**11th Grade Biology Course Outline – 08/30 to 09/23, 2016**

**Day 1 – Tuesday 08/30**

**COURSE INTRO:** Grading, assignments and tests, deadlines, themes and purpose

**LECTURE/DISCUSSION/NOTES:** Review

Cell Division Cycles: Mitosis and Meiosis

The Structure of DNA/Chromosomes

**LAB:** #1 – Begin Genetics of *Drosophila* Lab (Activity A)

**Day 2 – Wednesday 08/31**

**LECTURE/DISCUSSION/NOTES:** Mendelian Genetics and The Gene Idea

Mendel’s Biography, setting the context

Mendel’s Experimentation

Dominant and Recessive Traits

The Law of Probability and Punnet Squares: Single Crosses

**LAB:** #1 – Genetics of *Drosophila* Lab (Activity B)

**HW/WORKSHEET:** Single Cross Punnet Squares

**Day 3 – Thursday 09/01**

**LECTURE/DISCUSSION/NOTES:** Mendelian Genetics

The Law of Segregation

Dihybrid Crosses and the Law of Independent Assortment

**LAB:** #2 - Environmental Influence on Fungi Phenotypes (Inoculation of Fungi Habitats)

**HW/WORKSHEET:** Dihybrid Crosses

**Day 4 – Friday 09/02**

**QUIZ #1**

**LECTURE/DISCUSSION/NOTES:** Beyond Mendelian Genetics

Biosynthesis Pathways; The Relationship Between Dominance and Phenotype

The Spectrum of Dominance: Incomplete, Complete, and Co- dominance

Multiple Alleles, Pleiotropy, Epistasis, and Polygenetic Inheritance

**DEMO:** Human Genetics of Taste (Combine with Lab #3 for MLB)

**LAB:** #3 – Corn Dihybrid Genetics

**HW:** Read *The Path of Reduction: Mendel’s Initial Steps*

**Day 5 – Tuesday 09/06**

**QUIZ #1 REVIEW**

**LECTURE/DISCUSSION/NOTES:**

Discussion of Reading: *The Path of Reduction: Mendel’s Initial Steps*

DNA Structure and Function and DNA Replication

**DEMO:** Exploring Electrophoresis of dyes (Combine with Lab #4 for MLB)

**LAB**: #4 – Nature’s Dice: A Genetic Screening Simulation – Setup

**Day 6 – Wednesday 09/07**

**LECTURE/DISCCUSION/NOTES:**

DNA Replication continued…

RNA, DNA & Protein Synthesis: The Central Dogma

**LAB:** #4 – Nature’s Dice: A Genetic Screening Simulation – Analysis and Conclusion

**Day 7 – Thursday 09/08**

**LECTURE/DISCUSSION/NOTES:**

RNA, DNA & Protein Synthesis continued…

Transcription: RNA Synthesis and Functions

Translation: Protein Biosynthesis

**LAB:** #1 –Genetics of *Drosophila* (Activity C)

**Day 8 – Friday 09/09**

**MIDTERM**

**LAB:** #1 –Genetics of *Drosophila* (Activity C) \*If not completed on Day 7.

**Day 9 – Monday 09/12**

**MIDTERM REVIEW**

**LECTURE/DISCUSSION/NOTES:**

Biotechnology Applications: PCR, Gel Electrophoresis and CRISPR

**LAB:** #5 – Genotype–Phenotype Connection: Basic Molecular Genetics (Activities 1 and 2)

**Day 10 – Tuesday 09/13**

**LECTURE/DISCUSSION/NOTES:**

Mutations and Gene Regulation

**LAB:** #5 – Genotype–Phenotype Connection: Basic Molecular Genetics (Activity 3)

**Day 11 – Wednesday 09/14**

**LECTURE/DISCUSSION/NOTES:**

Gene Mapping and Gene Linkage

The Nature versus Nurture Debate

Introduction to Epigenetics: NOVA Video (learn.genetics.utah.edu)

**LAB:** #5 – Genotype-Phenotype Connection: Basic Molecular Genetics (Activity 4)

**Day 12 – Thursday 09/15**

**LECTURE/DISCUSSION/NOTES~~:~~**

Epigenetics Basics

Lamarckism and Darwinian Evolution

**LAB:** #1 **–** Genetics of Drosophila (Activities D&E, if ready)

**Day 13 – Friday 09/16**

**QUIZ #2**

**LECTURE/DISCUSSION/NOTES:**

Darwinian Evolution continued…

**LAB:** #1 **–** Genetics of Drosophila (Activities D&E, if ready)

#2 – Environmental Influence on Fungi Phenotypes (Results and Analysis)

**Final Study Guides handed out!!!**

**HW:** Lab #1, Activity E

**Day 14 – Monday 09/19**

**LECTURE/DISCUSSION/NOTES:**

Darwinian Evolution Continued…

The Arc of Evolution: Plants and Fungi

**LAB:** #6 – Evidence For Evolution: Form Fits Function

**Day 15 – Tuesday 09/20**

**LECTURE/DISCUSSION/NOTES:**

The Arc of Evolution: Plants and Fungi

Discussion: Nature, Nurture and Freedom

**LAB:** #6 – Evidence for Evolution: Form Fits Function

**Day 16 – Wednesday 09/21**

**LECTURE/DISCUSSION/NOTES:** The Arc of Evolution: Plants and Fungi

**PLANED CATCH-UP TIME**

**Day 17 – Thursday 09/22**

**FINAL REVIEW**

**PLANNED CATCH-UP TIME**

**Day 18 – Friday 09/23**

**FINAL: CUMULATIVE**

**TURN IN MLBs**

**NOTES on 09/2015 Block**

**Labs**

**The Phenotype-Genotype lab, if you choose to do it again, should not drag out. The students get very confused about what they’ve already done and what the purpose is.**

**Make sure to give a thorough introduction as to the purpose of the lab (discovering any possible connection between the observed phenotypes of the Halobacteria and the genotypes (as expressed by the gel electrophoresis experiment) without giving away the cause/connection.**

**Make sure to give a thorough overview of gel electrophoresis, it’s purposes, and proper procedures prior to doing it in the lab.**

**\*\*Rewrite the procedure and the overview/background section in more easy to understand terms. Incorporate the diagram on PCR into the lab guide.**

**Go over the Overview section of the lab in class.**

**Practice this lab to work out any kinks or inconsistencies before doing it again. It’d be good to run the PCR process several times to make sure it works with consistent results and change the settings as needed until consistency is achieved.**

**The Fly Lab should be** **completed in a more condensed time frame. If the students are waiting until week four to collect all results, they lose the intended purpose and proper connection to block content.**

**Order the flies to be delivered no more and no less than 7-10 before they will be used.**

**Do activities A and B together or back-to-back. It’s good to get to Activity C, setting up the f1 crosses as soon as possible because it will take 10-14 days for enough flies to emerge to make the final results meaningful.**

**Do research on the chi-square test in order to make its introduction and use meaningful as an analysis tool.**

**Maybe replace this lab?? Is there another lab that could illustrate the same concepts, perhaps with more depth and dynamism in less time???**

**Course Content**

**The Website**

**Put the new, simplified lab guides on the website.**

**Create a more cohesive pathway to supportive material. Organize the website content in a way that you have your own material, written simply, that backs/supports the flow of the class with clear links to web-based support materials that the students can easily access and get support on SPECIFIC topics. Create pathways for content that are clearly laid out.**