

Physics – Standard Level

Physics is the most fundamental of the experimental sciences as it seeks to explain the universe from the smallest particles, quarks, to the vast distances between the galaxies. IB Physics HL is a two-year course that allows the student to continue the study of Physics. While the Physics topics in Grades 9 and 10 tended to focus on areas of classical physics such as the building blocks of Newtonian mechanics & electromagnetism, IB Diploma physics revisits these concepts in more detail and moves forward into the areas of thermodynamics and quantum mechanics. Additionally, the IB Physics course allows students to develop investigative skills and develop skills in the use of mathematics, the language of physics. Typically, physics is a prerequisite for many sciences and engineering courses at Tertiary level education.

Subject Areas

1. **Physics and Physical Measurement** – realm of physics, measurement and uncertainties, mathematical and graphical analysis, vectors and scalars
2. **Mechanics** - Kinematics, forces, dynamics, momentum, work, energy, power, uniform circular motion
3. **Thermal Physics** – heat capacity, latent heat, Ideal gases, thermal energy transfer, states of matter.
4. **Waves** - traveling waves, properties of waves, standing waves
5. **Electricity and Magnetism** - electrostatics, electric fields, electric potential difference, current, circuits and magnetism
6. **Atomic and Nuclear Physics** – atomic structure, radioactive decay, nuclear reactions, fission, fusion

Options

7. **The History and Development of Physics** –models of the universe, heat, mechanics, electricity, magnetism, atomic and nuclear physics
8. **Astrophysics** – components of the universe, stellar radiation and types, cosmology.
9. **Relativity** – frames of reference, relativistic kinematics, special relativity
10. **Optics** – nature of light, reflection and refraction, critical angle, lenses, optical instruments

Assessment

Internal Assessments Interdisciplinary project, a mixture of short or long term investigations (practical and subject specific projects) 24%

This includes completion of 40 hours of Practical Investigations and must include completion of the Group 4 Project. All Group 4 Science students must complete the Group 4 research project in Grade 11 in addition to the required hours of investigative work over the two-year course. Internal Assessment will be based upon the IBO Diploma Assessment criteria for Practical reports in the areas of Planning, Data Collection, Data Processing and Presentation, Conclusion and Evaluation, Manipulative Skills, and Personal Skills. Practical reports completed by students across the two-years course will be assessable.

External Paper 1	$\frac{3}{4}$ hr – 30 multiple choice questions on the core	20%
Paper 2	1 $\frac{1}{4}$ hrs	32%
	<ul style="list-style-type: none"> • One data based question and several short answer questions on the core • One extended response question on the core • (a choice of three) 	
Paper 3	Several short answer questions in each of the two options studied (all compulsory)	24%