**GENETICS PROBLEM LAB** Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date \_\_\_\_\_\_\_\_\_\_\_ Period \_\_\_\_\_

**Simple Dominance**

1. A heterozygous brown haired man marries and has children with a heterozygous brown haired woman. Brown hair is dominant to blonde hair.

* Genotypic ratio:
* Phenotypic ratio:
* What percentage of their offspring will be heterozygous brown haired?
* What percentage of their offspring will have blonde hair?

1. Mid-digital hair is dominant over not having mid-digital hair. A woman who has no mid-digital hair marries a man that is homozygous dominant with mid-digital hair.

* Genotypic ratio:
* Phenotypic ratio:
* What percentage of their offspring will be heterozygous for mid digital hair?
* What percentage of their offspring will have no mid-digital hair?

1. Yellow peas are dominant to green peas. 25% of the offspring produced from a parental cross are green and 75% are yellow. Which parental cross would produce this ratio of offspring? Complete crosses between different combinations of parents to figure this out.
   * Parent 1:
   * Parent 2:
2. A heterozygous purple pea plant is crossed with a homozygous dominant purple pea plant. Purple flowers are dominant to white flowers.

* What percentage of their offspring will have purple flowers?
* What percentage of their offspring will have white flowers?

1. The ability to curl your tongue is a dominant trait. A man who can curl his tongue mates with a woman who cannot curl her tongue. They produce children and 50% of them can curl their tongue while the other 50% cannot. What is the genotype of the father who can curl his tongue?
2. In guinea pigs, black coat is dominant over white. Cross a homozygous dominant with a heterozygous individual.

* Genotypic ratio:
* Phenotypic ratio:
* What percentage of their children will be black?
* What percentage of their children will be white?

1. Cystic fibrosis is an autosomal recessive disease of the lungs.

* What are the possible genotypes of someone unaffected?
* What are the possible genotypes of someone who is affected?
* Show the punnett cross between two individuals that are heterozygous (considered carriers) for the condition. What percentage of their children will have CF?

**Incomplete Dominance**

1. In radishes, red color is not totally dominant over white color. The intermediate color produced is purple. Cross a red radish with a purple radish.

* Genotypic ratio:
* Phenotypic ratio:
* What percentage of the offspring will be red?

1. In Japanese four o’clock flowers, red is not completely dominant over white. The intermediate color produced is pink. Cross two pink flowers.

* Genotypic ratio:
* Phenotypic ratio:

1. In a certain species of mice, black fur is not completely dominant over white fur. There is an intermediate coat color of gray produced. Cross a gray mouse with a white mouse.

* Genotypic ratio:
* Phenotypic ratio:
* What percentage of the offspring will be black?
* What percentage of the offspring will be gray?

**Codominance**

1. Cross a man with heterozygous Type A blood type with a woman who has type O blood.

* Genotypic ratio:
* Phenotypic ratio:
* What percentage of their children will have type A blood?
* What percentage of their children will have type O blood?

1. Checkered chickens are an example of codominance inheritance pattern. If a black chicken is crossed with a checkered black and white hen, what are the offspring?

* Genotypic ratio:
* Phenotypic ratio:
* What percentage of their offspring will be black?
* What percentage of their offspring will be checkered?

1. A man and a woman have a baby and they have their doubts as to whether the child is theirs. They believe there could have been an accidental baby swap at the hospital. To find out, the couple has a blood test performed. The parents are both Type A blood. The baby has type O blood. Is it possible for this couple to be the parents of the child. Show the punnett to explain your answer whether it is or is not possible.
2. A girl has Type AB blood. Her mother is heterozygous Type A blood and her father is heterozygous Type B blood. How likely is it that one of her siblings has AB blood as well? Show the punnett.

**Sex-Linked Inheritance**

1. Muscular Dystrophy is a sex-linked recessive disorder. Cross a heterozygous unaffected woman with an unaffected man.

* What percentage of their sons will be affected?
* What percentage of their daughters will be affected?
* What percentage of their daughters will be carriers for Muscular Dystrophy?

1. Hemophilia is a sex-linked recessive disorder. If a woman who does not have hemophilia has children with a hemophiliac male and they have one hemophiliac daughter, what must the mother’s genotype be in order for this couple to have a hemophiliac daughter. Show the punnett(s) to prove it. Explain.

**Review Basic Questions:**

1. What does simple dominance mean?
2. What does incomplete dominance mean?
3. What does codominance mean?
4. What does sex-linked mean?
5. In simple dominance, how many dominant alleles do you need to show a dominant trait?
6. In simple recessive, how many recessive alleles do you need to show a recessive trait?
7. In incomplete dominance, is any trait dominant over the other?
8. In codominance, is any trait dominant over the other?
9. Why are more males affected with sex-linked traits/disorders than females?
10. Blood types show what pattern of inheritance?