

# NKS Physics Curriculum Map 2022-23

## The purpose of studying Physics at NKS is...

The Science Curriculum at NKS ensures that:

- Students develop their scientific knowledge and conceptual understanding in Biology, Chemistry and Physics
- Students build up, and confidently use specialist vocabulary
- Students are able to address scientific questions through enquiry
- Students can competently demonstrate their practical skills
- Students can assess information using reliable scientific data and evidence

## Year 7

### Our curriculum builds on and extends this by:

- Throughout Year 7 students will study two Biology (Biology A and B), two Chemistry (Chemistry A and B) and two Physics topics (Physics A and B).
- Each group will rotate through the subjects by studying one unit each. Consequently, the actual teaching order may differ from the one below.
- The programme of study allows students to develop a secure understanding of each block, before moving onto the next. All units include planning investigations, recording and analysing data, writing conclusions and evaluations.
- Students have five lessons a fortnight

### Our curriculum builds on and extends this by sequencing units to encourage/allow a deeper appreciation of interrelated concepts.

The GCSE Physics AQA SoW begins by building on topics covered at KS3: Circuits and Energy, Forces and Waves. Physics principles are embedded throughout using modelling, mathematics and practical investigative work. Required Practical's engage students, embed skills, and enable the linking of application of knowledge to practice and data analysis, whilst respecting safe and ethical working practices.

Good Science includes investigating, observing, experimenting and testing out ideas. These scientific ideas flow through the Schemes of Work and more details of each of the skills can be found on the below links:

[Physics GCSE Developing Scientific Skills](#)

[A Level Physics Practical Skills](#)

	<b>Term 1</b>	<b>Term 2</b>	<b>Term 3</b>	<b>Term 4</b>	<b>Term 5</b>	<b>Term 6</b>
<b>Content – Knowledge and Understanding</b>	<ul style="list-style-type: none"> <li>• Introduction to Science/Primary transition.</li> <li>• Organisms, Movement and Human Reproduction (Biology A)</li> </ul>	<ul style="list-style-type: none"> <li>• The Particle Model and Separating Mixtures (Chemistry A)</li> </ul>	<ul style="list-style-type: none"> <li>• Circuits and Energy (Physics A)</li> </ul>	<ul style="list-style-type: none"> <li>• Interdependence, Plant reproduction and Variation (Biology B)</li> </ul>	<ul style="list-style-type: none"> <li>• Acids and Alkalis and Metals and non-metals (Chemistry B)</li> </ul>	<ul style="list-style-type: none"> <li>• Forces: Speed, Gravity and Waves (Physics B)</li> </ul>
<b>Skills and concepts</b>	<ul style="list-style-type: none"> <li>• Working Scientifically Skills: Scientific attitudes, experimental skills, analysis and evaluation.</li> <li>• Identifying and selecting appropriate scientific equipment</li> <li>• Understanding that some concepts have both scientific and common ways to refer to them.</li> </ul>					
<b>Assessment</b>	Baseline testing Regular Afl embedded into lessons End of Topic test	Regular Afl embedded into lessons End of Topic test	Regular Afl embedded into lessons End of Topic test	Regular Afl embedded into lessons End of Topic test	Regular Afl embedded into lessons End of Topic test	Regular Afl embedded into lessons End of Topic test
<b>Enrichment and extension</b>	<ul style="list-style-type: none"> <li>○ <b>Young scientists journal ECA</b></li> <li>○ <b>Science week activities (March)</b></li> <li>○ <b>World Space Week Activities (October)</b></li> </ul>					

# NKS Physics Curriculum Map 2022-23

## Year 8

**Our Y8 curriculum builds on and extends the work done in Y7 by:**

- Throughout Year 8 students will study two Biology (Biology C and D), two Chemistry (Chemistry A and B) and two Physics topics (Physics A and B).
- Each group will rotate through the subjects by studying one unit each. Consequently, the actual teaching order may differ from the one below.
- Units are sequenced to allow students to develop a secure understanding of each block, before moving onto the next. All units include planning investigations, recording and analysing data, writing conclusions and evaluations.

