



## AP BIOLOGY

### COURSE SYLLABUS

GRADE LEVEL: AP

TEACHER: Sophia Lin

SCHOOL YEAR: 2024-25

EMAIL: [slin@dishs.tp.edu.tw](mailto:slin@dishs.tp.edu.tw)

#### 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>	
<b>Week / Date</b>	<b>Topic / <i>Projects &amp; Labs</i> / <i>Assessments</i></b>
<b>Week 1</b> <b>Aug 12<sup>th</sup> to 16<sup>th</sup></b> <i>12 ~ First Day / Orientation Day</i> <i>15 ~ Opening Mass</i>	Welcome to AP Biology Course Overview
<b>Week 2</b> <b>Aug 19<sup>th</sup> to 23<sup>rd</sup></b>	<b>Unit 0 – Experimental Design</b> <i>Scientific Explanations – CER</i>
<b>Week 3</b> <b>Aug 26<sup>th</sup> to 30<sup>th</sup></b> <i>26 ~ St. Dominic Feast Day Celebration</i>	<b>Ch 2 &amp; 3 – Chemical Context of Life</b> <i>Water Properties with Descriptive Statistics</i>
<b>Week 4</b> <b>Sep 2<sup>nd</sup> to 6<sup>th</sup></b>	<b>Ch 4 – Carbon &amp; the Molecular Diversity of Life</b> <i>Introduce Transpiration Lab</i>
<b>Week 5</b> <b>Sep 9<sup>th</sup> to 13<sup>th</sup></b> <i>9 ~ Holy Mass &amp; Birthday of Mother Mary</i>	<b>Ch 5 – Biological Macromolecules and Lipids</b> <i>Transpiration Lab Investigation</i>
<b>Week 6</b> <b>Sep 16<sup>th</sup> to 20<sup>th</sup></b> <b><u>1 Day of Class</u></b> <i>17 – Moon Festival Holiday</i> <i>18-20 ~ Teacher's Conference</i>	<b>Ch 4.1 &amp; 25.1 – The Origin of Life</b> <i>Biochemistry</i>
<b>Week 7</b> <b>Sep 23<sup>rd</sup> to 27<sup>th</sup></b> <i>24-26 ~ Pre-Exam Days</i>	<b>Ch 52 – Behavioral Ecology</b> <i>Introduce Behavior Lab</i>
<b>Week 8</b> <b>Sep 30<sup>th</sup> to Oct 4<sup>th</sup></b>	<b>Ch 53 – Population Ecology &amp; the Distribution of Organisms</b> <b>Ch 54 – Biodiversity and Communities</b>
<b>Week 9</b> <b>Oct 7<sup>th</sup> to 11<sup>th</sup></b> <b><u>1 Day of Class</u></b> <i>8-9 ~ Q1 Exams</i> <i>10 – Double Ten Holiday</i> <i>11 ~ Record Day</i>	<i>Test – Ecology</i> <i>Quarter Exam</i>

