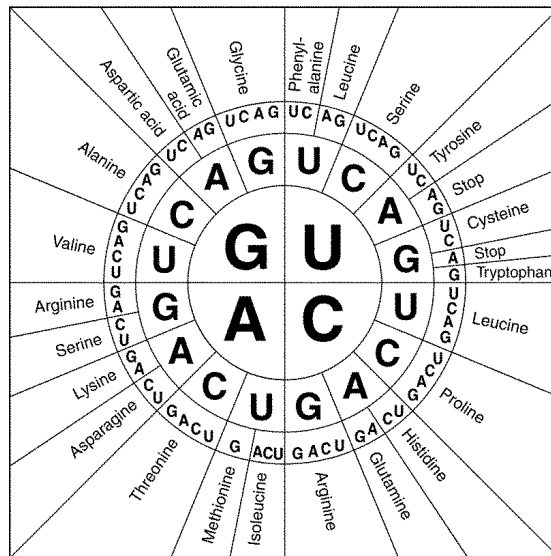


Mutations Worksheet

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**.

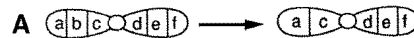
| | | Type of Mutation |
|---------------|--------------|------------------|
| DNA sequence | TACGCCAGTGGT | Original |
| mRNA sequence | | |
| Amino Acids | | |
| DNA sequence | TACCCCAGTGGT | |
| mRNA sequence | | |
| Amino Acids | | |
| DNA sequence | TACCCAGTGGT | |
| mRNA sequence | | |
| Amino 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**

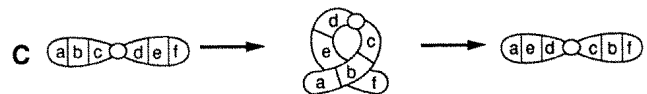
A. _____



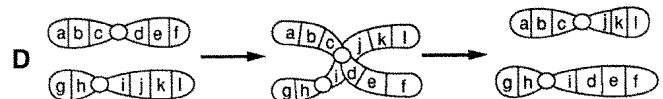
B. _____



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.

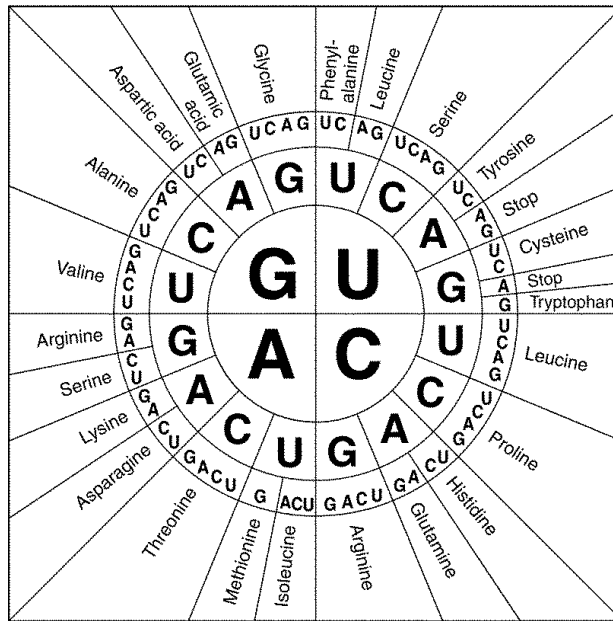
For numbers 9 and 10, choose from the following terms:

- 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