Students have five lessons a fortnight

	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
<b>Content – Knowledge and Understanding</b>	Breathing and Nutrients (Biology C)	An introduction to the Periodic Table and Representing Chemical reactions (Chemistry C)	Contact Forces, Pressure and Work (Physics C)	Photosynthesis and Evolution (Biology D)	Types of Chemical reaction and an introduction to Chemical Energy and The Earth (Chemistry D)	Electromagnets, Waves and Space (Physics D)
<b>Skills and Concepts</b>	<ul style="list-style-type: none"> <li>• Working Scientifically Skills: Scientific attitudes, experimental skills, analysis and evaluation.</li> <li>• Identifying and selecting appropriate scientific equipment</li> <li>• Understanding that some concepts have both scientific and common ways to refer to them.</li> </ul>					
<b>Assessment</b>	Regular Afl embedded into lessons End of Topic test	Regular Afl embedded into lessons End of Topic test	Regular Afl embedded into lessons End of Topic test	Regular Afl embedded into lessons End of Topic test	Regular Afl embedded into lessons End of Topic test	Regular Afl embedded into lessons End of Topic test
<b>Enrichment and extension</b>	<ul style="list-style-type: none"> <li>○ Science and Technology Challenge</li> <li>○ Young Scientists Journal (ECA)</li> <li>○ Salters Challenge</li> <li>○ World Space Week (October)</li> </ul>					

# NKS Physics Curriculum Map 2022-23

## Year 9

In year 9, students revisit the concept of Energy, building on stores of energy with the store and pathways model. Students also look ways of converting energy into electrical power and the pros and cons of each method.

Then, Electricity is described as a transfer of energy around a circuit. Students learn to draw standard circuit diagrams and calculate electrical quantities mathematically. This is used to explore how electricity is used in their homes and radiation topics are used to look at Physics' impact on the wider environment and discuss how Physics can impact the wider world.

Working Scientifically and Maths Skills referenced are listed in the specification, found here: [AQA | GCSE | Physics | Specification at a glance](#)

	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
<p><b>Content – Knowledge and Understanding</b></p> <p><b>Triple Only Content</b></p> <p><b>Skills and concepts</b></p>	<p>Energy - Using the stores and Pathways Model</p> <p><b>Required Practical Specific Heat Capacity</b></p> <p>Working Scientifically: 4.5, 1.2, 1.4, 1.3, 3.5, 4.4, 4.5, 4.6</p> <p>Maths Skills: 1a,c 2c &amp; 3b,c</p> <p>AT 1, 5</p>	<p>Earth's Energy Resources</p> <p><b>Required Practical The Effect of Thermal Insulation</b></p> <p>Working Scientifically 4.5, 1.2, 1.4, 1.3, 3.5, 4.4, 4.5, 4.6</p> <p>Maths Skills: 1a,c 2c 3b,c</p> <p>AT 1, 5</p>	<p>Electric Circuits – <i>In terms of defining current as the result of potential difference and resistance. Rather than current as the foundation of electricity.</i></p> <p><b>Required Practical Calculating Resistance of a Wire I-V Characteristics of electrical components</b></p> <p><b>Static Electricity</b></p> <p>Working Scientifically 1.2, 1.4</p> <p>Maths Skills: 1c 3b,c,d 4c,d,e</p> <p>AT 6</p>	<p>Energy in the Home</p> <p>Working Scientifically 1.2 1.4, 1.5, 4.5</p> <p>Maths Skills: 1a,b,c 3b,c</p>	<p>The Particle Model</p> <p><b>Required Practical Calculating the Density of regular and irregular shaped objects</b></p> <p><b>Measuring and Increasing Pressure in Gasses</b></p> <p>Working Scientifically 1.2, 3.5</p> <p>Maths Skills: 1a, b,c 3b,c, d 4a</p> <p>AT 5</p>	<p>Atomic Structure and Radiation</p> <p>Working Scientifically 1.1, 1.5, 4.1, 4.4</p> <p>Maths Skills: 1b,c 3c,d 4a</p>
<b>Assessment</b>	<p>Regular Afl embedded into lessons</p> <p>Interim marked test</p>	<p>Regular Afl embedded into lessons</p> <p>GCSE Style Test covering all of term 1 and term 2 content</p>	<p>Regular Afl embedded into lessons</p> <p>Interim marked test</p>	<p>Regular Afl embedded into lessons</p> <p>GCSE Style Test covering all of term 3 and 4 content</p>	<p>Regular Afl embedded into lessons</p> <p>Interim Marked Test</p>	<p>End of Year exams covering all year 9 content</p>
<b>Enrichment and extension</b>	<ul style="list-style-type: none"> <li>○ Space Club</li> <li>○ THiNKS Lectures</li> </ul>					

