King Edward VI Camp Hill School for Boys

Biology
Department Handbook 2024- 25

AN UNABRIDGED VERSION OF THIS HANDBOOK CAN BE FOUND IN THE BIOLOGY DEPARTMENT FOR STAFF USAGE.

WHILST THIS DOCUMENT REFLECTS OUR AIMS, SLIGHT DIFFERENCES MAY EXIST IN PRACTICE DUE TO EXTENUATING CIRCUMSTANCES.

FOR PARENT EASE, SOME MATERIAL HAS BEEN ARRANGED BY KEY STAGE. THIS INCLUDES I3 STATEMENTS (INTENT, IMPLEMENTATION AND IMPACT), CURRICULUM MAPS AND TEXTBOOK INFORMATION. PLEASE SEE CONTENTS TABLE FOR DETAILS.

OUR I3 STATEMENTS ARE DIFFERENTIATED FOR EACH KEY STAGE, ALTHOUGH COMMON ASPECTS EXIST ACROSS ALL GROUPS.

Staffing and accommodation

Staff	Roles	email
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The Biology department has two laboratories (B1 and B2) on the second floor and a traditional style one on the ground floor (B3).

We also use Room 3 and Room 4; these are laboratories shared with other science subjects.

There is a Biology prep room between B1 and B2 and dedicated Biology office space on the first floor.

All laboratories have projectors, interactive white boards, sound systems, and standard scientific apparatus.

Teaching Resources

Each teaching group has their own Google Classroom; these allow teachers to share information and resources with students digitally.

We have a full online Kerboodle package (online textbook and resources for Years 7-13).

We have subscriptions to Curriculum Press BioFactsheets, Biological Sciences Review and Exampro.

We also have many bought resource packs, including a full GCSE Collins resource pack and many extension activities for our sixth form students.

The department is well stocked with glassware, chemicals and apparatus in all laboratories.

We are resource-rich in terms of biological equipment, models and specimens.

KS3 Biology

KS3 Biology: Department Intent, Implementation and Impact

Intent

Year 7 and Year 8 are mostly taught by subject specialists and in separate science groups. The students arrive into Year 7 with varying degrees of biological knowledge and appreciation of the natural world, dependent on their primary education and home background. By the end of Year 8, all students should be at the same place and well prepared for the next key stage and the start of their GCSE course. We aim to build on the KS2 Programme of Study (Living things and their habitats, Plants, Animals, including humans, and Working scientifically), develop a deeper understanding of a range of scientific ideas in the subject disciplines of biology and help students to begin to make connections between these subject areas.

'Working scientifically' is embedded throughout the course and clearly related to substantive science content in the KS3 AQA specification. We aim to stress that science is about working objectively, modifying explanations to take account of new evidence and ideas and subjecting results to peer review. Students should appreciate the importance of experimental design and investigative work in order to develop a deeper understanding of factors to be taken into account when collecting, recording and processing data. They should be confident in evaluating their results and identifying further questions arising from them. Within this strand, present in all units possible, students are encouraged to develop their use of scientific vocabulary and mathematical and graph-drawing skills. We have included as many opportunities for practical work as possible and this is central to the delivery of our KS3 course. Students work through school-made practical enquiry and graph booklets, with a structured practical activity being assessed by their teacher each half term.

Our marking policy for Key Stage 3 is that every unit will include one piece of written feedback based on the practical enquiry booklet that is also then reviewed in class and commented on by the students. Each unit also includes a multiple choice end-of-topic test to review knowledge gained and identify underperforming students and problem areas. Exam questions are covered in class but the students mostly peer and self-assess these. This improves their exam technique and awareness, whilst also reducing our already heavy marking workload. Students know what topic they are studying and the sequence of topics coming up in the course. Each unit is preceded by a topic description and place in the scheme of work. The sequence of topics is also on the wall in every lab, as a visual reminder for staff and students.

Implementation

What we do in the classroom

- Topic overview sheets so students are clear what they need to learn and when they will learn it.
- MCQ tests (peer or teacher marked) to identify gaps in understanding monitor progress
- Worksheets to cater for different levels of understanding and to support all learners
- Exam questions to improve understanding and exam technique. The focus of these is KS3 level, but we may also choose to use KS4 (or KS5!) questions to extend or challenge the students.
- Discussion and questioning so students know how topics fit into the 'bigger picture'
- Pair and group activities to promote active learning and teamwork
- As much practical work as possible (this is obviously topic-dependent) with enquiry booklets.
- Video clips

How we do it

- Online Activate package (online textbook and resources purchased by school)
- Exam questions from Exampro (purchased by school) and other exam boards (found by staff)
- Reviews of Carousel fact retrieval homework
- Teacher resource folders and central bank of digital resources on department drive
- Good communication between teachers, including discussion of teaching groups and lesson ideas
- Supportive, honest, encouraging classroom interactions with all students

What we do outside the classroom

- We have biology books in the school library that are relevant to KS3 students and above
- Mentoring of younger students by older students
- Open door policy

Impact

We are confident that we develop essential knowledge and understanding of different areas of the subject and how they relate to each other. This can hopefully be confirmed by our end of topic test results.

Students tell us that they are happy and that they enjoy the subject! Enthusiasm levels are high and they often ask questions about material from outside the curriculum.

