

IB Biology

What is the course about?

IB Biology at BISC builds on the foundations set down in IGCSE Biology or equivalent. Biology is the study of all life. During the course we uncover more detail into the fascinating workings of the human body as well as the ultrastructure of cells, Biochemistry, Genetics, Evolution, Ecology and Plant Biology to name a few topics. By studying the course, students will have a much better understanding of how our bodies work but also how we influence the lives of all other living organisms and how those organisms affect our lives. Where possible we use practical work to demonstrate and explore ideas as well as trips to suitable locations to further consolidate the material in the syllabus.

How is the course structured?

SL and HL students have all core lessons together. In the first term of the first year, we begin with the ultrastructure of the cell and then move onto Biochemistry. This builds a firm foundation on which to explore all other topics. Higher level students in their separate sessions begin the course with Plant Biology and then move on to higher level Biochemistry. Having completed the necessary course foundation, students move on to Human Physiology. Usually the topics studied in the second term include Digestion, Gas Exchange and Blood and the Circulatory System. During this time we study the additional material from the Human Physiology option such as Nutrition, Digestion in detail and the Liver. Higher level students add Muscles and Movement, Kidney and Osmoregulation as well as higher level Option material such as Respiratory gases. The final topics studied during the first year are Ecology, Classification and Evolution. Where possible these include field trips to practise techniques as well as consolidate knowledge. All during the first year, students have practical work which is designed to be written

up and practise the skills required for the internal assessment. In May, all IB1 students work together on a collaborative piece of research of their own devising called the Group 4 Project. This can be lab or field based and culminates in the various groups presenting their results and conclusions to their peers and panel of teachers.

In the second year, students study Respiration and Photosynthesis, Genetics, and the remaining human physiology topics of the Immune system, Homeostasis and Reproduction. Higher level students complete their course with higher level Genetics, Immunology, Homeostasis and Reproduction. All students complete the Option material. In the first term of the second year all students work on their Internal Assessment to have it written up by the end of term. For those that are absent there is the chance to do this in February of the second term. After the mock exams at the beginning of the second term, there is time to complete the syllabus and work on revision. All during the course, students are given end of topic tests which are always a mix of past exam questions. We work on past papers once we are in the revision stage of the second year.

What distinguishes this course from others?

The IB Diploma allows students to make links between different subjects and notice how everything is related. We try to stay abreast of current developments in the field of Biology, bringing it into appropriate lessons and discussing the implications of new research or new ideas. We try and foster those links by discussion, reading relevant articles, watching film clips as well as taking trips to suitable venues such as Ojcow National Park, and the Jagiellonian University

How is the course assessed?

As mentioned earlier, each topic ends with a test composed of a mixture of multiple choice and structured questions that will be found in papers 1, 2 and 3 of the actual exam. Practical work that is

written up will be marked with comments made to guide the student where and how to improve in readiness for writing their internal assessment. The end of year mark is based on the end of year exam which closely mimics the IB exam. Namely there is a multiple choice paper, a structured questions paper with compulsory questions and a choice of essay questions as found in Paper 2 and finally there is a structured questions paper based on practical work and Option material covered to date. Standard level students must gain at least a grade 2 and higher-level students a 3 although realistically these are far too low grades for someone wishing to study science at university.

What are the requirements for entry?

Biology is a very demanding subject with a wealth of knowledge to be assimilated as well as the ability to draw very many biological diagrams. Given the amount of Biochemistry required, students also need a good foundation in Chemistry at IGCSE or equivalent. In addition, a very good command of English at a written level is essential to be able to express oneself clearly and concisely.

Therefore to enter this course at Standard level, students must have at least a grade C or higher at IGCSE in BOTH Biology and Chemistry or the equivalent. For Higher level students, to cope with the demands of the course, students **MUST** have at least a grade A or higher at IGCSE or the equivalent in Biology and a C in Chemistry. If students have not been formally assessed they will need to sit an entrance exam in the week preceding the start of the first term to determine whether they will be able to cope with the material and pace.

What materials will I need?

Students are provided with a textbook as well as printouts of Power Point presentations used during lessons. In addition, students are

required to purchase the course workbook at the start of the first year which is used throughout the course during lesson time and for homework. This is ordered by the Science Department at the start of the year. Students have access to other textbooks to use during school time and are encouraged to read articles in publications such as New Scientist and Biological Sciences Review. In addition, we expect students to have an enquiring mind, be proactive and enthusiastic as well as have a willingness to learn.

