

Genetics Review

N	1. Dominant	A. An organism having a pair of identical alleles for a gene (PP or pp)
D	2. Recessive	B. A gene at one location on the DNA alters the phenotypic expression of a gene at a second location.
K	3. Allele	C. An organism's traits or physical appearance (purple or white flowers)
A	4. Homozygous	D. Gets masked or dominated by another factor (trait)
H	5. Heterozygous	E. Chart used to predict the probability that certain traits will be inherited in the offspring
C	6. Phenotype	F. Two or more genes influence the expression of a single phenotypic character.
L	7. Genotype	G. The F ₁ hybrids have an appearance somewhere in between the phenotypes of the two parental varieties (blending of traits)
E	8. Punnett Square	H. Genes that exist in populations in more than two allelic forms
M	9. Complete dominance	I. An organism having two different alleles for a gene (Pp)
G	10. Incomplete dominance	J. Both alleles for a gene are expressed in the offspring
U	11. Co-dominance	K. Different versions of a trait
O	12. Sex-linked traits	L. An organism's genetic makeup (PP, pp, or Pp)
B	13. Epistasis	M. One allele hides the expression of another allele
T	14. Polygenic Inheritance	N. Masks or dominates another factor (trait)
I	15. Multiple Alleles	O. Genes inherited on the X or Y chromosome

Short Answer

1. What was the name of Mendel's **starting generation**, **first offspring generation**, and then **second offspring generation**?

P, F₁, F₂

2. What type of pollination did Mendel use to get his first offspring generation? *Self-pollination* or *Cross-pollination*

3. Which of Mendel's laws states that during formation of gametes (sex cells), the two alleles for a trait separate? *Law of segregation* or *Law of independent assortment*

4. Using the following traits to complete Mendel's monohybrid crosses, then label the generations on the Punnett Squares.

D = purple flower
d = white flower

- a. homozygous dominant parent crossed with a homozygous recessive parent

P

	d	d	
D	Dd	Dd	F1
D	Dd	Dd	

Genotype: Dd 100%

Phenotype: Purple 100%

- b. heterozygous parent crossed with a heterozygous parent

F1

	D	d	
D	DD	Dd	F2
d	Dd	dd	

Genotype: DD 25%. Dd 50%. dd 25%

Phenotype: Purple 75%. White 25%

5. Cross a heterozygous parent for both traits with a heterozygous parent for both traits. Use B= brown eyes, b= blue eyes, D= dimples, d= no dimples

BbDd x BbDd

Phenotype:

Brown/Dimples 9/16

Brown/No 3/16

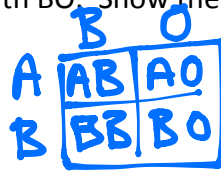
Blue/Dimples 3/16

Blue/No 1/16

	BD	Bd	bD	bd
BD	BBDD	BBdD	BbDD	BbDd
Bd	BBdD	BBdd	BbDd	Bbdd
bD	BbDD	BbDd	bbDD	bbDd
bd	BbDd	Bbdd	bbDd	bbdd

6. Solve the following Multiple Allele blood type problems

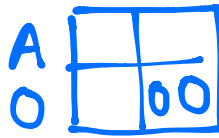
a. Cross AB with BO. Show the genotype and phenotype ratios.



G: AB 25%
 AO 25%
 BB 25%
 BO 25%

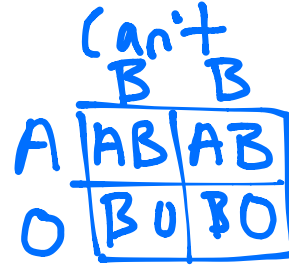
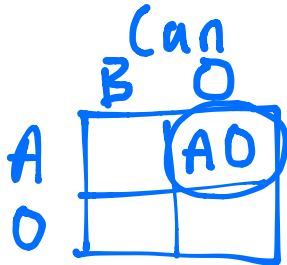
Type AB 25%
 P: Type A ~~25%~~
 Type B 50%

b. If a son has blood type O and his mother has blood type A (with a genotype of AO, what are the only genotypes and phenotypes the father can have.



