



AP BIOLOGY

COURSE SYLLABUS

GRADE LEVEL: AP

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SCHOOL YEAR: 2023-24

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COURSE DESCRIPTION:

AP Biology is a challenging course which will help students gain enduring understandings of biological concepts and the scientific evidence that supports them. The approach noted in the AP Biology Curriculum Framework enables students to establish lines of evidence, and use them to develop and refine testable explanations and predictions of natural phenomena. Content knowledge, inquiry, and reasoning are integral parts of the curriculum.

The AP Biology course was designed to be the equivalent of a two-semester college introductory course usually taken by Biology majors during their freshman year. The course is organized around four ‘big ideas’, and ‘enduring understandings’ and ‘science practices’ which clarify them. This structure enables students to understand the unifying principles within a diversified biological world while developing reasoning skills essential to the science practices.

Along with preparing students for the comprehensive AP Biology exam in May, this course is planned according to the Dominican International School’s ethos and mission statement, aiming to produce knowledgeable and responsible citizens who understand biological issues that could potentially impact their lives, and those of other members of our pluralistic society.

COURSE OBJECTIVES:

The key concepts and related content of AP Biology course is structured around the four underlying principles called the *big ideas*, as defined by the College Board, *enduring understandings* within the big ideas and *essential knowledge* within *enduring understandings*. The big ideas encompass the core scientific principles, theories, and processes governing organisms and biological systems. For each big idea, *enduring understandings* incorporate the core concepts that students should retain from the learning experience.

The Big Ideas:

Big Idea 1: Evolution The process of evolution drives the diversity and unity of life.

Big Idea 2: Energetics Biological systems utilize free energy and molecular building blocks to grow, to reproduce and to maintain dynamic homeostasis.

Big Idea 3: Information Storage and Transmission Living systems store, retrieve, transmit and respond to information essential to life processes.

Big Idea 4: Systems Interactions Biological systems interact, and these systems and their interactions possess complex properties.

The four ideas will not be taught separately, as this syllabus has been designed to give students opportunities to connect the AP Biology enduring understandings within each of the AP Biology big ideas to at least one other AP Biology big idea. See the units of instruction for further details.

Much of the structure and content is based on the *AP Biology Course and Exam Description* and the *AP Biology Sample Syllabi*, which are provided by the College Board. The outlines given in these documents have been modified to fit the timeframe of the school year in DIS.

The Investigative Laboratory Component

The updated course also requires a strong focus on scientific inquiry, and the use of the following seven science practices throughout the course:

1. The student can use representations and models to communicate scientific phenomena and solve scientific problems.
2. The student can use mathematics appropriately.
3. The student can engage in scientific questioning to extend thinking or to guide investigations within the context of the AP course.
4. The student can plan and implement data collection strategies appropriate to a particular scientific question.
5. The student can perform data analysis and evaluation of evidence.
6. The student can work with scientific explanations and theories.
7. The student is able to connect and relate knowledge across various scales, concepts and representations in and across domains.

In accordance with the updated curricular requirements of the course, students are given the opportunity to engage in student-directed laboratory investigations throughout the course for a minimum of 25% of instructional time. Students will also conduct more than the minimum of eight inquiry-based investigations (two per big idea throughout the course). This provides opportunities for students to design plans for experiments, data collection, application of mathematical routines, and refinement of testable explanations and predictions. The timeframe for these investigations is outlined in the following sections.

For full details of the 13 investigations recommended by the College Board, most of which will be covered by this syllabus, see the publication, *AP Investigative Labs: An inquiry – based Approach*.

ASSESSMENT:

Assessment strategies for this course are in accordance with the school's assessment policy. It includes homework, seatwork, and projects (30%), quizzes and tests (30%), quarter exam (30%), and participation (10%). In addition to the external AP Biology exam in May, there will be an internal exam at the end of each quarter. The student's lab reports for the AP Labs and others will contribute to the homework, seatwork and project grade. The students will compile a folder including not only their lab reports but also all of their notes and background research that they conduct prior to each of the investigations. The investigation lab reports will be graded using rubric so that students are aware of the expectation and the standards. However, four

investigations (one per quarter) will also be presented to the class for peer review using a mini-poster format. These peer assessments will form part of the student's grade for these assignments.

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:

1. Purposely incorporating the ideas, words of sentences, paragraphs, or parts thereof without appropriate acknowledgement and representing the product as one's own work.
2. Representing another's intellectual work such as photographs, paintings, drawings, sculpture, or research or the like as one's own, including failure to attribute content to an AI.
3. Employing a tutor, making use of Artificial Intelligence without acknowledgement, getting a parent to write a paper or do an assignment, paying for an essay to be written by someone else and presented as the student's own work.
4. 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 plagiarism will result in an automatic zero on the entire assignment.

