

Name: _____

Gene Mutations Worksheet

There are several types of gene point 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)
 - 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 mutated strand as: Deletion, Insertion, or Substitution **AND** as either frameshift, missense, silent or nonsense (hint: deletion or 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:																		
Amino Acid Sequence:																		

Mutated DNA Sequence #1:	T	A	C	A	T	C	T	T	G	G	C	G	A	C	G	A	C	T
mRNA Sequence:																		
Amino Acid Sequence:																		

Circle the mutation in the mutated strand above

Circle all of these words that apply to the mutation	insertion deletion substitution	frameshift missense silent nonsense
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Mutated DNA Sequence #2:	T	A	C	G	A	C	C	T	T	G	G	C	G	A	C	G	A	C	T
mRNA Sequence:																			
Amino Acid Sequence:																			

Circle the mutation in the mutated strand above

Circle all of these words that apply to the mutation	insertion deletion substitution	frameshift missense silent nonsense
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Mutated DNA Sequence #3:	T	A	C	A	C	C	T	T	A	G	C	G	A	C	G	A	C	T
mRNA Sequence:																		
Amino Acid Sequence:																		
Circle the mutation in the mutated strand above																		
Circle all of these words that apply to the mutation	insertion deletion substitution									frameshift missense silent nonsense								

Mutated DNA Sequence #4:	T	A	C	A	C	C	T	T	G	G	C	G	A	C	C	A	C	T
mRNA Sequence:																		
Amino Acid Sequence:																		
Circle the mutation in the mutated strand above																		
Circle all of these words that apply to the mutation	insertion deletion substitution									frameshift missense silent nonsense								

Mutated DNA Sequence #5:	T	A	C	A	C	C	T	T	G	G	G	A	C	G	A	C	T	
mRNA Sequence:																		
Amino Acid Sequence:																		
Circle the mutation in the mutated strand above																		
Circle all of these words that apply to the mutation	insertion deletion substitution									frameshift missense silent nonsense								

Looking at all of the mutated strands, which strand or strands might result in no change to the protein?

Which strand is guaranteed to result in a completely non-functional protein?