**AP Biology vMIT 2013-2014**

**Syllabus**

Dear students,

We hope you had an enjoyable summer and that you’ll have an even more enjoyable time in AP Biology with us! Yimin recently graduated from MIT as a Bioengineering major. She hopes to pursue medicine and is currently working at Boston Children’s Hospital doing some pretty cool research studying the mechanisms of somatic hypermutation in mature lymphocytes and V(D)J recombination in developing B cells. Esme is a rising senior, also studying Bioengineering. She is working on elucidating the causal effects of plasticity deficits on the Rett Syndrome phenotype. If the previous two sentences made no sense to you, you’re in the right place. By the end of this class, we hope that not only will you get a 5 on your AP exam, but that you will have the tools necessary to pursue a career in biology. This class won’t be like your ordinary high school class. For starters, you will **not be graded** (no A’s , B’s, etc), but will be given **personalized feedback** and **progress reports**. You will also be asked to participate in a monthly **journal club** where you or your peers will be asked to present their understanding and input on a paper (don’t fret, we know what it’s like to give a first journal  presentation, so we’ll make it as smooth as possible). We will have in-class projects that will teach you the tools and mechanisms by which biologists obtain their data (get ready for a DNA extraction!). You will complete **problem sets** similar to those given to an MIT freshman...college won’t have anything on you. We will take you on **lab tours** (who wants to see where your teacher works? Yes, you!), so that you can become familiar with the biologist’s working environment. Most importantly, we will guide you through a course that is quite involved in a fun manner. Yes, there will be lectures and quizzes, but also lots of **team jeopardy** and other activities. We welcome you to our classroom!

**Contact info**

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**Textbook**

Campbell Biology 7th edition.

**Tentative schedule**

**Unit 1: The Chemistry of Life**

Day 1: Introduction to Biology, Review of Chemistry Concepts, Water

*Assigned reading:* Chapter 1 and 2 Campbell

Day 2: Water (continued), Carbon in Life, Structure and Function of Macromolecules

*Assigned reading:* Chapter 3, 4, 5 Campbell (**must read**!)

Day 3: Review Day for section. Old AP exam questions.

**Unit 2: The Cell**

Day 4: Components of a Cell: Organelles

*Assigned reading:* Chapter 6 Campbell (**must read**!)

Day 5: Membrane Structure and Function

*Assigned reading:* Chapter 7

Day 6: Introduction to Metabolism

*Assigned reading:* Chapter 8 (**must read!**)

Day 7: Review Day for section. Journal club. Discussion.

**Unit 3: Cellular Processes**

Day 8: Cellular Respiration and Fermentation

*Assigned reading:* Chapter 9 (**must read!**)

Day 9: Photosynthesis

*Assigned reading:* Chapter 10 (**must read!**)

Day 10: Cell Communication

*Assigned reading:* Chapter 11

Day 11: Cell Cycle

*Assigned reading*: Chapter 12 (**must read!**)

Day 12: Review Day for section. Journal club. Discussion.

**Unit 4: From Gene to Protein [Most important section]**

Day 13: Meiosis, Sexual Life Cycles, Mendel and the Gene Idea

*Assigned reading*: Chapter 13 and 14

Day 14: Chromosomal Basis of Inheritance, Molecular Basis of Inheritance, From Gene to Protein

*Assigned reading:* Chapter 15 (optional), 16 and 17 (**must read!**)

Day 15: Regulation of Gene Expression, Viruses, Genomes and their Evolution

*Assigned reading:* Chapter 18, 19 (**must read!**)

Day 16: Biotechnology, Genetic Basis of Development

*Assigned reading*: Chapter 20, 21

Day 17: Review Day for section. Journal club. Discussion

**Unit 5: Evolution**

Day 17: Descent with Modification: Darwinian View of Life, Evolution of Populations, Origins of Species, History of Life on Earth.

*Assigned reading*: Chapter 22 (**must read!**), 23, 24, 25

Day 18: Review Day for section; journal club; Discussion

**Unit 6: Biodiversity and Evolution [27-34, 40-49]**

Day 19: Bacteria and Archaea, Protists, Plant Diversity, Fungi, Overview of Animal Diversity, Introduction to Invertebrates, Origin and Evolution of Vertebrates

*Assigned reading:* Chapter 26, pg 534-538, pg 771-780, Chapter 39

Day 20 : Organ Day 1

*Assigned reading*: Chapter 40, 43

Day 21: Organ Day 2

*Assigned reading*: Chapter 45, 47

Day 22: Review Day for section. Journal club. Discussion

**Unit 7:  Preparing for Test Day**

Day 23: Review part I of course

Day 24 : Review part II of course

Day 25: Review part III of course

Day 26 : Review part IV of course