Name: _____ Block: _____ Date: _____

DNA and Genes

Click on **Mutation Guide** to answer the following questions:

1. What are **mutations**? _____

_____

2. The fewer the _____ in the protein sequence impacted by the mutation, the

   more likely the protein sequence will be able to function _____.

3. Define the following terms:

   Point Mutation: _____

   _____

   Silent Mutation: _____

   _____

   Frameshift Mutation: _____

   _____

4. How many codons does a point mutation impact? _____

5. Explain why a silent mutation has little effect on the protein sequence: _____

   _____

6. What is the result of a frameshift mutation? _____

7. Label the **Start** and **Stop codons** in the RNA sequences:

   a. AUG GGC GUU AGA UAG CCA GCA   b. AUG CCG ACA UUU UGG AAC UGA

   c. GAG AUG GUG UAA UCU CCC CAC   d. UCA GGU AUG UGA UCA AUC ACU

8. Are mutations beneficial?

   _____

   _____

Once you have completed the Mutation Guide problems, **follow the instructions** on the left of the interactive under the question "How do point mutation and frameshift mutation impact genetic sequences?" to complete the rest of the worksheet.

Journal Questions

1. Describe the differences between the original and mutated sequences: _____

_____

2. How many amino acids were changed? _____

3. What do you think will be the impact of this mutation? Why? _____

_____

_____

4. Was the sequence a result of a point or a frameshift mutation? Explain your reasoning.

_____

_____

_____

5. Explain why all mutations are not necessarily harmful. (Hint: Think about their benefits as well as what our

   bodies can do to counter damaged DNA.)

_____

_____

_____

6. Does changing the sequence of nucleotides always result in a different amino acid sequence? Explain your

   reasoning. (Hint: Look at your amino acid chart. What do you notice about most amino acids?)

_____

_____

_____