MEDELIAN GENETICS PRACTICE

1. Mendel followed solid experimental design procedures. Briefly describe how he did the procedure called "cross-fertilization" with his pea plants.

2. Gregor Mendel kept records of seven characters (characteristics) of his pea plants. Plant height is one of these characteristics, what are the other six?

3. Describe the two possible traits for the characteristics you found in question 2. Give the ratio of the traits in the F2 generation for each (you will need to do more research to find Mendel's actual ratios). List the trait that was considered dominant first and the recessive trait second, for each pair of traits. Show the short hand code for each trait. See the example below.

   Example: Plant Height = 3 Tall (T) for every 1 short (t) plant = 3 T:1 t (Note: more precisely, Mendel's result was 2.84 T:1 t)

4. You have a pea plant with inflated pods (I) and another pea plant with constricted pods (i). You wish to use the plants in a Mendelian experiment. You are sure that both plants are pure-breeding and that inflated (smooth) pods are dominant over constricted (pinched) pods.

   a) What are the genotypes of the two parental plants? Describe the genotypes with both appropriate letters AND a combination of the terms homozygous, heterozygous, dominant, and recessive as appropriate. What are the phenotypes of the two plants?

   b) After crossing the two parent plants, you have a look at the F1 generation. What are the genotypes of the F1 plants? What are the phenotypes of the F1 plants? Describe the genotypes and the phenotypes as a ratio.

   c) Choose any two F1 plants and complete a cross. The offspring are now F2 plants. Describe the F2 plants in terms of genotype, phenotype, and a ratio.

(Be sure to include enough information in your answers so that it is clear how you arrived at your answers. You may use diagrams to work out your responses. The answer must be clearly stated and the explanation must also be in words.)