

INTERNATIONAL BACCALAUREATE DIPLOMA PROGRAM (IBDP)

INPUT SESSION
GROUP 4: EXPERIMENTAL SCIENCES

Physics

Biology

Chemistry

Computer Science

Environmental Systems & Societies



Group 4 Aims

In the IBDP Group 4 science classes emphasis is placed on:

- Conceptual understanding
- Experimental work
- Covering a broad range of topics (University preparation)
- How scientists work, communicate and collaborate for the progress of science

Assessment objectives

Students should be able to:

- Understand and apply facts, terminology, concepts, methodologies and techniques
- Formulate, analyze and evaluate hypotheses, research questions, methodologies and techniques, data and scientific explanations
- Demonstrate the appropriate research, experimental, and personal skills necessary to carry out investigations

EXTERNAL ASSESSMENT

Final written examinations at the end of the 2nd year in the IBDP

INTERNAL ASSESSMENT

Experimental work in class or fieldwork

INTERNAL ASSESSMENT	MINIMUM TIME SPENT IN HOURS
Biology HL Chemistry HL Physics HL	60
Biology SL Chemistry SL Physics SL Computer Science HL & SL	40
Environmental Systems and Societies (SL)	30

Assessment

Subject	External Assessment	Internal Assessment
Biology (SL & HL) Chemistry (SL & HL) Computer Science (HL) Physics(SL & HL)	80%	20%
Computer Science SL	70%	30%
Environmental Systems and Societies (SL)	75%	25%

INDIVIDUAL INVESTIGATION

- Each student plans and carries out experiments on a topic of their choice.

Examples:

- Do different combinations of foods produce chemicals that form kidney stones?
- How does temperature affect the concentration of dissolved oxygen and therefore the living organisms in a river?
- How does the tension of a guitar string affect the frequency of a note?

GROUP 4 PROJECT

- Compulsory for both HL and SL students for all Group 4 subjects
- It is an *interdisciplinary* activity
- Consists of
 - *Planning* (all Group 4 students “brainstorm”)
 - *Action*
 - *Evaluation*

Activities of Group 4 subjects

- **Clubs**

Biology, Computer Science, CERN

- **Contests**

Panhellenic robotic competition

Panhellenic programming competition

EUSO (European Union Science Olympiad)

- **Visits**

Psychico Creek, Schinias beach, Ochi mountain, CERN



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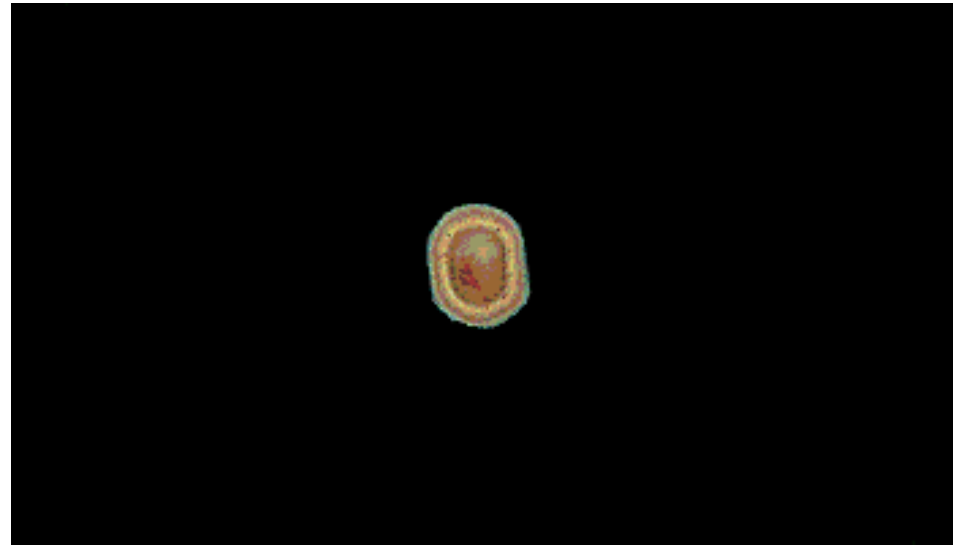
Biology

HL and SL



Biology is the science of life

From the chemicals involved in life processes – **molecular biology**,
to the studies of cells – **cell biology**,
to the study of entire organs and organisms – **zoology and botany**,
to the study of **heredity** and **evolution of life forms**,
to the study of entire ecosystems – **ecology**



Biology SL

An introductory course most suited to students interested in life sciences but do not necessarily wish to pursue that further.

Biology HL

A pre-university course that prepares students for university studies in the multitudes of biological and medical fields.


- from research in molecular biology, evolutionary biology and genetics,
- to medicine, medical technology and pharmaceutical sciences.



