**Magnet Biology Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ # \_\_\_\_\_**

**Genetics Problems**

**Show your work! Circle final answer(s). \*If extra paper is needed, staple to the back of this sheet.**

1. A brown mouse is mated with a white mouse. All of their offspring are brown. If two of these brown offspring are mated, what fraction of their offspring will be white?
2. Suppose you wanted to know the genotype of one of the brown F2 mice in question #1. Describe how you would do that, using complete sentences. You may show how you derived probabilities, but the work must be shown within the context of your paragraph.
3. Some dogs bark while trailing; others are silent. The barker gene is dominant, the silent gene is recessive. The gene for normal tail is dominant over the gene for screw (curly) tail. A barker dog with a normal tail who is hybrid for both traits is mated to another dog of the same genotype. What fraction of the offspring will be barkers with screw tails?
4. A young unmarried woman had a baby and wished to collect child support from the father. Her blood type is AB. The baby’s blood type is A. There are two possible fathers: Jim is type A, and Michael is type O. Which man could be the father? Explain.
5. Red-green color blindness is a human recessive sex-linked trait. A man and a woman with normal vision have a color-blind son. What is the probability that their next child will also be a color-blind son?
6. The inheritance of flower color in snapdragons illustrates incomplete dominance. When a red snapdragon is crossed with a white one, all their offspring are pink. What offspring would be produced, in what proportions, if two of these pink snapdragons were crossed? What offspring would be produced, in what proportions, if a pink snapdragon was crossed with a white one?
7. A man whose blood type is A and a woman whose blood type is B have a son whose blood type is O. A) What are their genotypes? B) What is the probability of the couple’s next child having blood group B?
8. In fruit flies, the alleles for red eyes are dominant over the allele for pink eyes. Straight wings are dominant over curled wings. Imagine that a red-eyed straight-winged fly that is heterozygous for both characteristics is mated with a fly with pink eyes and curled wings. Predict the offspring that would be produced by this cross (genotypes, phenotypes, and fraction of each) if these genes were on different chromosomes.
9. When a geneticist actually carried out the cross from #8, the observed offspring were as follows: 49% red eyes and straight wings, 49% pink eyes and curled wings, 1% red eyes and curled wings, 1% pink eyes and straight wings. A) Does this agree with your prediction? B) **How** would you explain the results?
10. Numerous fruit-fly matings show that the h allele for hairy body, the b allele for spineless bristles, and the s allele for striped body are all located on the same chromosome. The recombination frequency between alleles h and b is 4%. The recombination frequency between alleles s and b is 15%. A) Why are the recombination frequencies between h and b and between s and b different? The recombination frequency between alleles h and s is 10%. B) What is the order of these three genes on the chromosomes?