We regularly revisit key areas of the KS3 Biology curriculum and each section of the specification begins with an overview, which puts the topic into a broader biological context and encourages understanding of the place of each topic within the subject.

We emphasise links between topics as a way of building confidence at the start of a new topic and as a reminder of previous work covered.

Our mock examinations in the summer also review key areas of the curriculum, to check students' knowledge and understanding of the content developed in one unit and their ability to link their knowledge to different topics.

Textbook

Activate Biology Student Book (not issued to students, digital copy access instead)
https://global.oup.com/education/product/9780198307150/?region=uk
Full staff and student subscription to https://global.oup.com/education/product/9780198307211/?region=uk

Homework policy

- Homework uses the Carousel package with emphasis on retrieval practice to embed knowledge in student long-term memory and help us to feed forward in lessons.
- Homework may include revision for classroom or whole cohort tests.
- Unfinished lesson work will also be expected to be completed so the student does not fall behind.
- We also use Activate to provide other homework opportunities.

Marking policy

- Carousel homework tasks are reviewed by the teacher and used to inform future lessons, produce insightful data and create a culture that celebrates knowledge.
- Each unit also includes a standardised multiple choice end-of-topic test to review knowledge gained and identify underperforming students and problem areas. These remain in school for formative purposes and assessments inform decisions about student progress for rapid reviews, which are submitted each half term.
- A standardised enquiry booklet covers each topic in Key Stage 3, focussing on working scientifically to include activities which allow students to demonstrate their ability to:

  Analyse, consisting of presenting data, analysing patterns, drawing conclusions and discussing limitations.

Communicate, consisting of constructing explanations, communicating ideas, critiquing claims and justifying opinions.

Enquire, consisting of devising questions, testing hypotheses, planning to control variables and collecting data.

Solve, consisting of estimating risks, examining consequences, interrogating sources and understanding how scientific ideas change over time.

Teachers assess these skills and feedback to students. Comments should be constructive to the student, and indicate whether or not the work exceeds, meets or fails to meet expectations. Spelling of scientific terminology should be corrected. Students will have opportunities to reflect on their learning after their work has been marked.

- We mark end of year examinations and centralised exam ladders are used to record this data.
- Other exam questions are covered in class but the students mostly peer and self-assess these. AQA provides clear marking guidance for examination style answers. This is regularly used and shared with students.

Biology in Key Stage 3

KS3 themes: Organisms, Ecosystems, Genes

Year 7

3.8.2 Cells	Autumn 1 + 2
3.8.1 Movement	Autumn 2
3.10.1 Variation	Spring 1
3.10.2 Human reproduction	Spring 2
3.9.2 Plant reproduction	Summer 1
3.9.1 Interdependence	Summer 2

Year 8

3.10.3 Evolution	Autumn 1
3.10.4 Inheritance	Autumn 2
3.8.4 Digestion	Spring 1
3.8.3 Breathing	Spring 2
3.9.3 Respiration	Summer 1
3.9.4 Photosynthesis	Summer 2

KS4 Biology

KS4 Biology: Department Intent, Implementation and Impact

Intent

Year 9, 10 and 11 are taught by subject specialists and in separate science groups. The students arrive into Year 9 having completed a comprehensive exploration of the KS3 curriculum and are well-prepared for the next key stage and the start of their GCSE course.

We study AQA GCSE Biology (specification 8461) and build on the firm foundations to develop an even deeper understanding of a range of scientific ideas in the subject disciplines of biology and help students to begin to make connections between these subject areas as we move from Year 9 through to Year 11.

We continue to stress that science is about working objectively, modifying explanations to take account of new evidence and ideas and subjecting results to peer review. Students should appreciate the importance of experimental design and investigative work in order to develop a deeper understanding of factors to be taken into account when collecting, recording and processing data. They should be confident in evaluating their results and identifying further questions arising from them. Within this strand, present in all units possible, students are encouraged to develop their use of scientific vocabulary and mathematical and graph-drawing skills. We have included as many opportunities for practical work as possible and this is central to the delivery of our KS4 course.

We regularly test students to review knowledge gained and identify underperforming students and problem areas. Exam questions are covered in class but the students mostly peer and self-assess these. This improves their exam technique and awareness, whilst also reducing our already heavy marking workload.

Students know what topic they are studying and the sequence of topics coming up in the course. They understand the progression of topics and each year group are given a topic sequence sheet, that links these topic areas to specification references.

Implementation

What we do in the classroom

- Topic sequence sheets so students are clear what they need to learn and when they will learn it.
- Regular short tests (peer or teacher marked) to identify gaps in understanding monitor progress
- Worksheets to cater for different levels of understanding and to support all learners
- Exam questions to improve understanding and exam technique. The focus of these is KS4 level, but we may also choose to use KS5 questions to extend or challenge the students.
- Discussion and questioning so students know how topics fit into the 'bigger picture'
- Pair and group activities to promote active learning and teamwork
- As much practical work as possible
- Video clips

How we do it

- Online Kerboodle package (online textbook and resources purchased by school)
- Collins resource pack purchased
- Exam questions from Exampro (purchased by school) and other exam boards (found by staff)
- Teacher resource folders
- Central bank of digital resources on department drive
- Good communication between teachers, including discussion of teaching groups and lesson ideas
- Supportive, honest, encouraging classroom interactions with all students

What we do outside the classroom

- We have biology books in the school library that are relevant to GCSE students and above
- Mentoring of younger students by A level biologists
- Open door policy
- Biology Big Quiz (local competition) for Year 10 students, selected for high effort levels.