# NKS Physics Curriculum Map 2022-23

## Year 10

In year 10, the relationship between force and energy is explored on the macro scale through Newton's three laws, Hooke's law and the idea of conservation of momentum. Students are taught to represent forces numerically (through the study of equations of motion), pictorially (using vector diagrams) and graphically (using graphs of motion)

Working Scientifically and Maths Skills referenced are listed in the specification, found here: [AQA | GCSE | Physics | Specification at a glance](#)

	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
<p><b>Content –</b> Knowledge and Understanding</p> <p><b>Triple Only Content</b></p>	<p>Forces in Balance</p> <p><b>Moments, levers and gears</b></p>	<p>Motion</p> <p><b>Required Practical Calculating Acceleration</b></p>	<p>Forces and Motion</p> <p><b>Required Practical Hooke's Law</b></p> <p><b>Calculating changes in momentum during a collision and pressure</b></p>	<p>PPE Preparation (Usually a full Paper 1, which is all Year 9 content)</p>	<p>Wave Properties</p>	<p>Wave Properties</p> <p><b>Required Practical The effect of different surfaces on IR absorption Waves in a Ripple Tank</b></p> <p><b>Light, Sound Waves (including ultrasound) and Seismic Waves</b></p>
<p><b>Skills and concepts</b></p>	<p>Working Scientifically 1.2, 3.5, 4.5, 4.6 Maths Skills: 1c, 3a,b,c 4a 5a,c</p>	<p>Working Scientifically 1.2, 3.5, 4.5, 4.6 Maths Skills: 1c, 3a,b,c 4a 5a,c</p>	<p>Working Scientifically 1.2, 1.5, 3.5, 4.5, 4.6, 4.2 Maths Skills: 1c,d 3a,b,c 4a 5a,c AT 1,2</p>	<p>Working Scientifically 1.2, 1.5, 3.5, 4.5, 4.6, 4.2 Maths Skills: 1c,d 3a,b,c 4a 5a,c</p>	<p>Working Scientifically 1.2, 1.5, 3.5, 4.5, 4.6, 4.2 Maths Skills: 1c,d 3a,b,c 4a 5a,c</p>	<p>Working Scientifically 1.2, 1.5, 3.5, 4.5, 4.6, 4.2 Maths Skills: 1c,d 3a,b,c 4a 5a,c</p>
<p><b>Assessment</b></p>	<p>Regular Afl embedded into lessons Interim Marked Test</p>	<p>Regular Afl embedded into lessons Interim Marked Test</p>	<p>Regular Afl embedded into lessons Multiple Choice Test focussing on using Equations</p>	<p>PPE – Paper 1</p>	<p>Regular Afl embedded into lessons GCSE Style Test covering all of Forces</p>	<p>Regular Afl embedded into lessons Interim Marked Test</p>
<p><b>Enrichment and extension</b></p>	<ul style="list-style-type: none"> <li>○ Space Club</li> <li>○ Physics Olympiad</li> <li>○ Enrichment Week Trip to CERN (currently suspended)</li> </ul>					

