

Name \_\_\_\_\_ key \_\_\_\_\_ Date \_\_\_\_\_

## MUTATION - DELETION, INSERTION, & SUBSTITUTION

There are several types of mutations:

- **DELETION** (a base is lost/deleted)
- **INSERTION** (an extra base is added/inserted)  
Deletion & insertion may cause what's called a **FRAMESHIFT** mutation, meaning the reading "frame" changes, thus changing the amino acid sequence from this point forward
- **SUBSTITUTION** (one base is substituted for another)  
If a substitution changes the amino acid, it's called a **MISSENSE** mutation  
If a substitution does not change the amino acid, it's called a **SILENT** mutation  
If a substitution changes the amino acid to a "stop," it's called a **NONSENSE** mutation

Complete the boxes below. Classify each as Deletion, Insertion or Substitution AND as either frameshift, missense, silent or nonsense (Hint: Deletion & Insertion will always be frameshift).

Original DNA Sequence: T A C A C C T T G G C G A C G A C T  
mRNA Sequence: A U G / U G G / A A C / C G C / U G C / U G A  
Amino Acid Sequence: Methionine-Tryptophan-Asparagine-Arginine-Cysteine-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? A U G / U A G / A A C / C G C / U G C / U G A  
What will be the amino acid sequence? Methionine-Stop  
Will there likely be effects? Yes What type of mutation is this? 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? A U G / C U G / G A A / C C G / C U G / C U G / A  
What will be the amino acid sequence? Methionine-Leucine-Glutamic Acid-Proline-Leucine-Leucine  
Will there likely be effects? Yes What type of mutation is this? 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? A U G / U G G / A A U / C G C / U G C / U G A  
What will be the amino acid sequence? Methionine-Tryptophan-Asparagine-Arginine-Cysteine-Stop  
Will there likely be effects? No What type of mutation is this? 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? A U G / U G G / A A C / C G C / U G A / U G A  
What will be the amino acid sequence? Methionine-Tryptophan-Asparagine-Arginine-Stop  
Will there likely be effects? Yes What type of mutation is this? Nonsense