

Gr. 9 Biology



Dominican International School

Course Syllabus

School Year 2026–27



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COURSE DESCRIPTION

This course is designed and delivered around the Next Generation Science Standards for Life Science, that emphasise investigation and higher order thinking. A high school biology course following the NGSS is usually required by the higher education institutions in the USA, and it's a prerequisite for accessing the AP Biology course, as it provides the necessary conceptual foundations and trains the necessary skills.

COURSE OBJECTIVES

According to the NGSS, students will practice the following skills (Science and Engineering Practices, SEPs):

SEP-1: Ask questions and define problems.

SEP-2: Develop and use models.

SEP-3: Plan and carry out investigations.

SEP-4: Analyze and interpret data.

SEP-5: Use mathematics and computational thinking.

SEP-6: Construct explanations and design solutions.

SEP-7: Engage in argument from evidence.

SEP-8: Obtain, evaluate, and communicate information.

These skills are variously applied to core concepts (Disciplinary Core Ideas, DCIs)*

LS1: From Molecules to Organisms: Structures and Processes

LS1.A: Structure and Function — Explain how cell structures and molecules determine biological function.

LS1.B: Growth and Development — Describe cell division, differentiation, and organism growth.

LS1.C: Matter and Energy Flow in Organisms — Model photosynthesis and respiration transforming matter and energy.

LS2: Ecosystems: Interactions, Energy, and Dynamics

- LS2.A:** Interdependent Relationships — Evaluate carrying capacity, biological interactions, and ecosystem resources.
- LS2.B:** Matter and Energy Transfer in Ecosystems — Trace carbon cycling and energy flow through trophic levels.
- LS2.C:** Ecosystem Dynamics and Resilience — Assess how physical and biological changes impact ecosystem stability.
- LS2.D:** Social Interactions and Group Behavior — Evaluate evidence on how group behavior enhances survival.

LS3: Heredity: Inheritance and Variation of Traits

- LS3.A:** Inheritance of Traits — Explain how DNA and chromosomes encode genetic instructions.
- LS3.B:** Variation of Traits — Detail sources of genetic variation through meiosis, mutation, and distribution.

LS4: Biological Evolution: Unity and Diversity

- LS4.A:** Evidence of Common Ancestry — Synthesize evidence for biological evolution and shared ancestry.
- LS4.B:** Natural Selection — Explain how differential survival and trait expression drive evolution.
- LS4.C:** Adaptation — Model population adaptation to shifting environmental conditions over generations.
- LS4.D:** Biodiversity and Humans — Analyze human impacts on biodiversity and evaluate solutions.

The above core concepts and practices are implemented through a set of learning objectives (Performance Expectations, PEs)* as follows:

- HS-LS1-1:** Explain how DNA structure determines protein structure and function.
- HS-LS1-2:** Describe hierarchical organization of interacting body systems in organisms.
- HS-LS1-3:** Plan an investigation on feedback mechanisms that maintain homeostasis.
- HS-LS1-4:** Model cellular division (mitosis) and differentiation in complex organisms.
- HS-LS1-5:** Model how photosynthesis transforms light energy into stored chemical energy.
- HS-LS1-6:** Construct explanations for how carbon, hydrogen, and oxygen form complex molecules.
- HS-LS1-7:** Model cellular respiration breaking down food molecules to release energy.
- HS-LS2-1:** Use mathematical representations to support factors affecting carrying capacity.
- HS-LS2-2:** Use mathematical models to explain ecosystem factors affecting biodiversity and populations.
- HS-LS2-3:** Construct explanations for aerobic and anaerobic cycling of matter and flow of energy.
- HS-LS2-4:** Use mathematical representations to calculate biomass and energy transfer through trophic levels.
- HS-LS2-5:** Develop a model to illustrate the cycling of carbon among Earth's spheres.
- HS-LS2-6:** Evaluate claims that complex ecosystems maintain stability despite changing conditions.

- HS-LS2-7:** Design, evaluate, and refine a solution for reducing human impacts on biodiversity.
- HS-LS2-8:** Evaluate evidence for the role of group behavior on individual and species survival.
- HS-LS3-1:** Explain how DNA and chromosomes supply instructions for inherited traits.
- HS-LS3-2:** Make claims about the sources of genetic variation during meiosis and mutation.
- HS-LS3-3:** Apply concepts of statistics to explain the variation and distribution of expressed traits.
- HS-LS4-1:** Communicate scientific information supporting common ancestry and biological evolution.
- HS-LS4-2:** Construct an explanation based on evidence for how natural selection leads to adaptation.
- HS-LS4-3:** Apply concepts of statistics to support explanations that advantageous traits increase in populations.
- HS-LS4-4:** Construct an explanation for how natural selection leads to adaptation of populations.
- HS-LS4-5:** Evaluate evidence supporting claims that environmental changes drive species adaptation or extinction.
- HS-LS4-6:** Create or revise a simulation to test a solution for mitigating human impacts on biodiversity.

