Directions: see the Canvas page for directions on how to submit your work. You are uploading a file. It is recommended that you print these pages and write your answers directly on the page.

This exercise is examining inheritance of kernel color in corn. Kernel color is determined by one gene. There are 2 alleles of the gene for kernel color: (1) purple which is dominant and (2) yellow which is recessive

Problem #1: Procedure for Monohybrid Cross

Consider the following genetic cross:

        true breeding (pure breeding) purple   X   true breeding (pure breeding) yellow
                     female   male

What are the genotype and phenotype ratios of the F1 generation? What are the genotype and phenotype ratios of the F2 generation?

Step 1: Indicate the genotypes of each parent: (use any letter of the alphabet to symbolize the alleles)

Key: _____ = dominant allele (purple)

      _____ = recessive allele (yellow)

Genotypes of the parents:

      Female _____

      Male _____   *remember, genotype is 2 letters

Step #2: Indicate the P generation by writing the parents genotypes in the equation below

      Female _____   X   Male _____

Step #3: Indicate the types of gametes each parent produces with respect to the gene for kernel color

      Female: Male:

Step #4: Determine the genotype and phenotype ratios of the F1 generation by symbolizing the possible ways the gametes in step #3 can fuse together

*remember, when writing ratios, you must specify: (1) the probability, as a number, for each genotype and (2) the probability, as number, for each phenotype

Step #5: The F1 will be crossed together to produce the F2 generation. Indicate the genotypes of the parents. Remember the parents in this part of the cross are the F1 individuals shown as the answer to question #4 above.

Genotypes of the parents:

       Female _____

       Male _____

Step #6: Fill in the equation below with the genotypes of the parents

       Female _____   X Male _____

Step #7: Indicate the types of gametes each parent produces with respect to the gene for kernel color

       Female: Male:

Step #8: Determine the genotype and phenotype ratios of the F2 generation by symbolizing the possible ways the gametes in question #7 can fuse together

*remember, when writing ratios, you must specify: (1) the probability, as a number, for each genotype and (2) the probability, as a number, for each phenotype

Problem #2: Another Monohybrid Cross

Consider the following cross:

    heterozygous female X homozygous recessive male

What is genotype and phenotype ratio of the F1 generation?

Step 1: Indicate the genotypes of each parent below: (use any letter of the alphabet to symbolize the alleles)

Key: _____ = dominant allele (purple)

    _____ = recessive allele (yellow)

Genotypes of the parents:

    Female _____

    Male   _____

Step #2: Indicate the P generation by writing the parents genotypes in the equation below

    Female _____   X Male _____

Step #3: Indicate the types of gametes each parent produces with respect to the gene for kernel color

    Female: Male:

Step #4: Determine the genotype and phenotype ratios of the F1 generation:

*remember, when writing ratios, you must specify: (1) the probability, as a number, for each genotype and (2) the probability, as a number, for each phenotype
step 3B.

Problem #2: Mendel's Laws

Based on his results, Gregor Mendel developed 4 laws about genetics. In this course, we examine only 3 of these laws.

<u>Law of Unit Character</u>: states that genes determine traits.
        Where in a genetics problem do you apply this law? (look at the problems you did above to help you).

<u>Law of Segregation</u>: states that members of a gene pair separate in the formation of gametes so that the gamete has only 1 copy of each gene.
        Where in a genetics problem to you apply this law?

<u>Law of Dominance</u>: states that one gene may mask or hide the expression of another.
        Where in a genetics problem to you apply this law?