Code Cracking

Mutation Practice:

Review:
Three of the most common types of mutations are:

1. **POINT MUTATION** (one base is substituted for another)

    If a point mutation changes the amino acid, it's called a MISSENSE mutation.
    If a point mutation does not change the amino acid, it's called a SILENT mutation.
    If a point mutation changes the amino acid to a "stop," it's called a NONSENSE mutation.

2. **INSERTION** (an extra base, or bases, is inserted)

3. **DELETION** (a base, or bases, is lost)

Deletion and insertion may cause what's called a **FRAMESHIFT**, meaning the reading frame changes. These are typically one of the most serious types of mutations.

Directions:

1. Following the same procedure you followed during the decoding activity (DNA to mRNA to Amino Acid), decode the original and mutated sequences and identify them as one of the three types of mutations listed above. If it is a point mutations, include whether it is a missense, silent, or nonsense mutations.

    The original DNA sequence is:

    DNA: TGC GTG CTT AAG CGG TGT ACA CGT TGC

    mRNA:

    Amino acid:

Now decode the following mutated sequences:

2. **TGC GTG CTT AAG CGA TGT ACA CGT TGC**

   What kind of mutation is this?

   Do you think it will affect the protein's function? Why?

3. **TGC GTG CTT AAG CGG TGT GCA CGT TGC**

   What kind of mutation is this?

   Do you think it will affect the protein's function? Why?

4. **TGC GTG CTT AAG TAG TGT ACA CGT TGC**

   What kind of mutation is this?

   Do you think it will affect the protein's function? Why?

5. **TGC GTG CTT ACT CGG TGT GCA CGT TGC**

   What kind of mutation is this?

   Do you think it will affect the protein's function? Why?

6. **GCG TGC TTA AGC GGT GTA CAC GTT GC**

   What kind of mutation is this?

   Do you think it will affect the protein's function? Why?

Extension Questions:

7. Do any of the amino acids only have one codon? Which ones?

8. Many of the amino acids have more than one codon. Do you think this is an advantage or disadvantage? Why?

9. If your DNA sequence is 96 bases long. How long will the resulting amino acid sequence be?

10. If a mutation doesn't cause any change to the resulting protein, what type of mutation do you think this most likely is?