

**MT. DIABLO UNIFIED SCHOOL DISTRICT  
COURSE OF STUDY**

<b>COURSE TITLE:</b>	<b>IB Biology Higher Level Year 1</b>
<b>COURSE NUMBER:</b>	<b>340240</b>
<b>CBEDS NUMBER:</b>	<b>2660</b>
<b>DEPARTMENT:</b>	<b>Science</b>
<b>LENGTH OF COURSE:</b>	<b>1 year</b>
<b>CREDITS PER SEMESTER:</b>	<b>5</b>
<b>GRADE LEVEL(S):</b>	<b>11th</b>
<b>REQUIRED OR ELECTIVE:</b>	<b>Fulfills a-g “d” requirement; also “g” elective</b>
<b>PREREQUISITES:</b>	
Required -	Passing grade in CP Biology and either Physics or Chemistry
Recommended -	Chemistry

**BOARD OF EDUCATION ADOPTION: May 22, 2017**

**NOTE:** This course is previously approved by the UC/CSU, under the International Baccalaureate Organization (IBO). The official IB Subject Guide was used to create the Course of Study submitted to the IBO on April 1, 2016, along with the Application for Authorization. The Course of Study submitted was approved by the IBO as meeting the requirements of the course. **Please see the attached Biology Guide published by the IBO, February 2014**

**COURSE DESCRIPTION:**

Biology is the study of life. The vast diversity of species makes biology both an endless source of fascination and a considerable challenge. Biologists attempt to understand the living world at all levels from the micro to the macro using different approaches and techniques. Biology is still a young science and great progress is expected in the 21st century. This progress is important at a time of growing pressure on the human population and the environment.

By studying biology in the DP students should become aware of how scientists work and communicate with each other. While the scientific method may take on a wide variety of forms, it is the emphasis on the practical approach through experimental work that characterizes the sciences. Teacher provide students with opportunities to design investigations, collect data, develop manipulative skills, analyze results, collaborate with peers and evaluate and communicate their findings.<sup>1</sup>

**COURSE PURPOSE:**

Through the overarching theme of the nature of science, the aims of the DP biology course are to enable students to:

- Appreciate scientific study and creativity within a global context through stimulating and challenging opportunities.
- Acquire a body of knowledge, methods and techniques that characterize science and technology.
- Apply and use a body of knowledge, methods and techniques that characterize science and technology.

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<sup>1</sup> IBO, International Baccalaureate Diploma Programme Subject Brief Sciences: Biology--Higher Level, 2014

- Develop an ability to analyze, evaluate and synthesize scientific information.
- Develop a critical awareness of the need for and the value of effective collaboration and communication during scientific activities.
- Develop experimental and investigative scientific skills including the use of current technologies.
- Develop and apply 21st century communication skills in the study of science.
- Become critically aware, as global citizens, of the ethical implications of using science and technology.
- Develop an appreciation of the possibilities and limitation of science and technology.
- Develop an understanding of the relationships between scientific disciplines and their influence on other areas of knowledge.<sup>2</sup>

### **COURSE OUTLINE:**

(Please see Biology Subject Guide pages 25 to 141 for more details.)

The IB Biology Higher Level (HL) course is a two-year sequence. During Year 1, the majority of the core set of topics is emphasized (see below). During Year 2, the remaining core topics are studied, as well as the additional choice of coursework. The Investigations are carried out during both years.

The IB Biology HL has a core set of topics that equal a minimum of 155 hours of coursework. These topics include:

- Cell biology
- Molecular biology
- Genetics
- Ecology
- Evolution and biodiversity
- Human physiology
- Nucleic acids
- Metabolism, cell respiration and photosynthesis
- Plant biology
- Genetics and evolution
- Animal physiology

An additional 25 hours of coursework are required from one of the four following choices:

- Neurobiology and behavior
- Biotechnology and bioinformatics
- Ecology and conservation
- Human physiology

Finally, there is a required 60 hours of specific investigations that are carried out. These include:

- Prescribed and other practical activities
- Individual investigation
- Group 4 project

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<sup>2</sup> IBO, 2014

## **LABORATORY ACTIVITIES:**

(Please see Biology Subject Guide pages 25 to 141 for details.)

Laboratory experience is an essential part of this course. A minimum of 60 hours of lab work is built into the course over the two year period and there is a minimum of two lab activities per topic. Some examples of laboratory experiences may include, but are not limited to the following:

- Biomolecules in food
- Catalase activity
- Characteristics of prokaryotic cells and eukaryotic cells
- Comparing plant & animal cells
- Membranes and osmosis
- Rate of mitosis in onion root tips
- Plant pigments and photosynthesis
- Cellular respiration in seeds
- Extraction of cheek cell DNA
- pGLO transformation
- Karyotyping
- Corn lab-chi square
- Meiosis modeling
- PCR informatics lab
- GMO Investigation
- Building an ecosystem lab
- Predator-prey simulation lab
- Transpiration rates in plants lab
- Hardy-Weinberg population genetics lab
- Physiology of the circulatory system lab
- Digestive enzyme activity
- Modality, reflexes and reaction time of the human nervous system
- Urinary system lab

## **KEY ASSIGNMENTS:**

Group 4 Project--students identify a problem, research it, conduct an experiment, then analyze results. This project is completed in cooperation with other IB science courses and is completed over a three week period.

A guided Independent Investigation is carried out by students on a topic of their interest.

Additional assignments as decided by the teacher.

## **INSTRUCTIONS METHODS and/or STRATEGIES:**

(Please see Biology Subject Guide pages 21 to 24 for details.)

General IB approaches to teaching are:

- Based on inquiry
- Focused on conceptual understanding
- Developed in local and global contexts
- Focused on effective teamwork and collaboration

- Differentiated to meet the needs of all learners
- Informed by formative and summative assessment

Strategies to meet these approaches with students include deliberate lesson planning that encourages students to develop these approaches to learning skills:

- Thinking
- Communication
- Social
- Self-management
- Research

**ASSESSMENTS INCLUDING METHODS and/or TOOLS**

(Please see Biology Subject Guide pages 145 to 161 for details.)

There are ongoing formative and summative assessments throughout the course as prepared by the instructor. In addition, there are specific IB assessments called Internal Assessment (IA) and External Assessment (EA). Preparation for both the IAs and EAs are ongoing throughout the course.

- IA: Individual Investigation and write-up of 6 to 12 pages
- EA: 40 multiple-choice questions exam  
Data-based, short answer and extended response questions  
Data-based, short answer and extended response questions

**INSTRUCTIONAL MATERIALS:**

Board approved IB textbook. Board approved AP textbook.

**For Honors Distinction:**

IB Biology HL Year 1 is similar in scope and rigor to AP Biology.  
IB Biology HL Year 2 is recognized for honors distinction in the UC/CSU Approved Course List portal.

**CORRESPONDING NON-HONORS COURSE:**

This is not applicable because the corresponding non-honors course, CP Biology, is a prerequisite for this course.

**DIFFERENCES in HONORS/NON-HONORS COURSES:**

N/A

**Committee Members:**

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|----------------------|-------------------|
| 1. Maria Fletcher    | 4. David Ramirez  |
| 2. Debra Arthur      | 5. Efa Huckaby    |
| 3. Carissa Weintraub | 6. Sasha Robinson |