Impact

Students ask a lot of questions, particularly about topics that arise in the news or are on television. We encourage interest in all material, whether on the curriculum or not. This means our students develop a well-rounded view of the subject, greater awareness and informed personal opinions on various scientific issues.

We regularly revisit key areas of the GCSE Biology curriculum and relate the topics to each other as much as possible to allow students to identify links between different themes. We are keen to stress the importance of individual topics in a broader biological context so the students build a greater subject confidence.

Mock examinations highlight areas of strength and weakness in both revision and examination techniques, helping students to reconsider their learning strategies, make better choices and improve their chances in the final examinations.

We are certain that we develop essential knowledge and understanding of different areas of the subject and how they relate to each other. This can be confirmed by our external examination results.

Our uptake at A level is good so we know that the students are interested in the subject. We aim to include enough detail to stretch our most able students and to allow them to make the transition to A level as easy as possible whilst reinforcing the GCSE requirements needed for their current key stage.

Textbook

GCSE Science 9-1 - AQA GCSE Biology 9-1 Student Book (issued to students in Year 10, plus alternative digital copy access) https://collins.co.uk/products/9780008158750
Full staff and student subscription to https://global.oup.com/education/product/9780198308850/?region=uk

Homework policy

- Homework uses the Carousel package with emphasis on retrieval practice to embed knowledge in student long-term memory and help us to feed forward in lessons.
- Homework may include revision for classroom or whole cohort tests.
- Unfinished lesson work will also be expected to be completed so the student does not fall behind.

Marking policy

- Carousel homework tasks are reviewed by the teacher and used to inform future lessons, produce insightful data and create a culture that celebrates knowledge.
- We regularly test students in lessons to review knowledge gained and identify underperforming students and problem areas. This is teacher-dependent and we try not to share tests, as the students also like sharing them between groups. Tests will be marked and parents will be informed if there is substantial underperformance.
- We mark whole cohort examinations and centralised exam ladders are used are used to record this data.
- Other exam questions are covered in class but the students mostly peer and self-assess these. AQA provides clear marking guidance for examination style answers. This is regularly used and shared with students.

Biology in Key Stage 4

We teach AQA Biology: https://www.aqa.org.uk/subjects/science/gcse/biology-8461

Year 9 Biology

Specification ref	Topic	Practical assessments
4.1	Cell biology	
4.1.1	Cell structure	
4.1.1.1	Eukaryotes and prokaryotes	
4.1.1.2	Animal and plant cells	Required practical activity 1: use a light microscope to observe, draw and label a selection of plant and animal cells. A magnification scale must be included.
4.1.1.3	Cell specialisation	
4.1.1.4	Cell differentiation	
4.1.1.5	Microscopy	
4.1.1.6	Culturing microorganisms	Required practical activity 2: investigate the effect of antiseptics or antibiotics on bacterial growth using agar plates and measuring zones of inhibition.
4.1.2	Cell division	
4.1.2.1	Chromosomes	
4.1.2.2	Mitosis and the cell cycle	
4.1.2.3	Stem cells	
4.1.3	Transport in cells	
4.1.3.1	Diffusion	
4.1.3.2	Osmosis	Required practical activity 3: investigate the effect of a range of concentrations of salt or sugar solutions on the mass of plant tissue.
4.1.3.3	Active Transport	
4.2	Organisation	
4.2.1	Principles of organisation	
4.2.2	Animal tissues, organs and organ systems	
4.2.2.1	The human digestive system including digestive enzymes	Required practical activity 4: use qualitative reagents to test for a range of carbohydrates, lipids and proteins. To include: Benedict's test for sugars; iodine test for starch; and Biuret reagent for protein. Required practical activity 5: investigate the effect of pH on the rate of reaction of amylase enzyme

4.7	Ecology	
4.7.1	Adaptations, interdependence and competition	
4.7.1.1	Communities	
4.7.1.2	Abiotic factors	
4.7.1.3	Biotic factors	
4.7.1.4	Adaptations	
4.7.3	Biodiversity and the effect of human interaction on ecosystems	
4.7.3.1	Biodiversity	
4.7.3.2	Waste management	
4.7.3.3	Land use	
4.7.3.4	Deforestation	
4.7.3.6	Maintaining biodiversity	

