# Mutations Worksheet

Part 1: Gene Mutations

In the chart below, transcribe the DNA sequence into mRNA. Then use the codon chart (below) to indicate what amino acids are being coded for by the base sequences listed for the mRNA. Then, tell what type of gene mutation is being illustrated. Choose from **point mutation** and **frameshift mutation**.

		Type of Mutation
DNA sequence	TACGCCAGTGGT	
mRNA sequence		Original
Amino Acids		
DNA sequence	TACCCCAGTGGT	
mRNA sequence		
Amino Acids		
DNA sequence	TACCCAGTGGT	
mRNA sequence		
Amino Acids		
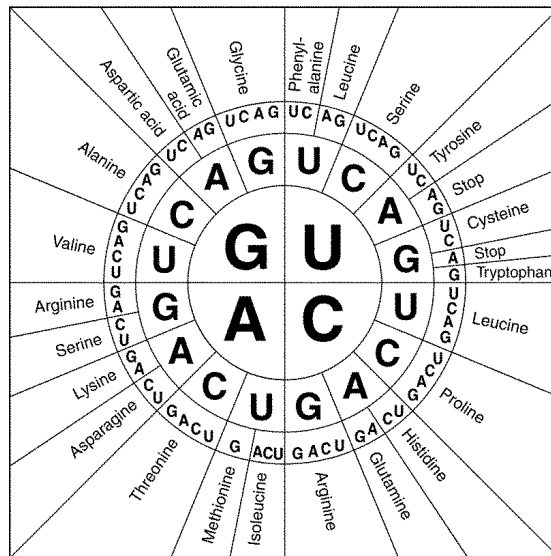
Part 2: Chromosome Mutations

For each diagram below, indicate what type of chromosome mutation is illustrated. Choose from: **deletion, insertion/duplication, inversion,** and **translocation**

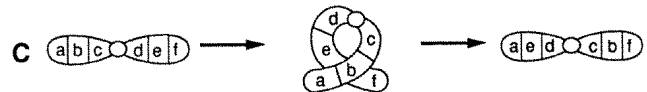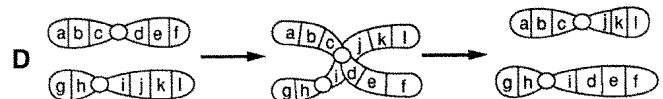A. _____
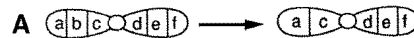
B. _____

C. _____

D. _____

For numbers 1-5, choose from the following terms.

    Insertion   Inversion
    Deletion   Substitution
    Point Mutation   Translocation

1. Name the three types of point (gene) mutations:

    _____

    _____

    _____

2. Name the four types of chromosome mutations:

    _____

    _____

    _____

    _____

3. What mutations would be considered frameshift mutations?

    _____

    _____

4. Which mutation involves two chromosomes? _____

5. Can a point mutation be a frameshift mutation? _____

Match the following terms to the descriptions below.

    A. Deletion
    B. Frameshift mutation
    C. Insertion
    D. Inversion
    E. Mutagen
    F. Point mutation (gene mutation)
    G. Substitution
    H. Translocation

_____ 1. A mutation that involves one or a few nucleotides.

_____ 2. Involves the loss of all or part of a chromosome or one base.

_____ 3. Produces extra copies of parts of a chromosome or a base.

_____ 4. Reverses the direction of parts of chromosomes.

_____ 5. Occurs when part of one chromosome breaks off and attaches to another.

_____ 6. Affects the DNA sequence of an entire chromosome.

_____ 7. A substance that can change the chemical nature of DNA.

_____ 8. One base is exchanged for another.

For numbers 9 and 10, choose from the following terms:

    A. Frameshift mutation

    B. Point mutation

_____ 9. A DNA segment is changed from AAGGACATTAGC to AGGACATTAGC

_____ 10. A DNA segment is changed from GGTCAT to GGGCAT

Show how mutations can cause problems by completing the protein synthesis of the following DNA strands. Use the codon chart below to find the amino acids.
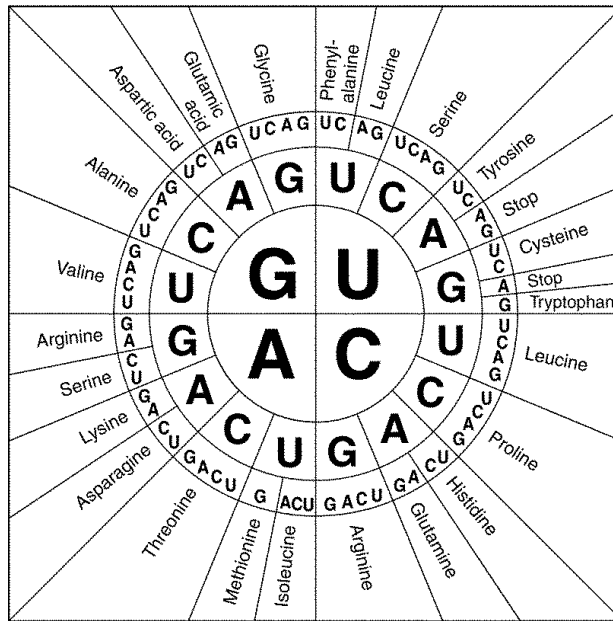
1. "Normal" DNA: T A C C C C G T C A C C G C C T A T A T C

   "Normal" mRNA: _____

   "Normal" Protein: _____

2. "Mutated" DNA: T A C C C C G T C **C** A C C G C C T A T A T C

   "Mutated" mRNA: _____

   "Mutated" Protein: _____

   Circle the type of mutation: POINT   FRAMESHIFT

   Circle the specific type of mutation: INSERTION   DELETION   SUBSTITUTION

3. "Mutated" DNA: T A C C C C G T _ A C C G C C T A T A T C

   "Mutated" mRNA: _____

   "Mutated" Protein: _____

   Circle the type of mutation: POINT   FRAMESHIFT

   Circle the specific type of mutation: INSERTION   DELETION   SUBSTITUTION

4. "Mutated" DNA: T A C C **A** C G T C A C C G C C T A T A T C

   "Mutated" mRNA: _____

   "Mutated" Protein: _____

   Circle the type of mutation: POINT   FRAMESHIFT

   Circle the specific type of mutation: INSERTION   DELETION   SUBSTITUTION