Name:

Class:

**Non-Mendelian Practice Problems**

1. There are flowers blooming in the spring garden! Name the trait that is demonstrated by each cross:

True breeding red x true breeding white = red flowers \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Red flowers x white flowers = red flowers with a white center \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Red flowers x white flowers = pink flowers \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Red flowers x white flowers = many shades of pink flowers \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

# Incomplete dominance practice Problems

2. Snapdragons are incompletely dominant for color; they have phenotypes red, pink, or white. The red flowers are homozygous dominant, the white flowers are homozygous recessive, and the pink flowers are heterozygous. Give the genotypes for each of the phenotypes, using the letters “R” and “ r ” for alleles:

A. Red snapdragon B. Pink snapdragon C. White snapdragon

genotype: \_\_\_\_\_\_ genotype: \_\_\_\_\_\_ genotype: \_\_\_\_\_\_

Show genetic crosses between the following snapdragon parents:

A. pink x pink B. red x white C. pink x white

Genotype Ratio: Genotype Ratio: Genotype Ratio:

Phenotype Ratio: Phenotype Ratio: Phenotype Ratio:

1. A gardener loves her pink snapdragons and wants to cross them to get more pink snapdragon seeds to plant next year. The gardener plants the seeds in the spring and is surprised. What did she get?
2. What colored flowers should she cross to get only pink offspring? Parents= \_\_\_\_\_\_\_\_\_\_\_\_ x \_\_\_\_\_\_\_\_\_\_\_\_\_
3. Can she have only white flowers? She should mate… Parents= \_\_\_\_\_\_\_\_\_\_\_\_ x \_\_\_\_\_\_\_\_\_\_\_\_\_
4. Horse hair color is also incomplete dominant. What are the genotypes for:

A Chestnut horse\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ a Palomino horse\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ a Cremello horse\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Show genetic crosses between the following horse parents:

A. Palomino x Palomino B. Chestnut x Cremello C. Palomino x Cremello

Genotype Ratio: Genotype Ratio: Genotype Ratio:

Phenotype Ratio: Phenotype Ratio: Phenotype Ratio:

# Codominance practice problems

1. Chickens are codominant for color; they have phenotypes black, white or speckled black and white.

The black are homozygous dominant, the white are homozygous dominant and the hybrids are heterozygous. Give the genotypes for each of the phenotypes, using the letters “B” and “ W ” for alleles:

A. Black chicken B. White chicken C. Speckled chicken

genotype: \_\_\_\_\_\_ genotype: \_\_\_\_\_\_ genotype: \_\_\_\_\_\_

Show genetic crosses between the following chicken parents:

A. Black x white B. Speckled x Speckled C. Speckled x white

Genotype Ratio: Genotype Ratio: Genotype Ratio:

Phenotype Ratio: Phenotype Ratio: Phenotype Ratio:

1. If a spotted chicken mated with a black chicken, what would their offspring be?
2. What parents would you use to get 100% black chickens?
3. What parents would you use to get 100% white chickens?
4. What parents would you use to get 100% speckled chickens?

**Polygenic practice problems**

1. Skin color is controlled by at least three genes each of which has a dominant allele that produces melanin pigment and a recessive that does not produce pigment. Each gene is given a different letter (gene 1-A, gene 2-B and gene 3-C). A homozygous dominant person would have very dark skin and have 6 dominant alleles, a homozygous recessive person would be very light with 6 recessive alleles and a heterozygous person would have intermediate brown skin.

A. Black skin B. Brown skin C. White skin

genotype: \_\_\_\_\_\_\_\_\_\_\_\_\_ genotype: \_\_\_\_\_\_\_\_\_\_\_\_\_ genotype: \_\_\_\_\_\_\_\_\_\_\_\_\_

1. A black skin toned mom marries a white skin toned dad. What color will their children be?

Parents genotypes\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ x \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Egg genotype:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ x Sperm genotype:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Fertilized zygote genotype:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Two heterozygous brown skin toned people marry. Can they have a black skin toned child?

Parents genotypes\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ x \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Egg genotype:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ x Sperm genotype:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Fertilized zygote genotype:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Can the two heterozygous parents have a white skin toned child?

Parents genotypes\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ x \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Egg genotype:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ x Sperm genotype:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Fertilized zygote genotype:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

17. Height in humans is also polygenic. Explain why very tall and very short people are less common and medium height is the most common.