

Group 4:

Experimental Sciences

Biology

Nature of the subject:

Biology has been described as the study of life and living organisms. It is an exciting, challenging but approachable science. The subject matter ranges from cells, organs and organisms, to populations, ecosystems and the interdependence of organisms on each other and on the environment.

The aim is to encourage students to create an understanding of the structure and functioning of organisms at all levels, including the chemical processes occurring within cells.

Practical work and internal assessment involve a number of experiments, investigations and fieldwork designed to reinforce the concepts taught, skills acquisition and to inculcate an appreciation of the benefits and limitations of scientific methodology. Throughout the course, emphasis will be given to the ethical implications of the choice of living organisms and the environment.

Cells Cell division Membranes Chemical elements Biological molecules DNA and transcription Enzymes Cell respiration Photosynthesis.	DNA structure and replication Transcription and translation Proteins and enzymes Ecosystems Greenhouse effect Evolution Classification.
Community ecology Ecosystem and biomes Impacts of humans on ecosystems Conservation of biodiversity Population ecology Digestion The Group Project.	Chromosomes, genes and mutations Genetics Genetic engineering and biotechnology Transport system Gas exchange Defence against infectious disease Nerves, hormones and homeostasis Meiosis and reproduction The kidney Muscles and movement.

<p>Dihybrid crosses and gene linkage Polygenic inheritance Plant structure, transport and reproduction Microbes and biotechnology. Revision and Mock exams. Consolidation and further revision.</p>	
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Previous Knowledge:

A keen interest in biology with a good grade in GCSE or IGCSE will be a great help towards a successful completion of this course. For those aspiring to read biology beyond the diploma, a course in chemistry at higher level provides a good combination.

Assessment format:

The course consists of internal and external assessment components.

Internal Assessment:

This is worth 24% at both higher and standard levels. It is based on continuous assessment of practical work and on the Group Project, involving all the students.

External Assessment:

There are three papers for the HL and SL external assessment.

	Higher Level	Standard Level
Paper 1:	20% - Multiple Choice	20% - Multiple Choice
Paper 2:	36% - Data-based and Extended response	32% - Data-based and Extended response.
Paper 3:	20% - Short Answer and Extended Response Questions on two Options.	24% - Short Answer and Extended Response Questions on two Options

Preliminary Reading:

An interest in magazines such as the New Scientist, Scientific American and the National Geographic would provide a good reading and an excellent preparation for the course.

Similarly, books written by naturalists such as David Attenborough, David Bellamy and Stephen Jay Gould could provide a good insight into biology at this level.

Chemistry

Core Topics covered in Chemistry – Standard Level (SL) & Higher Level (HL)

Quantitative Chemistry
Measurement and Data Processing
Atomic Structure
Periodicity
Bonding
Energetics
Kinetics
Equilibrium
Acids, Bases and Salts
Reduction and Oxidation
Organic Chemistry

Optional Topics covered in Chemistry – Standard Level (SL) & Higher Level (HL)
(Students have a choice to select any two topics from A to G)

Modern Analytical Chemistry
Human Biochemistry
Chemistry in Industry & Technology
Medicines and Drugs
Environmental Chemistry
Food Chemistry
Further Organic Chemistry

IB Chemistry allows students to study the techniques scientist use in conducting investigations and communicating with others around the world. In repeating classic investigations performed by historical members of this international global community, students demonstrate an understanding of scientific principles, learn to apply these principles, learn to construct, analyse and evaluate hypotheses, develop interpersonal skills with peers, and improve manipulative skills necessary to carry out scientific investigation with precisions and safety. Scientific knowledge is interdisciplinary in nature and design. Knowledge is shared among members of the international scientific community through publications and symposiums. Through research and investigation, students fulfil the aims of improving critical scientific reasoning skills and learning investigative techniques needed for rational inductive and deductive reasoning.

Student learning is manifest through internal and external evaluations. In addition to learning the theory that is assessed through external examination by the IBO, students are required to complete investigations and Group 4 project for internal evaluation by the teacher. Each student must keep a Portfolio of Investigations that is written to support the students' practical scheme of work. An in-depth investigation (Group 4 project) must be initiated and conducted by the student with the aid of the instructor. Such projects may lead students to complete extended essay or work with the local community in CAS projects.

Students will conduct classic labs emphasizing the importance of international collaboration in the scientific process. The library facilities on campus are expanding to Australian publications in addition to the European ones. Internet facilities are available throughout the campus which allows students to research global literature support findings and data acquired in the lab. Students will learn to record

their results using the International System of Measurement and verify their findings with published values in the international community.

