

NKS Biology Curriculum Map 2022



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

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 three 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:

[GCSE Biology Development of Scientific Thinking](#)

[A Level Biology Practical Skills](#)

| | Term 1 | Term 2 | Term 3 | Term 4 | Term 5 | Term 6 |
|--|--------|--------|--------|--------|--------|--------|
|--|--------|--------|--------|--------|--------|--------|

| | | | | | | |
|---|---|--|---|--|--|---|
| <p>Content – Knowledge and Understanding</p> | <p>Introduction to Science/Primary transition.</p> <p>Organisms and Movement (Biology A)</p> <p>Working Scientifically Skills: Scientific attitudes, experimental skills, analysis and evaluation.</p> | <p>The Particle Model and Separating Mixtures (Chemistry A)</p> <p>Working Scientifically Skills : Scientific attitudes, experimental skills, analysis and evaluation.</p> | <p>Circuits and Energy (Physics A)</p> <p>Working Scientifically Skills Scientific attitudes, experimental skills, analysis and evaluation.</p> | <p>Interdependence, Plant reproduction and Variation (Biology B)</p> <p>Working Scientifically Skills: Scientific attitudes, experimental skills, analysis and evaluation.</p> | <p>Acids and Alkalis and Metals and non-metals (Chemistry B)</p> <p>Working Scientifically Skills: Scientific attitudes, experimental skills, analysis and evaluation.</p> | <p>Forces; Speed, Gravity and Waves (Physics B)</p> <p>Working Scientifically Skills: Scientific attitudes, experimental skills, analysis and evaluation.</p> |
| <p>Skills and concepts</p> | <p>Baseline testing</p> <p>Regular Afl embedded into lessons</p> <p>End of Topic test</p> | <p>Regular Afl embedded into lessons</p> <p>End of Topic test</p> | <p>Regular Afl embedded into lessons</p> <p>End of Topic test</p> | <p>Regular Afl embedded into lessons</p> <p>End of Topic test</p> | <p>Regular Afl embedded into lessons</p> <p>End of Topic test</p> | <p>Regular Afl embedded into lessons</p> <p>End of Topic test</p> <p>End of Year exams</p> |
| <p>Assessment</p> | <p>Enrichment and extension</p> <ul style="list-style-type: none"> ○ Young scientists journal ECA ○ Science week activities (March) ○ World Space Week Activities (October) | | | | | |



NKS Biology Curriculum Map 2022

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 |
|--|---|--|--|--|--|--|
| Content – Knowledge and Understanding | 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) |
| Skills and concepts | Working Scientifically Skills: Scientific attitudes, experimental skills, analysis and evaluation. | Working Scientifically Skills: Scientific attitudes, experimental skills, analysis and evaluation. | Working Scientifically Skills: Scientific attitudes, experimental skills, analysis and evaluation. | Working Scientifically Skills: Scientific attitudes, experimental skills, analysis and evaluation. | Working Scientifically Skills: Scientific attitudes, experimental skills, analysis and evaluation. | 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 | <ul style="list-style-type: none"> ○ Science and Technology Challenge ○ Young Scientists Journal (ECA) ○ Salters Challenge ○ World Space Week (October) | | | | | |

NKS Biology Curriculum Map 2022

Year 9

Our Y9 curriculum builds on and extends the work done in Yr7 and Yr8 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, inevitably helping students who choose A Level Biology.

