Mississippi 8th Grade Science Practice Quiz – Genetics and Mutations

Questions 1–3: Genes, Chromosomes, DNA (L.8.2A.1)

1. Which statement best describes the relationship between DNA, genes, and chromosomes?
A) Chromosomes are made of proteins, which form genes, which form DNA.
B) DNA is made of chromosomes, which form genes.
C) Genes are segments of DNA found on chromosomes that code for proteins.
D) DNA, genes, and chromosomes are all unrelated structures.

2. A cell has 46 chromosomes. How many copies of each gene does a typical body cell contain?
A) One copy of each gene
B) Two copies of each gene (one from each parent)
C) Three copies of each gene
D) Forty-six copies of each gene

3. Which molecule directly determines the traits of an organism?
A) Water
B) DNA
C) Oxygen
D) Carbohydrates

Questions 4–6: Protein Production, Mutations, Traits (L.8.2C.1)

4. Which process converts the information in DNA into proteins?
A) Photosynthesis
B) Transcription and translation
C) Mitosis
D) Meiosis

5. A mutation occurs in a gene that codes for a skin pigment protein. What could be a possible outcome?
A) The individual may have a different skin color.
B) The individual will have extra chromosomes.
C) The DNA molecule will disappear.
D) The individual will not be affected by the environment.

6. Which statement correctly explains the connection between genes and traits?
A) Traits are unrelated to genes or DNA
B) Traits produce genes, which then form DNA.
C) Proteins are made independently of genes and DNA.
D) Genes are segments of DNA that code for proteins, which determine traits.

Questions 7–10: Pros and Cons of Genetic Mutations (L.8.2C.2)

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7. Which is an example of a beneficial mutation?
A) A mutation that allows bacteria to survive antibiotics
B) A mutation that causes a lethal disease
C) A mutation that produces no protein
D) A mutation that damages chromosomes

8. Which is a potential risk of genetic mutations in humans?
A) Increased resistance to disease
B) Development of genetic disorders
C) Greater adaptability to the environment
D) Increased protein production efficiency

9. A student claims that all mutations are harmful. Which argument best counters this claim?
A) Mutations never affect traits.
B) Mutations always produce identical offspring.
C) Some mutations introduce genetic variation that can improve survival.
D) Mutations are impossible in DNA.

10. Which scenario shows a trade-off of genetic mutations?
A) Mutations prevent cells from producing any protein
B) A mutation has no effect on the organism
C) A mutation always produces identical copies of DNA
D) A mutation increases disease resistance but also causes slower growth

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