

## Genetics Study Guide

Name \_\_\_\_\_

1. Describe the genotypes given. The first one has been done for you.

DD-homozygous dominant

tt-

Dd-

TT-

dd-

Tt-

2. Red fur is dominant over white fur. What are the phenotypes of the following genotypes?

RR-\_\_\_\_\_

Rr-\_\_\_\_\_

rr-\_\_\_\_\_

### Mendelian Monohybrid Crosses

3. A pea plant that is heterozygous for smooth pods is crossed with a pea plant that has wrinkled pods.

- What are the alleles?
- What are the genotypes of each parent?
- Complete a punnett square to predict the offspring from the cross.
- What are the predicted genotype and phenotype ratios of the offspring?
- If this cross produced 50 pea plants, how many of the 50 would we expect to be wrinkled?

### Working Backwards

4. In pea plants, yellow seeds are dominant to green seeds. A pea plant with yellow seeds is crossed with a pea plant with green seeds. About 50% of the offspring are green and the other 50% are yellow. What are the genotypes of the parent plants? Show a punnett square as evidence.

5. In another cross, two yellow seeded plants were crossed. About 25% of their offspring were green. What must the genotypes of the parent plants have been? Show a punnett square as evidence.

### Non-Mendelian Monohybrid Crosses

6. In Kentucky, there is a creature known as a wildcat. Wildcats can be blue, light blue, or white.

- a. What type of inheritance is this?
- b. Cross two light blue wildcats and give the genotype and phenotype ratios of the offspring.

7. Short horn cattle can have coats that are red, white, or roan(red and white speckled).

- a. What type of inheritance is this?
- b. Cross a roan bull and a red cow and give the genotype and phenotype ratios of the offspring.

8. There are four different blood types in humans. Give the genotype of each individual described.

- |                         |                      |
|-------------------------|----------------------|
| a. Heterozygous type A- | d.homozygous type B- |
| b. Heterozygous type B- | e.type AB-           |
| c. Homozygous type A-   | f. Type O-           |

9. A father with type A blood and a mother with type B blood have a child with type O blood.

- a. What must the genotypes of the parents be? Show a punnett square as evidence.

- b. What are all the possible blood types their offspring could have?

10. Cross an incompletely dominant red flower with an incompletely dominant pink flower. Give the genotypes and phenotypes of the offspring. What % of the offspring is homozygous?

11. A man with type A blood marries a woman with type O blood. Give genotypes and phenotypes of the offspring. What is the chance that they will have a child with type A blood? O blood? AB blood?

12. In a species of birds, incomplete dominance between alleles for red and blue feathers is observed. Heterozygotes are purple. If two purple birds are crossed, what will be the possible genotypes and phenotypes of the offspring?

13. Sickle cell anemia is a trait that exhibits codominance. A person with an AA genotype does not have sickle cell anemia, and a person with an SS genotype has full sickle cell anemia. A person with an AS genotype will have some sickle-cells, though s/he might show minimal or no symptoms (a "carrier").

Engelbert is a carrier for sickle-cell anemia (shows minimal symptoms), and his wife, Gwendoline, does not have it. What are the chances that Engelbert and Gwendoline will have a child with ANY sickle-shaped blood cells? Show your work!

14. In humans, hair type is determined by incomplete dominance. Some people have curly hair, some people have straight hair, and heterozygotes have wavy hair. What would occur if a person with wavy hair had a baby with a person with straight hair? Draw the Punnett square and identify the genotypes and phenotypes of their offspring.

15. If two people with wavy hair have a baby together, what is the likelihood that they'll have a curly haired baby? A straight-haired baby?