Classroom Polices and Parent information for IB Chemistry

Preparation:

It is your responsibility to attend each class fully prepared. This includes bringing to class a pencil/pen, eraser, calculator, notes and lab notebook.

Attendance:

You are expected to attend every class. If you have been absent, you are responsible for obtaining missing notes and homework from a classmate. Missed tests will be made up on your own time, after making arrangements with your teacher. If you are absent on the day of an exam and do not bring a note, you will not be allowed to rewrite the exam; thus you will receive a zero. 92% of the attendance is compulsory during the course.

Punctuality:

If tardiness is frequent and becomes a problem, recommendations will be made to the School Heads which may end up in disciplinary action. Missing the deadline of Internal Assignment may end up in losing the percentage from final grading.

Homework:

IB chemistry is a demanding course. In order to be successful, you must be willing to do daily homework and review. If you are having trouble with any of the topics, I am frequently available to meet with you for extra help.

Classroom Conduct:

You will conduct yourself in an exemplary manner at all times by respecting the rights of all students, staff, and guests. BE RESPECTFUL, BE RESPONSIBLE, BE PRODUCTIVE AND BE SAFE.

You will accept personal responsibility for your behaviour and your academic standing. Appropriate language is expected at all times. During laboratory experiments, safety of all students is of utmost importance. Any unsafe behaviour will not be tolerated and the student will be asked to leave and receive a mark of zero.

Academic Honesty:

The IB program has a zero tolerance policy towards cheating/plagiarism. This will result in a loss of IB diploma and removal from the course.

Assessment

Assessment Specifications	Higher Level			Standard Level		
	Weighting	Syllabus	Duration	Weighting	Syllabus	Duration
Paper 1 (MCQ)	20 %	Core	60 min	20 %	Core	45 min
Paper 2 (Short & Extended)	36 %	Core	2 h & 15 min	32 %	Core	1 h & 15 min
Paper 3 (Short Answer)	20 %	Options	1 h & 15 min	24 %	Options	1 h
Internal Assessment	24 %	Practical	60 h	24 %	Practical	50 h

Physics

Physics is a subject of enormous breadth. In physics students will seek explanations of the universe itself. It is a study that will take you from the very smallest particles to the vast distances between galaxies. It gives basic explanations of how stars evolve, the planets move and also the wave-particle dual nature of subatomic particles. Physics enables us to alter our surroundings- to build bridges, launch satellites and make delicate instruments for microsurgery. It has given us the internet and advances in sports equipment and medical imaging. It may also provide the answers to the big issues facing the world in the 21st century, such as the shortage of world energy resources and climate change.

Physics can be described as having two aspects. First, it is a body of information containing the rules that governs the universe we live in and help us appreciate our surrounding. Secondly, physics provides the tools for the many human activities- of engineers, astronomers, software designers and medical researchers-that allow us to alter and construct the material world to suit our needs and to pursue our wish to discover the unknown.

The Course

Physics deals with the nature and structure of matter and tries to provide order in the universe around us. The IB physics course is divided up into the following areas: **mechanics, thermal physics, waves, electromagnetism, gravitational and electrostatic fields, energy resources and climate change, atomic physics and radioactivity, quantum and nuclear physics.**

Option topics include: **astrophysics, communication, electromagnetic waves, relativity, medical physics and particle physics.**

Levels available

Higher and standard level is available.

Previous knowledge

For Higher Level and Standard Level sciences previous knowledge is essential. For HL a minimum of Grade B at IGCSE (or equivalent) in the relevant IGCSE science is preferred. At SL at least a grade C at IGCSE (or equivalent) is preferred.

Assessment:

	Higher Level		Standard Level	
	%	Details	%	Details
External assessment	76	Three written papers: <ul style="list-style-type: none">• Paper 1 (20%): multiple choice questions• Paper 2 (36%): data-based and extended-response questions• Paper 3 (20%): short-answer questions in each of the two options studied	76	Three written papers: <ul style="list-style-type: none">• Paper 1(20%): multiple choice questions• Paper 2 (32%): data-based and extended-response questions• Paper 3 (24%): short-answer questions in each of the two options studied
Internal assessment	24	Practical investigations (60 hours) which are assessed using 5 assessment criteria:	24	Practical investigations (40 hours) which are assessed using 5 assessment criteria:

Career link- university courses

Architect, astronomer, doctor, civil engineer, optician, electronic engineer, software designer, cosmologist, nuclear engineer, acoustic and sound engineer, design engineer, marine engineer, medical physicist, clinical engineer, veterinary surgeon, airspace controller, civil service, metallurgy, crystallography, material science, climate change scientist, scientist journalist, meteorologist, oceanographer, defence engineer, manufacturing, aerospace and aviation, seismologist, environmental control officer, physics teacher.