



XV. GIMNAZIJA

International Baccalaureate Department
Diploma Programme

PHYSICS

Curriculum Overview | SL and HL

Programme	IB Diploma Programme
Subject / group	Physics / Sciences
Levels	Standard Level (SL) and Higher Level (HL)
Applicable from	Teaching from 2023; first assessment 2025

Academic year 2026/2027

Prepared for publication on the school website by IB DP Physics teachers Marko Movre and Miha Španić.

1. Purpose and planning principles

This curriculum overview translates the first-assessment-2025 IB Physics framework into a coherent two-year school plan. It retains the useful features of the previous overview - units, concepts, content, learning outcomes, assessment, ATL and interdisciplinary links - while replacing the former topic structure, options and examination model with the current syllabus.

Planning status

This is a publishable overview, not a daily scheme of work. Exact dates, lesson allocation, laboratory availability and internal deadlines are finalized annually by the Physics Department and DP Coordinator.

2. Course architecture and time allocation

Level	Total	Content	Practical work	Shared components
SL	150 h	110 h	20 h	Collaborative sciences project 10 h; scientific investigation 10 h
HL	240 h	180 h	40 h	Collaborative sciences project 10 h; scientific investigation 10 h

The five themes and their recommended hours are: A 27/42, B 24/32, C 17/29, D 19/38 and E 23/39 hours for SL/HL respectively. The sequence below is school-designed and may be adjusted while preserving full syllabus coverage and total time.

3. IB philosophy in the physics curriculum

Element	How it is enacted
Nature of science	Students evaluate evidence, assumptions, models, uncertainty, peer scrutiny, scientific consensus and limitations of methods.
Concept-based learning	Forces, energy and particles recur across the five themes, helping students transfer understanding to unfamiliar contexts.
Approaches to teaching	Inquiry-based, conceptually focused, contextualized, collaborative, differentiated and informed by assessment.
ATL	Thinking, communication, social, self-management and research skills are planned explicitly and revisited.
Learner profile	Units create opportunities to be inquiring, knowledgeable, thinking, communicating, principled, open-minded, caring, courageous, balanced and reflective.
DP core	TOK questions, EE research skills and authentic CAS connections are signposted without conflating subject assessment with core requirements.
International-mindedness	Examples and datasets include global scientific challenges, diverse scientific contributions and consequences for communities and the environment.

4. Two-year curriculum map

Key: “HL extension” identifies content or depth not required at SL. Month ranges are indicative and should be aligned to the annual calendar.

Period	Unit / concepts	Content and SL-HL distinction	Objectives / outcomes	Assessment evidence	ATL and links
DP1 Sep-Oct	1. Describing motion Forces; reference frames	A.1 Kinematics: position, displacement, velocity, acceleration, graphs and equations of motion. HL: There is no additional higher level content in A.1	Model motion in one and two dimensions; interpret graphs; select equations and evaluate assumptions.	Diagnostic task; problem-solving quiz; motion investigation.	Thinking; communication; research Mathematics; TOK: models and idealization
DP1 Oct-Dec	2. Forces, momentum and energy Forces; energy	A.2 Forces and momentum; A.3 Work, energy and power: free-body diagrams, Newton laws, impulse, conservation principles, efficiency. HL: There is no additional higher level content in A.2. Additional HL in A.3: Collisions in two dimensions.	Construct force models; apply conservation laws; analyse collisions; evaluate experimental evidence.	Test; force/momentum practical; lab report and peer feedback. Semester test.	Thinking; social; research Mathematics; engineering; road safety

