**AP Biology Unit 4: Mendelian Genetics and Reproduction**

**Unit Exam:** Thursday, October 8

**Learning objectives:**

* **LO 2.32** The student is able to use a graph or diagram to analyze situations or solve problems (quantitatively or qualitatively) that involve timing and coordination of events necessary for normal development in an organism.
* **LO 2.33** The student is able to justify scientific claims with scientific evidence to show that timing and coordination of several events are necessary for normal development in an organism and that these events are regulated by multiple mechanisms.
* **LO 2.34** The student is able to describe the role of programmed cell death in development and differentiation, the reuse of molecules, and the maintenance of dynamic homeostasis.
* **LO 2.35** The student is able to design a plan for collecting data to support the scientific claim that the timing and coordination of physiological events involve regulation.
* **LO 2.36** The student is able to justify scientific claims with evidence to show how timing and coordination of physiological events involve regulation.
* **LO 3.7** The student can make predictions about natural phenomena occurring during the cell cycle.
* **LO 3.8** The student can describe the events that occur in the cell cycle.
* **LO 3.9** The student is able to construct an explanation, using visual representations or narratives, as to how DNA in chromosomes is transmitted to the next generation via mitosis, or meiosis followed by fertilization.
* **LO 3.10** The student is able to represent the connection between meiosis and increased genetic diversity necessary for evolution.
* **LO 3.11** The student is able to evaluate evidence provided by data sets to support the claim that heritable information is passed from one generation to another generation through mitosis, or meiosis followed by fertilization.
* **LO 3.12** The student is able to construct a representation that connects the process of meiosis to the passage of traits from parent to offspring.
* **LO 3.13** The student is able to pose questions about ethical, social or medical issues surrounding human genetic disorders.
* **LO 3.14** The student is able to apply mathematical routines to determine Mendelian
* **LO 3.15** The student is able to explain deviations from Mendel’s model of the inheritance of traits.
* **LO 3.16** The student is able to explain how the inheritance patterns of many traits cannot be accounted for by Mendelian genetics.
* **LO 3.17** The student is able to describe representations of an appropriate example of inheritance patterns that cannot be explained by Mendel’s model of the inheritance of traits.
* **LO 3.18** The student is able to describe the connection between the regulation of gene expression and observed differences between different kinds of organisms.

**Topic Outline:**

* Cell Signaling
* Mitosis
* Meiosis and gametogenesis
* Eukaryotic chromosomes
* Inheritance patterns
* Human Genetic Disorders

**Chapters:**

Chapter 12, pages 228-245

Chapter 13, pages 248-261

Chapter 14, pages 262-285

Chapter 15, pages 286-304

Chapter 46, pages 997-1018

**Reading quizzes:**

1. Tuesday, September 29- Ch. 12 The Cell Cycle
2. Monday, October 5- Ch. 15 (pages 286-296 only) The Chromosomal Basis of Inheritance

**Labs:**

AP Lab 7- Mitosis and Meiosis

Supplemental lab- m&m Chi-square (Bring a LARGE bag of M&Ms to share with a partner 9/29)

**Calculations:**

Mendelian probabilities

Chi-square

**Vocabulary:**

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| 11 | Cell Communication | Signal transduction pathway, local regulators, reception, transduction, response, ligand, protein kinase, protein phosphatases, second messengers, cyclic AMP, adenylyl cyclase |
| 12 | Cell Cycle | Interphase, mitosis, G1, S, G2, G0, prophase, prometaphase, anaphase, telophase, metaphase, kinetochore, sister chromatid, centromere, somatic cell, gamete, tumor, cytokinesis, cleavage furrow, cell plate, binary fission, spindle fibers, metaphase plate, daughter chromosome, cyclin, metastasis |
| 13 | Reproduction | Gene, locus, asexual reproduction, sexual reproduction, somatic cell, karyotype, autosome, meiosis I, meiosis II, crossing over, homologous chromosomes, tetrad, chiasmata, synapsis, zygote, gamete, fertilization, sex chromosome, autosome, somatic cell |
| 14 | Genetics | Trait, allele, hybridization, true-breeding, Mendel, homozygous, heterozygous, phenotype, genotype, incomplete dominance, complete dominance, codominance, pleiotropy, epistasis, pedigree, carrier, recessive allele, dominant allele, law of segregation, law of independent assortment, punnett square, genotype, phenotype |
| 15 | Inheritance | Wild type, mutant phenotype, linked gene, sex-linked gene, genetic recombination, parental types, recombinants, genetic map, linkage map, Barr body, nondisjunction, trisomic, aneulploidy, duplication, inversion, translocation, polyploidy |
| 46 | Gametogenesis | Fertilization, gonads, follicles, oocyte, oogenesis, corpus luteum, oviduct, uterus, endometrium, testes, seminiferous tubules, Leydig cells, scrotum, epididymis, ejaculation, vas deferens, ejaculatory duct, urethra, semen, seminal vesicles, prostate gland, gametogenesis, spermatogenesis, oogenesis, spermatagonia, oogonia,primary oocytes, secondary oocyte, |