## 2nd QUARTER – TENTATIVE COURSE CONTENT

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

Week / Date	Topic / <i>Projects &amp; Labs</i> / <i>Assessments</i>
<b>Week 1 (10)</b> <b>Oct 14<sup>th</sup> to 18<sup>th</sup></b> <i>14 ~ Q2 Begins</i>	<u><b>Q1 Review &amp; Reflect</b></u>
<b>Week 2 (11)</b> <b>Oct 21<sup>st</sup> to 25<sup>th</sup></b> <i>25 ~ Masquerade Night</i>	<b>Ch 55</b> – Ecosystems & Energy <b>Ch 56</b> – Global Ecology & Conservation Biology
<b>Week 3 (12)</b> <b>Oct 28<sup>th</sup> to Nov 1<sup>st</sup></b> <i>1 ~ All Saint's Day Mass</i>	<b>Ch 7</b> – Cell Structure & Function
<b>Week 4 (13)</b> <b>Nov 4<sup>th</sup> to Nov 8<sup>th</sup></b>	<b>Ch 8</b> – Cell Membranes & Membrane Transport  <i>Diffusion &amp; Osmosis</i>
<b>Week 5 (14)</b> <b>Nov 11<sup>th</sup> to 15<sup>th</sup></b>	<b>Ch 6</b> – An Introduction to Metabolism  <i>Enzyme Lab</i> <i>Test – Cell</i>
<b>Week 6 (15)</b> <b>Nov 18<sup>th</sup> to 22<sup>nd</sup></b> <i>22 ~ Gr.12 Q2 Exams</i>	<b>Ch 10</b> – Cell Respiration & Fermentation <b>Ch 11</b> – Photosynthesis  <i>Photosynthesis Lab Investigation</i>
<b>Week 7 (16)</b> <b>Nov 25<sup>th</sup> to 29<sup>th</sup></b> <i>25 ~ Gr.12 Q2 Exams</i> <i>26-28 ~ Pre-Exam Days</i>	<b>Ch 9 &amp; 41</b> – Cellular Signaling & Cell Communication  <i>Test – Cellular Energetics</i>
<b>Week 8 (17)</b> <b>Dec 2<sup>nd</sup> to Dec 6<sup>th</sup></b> <i>6 ~ Foundation Day Celebrations</i>	<b>Ch 39</b> – Plant Responses to Internal & External Signals <b>Ch 46~49</b> – The Internal Environment of Animals (the Development, the Immune System, and the Nervous System)  <i>Behavior Lab Investigation / Chi Square goodness-of-fit Analysis</i>
<b>Week 9 (18)</b> <b>Dec 9<sup>th</sup> to 13<sup>th</sup></b> <u><b>3 Days of Class</b></u> <i>12-13 ~ Q2 Exams</i>	<i>Test – Cell Communication</i>  <i>Quarter Exam</i>
<b>Dec 16<sup>th</sup> to Jan 3<sup>rd</sup></b>	<b>Christmas Holiday</b>

