will be taught as two separate units; astronomy at the end of Year 10 and nuclear physics at the end of the course in Year 11.				
	Why now: This topic starts with work that should largely be revision. Electromagnets were also introduced in year 8 but will be revisited. Higher strand pupils will need to develop a good understanding of the motor effect.	Why now: Pupils will need to be familiar with the knowledge covered in the Year 9 topic, this deepens understanding of radioactivity.	Why now: Pupils are provided the opportunity to review key ideas and provide starting point for examination revision and practise key practical skills prior to examination, providing opportunities to ensures all pupils have completed core practical activities or repeat core practicals where needed.					