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## Year 11

Finally, in year 11 the interaction between energy and force is explored beyond visible physics by exploring the effects of magnetism, electromagnetism and the EM spectrum. Students studying triple science also complete a unit studying space (limited to the constituent parts of the universe and the birth of the universe)

Working Scientifically and Maths Skills referenced are listed in the specification, found here: [AQA | GCSE | Physics | Specification at a glance](#)

	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
<b>Content –</b> Knowledge and Understanding  <b>Triple only Content</b>	Electromagnetic Radiation	Properties of Light PPE Paper 1 Preparation  <b>Required Practical Reflection and Refraction (Physics Only)</b>  <b>Lenses</b> <b>Visible Light</b> <b>Black Body Radiation</b>	Electromagnetic Effects	Electromagnetic Effects PPE Paper 2 Preparation	Exam Period	Exam Period
<b>Skills and concepts</b>	Working Scientifically 1.2, 3.5, 4.5, 4.6  Maths Skills: 1c, 3a,b,c 4a 5a,c	Working Scientifically 1.2, 3.5, 4.5, 4.6  Maths Skills: 1c, 3a,b,c 4a 5a,c	Working Scientifically 1.2, 3.5, 4.5, 4.6 Maths Skills: 1c, 3a,b,c 4a 5a,c	Working Scientifically 1.2, 3.5, 4.5, 4.6  Maths Skills: 1c, 3a,b,c 4a 5a,c		
<b>Assessment</b>	Regular Afl embedded into lessons  Interim Marked Test	<b>PPE paper 1</b>	Regular Afl embedded into lessons  Interim Marked Test	<b>PPE paper 2</b>	Regular Afl embedded into lessons	Regular Afl embedded into lessons
<b>Enrichment and extension</b>	<ul style="list-style-type: none"> <li>○ Science Live! Conference (currently suspended)</li> </ul>					

# NKS Physics Curriculum Map 2022-23

## Year 12

At A level, students follow the OCR A course; this offers the students a challenging scheme but remains accessible to the majority. The structure of the course is linear and therefore we don't deviate from the prescribed route. This allows the move of students from A Level to AS only entry if necessary. The Year 12 course starts with GCSE transition tasks and the teaching of Module 2: Foundations of Chemistry.

This course is split equally and taught by both teachers and continually revisited throughout the two year course. In a similar way to GCSE we use the required practical activities to back up theoretical concepts. This allows students to have a more inquiry led experience.

"PAG"s refer to assessed practical activities. More information can be found on the OCR Website, here: [A Level Physics A and Physics B \(Advancing Physics\) Practical Activities Support Guide \(ocr.org.uk\)](https://www.ocr.org.uk)

