Life Science Study Guide: Genetics

1. What is the correct name for the organism that Gregor Mendel studied? (1 point)

2. Match the following terms and definitions by writing the letter in the correct blanks. (6 points)

1. heredity ______
2. genetics ______
3. phenotype ______
4. genotype ______
5. allele ______
6. gene _____

A. the scientific study of heredity
B. factors that control a trait
C. passing of physical characteristics from parent to offspring
D. different forms of a gene
E. the physical appearance of an organism
F. the underlying genes that determine how the organism looks

3. Define an allele in complete sentences: (1 pt)

4. For each genotype below, tell whether it is heterozygous (He) or homozygous (Ho). (16 points)

- AA ________
- BB ________
- cc ________
- Dd ________
- EE ________
- Ff ________
- GG ________
- Hh ________
- ii ________
- Jj ________
- Kk ________
- LL ________
- Mn ________
- NN ________
- oo ________
- Pp ________

5. Determine the phenotype based on the genotype. (3 points per question)

A. Tall stems are dominant to short stems
   - TT ________________
   - Tt ________________
   - tt ________________

B. Brown eyes are dominant to blue eyes
   - BB ________________
   - Bb ________________
   - bb ________________
6. Discuss the difference between genotype and phenotype.

7. A TT (tall) plant is crossed with a tt (short plant). What percentage of the offspring will be tall? (2 points) **SHOW ALL WORK**

8. A homozygous dominant round seeded plant (RR) is crossed with a homozygous recessive wrinkle seeded plant (rr). What percentage of the offspring will be homozygous dominant (RR)? (2 points) **SHOW ALL WORK**
9. Let’s say that in seals, the gene for the length of the whiskers has two alleles. The dominant allele (W) codes long whiskers and the recessive allele (w) codes for short whiskers. (6 points)
   
a. What is the probability of producing offspring that have short whiskers from a cross of two long-whiskered seals, one that is homozygous dominant and one that is heterozygous? Show your work on the punnett square.

   ________ % long whiskers
   ________ % short whiskers

b. If one parent seal is a heterozygous long-whisker and the other is short-whiskered, what is the probability that the offspring will have short whiskers?

   ________ % long whiskers
   ________ % short whiskers

10. Describe the structure of DNA.

11. In some cats the gene for tail length shows incomplete dominance. Cats either have long tails (LL) and or with no tails (NN) for their alleles. Cats that are heterozygous (NL) have a short tail. Complete a Punnet square and calculate the percentages of long tails, no tails, and short tails. (4 points)

   ________% long tails
   ________% no tails
   ________% short tails