

Curriculum overview for BIOLOGY, SL, DP1, 3mn, 2026/2027

Teacher: M. Marceljak Ilić

Unit title / Month	Key concept(s)	Content	Objectives / Learning outcomes	Assessment tasks	ATL skills	TOK	sources	Links to other subjects
A1 Water and nucleic acids September 10 h	Structure–function; unity of life	Water properties; nucleotides; DNA/RNA; complementary base pairing.	Explain water’s roles; compare DNA/RNA; interpret molecular models.	Water investigation; model; Paper 1A/1B.	Research; modelling; data interpretation.	How do models help and limit explanation?	IB Guide FA 2028; Oxford Course Companion (2023); OpenStax Biology 2e; Khan Academy AP Biology.	Chemistry: bonding, hydrogen bonds, organic molecules.
B1 Carbohydrates, lipid and proteins September–October 12 h	Structure determines function	Condensation/hydrolysis; carbohydrates; lipids; amino acids; protein structure/denaturation.	Relate molecular structure to biological function.	Food-test analysis; Paper 2 short response.	Analysis; laboratory technique.	How does classification shape knowledge?	IB Guide FA 2028; Oxford Course Companion; OpenStax Biology 2e; Khan Academy AP Biology.	Chemistry: functional groups and polymers.
A2 Cell structure October 10 h	Unity and diversity of cells	Cell theory; prokaryotic/eukaryotic cells; microscopy; drawings; differentiation.	Calculate magnification; identify structures; compare cells.	Microscopy practical; drawings; calculations.	Observation; measurement; visualization.	How do instruments influence knowledge?	IB Guide FA 2028; Oxford Course Companion; NCBI Molecular Biology of the Cell; Khan Academy AP Biology.	Physics: lenses. Maths: scale/standard form.
B2 Membranes, transport, organelles and specialization November–January- 14 h	Compartmentalization; exchange	Fluid mosaic model; diffusion, osmosis and active transport; organelles; SA:V; specialization.	Explain transport/compartmentalization; interpret osmosis data.	Osmosis investigation; graph/uncertainty/evaluation.	Research design; processing; evaluation.	How do measurement choices affect conclusions?	IB Guide FA 2028; Oxford Course Companion; OpenStax Biology 2e; NCBI Molecular Biology of the Cell.	Chemistry: concentration. Physics: diffusion/SA:V.
D2 Cell/nuclear division and water potential December–January- 12 h	Continuity; exchange	Mitosis, meiosis, variation, non-disjunction; osmosis and water-potential gradients.	Compare division; explain variation; determine water potential.	Mitosis microscopy; osmosis practical; Paper 2 calculations.	Analysis; calculation; evaluation.	How certain are inferences from observation?	IB Guide FA 2028; Oxford Course Companion; OpenStax Biology 2e; Khan Academy AP Biology.	Maths: ratios/graphs. Chemistry: concentration.
D3 Inheritance January–February 9 h	Continuity; inheritance	Genotype/phenotype; dominance/codominance; sex linkage; pedigrees; polygenic variation; Punnett grids and chi-squared.	Solve inheritance problems; interpret pedigrees and variation data.	Genetics problem set; pedigree analysis; Paper 1A/Paper 2 calculations.	Logical reasoning; statistics; communication.	What are limits of probabilistic explanations?	IB Guide FA 2028; Oxford Course Companion; NCBI Heredity, Genes and DNA; Khan Academy AP Biology.	Maths: probability, ratios and chi-squared.
C1 Enzymes, respiration and photosynthesis February–March 18 h	Metabolism; energy transformation	Enzymes and rate variables; ATP; respiration; photosynthesis, pigments and limiting factors.	Design controlled investigations; compare pathways; explain energy transformations.	Enzyme-rate practical; respirometry/photosynthesis; Paper 2 data work.	Experimental design; data analysis; evaluation.	What counts as evidence for unseen processes?	IB Guide FA 2028; Oxford Course Companion; HHMI BioInteractive; OpenStax Biology 2e; Khan Academy HS Biology.	Chemistry: redox/activation energy. Physics: energy/light.
D1 Replication, protein synthesis, mutations and gene editing March–April 16 h	Information transfer; change	Replication; transcription/translation; PCR/gel electrophoresis; mutation; CRISPR.	Model gene expression; interpret sequence data; evaluate gene editing.	DNA extraction; data task; ethics discussion.	Research; modelling; ethical reasoning.	What ethical limits apply to intervention?	IB Guide FA 2028; Oxford Course Companion; HHMI Central Dogma; NCBI DNA and Chromosomes.	Chemistry: molecular interactions. Digital Society: privacy/ethics.
A3 Diversity of organisms April–May 14 h	Diversity; classification	Species concepts; binomial nomenclature; karyograms; genome size/sequencing; keys; environmental DNA.	Apply nomenclature; interpret karyograms/genome data; use a key.	Karyotype/genome task; species key; Paper 1B.	Research; classification; evidence evaluation.	How do classification systems influence knowledge?	IB Guide FA 2028; Oxford Course Companion; OpenStax Biology 2e; NCBI Bookshelf.	Maths: data visualisation. Digital Society: genomic ethics.
A4 Evolution, speciation and biodiversity conservation May–June 12 h	Evolution; diversity; conservation	Evolutionary evidence; isolation/speciation; biodiversity loss and conservation.	Explain speciation; evaluate conservation strategies.	Evidence analysis; biodiversity survey; extended response.	Fieldwork; research; argumentation.	How do evidence, theory and explanation relate?	IB Guide FA 2028; Oxford Course Companion; OpenStax Biology 2e; Khan Academy AP Biology.	Geography: biodiversity. ESS: environmental values.

