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BIOLOGY

INHERITANCE AND HARDY-WEINBERG PRINCIPLE

Level & Board	AQA (A-LEVEL)
TOPIC:	INHERITANCE AND HARDY
PAPER TYPE:	QUESTION PAPER - 2
TOTAL QUESTIONS	5
TOTAL MARKS	26

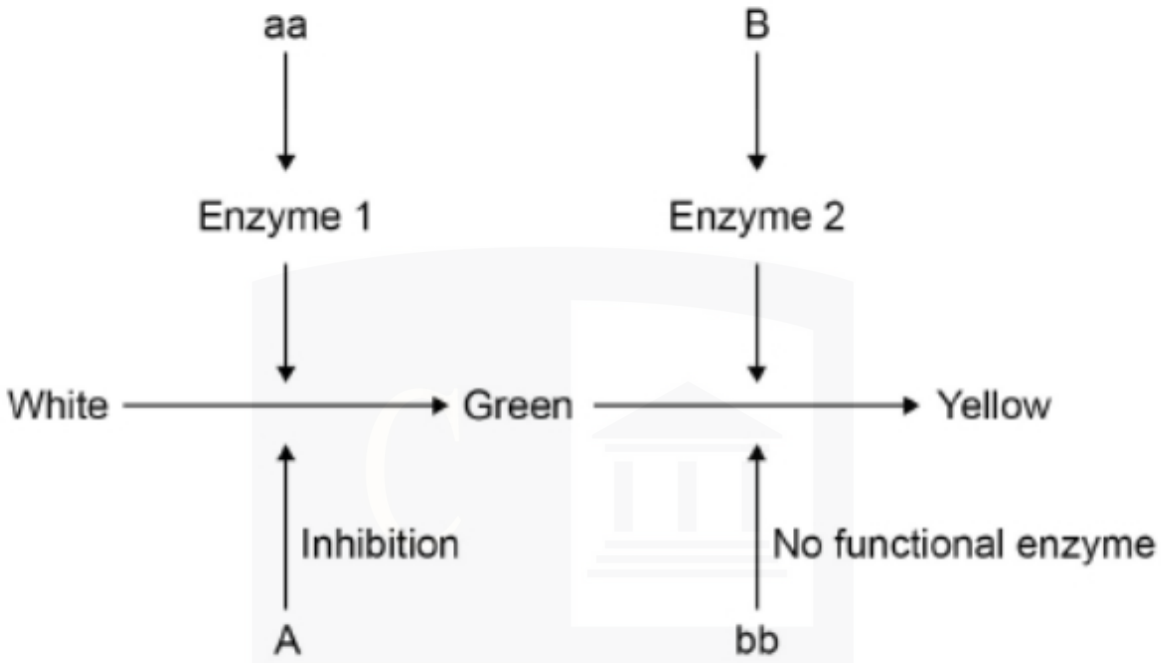
Inheritance and Hardy-Weinberg Principle - 2

1.

(a) What does the word "phenotype" mean? **(2)**

(b) Two genes, A and B, determine how summer squash plants inherit their fruit color. Two alleles make up each gene.

The graphic illustrates how these two genes interact to determine the color of the fruit on summer squash plants.



What kind of gene interaction is depicted in the above diagram? **(1)**

(c) Given the given genotypes, what fruit color would you expect them to have? **(1)**

I am Sorry !!!!!

2.

(a) A and B do not share any genes.

Fill in the genetic diagram to see every potential genotype and the proportion of traits anticipated in this cross's progeny. **(3)**

Genotypes of parents	**aabb**	×	**AaBb**

(b) All that was generated by a population of summer squash plants was green and yellow fruit. 36 percent of the plants in this population bore yellow fruit.

To find the percentage of plants that were heterozygous for gene B, use the Hardy-Weinberg equation. **(2)**

3.

A student looked at fruit fly monohybrid inheritance of eye form. There were two fruit flies crossed that had bar (narrow) eyes. Of the progeny, 462 had round (normal) eyes and 1538 had bar eyes.

(a) Provide the parents' genotypes using appropriate symbols.

Give an explanation for your response. **(2)**

(b) The student's data showed a different ratio between round-eyed and bar-eyed flies than what she had anticipated.

What proportion of round-eyed to bar-eyed flies did the student anticipate?

(1)

(c) Provide two explanations for the frequent discrepancy between observed and expected ratios**. (2)**

(d) The student wanted to compare her outcomes to what she had anticipated.

What statistical test ought she to apply? **(1)**

4.

(a) Another trait of this fruit fly is determined by the codominant alleles WN and WV.

What does codominant allele mean? **(1)**

(b) One colony of fruit flies contained 850 individuals. 85 fruit flies in this population had the genotype WVWV, 255 had the genotype WNWV, and 510 had the genotype WNWN.

Determine the allele WV's true frequency. In your computation, do not employ the Hardy-Weinberg equation. **(1)**

(c) In another population of 950 fruit flies, the frequency of the WV allele was 0.2.

Use the Hardy-Weinberg equation to calculate the number of insects that

would be expected to have the genotype W^NW^V. **(2)**

5.

(a) The genes for wing length and body color are connected in fruit flies. What does this mean, please? **(2)**

(b) A researcher looked into the relationship between the genes for wing length and body color.

He conducted fruit fly crosses between black-bodied, short-winged fruit flies and grey-bodied fruit flies.

He exhibits his crosses and the outcomes in Figure 1.

• For a grey body, G stands for the dominant allele, while for a black body, G stands for the recessive allele.

• For long wings, the dominant allele is represented by N, while for short wings, the recessive allele is represented by N.

Figure 1

Phenotype of parents	grey body, long wings	×	black body, short wings
Genotype of parents	**GGNN**		**ggnn**
Genotype of offspring		**GgNn**	
Phenotype of offspring		all grey body, long wings	

These offspring were crossed with flies homozygous for black body and short wings.

The scientist's results are shown in Figure 2.

Figure 2

GgNn crossed with **ggnn**

	Grey body, long wings	**Black body, short wings**	**Grey body, short wings**	**Black body, long wings**
Number of offspring	975	963	186	194

(b) Make use of your understanding of gene linkage to explain these findings.

(4)

(c) What percentage of traits would the scientist have anticipated in the progeny if these genes were unrelated? **(1)**

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