**Animal Haven Genetics**

Scientists at Animal Haven have been investigating the genetic makeup of the organisms in the community. Use the information provided and your knowledge of genetics to answer each question.

1. For each genotype below, indicate whether it is a heterozygous (He) OR homozygous (Ho).

TT \_\_\_\_ Bb \_\_\_\_ DD \_\_\_\_ Ff \_\_\_\_ tt \_\_\_\_ dd \_\_\_\_

Dd \_\_\_\_ ff \_\_\_\_ Tt \_\_\_\_ bb \_\_\_\_ BB \_\_\_\_ FF \_\_\_\_

Which of the genotypes in #1 would be considered purebred? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Which of the genotypes in #1 would be hybrids? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Determine the phenotype for each genotype using the information provided about a yellow spotted cat.

Yellow body is dominant to white.

YY \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Yy \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ yy \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Spots are dominant to stripes.

SS \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Ss \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ss \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. For each phenotype, give the genotypes that are possible for a puppy.

A long tail (T) is dominant to a short tail (t).

Long: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Short: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Brown fur (B) is dominant to yellow (b).

Brown fur: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Yellow fur: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Two cats, Robert and Ellen, recently met at the Animal Haven. Robert is heterozygous for yellow fur, but Ellen has white fur. Create a Punnett square to show the possibilities that would result if Robert and Ellen had kittens. HINT: Read question 2!

A. List the possible genotypes and phenotypes for their children.

B. What are the chances of a kitten with yellow fur? \_\_\_\_ out of \_\_\_\_ or \_\_\_\_%

C. What are the chances of a kitten with white fur? \_\_\_\_ out of \_\_\_\_ or \_\_\_\_%

1. Everyone in Lassie’s family has golden fur, which is the dominant trait for fur color in his hometown. His family brags that they are a “purebred” line. He recently married a nice girl dog who has brown fur, which is a recessive trait. Create a Punnett square to show the possibilities that would result if Lassie and his new bride had puppies. Use G to represent the dominant gene and g to represent the recessive gene.
A. List the possible genotypes and phenotypes for their puppies.

B. What are the chances of a puppy with golden fur? \_\_\_\_%

C. What are the chances of a puppy with brown fur? \_\_\_\_%

D. Would Lassie’s puppies still be considered purebreds? Explain!

1. Mr. Bunny and his wife recently had a Lil’ Bunny, but it has not been a happy occasion for them. Mrs. Bunny has been upset since she first saw her new baby who has long floppy ears. She claims that the hospital goofed and mixed up her baby with someone else’s baby. Mr. Bunny is homozygous for his short ears, while his wife is heterozygous for her short ears. Some members of her family have long floppy ears, which is the recessive trait. Create a Punnett square using E for the dominant gene and e for the recessive gene.

A. List the possible genotypes and phenotypes for their children.

B. Did the hospital make a mistake? Explain your answer.

1. A female cat is heterozygous long-haired and a male cat is homozygous short-haired. Create a Punnett square to determine the possible outcomes of their offspring and the probabilities of each. Label each genotype as heterozygous or homozygous and list the phenotypes of all of the offspring.