PRIMARY TEXTBOOK & OTHER RESOURCES:

The main reference in this course and its accompanying website is as followed:

Urry, L., Cain, M., Wasserman, S., Minorsky, P. and Orr, R. (2020) *Campbell Biology AP Edition*. 12th edn. Boston, MA: Pearson Education, Inc.

<https://www.pearsonmylabandmastering.com/global/>

AP Classroom provided by the College Board offers flexible resources and practicing materials, and will be used throughout the course of the year.

<https://myap.collegeboard.org/>

Students will be given a reading schedule. Acquiring information out of class is an expectation of the course that is ongoing throughout the year.

Google Classroom offers the web-based platform for effective instructional communications and formative feedback. It is accessible not only for pupils, but also for parents and the school. Other resources, such as video clips, interactive learning programs, and web-based learning tools, will also be assigned to facilitate and stimulate learning.

ADDITIONAL INFORMATION – Please see Google Classroom for more information.

Schedule of Instruction

SUBJECT: AP BIOLOGY

1st QUARTER – TENTATIVE COURSE CONTENT

<i>(NB: Depending on time and interest, the teacher may delete and/or add other selections.)</i>	
Week / Date	Topic / <i>Projects & Labs</i> / <i>Assessments</i>
Week 1 Aug 10th to 11th <u>2 Days of Class</u> <i>10 ~ First Day / Orientation Day</i>	Welcome to AP Biology Course Overview
Week 2 Aug 14th to 18th <i>15 ~ Opening Mass</i>	Unit 0 – Experimental Design <i>Scientific Explanations – CER</i>
Week 3 Aug 21st to 25th	Ch 2 & 3 – Chemical Context of Life <i>Water Properties with Descriptive Statistics</i>
Week 4 Aug 28th to Sep 1st	Ch 4 – Carbon & the Molecular Diversity of Life <i>Introduce Transpiration Lab</i>
Week 5 Sep 4th to 8th <i>8 ~ Holy Mass & Birthday of Mother Mary</i>	Ch 5 – Biological Macromolecules and Lipids Ch 4.1 & 25.1 – The Origin of Life <i>Transpiration Lab Investigation</i>
Week 6 Sep 11th to 15th <i>12-14 ~ Pre-Exam Days</i>	Ch 52 – Behavioral Ecology <i>Introduce Behavior Lab</i> <i>Biochemistry</i>
Week 7 Sep 18th to 22nd	Ch 53 – Population Ecology & the Distribution of Organisms Ch 54 – Biodiversity and Communities
Week 8 Sep 25th to 29th <u>No Classes</u> <i>25-28 ~ Teacher's Conference</i> <i>29 ~ Moon Festival Holiday</i>	<i>Test – Ecology</i>
Week 9 Oct 2nd to 6th <u>3 Days of Class</u> <i>5-6 ~ Q1 Exams</i>	<i>Quarter Exam</i>

2nd QUARTER – TENTATIVE COURSE CONTENT

<i>(NB: Depending on time and interest, the teacher may delete and/or add other selections.)</i>	
Week / Date	Topic / <i>Projects & Labs</i> / <i>Assessments</i>
Week 1 (10) Oct 9th to 13th <u>3 Days of Class</u> <i>9-10 – Double 10 Holiday</i>	<u>Q1 Review & Reflect</u>
Week 2 (11) Oct 16th to 20th	Ch 55 – Ecosystems & Energy Ch 56 – Global Ecology & Conservation Biology
Week 3 (12) Oct 23rd to 27th	Ch 7 – Cell Structure & Function
Week 4 (13) Oct 30th to Nov 3rd <i>1 ~ All Saint's Day Mass</i>	Ch 8 – Cell Membranes & Membrane Transport <i>Diffusion & Osmosis</i>
Week 5 (14) Nov 6th to 10th	Ch 6 – An Introduction to Metabolism <i>Enzyme Lab</i> <i>Test – Cell</i>
Week 6 (15) Nov 13th to 17th	Ch 10 – Cell Respiration & Fermentation Ch 11 – Photosynthesis <i>Photosynthesis Lab Investigation</i>
Week 7 (16) Nov 20th to 24th	Ch 9 & 41 – Cellular Signaling & Cell Communication <i>Test – Cellular Energetics</i>
Week 8 (17) Nov 27th to Dec 1st <i>28-30 ~ Pre-Exam Days</i> <i>27 - Gr.12 Q2 Exams</i>	Ch 39 – Plant Responses to Internal & External Signals <i>Behavior Lab Investigation / Chi Square goodness-of-fit Analysis</i>
Week 9 (18) Dec 4th to 8th <i>8 ~ Foundation Day Celebrations</i>	Ch 46-49 – The Internal Environment of Animals (the Development, the Immune System, and the Nervous System) <i>Test – Cell Communication</i>
Week 10 (19) Dec 11th to 15th <u>3 Days of Class</u> <i>14-15 ~ Q2 Exams</i>	<i>Quarter Exam</i>
Dec 18th to Jan 1st	Christmas Holiday

3rd QUARTER – TENTATIVE COURSE CONTENT

(NB: Depending on time and interest, the teacher may delete and/or add other selections.)