| | Term 1 | Term 2 | Term 3 | Term 4 | Term 5 | Term 6 |
|---|--|--|---|---|---|--|
| Topic and content – Knowledge and Understanding | Cells GCSE TOPIC: AQA How have scientists developed their understanding of cell structure and function? How do we develop into a complex organism from a fertilised egg? How do organisms obtain their energy from food? The importance of studying microorganisms and how do we grow them both in the lab and commercially? | Cells GCSE TOPIC | Photosynthesis and Bioenergetics GCSE TOPIC: How do plants' adaptations help them survive? What factors affect photosynthesis and how? How is the supply of water to a plant affected by environmental conditions? Which substances move into and out of plants by diffusion and how do factors affect rate? | Moving and Changing Materials GCSE TOPIC: Do all materials move by diffusion? Why do multicellular organisms need organ systems? What are enzymes and how do they work? | Moving and Changing Materials GCSE TOPIC | End of Year Exam preparation Ongoing review of work in class using various methods of reflection and reinforcement of key biological knowledge, key vocabulary, and skills. |
| Skills and concepts | MICROSCOPY REQUIRED PRACTICAL 1 AND INVESTIGATING DISINFECTANTS REQUIRED PRACTICAL 2 TRIPLE ONLY: Culturing microorganisms (Biology only) 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 | 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 | 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 | OSMOSIS REQUIRED PRACTICAL 4 ENZYMES REQUIRED PRACTICAL 5 FOOD TESTS REQUIRED PRACTICAL 6 Working Scientifically Skills: 1.2 1.3 1.4 1.5 3.5 AT 7 Maths Skills 1A 1C 4A 4B 4C 4D 5C | OSMOSIS REQUIRED PRACTICAL 4 ENZYMES REQUIRED PRACTICAL 5 FOOD TESTS REQUIRED PRACTICAL 6 Working Scientifically Skills: 1.2 1.3 1.4 1.5 3.5 AT 7 Maths Skills 1A 1C 4A 4B 4C 4D 5C | |
| Assessment | Practice Exam Questions RP | Practice Exam Questions assessment cumulative RP | Practice Exam Questions assessment cumulative RP | Practice Exam Questions assessment cumulative RP | Practice Exam Questions assessment cumulative RP | PPE |
| Enrichment and extension | <ul style="list-style-type: none"> ○ Science Live Microscopy 2022 | | | | | |



NKS Biology Curriculum Map 2022

Year 10

Our Y10 curriculum builds on and extends the work done in Y9 b sequencing units to encourage/allowing 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 |
|---|--|--|--|--|--|---|
| Topic and content – Knowledge and Understanding | Health Matters GCSE TOPIC: Factors affecting our chances of developing a non-communicable disease. How are communicable diseases spread? How do we control the spread of disease? How are plants affected by disease and protected from attack? | Health Matters GCSE TOPIC | Coordination and Control GCSE TOPIC: PAPER 2 Reflex actions and the nervous system Homeostasis and negative feedback to include thermoregulation and blood glucose control The brain Metabolism Sexual development and human reproduction Plant trophic responses to stimuli PRACTICAL 7 AUXINS REQUIRED PRACTICAL 8 | Coordination and Control GCSE TOPIC PPE Preparation: Ongoing review of work in class using various methods of reflection and reinforcement of key biological knowledge, key vocabulary, and skills. | Genetics GCSE TOPIC: Our understanding of DNA and the way genes work. Meiosis and the production of gametes for reproduction. Inheritance of characteristics to include Mendel's work and genetic disorders. | Genetics GCSE TOPIC |
| TRIPLE ONLY: | Monoclonal antibodies (Biology only) (HT only) | Plant disease (Biology only) | Plant hormones (Biology only) Use of plant hormones (HT only) | 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) | Advantages and disadvantages of sexual and asexual reproduction (Biology only) DNA structure (Biology only) Cloning (Biology only) | |
| Skills and concepts | Working Scientifically Skills: 1.3 1.4 1.5 1.6 AT Maths Skills 2C 2D 2G 4A | Working Scientifically Skills: 1.3 1.4 1.5 1.6 AT Maths Skills 2C 2D 2G 4A | Working Scientifically Skills: 1.1-1.5 AT Maths Skills 2C 4A | Working Scientifically Skills: 1.1-1.5 AT Maths Skills 2C 4A | Working Scientifically Skills: 1.1-1.4 AT Maths Skills 1C 2C 2E 3A 4A | 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 PAPER 1 1HR 45 MINUTES TOPICS 1-4 (50% OF SPECIFICATION) | Practice Exam Questions assessment cumulative | Practice Exam Questions assessment cumulative |

| | | | | | | |
|---------------------------------|--------------------------|--|--|--|--|--|
| | | | | | | |
| Enrichment and extension | ○ Biology Challenge 2023 | | | | | |



