Key

Amoeba Sisters | Video Recap

NAME:_____

Amoeba Sisters Video Recap: *Mutations (Updated)*

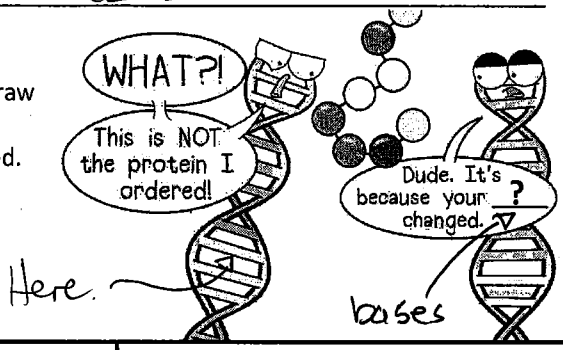
1. What is a **mutation**?

A change in the nucleic acid.

2. A specific part of a **nucleic acid** (such as DNA or RNA) experiences a mutation that could lead to a different protein produced. View the illustration below of DNA. Which part of the DNA experiences the mutation?

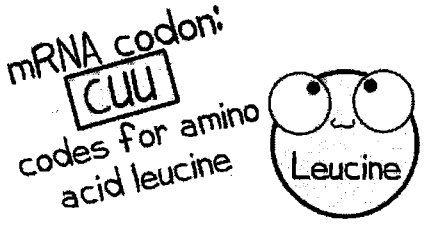
nitrogenous bases

3. On the DNA illustration, draw an *arrow* to show *where* the answer to #2 could be located.



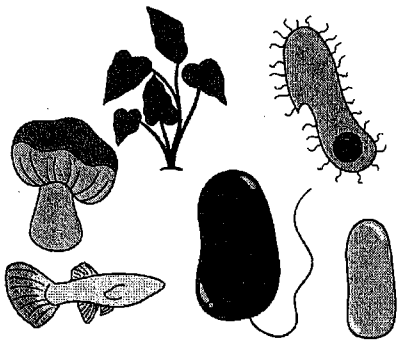
Mutations can be harmful, helpful, or neutral in their effect. A **silent mutation** tends to have a neutral effect as it does not result in coding for a different amino acid. Using your mRNA codon chart, give another mRNA codon that this CUU could mutate to and *still* code for leucine. CUA

4. The mRNA codon CUU could mutate to C U C and *still* code for leucine, which would not change the amino acid.



5. Which type(s) of organism(s) can experience a mutation? Mark any that apply.

- ✓ Animals (this includes humans)
- ✓ Archaea
- ✓ Bacteria
- ✓ Fungi
- ✓ Plants
- ✓ Protists



6. Even a **gene mutation** that is a **point mutation**, meaning it affects one nucleotide base, can still make a major change

Consider the below information for normal hemoglobin:

	Here ↓
Portion of Hemoglobin DNA	GGA CTC CTC
mRNA	CCU GAG GAG
Amino Acids	Proline-Glutamic Acid-Glutamic Acid

Sickle Cell Anemia is caused by a point mutation known as a **substitution.** Show what would occur *if* the *first* T ("thymine") DNA base in the portion shown above experienced a mutation with a substitution of A ("adenine").

Sickle Cell Hemoglobin:

Portion of mutated hemoglobin DNA: GGA CAC CTC

mRNA: CCU GUG GAG

Amino Acids: Proline - Valine - Glutamic Acid

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Amoeba Sisters Video Recap: Mutations (Updated)

7. An **insertion or deletion** can result in a **frameshift mutation**. To demonstrate this, complete the following. *Note: You will need a codon chart.*

Normal Strand:

DNA: GCA ATG CAC

mRNA: CGU UAC GUG

Amino Acids: Arginine - Tyrosine - Glycine

Deletion (causing a frameshift):

Taking out the first "G" in the original DNA above results in:

DNA: CAA TGC AC

mRNA: GUU ACG UG

Amino Acids: Glycine - Threonine -

How did the frameshift change the amino acids?

different amino acids and less

8. Check your understanding! Mark any that are *correct.*

✓ Mutations are random.

_____ Mutations are mostly beneficial and useful for an organism.

✓ Mutations can occur in both DNA and RNA, which are **nucleic acids.**

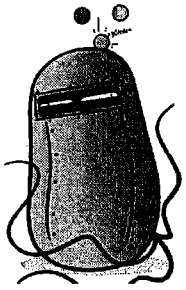
_____ Mutations can only occur during **interphase.**

✓ Not all genes code for proteins.

✓ Not all genes are "turned on" at a given time.

_____ **Substitution** mutations typically result in a **frameshift mutation.**

_____ Mutations can be **genetically inherited.**

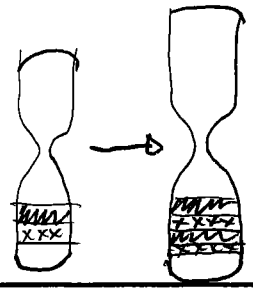


Chromosome Mutations

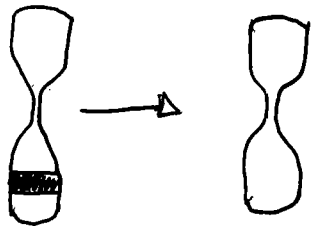
Sketch It!

Create illustrations to show the following chromosome mutations. Note: Chromosomes exist in both prokaryotic and eukaryotic cells, but prokaryotic chromosome structure tends to be very different from eukaryotic chromosomes.

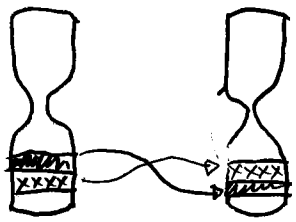
9. Duplication



10. Deletion



11. Inversion



12. Translocation