NKS Biology Curriculum Map 2021

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 answer scientific questions through enquiry
- Students can competently demonstrate their practical skills

For further information please contact:

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Year 7

Prior to joining NKS students will have studied Prior to joining NKS students will have studied:

- KS2 National Curriculum

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 Biology AQA SoW begins by building on topics covered at KS3: Cells, organ systems, plant and human biology and transport mechanisms. Key biological principles are embedded throughout using modelling, mathematics and practical investigative work. Required Practical's engage students and 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 **(right click to Open Hyperlink):**

GCSE Biology Development of Scientific Thinking

A Level Biology Practical Skills

	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Content – Knowledge and Understanding **Skills and concepts**	Introduction to Science/Primary transition. Organisms and Movement (Biology A) Working Scientifically Skills: Scientific attitudes, experimental skills, analysis and evaluation.	The Particle Model and Separating Mixtures (Chemistry A) Working Scientifically Skills : Scientific attitudes, experimental skills, analysis and evaluation.	Circuits and Energy (Physics A) Working Scientifically Skills Scientific attitudes, experimental skills, analysis and evaluation.	Interdependence, Plant reproduction and Variation (Biology B) Working Scientifically Skills: Scientific attitudes, experimental skills, analysis and evaluation.	Acids and Alkalis and Metals and non-metals (Chemistry B) Working Scientifically Skills: Scientific attitudes, experimental skills, analysis and evaluation.	Forces; Speed, Gravity and Waves (Physics B) Working Scientifically Skills: Scientific attitudes, experimental skills, analysis and evaluation.
Assessment	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 End of Year exams
Enrichment and extension	○ **Y7 Science Club (Terms 4-6)** ○ **Science week activities (March)** ○ **World Space Week Activities (October)**					

NKS Biology Curriculum Map 2021

Year 8

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

	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Content – Knowledge and Understanding **Skills and concepts**	Breathing and Nutrients (Biology C) Working Scientifically Skills: Scientific attitudes, experimental skills, analysis and evaluation.	An introduction to the Periodic Table and Representing Chemical reactions (Chemistry C) Working Scientifically Skills: Scientific attitudes, experimental skills, analysis and evaluation.	Contact Forces, Pressure and Work (Physics C) Working Scientifically Skills: Scientific attitudes, experimental skills, analysis and evaluation.	Photosynthesis and Evolution (Biology D) Working Scientifically Skills: Scientific attitudes, experimental skills, analysis and evaluation.	Types of Chemical reaction and an introduction to Chemical Energy and The Earth (Chemistry D) Working Scientifically Skills: Scientific attitudes, experimental skills, analysis and evaluation.	Electromagnets, Waves and Space (Physics D) Working Scientifically Skills Scientific attitudes, experimental skills, analysis and evaluation.
Assessment	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
Enrichment and extension	○ Science and Technology Challenge ○ Salters Challenge ○ World Space Week (October)					

NKS Biology Curriculum Map 2021

Year 9

Our Y9 curriculum builds on and extends the work done in Yr7 andYr8 by sequencing units to encourage/allow a deeper appreciation of interrelated concepts.

It prepares students for the GCSE programme by introducing and developing fundamental biological concepts and skills

	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Content – Knowledge and Understanding TRIPLE ONLY: **Skills and concepts**	Cells GCSE TOPIC **MICROSCOPY REQUIRED PRACTICAL 1 AND INVESTIGATING DISINFECTANTS REQUIRED PRACTICAL 2** Culturing microorganisms (Biology only) Working Scientifically Skills GCSE Biology Development of Scientific Thinking: 1.1 1.2 1.3 2.2 2.4 4.4 AT 7 **Maths Skills** – see Appendix 1 for code definitions: 1A 1B 1D 2A 2H3A 3B 5C	Cells GCSE TOPIC **MICROSCOPY REQUIRED PRACTICAL 1 AND INVESTIGATING DISINFECTANTS REQUIRED PRACTICAL 2** Working Scientifically Skills: 1.1 1.2 1.3 2.2 2.4 4.4 AT 7 Maths Skills 1A 1B 1D 2A 2H3A 3B 5C	Photosynthesis Bioenergetics GCSE TOPIC **LIGHT INTENSITY REQUIRED PRACTICAL 3** Working Scientifically Skills: 1.2 1.4 AT 1 3 4 5 6 7 8 Maths Skills 1A 1C 2A 2C 2D 3A 3D4A 4C 5C	Moving and Changing Materials GCSE TOPIC **OSMOSIS REQUIRED PRACTICAL 4** **ENZYMES REQUIRED PRACTICAL 5** **FOOD TESTS REQUIRED PRACTICAL 6** Working Scientifically Skills: 1.2 1.3 1.41.53.5 AT 7 Maths Skills 1A 1C 4A 4B 4C 4D5C	Moving and Changing Materials GCSE TOPIC **OSMOSIS REQUIRED PRACTICAL 4** **ENZYMES REQUIRED PRACTICAL 5** **FOOD TESTS REQUIRED PRACTICAL 6** Working Scientifically Skills: 1.2 1.3 1.41.53.5 AT 7 Maths Skills 1A 1C 4A 4B 4C 4D 5C	End of Year Exam preparation
Assessment	Practice Exam Questions	Practice Exam Questions assessment cumulative	Practice Exam Questions assessment cumulative	Practice Exam Questions assessment cumulative	Practice Exam Questions assessment cumulative	**PPE**
Enrichment and extension	○ **SATELIFE 2020**					

NKS Biology Curriculum Map 2021

Year 10

Our Y10 curriculum builds on and extends the work done in Y9 by… sequencing units to encourage/allow… a deeper appreciation of interrelated concepts.