NKS Biology Curriculum Map 2022

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 |
|---|--|--|--|--|---|-------------|
| Topic and content – Knowledge and Understanding | Variation and Evolution GCSE TOPIC: What causes variation and what are its effects on the individual? How do variation, a struggle for existence and the process of Natural Selection lead to the theory of Evolution? What are the causes of extinction and mass extinctions? | PPE 1 Preparation: Ongoing review of work in class using various methods of reflection and reinforcement of key biological knowledge, key vocabulary, and skills. | Ecology in Action GCSE TOPIC: What factors affect living organisms in a habitat? How do plants and animals within a community interact? How do human activities affect biodiversity? How are materials in a community recycled? PPE 2 Preparation: Ongoing review of work in class using various methods of reflection and reinforcement of key biological knowledge, key vocabulary, and skills. | Ecology in Action EXAM PREP Ongoing review of work in class using various methods of reflection and reinforcement of key biological knowledge, key vocabulary, and skills. | Review of topics as identified from PPEs: Ongoing review of work in class using various methods of reflection and reinforcement of key biological knowledge, key vocabulary, and skills. | EXAM PERIOD |
| TRIPLE ONLY: | Theory of evolution (Biology only) Speciation (Biology only) The understanding of genetics (Biology only) | | ECOLOGY REQUIRED PRACTICAL 9 DECAY REQUIRED PRACTICAL 10 | Decomposition (Biology only) Impact of environmental change (Biology only) (HT only) Trophic levels Food production (Biology only) | EXAM PERIOD | |
| Skills and concepts | Working Scientifically Skills: 1.1-1.4 AT Maths Skills 1C 2C 2E 3A 4A | | Working Scientifically Skills: 1.2-1.6, 2.6 AT Maths Skills 1C 2B 2C 2F 4A 4C | | | |
| Assessment | Practice Exam Questions assessment cumulative | PPE Paper 1: Another practice at a full length paper. | Practice Exam Questions assessment cumulative | PPE Paper 2: Paper 2 covering paper 2 content to date, encompassing relevant changes due to pandemic. | | |
| Enrichment and extension | <ul style="list-style-type: none"> Science Live! Conference 2022 Microscopy | | | | | |

NKS Biology Curriculum Map 2022

Year 12

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

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 |
|---|---|--|--|---|--|---|
| Topic and content – Knowledge and Understanding | A LEVEL BIOLOGY: TOPIC 1: LIFESTYLE, HEALTH AND RISK CPAC: 1 THE EFFECT OF CAFFEINE ON HEART RATE CPAC 2: VITAMIN C CONTENT | TOPIC 2: GENES AND HEALTH CPAC 3: MEMBRANE STRUCTURE CPAC 4: ENZYMES | TOPIC 3: VOICE OF THE GENOME CPAC 5: MITOSIS PPE | 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 | TOPIC 5 CONTINUED SUMMER WORK |
| Skills and concepts | 1A 2C 4B, 2A 2D 5B, 2B 2C 5A 5B, 2A 2D 4B | | 1A 3A 4A, 2B 3B 4A, 1A 2A 4A, 2B 3A 4B, 2C 3B 4A | | 2A 3A 3B 5A 5B | |
| 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 | <ul style="list-style-type: none"> ○ BIOLOGY SOCIETY ○ MEDSOC ○ NATURAL SCIENCES SOCIETY ○ Intermediate Biology Olympiad 2023 | | | | | |

NKS Biology Curriculum Map 2022

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 |
|---|---|--|--|--|-------------|-------------|
| Topic and content – Knowledge and Understanding | TOPIC 5 CONTINUED CPAC 11: HILL REACTION CPAC 12: Q10 CALCULATIONS CPAC 13: HATCHING CPAC 13B: MANIPULATED GRASSLANDS | 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 | TOPIC 8: GREY MATTER CPAC 18: HABITUATION PPE | EXAM PERIOD | EXAM PERIOD |
| Skills and concepts | 2B 2D 5A, 2C 4B 5B, 1A 2D 4A, 2B 3A 5A, 1A 3A 3B | | 2C 3A 4B | 2A 4A 5A, 2D 3B 5B | | |
| Assessment | BASELINE TEST | PRACTICE EXAMINATION QUESTIONS ASSESSMENT- CUMULATIVE PPE PAPER 1 | PRACTICE EXAMINATION QUESTIONS ASSESSMENT- CUMULATIVE | PPE PAPER 2/3 | | |
| Enrichment and extension | <ul style="list-style-type: none"> ○ BIOLOGY SOCIETY ○ MEDSOC ○ NATURAL SCIENCES SOCIETY ○ Biology Olympiad 2023 | | | | | |