*Please note: these descriptions of the DCIs and PEs are not official. Please refer to this [NGSS document](#) for the complete description.

COURSE RESOURCES

- Textbook: National Geographic Learning. (2024). *National Geographic biology*. Cengage Learning. ISBN 978-0-357-58914-8 (in both physical and digital versions)
- Online material provided by the teacher (practices, videos, simulations, lecture slides, articles, instructional websites ...)

GRADING SYSTEM/ASSESSMENT

Students' understanding and mastery levels are assessed through the course with low stakes quizzes and practices, and evaluated with quizzes and end of unit tests, in addition to the quarter exams. Quarter exams can be project based, carried out in group or individually, or in a combination of the two. Assignments and classwork are usually graded for completion and timeliness.

According to the schoolwide policy, grading follows this system:

Category	No. Per Quarter	Weight
Tests and Quizzes	5	30%
Homework/seatwork/projects	10	30%
Quarter Exam	1	30%
Department	-	10%

ACADEMIC DISHONESTY

Academic Dishonesty means employing a method or technique or engaging in conduct in an

academic endeavor that contravenes the standards of ethical integrity expected at DIS.

Academic dishonesty includes but is not limited to the following:

- Purposely incorporating the ideas, words of sentences, paragraphs, or parts thereof without appropriate acknowledgment and representing the product as one's work;
- Representing another's intellectual work, such as photographs, paintings, drawings, sculpture, research, or the like, as one's own, including failure to attribute content to an AI.
- Employing a tutor, using Artificial Intelligence without acknowledgment, getting a parent to write a paper or do an assignment, and paying for an essay to be written by someone else and presented as the student's work.
- Committing any act that a reasonable person would conclude, when informed of the evidence, to be a dishonest means of obtaining or attempting to obtain credit for academic work.

Any act of academic dishonesty will result in an automatic zero on the entire assignment/learning task.

WEEKLY SCHEDULE

First Quarter Tentative Course Content

Week & Date	Topics / Projects / Assessments
Week 1 Aug 10 - 14	Monday Class Preparation ~ Student Holiday Tuesday Morning Assembly Friday Opening Mass & Assumption of Our Lady 8:00 (4) Course Introduction and Class Set-up Unit 1: Chemistry Of Life • Properties Of Water • Scientific Investigation
Week 2 Aug 17 - 21	(5) Laboratory (Surface Tension) • Carbon Structures
Week 3 Aug 24 - 28	(5) • Carbohydrates • Lipids • Nucleic Acids
Week 4 Aug 31 - Sep 4	(5) • Proteins Unit 1 Test
Week 5 Sep 7 - 11	(5) Unit 2: Cell Structure & Membranes • Cell Theory • Prokaryotic Vs. Eukaryotic Cells
Week 6 Sep 14 - 18	(5) Laboratory (Microscope Practice) • Membrane Structure • Organelle Functions
Week 7 Sep 21 - 25	T-W-Th Pre-Exam Days Friday Moon Festival ~ Public Holiday (4) • Passive/Active Transport, and Osmoregulation. Unit 2 Test
Week 8 Sep 28 - Oct 2	Monday Confucius' Birthday ~ Public Holiday Thursday Major Exams Day 1 Friday Major Exams Day 2 Review; Q1 Exam
Week 9 Oct 5 - 9	Monday Record Day ~ Student Holiday T-W-Th Teachers Conference ~ Student Holiday Friday Double 10 Day ~ Public Holiday

Second Quarter Tentative Course Content

Week & Date	Topics / Projects / Assessments
Week 1 (10) Oct 12 - 16	(5) Unit 3: Cellular Energy - Reactions and Energy - Enzymes and Catalysis
Week 2 (11) Oct 19 - 23	(5) - The Role of ATP - Photosynthesis
Week 3 (12) Oct 26 - 30	Monday Retrocession Day ~ Public Holiday (5) Laboratory (Catalase Or Photosynthesis)
Week 4 (13) Nov 2 - 6	(5) Cellular Respiration Unit 3 Test
Week 5 (14) Nov 9 - 13	(5) Unit 4: Gene Expression - DNA Replication - RNA Synthesis (Transcription) - Protein Synthesis (Translation)
Week 6 (15) Nov 16 - 20	(5) - Mutations. - Gene Regulation Practice (TBD)
Week 7 (16) Nov 23 - 27	T-W-Th Pre-Exam Days Friday Grade 12 Exams (5) Unit 4 Test Unit 5: Cell Division & Regulation Cell Cycle
Week 8 (17) Nov 30 - Dec 4	Monday Grade 12 Exams (5) - Mitosis - Laboratory (Mitotic Index)
Week 9 (18) Dec 7 - Dec 11	Monday TBD Tuesday Foundation Day Mass 9:00, Cutting of the Cake Ceremony, Christmas Fair, (Whole day) Wednesday TBD Thursday Major Final Exams half day Friday Major Final Exams half day Review Q2 exam
<i>Dec 14 to Jan 1 Christmas Break</i>	

