The activity is found at the following site: http://www.mhhe.com/biosci/genbio/virtual_labs/BL_26/BL_26.html

1. Click the “Mutate” button that appears on the new page to begin the activity

2. Click on the “mutation guide” button and answer the following questions:

   a. How often do mutations occur?

   ______________________________________________________

   b. How many diseases can be inherited by mutations?

   ______________________________________________________

   c. What is a point mutation?

   ______________________________________________________

   ______________________________________________________

   d. What nucleotides changed in the silent mutation?

   ______________________________________________________

   e. What is the result of a frameshift mutation?

   ______________________________________________________

   f. What is the start codon for all sequences?

   ______________________________________________________

   g. What are the three stop codons that are possible?

   ______________________________________________________

   h. How could a mutation be a good thing?

   ______________________________________________________
2. Close out of the mutation guide box. You will see the following:

   An “original sequence” of mRNA that has been translated properly OR is blank

   A “mutated sequence” that is blank OR that has been translated incorrectly

   A “mutation rules” block of information

3. Your task is to read the information in the “mutation rules” area then apply the information to completing the blank sequence.
   a. Read the mutation rule box
   b. Look at the sequence provided
   c. Apply the mutation rule to the empty sequence
   d. Determine the sequence of amino acids using the “amino acid chart”
   e. Click “check” when you believe you are done

4. BEFORE CLOSING OUT OF THE SEQUENCE - complete the following information below for your scenario:

   “Mutation rule” states:

   Original sequence:

   mRNA:

   Protein:

   Mutated sequence:

   mRNA:

   Protein:

Post Lab Questions:

1. A mutation:
   a. Can result in abnormal encoding of protein sequences
   b. Is always detrimental
   c. Results in a change in DNA sequence
   d. A and C
   e. All of the above

   Explain:
2. During the process of transcription:
   a. DNA is turned into mRNA
   b. DNA is turned into protein
   c. mRNA is turned into protein

Explain:

_____________________________________________________________________________________
_____________________________________________________________________________________

3. The building blocks of protein are:
   a. Amino acids
   b. Fatty acids
   c. Nucleic acids
   d. Polysaccharides

Explain:

_____________________________________________________________________________________
_____________________________________________________________________________________

4. Mutations:
   a. Occur roughly 1 in 100 nucleotides
   b. Occur roughly 1 in 1000 nucleotides
   c. Occur roughly 1 in 10000 nucleotides
   d. Never occur

Explain:

_____________________________________________________________________________________
_____________________________________________________________________________________

5. In a protein:
   a. A single nucleotide change can alter the encoded protein and cause disease
   b. Mutations always alter the encoded protein structure and function
   c. Two or more amino acids are linked together
   d. A and C
   e. All of the above

Explain:
6. Silent mutations:
   a. Always affect protein structure and function
   b. Are a type of point mutation
   c. Code for the same amino acid as intended by the original sequence
   d. B and C

Explain:
_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________

7. A frameshift mutation:
   a. Involves the addition or deletion of one or more nucleotides
   b. Results in a new amino acid sequence
   c. Results in a new codon sequence
   d. All of the above

Explain:
_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________

8. A stop codon is:
   a. AUG
   b. UAC
   c. UAG
   d. UGG

Explain:
_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________

9. The codon “CUG” specifies which amino acid?
   a. Glu (glutamic acid)
   b. Leu (leucine)
   c. Ser (serine)
   d. Tyr (tyrosine)

Explain:
_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________
_____________________________________________________________________________________

10. If the DNA sequence “AUGGGACCUCU” was changed to “AUGGGAAACCUCU” this would result in a:
   a. Frameshift mutation
   b. Point mutation
   c. Silent mutation

Explain: