Science at The Bridge

Aims and objectives

At The Bridge we aim to create curious, knowledgeable and enthusiastic Biologists during KS 4. Biology helps us to understand how organisms are structured and function. It helps us discover how the world works, our place, impact, role and the responsibilities we have; to explore how scientific ideas develop and how we learn by experimentation. We are committed to providing a stimulating, engaging and intellectually challenging learning environment to enable all our students to develop a scientific conscience, establishing an informed view about the world around and in them.

Specifically at The Bridge our intent is to:

- Develop students' understanding of the scientific process of verification through experimentation, discussion and logic, allowing them to **critically assess the world** through an informed knowledge base and understanding. Linked with this aim is the challenge to develop students' awareness of 'Moral education in Biology'; encouraging pupils to become increasingly curious, to develop open mindedness to the suggestions of others and to make judgements on evidence not prejudice
- To provide opportunities which support students in their journey of becoming **independent, accurate and safe practical enquirers**. An investigative approach engages students, helping them to develop important skills whilst establishing a broad understanding of biological concepts
- To develop confidence and a **secure knowledge base** in students so that they are able to **apply biological concepts to novel situations**
- Teaching and encouraging students to be conscious and deliberate in their **use of scientific language** in the search for new knowledge and through this develop their scientific literacy
- Embedding the importance of **numeracy skills** throughout the process of teaching and learning**;** providing opportunities where students are challenged to make sense of trends in data, supporting them to develop a grasp of validity and errors within results and the detection of bias before drawing conclusions

Teaching and learning styles

At the Bridge a wide range of teaching and learning styles are employed to deliver a 'knowledge rich' Biology curriculum. These include:

- Interactive presentations
- Whole class debates and discussions
- Small group work
- Whole class, teacher-led delivery involving Q&A sessions
- Practical investigative work
- Interleaving, a teaching and learning strategy that involves switching between topics or ideas, which has been shown to improve long-term learning relative to blocking study of the same idea or topic. This is reflected in the development of a spiral curriculum.

Students in Year 11 will have the opportunity of visiting Rainham Marshes to experience and take part in practical field work activities. The marshes are also one of the few remaining ancient grassland and grazing marshes in the UK. This variety of wildlife and habitats provides a fantastic opportunity for all types of field study. This whole day visit provides the opportunity for The Bridge students to explore the unique landscape of the marshes, whilst at the same time developing practical skills which will be tested in examinations. Outside speakers and trips enrich the Biology curriculum on offer and we endeavour to include such activities whenever the opportunity arises.

Biology planning

The development of the Schemes of Learning within Biology involve an element of a 'Spiralling curriculum'**;** a course of study in which students will see the same or connected topics throughout their school career, with each encounter increasing in complexity and reinforcing previous learning. Curriculum planning also takes into account the school's Unique Me principles for each half term.

Units of learning covered are:

Year 10

- Cell structure
- Organisation of the digestive system, gas exchange and the circulatory system
- Organisation of the digestive system to include the role of enzymes in biological systems
- Infection and response
- Bioenergetics, to include photosynthesis, respiration and metabolism
- Mastering the longer style, continuous prose examination questions

Year 11

- Homeostasis to include the human nervous system and hormonal communication
- Ecology to include 'Organisation of ecosystems and biodiversity'
- Inheritance, variation and evolution
- Revision, consolidation and linking of all biological concepts including those studied in year 10

(Note that the above is subject to change depending on when students are enrolled at The Bridge and prior learning)

KS3

These students, depending upon progress made at their prior school and timing of entry to the Bridge, will either follow the KS3 pathway covering units of Biology, Chemistry and Physics. It is important that where appropriate, students are able to study all three aspects of Science to allow an effective transition back to mainstream schooling.

(Note that this is subject to change depending upon time of student entry to The Bridge, Baseline testing and the year group mix at KS3)

Units of Learning covered at KS3

Biology	**Cells, tissues and organs**	**Reproduction**	**Environment and adaptation**
Chemistry	**Particles**	**Atoms and elements**	**Periodic table**
Physics	**Forces and their effects**	**Energy transfers and resources**	**The Earth and beyond**

Teaching Biology and Science to students with special needs

Teaching and learning approaches at The Bridge match individual students' needs. This may be through differentiated worksheets and tasks, scaffolding support for weaker students and challenge tasks to move the higher attaining students on in their learning. When planning and delivering Biology and providing feedback to students, any EHCP (Educational, Health and Care Plan) IEP (Individual Educational Plan) and SEND (Special Educational Needs and Disabilities) are taken into account.

Assessment and recording

Assessment is on-going throughout the entire course and at each stage informs future planning and learning. Following the completion of each unit of work a test is completed by all students. Analysis of students' responses will guide the next stage in their learning, where common misconceptions and areas of weaknesses will be revisited. These written assessments, alongside progress made in the classroom and homework assignments, will inform the half termly data drops which are kept on a central database. There will be end of year examinations testing a wider breadth of content, these too will be analysed to identify student weaknesses and provide appropriate therapy. Assessment of class/homework assignments will involve a mix of teacher, peer and self-assessment. Post cards are routinely sent out to those parents/carers whose children have made a particularly impressive effort and/or are displaying a commendable level of attainment. Subject teachers will also call parents when the need arises and report formally to parents twice yearly in December and July.

Resources

There exists at The Bridge a wide range of resources to match individual teaching needs. These include:

- Twinkl subscription. This provides instant access to inspirational lesson plans, schemes of work, assessment, interactive activities, resource packs, PowerPoints, and suggestions for teaching approaches
- Schemes of Work which have hyperlinks to informative video clips/podcasts/required practical support
- Course textbooks for class use and revision guides for use at home.
- A school subscription to ClickView. ClickView is the leading video content resource for secondary schools and further education settings. Visually stunning, curriculum-aligned video content and teacher resources can be accessed, plus contextual on-demand TV, video library and interactive question layers for formative assessment.
- The Bridge continues to develop a wide variety of resources to ensure students can take part in practical investigative work.

Monitoring and review

Maria Jackson (Deputy Head i/c Teaching and Learning) is responsible for monitoring the standard of student work and the quality of teaching. Loraine Holland is responsible for the development and delivery of the Biology curriculum. Monitoring of the Biology curriculum and areas for development are identified as part of the Personal Development/Quality of Education Health Checks three times a year and discussed with the Head of School and the lead governor responsible. Feedback is then given to the Local Governing Body.