Week / Date	Topic / <i>Projects & Labs</i> / <i>Assessments</i>
Week 1 (20) Jan 3rd to 5th <u>3 Days of Class</u> <i>4 ~ New Year Mass</i>	<u>Q2 Review & Reflect</u>
Week 2 (21) Jan 8th to 12th	Ch 12 – The Cell Cycle
Week 3 (22) Jan 15th to 19th	Ch 13 – Meiosis & Sexual Life Cycles <i>Meiosis Modeling Lab</i> <i>Test – Cell Cycle</i>
Week 4 (23) Jan 22th to Jan 26th	Ch 14 – Mendelian Genetics
Week 5 (24) Jan 29th to Feb 2nd	Ch 15 – The Chromosomal Basis of Inheritance Ch 16 – The Molecular Basis of Inheritance
Week 6 (25) Feb 5th to 9th <u>3 Days of Class</u> <i>8-9 – CNY Holiday</i>	Ch 17 – Gene Expression: From Gene to Protein & Genetic Abnormalities <i>Test – Heredity</i>
Feb 8th to 16th	Chinese New Year Holiday
Week 7 (26) Feb 19th to 23rd <i>19 ~ Lenten Mass</i> <i>20-22 ~ Pre-Exam Days</i>	Ch 18 – Regulation of Gene Expression <i>Quiz – DNA/Transcription/Translation/Point Mutation</i>
Week 8 (27) Feb 26th to March 1st <u>4 Days of Class</u> <i>28 – Memorial Day Holiday</i>	Ch 19 – Biotechnology <i>Bacterial Transformation Lab</i> <i>Test – Gene Expression and Regulation</i>
Week 9 (28) Mar 4th to 8th <u>4 Days of Class</u> <i>8 ~ Q3 Exams</i>	Ch 20 – The Evolution of Genomes <i>Quarter Exam</i>

4th QUARTER – TENTATIVE COURSE CONTENT

(NB: Depending on time and interest, the teacher may delete and/or add other selections.)

Week / Date	Topic / <i>Projects & Labs</i> / <i>Assessments</i>
Week 1 (29) Mar 11th to 15th <u>4 Days of Class</u> <i>11 ~ Q3 Exams</i> <i>12 ~ Q4 Begins</i>	<u>Q3 Review & Reflect</u> Ch 21 – Descent with Modification
Week 2 (30) Mar 18th to 22nd <i>18-21 ~ Fire Drill</i>	Ch 23 – Microevolution Ch 24 – Species and Speciation <i>Hardy-Weinberg Lab Investigation</i>
Mar 25th to Apr 5th	Easter Holiday
Week 3 (31) Apr 8th to 12th <i>10 ~ Easter Mass</i>	Ch 22 – Phylogeny
Week 4 (33) Apr 15th to 19th	Ch 25 – Macroevolution <i>Test – Natural Selection</i>
Week 5 (34) Apr 22nd to 26th <i>22-26 ~ AP Mock Exams</i>	Review activities & exam practice <i>Mock Exam</i>
Week 6 (35) Apr 29th to May 3rd <i>1-2 ~ Pre-Exam Days</i> <i>1-10 ~ Final Exams (K, 5, 8, 12 only)</i> <i>4/29 – 5/10 ~ AP Exams</i>	Review activities & exam practice
Week 7 (36) May 6th to 10th <i>1-10 ~ Final Exams (K, 5, 8, 12 only)</i> <i>4/29 – 5/10 ~ AP Exams</i>	Review activities & exam practice
Week 8 (37) May 13th to 17th <u>2 Days of Class</u> <i>15-16 ~ Q4 Exams</i> <i>17 ~ Record Day</i>	<i>AP Biology Exam – 5/16/2024</i> <i>Brain Dissection</i>
Week 9 (38) May 20nd to 24th <u>ACTIVITIES:</u> <i>Double check the school calendar and emails from the administration.</i>	Various readings and research
Week 10 (39) May 27th to 31st <u>4 Days of Class</u> <i>30 ~ Students Last Day</i> <i>31 ~ Teachers/Staff Meeting</i>	End-of-Year School Activities