Year 10 Biology

4 lessons per fortnight

Specification ref	Topic	Practical assessments
4.2	Organisation	
4.2.3	Plant tissues, organs and systems	
4.2.3.1	Plant tissues	
4.2.3.2	Plant organ system	
4.4	Bioenergetics	
4.4.1	Photosynthesis	
4.4.1.1	Photosynthesis reaction	
4.4.1.2	Rate of photosynthesis	Required practical activity 6: investigate the effect of light intensity on the rate of photosynthesis using an aquatic organism such as pondweed.
4.4.1.3	Uses of glucose from photosynthesis	
4.3	Infection and response	
4.3.3	Plant disease	
4.3.3.1	Detection and identification of plant diseases	
4.3.3.2	Plant defence responses	
4.4	Bioenergetics	
4.4.2	Respiration	
4.4.2.1	Aerobic and anaerobic respiration	
4.4.2.2	Response to exercise	
4.4.2.3	Metabolism	
4.2	Organisation	
4.2.2	Animal tissues, organs and organ systems	
4.2.2.2	The heart and blood vessels	
4.2.2.3	Blood	
4.2.2.4	Coronary heart disease: a non-communicable disease	
4.2.2.5	Health issues	
4.2.2.6	The effect of lifestyle on some non-communicable diseases	
4.2.2.7	Cancer	
4.3	Infection and response	
4.3.1	Communicable diseases	
4.3.1.1	Communicable (infectious) diseases	
4.3.1.2	Viral diseases	
4.3.1.3	Bacterial diseases	
4.3.1.4	Fungal diseases	
4.3.1.5	Protist diseases	
4.3.1.6	Human defence systems	
4.3.1.7	Vaccination	
4.3.1.8	Antibiotics and painkillers	
4.3.1.9	Discovery and development of drugs	

4.3.2	Monoclonal antibodies	
4.3.2.1	Producing monoclonal antibodies	
4.3.2.2	Uses of monoclonal antibodies	
4.7.2	Organisation of an ecosystem	
4.7.2.1	Levels of organisation	Required practical activity 9: measure the population size of a common species in a habitat. Use sampling techniques to investigate the effect of a factor on the distribution of this species.
4.7.4	Trophic levels in an ecosystem	
4.7.4.1	Trophic levels	
4.7.4.2	Pyramids of biomass	
4.7.4.3	Transfer of biomass	
4.7.2	Organisation of an ecosystem	
4.7.2.2	How materials are cycled	
4.7.2.3	Decomposition	Required practical activity 10: investigate the effect of temperature on the rate of decay of fresh milk by measuring pH change
4.7.2.4	Impact of environmental change	
4.7.5	Food production	
4.7.5.1	Factors affecting food security	
4.7.5.2	Farming techniques	
4.7.5.3	Sustainable fisheries	
4.7.5.4	Role of biotechnologies	

Year 11 Biology

4 lessons per fortnight

Specification ref	Topic	Practical assessments
4.5	Homeostasis and Response	
4.5.4	Plant hormones	
4.5.4.1	Control and coordination	
4.5.4.1	Use of plant hormones	Required practical activity 8: investigate the effect of light or gravity on the growth of newly germinated seedlings.
4.5.1	Homeostasis	
4.5.2	The human nervous system	
4.5.2.1	Structure and function of the human nervous system	Required practical activity 7: plan and carry out an investigation into the effect of a factor on human reaction time.
4.5.2.2	The brain	
4.5.2.3	The eye	
4.5.2.4	Control of body temperature	
4.5.3	Hormonal coordination in humans	
4.5.3.1	Human endocrine system	
4.5.3.2	Control of blood glucose concentration	
4.5.3.3	Maintaining water and nitrogen balance in the body	
4.5.3.4	Hormones in human reproduction	
4.5.3.5	Contraception	
4.5.3.6	The use of hormones to treat infertility	
4.5.3.7	Negative feedback	
4.6	Inheritance, variation and evolution	
4.6.1	Reproduction	
4.6.1.1	Sexual and asexual reproduction	
4.6.1.3	Advantages and disadvantages of sexual and asexual reproduction	
4.6.1.2	Meiosis	
4.6.1.4	DNA and the genome	
4.6.1.5	DNA structure and protein synthesis	
4.6.1.6	Genetic inheritance	
4.6.1.7	Inherited disorders	
4.6.1.8	Sex determination	
4.6.3.3	The understanding of genetics	
4.6.2	Variation and evolution	
4.6.2.1	Variation	
4.6.2.2	Evolution	
4.6.2.3	Selective breeding	
4.6.2.4	Genetic engineering	
4.6.2.5	Cloning	

4.6.3	The development of understanding of genetics and evolution	
4.6.3.1	Theory of evolution	
4.6.3.2	Speciation	
4.6.3.4	Evidence for evolution	
4.6.3.5	Fossils	
4.6.3.6	Extinction	
4.6.3.7	Resistant bacteria	
4.6.4	Classification of living organisms	

Public examinations

Paper 1

What's assessed

Topics 1–4: Cell biology; Organisation; Infection and response; and Bioenergetics.

How it's assessed

Written exam: 1 hour 45 minutes
100 marks
50% of GCSE

Questions

Multiple choice, structured, closed short answer and open response.

Paper 2

What's assessed

Topics 5–7: Homeostasis and response; Inheritance, variation and evolution; and Ecology.

How it's assessed

Written exam: 1 hour 45 minutes
100 marks
50% of GCSE

A2 Biology: Department Intent, Implementation and Impact

Intent

In the sixth form, we ask students to prepare before the lessons by using their online textbook to make notes on the topic set. This topic is then explored together in a flipped classroom environment over a series of lessons. We do not believe in spoon-feeding and students are clear of our department philosophy on this prior to starting, and throughout, the course. Our focus is on developing skills needed to answer questions based on AO2 (Apply knowledge and understanding of scientific ideas, processes, techniques and procedures) and AO3 (Analyse, interpret and evaluate scientific information, ideas and evidence) which account for up to 75% of the weighting of assessment objectives in A2 Biology.

