**Mendelian Genetics Guided Notes**

**Gregor Mendel (1822-1884)**

-Responsible for the \_\_\_\_\_\_\_\_\_ governing inheritance of traits. He studied the inheritance of \_\_\_\_\_\_\_\_\_ in pea plants, resulting in the laws of inheritance.

**Mendel’s Laws: Law #1**

1. Law of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_-during the formation of gametes (eggs or sperm), the two \_\_\_\_\_\_\_\_\_ responsible for a trait \_\_\_\_\_\_\_\_\_\_\_\_\_\_ from one another. Alleles for a trait are then “\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_” at fertilization, producing the genotype for the traits of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_.

-Two alleles for each trait separate during \_\_\_\_\_\_\_\_\_\_\_\_. During \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, two alleles for that trait \_\_\_\_\_\_\_\_. Heterozygous organisms are called \_\_\_\_\_\_\_\_\_\_\_\_.

2. Law of assortment-states that \_\_\_\_\_\_\_\_\_\_\_\_\_\_ distribution of alleles occurs during gamete \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Genes on separate chromosomes \_\_\_\_\_\_\_ independently during meiosis. Each allele combination is \_\_\_\_\_\_\_\_\_\_\_\_\_ likely to occur.

3. Law of Dominance-in a \_\_\_\_\_\_\_\_\_ of parents that are \_\_\_\_\_\_\_\_ for contrasting traits, only one form of the trait will appear in the next \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. All the offspring will be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and express ONLY the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ trait. Example: RR X rr yields all Rr (round seeds).

**Types of Genetic Crosses**

-Monohybrid cross-a \_\_\_\_\_\_ involving a \_\_\_\_\_\_\_\_\_\_\_\_ trait (ex: flower color). Dihybrid cross-cross involving two \_\_\_\_\_\_\_\_ (ex: flower \_\_\_\_\_\_\_\_\_\_\_ and plant height).

**Punnett Square**

-Used to \_\_\_\_\_\_\_\_\_\_\_\_ possible \_\_\_\_\_\_\_\_\_\_\_\_\_\_ in offspring to solve genetics problems using \_\_\_\_\_\_\_\_\_\_\_ to represent traits.

**Designer “Genes”**

-Alleles-two forms of a \_\_\_\_\_\_\_\_ (dominant and recessive)

-Dominant-\_\_\_\_\_\_\_\_\_\_\_\_ of two genes expressed in the hybrid; represented by a \_\_\_\_\_\_\_\_\_\_\_\_\_ letter (R)

Recessive-gene that shows up \_\_\_\_\_\_ often in a cross; represented by a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ letter (r)

-Genotype-gene \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ for a trait (ex: RR, Rr, rr)

-Phenotype-the \_\_\_\_\_\_\_\_\_\_\_\_\_ expression resulting from a \_\_\_\_\_\_\_\_\_\_\_\_ (ex: red flowers vs. white flowers; type A blood vs. type B blood).

**Sometimes, the Word Dominant is Misunderstood**

-A \_\_\_\_\_\_\_\_\_\_\_\_\_\_ allele isn’t necessarily better or \_\_\_\_\_\_\_\_\_\_\_\_\_ than a recessive allele. It also doesn’t mean it occurs most often in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Example: polydactyly is when someone has extra \_\_\_\_\_\_\_\_\_\_\_\_ or toes-its dominant.

**Genotype and Phenotype in Flowers**

-Genotype of \_\_\_\_\_\_\_\_\_\_\_: R= red flower; r= yellow flower. All genes occur in \_\_\_\_\_\_\_\_, so two alleles affect a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Possible combinations:

Genotypes: RR Rr rr

Phenotypes: Red Red Yellow

**Genotypes**

-Homozygous genotype-gene combination involving two \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or two recessive genes (ex: RR or rr), also called “\_\_\_\_\_\_\_\_\_”.

-Heterozygous genotype- gene combination of one \_\_\_\_\_\_\_\_\_\_\_\_\_\_ and one recessive \_\_\_\_\_\_\_\_\_\_\_ (ex: Rr), also called “\_\_\_\_\_\_\_\_\_\_\_\_\_\_”.

**P1 Monohybrid Cross Review**

-\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ dominant X homozygous \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Offspring are all heterozygous (hybrids). Offspring called \_\_\_\_\_\_ generation. Genotypic and phenotypic ration are ALL \_\_\_\_\_\_\_\_\_\_\_\_\_.

**F1 Monohybrid Review**

-\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ X heterozygous.

Offspring: 25% Homozygous dominant RR

50% Heterozygous Rr

25% Homozygous recessive rr

Offspring called \_\_\_\_\_ generation, genotypic ratio \_\_\_\_\_\_\_ and phenotypic ratio is \_\_\_\_\_\_

**Human Disorders: Recessive**

-Recessive \_\_\_\_\_\_\_\_\_\_\_\_\_:

Only seen/\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in the homozygous recessive genotype. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ that have children with recessive disorders are said to be \_\_\_\_\_\_\_\_\_\_\_\_\_\_, meaning they are heterozygous. They are \_\_\_\_\_\_\_ affected, but they can pass on the disease.

-Cystic Fibrosis: The genotype results in the body making excessive \_\_\_\_\_\_\_\_\_\_\_ that accumulates in the lungs and pancreas. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and digestion are affected by this disease-disease is \_\_\_\_\_\_\_\_\_\_\_\_.

-Tay-Sachs Disease: Results in the \_\_\_\_\_\_\_\_\_\_\_\_\_ to make an enzyme responsible for breaking down \_\_\_\_\_\_\_. The buildup of fats in the \_\_\_\_\_\_\_\_\_\_ leads to organ failure, mental retardation and \_\_\_\_\_\_\_\_\_\_\_ if it is the infantile type.

**Dominant Disorders**

In this case, the homozygous \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ genotype is normal.

-Huntington’s disease-\_\_\_\_\_\_\_\_\_\_ function declines due to \_\_\_\_\_\_\_\_\_\_\_ of nerve cells, affecting movement and mental abilities-leads to \_\_\_\_\_\_\_\_\_\_\_.

-Dwarfism- \_\_\_\_\_\_ of children are born to parents of normal height. Bone growth is \_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Dihybrid Cross**

Dihybrid \_\_\_\_\_\_\_\_ is a cross between two different \_\_\_\_\_\_\_\_ that differ in two observed traits. \*\*Ratio with heterozygous genotypes results is a ratio of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\*\*