NOTTINGHAM GIRLS' ACADEMY

KS5 Physics Curriculum

Purpose of Study

A high-quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. Science has changed our lives and is vital to the world's future prosperity, and all pupils should be taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational knowledge and concepts, pupils should be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes.

Aims

The Nottingham Girls' Academy curriculum for science aims to ensure that all pupils:

- develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics
- develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them
- are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future

Scientific knowledge and conceptual understanding

The programmes of study describe a sequence of knowledge and concepts. While it is important that pupils make progress, it is also vitally important that they develop secure understanding of each key block of knowledge and concepts in order to progress to the next stage. Insecure, superficial understanding will not allow genuine progression: pupils may struggle at key points of transition (such as between primary and secondary school), build up serious misconceptions, and/or have significant difficulties in understanding higher-order content.

Pupils should be able to describe associated processes and key characteristics in common language, but they should also be familiar with, and use, technical terminology accurately and precisely. They should build up an extended specialist vocabulary. They should also apply their mathematical knowledge to their understanding of science, including collecting, presenting and analysing data. The social and economic implications of science are important but, generally, they are taught most appropriately within the wider school curriculum: teachers will wish to use different contexts to maximise their pupils' engagement with and motivation to study science.

The nature, processes and methods of science

'Working scientifically' specifies the understanding of the nature, processes and methods of science for each year group. It should not be taught as a separate strand. The notes and guidance give examples of how 'working scientifically' might be embedded within the content of biology, chemistry and physics, focusing on the key features of scientific enquiry, so that pupils learn to use a variety of approaches to answer relevant scientific questions. These types of scientific enquiry should include: observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigations); and researching using secondary sources. Pupils should seek answers to questions through collecting, analysing and presenting data. 'Working scientifically' will be developed further at key stages 3 and 4, once pupils have built up sufficient understanding of science to engage meaningfully in more sophisticated discussion of experimental design and control

Medium Term Plan: Physics

Curriculum-at-a-Glance: Physics

	Half Term 1	Half Term 2	Half Term 3	Half Term 4	Half Term 5	Half Term 6
Year 7	Good scientist Organisms 1	Forces 1 Matter 1	Energy 1 Ecosystems 1	Waves 1 Electromagnets 1	Reactions 1 Earth 1	Genes 1
Year 8	Reactions 2 Genes 2	Waves 2 Organisms 2	Electromagnets 2 Earth 2	Ecosystems 2 Forces 2	Energy 2	Matter 2
Year 9 (GCSE from Term 3)	Reproduction Working scientifically skills	Space	P4 Atomic structure C1 Periodic table	P3 Particles C2 Bonding	C2 Bonding P1 Energy	B1 Cells C3 Quantitative chemistry
Year 10 (GCSE)	B1 Cells C3 Quantitative chemistry	B2 Organisation C4 Chemical changes	P2 Electricity B3 Infection & Response	B4 Bioenergetics C5 Energy changes	P5 Forces	B5 Homeostasis C6 Rates
	GCSE topics in Year 10 are often taught in rotation depending on specialist staff timetables. The same applies in Year 11.					
Year 11 (GCSE)	B6 Inheritance C7 Organic P6 Waves	C8 Chemical analysis C9 Atmosphere	B7 Ecology P7 Electromagnetism	C10 Using resources	Revision & examinations	Revision & examinations
Year 12						
Year 13						

Year 12 Physics

Knowledge, Qualifications and Assessment
What pupils will study during Year 7, our ambition for the knowledge they retain and subject specific skill they will develop and how learning will be assessed formatively and summatively.

Unit Title	***Periods***	***Learning Challenge*** *What will pupils produce at the end of a unit to demonstrate their learning?*	***Learning Journey*** *What knowledge and subject specific skills will pupils learn in order to complete the Learning Challenge?*	***Learning Consolidation*** *What prior learning will pupils consolidate using spaced retrieval and spaced practice?*
Good scientist	***12***			
Forces 1	***6***			
Electromagnets 1	***6***			
Energy 1	***5***			
Waves 1	*10*			
Matter 1	***15***			
Reactions 1	***12***			
Earth 1	***10***			
Organisms 1	***9***			
Ecosystems 1	***7***			
Genes 1	***10***			

Qualities
During Year 12, pupils will have opportunities to develop the following BUILD qualities:

Medium Term Plan: Physics

BUILD Quality	***How the KS3 Science curriculum contributes to developing this quality:***
Respect	***Environmental concerns,***
Kindness	***Practicals and group work***
Tolerance	***Practicals and group work, class discussions***
Resilience	***Graphing skills***
Creativity	***Making models***
Positivity	***Static electricity***
Integrity	***Class discussions - puberty***
Aspiration	
Empathy	***Class discussions***

Skills

During Year 12, pupils will have opportunities to develop the following wider skills:

