Variation and Inheritance

What is variation?

Give a description of continuous variation – include at least 3 examples.

Give a description of discrete variation – give at least 3 examples.

Give a reason why "expected" and "actual/observed" phenotypic ratios may differ.

What is polygenic inheritance?

List three variations that are controlled by polygenic inheritance.

1.

2.

3.

What is meant by the term "true-breeding"?

Two factors that can affect a characteristic that shows continuous variation.

1.

2.

Draw a line to match each term to its correct description.

Term	Description
Allele	individual with two different alleles
Recessive	individual with two identical alleles
Dominant	sex cell
Heterozygous	different forms of a gene
Homozygous	the physical characteristics of an organism
Gamete	stronger allele, represented by a capital letter
Phenotype	the set of genes possessed by an individual
Genotype	weaker allele, represented by a small letter

7. (a) Hair appearance in mice is controlled by a single gene.

Wavy hair (H) is dominant to straight hair (h).

Two homozygous mice were crossed, one had wavy hair and one had straight hair.

(i) Complete the genotypes of the parental generation (P).

	Wavy haired	×	**Straight haired**
P genotypes	_____	×	_____

(ii) State the phenotype of the F_1 mice.

F_1 phenotype _____

(iii) An F_1 mouse was crossed with a straight haired mouse.

State the genotype of the wavy haired offspring.

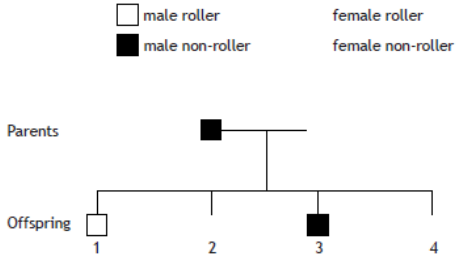
Space for working

Genotype _____

8. Tongue rolling is an inherited characteristic in humans.

Tongue rolling is determined by the dominant form of the gene, T and the non-rolling condition is determined by the recessive t.

The family tree diagram below shows the pattern of inheritance in one family.



(a) (i) State the genotypes of the following individuals. 2

Male 1

_____

Female 2

_____

Female 4

_____

(ii) Identify which of the parents is homozygous. 1

Tick (✓) the correct box.

Male parent ❑

Female parent ❑

Both parents ❑

Neither parent ❑

8. Hair type in humans is controlled by a single gene. The dominant form is curly hair (H). The recessive form (h) produces straight hair.

Both parents of this curly-haired child have the genotype Hh.

(a) What term is used to describe the genotype of both parents?

_____

(b) Complete the Punnet square to show the possible genotypes of their offspring.

		Male gametes: H	Male gametes: h
Female gametes	H		
	h		

(c) State the possible genotype(s) of the girl in the picture.

_____

9. Coat colour in Labrador dogs is an inherited characteristic. Black coat (**B**) colour is dominant to chocolate coat colour (**b**).

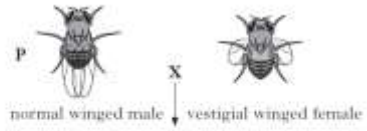
(a) A homozygous black Labrador was crossed with a Labrador with a chocolate coloured coat.

Complete the diagram below to show the genotypes of each of the parents and the F_1 phenotype.

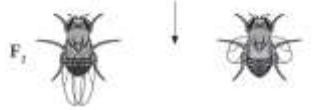
Parents:	black coat	X	chocolate coat
Genotypes:			
F_1 genotype:		All Bb	
F_1 phenotype:			

12. (a) Fruit flies show variation in wing structure which can be inherited.

Flies were crossed as shown below.



All F_1 flies have normal wings.
F_1 flies were self-crossed.



Some flies have normal wings and some have vestigial wings

(i) Using "N" for the normal form and "n" for the vestigial form, give the genotypes of each of the following:

1 Parent with normal wings _____

2 A fly from the F_1 generation _____

3 An F_2 fly with vestigial wings _____

(ii) Which of the following flies could be described as true-breeding?

Tick (✓) the correct boxes.

❑ Parent with normal wings

❑ Parent with vestigial wings

❑ F_1 flies

❑ F_2 flies with normal wings