Short tests at the start of lessons allow teachers to ensure that the students are preparing adequately and questioning and discussion with the students also makes it very clear if they are putting in the necessary effort. This also allows for more frequent testing so we get to know our students quicker and are more aware of their needs.

During the lessons, the students work on practical tasks, group activities, exam questions and worksheets that aim to improve analysis skills rather than just test fact recall. We aim to minimise teaching from the board as this can create a passive learning environment in which some students can feel they are being rushed by more able students and others can feel frustrated they are being held back by their less able peers. However, we do recognise that some topics are conceptually more challenging and these are better explained to the class as a whole, in which case we obviously do this. For example, the layout of genetic diagrams or the details of oxidative phosphorylation.

As teachers, we have more chance to circulate and help individual students and we can build a more accurate picture of which students are struggling with which topics.

By working in this way we can also prioritise the higher-order thinking skills that are needed to achieve the highest grades, eliminate Googling of exam questions (which is what they did when these were set for homework), maintain higher effort levels throughout the course, improve student understanding and foster independence that we believe is imperative for their next stage of study. Students are not worried to ask questions or request help and are much more likely to do so when we are constantly interacting with them on an individual basis by circulating in the classroom. It also reinforces the idea that they are allowed to find the work challenging and that the support is there to help them understand the content, develop problem-solving strategies and build resilience. We are confident that a flipped classroom approach allows us to both support SEND students and stretch the most able.

Although we never know what questions we will be asked as a result of their preparatory work outside of lessons, we need to develop and collate more resources, and we work in a more energetic way in the classroom, we enjoy teaching our sixth form students in this way.

Implementation

What we do in the classroom

- Topic checklists so students are clear what they need to learn
- Short tests (peer or teacher marked) to identify gaps in understanding and exam technique
- Worksheets to cater for different levels of understanding and to support all learners
- Exam questions to improve understanding and exam technique. A range of question types are used, including those that require extended responses. Extended response questions allow students to demonstrate their ability to construct and develop a sustained line of reasoning which is coherent, relevant, substantiated and logically structured.
- Discussion to assess understanding and so students know how topics fit into the 'bigger picture'

- Pair and group activities to promote active learning and teamwork
- Practical work (including AQA set practical assessment activities)
- Active learning and fact consolidation strategies (dominoes, card sorts, bingo, etc)
- Alternative learning strategies (dance, drama, etc)

How we do it

- Online Kerboodle package (online textbook and resources purchased by school)
- Exam questions from Exampro (purchased by school) and other exam boards (found by staff)
- Teacher resource folders
- Central bank of digital resources on department drive
- Good communication between teachers, including discussion of teaching groups and lesson ideas

What we do outside the classroom

- Biology Intermediate Olympiad and Biology Olympiad- Option for students to enter both of these national challenges.
- Attending/ organising biology extension talks by external speakers
- We manage and actively promote subscriptions to Biological Review magazine
- Promote FutureLearn online courses to the students. This helps to develop their interest in and enthusiasm for Biology, including developing an interest in further study and careers associated with the subject.
- We encourage students to read popular science biology books that are in the school library.
- Open door policy

Impact

We are confident that we develop essential knowledge and understanding of different areas of the subject and how they relate to each other. This can hopefully be confirmed by our external examination results. We regularly revisit key areas of the A2 Biology curriculum and each section of the specification begins with an overview, which puts the topic into a broader biological context and encourages understanding of the place of each topic within the subject. We emphasise links between topics as a way of building confidence at the start of a new topic and as a reminder of previous work covered. When preparing for essays in particular, students are constantly reviewing and revisiting previous material.

Our main examinations in the summer of Year 12 and the spring of Year 13 also review key areas of the curriculum, to check students' knowledge and understanding of the content developed in one section or topic and their ability to apply mathematical and practical skills to different areas of content.

As we have adopted a flipped classroom philosophy, our curriculum undeniably develops independence and resilience. Students have told us that they like being able to work at their own pace, they enjoy the variety in lessons and they feel more prepared for university.

Our numbers for A2 Biology are healthy (58, 68, 70, 63, 58 students for the last five examination series). There are 66 students preparing for June 2025 examinations and 74 students preparing for June 2026 examinations.

Textbook

AQA Biology: A Level (not issued to students, digital copy access instead)
https://global.oup.com/education/product/9780198351771/?region=uk
Full staff and student subscription to https://global.oup.com/education/product/9780198351801/?region=uk

Homework policy

- Homework uses the Carousel package with emphasis on retrieval practice to embed knowledge in student long-term memory and help us to feed forward in lessons.
- Homework may include revision for classroom or whole cohort tests.
- Unfinished lesson work will also be expected to be completed so the student does not fall behind.
- Written homework notes are checked by the teacher when the tasks are uploaded to Google Classroom as these are essential for our flipped learning approach.