	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
<b>Content – Knowledge and Understanding</b>	Foundations in Physics <ul style="list-style-type: none"> <li>• Quantities and Units</li> <li>• Scalar and Vector</li> <li>• Resolving Vectors</li> </ul> Modelling Physics <ul style="list-style-type: none"> <li>• Speed</li> <li>• Acceleration</li> <li>• V-T Graphs</li> <li>• Equations of Motion</li> </ul> Exploring Physics <ul style="list-style-type: none"> <li>• Moving Charge</li> <li>• Kirchhoff's First Law</li> <li>• Electron Drift Velocity</li> </ul>	Modelling Physics <ul style="list-style-type: none"> <li>• Representing Forces</li> <li>• Density</li> </ul> Exploring Physics <ul style="list-style-type: none"> <li>• Energy Power and Resistance</li> <li>• Electrical Circuits</li> </ul>	Modelling Physics <ul style="list-style-type: none"> <li>• Representing Forces</li> <li>• Density</li> </ul> Exploring Physics <ul style="list-style-type: none"> <li>• Wave Theory</li> </ul>	Modelling Physics <ul style="list-style-type: none"> <li>• Materials Physics</li> <li>• Laws of Motion and Momentum</li> </ul> Exploring Physics <ul style="list-style-type: none"> <li>• Wave Theory</li> </ul>	Modelling Physics <ul style="list-style-type: none"> <li>• Laws of Motion and Momentum</li> </ul> Exploring Physics <ul style="list-style-type: none"> <li>• Quantum Physics</li> </ul>	Physics Research Project
<b>Skills and concepts</b>	PAG 1 PAG 3	PAG 2 PAG 4		PAG 5	PAG 6	PAG 9 PAG 12
<b>Assessment</b>	Regular Afl embedded into lessons Interim Marked Test	Regular Afl embedded into lessons Interim Marked Test	Regular Afl embedded into lessons Interim Marked Test	Regular Afl embedded into lessons Interim Marked Test	Regular Afl embedded into lessons Interim Marked Test	
<b>Enrichment and extension</b>	<ul style="list-style-type: none"> <li>○ Physics Olympiad</li> <li>○ Dungeness Visit (currently suspended)</li> </ul>					

# NKS Physics Curriculum Map 2022-23

## Year 13

At A level, students follow the OCR A course; this offers the students a challenging scheme but remains accessible to the majority. The structure of the course is linear and therefore we don't deviate from the prescribed route. This allows the move of students from A Level to AS only entry if necessary. The Year 12 course starts with GCSE transition tasks and the teaching of Module 2: Foundations of Chemistry.

This course is split equally and taught by both teachers and continually revisited throughout the two year course. In a similar way to GCSE we use the required practical activities to back up theoretical concepts. This allows students to have a more inquiry led experience.

"PAG"s refer to assessed practical activities. More information can be found on the OCR Website, here: [A Level Physics A and Physics B \(Advancing Physics\) Practical Activities Support Guide \(ocr.org.uk\)](https://www.ocr.org.uk)

	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
<b>Content – Knowledge and Understanding</b>	Modelling Physics <ul style="list-style-type: none"> <li>• Circular motion</li> <li>• Gravitational Fields</li> </ul> Exploring Physics <ul style="list-style-type: none"> <li>• Capacitance</li> <li>• Electric Fields</li> </ul>	Modelling Physics <ul style="list-style-type: none"> <li>• Stars</li> <li>• Cosmology</li> </ul> Exploring Physics <ul style="list-style-type: none"> <li>• Magnetic Fields</li> <li>• Particle Physics</li> </ul>	Modelling Physics <ul style="list-style-type: none"> <li>• Oscillations</li> </ul> Exploring Physics <ul style="list-style-type: none"> <li>• Radioactivity</li> </ul>	Modelling Physics <ul style="list-style-type: none"> <li>• Thermal Physics</li> <li>• The Ideal Gas</li> </ul> Exploring Physics <ul style="list-style-type: none"> <li>• Nuclear Physics</li> </ul>	Modelling Physics <ul style="list-style-type: none"> <li>• Ideal Gas</li> </ul> Exploring Physics <ul style="list-style-type: none"> <li>• Medical Physics</li> </ul>	Exam Period
<b>Skills and concepts</b>	PAG 8	PAG 10	PAG 7 PAG 11			
<b>Assessment</b>	Regular Afl embedded into lessons Interim Marked Test	Regular Afl embedded into lessons Interim Marked Test	Regular Afl embedded into lessons Interim Marked Test	Regular Afl embedded into lessons Interim Marked Test	Regular Afl embedded into lessons Interim Marked Test	Regular Afl embedded into lessons Interim Marked Test
<b>Enrichment and extension</b>	<ul style="list-style-type: none"> <li>○ Physics Olympiad</li> <li>○ Dungeness Visit (currently suspended)</li> </ul>					