

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

## 13.3 Mutations

### Types of Mutations

For Questions 1–8, match the term with its definition.

#### Definition

- \_\_\_\_\_ 1. The change of one base to another in a DNA sequence
- \_\_\_\_\_ 2. A change in one or a few nucleotides that occur at a single point in the DNA sequence
- \_\_\_\_\_ 3. Part of one chromosome breaks off and attaches to another
- \_\_\_\_\_ 4. A heritable change in genetic information
- \_\_\_\_\_ 5. A mutation that produces an extra copy of all or part of a chromosome
- \_\_\_\_\_ 6. A chromosomal mutation that reverses the direction of parts of a chromosome
- \_\_\_\_\_ 7. A kind of mutation that can change every amino acid that follows the point of mutation
- \_\_\_\_\_ 8. The addition of a base to the DNA sequence

#### Term

- A.** mutation
- B.** substitution
- C.** point mutation
- D.** frameshift mutation
- E.** insertion
- F.** translocation
- G.** inversion
- H.** duplication

9. Complete the table to describe the processes and outcomes of the different types of gene (point) mutations.

Type	Description	Outcome
Substitution		
Insertion		
Deletion		

10. Deletion can happen as a gene mutation or as a chromosomal mutation. What is the difference?

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## Effects of Mutations

For Questions 10–17, write the letter of the correct answer on the line at the left.

- \_\_\_\_\_ 10. The cellular machinery that replicates DNA inserts an incorrect base
- A. most of the time.
  - B. about half the time.
  - C. roughly once in every million bases.
  - D. roughly once in every 10 million bases.
- \_\_\_\_\_ 11. A possible mutagen is
- A. an anticodon.
  - B. translocation.
  - C. hemoglobin.
  - D. ultraviolet light.
- \_\_\_\_\_ 12. What happens when cells cannot repair the damage caused by a mutagen?
- A. The DNA base sequence changes permanently.
  - B. The DNA base sequence is not affected.
  - C. The organism is not affected.
  - D. The organism is affected temporarily.
- \_\_\_\_\_ 13. Which of the following most accurately summarizes the effects of mutations on living things?
- A. Most mutations are harmful, but some have little effect.
  - B. Many mutations have little or no effect, but some can be harmful or beneficial.
  - C. Most mutations are beneficial and a few are harmful.
  - D. About half of mutations are beneficial and half are harmful.
- \_\_\_\_\_ 14. Mutations are important to the evolution of a species because they
- A. happen over the long period of time that evolution requires.
  - B. cut out and replace damaged or useless genes.
  - C. are a source of genetic variability.
  - D. accelerate the transcription rate of DNA.
- \_\_\_\_\_ 15. Cancer is the product of a mutation that
- A. causes the uncontrolled growth of cells.
  - B. changes the structure of hemoglobin in the blood.
  - C. brings about stunted growth and severe pain.
  - D. causes a translocation in a pair of chromosomes.
- \_\_\_\_\_ 16. Polyploidy is the condition in which
- A. a piece of a chromosome breaks off and reattaches to another chromosome.
  - B. an organism has an extra set of chromosomes.
  - C. a mutagen speeds the mutation rate.
  - D. an insect develops a resistance to a pesticide.