
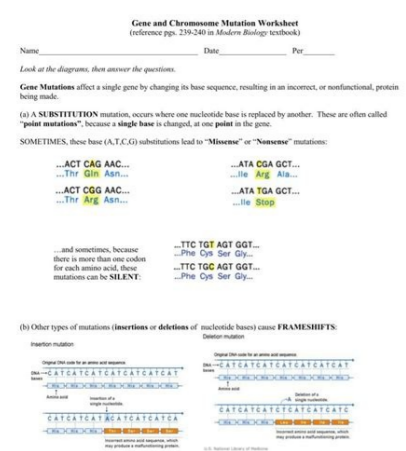


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# Genetic mutations worksheet answers



## Mutations

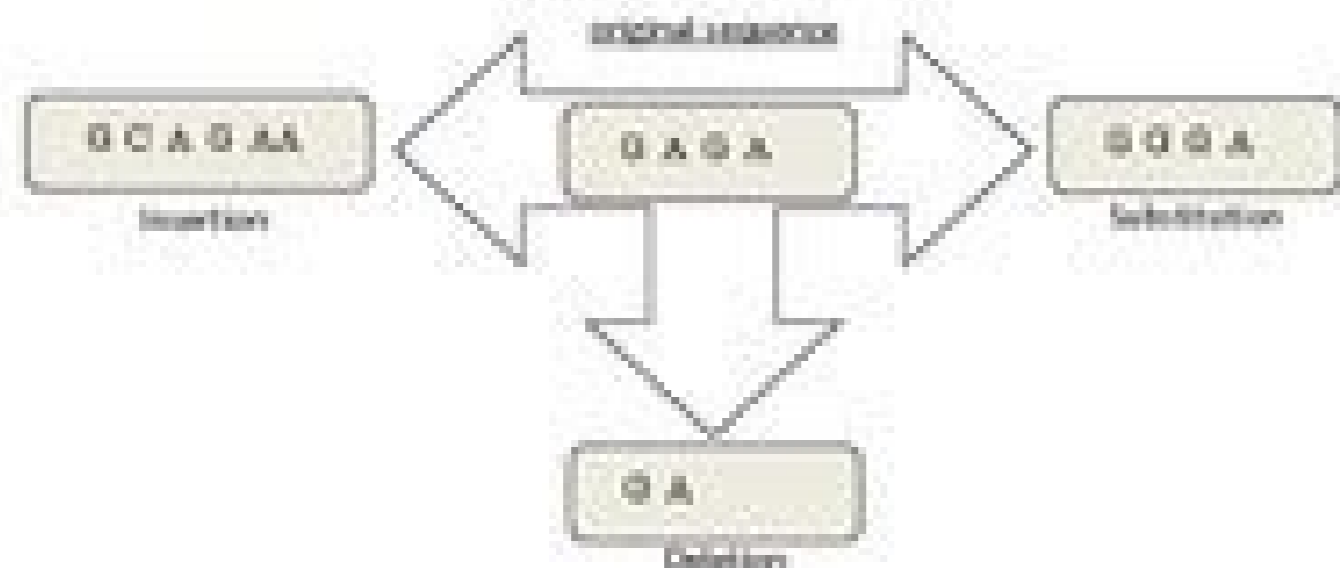
An unplanned change in DNA

Name \_\_\_\_\_  
Date \_\_\_\_\_ Period \_\_\_\_\_

### Background:

The cell's machinery isn't always perfect. There are times when DNA is miscopied during DNA replication, or it is miscopied into RNA. There are also times where our DNA is changed by outside factors such as UV rays from the sun or chemicals in our environment or in our food. These changes are called mutations and they can have profound effects on protein synthesis or sometimes no effect at all. Today we will look at the different types of mutation and what they do to proteins.

Three types of mutations are shown below:



A substitution mutation can sometimes be considered a "silent mutation" since it will not change the translated amino acid sequence. Deletions and insertions can be very deleterious (harmful) because they cause each reading frame after to change sequence. These are called "frameshift mutations".

- Which amino acids does the following mRNA codon sequence code for?
 

a. GGT _____	b. ATG _____
c. GCA _____	d. GGG _____
e. TGA _____	f. GGA _____
g. ACG _____	h. GAG _____

- Translate the following sequence before and after the mutation. Explain what effect would it have on the organism?  
 ATG CAG GGG GGA → AUG CAG GGG GGA

- What type of mutation would #2 be? \_\_\_\_\_

Name \_\_\_\_\_ Per \_\_\_\_\_

### MUTATIONS

There are three main types of mutations: point missense mutations, point nonsense mutations, and frameshift mutations.

