**AP Biology Syllabus 2013-2014**

**Textbook:** Campbell, Neil A., and Jane B. Reece. Biology AP Edition. 8Th ed. San Francisco, CA: Pearson Benjamin Cummings, 2008.

**Course Description**

AP Biology is a year-long course that is designed to be taken by students after the successful completion of both high school biology and chemistry. AP Biology includes those topics typically covered in a college introductory biology course and differs from the standards-based, high school biology course with respect to the kind of textbook used, the range and depth of topics covered, the kind of laboratory work undertaken, and the time and effort required of students. AP Biology is a course that aims to provide students with the conceptual framework, factual knowledge, and analytical skills necessary to engage critically with the rapidly changing science of biology. The College Board launched the redesigned AP Biology curriculum in the 2013 school year. The new curriculum emphasizes analytical thinking, applications of concepts rather than memorization of facts, and inquiry-based labs. This course is designed to prepare students for the Biology College Board Advanced Placement Exam.

**Prerequisites**

Junior or senior standing. Successful completion of one year of the following courses: Biology with an “A” or Honors Biology with a “B” or better, and Chemistry with a “B” or better.

**Required Course Materials**

Three ring binder, lined loose leaf paper, lab notebook, graph paper, pens, pencils, highlighters, colored pencils, calculator

**MVHS Attendance Policy**

Regular attendance is an important factor in academic success. In a high school schedule daily attendance is essential, as many classroom activities cannot be duplicated for individual students who are absent. Classroom instruction, group work, and the discussion and interactions that take place are important components of each course that cannot be replicated through make-up work. For these reasons, all students are expected to be in school, on time, and to attend all assigned classes each day.

**RTI Study Halls**

Students are placed into RTI study halls at two different times each quarter. The purpose of these study halls is for a teacher to directly work with a student on assignments he/she is missing in a class, help with organization skills, and help tutor if needed.

1. At progress report time, students' grades are checked. Any student that received an "unsatisfactory" in a course will be placed into an RTI study hall. Students remain in RTI study hall until the end of the quarter.

2. At the end of the quarter, students' grades are checked. Any student that received a D or an F in a course will be placed into an RTI study hall. The student remains in the study hall until the end of the next quarter. If grades have improved to C or better, the student will be removed at the end of the next quarter.

**Grades**

Students earn a grade based on the quality and accuracy of the work they complete. The point value of individual assignments varies. Overall class grades are based on a percentage.

Exams and Quizzes 40%

Labs and Lab Reports 40%

Homework 20%

The Mount View High School 2013-2014 Student Handbook states that “Honors, Advanced Placement and College courses are multiplied by 1.1 when calculating grade point average.”

**Quizzes**

Quizzes will be given weekly to encourage students to keep up with the material and to familiarize them with the types of questions they will encounter on the AP exam. Quizzes will vary in format depending on the topic being covered.

**Exams**

Exams will be given after natural breaks in the course topics (i.e. there is no set schedule for exams, but they will be announced ahead of time) and will assess mastery of both new and previously covered material. The format will include multiple choice and free response questions. Time will be limited, just as on the AP Biology Exam.

**Homework & Readings**

Homework will take many forms and is designed to help with student understanding of the current unit being studied. AP assignments are not “busy work”; they are designed to help you learn difficult material. Homework assignments for each unit may include, but are not limited to:

* online videos and podcasts;
* case studies;
* textbook questions;
* lab reports; and
* free-response questions.

Readings for each unit include chapters from the textbook. Supplemental scientiﬁc abstracts and papers are assigned with the purpose of demonstrating how discoveries are made and communicated, and to show that science is a process. Articles found in science magazines and online news sources are assigned to promote discussion about relevant current events.

**Lab Investigations & Lab Reports**

The laboratory experience is extremely important in the AP Biology course. Labs emphasize science as a process and develop students’ skills in the science practices specified by College Board. To ensure the lab component of the course is met, 25% of instructional time is devoted to laboratory work. Students are required to come in to the laboratory prepared, with the pre-lab completed, and ready to complete the day’s procedure. Lab reports are to be completed as homework.

Students will keep a neat, organized lab notebook to record procedures and observations during labs. Lab notebook guidelines will be provided. Lab work will include graphing, data analysis, and mathematical modeling. Students will work in pairs to complete lab procedures, but are responsible for turning in individual lab reports and notes. Lab reports will be due one week from the conclusion of the lab unless otherwise indicated. Labs will be graded according to a rubric provided by College Board which is available on Ms. Richardson’s website. Students will have opportunities to peer evaluate lab reports.

Inquiry-based laboratory activities will come from *AP Biology Investigative Labs: An Inquiry-Based Approach* (available online for free) or other sources that meet the learning objectives. The labs include several opportunities for students to design and carry out experimental procedures.

**The AP Exam**

The AP Exam is scheduled for Monday, May 12, 2014 at 8am.

**Topic Outline**

The AP Biology Curriculum is framed around four Big Ideas. The Big Ideas encompass the core scientific principles, theories, and processes governing living organisms and biological systems. For each of these Big Ideas, there is a set of core concepts called Enduring Understandings which are used to guide the AP Biology course curriculum and exam questions.