In Year 10 the topic of Infection and Response enables cumulative learning and further development of critical analysis skills. Homeostasis links back to earlier topics, enabling further cumulative assessment opportunities.

	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Content – Knowledge and Understanding TRIPLE ONLY: **Skills and concepts**	Health Matters GCSE TOPIC Monoclonal antibodies (Biology only) (HT only) Working Scientifically Skills: 1.3 1.4 1.5 1.6 AT Maths Skills 2C 2D 2G 4A	Health Matters GCSE TOPIC Plant disease (Biology only) Working Scientifically Skills: 1.3 1.4 1.5 1.6 AT Maths Skills 2C 2D 2G 4A	Coordination and Control GCSE TOPIC Reflex Actions **PRACTICAL 7** **AUXINS REQUIRED** **PRACTICAL 8** Plant hormones (Biology only) Use of plant hormones (HT only) Working Scientifically Skills: 1.1-1.5 AT Maths Skills 2C 4A	Coordination and Control GCSE TOPIC PPE Preparation The brain (Biology only) The eye (Biology only) Control of body temperature (Biology only) Maintaining water and nitrogen balance in the body (Biology only) The use of hormones to treat infertility (HT only) Negative feedback (HT only) Working Scientifically Skills: 1.1-1.5 AT Maths Skills 2C 4A	Genetics GCSE TOPIC Advantages and disadvantages of sexual and asexual reproduction (Biology only) DNA structure (Biology only) Cloning (Biology only) Working Scientifically Skills: 1.1-1.4 AT Maths Skills 1C 2C 2E 3A 4A	Genetics GCSE TOPIC Working Scientifically Skills: 1.1-1.4 AT Maths Skills 1C 2C 2E 3A 4A
Assessment	Practice Exam Questions assessment cumulative	Practice Exam Questions assessment cumulative	Practice Exam Questions assessment cumulative	PPE	Practice Exam Questions assessment cumulative	Practice Exam Questions assessment cumulative
Enrichment and extension	○ Biology Challenge					

NKS Biology Curriculum Map 2021

Year 11

Our Y11 curriculum builds on and extends the work done in Y10 by… sequencing units to encourage/allow… a deeper appreciation of interrelated concepts.

In Year 11 students study genetics and Evolution and also Ecology enabling ongoing skills development, for example with Required practical investigations and mathematical data analysis. This three-year course provides students with the skills needed for future success both academically and in the wider world.

	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Content – Knowledge and Understanding TRIPLE ONLY: **Skills and concepts**	Variation and Evolution GCSE TOPIC Theory of evolution (Biology only) Speciation (Biology only) The understanding of genetics (Biology only) Working Scientifically Skills: 1.1-1.4 AT Maths Skills 1C 2C 2E 3A 4A	PPE 1 Preparation	Ecology in Action GCSE TOPIC PPE 2 Preparation **ECOLOGY REQUIRED PRACTICAL 9** **DECAY REQUIRED PRACTICAL 10** Working Scientifically Skills: 1.2-1.6, 2.6 AT Maths Skills 1C 2B 2C 2F 4A 4C	Ecology in Action EXAM PREP Decomposition (Biology only) Impact of environmental change (Biology only) (HT only) Trophic levels Food production (Biology only)	EXAM PERIOD	EXAM PERIOD
Assessment	Practice Exam Questions assessment cumulative	PPE Paper 1	Practice Exam Questions assessment cumulative	PPE Paper 2		
Enrichment and extension	○ Science Live! Conference 2021					

Appendix 1

Mathematical requirements

Students will be required to demonstrate the following mathematics skills in GCSE Biology assessments.

Questions will target maths skills at a level of demand appropriate to each subject. In Foundation Tier papers questions assessing maths requirements will not be lower than that expected at Key Stage 3 (as outlined in Mathematics Programmes of Study: Key Stage 3, by the DfE, document reference DFE00179-2013). In Higher Tier papers questions assessing maths requirements will not be lower than that of questions and tasks in assessments for the Foundation Tier in a GCSE qualification in mathematics.