- Missense mutation: leads to an amino acid change.
- Nonsense mutation: causes premature stop-codon before the protein is complete.
- Frameshift mutation: (insertion/deletion/duplication) changes the reading frame, alters protein.
- Silent mutation: nucleotide change, but no change in amino acid.

In each of the following DNA sequences, you will use the mRNA and amino acid sequences to identify the mutation that occurred and the effects of each one, if any. Look and analyze carefully!

Original DNA Sequence: T A C A C C T T G G C G A G A C T
mRNA Sequence: _____
Amino Acid Sequence: _____

Mutated DNA Sequence #1: T A C A T C T T G G C G A G A C T
What's the mRNA sequence? (Circle the change) _____
What will be the amino acid sequence? _____
Will there likely be effects? _____
What kind of mutation is this? _____

Mutated DNA Sequence #2: T A C G A C C T T G G C G A G A C T
What's the mRNA sequence? (Circle the change) _____
What will be the amino acid sequence? _____
Will there likely be effects? _____
What kind of mutation is this? _____

Mutated DNA Sequence #3: T A C A C C T T A G C G A G A C T
What's the mRNA sequence? (Circle the change) _____
What will be the amino acid sequence? _____
Will there likely be effects? _____
What kind of mutation is this? _____

Mutated DNA Sequence #4: T A C A C C T T G G C G A C T A C T
What's the mRNA sequence? (Circle the change) _____
What will be the amino acid sequence? _____
Will there likely be effects? _____
What kind of mutation is this? _____



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### Quiz & Worksheet - Genetic Variability and Random Mutation

Answer the following questions to test your knowledge of genetic variability and random mutation.

- Which is true about evolution?
 

<input type="checkbox"/> It decreases genetic variability.	<input type="checkbox"/> It creates genetic variation.
<input type="checkbox"/> It occurs within a population.	<input type="checkbox"/> It creates random mutations.
<input type="checkbox"/> It occurs among individuals.	
- Genetic variability describes which of the following?
 

<input type="checkbox"/> How likely a mutation is to be hereditary.	<input type="checkbox"/> How harmful a mutation will be to an individual.
<input type="checkbox"/> The amount of variation within a population.	<input type="checkbox"/> The potential for a characteristic to vary within a population.
<input type="checkbox"/> The persistence of random mutations within a population.	
- Which is true about random mutations?
 

<input type="checkbox"/> They make measuring variation impossible.	<input type="checkbox"/> They remove variation from a population.
<input type="checkbox"/> They introduce new variation into a population.	<input type="checkbox"/> They are always negative.
<input type="checkbox"/> They are always positive.	

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This causes a person to load two different sets of DNA. For example, how does parents age affect the number of mutations passed to their children? Photo courtesy: Article of Medmedicine/Wikimedia Commons The condition can be severe and can cause severe health complications, including problems with lung capacity and hearing loss. If it is, it is usually not functional. Also known as "Eldemear of fish disease, the defect happens when the production of the flavine body is compromised with the monooxygenase 3 containing flavine. 95 Fabt ful in Tao 115 as an ET ... and sometimes, because there is more than one codon for each amino acid, mutations can be "irer oh thur" "original una coda for a sequence of amino aci" saree saree AP SO S Avery ErorRer ANA Vas da Catatcatcatcatcats Bases PTI HS CIS HS HISS TTE - Anline insert of LCA of & Ingle nulotide 14 Ax "JnoorEat ATID ATID. Whic can produce 2 Maltfunctionmmmm. Congenital defect occurs in the uterus when the two eye sockets do not separate during early development. Extra members are, in many cases, significantly deformed and may not work. Sivens. 38 natiomat tee et being the amino acid sequence of DK 4 amino acids of the foramen. This enzyme is responsible for the proper function of uric acid. How are they different? It was also argued that people developed UNER BAND if they learned to walk four as babies, making the balance on two legs very difficult. leads to excessive hair growth in all parts of the body. "Our genetic study, the first of its kind, shows that in fact much less errors, or mutations, are committed." This means that human evolution happens more slowly than they previously thought. The researchers analyzed the complete genetic sequences of two families that had previously been collected as part of the 1,000 Photo Courtesy: Touchstone Pictures/IMDb Many people who develop the disorder cannot come into contact with anything outside of their personal disinfected environment. It's hereditary and is so rare that the number of cases in the world remains unknown. How do their various environmental exposures impact mutation rates? Geneticists will find out by comparing the number of new mutations in the children born to parents of different ages and life experiences. Is Bad Handwriting Genetic? Other symptoms include lung issues, heart issues and blue coloring of the whites of the eyes. This condition is one of the more





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