

## 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)

**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