# Genetics Worksheet

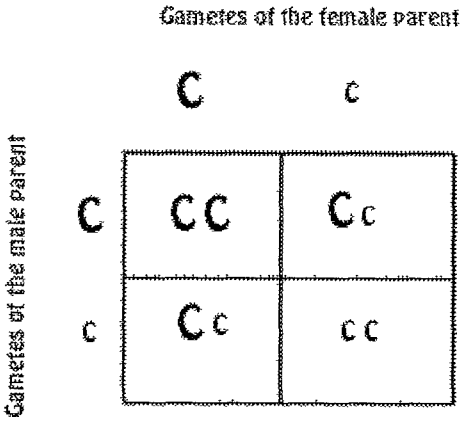
**Name:**_____

**1.** Chlorophyll production in corn is governed by a dominant gene **C** The recessive gene, **c**, will produce albino plants if present in the homozygous recessive condition, or **cc** Complete the following showing a cross of an albino **(cc)** with a homozygous green plant **(CC)**

**cc (albino) X CC (green) Parents (P)**
**Gametes**
**$F_1$**

a What color is the $F_1$?
b Is the $F_1$ homozygous or heterozygous?
c Which gene is dominant?
d What is the phenotype of the $F_1$?
e What is the genotype of the $F_1$?

**2.** A monohybrid cross is made by self-pollinating the $F_1$ generation from question #1, i.e., cross Cc X Cc. The Punnett square below shows the $F_1$ gametes




and the $F_2$ progeny

a Which $F_2$ is homozygous dominant?
b Which $F_2$ is heterozygous?
c Which $F_2$ is homozygous recessive?
d What is the color of the homozygous dominant $F_2$?
e What is the color of the heterozygous $F_2$?
f What is the color of the homozygous recessive $F_2$?
g List the phenotypes possible in the $F_2$ generation.
h How many genotypes are present?
i What is the genotypic ratio?

**3.** In corn, one gene controls the height of the plant Tall (T) is dominant over dwarf (t) A tall corn plant is crossed with a dwarf plant. Of the progeny, 247 are tall and 256 are dwarf What are the genotypes of the parent plants?

**4.** In peas, the gene for red flowers (R) is dominant over the gene for white flowers (r) A pea plant with white flowers is crossed with one that has red flowers Of the offspring, all have red flowers What are the genotypes of the parents?

**5.** Gregor Mendel employed the pea plant in his plant breeding experiments because he noted easily observable traits including plant height, seed color, seed shape, etc. After numerous experiments and recording all his observations he concluded that certain traits were dominant over others, such as tall (T) over dwarf (t), yellow seeds (Y) over green (y); and round seeds (R) over wrinkled (r) Each of these pairs of genes were found on separate chromosomes and thus sort independently.

Using the letters indicated above assume Mendel crossed a plant which was homozygous dominant for both height and seed color with a plant that was homozygous recessive for the same traits Set up a dihybrid cross using these two parent (P) plants Work the cross through to the $F_2$ generation by ultimately crossing 2 of your $F_1$ generation plants

**Gene Symbols: T = tall, t = dwarf, Y = yellow seed, y = green seed**
**P: Homozygous Tall Yellow Homozygous dwarf green**
**P genotype:**
**Gametes of P:**
**$F_1$ (zygote):**
**$F_1$ X $F_1$**
**genotypes:**
**$F_1$ gametes:**
**$F_2$ Punnett Square:**
(place female gametes across the top and male gametes down the left side and cross all)

1 What is the phenotype of the $F_1$?
2. How many different genotypes are observed in the $F_2$?
3 How many different phenotypes are observed in the $F_2$ and what is the phenotypic ratio of the $F_2$?
4 What process must occur between the P and gametes stages or the $F_1$ parents and the $F_1$ gametes?
5 What process occurs between the gametes to produce the $F_1$ or $F_2$ (zygote) stage?