1 Arithmetic and numerical computation

a Recognise and use expressions in decimal form

b Recognise and use expressions in standard form

c Use ratios, fractions and percentages

d Make estimates of the results of simple calculations

2 Handling data

a Use an appropriate number of significant figures

b Find arithmetic means

c Construct and interpret frequency tables and diagrams, bar charts and histograms

d Understand the principles of sampling as applied to scientific data

e Understand simple probability

f Understand the terms mean, mode and median

g Use a scatter diagram to identify a correlation between two variables

h Make order of magnitude calculations

3 Algebra

a Understand and use the symbols: =, <, <<, >>, >, ∝ , ~

d Solve simple algebraic equations

4 Graphs

a Translate information between graphical and numeric form

b Understand that y = mx + c represents a linear relationship

c Plot two variables from experimental or other data

d Determine the slope and intercept of a linear graph

5 Geometry and trigonometry

c Calculate areas of triangles and rectangles, surface areas and volumes of cubes

Mathematical skills references are taken from the DfE subject criteria.

NKS Biology Curriculum Map 2021

Year 12

Prior to commencing A Level students will have studied GCSE BIOLOGY/TRILOGY

An understanding of students' starting points is achieved by a baseline test

Our Y12 curriculum builds on and extends this by sequenced units to encourage/allow effective knowledge acquisition and application.

At A Level, students follow the Pearson Edexcel Biology A specification; a context led approach with ample opportunities for cumulative knowledge acquisition. The course is linear and each topic reinforces key fundamental biological principles with the possibility of AS entry. Transition work is introduced in September, tackling the more challenging aspects of the GCSE before moving on to the contextual topics of Cardiovascular Disease and Cystic Fibrosis, followed by Genetics and the Epigenome, alongside Biodiversity. CPAC practical work permeates the two-year course and provides the opportunities for individualised approaches to research, planning and investigative work throughout.

	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Content – Knowledge and Understanding **Skills and concepts**	A LEVEL BIOLOGY: TOPIC 1: LIFESTYLE, HEALTH AND RISK **CPAC: 1 THE EFFECT OF CAFFEINE ON HEART RATE** **CPAC 2: VITAMIN C CONTENT** **A Level Biology Practical Skills** 1A 2C 4B, 2A 2D 5B, 2B 2C 5A 5B, 2A 2D 4B	TOPIC 2: GENES AND HEALTH **CPAC 3: MEMBRANE STRUCTURE** **CPAC 4: ENZYMES**	TOPIC 3:VOICE OF THE GENOME **CPAC 5: MITOSIS** PPE 1A 3A 4A, 2B 3B 4A, 1A 2A 4A, 2B 3A 4B, 2C 3B 4A	TOPIC 4:BIODIVERSITY AND NATURAL RESOURCES **CPAC 6: PLANT FIBRES** **CPAC 7: MINERAL IONS** **CPAC 8: TENSILE STRENGTH** **CPAC 9: ASEPTIC TECHNIQUES**	TOPIC 5: ON THE WILD SIDE **CPAC 10: ECOLOGY AND STATISTICS** 2A 3A 3B 5A 5B	TOPIC 5 CONTINUED SUMMER WORK
Assessment	BASELINE TEST	PRACTICE EXAMINATION QUESTIONS ASSESSMENT-CUMULATIVE	REVISION QUESTIONS AND PPE ASSESSMENT	PRACTICE EXAMINATION QUESTIONS ASSESSMENT-CUMULATIVE	PRACTICE EXAMINATION QUESTIONS ASSESSMENT-CUMULATIVE	PRACTICE EXAMINATION QUESTIONS ASSESSMENT-CUMULATIVE
Enrichment and extension	○ BIOLOGY SOCIETY ○ MEDSOC ○ NATURAL SCIENCES SOCIETY					

NKS Biology Curriculum Map 2021

Year 13

Our Y13 curriculum builds on and extends the work done in Y12 by…

In Year 13 further biochemistry builds on work from the previous year and Immunity is studied in greater detail than at GCSE level, alongside Forensics. This is followed by topics on physiology and the nervous system. The course also requires analysis of a synoptic scientific article, in preparation for the examinations, pre released by the exam board at Easter

	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Content – Knowledge and Understanding **Skills and concepts**	TOPIC 5 CONTINUED **CPAC 11: HILL REACTION** **CPAC 12: Q10 CALCULATIONS** **CPAC 13: HATCHING** **CPAC 13B: MANIPULATED GRASSLANDS** **A Level Biology Practical Skills** 2B 2D 5A, 2C 4B 5B, 1A 2D 4A, 2B 3A 5A, 1A 3A 3B	TOPIC 6 : INFECTION, IMMUNITY AND FORENSICS **CPAC 14: GEL ELECTROPHORESIS** **CPAC 15: ANTIBIOTICS** PPE	TOPIC 7: RUN FOR YOUR LIFE **CPAC 16: RESPIROMETRY** **CPAC 17: SPIROMETRY** 2C 3A 4B	TOPIC 8: GREY MATTER **CPAC 18: HABITUATION** PPE 2A 4A 5A, 2D 3B 5B	EXAM PERIOD	EXAM PERIOD
Assessment	BASELINE TEST	PRACTICE EXAMINATION QUESTIONS ASSESSMENT-CUMULATIVE PPE PAPER 1	PRACTICE EXAMINATION QUESTIONS ASSESSMENT-CUMULATIVE	PPE PAPER 2/3		
Enrichment and extension	○ BIOLOGY SOCIETY ○ MEDSOC ○ NATURAL SCIENCES SOCIETY					