**More Outcome Practice: Punnett Squares (Monohybrid Cross)**

**Outcome #4**

**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Biology 12**

**Directions:** Complete the following crosses looking at a single trait. Indicate your answers as either a ratio (in fractions) or a percentage.

1. Using the information already known about dominant and recessive traits from Mendel’s experiments answer the following crosses between plants using a Punnett square.
   1. What is the genotype and phenotypes of the F1 generation when two heterozygous green pod plants are crossed?
   2. What is the genotype and phenotypes of the F1 generation when a heterozygous plant for axial flowers is crossed with a plant with terminal flowers?
   3. What is the genotype and phenotypes of the F1 generation when a homozygous tall plant is crossed with a short plant?
   4. What is the genotype and phenotypes of the F1 generation when a heterozygous plant with a smooth pod is crossed with a plant that has constricted pods?
2. Using Mendel’s experiment information and test crosses identify what the parental genotypes for each situation are:
   1. When a tall plant is crossed with a short plant, some of the offspring are short. What are the genotypes of the parents and the offspring?
   2. Three-fourths (3/4) of the plants produced by a cross between two unknown pea plants have axial flowers and ¼ have terminal flowers. What are the genotypes of the parent pea plants?
   3. What cross would result in ½ of the offspring having green pods and ½ of the offspring having yellow pods?
3. In seals, the length of whiskers has two alleles with the dominant being long and the short being recessive. Using the letter “L” to represent the allele answer the following:
   1. What are the traits and alleles for the length of whiskers in seals? Make sure to indicate which is dominant and which is recessive.
   2. What are the genotypes and phenotypes produced if a long whiskered heterozygous seal and a short whiskered seal mated?
   3. What would the genotypes and phenotypes be for the offspring of two short whiskered seals be?
4. For Labrador retrievers, black fur colour is dominant to yellow. Explain how a homozygous black dog can have a different genotype than a heterozygous black dog. Could the heterozygous black dog have the same genotype as a yellow-haired dog?
5. Cystic fibrosis is a chronic recessive genetic disorder that affects the respiratory and digestive systems. Jaren was diagnosed with cystic fibrosis; however neither of his parents have the disease. Use “F” to represent the normal/no cystic fibrosis allele and ‘f” to represent the recessive occurrence of cystic fibrosis allele.
   1. What are the allele combinations of Jaren’s parents? How do you know?
   2. What is Jaren’s allele combination?
   3. What are the chances that any future child of Jaren’s parents will **NOT** inherit cystic fibrosis?
   4. What are the chances that any future child of Jaren’s parents **WILL** inherit cystic fibrosis?
   5. Explain why you think Jaren’s parents do not show symptoms.