**Big Ideas and Enduring Understandings**

**1. The process of evolution drives the diversity and unity of life.**

A. Change in the genetic makeup of a population over time is evolution.

B. Organisms are linked by lines of descent from common ancestry.

C. Life continues to evolve within a changing environment.

D. The origin of living systems is explained by natural processes.

**2. Biological systems utilize energy and molecular building blocks to grow, reproduce, and maintain homeostasis.**

A. Growth, reproduction, and maintenance of the organization of living systems require free energy and matter.

B. Growth, reproduction, and dynamic homeostasis require that cells create and maintain internal environments that are different from their external environments.

C. Organisms use feedback mechanisms to regulate growth and reproduction, and to maintain dynamic homeostasis.

D. Growth and dynamic homeostasis of a biological system are inﬂuenced by changes in the system’s environment.

E. Many biological processes involved in growth, reproduction, and dynamic homeostasis include temporal regulation and coordination.

**3. Living systems retrieve, transmit, and respond to information essential to life processes.**

A. Heritable information provides for continuity of life.

B. Expression of genetic information involves cellular and molecular mechanisms.

C. The processing of genetic information is imperfect and is a source of genetic variation.

D. Cells communicate by generating, transmitting, and receiving chemical signals.

E. Transmission of information results in changes within and between biological systems.

**4. Biological systems interact and these interactions possess complex properties.**

A. Interactions within biological systems lead to complex properties.

B. Competition and cooperation are important aspects of biological systems.

C. Naturally occurring diversity among and between components within biological systems affects interactions with the environment.

**Science Practices**

AP Biology students are expected to engage in inquiry investigations using the reasoning skills that are laid out in the science practices, as follows:

*Science Practice 1*: The student can use representations and models to communicate scientific phenomena and solve scientific problems.

*Science Practice 2*: The student can use mathematics appropriately.

*Science Practice 3*: The student can engage in scientific questioning to extend thinking or to guide investigations within the context of the AP course.

*Science Practice 4*: The student can plan and implement data collection strategies appropriate to a particular scientific question.

*Science Practice 5*: The student can perform data analysis and evaluation of evidence.

*Science Practice 6*: The student can work with scientific explanations and theories.

*Science Practice 7*: The student is able to connect and relate knowledge across various scales, concepts and representations in and across domains.

**Course Sequence**

The tables below list the sections we will cover, in order, and the corresponding assigned questions. Students are required to read every section listed in the “Chapter & Section” column. Only questions associated with the **bold** sections are assigned. The numbers of these questions are found under the “Questions” column. Chapter review questions also must be completed. These assignments will not be graded for correctness, but there will be random homework checks to ensure that students are completing them.

**Big Idea 1:** **Evolution**

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| **Chapter & Section** | **Questions** | **Chapter Review** |
| ***Evolution*** |
| 22.1**22.2****22.3** | #1-2#1-2 | p. 467 #1-7 |
| **23.1****23.2****23.3****23.4** | #1-3#1-2#1-3#1-3 | p. 486 #1-6, 8 |
| **24.1****24.2****24.3****24.4** | #1#1-2#1#1 | pp. 505-506 #1-7, 9 |
| **25.1****25.2****25.3****25.4**25.525.6 | #1-2#1-2#1-3#1-2 | p. 532 #1-7, 9 |
| **26.1****26.2****26.3****26.4**26.5**26.6** | #1-3#1-2#1-2#1#1-2 | p. 555 #1-8 |

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| **Laboratory Exercise** | **Quantitative Skills** |
| AP Lab 2. Mathematical Modeling: Hardy-Weinberg | Mendelian genetics equations, Hardy-Weinberg equation, Excel and spreadsheet operations |
| AP Lab 3. Comparing DNA Sequences to Understand Evolutionary Relationship with BLAST | Statistical analysis, mathematical modeling, computer science (bioinformatics) |

Timeframe: By October 4, 2013

**Big Idea 2: Cellular Processes: Energy and Communication**

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| **Chapter & Section** | **Questions** | **Chapter Review** |
| ***Cellular Processes: Energy*** |
| **3.1****3.2****3.3** | #1-2#1-3#1 | p. 57 #1, 3-5, 11 |
| **4.1****4.2****4.3** | #1#1-3#1-2 | p. 67 #1-7, 9 |
| **6.1****6.2****6.3****6.4****6.5**6.66.7 | #1-2#1#1-3#1-3#1 | p. 124 #1-8, 10 |
| **7.1****7.2****7.3****7.4****7.5** | #1-2#1-2#1-2#1-2#1 | p. 141 #1-6, 9 |
| **8.1****8.2****8.3****8.4****8.5** | #1-2#1-2#1-2#1-2#1-2 | p. 161 #1-8, 9 |
| **9.1****9.2****9.3****9.4****9.5**9.6 | #1#1#1-3#1-2#1-2 | pp. 183-184 #1-10, 12, 13 |
| **10.1****10.2****10.3**10.4 | #1-2#1-4#1-2 | p. 205 #1-8, 10 |
| **38.1**38.238.3 | #1-4 | p. 820 #1-10, 12 |
| 39.1**39.2****39.3**39.4**39.5** | #1-3#1-3#1-4 | p. 849 #1-10, 12 |
| **40.1****40.2****40.3****40.4** | #1-3#1-2#1-2#1-3 | p. 874 #1-6, 8, 9 |
| **43.1****43.2****43.3****43.4** | #1-3#1-2#1-2#1-2 | p. 953 #1-7, 9 |
| **51.1****51.2**51.3**51.4**51.5 | #1-2#1-2#1-3 | pp. 1144-1145 #1-7, 9, 10 |

