Genetics Exam Topic List

## Genetic Crosses

1. Monohybrid & Dihybrid
   1. For dihybrid crosses make sure you can figure out the possible genotypes of gametes!
   2. FOIL
      1. So if I give you the following genotype, how many different gametes can be made, and what are their genotypes 🡪 WwXXyyZz
2. Complete dominance
3. Sex linked
4. Incomplete dominance
5. Codominance
6. Punnett Squares
7. Polygenic
8. Know how to do a test cross to determine an unknown genotype for an organism
   1. In other words, what would you have to breed something with to figure out its genotype (is it homozygous or heterozygous)
   2. How would you interpret the results of the test cross?

## Genomic Imprinting

## Know what it is

1. Know how genomic imprinting affects gene expression & phenotypes
2. If given an genomic imprinting scenario, be able to determine phenotypic & genotypic ratios of offspring
   1. Note how this is different than traditional mendelian inheritance

## Epistasis

1. Know examples of traits that are expressed epistatically
2. Know how epistasis affects gene expression & phenotypes
3. If given an epistatic scenario, be able to determine phenotypic & genotypic ratios of offspring
   1. Note how this is different than traditional mendelian inheritance

## Chromosomal Mutations

1. Be able to define the following
   1. Deletion
   2. Inversion
   3. Traslocation
   4. duplication
2. If I give you a a sequence of DNA with certain genes, be able to identify what kind of mutation has occurred

## Modes of Inheritance

1. Know how to identify the following by looking at a pedigree
   1. Autosomal Dominant
   2. Autosomal Recessive
   3. Sex-linked
   4. Mitochondrial
2. Know which diseases are which! ( all of the diseases on the chart I gave you earlier)

# Mendelian Laws

1. Law of Segregation
2. Law of Independent Assortment

## Karotyping

1. What can karotyping be used to diagnose?

## Vocab Terms: Difference between polyploids and aneuploids.

G-banding-Know what the difference between light and dark bands are.

Non-disjunction: Know when it can happen and how the results differ based on when it happens.

## Sex Chromosomes

1. Know the general characteristics of the X and Y chromosomes
2. Know about the disorders that can arise from various mutations/improper crossing over
3. Know how the X chromosome is inactivated
   1. Female Mosaicism
   2. What factors are involved
4. Understand how gender is determined
   1. Know about the SRY gene
5. Who is more likely to inherit an X-linked recessive disease.

# Short Answer

* Review Meiosis and understand the stages, why its called reduction division, processes that increase genetic variation; how abnoromalities , mutations, and nondisjunction can lead to diseased states, and examples of diseases caused by mistakes in meiosis; and how asexual reproduction bypasses meiosis and how that affects the offsprings genome compared to their parents
* Genetic Imprinting Question-In detail, make sure you look back over mitosis and **checkpoints**. ( built in bonus points for successfully attempting this question)
* Molecular Process of Inactivating an X chromosome
* Pedigree in detail. Be able to calculate genotypes of people on a pedigree. Be able to understand what the symbols represent and mean. Be able to calculate potential inheritance chances of future children based on pedigree information.
* Modes of inheritance. Be able to explain how different modes of inheritance effects genotypes and phenotypes differently. (Ex. How is a cross between heterozygotes different if there is complete dominance or incomplete dominance)