D4 Natural selection, stability/change and climate change May–June 13 h	Change; sustainability	Selection pressures; stability/change; climate impacts; mitigation/adaptation.	Explain selection; evaluate climate/sustainability responses.	Selection simulation; climate-data task; Paper 2.	Systems thinking; analysis; evaluation.	What responsibilities follow from climate knowledge?	IB Guide FA 2028; Oxford Course Companion; NOAA Climate resources/data; OpenStax Biology 2e.	Geography: climate. ESS: sustainability. Economics: externalities.
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Source key: IB Biology: <https://ibo.org/programmes/diploma-programme/curriculum/sciences/biology/> | OpenStax Biology 2e: <https://openstax.org/books/biology-2e> | HHMI BioInteractive: <https://www.biointeractive.org/> | NCBI Bookshelf: <https://www.ncbi.nlm.nih.gov/books/> | Khan Academy Biology: <https://www.khanacademy.org/science/hs-bio> | NOAA Climate: <https://www.noaa.gov/education/resource-collections/climate>.

Curriculum overview for BIOLOGY, SL, DP2, 4mn, 2026/2027

Teacher: M. Marceljak Ilić

Unit title / Month	Key concept(s)	Content	Objectives / Learning outcomes	Assessment tasks	ATL skills	TOK	Sources	Links to other subjects
B3 Gas exchange and transport September–October- 15 h	Form/function; exchange	Gas exchange and ventilation; blood/vessels/heart/lymph; xylem, transpiration and phloem.	Explain adaptations; compare transport systems.	Ventilation/pulse investigation; Paper 2 data response.	Data collection; graphing.	How do models explain unseen systems?	IB Guide FA 2028; Oxford Biology Course Companion (2023); OpenStax Biology 2e; Khan Academy HS Biology.	Physics: gas pressure/diffusion. Chemistry: CO ₂ /pH.
Collaborative sciences project October- 10 h	Collaboration; interdisciplinary inquiry	Collaborative project involving Biology and at least one other science subject; shared real-world problem, planning, research, communication and reflection.	Collaborate effectively across science disciplines; apply scientific knowledge to a real-world context; communicate evidence-based outcomes.	Project planning, group research/product and reflection.	Collaboration; communication; research; organization; reflection.	How do different areas of knowledge contribute to solving complex problems?	IB Biology Guide FA 2028; IB collaborative sciences project guidance; school/library sources relevant to selected issue.	Chemistry/Physics/ESS: select a shared local or global scientific issue.
Scientific investigation October–December 10 h	Inquiry; evidence; evaluation	Student-designed biology investigation: research question, method, data collection/analysis, conclusion and evaluation; maximum 3,000-word report.	Meet Research design, Data analysis, Conclusion and Evaluation criteria.	Research design 6; Data analysis 6; Conclusion 6; Evaluation 6 = 24 marks.	Research; self-management; data literacy; reflection.	How do methods affect the strength of a knowledge claim?	IB Biology Guide FA 2028; Oxford Course Companion; school laboratory safety guidance; appropriate peer-reviewed sources.	Mathematics: uncertainty/statistics. Digital Society: ethical data use.
