**Unit 4: Classical Genetics**

***Mendelian Inheritance, Non-Mendelian Inheritance and Cytogenetics***

* **Homework after Unit 3 Test:** create vocabulary cards for the bolded words in Part A Vocabulary below
* **Part A Double Quiz:** Friday, October 4th (notebook check for part A included, complete all vocab for part A by this date, no summary necessary)
* **Work after Double Quiz:** create vocabulary cards for the italicized words in Part B Vocabulary below
* **Unit 4 Test:** Friday, October 18th

**Vocabulary**

For all terms, write the page number where the word originally appeared in your GILL and draw a picture if you did not already have one in your notebook.

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| **Part A Vocabulary** | | | **Part B Vocabulary** | | |
| **Gamete** | **Trait** | **Fertilization** | *Incomplete dominance* | *Codominance* | *Multiple alleles* |
| **Character** | **Allele** | **Gene** | *Epistasis* | *Incomplete Penetrance* | *Pleiotropy* |
| **Recessive** | **Dominant** | **Homozygous** | *Gene Linkage* | *X-linked traits* | Amniocentesis |
| **Heterozygous** | **Monohybrid cross** | **Dihybrid cross** | X inactivation | Barr body | Chromosomal  Duplication |
| **Genotype** | **Phenotype** | **Wild type** | Multifactorial trait | Karyotype | Infertility |
| Mutant | Law of Dominance | Law of Independent Assortment | Chorionic villus sampling | Chromosomal Deletion |  |
| Law of Segregation | Pedigree | Modes of inheritance | Chromosomal Translocation | Chromosomal Inversion |  |
| Parental generation | Filial generation (F1 and F2) |  | *in vitro* fertilization (not part of assignment after double quiz) | Genomic imprinting |  |

**Part A: Mendelian Genetics (Double Quiz Friday, October 4th)**

1. Draw pedigree charts using correct symbols, and read pedigree charts to determine the inheritance of certain traits. Identify autosomal dominant, autosomal recessive
2. Solve Punnett square problems for simple Mendelian inheritance.
3. Describe the life of Gregor Mendel and explain his experiments with peas.
4. Solve dihybrid and trihybrid crosses.
5. Characterize the inheritance of certain common genetic disorders
6. Describe historical events leading up to our current knowledge of Mendelian genetics.

**Part B: Non-Mendelian Genetics and Cytogenetics**

1. Draw pedigree charts using correct symbols, and read pedigree charts to determine the inheritance of certain traits. Identify autosomal dominant, autosomal recessive, sex-linked recessive and sex-linked dominant.
2. Solve Punnett square problems involving lethal alleles, multiple alleles, codominance, and sex-linkage.
3. Define epistasis, penetrance, expressivity, pleiotropy, and phenocopy.
4. Explain mitochondrial inheritance.
5. Explain how “genetic recombination” aids survival of a species.
6. Explain synapsis and crossing over; how are linkage maps (using map units) made?
7. Read a human genome map (ideogram); draw and label chromosomes as they appear at metaphase, identifying them according to Paris Convention terminology.
8. Explain the steps involved in karyotype preparation
9. Explain how the following pre-natal diagnosis techniques are used: amniocentesis; chorionic villus sampling; fluorescence in-situ hybridization.
10. Explain how nondisjunction causes aneuploidy: XO, XXY, Trisomy-21
11. Describe the following chromosome rearrangements: deletion, translocation, inversion, duplication.
12. Explain sex determination in humans and the inheritance of sex-linked traits.
13. Explain “dosage compensation” and how it result in Barr body formation.
14. Explain the existence of mosaic traits (ectodermal dysplasia, calico cats).
15. Describe the reasons that Drosophila are such good experimental animals for genetics; explain how to breed two different mutant strains of fruit flies.
16. Explain the methods for studying polygenic traits and multifactorial traits such as intelligence.