

School Logo

LIFE SCIENCES GRADE 12

GENETICS TEST: 2

DATE:

TIME: 60MIN

MARKS: 60

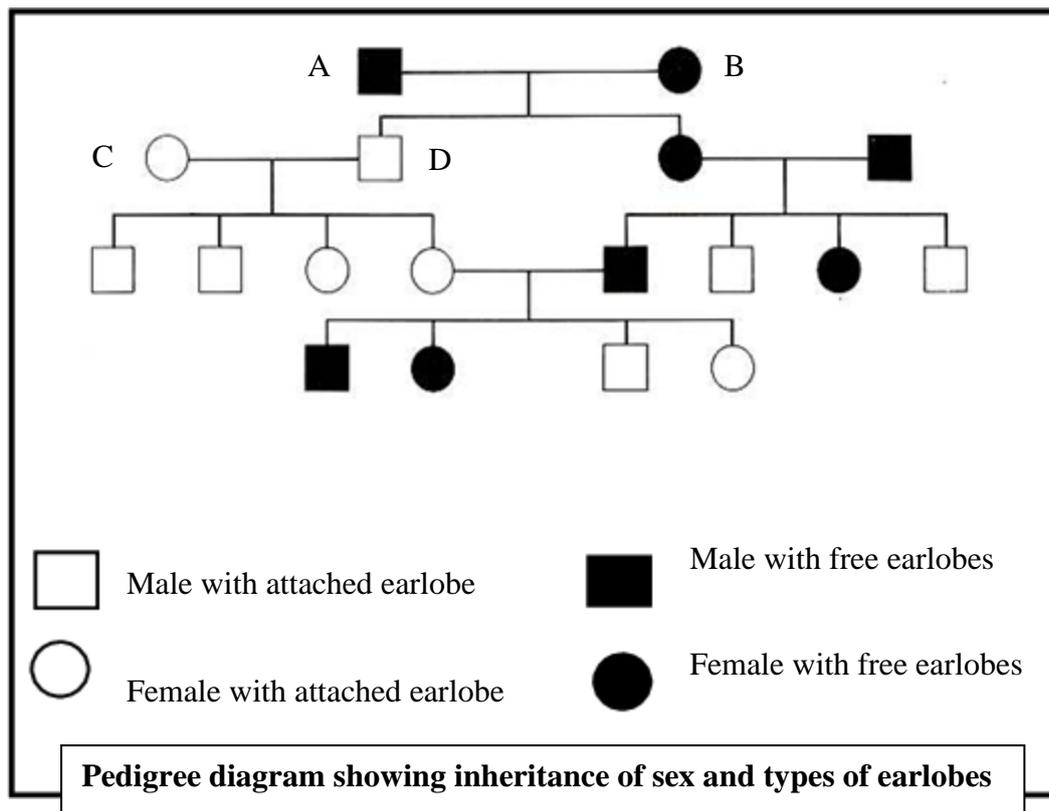
1. A homozygous snapdragon plant with red flowers (**R**) was cross-pollinated with a homozygous snapdragon plant with white (**W**) flowers. All the plants that grew from the cross had pink flowers. Represent a genetic cross to determine the genotype of the F₁ generation of plants.

[7]

2. A mother with blood group A and a father with blood group B are both heterozygous in terms of this characteristic. Represent a genetic cross to determine the different possible blood group genotypes and phenotypes of their children.

[7]

3. Study the pedigree diagram below which shows the inheritance of sex and types of earlobes over four generations of a family. In humans, free earlobes (**F**) is dominant over attached earlobes (**f**)



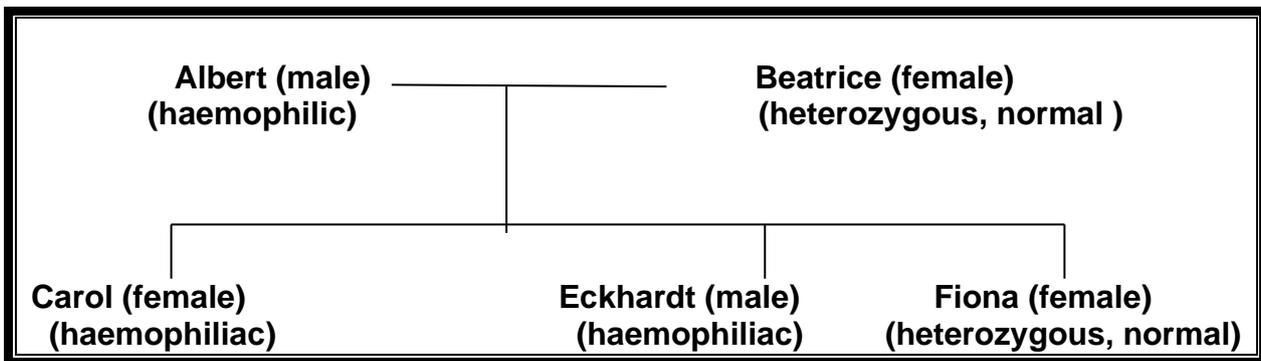
3.1.1 How many members of the family have free earlobes? (1)

3.1.2 What proportion of offspring in the fourth generation are females with attached earlobes? (2)

- 3.1.3 If the genotype of person A is FF, what will be the genotype of person B? (2)
- 3.1.4 Give a reason for your answer to QUESTION 1.1.3. (2)
- 3.1.5 Is it possible for individuals C and D to have a child with free earlobes? (1)
- 3.1.6 Explain your answer to QUESTION 1.1.5. (2)

[10]

- 4.1 Haemophilia is a sex-linked hereditary disease that occurs as a result of a recessive allele on the X- chromosome. Study the family tree below and answer the questions which follow. (Use the symbols **H** for normal and **h** for haemophilia above the gonosomes where applicable, e.g. $X^H X^h$)



- 4.1.1 Write down the genotypes of each member of the family pedigree diagram. (10)
- 4.1.2 If Albert and Beatrice had a 4th child, Damien (male), what would be the probability in percentage that he would be a haemophiliac? (1)
- 4.1.3 Should Fiona marry Fred who is a haemophilia sufferer, what would be the chance that their daughter, Helen, will be a Haemophilia sufferer as well? (2)

[13]

5. Tabulate THREE differences between polygenic inheritance and multiple alleles. [7]

- 6 State THREE reasons why some people might:

6.1 favour the cloning process (3)

6.2 be against cloning. (3)

[6]

7 In rabbits, gray hair (G) is dominant to white hair (g), and black eyes (B) are dominant to red eyes. These two traits are independent of each other. In other words, a female rabbit with the genotype GgBb may produce eggs with the alleles GB, Gb, gB, or gb. Predict the probability of these sorts of crosses, by drawing a dihybrid Punnett Square.

7.1 What are the phenotypes (descriptions) of rabbits that have the following genotypes?

Ggbb _____ ggBB _____

ggbb _____

(3x2=6)

A male rabbit with the genotype **GGbb** is crossed with a female rabbit with the genotype **ggBb**. The square is set up below. Determine the phenotypes and proportions in the offspring.

	Gb	Gb	Gb	Gb
Bg	GgBb	GgBb	GgBb	GgBb
Bg	GgBb	GgBb	GgBb	GgBb
Bg	Ggbb	Ggbb	Ggbb	Ggbb
Bg	Ggbb	Ggbb	Ggbb	Ggbb

7.2 How many out of 16 are:

7.2.1 Gray, red-eyed _____

7.2.2 Gray, black-eyed _____

7.2.3 White, red-eyed _____

7.2.4 White, black-eyed _____

(4)

[10]

Total [60]

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