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DNA and Protein Synthesis Answer Key

Directions: Read each question carefully. Write your answer in the space provided.

For Knowledge Questions (1-10): Write the letter of the correct answer in the space provided.

For Short Answer Questions (11-15): Write your answer in the space provided.

For Long Answer Questions (16-20): Write your answer in the space provided.

Key:

1. C
2. A
3. B
4. D
5. A
6. B
7. C
8. D
9. A
10. B
11. AUG UGG AAC CGC UGC UGA
12. Met - Trp - Asn - Arg - Cys - STOP
13. AUG UGG AAC CGC UGC UGA
14. Met - Trp - Asn - Arg - Cys - STOP
15. Met - Trp - Asn - Arg - Cys - STOP
16. AUG UGG AAC CGC UGC UGA
17. Met - Trp - Asn - Arg - Cys - STOP
18. AUG UGG AAC CGC UGC UGA
19. Met - Trp - Asn - Arg - Cys - STOP
20. AUG UGG AAC CGC UGC UGA
21. Met - Trp - Asn - Arg - Cys - STOP

Mutations Practice

Name _____ Per. _____

There are several types of genetic mutations:

- DELETION** (a base is lost)
- INSERTION** (an extra base is inserted)
Deletion and insertion may cause what's called a **FRAMESHIFT**, meaning the reading "frame" changes, changing the amino acid sequence.
- SUBSTITUTION** (one base is substituted for another)
Substitutions cause **POINT MUTATIONS**.
If a substitution *changes* the amino acid, it's called a **MISSENSE** point mutation.
If a substitution *does not change* the amino acid, it's called a **SILENT** point mutation.
If a substitution *changes the amino acid to a "stop"*, it's called a **NONSENSE** point mutation.

Complete the boxes below. Classify each as either **Frameshift** or **Point** mutations, then specify further with **Deletion, Insertion, or Substitution**. Use the chart on the following page in order to determine the amino acid sequence. Remember, **RNA has Uracil instead of Thymine**.

Original DNA Sequence: T A C A C C T T G G C G A C G A C T
mRNA Sequence: AUG UGG AAC CGC UGC UGA
Amino Acid Sequence: Met - Trp - Asn - Arg - Cys - STOP

Mutated DNA Sequence #1: T A C A T C T T G G C G A C G A C T
What's the mRNA sequence? (Circle the change) AUG U G AAC CGC UGC UGA
What will be the amino acid sequence? Met - STOP
Will there likely be effects? YES!
What kind of mutation is this? Point Substitution - Nonsense

Mutated DNA Sequence #2: T A C G A C C T T G G C G A C G A C T
What's the mRNA sequence? (Circle the change) AUG U G G A A C C G C U G C U G A
What will be the amino acid sequence? Met - Leu - Glu - Pro - Leu - Leu
Will there likely be effects? YES!
What kind of mutation is this? Frameshift Insertion

Mutated DNA Sequence #3: T A C A C C T T A G C G A C G A C T
What's the mRNA sequence? (Circle the change) AUG U G G A A C G C U G C U G A
What will be the amino acid sequence? Met - Trp - Asn - Arg - Cys - STOP
Will there likely be effects? No!
What kind of mutation is this? Point Substitution - Silent

Mutated DNA Sequence #4: T A C A C C T T G G C G A C T A C T
What's the mRNA sequence? (Circle the change) AUG U G G A A C C G C U G U G A
What will be the amino acid sequence? Met - Trp - Asn - Arg - STOP
Will there likely be effects? Yes!
What kind of mutation is this? Point Substitution - Nonsense

Mutated DNA Sequence #5: T A C A C C T T G G G A C G A C T
What will be the corresponding mRNA sequence? AUG U G G A A C C C U G C U G A
What will be the amino acid sequence? Met - Trp - Asn - Pro - Ala
Will there likely be effects? Yes!
What kind of mutation is this? Frameshift Deletion

Mutations Practice

Name _____ Per. _____

There are several types of genetic mutations:

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Complete the boxes below. Classify each as either **Frameshift** or **Point** mutations, then specify further with **Deletion, Insertion, or Substitution**. Use the chart on the following page in order to determine the amino acid sequence. Remember, **RNA has Uracil instead of Thymine**.

Original DNA Sequence: T A C A C C T T G G C G A C G A C T
mRNA Sequence: AUG UGG AAC CGC UGC UGA
Amino Acid Sequence: Met - Trp - Asn - Arg - Cys - STOP

Mutated DNA Sequence #1: T A C A T C T T G G C G A C G A C T
What's the mRNA sequence? (Circle the change) AUG U G AAC CGC UGC UGA
What will be the amino acid sequence? Met - STOP
Will there likely be effects? YES!
What kind of mutation is this? Point Substitution - Nonsense

Mutated DNA Sequence #2: T A C G A C C T T G G C G A C G A C T
What's the mRNA sequence? (Circle the change) AUG U G G A A C C G C U G C U G A
What will be the amino acid sequence? Met - Leu - Glu - Pro - Leu - Leu
Will there likely be effects? YES!
What kind of mutation is this? Frameshift Insertion

Mutated DNA Sequence #3: T A C A C C T T A G C G A C G A C T
What's the mRNA sequence? (Circle the change) AUG U G G A A C G C U G C U G A
What will be the amino acid sequence? Met - Trp - Asn - Arg - Cys - STOP
Will there likely be effects? No!
What kind of mutation is this? Point Substitution - Silent

Mutated DNA Sequence #4: T A C A C C T T G G C G A C T A C T
What's the mRNA sequence? (Circle the change) AUG U G G A A C C G C U G U G A
What will be the amino acid sequence? Met - Trp - Asn - Arg - STOP
Will there likely be effects? Yes!
What kind of mutation is this? Point Substitution - Nonsense

Mutated DNA Sequence #5: T A C A C C T T G G G A C G A C T
What will be the corresponding mRNA sequence? AUG U G G A A C C C U G C U G A
What will be the amino acid sequence? Met - Trp - Asn - Pro - Ala
Will there likely be effects? Yes!
What kind of mutation is this? Frameshift Deletion

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