Skill Area	***How the KS3 Science curriculum contributes to developing this skill area:***
Literacy & Numeracy	Correctly use some SI units, Present data using a bar graph, rearrange and substitute values in equations
Communication	*Presenting data*
Problem Solving	Ask questions based on behaviour of the world
Leadership	
Collaboration	*Teamwork when carrying out practicals*
Metacognition	*Interleaving of assessments & retrieval*
Physical, Practical and Technical	Conduct experiments to test predictions, Identify some hazards. make and record simple observations in a table, make predictions using scientific language and understanding
Digital Literacy	*Use of Onenote and Teams*

Enrichment
During Year 12, the following events, visits, and trips will enrich the Physics curriculum:

Event, Visit or Trip	***Linked unit(s) of study***	***How the event, visit or trip enriches the curriculum:***
Biology week	***Theme dependent***	*Developing skills related to working scientifically to themed lessons outside of the curriculum content. Looking at the wider world and how science plays a role.*
Chemistry	***Theme dependent***	*Developing skills related to working scientifically to themed lessons outside of the curriculum content. Looking at the wider world and how science plays a role.*
Science week	***Theme dependent***	*Developing skills related to working scientifically to themed lessons outside of the curriculum content. Looking at the wider world and how science plays a role.*
Women in engineering week	***Theme dependent***	*Developing skills related to working scientifically to themed lessons outside of the curriculum content. Looking at the wider world and how science plays a role. Making links with careers in engineering/ STEM.*
CREST awards	***Dependent on student project choice***	*Development of research and scientific investigation skills to present a project. Students link topics from the classroom to real world problems, examining ways to solve current issues in a scientific way.*
Eco group	***Various***	
STEM club	***Industrial strategy challenges***	

Year 13 Physics

Knowledge, Qualifications and Assessment
What pupils will study during Year 13 our ambition for the knowledge they retain and subject specific skill they will develop and how learning will be assessed formatively and summatively.

Unit Title	***Periods***	***Learning Challenge*** *What will pupils produce at the end of a unit to demonstrate their learning?*	***Learning Journey*** *What knowledge and subject specific skills will pupils learn in order to complete the Learning Challenge?*	***Learning Consolidation*** *What prior learning will pupils consolidate using spaced retrieval and spaced practice?*
Forces 2	***8***			
Electromagnets 2	***4***			

Energy 2	***10***			
Waves 2	***4***			
Matter 2	***10***			
Reactions 2	***7***			
Earth 2	***5***			
Organisms 2	***10***			
Ecosystems 2	***7***			
Genes 2	***10***			

Qualities

During Year 13, pupils will have opportunities to develop the following BUILD qualities:

BUILD Quality	***How the KS3 Science curriculum contributes to developing this quality:***
Respect	***Diet, smoking, alcohol & exercise***
Kindness	***Diet, smoking, alcohol & exercise***
Tolerance	***Diet, smoking, alcohol & exercise***
Resilience	
Creativity	***Models of DNA, ecosystem in a box***
Positivity	
Integrity	
Aspiration	
Empathy	***Preserving biodiversity***

Skills

During Year 13, pupils will have opportunities to develop the following wider skills:

Skill Area	***How the KS3 Science curriculum contributes to developing this skill area:***
Literacy & Numeracy	***Conservation of mass***
Communication	***Listening, discussions***
Problem Solving	***Mutations***
Leadership	***Group work***
Collaboration	***Climate change, recycling, extraction of resources***
Metacognition	***Interruption activities, interleaving of assessments***

Physical, Practical and Technical	Conduct experiments to test predictions, Identify some hazards. make and record simple observations in a table, make predictions using scientific language and understanding
Digital Literacy	***Use of OneNote and Teams, dataloggers***

Enrichment

During Year 13, the following events, visits, and trips will enrich the Science curriculum:

Event, Visit or Trip	***Linked unit(s) of study***	***How the event, visit or trip enriches the curriculum:***
Biology week	*Theme dependent*	*Developing skills related to working scientifically to themed lessons outside of the curriculum content. Looking at the wider world and how science plays a role.*
Chemistry week	*Theme dependent*	*Developing skills related to working scientifically to themed lessons outside of the curriculum content. Looking at the wider world and how science plays a role.*
Science week	*Theme dependent*	*Developing skills related to working scientifically to themed lessons outside of the curriculum content. Looking at the wider world and how science plays a role.*
Women in engineering week	*Theme dependent*	*Developing skills related to working scientifically to themed lessons outside of the curriculum content. Looking at the wider world and how science plays a role. Making links with careers in engineering/ STEM.*
CREST awards	*Dependent on student project choice*	*Development of research and scientific investigation skills to present a project. Students link topics from the classroom to real world problems, examining ways to solve current issues in a scientific way.*
Eco group	***Various***	
STEM club	***Industrial strategy challenges***	