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Chemistry

HL and SL



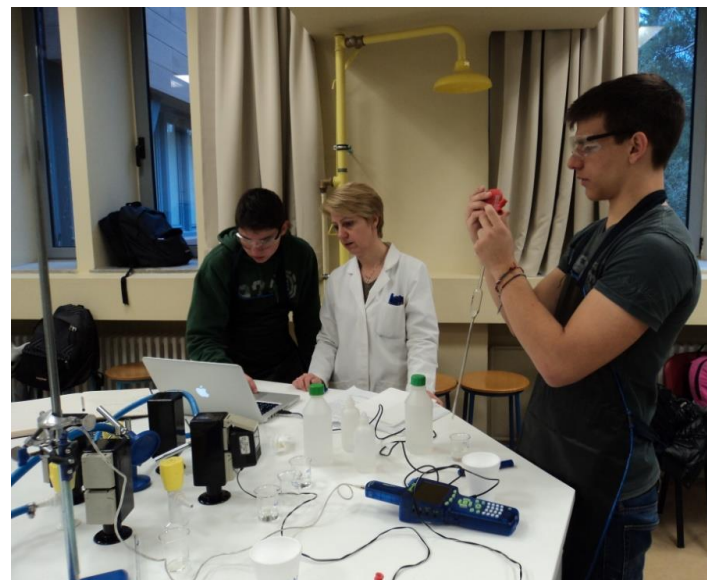
Chemistry is often called the central science, as chemical principles underpin both the physical environment in which we live and all biological systems.

Chemistry Syllabus

- Stoichiometric Relationships
- Atomic Structure
- Periodicity
- Chemical Bonding & Structure
- Energetics / Thermochemistry
- Chemical Kinetics
- Equilibrium
- Acids & Bases
- Redox Processes
- Organic Chemistry
- Measurement & Data Processing
- AHL material for all

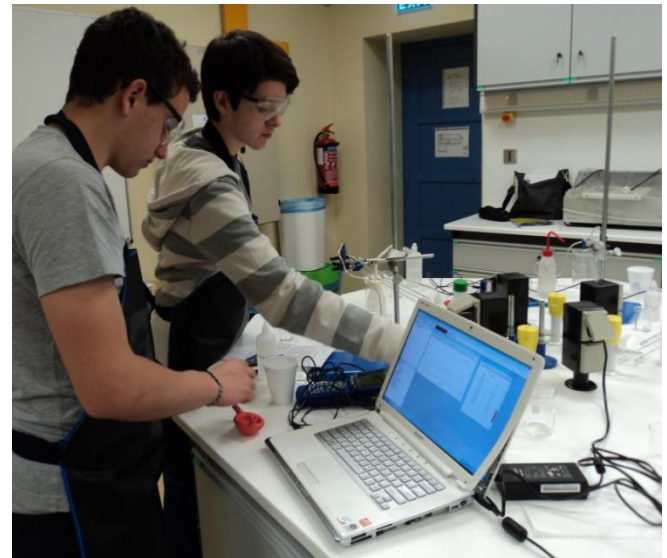
OPTIONS

- Materials
- Biochemistry
- Energy
- Medicinal Chemistry



Why take Chemistry?

- FUN !
- If you are interested in:
 - Chemistry
 - Chemical engineering
 - Medicine or other related fields
 - Biological, biochemical studies, environmental studies
 - Pharmacy
 - Forensic Science






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Computer Science

HL and SL



Computer science requires an understanding of the fundamental concepts of computational thinking as well as knowledge of how computers and other digital devices operate.

Computer Science Syllabus

CORE SYLLABUS

- System fundamentals
- Computer organization
- Networks
- Computational thinking, problem-solving and programming

OPTIONS

- Databases
- Modelling and simulation
- Web science
- Object-oriented programming (OOP)

ADDITIONAL HIGHER LEVEL

- Abstract data structures
- Resource management
- Control
- **Case study**-Additional subject content introduced by the annually issued case study

INTERNAL ASSESSMENT

- Practical application of skills through the development of a product and associated documentation

Why take Computer Science?

- If you are interested in the way everything works
- If you are interested in:
 - Computer Science
 - Information and Communication Technology
 - Software engineering
 - Hardware engineering
 - Robotics
 - AI
 - etc.






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Environmental Systems & Societies

SL



ESS is firmly grounded in both a scientific exploration of environmental systems in their structure and function and in the exploration of cultural, economic, ethical, political, and social interactions of societies with the environment.

Environmental Systems & Societies Syllabus

- Foundations of Environmental systems & societies
- Ecosystems & Ecology
- Biodiversity & Conservation
- Water and aquatic food production systems & societies
- Soil systems and terrestrial food production systems & societies
- Atmospheric systems & societies
- Climate change and energy production
- Human systems & resource use



Why take Environmental Systems & Societies?

➤ If you are interested in:


- Environmental Science
- Marine Science
- Biodiversity
- Green Technology, Alternative Energy
- Zoology, Aquaculture, Agriculture
- Environmental Engineering
- Oceanography, Meteorology, Geology
- Environmental Economics & Management and many more!



IB Diploma

Physics

HL and SL



Physics seeks to explain all physical phenomena
from the very small entities (elementary particles)
to the whole Universe (Cosmos).

Physics syllabus

CORE SYLLABUS

- Measurements
- Mechanics
- Thermal physics
- Waves
- Electricity & magnetism
- Circular motion & gravitation
- Atomic, nuclear & particle physics
- Energy production

ADDITIONAL HIGHER LEVEL

- Wave phenomena
- Fields
- Electromagnetic induction
- Quantum and nuclear physics

OPTIONS

- Relativity
- Engineering physics
- Imaging
- Astrophysics

Why take Physics?

- If you are interested in the way Nature works
- If you are interested in:
 - Engineering
 - Medicine or other related fields
 - Science