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Period	Unit / concepts	Content and SL-HL distinction	Objectives / outcomes	Assessment evidence	ATL and links
DP1 Jan-Mar	3. Thermal physics and climate Particles; energy	B.1 Thermal energy transfers; B.2 Greenhouse effect; B.3 Gas laws. HL: There is no additional higher level content in B.1, B.2 and B.3.	Use particle models; analyse heating and phase change; interpret gas data; evaluate simplified climate models and evidence.	Calorimetry/gas practical; data-based test; climate evidence task.	Research; thinking; communication Chemistry; geography; environmental systems
DP1 Mar-Apr	4. Thermodynamics and circuits Energy; particles	B.4 Thermodynamics; B.5 Current and circuits: energy transfers, electrical quantities, resistance, circuit models. HL: Additional HL thermodynamics content; deeper quantitative applications.	Apply energy accounting; analyse processes and circuit behaviour; design and evaluate practical methods.	Circuit investigation; problem-solving test; practical notebook review.	Research; thinking; self-management Chemistry; mathematics; technology
DP1 Apr-Jun	5. Oscillations and wave model Energy; forces	C.1 Simple harmonic motion; C.2 Wave model: oscillations, wave quantities, representations, intensity and superposition foundations. HL: Additional HL SHM treatment.	Connect motion, restoring effects and energy; use graphical and mathematical wave models; evaluate measurement uncertainty.	Pendulum/oscillation investigation; quiz; end-of-year examination (MOCK).	Thinking; communication; research Mathematics; music; engineering
DP2 Sep-Oct	6. Wave phenomena, resonance and Doppler Energy; models	C.3 Wave phenomena; C.4 Standing waves and resonance; C.5 Doppler effect. HL: Additional HL wave phenomena and Doppler depth.	Apply interference, diffraction, refraction, standing-wave and Doppler models; connect evidence to applications.	Wave practical; data-based questions; presentation/application task.	Thinking; social; communication Music; medicine; astronomy; mathematics
DP2 Oct-Dec	7. Gravitational, electric and magnetic fields Forces; energy	D.1 Gravitational fields; D.2 Electric and magnetic fields; D.3 Motion in electromagnetic fields. HL: Additional HL field depth and synthesis.	Represent fields; relate force, potential and energy; analyse charged-particle and orbital motion within syllabus scope.	Field modelling task; practical/simulation; written test.	Thinking; communication; research Astronomy; mathematics; engineering
DP2 Dec-Jan	8. Electromagnetic induction Energy; fields	D.4 Induction: magnetic flux, induced emf and applications. HL: Additional HL induction content.	Use flux and induction models; apply conservation reasoning; evaluate technological applications and losses.	Induction/transformer practical; problem set; quiz.	Research; thinking; social Technology; sustainability; power distribution
DP2 Jan	9. Rotation and relativity Reference frames; energy	A.4 Rigid body mechanics; A.5 Galilean and special relativity. HL: A.4 and A.5 are HL only.	Analyse rotational dynamics; use angular quantities; examine inertial frames, simultaneity and relativistic effects at syllabus level.	HL problem set; modelling task; short presentation.	Thinking; communication; self-management Mathematics; philosophy of science; astronomy
DP2 Feb-Mar	10. Atomic, quantum and nuclear physics Particles; energy	E.1 Structure of atom; E.2 Quantum physics; E.3 Radioactive decay; E.4 Fission; E.5 Fusion and stars. HL: Additional HL quantum and decay content.	Interpret spectra and quantum evidence; apply decay and nuclear-energy models; evaluate scientific, ethical and environmental implications.	Spectra/decay practical or simulation; test; evidence-based discussion.	Thinking; communication; research Chemistry; astronomy; ethics; mathematics
DP1-DP2	11. Experimental programme and assessment preparation Inquiry; evidence	Practical work embedded across themes; collaborative sciences project; scientific investigation; cumulative review and exam practice. HL: HL practical programme totals 40 h, compared with 20 h at SL.	Design ethical investigations; process uncertainty-aware data; conclude and evaluate; communicate in scientific form; transfer learning across themes.	Lab portfolio; CSP reflection; scientific investigation; mock Paper 1 and Paper 2.	All ATL categories All sciences; TOK; EE; CAS where authentic

Teachers use the detailed Physics guide and current Programme Resource Centre materials to map each listed topic to the complete syllabus understandings, applications and skills. This public overview intentionally summarizes rather than reproduces the copyrighted subject guide.

5. Experimental programme plan

Component	SL	HL	Purpose	Documentation
Practical work	20 h	40 h	Develop experimental techniques, technology use, mathematical processing and inquiry skills across the syllabus.	Lab notebook/portfolio, selected reports, teacher feedback.
Collaborative sciences project	10 h	10 h	Interdisciplinary collaboration on a real-world scientific problem; focus on process, communication and reflection.	Planning evidence and reflection according to current school/IB guidance; not a separately weighted assessment component.
Scientific investigation (Internal assessment; DP Year 2)	10 h	10 h	Individual open-ended investigation answering a student-formulated research question through collection and analysis of data.	Written report, maximum 3,000 words; internally assessed and externally moderated; 20 %.

6. Assessment plan

Assessment is criterion-related and combines formative feedback with summative judgements. Classroom assessment prepares students for the four IB assessment objectives and should include conceptual questions, unfamiliar applications, data analysis, experimental design and evaluation, and extended scientific communication.

Assessment	Format	SL time	HL time	IB weighting
Paper 1	Paper 1A multiple-choice; Paper 1B data-based questions	1 h 30	2 h	36%
Paper 2	Short-answer and extended-response questions	1 h 30	2 h 30	44%
Scientific investigation	Individual report, maximum 3,000 words	10 h allocation	10 h allocation	20%

School grading note

The former fixed percentage boundaries and formula are not reproduced. Internal report grades follow the current school assessment policy. IB examination grade boundaries are session-specific and must not be represented as permanent thresholds.

7. ATL progression

Thinking: Interpret representations; identify assumptions; connect concepts; solve unfamiliar problems; evaluate evidence and competing explanations.

Communication: Use accepted symbols, units, graphs and scientific language; explain reasoning; present investigations; listen and respond to peer critique.

Social: Plan safe collaborative work; distribute responsibilities; negotiate methods; resolve disagreement through evidence; contribute to the CSP.

Self-management: Plan long investigations; maintain records; meet milestones; respond to feedback; reflect on errors and learning strategies.

Research: Formulate focused questions; find and evaluate sources; design methods; use technology; process data; cite ideas, data, images and code appropriately.

8. TOK, EE, CAS and interdisciplinary connections

- TOK prompts may address the role of models, whether measurement is theory-laden, how uncertainty affects confidence, the difference between correlation and causation, and responsibilities attached to scientific knowledge.
- Physics EEs develop a focused question, defensible methodology, sustained analysis and evaluation. Supervision and subject suitability follow current EE guidance.
- CAS links are encouraged where experiences genuinely satisfy CAS learning outcomes, for example outreach, environmental monitoring, accessible science communication or community engineering. Required physics work is not automatically CAS.
- Concurrency of learning is supported through mathematics, chemistry, geography/environmental systems, design/technology, astronomy, computing and ethical analysis.

9. Sources and publication note

- International Baccalaureate Organization. Physics guide. First assessment 2025. Published February 2023.
- International Baccalaureate Organization. DP Sciences: Physics subject brief. First assessment 2025.
- International Baccalaureate Organization. “Physics in the DP”, updated 6 March 2026.
- International Baccalaureate Organization. Programme standards and practices (2020).
- XV. gimnazija. Physics Course Description 2019/2020 and Curriculum Overview 2019/2020, used as structural school references.

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