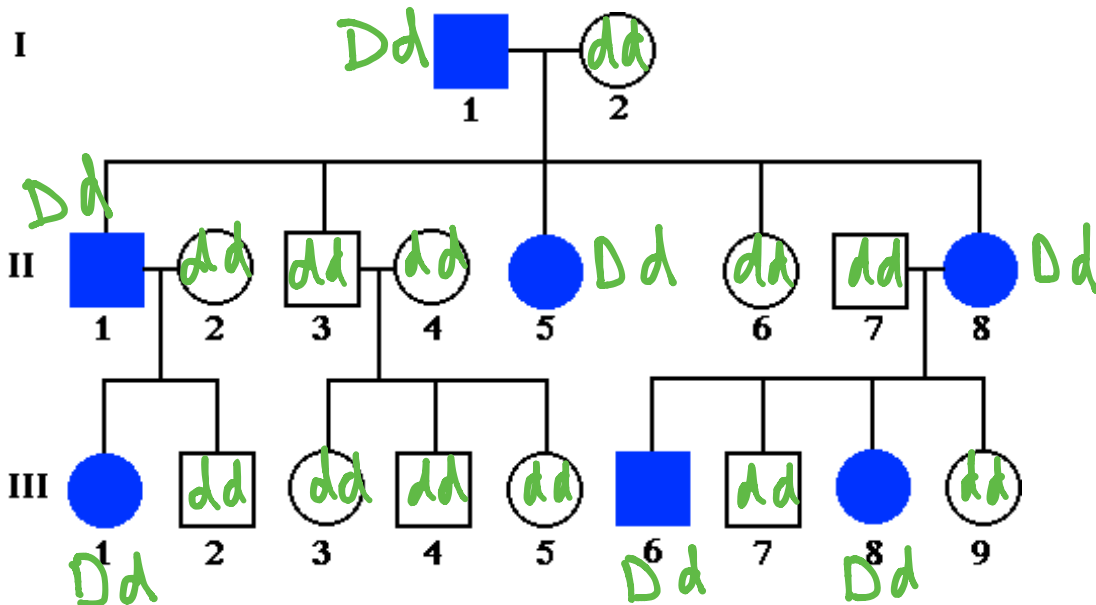
Father: OO Type O
 AO Type A
 BO Type B

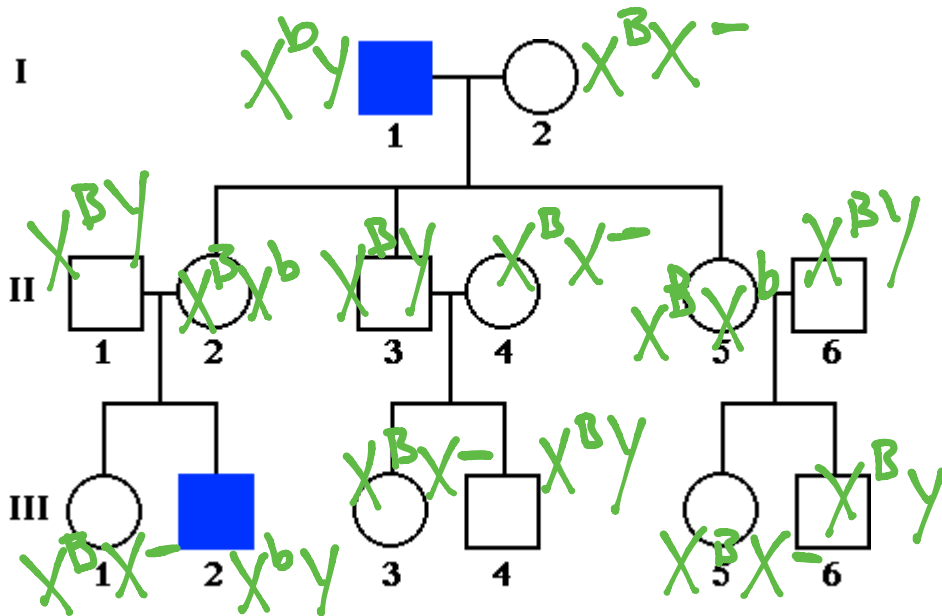
c. A daughter has blood type A and the mother has blood type A. A man claims to be the father and has blood type B. Explain a situation in which he **can be** the father and one where he **could not be** the father. Use a Punnett square to justify your answer.



7. Determine the genotypes for all the people in the pedigree using the letters D and d.

a. First determine if the disease is dominant or recessive, then list the genotypes





8. Solve the following Hardy-Weinberg problems.

- a. In a certain population the dominant phenotype of a certain trait occurs 91% of the time. What is the frequency (percent in decimal form) of the dominant allele?

$$p^2 + 2pq = .91$$

$$p + q = 1$$

$$q^2 = 1 - .91$$

$$= .09$$

$$p + .3 = 1$$

$$p = .7$$

$$q = .3$$

- b. In the U.S. about 16% of the population is Rh negative. The allele for Rh negative is recessive to the allele for Rh positive. If the student population of a high school in the U.S. is 2,000, how many students would you expect for each of the three possible genotypes?

9.

$$q^2 = .16$$

$$p^2 = .6^2$$

$$= .36$$

$$q = .4$$

$$2pq = 2(.6)(.4)$$

$$= .48$$

$$(p + .4 = 1)$$

$$p = .6$$

$$p = .6$$

of students

AA 720

Aa 960

aa 320

of students out of 2000

$$p^2 = .36$$

$$2000 \times .36 = 720$$

$$2pq = .48$$

$$2000 \times .48 = 960$$

total

$$2000 - 720 - 960 = 320$$