Year 12 Science: Mutations, metabolic pathways and the environment

Name: _____ Date: _____

Try these without your notes first, then check the answer key.

Practice

1. The mRNA codon UAC changes to UAA. Name the type of mutation.

2. The mRNA codon GGU changes to GGC. What happens to the amino acid?

3. Which shifts the reading frame: deleting 1 base or deleting 3 bases?

4. In the pathway A → B → C, enzyme 2 (B to C) does not work. Which substance builds up, and which is missing?

5. Name two mutagens.

6. What environmental factor makes a Siamese cat's ears dark?

Exam-style question: melanin and mutations

Gene 2 codes for tyrosinase, the enzyme that turns tyrosine into melanin. A short, made-up section of its template strand, 3' to 5', reads TAC AAG CTT GTA ACC. Mutation 1 reads TAC AAG CTC GTA ACC, and mutation 2 reads TAC AAG CTT GTA ACT.

7. Give the amino acid sequence for the normal gene and for each mutation.

8. Name the type of each mutation.

9. Explain which mutation is more likely to cause albinism.

10. Discuss how a mutation in gene 1 would show differently from one in gene 2, and how the environment can change melanin production without changing the genes.

Fix the mistake

11. Correct this statement: "A substitution always changes the protein."

12. Correct this statement: "A deletion removes one amino acid, so it is mild."

13. Correct this statement: "The Siamese cat's cold ears changed its genes for dark fur."

14. Correct this statement: "If enzyme 2 is blocked, the substrate of enzyme 1 builds up."