What will I learn?

The aim of the course is to gain a much better understanding of the human body both at a cellular level as well as the organ level.

- The IB biology course will develop you as a scientist.
- You will gain the skills needed to read and assess data on its merits, develop your analytical skills both practically and theoretically, develop more of an enquiring mind that you are able to question material given to you in terms of relevance and whether the conclusions are justified or not, be able to devise research questions to answer a particular questions and come up with and execute a practical that can investigate a simple research question.
- You will also be able to look at the bigger picture: you will see how actions taken in one place can have consequences all over the world and that the human race needs to take responsibility for its actions to date
- You will hopefully become a more compassionate person being able to see both sides of an argument and that there are still very many issues which need more research to fully understand the pros and cons of a particular procedure

In what ways does the Biology Syllabus promote the attributes of the IB Learner profile?

Curiosity: This attribute is developed through devising ones own practicals and Internal assessment

Balance: This is developed by assessing both sides of a moral dilemma e.g. abortion, factory farming etc and being able to see both the pros and cons of a given situation. In particular, as the evidence for Man's impact on the environment mounts, students are shown that we are only stewards of our planet for a given time and as such have a responsibility for our actions and how those impact other species.

Reflection: At a student level we encourage the student to reflect on all work and see where they could improve and look at perhaps alternative methods of learning and revising. At a higher level we expect students to understand that we all play a role in the world's future by understanding and implementing the lessons of the past so previous mistakes are not repeated.

Principled: all student work especially practical work must be the students own and the idea of honesty and integrity is always communicated to students throughout the course

Caring: During the course there are many opportunities that allow the students to become more involved with topics that they have empathy for.e.g. it may be working with children on a cancer ward, it can be driving a 'pass on plastic 'campaign within the school community as part of a CAS project

Open-minded: we encourage students to discuss ideas and opinions which often show a cultural or personal bias. As discussions go deeper, students often can see another's viewpoint and accept it even if it is not the same as their own

Knowledgeable: Each topic studied requires the development of existing ideas and often using concepts. Issues can be locally as well as globally significant.

Communicative: Scientists must be good communicators as it is common practise for many different labs across the world to collaborate on research projects. Communication therefore is key for our students both in being able to express themselves in their written work as well as working practically with others.

Inquirer: throughout the course, students are expected to come up with research questions which they could take further in a practical setting. This is clearly demonstrated by their IA which has to reflect a personal interest and the EE if the student decides to do a Biology based essay.

Thinker: For any of the science subjects, the ability to think logically and laterally is a key skill. Students are expected to use the knowledge learned and then apply it in an unfamiliar situation to analyse and communicate their conclusions or in giving a reasoned ethical response.

What from the course can make worthwhile extended essay questions?

Extended essay questions need to be personal to the student and not all Biology questions can easily be investigated and written up within the boundaries set by the IB. However, in the recent past, some students have had successful extended essays with plant based projects mainly for the ease and speed with which these can be set up.

Can an interest in Biology lead to a CAS project?

Absolutely! Students have in the past created a school shade garden for all students to enjoy, have become involved with a variety of recycling projects , a school project on cutting down plastic waste as

well as tutoring younger secondary students in Biology particularly in the run up to IGCSE.

What is the relationship between TOK and Biology?

TOK is fundamental to any of the sciences. It itself asks us to not accept things blindly but to question, ask for evidence and weigh up various opinions and results. Therefore, there are many opportunities to do this during the Biology course. We look, for example, how our understanding of the cell membrane composition has changed as more evidence has come to light given advances in technology, we look at the moral and ethical arguments of compassionate farming and so much more. Therefore, we become better citizens of the world by becoming more informed and able to make informed decisions and choices.

What career paths are open to me?

This course is perfect preparation for someone wishing to go into medicine or similar at university. However, given the breadth of the syllabus, this is also perfect for anyone wishing to study further any Biology related subject such as Biological Science, Pharmacology, Marine Biology, Sports Science to name but a few.

Where can I find more information on the Biology course?

Please download the subject guide for more information. You can also contact one of the Biology teachers at BISC. Head of Science
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