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| **Laboratory Exercise** | **Quantitative Skills** |
| AP Lab 4. Diffusion and Osmosis | Measuring volumes, calculating surface area-to-volume ratios, calculating rate, calculating water potential, graphing |
| AP Lab 5. Photosynthesis | Calculating rate, preparing solutions, preparing serial dilutions, measuring light intensity, developing and applying indices to represent the relationship between two quantitative values, using reciprocals to modify graphical representations, utilizing medians, graphing |
| Cellular Respiration with Yeast | Calculating rate, measuring temperature and volume, graphing |

Timeframe: By December break (12/20/2013)

**Big Idea 3: Genetics and Information Transfer**

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| **Chapter & Section** | **Questions** | **Chapter Review** |
| ***Genetics*** |
| **5.1****5.2****5.3****5.4****5.5** | #1-2#1-3#1-2#1-3#1-3 | p. 91 #1-10 |
| **27.1****27.2**27.327.427.527.6 | #1-3#1-3 | p. 574 #1-8 |
| **13.1****13.2****13.3****13.4** | #1-2#1-3#1#1-3 | p. 261 #1-11 |
| **14.1****14.2****14.3****14.4** | #1-2#1-2#1-3#1-3 | pp. 284-285 #20, and choose 6 problems from #1-12 |
| **15.1****15.2****15.3****15.4****15.5** | #1-2#1-3#1-3#1-2#1-3 | pp. 303-304 #1-9, 16 |
| **16.1****16.2**16.3 | #1-3#1-2 | p. 324 #1-9 |
| **17.1****17.2****17.3****17.4****17.5**17.6 | #1-2#1-3#1-2#1-3#1-2 | p. 350 #1-9 |
| **18.1****18.2****18.3****18.4**18.5 | #1-2#1-4#1#1-3 | pp. 379-380 #1-10, 12 |
| **19.1****19.2**19.3 | #1#1-4 | p. 395 #1-5, 7, 8 |
| **20.1****20.2**20.320.4 | #1-3#1-2 | pp. 424-425 #1-8, 11 |
| 21.121.221.321.4**21.5**21.6 | #1-3 | p. 449 #1-8 |
| **11.1****11.2****11.3****11.4**11.5 | #1-2#1#1-3#1-2 | pp. 226-227 #1-8, 10 |
| **12.1****12.2****12.3** | #1-3#1-5#1-4 | p. 245 #1-9, 11 |
| **45.1****45.2**45.345.4 | #1-2#1-2 | p. 996 #1-8, 10, 11 |
| **48.1****48.2****48.3****48.4** | #1-3#1#1-3#1-2 | p. 1063 #1-6, 8 |
| 49.1**49.2** | #1-2 | pp. 1085-1086 #1-6 |

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| **Laboratory Exercise** | **Quantitative Skills** |
| AP Lab 7. Cell Division: Mitosis and Meiosis | Measuring volume, counting, chi-square statisticalanalysis, calculating crossover frequency |
| AP Lab 8. Biotechnology: Bacterial Transformation | Measuring volume and temperature, calculatingtransformation efficiency |

Timeframe: By March 28, 2014

**Big Idea 4: Interactions**

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| **Chapter & Section** | **Questions** | **Chapter Review** |
| ***Interactions*** |
| **52.1**52.252.3**52.4** | #3#1-2 | pp. 1172-1173 #1-11 |
| **53.1****53.2****53.3****53.4****53.5****53.6** | #1#1-2#1-3#1-3#1-2#1-2 | pp. 1196-1197 #1-10, 12 |
| **54.1****54.2****54.3****54.4****54.5** | #1-2#1-2#1-2#1-3#1-2 | pp. 1120-1121 #1-9, 12 |
| **55.1****55.2****55.3****55.4****55.5** | #1-2#1-3#1-2#1-2#1-2 | p. 1244 #1-7, 9 |
| **56.1****56.4** | #1-2#2 | p. 1267 #1-9 |

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| **Laboratory Exercise** | **Quantitative Skills** |
| AP Lab 11. Transpiration | Measuring distance, volume, and mass; estimating surface area; calculating surface area; graphing; calculating rate |
| AP Lab 13. Enzyme Activity | Measuring volume and mass, measuring color change, graphing, calculating rates of enzymatic reactions |

Timeframe: By May 2, 2014