

Chapter 12 – Patterns of Inheritance



1. Why was Mendel's genetics research so much more valuable than his predecessors?

2. List 4 advantages of Mendel's choice of the garden pea as a model organism.

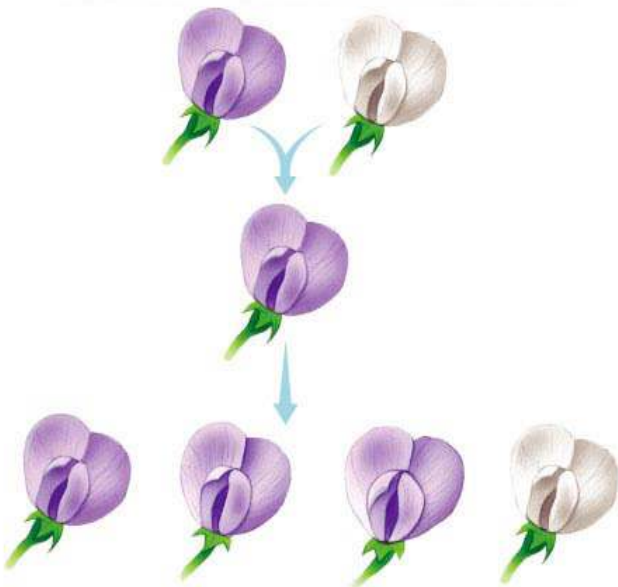
a. _____

b. _____

c. _____

d. _____

3. Use the diagram to label the generations: **P**, **F₁**, **F₂**, **pure**, **hybrid**, and make notes of Mendel's observations. Complete a Punnett square for each of the crosses.



4. Define the following:

a. **Allele** _____

b. **Gene** _____

c. **Locus** _____

d. **Homozygous** _____

e. **Heterozygous** _____

f. **Phenotype** _____

g. **Genotype** _____

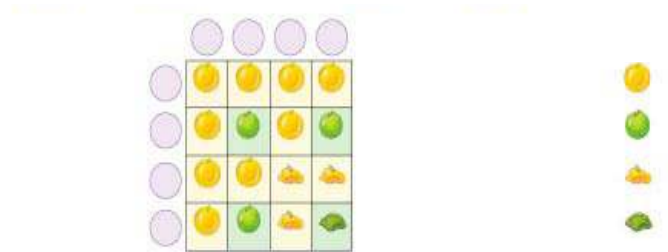
5. Explain Mendel's First Law of Heredity, the **Law of Segregation**.

6. Using the diagram in Question 3, describe how the Law of Segregation applies to the F_1 and to the F_2 generations.

7. When does the segregation of alleles occur? _____

8. Explain Mendel's Second Law of Heredity, the **Law of Independent Assortment**. In other words, when two traits are on different (non-homologous) chromosomes, how are they inherited?

9. Indicate the phenotypic ratios that result in the F₂ from the F₁ cross (**dihybrid** cross).



10. Use the rules of probability to determine the expected ratio of offspring showing two recessive traits in the trihybrid cross (PpYyRr X Ppyyrr).

11. What is the purpose of a **test cross**?

12. Explain what a **quantitative trait** is. Give an example. What causes a trait to exhibit **continuous variation**?

13. Define and give an example of **pleiotropy**.

14. Describe and give an example of **incomplete dominance**.

15. Describe and give an example of **codominance**.

16. How is blood type an example of **multiple alleles**?

17. Describe and give an example of environmental effects on gene expression.

18. Define and give an example of **epistasis**.