C2 Neural signalling November- 8 h	Communication and response	Resting potential, action potentials, synapses, neurotransmitters and myelination.	Explain neural signalling; interpret reaction-time data.	Reaction-time investigation; Paper 1B/Paper 2.	Data handling; modelling.	Can experience be fully explained biologically?	IB Guide FA 2028; Oxford Course Companion; Khan Academy HS Biology; OpenStax Biology 2e.	Psychology: behaviour. Physics: electrical potentials.
C3 Integration and defence against disease December–January 12 h	Interaction; defence	Nervous/endocrine integration; immunity; vaccination; HIV; resistance and herd immunity.	Explain coordinated responses; interpret health data.	Immunity case study; Paper 2 response.	Evidence evaluation; communication.	How should evidence and values balance in health decisions?	IB Guide FA 2028; Oxford Course Companion; HHMI BioInteractive; OpenStax Biology 2e.	Psychology: health. Chemistry: medicines.
D3Reproduction and homeostasis January- 5 h	Continuity; regulation	Sexual/asexual reproduction; fertilization; feedback and regulation.	Explain reproduction and homeostatic control.	Feedback case study; Paper 2.	Applying knowledge; reflection.	How do feedback models shape explanation?	IB Guide FA 2028; Oxford Course Companion; Khan Academy AP Biology; OpenStax Biology 2e.	Psychology: hormones. Chemistry: signalling.
B4 Adaptation and ecological niches January–February- 10 h	Adaptation; interdependence	Abiotic factors; biomes; adaptations; niches and competition.	Explain distribution/niches; evaluate claims.	Case study; sampling design; Paper 1B.	Fieldwork; observation.	When does explanation become speculative?	IB Guide FA 2028; Oxford Course Companion; Khan Academy HS Biology; OpenStax Biology 2e.	Geography: biomes. ESS: capacity.
C4 Populations, communities, energy and matter February–April 11 h	Interdependence; systems	Sampling; population growth; interactions; trophic levels; productivity; carbon cycle.	Plan sampling; analyse population/energy/carbon data.	Fieldwork; statistics; Paper 2 data questions.	Sampling; statistics; collaboration.	How should ecosystem claims address complexity?	IB Guide FA 2028; Oxford Course Companion; Khan Academy Ecology; NOAA classroom-ready data; NOAA climate data.	Geography: carbon cycle. ESS: services. Mathematics: statistics.

Biology, ATL Skills, TOK, Academic Integrity and International-Mindedness

Through the study of biology, students develop research, communication, thinking, collaboration and self-management skills through inquiry, experimentation, fieldwork and data analysis. The course promotes international-mindedness by exploring global issues including biodiversity conservation, climate change, health, sustainability and advances in biotechnology. Connections with TOK encourage students to examine the role of models, evidence, ethics and uncertainty in the construction of scientific knowledge. Academic integrity underpins all learning through ethical research practices, responsible data collection, accurate citation of sources and honest reporting of scientific findings. The course supports the development of IB Learner Profile attributes including Inquirers, Thinkers, Knowledgeable, Communicators, Principled, Open-minded and Reflective learners.