

BIOEYES ASSESSMENT TASK

Question One

It can be said that an organism's genetic make-up is a combination of its parents' DNA and the fact that we inherit 2 copies of each gene in our genome.

- Explain how we receive 2 copies of each gene. You must use the following key terms in your response: chromosomes, fertilization, homologous chromosomes, and alleles. (3 points)
- It is one thing to say we inherit 2 copies of each gene, but it is another thing to prove it. Some groups correctly observed that some of their offspring had no pigmentation. What evidence from your zebrafish investigations supports the concept that we actually do inherit 2 copies of each gene? (3 points)

Question Two

How an organism's genotype influences its phenotype

- What is a genotype? (1 point)
- What is a phenotype? Give examples of phenotypic variation in zebrafish from our BioEYES experiment. (3 points)

In your experiment, you crossed 2 sets of adult fish:

Nacre zebrafish x wildtype zebrafish

- State how the phenotype of a zebrafish is influenced by its genotype. What evidence is there to support that an organism's phenotype is influenced by its genotype? You should refer to your zebrafish adults and their offspring, including a discussion of dominant and recessive alleles to demonstrate your understanding. (3 points)
- Some groups correctly observed that some of their offspring had no pigmentation, while other groups found that all of their offspring had pigmentation. Use Punnett squares to explain this observation. (3 points)

Question Three

Using genetics to predict traits of future generations

Punnett squares are used by geneticists to determine the probability of different genotypes and phenotypes in offspring.

- If we know the phenotypes of the offspring of two adult zebrafish, explain how we can determine the genotypes of their parents. Refer to evidence from your student journal to support your answer. (3 points)
- If we know the genotypes of two adult zebrafish, explain why a Punnett square enables us to predict the genotypes of their offspring. Include a hypothetical Punnett square to support your answer. (3 points)
- The offspring in your zebrafish experiments have grown into adults and become very cozy with each other. You choose two of your offspring to mate with each other and produce a second generation of zebrafish. What would be the genotypes and phenotypes of the offspring in this second generation? (3 points)
- Using your results, discuss the advantages and disadvantages of this method for predicting the traits of future generations. (2 points)

Student journal: 9 points

Total: 35 points