



Newport Girls' High School Curriculum Summary

Faculty: Science	Subject: Biology
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Our Vision

Faculty Vision

The Science Faculty teaches Biology, Chemistry and Physics as separate sciences from year 7. We aim to create and develop enthusiastic, informed, inquisitive and ultimately successful scientists. Students who study sciences at NGHS should be curious about the universe about them and enjoy learning how scientific models can be used to explain observations from the very large to the very small. We are committed to establishing a learning environment that encourages students to develop their observational, experimental, problem solving, critical thinking and evaluation skills so that they become confident at analysing and interpreting information and data. Students will be offered many opportunities to apply and expand on their mathematical and communication skills in the context of the different sciences. Students will become aware of the ethical implications of scientific advances and gain opportunities to independently extend their skills beyond the classroom. Fundamentally, our team want to inspire, foster and nurture a love of science and use scientific knowledge and skills to make informed decisions about the communication, application, and implications of science as these relate to their own lives and cultures and to the sustainability of the environment.

Subject Vision

The delivery of biology aims to make students into competent scientists who are able, if they wish to pursue a career in science. Students are taught to be numerate, speak and write scientifically, be able to apply existing knowledge and think in a way that allows them to research and answer the scientific questions of the day.

Curriculum Intent

At KS3, students are introduced to basic biology concepts and fundamental science investigative skills. The concepts are delivered using a variety of strategies to appeal to different styles of learning such as model making, practical work and research. They are introduced to all the key vocabulary and ideas in the scientific investigative method. This helps build a strong foundation for GCSE and A level.

At KS4, we study the AQA syllabus single science Biology. Topics studied at KS3 are reinforced and developed in KS4. Practical skills are further developed with the delivery of required practical and additional experiments where appropriate.

We encourage their passion for Biology by providing outdoor learning opportunities through contextualising the learning with every day examples and by attending GCSE live lecture day.

At KS5, students continue to study the central concepts but in greater detail. The ecology part of the course is delivered via field work at Malham Tarn field studies centre in Yorkshire. This hands-on approach makes the work more relevant and enjoyable. Students share their own passion in biology by giving a presentation on a chosen topic of interest which enables the teachers to have a deeper insight into their motivation and therefore write good quality references. Biological interests are cultivated by taking students to A level Biology live and encourage them to participate in the Biology Olympiad challenge run by Royal Society of Biology. Students are given the opportunity to extend their knowledge and practical experience by applying for a CREST award in association with Harper Adams University.

Curriculum Sequencing Rationale & Implementation

KS3

In year 7, students are introduced to the laboratory environment, including commonly used equipment. The topic of cells is then introduced as the building blocks of life. The topics of reproduction in humans and plants is covered followed by ecology.

During year 8, students study the main biological molecules and how they are digested and the structure of the human digestion system. This is followed by respiration and photosynthesis and then a study of microbes.

As concepts are delivered, links are made between the concepts. For example, in photosynthesis students need to understand the structure of starch and glucose, therefore these are studied in the digestion topic prior to photosynthesis. The link is then made between plants making glucose, storing it as starch, organisms consuming glucose for respiration and the idea of digestion to access the glucose from the starch made by the plants. Microbes are introduced partly to give access to practical work and as an introduction to the topic of communicable diseases for GCSE.

KS4

Students study a range of topics which all link to the seven life processes (Movement, respiration, sensitivity, growth, reproduction, excretion and nutrition). Students understand from KS3 the structure of a cell, in KS4 they now look at how substances move in and out of cells. This moves into the idea of how these substances are actually transported around multicellular organisms to the cells i.e the circulatory system. Having some knowledge of how a healthy organism functions. Students then move onto the idea of disease both communicable and non-communicable, including the role of the immune system in protecting us from infections. Students then move onto plants biology, understanding the process and importance of these processes to all life on earth. This is followed by the delivery of respiration, a process carried out by all living organisms. The following topics; nervous system, hormones reproduction and DNA are delivered towards the end of year 10 and into year 11. These topics are more academically demanding and therefore delivered later in the course. Students then finish the GCSE course with the idea of how the variety in life on earth came to be, evolution and speciation, and how all life is interconnected through ecosystems. Included in these last topics are man's use of knowledge to manipulate nature i.e. selective breeding and genetic engineering.

KS5:

In year 12, students study the same concepts, the seven life processes, but in far greater depth. The course starts with the biochemistry of biological molecules that make up a cell and the detailed study of the ultrastructure of the cell. This knowledge is then used to understand the immune system and how substances are transported around the organism in both animals and plants. This is followed by a study of protein synthesis leading into genetic diversity. Statistics is introduced towards the end of year 12 alongside biodiversity in a hands-on context with the residential ecology trip to the Field Studies Council centre.

In year 13, the academic rigour increases as students start with an in-depth study of the biochemistry of respiration and photosynthesis. At the same time with the co teacher they look at how organisms respond to and survive in their environment through the study of the nervous system, muscular system and hormones. Students then take a look at more detailed genetics including the more recent understanding of epigenetics and how man has harnessed the knowledge of genetics to manipulate organisms using genetic engineering. The year finishes with the study of ecosystems and population.

For specific information relating to the content of the curriculum in each year group, opportunities for wider personal development and enrichment and ways for parents to support their daughter in her learning within this subject, please see the Learning Overviews on our website.