

Biology

Name: _____

DNA and Genes Online Activity

Date: _____ Hour: _____

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:

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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. Polusaccharides

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 “AUGGGACCUCCU” was changed to “AUGGGAAACCUCCU” this would result in a:
- Frameshift mutation
 - Point mutation
 - Silent mutation

Explain:
