

**Science 10 - Some Extra Genetics Questions**

1. Human blood type is determined by three different alleles. The A and B alleles are codominant and the i allele is recessive.

Phenotype	Possible Genotypes
Type A	
Type B	
Type AB	
Type O	

What is the probability that a woman heterozygous for type A blood and a man with type O blood will have a child with type O blood?

Answer \_\_\_\_\_%

What is the probability that a woman homozygous for type A blood and a man with type O blood will have a child with type A blood?

Answer \_\_\_\_\_%

What is the probability that a woman heterozygous for type A blood and a man heterozygous for type B blood will have a child with type AB blood?

Answer \_\_\_\_\_%

Show ALL the possible genotypes for the offspring of a woman with type A blood and a man with Type B blood.

Answer \_\_\_\_\_

If both the mother and father have Type O blood, what is the probability that an offspring will have Type A blood? \_\_\_\_\_%, Type B blood? \_\_\_\_\_%, Type AB blood? \_\_\_\_\_%, Type O blood? \_\_\_\_\_%

A person with no B alleles has antibodies for the \_\_\_ antigen. A person with no A alleles has antibodies for the \_\_\_ antigen. A person with blood type AB has \_\_\_ antibodies for A or B antigen. A person with type O has antibodies for the \_\_\_ and \_\_\_ antigen. Which blood type is the universal donor? \_\_\_

Which blood type is the universal recipient? \_\_\_\_\_

2. A red-eyed male fruit fly and a re-eyed female fruit fly produce the following offspring:

- ✓ all the females have red eyes
- ✓ half the males have red eyes
- ✓ half the males have white eyes

What are the genotypes of the parents?

- A.  $X^rY$  and  $X^RX^r$
- B.  $X^rY$  and  $X^RX^R$
- C.  $X^RY$  and  $X^RX^r$
- D.  $X^RY$  and  $X^RX^R$

Answer \_\_\_\_\_

"r" is for \_\_\_\_\_ eyes and is (dominant/recessive) \_\_\_\_\_. "R" is for \_\_\_\_\_ eyes and is (dominant/recessive) \_\_\_\_\_. Eye colour in fruit flies is a \_\_\_\_\_-\_\_\_\_\_ trait.

3. State whether each of the following involve:

I) complete dominance, II) incomplete dominance, or III) codominance.

- a) A black mouse is crossed with a white mouse producing only white offspring. \_\_\_\_\_
- b) A red snapdragon plant is crossed with a white snapdragon plant producing pink offspring. \_\_\_\_\_
- c) A red carnation plant is crossed with a white carnation plant producing red and white striped offspring. \_\_\_\_\_
- d) Two individuals with normal blood-clotting ability produce a son with hemophilia. \_\_\_\_\_
- e) A red bull and a white cow have a roan-coloured calf. Roan colouration results when both red and white hairs are present. \_\_\_\_\_

4. Crossing two hybrids results in a phenotypic ratio of 1:2:1. What type(s) of inheritance would give this ratio?

I. Codominance, II. Complete dominance, III. Sex-linked inheritance, IV. Incomplete dominance

A. II only    B. I and IV only    C. I, II and IV only    D. I, III and IV only

5. In the inheritance of a trait that shows complete dominance, the phenotypic **and** genotypic ratio of the offspring are **both** 1:1. What are the genotypes of the parents?

A. Hh and hh    B. HH and hh    C. Hh and HH    D. HH and HH

6. Having a widow's peak (P) is dominant and having a straight hairline (p) is recessive. If there is a 100% chance that a particular individual will have a widow's peak, which of the following are the genotypes of the parents?

A. pp x pp    B. Pp x Pp    C. PP x pp    D. Pp x pp

7. Which of the following describes **phenotype**?

I	TT
II	brown eyes
III	the genes for a particular trait
IV	the physical appearance of an organism

- A. I and II only    B. I and IV only    C. II and III only    D. II and IV only

8. Which of the following crosses would result in only **heterozygous** offspring?

- A.  $tt \times tt$     B.  $Tt \times tt$     C.  $Tt \times Tt$     D.  $TT \times tt$

Use the following information to answer question 10.

I	$Hh \times Hh$	H = hairy toes h = smooth toes
II	$Hh \times hh$	
III	$HH \times Hh$	
IV	$HH$ and $hh$	

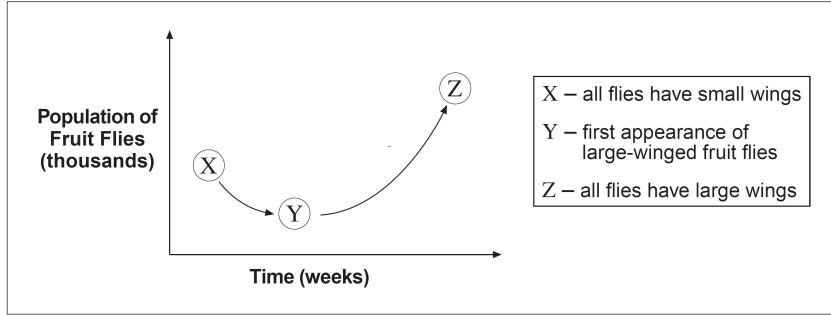
9. The hairy toe allele is dominant and the smooth toe allele is recessive. Which of the following crosses have equal chances of producing heterozygous hairy toed individuals?

- A. I, II and III only  
 B. I, II and IV only  
 C. I, III and IV only  
 D. I, II, III and IV

10. In codominance, heterozygous individuals have both phenotypes.

- A. True  
 B. False

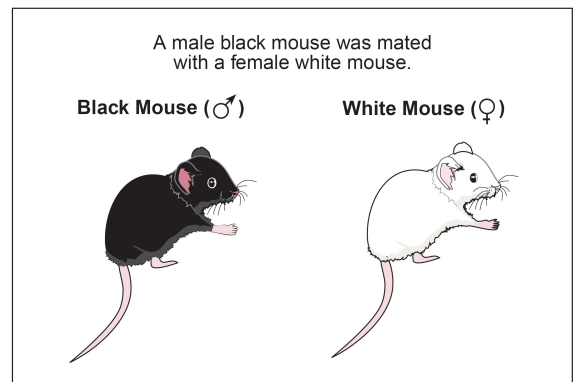
Use the following graph of the effect of a mutation on a fruit fly population to answer qu. 11.



11. The mutation increasing the size of wings in fruit flies was positive for this fruit fly population.  
 A. True B. False

Use the following information to answer question 12.

- 12 Which of the following describes the genotype of the female parent if she can only produce white offspring?  
 A. heterozygous only  
 B. homozygous recessive only  
 C. homozygous dominant only  
 D. homozygous dominant or heterozygous



13. A woman who is heterozygous for colour blindness and a man with colour blindness are considering having children. What is the probability of having a child who is **both** male and colour-blind?

- A. 100%  
 B. 75%  
 C. 25%  
 D. 0%