Third Quarter Tentative Course Content

Week & Date	Topics / Projects / Assessments
Week 1 (19) Jan 4 - Jan 8	Monday Record Day ~ Student Holiday Friday New Year Mass at 8:00 (5) Unit 5: Cell Division & Regulation (continued) Cell Cycle Regulation
Week 2 (20) Jan 11 - Jan 15	(5) The Biological Mechanisms Of Cancer. Unit 5 Test
Week 3 (21) Jan 18 - Jan 22	(5) Unit 6: Heredity & Genetics Meiosis And Fertilization
Week 4 (22) Jan 25 - Jan 29	(5) - Mendelian Genetics - Non-Mendelian Inheritance Patterns
Week 5 (23) Feb 1 - Feb 5	Thursday Little New Year's Eve ~ Public Holiday Friday Lunar New Year ~ Public Holiday (3) Pedigree Analysis Practices (Pedigrees)
<i>February 8 to 12 Chinese New Year Holiday</i>	
Week 6 (24) Feb 15 - Feb 19	(5) - Variation - Population Genetics. Practices (Allele Frequency Shifts In Populations)
Week 7 (25) Feb 22 - Feb 26	22-26 IOWA Assessments (5) Unit 7: Ecology - Ecosystems Description, Energy And Matter Flows - Ecological Relationships And Population Dynamics
Week 8 (26) Mar 1 - Mar 5	Monday Memorial Day ~ Public Holiday T-W-Th Pre-Exam Days (5) Unit 6 Test Carbon Cycle
Week 9 (27) Mar 8 - Mar 12	(5) - Ecosystems Stability And Successions - Biodiversity And Humans

Week 10 (28) Mar 15 - Mar 19	(5) Practice (Ecosystem Survey And Modeling) Unit 7 Test
Week 11 (29) Mar 22- Mar 26	Tuesday Major Final Exams half day Wednesday Major Final Exams half day Thurs - Fri Easter Break (Spring Break) ~ Public Holiday Review Q3 exam
<i>March 25 to April 2 Easter & Spring Break</i>	

Fourth Quarter Tentative Course Content

Week & Date	Topics / Projects / Assessments
Week 1 (30) Apr 5 - Apr 9	Monday Tomb Sweeping Day ~ Public Holiday Tuesday Children's Day ~ Public Holiday (4) Unit 8: Evolution (Ap Unit 7) Mechanisms Of Evolution
Week 2 (31) Apr 12 - Apr 16	(5) Speciation And Extinction
Week 3 (32) Apr 19 - Apr 23	19 - 23 AP Mock Exams (5) Evidence For Evolution
Week 4 (33) Apr 26 - Apr 30	T-W-Th Pre-Exam Days Friday Labor Day ~ Public Holiday (4) Phylogenetic Trees.
Week 5 (34) May 3 - May 7	3 - 7 Final Exams (K, Gr. 5, 8, & 12 Only) 3 - 14 AP Exams (5) Practice (Cladograms) Unit 8 Test
Week 6 (35) May 10 - May 14	3 - 14 AP Exams Wednesday Major Final Exams Undergraduates half day Thursday Major Final Exams Undergraduates half day Friday Record Day ~ Student Holiday Review; Q4 exam
Week 7 (36) May 17 - May 21	Monday Gr. 12 Recollection (Morning) Monday Baccalaureate Mass (Afternoon, Schoolwide) Wednesday House Sports Day Thursday High School Field Trip Friday House Culminating Activity All Week Student Clearance Days & Special Events
Week 8 (37) May 24 - May 28	Monday Middle & High School Sports Day Monday LS Field Trip Tuesday Kindergarten Graduation/Gr. 5 Promotion Wednesday Gr. 8 Graduation and Gr. 12 Graduation Thursday Pre-Kindergarten & Gr. 1 - 4, 6 & 7, 9-11 Recognition Friday Last Day of School for Students