

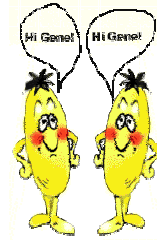
Name _____

Date _____

7 _____ *Life Science*
Genetics Problems 2



Teacher:
Miss Stanley



- _____ 1. In dogs, wire hair is dominant to smooth. In a cross of a homozygous wire haired dog with a smooth-haired dog, what will be the phenotype(s) of the F₁ generation?
_____ What would be the genotype(s)?
- _____ 2. Woodrats are medium sized rodents with lots of interesting behaviors. You may know of them as packrats. Let's assume that the trait of bringing home shiny objects is controlled by a single locus gene and is dominant to the trait of carrying home only dull objects. Suppose two heterozygous individuals are crossed. How many of each genotype would be expected if only 4 offspring were produced?
- _____ 3. In Venetian violets three phenotypes occur with respect to flower color: a deep violet, almost black(Midnight); a white; a pale lavender. Two pale lavender
_____ (midnight) flowered individuals have been crossed. The F₁ from this cross produces
_____ (lavender) individuals with pale lavender flowers but also individuals with Midnight
_____ (white) flowers and individuals with with white flowers. What would the expected phenotypic ratio be in these F₁? Indicate the genotypes for each flower color.
- _____ (daughter) 4. A man with hemophilia (a recessive , sex-linked condition) has a daughter who doesn't have hemophilia. She marries a man who is normal for the trait.
_____ (son) What is the probability that a daughter of this mating will be a hemophiliac?
_____ A son? If the couple has four sons, what is the probability that all four will be born with hemophilia?
- _____ 5. Saguaro cacti are very tall cylindrical plants that usually have two L-shaped arms, one on each side. Suppose you lived in southern Arizona where the Saguaro cactus is common and you happen to have one growing in your yard. Your Saguaro has two arms but one is longer than the other. Now, assume that arm length in these cacti are controlled by a single gene with arms of the same length being dominant to arms of different lengths. What is the genotype of your cactus?

- _____ 6. Suppose you cross your cactus with that of your neighbor which has arms of the same length. Your great grandchildren (it takes a Saguaro cactus a long time to mature) find that half of the resulting offspring have arms the same length and half have arms of different lengths. What was the genotype of your neighbor's cactus?
- _____ 7. Suppose you have two rose plants, both with pink flowers. You cross the two plants and are surprised to find that, while most of the offspring are pink, some are red and some are white. You decide that you like the red flowers and would like to make more. What cross would you perform, with your original pink rose plant, to produce the most red flowered plants?
- _____ 8. The common grackle is a species of robin-sized blackbirds that are fairly common (hence the name) over most of the United States. Suppose that long tails were dominant to short tails in these birds. A female short-tailed grackle mates with a male long-tailed grackle who had one parent with a long tail and one parent with a short tail. What is the male's genotype?
- _____ (a) 9. Pseudohypertrophic muscular dystrophy is a disorder that causes gradual deterioration of the muscles. It is seen only in boys born to apparently normal parents and usually results in death in the early teens. (a) Is pseudohypertrophic muscular dystrophy caused by a dominant or recessive allele? (b) Is its inheritance sex-linked or autosomal? (c) How do you know? Explain why this disorder is always seen in boys and never girls.
- _____ (c)
- _____ 10. A naturalist visiting an island in the middle of a large lake observes a species of small bird with three distinct types of beaks. Those with short, crushing beaks consume hard shelled nuts, those with long, delicate beaks pick the seeds from pine cones, and those with intermediate beaks, consume both types of seeds though they are not as good at either. What would be the phenotypic ratio of the F_1 generation resulting from a cross of intermediate beak with a long beak (Short:Intermediate:Long)?
- _____ (a) 11. A color-blind man marries a woman with normal vision whose father was color blind. (a) What is the probability that they will have a color-blind daughter?
- _____ (b) (b) What is the probability that their first son will be color-blind?