Marking policy

- Carousel homework tasks are reviewed by the teacher and used to inform future lessons, produce insightful data and create a culture that celebrates knowledge.
- Short tests at the start of lessons allow teachers to ensure that the students are preparing adequately. Discussion with the students also makes it very clear if they are putting in the necessary effort.
- We regularly test students in lessons to review knowledge gained and identify underperforming students and problem areas. This is teacher-dependent and we try not to share tests, as the students also like sharing them between groups. Tests will be marked and parents will be informed if there is substantial underperformance.
- We mark whole cohort examinations for Year 12 and 13 and centralised exam ladders are used are used to record this data.
- Other exam questions are covered in class but the students mostly peer and self-assess these. AQA provides clear marking guidance for examination style answers. This is regularly used and shared with students.

Biology in Key Stage 5

We teach AQA Biology A level: https://www.aqa.org.uk/subjects/science/as-and-a-level/biology-7401-7402

Year 12- Teacher A (4 lessons per fortnight)

Specification ref	Topic	Practical opportunities
3.1	Biological molecules	
3.1.1	Monomers and polymers	
3.1.2	Carbohydrates	Testing for starch, reducing sugars and non-reducing sugars using unknown solutions. 11. Production of a dilution series of a glucose solution and use of colorimetric techniques to produce a calibration curve with which to identify the concentration of glucose in an unknown 'urine' sample
3.1.3	Lipids	Emulsion test
3.1.4	Proteins	Biuret test.
	Enzymes	Demo of H2O2 decomposition (with manganese IV oxide, potato and liver). Plasticine models of E-S complexes. Urea unknown. 1. Investigation into the effect of a named variable on the rate of an enzyme-controlled reaction
3.1.5	Nucleic acids are important information-carrying molecules	Extracting DNA from peas. DNA models
3.1.6	ATP	
3.1.7	Water	Investigation circus- see SOW
3.1.8	Inorganic ions	
3.4	Genetic information, variation and relationships between organisms	
3.4.1	DNA, genes and chromosomes	
3.4.2	DNA and protein synthesis	
3.4.3	Genetic diversity can arise as a result of mutation or during meiosis	Biological drawings of meiosis/ mitosis slides
3.4.4	Genetic diversity and adaptation	6. Use of aseptic techniques to investigate the effect of antimicrobial substances on microbial growth
3.4.5	Species and taxonomy	
3.4.6	Biodiversity within a community	Sampling sweet or bead communities
3.4.7	Investigating diversity	Variation in ivy leaves. Sampling techniques

Year 12- Teacher B (5 lessons per fortnight)

Specification ref	Topic	Practical opportunities
3.2	Cells	
3.2.1	Cell structure	Using a microscope- general, using I2/KI to identify starch grains in plant cells. Centrifuges- extraction of chloroplasts from spinach, Using stage micrometers and graticules
3.2.3	Transport across cell membranes	Microscope drawings of turgid and plasmolysed cells. 3. Production of a dilution series of a solute to produce a calibration curve with which to identify the water potential of plant tissue
		4. Investigation into the effect of a named variable on the permeability of cell-surface membranes- Beetroot ISA
3.2.2	All cells arise from other cells	2. Preparation of stained squashes of cells from plant root tips; setup and use of an optical microscope to identify the stages of mitosis in these stained squashes and calculation of a mitotic index
3.2.4	Cell recognition and the immune system	
3.3	Organisms exchange substances with their environment	
3.3.1	Surface area to volume ratio	Agar cube ISA
3.3.2	Gas exchange	Nail varnish leaves and stomata. Fish gills. Spirometers. Respirometers. LUNGS
3.3.3	Digestion and absorption	Lipase
3.3.4	Mass transport	5. Dissection of animal or plant respiratory system or mass transport system or of organ within such a system Effect of exercise on heart rate- ISA?
3.3.4.2	Mass transport in plants	Potometers. Xylem slides. Celery

Year 13- Teacher A (4 lessons per fortnight)

Specification ref	Topic	Practical opportunities
3.7.4	Populations in ecosystems	12. Investigation into the effect of a named environmental factor on the distribution of a given species
3.7.1	Inheritance	
3.7.2	Populations	
3.7.3	Evolution may lead to speciation	
3.8.1	Alteration of the sequence of bases in DNA can alter the structure of proteins	
3.8.2	Gene expression is controlled by a number of features	
3.8.3	Using genome projects	
3.8.4	Gene technologies	
3.6.4	Homeostasis is the maintenance of a stable internal environment	

Year 13- Teacher B (5 lessons per fortnight)

Specification ref	Topic	Practical opportunities
3.5.1	Photosynthesis	7. Use of chromatography to investigate the pigments isolated from leaves of different plants, e.g. leaves from shade-tolerant and shade-intolerant plants or leaves of different colours 8. Investigation into the effect of a named factor on the rate of dehydrogenase activity in extracts of chloroplasts
3.5.2	Respiration	9. Investigation into the effect of a named variable on the rate of respiration of cultures of single-celled organisms
3.5.3	Energy and ecosystems	
3.5.4	Nutrient cycles	
3.6.1	Stimuli, both internal and external, are detected and lead to a response	10. Investigation into the effect of an environmental variable on the movement of an animal using either a choice chamber or a maze
3.6.2	Nervous coordination	
3.6.3	Skeletal muscles are stimulated to contract by nerves and act as effectors	

Public examinations

Paper 1

What's assessed

Any content from topics 1–4, including relevant practical skills

Assessed

written exam: 2 hours
91 marks, 35% of A-level

Questions

76 marks: a mixture of short and long answer questions
15 marks: extended response questions