## 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 &amp; Labs</i> / <i>Assessments</i>
<b>Week 1 (19)</b> <b>Jan 6<sup>th</sup> to 10<sup>th</sup></b> <b>4 Days of Class</b> <i>6 ~ Record Day</i> <i>7 ~ Q3 Begins</i> <i>10 ~ New Year Mass</i>	<u><b>Q2 Review &amp; Reflect</b></u>
<b>Week 2 (20)</b> <b>Jan 13<sup>th</sup> to 17<sup>th</sup></b>	<b>Ch 12</b> –The Cell Cycle
<b>Week 3 (21)</b> <b>Jan 20<sup>th</sup> to 24<sup>th</sup></b> <i>20 ~ Feast Day of St. Thomas Aquinas</i>	<b>Ch 13</b> – Meiosis & Sexual Life Cycles  <i>Meiosis Modeling Lab</i> <i>Test – Cell Cycle</i>
<b>Jan 27<sup>th</sup> to Jan 31<sup>st</sup></b>	<b>Chinese New Year Holiday</b>
<b>Week 4 (22)</b> <b>Feb 3<sup>rd</sup> to 7<sup>th</sup></b>	<b>Ch 14</b> – Mendelian Genetics
<b>Week 5 (23)</b> <b>Feb 10<sup>th</sup> to 14<sup>th</sup></b>	<b>Ch 15</b> – The Chromosomal Basis of Inheritance <b>Ch 16</b> – The Molecular Basis of Inheritance
<b>Week 6 (24)</b> <b>Feb 17<sup>th</sup> to 21<sup>st</sup></b>	<b>Ch 17</b> – Gene Expression: From Gene to Protein & Genetic Abnormalities  <i>Test – Heredity</i>
<b>Week 7 (25)</b> <b>Feb 24<sup>th</sup> to 28<sup>th</sup></b> <b>4 Days of Class</b> <i>25-27 ~ Pre-Exam Days</i> <i>27 ~ Lenten Mass</i> <i>28 ~ Memorial Day Holiday</i>	<b>Ch 18</b> – Regulation of Gene Expression  <i>Quiz – DNA/Transcription/Translation/Point Mutation</i>
<b>Week 8 (26)</b> <b>March 3<sup>rd</sup> to 7<sup>th</sup></b> <i>5 ~ Ash Wednesday</i>	<b>Ch 19</b> – Biotechnology  <i>Bacterial Transformation Lab</i> <i>Test – Gene Expression and Regulation</i>
<b>Week 9 (27)</b> <b>March 10<sup>th</sup> to 14<sup>th</sup></b> <b>4 Days of Class</b> <i>14 ~ Q3 Exams</i>	<b>Ch 20</b> – 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 &amp; Labs</i> / <i>Assessments</i>
<b>Week 1 (28)</b> <b>Mar 17<sup>th</sup> to 21<sup>st</sup></b> <u>4 Days of Class</u> <i>17 ~ Q3 Exams</i> <i>18 ~ Q4 Begins</i> <i>19 ~ Feast of St. Joseph</i>	<u><b>Q3 Review &amp; Reflect</b></u>  <b>Ch 21</b> – Descent with Modification
<b>Week 2 (29)</b> <b>March 24<sup>th</sup> to 28<sup>th</sup></b> <i>24-28 ~ Fire Drill</i>	<b>Ch 23</b> – Microevolution <b>Ch 24</b> – Species and Speciation  <i>Hardy-Weinberg Lab Investigation</i>
<b>Week 3 (30)</b> <b>March 31<sup>st</sup> to April 4<sup>th</sup></b> <u>4 Days of Class</u> <i>4 – Children’s Day Holiday</i>	<b>Ch 22</b> – Phylogeny
<b>Week 4 (31)</b> <b>Apr 7<sup>th</sup> to 11<sup>th</sup></b>	<b>Ch 25</b> – Macroevolution  <i>Test – Natural Selection</i>
<b>April 14<sup>th</sup> to April 18<sup>th</sup></b>	<b>Easter Holiday</b>
<b>Week 5 (32)</b> <b>Apr 21<sup>st</sup> to 25<sup>th</sup></b> <i>23 ~ Easter Mass</i> <i>21-25 ~ AP Mock Exams</i> <i>26 ~ Spring Fair</i>	Review activities & exam practice  <i>Mock Exam</i>
<b>Week 6 (33)</b> <b>Apr 28<sup>th</sup> to May 2<sup>nd</sup></b> <i>4/29-5/1 ~ Pre-Exam Days</i> <i>1-9 ~ Final Exams (K, 5, 8, 12 only)</i>	Review activities & exam practice
<b>Week 7 (34)</b> <b>May 5<sup>th</sup> to 9<sup>th</sup></b> <i>1-9 ~ Final Exams (K, 5, 8, 12 only)</i> <i>5-16 ~ AP Exams</i>	Review activities & exam practice
<b>Week 8 (35)</b> <b>May 12<sup>th</sup> to 16<sup>th</sup></b> <u>2 Days of Class</u> <i>5-16 ~ AP Exams</i> <i>14-15 ~ Q4 Exams</i> <i>16 ~ Record Day</i>	<i>AP Biology Exam – 5/5/2025 8 a.m.</i>  <i>Brain Dissection</i>
<b>Week 9 (36)</b> <b>May 19<sup>th</sup> to 23<sup>rd</sup></b> <i>19-23 ~ Student Clearance</i> <i>19 ~ Baccalaureate Mass</i> <i>23 ~ Gr. 8 Graduation</i>	Various readings and research
<b>Week 10 (37)</b> <b>May 26<sup>th</sup> to 30<sup>th</sup></b> <u>4 Days of Class</u> <i>27 ~ Gr. 12 Graduation</i> <i>29 ~ Students Last Day</i> <i>30 ~ Teachers/Staff Meeting</i>	End-of-Year School Activities