Paper 2

What's assessed

Any content from topics 5–8, including relevant practical skills

Assessed

written exam: 2 hours
91 marks, 35% of A-level

Questions

76 marks: a mixture of short and long answer questions
15 marks: comprehension question

Paper 3

What's assessed

Any content from topics 1–8, including relevant practical skills

Assessed

written exam: 2 hours
78 marks, 30% of A-level

Questions

38 marks: structured questions, including practical techniques
15 marks: critical analysis of given experimental data
25 marks: one essay from a choice of two titles

Sanctions and rewards

- These are at the teacher's discretion but should be in line with the school behaviour policy.
- Sanctions include notes in planner, emails or phone calls home and short detentions.
- Verbal praise and encouragement helps to create a positive classroom environment and good working relationships. Rewards include positive notes in planner, positive emails or phone calls home, merits and house points.
- Effort is rewarded, as well as the quality of work produced.

Closing the gap

- All KS4 and KS5 students are taught by specialist biologists with a degree in the subject. This combined with non-negotiable high expectations of every student, regardless of their academic level, allows us to help each student to reach or exceed their potential in the subject. Teachers who are non-specialists are experienced in teaching the subject at KS3 level.
- We provide a well thought out curriculum, which repeatedly consolidates and challenges key principles whilst linking these to further examples and increasingly complicated progression.
- We offer all students support outside of lessons; the students know they can ask any member of the department for subject help, and they do so frequently and confidently.
- We aim to close the gap between students who have, and have not, received extensive tutoring or access to more structured and stable home support. In particular, we stress the need for technical language, specific terminology and high effort levels both in and outside the classroom.
- All Year 9 Pupil Premium students are offered a free GCSE revision guide at the start of their course. KS5 students in receipt of Free School Meals are also given a choice of free CGP resources and provided with a free subscription to the Biological Sciences Review magazine.
- Students know that it is ok to occasionally underperform but that this cannot become a habit, nor will it go unchallenged. We promote learning as a journey and not a destination, and reinforce that many of our most successful students have come from disadvantaged backgrounds.
- We appreciate that different students have different home situations and circumstances. We know which students are in receipt of PP, have/ have ever had FSM, are on the SEND register, are LAC, and/ or have disclosed pertinent medical conditions. We adapt our approach when necessary. Teachers are expected to be familiar with PP and SEND students and their individual needs (via their Student Profiles) as well as engage in any relevant communications with pastoral and SEND staff where it may affect their learning. Informal discussions are often had to highlight concerns over individual students who might benefit from further support (e.g. use of laptop, extra time in exam, etc.).
- Centrally gathered assessment marks allow for department-wide analysis of key groups of students compared to their peers, allowing for us to react to particular needs in future planning. Analysis of academic performance for key groups is included in the annual examination review. Students performing below expectation will be highlighted to form tutors and parents, offered appropriate support, and helped to improve.
- We recognise the need for flexibility in our approach with some students. For example, students who live at more than one address, or are facing medical challenges, are often afforded longer deadlines to complete work. Often we are unaware of the problems that our students are facing; this became even more apparent with the Covid-19 pandemic. Kindness and compassion goes a long way when working with any student. We can manage the environment of our own classrooms, and our own degree of empathy and understanding to lessen the effect of adversity that our students may face.

More able students

- We appreciate that, as a selective school, the majority of our students are considered more able.
- We recognise that the most able students may present in various ways in and outside the classroom, and may not necessarily be the most studious or most focussed students that we teach. Often it is their questions, rather than their answers, that differentiate them from their peers. Teaching activities and extension tasks are designed to provide all students with appropriate stretch and challenge.
- Those students considered most able in Biology are identified by staff and recorded in a central spreadsheet. Identification is not prescriptive; no set numbers are demanded and criteria for judging whether a student is more able is based on individual professional judgement. The register is reviewed annually and progress of these students is monitored through the departmental examination results and departmental SEF.
- The department promotes additional supercurricular activities outside of lessons to provide additional breadth and depth. These are not restricted solely to our most able students, but invariably are embraced more by these individuals. We actively promote extension resources such as FutureLearn and national competitions. We encourage, but do not demand, participation and believe it is the students' responsibility to decide if they wish to take part in such extension activities. At no point should students perceive extension activities to be a burden or a negative compulsory requirement, rather they should be approached with interest and enthusiasm.
- We encourage students to read around the subject; the school library has a growing collection of popular biology books to extend students at all key stages.

Equality, Diversity & Inclusion

Equality, Diversity and Inclusion is fundamental to a supportive, progressive and successful department. We are responsible for promoting best practice in everything we do and every member of our community should feel free to grow and progress without barriers.

British Values and Spiritual, Moral, Social and Cultural education

The ethos of the department and its teaching supports **Fundamental British values** throughout all key stages and whilst we do not refer explicitly to them in planning and assessment, the following are clearly in evidence throughout our provision. Examples of how we promote these core values through our teaching are outlined below. If any student were to express discriminatory or extremist opinions or behaviours, these would be challenged.

Fundamental British values	**Desired student outcomes**	**How we do it**
B1 - democracy	Students understand that political decisions are made about which laws are passed, how scientific discoveries and medical research are funded, experiments which are allowed, etc. Students recognise that their opinion on a biological issue may differ to those of others, and that is	Democracy is taught through debating many issues such as • is drug taking in sports fair? • has COP26 done enough? • can we prevent climate change? • how is pollution impacting on society? • how should decisions be made on NHS funding?

	ok. Students are encouraged to express their opinions; they recognise that debating skills are important in a democratic society. Students know how to argue their point effectively and are prepared to listen to alternative ideas. They know how to listen and are able to compromise, adjust their viewpoint or concede in a mature manner. Every student has a voice to contribute to classroom discussion, and a right to express their opinion in a positive way.	• should the best heart surgeons be given the sickest patients? • what drugs should be prioritised for development? • how does British law compare to laws in other countries for key issues, e.g. cloning or stem cell science?
B2 - the rule of law	Students accept responsibility for their behaviour and show initiative in practical activities. Students are taught the need for rules when working in the laboratory. They also understand the need to accept the consequences if they break these rules. Students appreciate that there are non-negotiable Health and Safety legislation points and risk assessments to minimise risks in practical work. They often are asked what these are, rather than just informed of the dangers. Relevant scientific issues allow students to explore the nature of scientific evidence and the interplay between scientific communities, the media, politicians and policy makers.	Topics include: • Environmental legislation and agricultural laws, including conservation incentives. • Laws related to alcohol, tobacco and illegal drugs. • Drugs in sport. • Policy for stem cell technology, genetic modification, cloning, DNA database usage, reproductive technology and termination of pregnancy. • The importance of distinguishing between opinion based on valid, repeatable and reproducible evidence and opinion based on non-scientific ideas (for example prejudices, or hearsay). • Drug legislation including clinical trials, animal testing and animal rights.
B3 - individual liberty	In Biology, students are allowed to make mistakes, and are expected to do so from time to time! This builds resilience in our students. Students are expected to accept responsibility for their conduct; good behaviour is a non-negotiable.	Students select information and data from different sources to answer questions and think about problems creatively. In some A level work, students are required to design their own experiments. Students need to make informed choices about the reliability of various types of evidence, and choose

	Students are encouraged to ask questions and take risks with their learning. Discussion of controversial topics or ethical choices allow the right to express personal opinions, and the expectation to consider the differing viewpoint of others. Independent learning is used to increase self-esteem and develop ownership for their learning. This is particularly prominent in the flipped learning curriculum at A level.	appropriate sources for research purposes. Individual freedoms are discussed in various topics, including whether to: • donate organs for transplantation • use or not use birth control • have IVF treatment • have genetic screening • make individual lifestyle choices which influence health
B4 - mutual respect	In Biology lessons, students are expected to treat each other with respect, irrespective of differences in opinions, beliefs, background and personal choices. They are encouraged to support each other, as well as pursue individual academic goals. Pair and group work is prominent in lessons, particularly those with a main practical or discussion element. Students have the right to discuss their views in a supportive classroom environment, and are encouraged to understand that not everyone agrees or nobody really knows the answer to some questions. In practical work, they are expected to make necessary adjustments and consider how their individual decisions affect those around them. Teamwork, cooperation and courtesy is demanded at all times. The understanding of biological concepts can evolve with further technological advances and increased knowledge. Sometimes this is through the consideration and study of different beliefs and theories, and this should be viewed positively. For example,	We are always teaching topics where a 'right' answer can neither be expected, nor endorsed, and differing viewpoints are respected in the classroom. For example: • What are the ethical issues associated with vaccinations? • Should we genetically modify food crops? • What are the risks, benefits, ethical issues and regulation associated with gene technology? • Do people have a right to smoke if they cause others to suffer from the effects of passive smoking? • What is the cost of obesity? • How do lifestyle choices affect personal health and the NHS? Students learn that mutual respect, cooperation and collaboration is needed when working towards common goals. For example: • Tackling ecological concerns • Disease outbreaks on a local, national or global scale. • Scientists working together (discovery of DNA structure, insulin development, Covid-19 vaccines, etc.) • Collective responsibility (e.g. antibiotic resistance, pathogen spread, fertiliser and pesticide usage, population growth, seed banks).

	Semmelweiss, Lamarck, Darwin, Franklin, Mendel, etc.).	
B5 - tolerance of those of different faiths and beliefs	Students recognise that everyone is entitled to their own faiths and beliefs, and that prejudice or discrimination against these will not be tolerated. Students understand the importance of international collaboration in biology, and accept that differing cultures and societies contribute towards a greater global understanding of the subject. Students appreciate that different faiths and beliefs may influence decisions which impact on scientific opinions and health care.	There are many opportunities to discuss different faiths and beliefs. Topics include: • Importance of conservation • Genetic modification • Selective breeding • Stem cell research • Maintaining biodiversity • Zoos and wildlife parks • Three parent babies • Cloning • Evolution • Contraception • IVF • Organ donation

These themes also allow us to constantly develop student's **spiritual, moral, social and cultural development**. Avoiding unnecessary repetition, there is obviously massive overlap across these strands. Often ethical and moral questions arise in which students are expected to think for themselves and develop their understanding and personal viewpoints about a range of biological ideas, processes and advancements.