**STATION 1**

1. Describe the structure of DNA.



B

A

* What does DNA stand for?
* What are the pentagons?
* What are the nitrogen bases?
* What weak bonds hold the complementary bases together?
* What is DNA made of?
* What does the circled structure **A** represent?
* What does the circled structure **B** represent?
* What is a monomer of DNA?
* What are the 3 parts of a nucleotide?
* What type of biomolecule is DNA?
* Why is the sequence of nucleotides in a gene important?
* What is the genetic code?
* What is the shape of DNA?
* *Circle a gene in the picture of DNA below.*



1. What is the function of DNA?

**STATION 2**

1. Below is a strand of DNA. DNA in the cells exists as a double helix.

What needs to be added to it to make it a double helix?

Give the complementary nucleotide sequence.



1. If the strand of DNA (gene) above undergoes transcription, what will the sequence of the mRNA be?
2. What anticodons on the tRNA would compliment the codons on the mRNA?
3. After translation, what would the amino acid sequence be for this

section of mRNA?

1. What is a codon?
2. Circle a CODON on the mRNA strand (*refer to question 2*).

**STATION 3**

1. Compare RNA and DNA in the following table.

|  |  |  |
| --- | --- | --- |
|  | DNA | RNA |
| Sketch a molecule |  |  |
| Name of sugar |  |  |
| Bases |  |  |
| Number of strands |  |  |
| Where in the cell? |  |  |
| Function |  |  |

1. What are the functions of each type of RNA?
* Messenger RNA –
* Transfer RNA –
* Ribosomal RNA (ribosome) –

**STATION 4**



**Y**

1. What cellular process is shown above?
2. What process does **Y** represent?
* *What is the purpose of this process?*
* *What is the product of this process*?
* *Where does this process take place?*
1. What process does **Z** represent?
2. *What is the purpose of this process?*
3. *What is the product of this process*?
4. *Where does this process take place?*

**STATION 5**

1. What is a mutation?
2. What is a mutagen? Give an example.
3. Create a insertion frameshift mutation using the ***original DNA strand*** (gene).

Original DNA strand (GENE sequence):  **CTG GGG CAG TTA ACC**

Mutated DNA strand (***Insertion - frameshift***): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 mRNA: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 tRNA: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Amino Acid sequence (protein): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. Identify each point mutation:



A. Silent - no change in AA

B. Missense - substitution of one AA

C. Nonsense - substitution of a STOP codon for an AA

D. Frameshift Deletion - shift in a reading frame to the left. All amino acids are changed from the point of mutation.

**STATION 6**



**C**

**B**

**A**

1. Which cellular process is shown above?
2. What is happening at the point **A**?
3. What is happening at the point **B**?
4. What is happening at the point **C**?
5. What is the product of this process?
6. When do cells make this product?
7. Why this process is called *semi conservative*?

*Draw your answer:*

1. Occasionally, an error is made during this process. For example, an incorrect base pair may be included by DNA polymerase. What do we call errors made in DNA?
2. Such errors can be passed on to the new generation (offspring). The errors in what type of cells can be inherited?

**STATION 7**

1. What is a gene expression?
2. What is the product of gene expression?
3. What do the products of gene expression give rise to?
4. What are the two major steps of gene expression?
5. What process in the gene expression converts the gene’s code into mRNA?
6. When information in mRNA is made into a protein by ribosomes, the process is called as \_\_\_\_.
7. Gene expression means that the information in a gene is synthesized into a \_
8. What molecules ultimately control a cell’s traits (phenotype)?
9. Do all cells in an organism have the same genes?

Are they all turned on or expressed? Explain.

1. Why are some genes expressed in one type of cell but not others? Give an example.
2. Can a cell regulate how much or when a gene is expressed?
3. What plays a role in the regulation of gene expression?
4. If the following gene was expressed into a protein, what would the amino acid sequence be?

 **TAC TTA GGA CAG**

**STATION 8**

**Go to the following website and complete the virtual activity:** [**https://learn.genetics.utah.edu/content/basics/transcribe/**](https://learn.genetics.utah.edu/content/basics/transcribe/)

**When you are finished, Mrs. Lyle or Mrs. Kubajak need to check you off.**

***ANSWER SHEET - Review Stations***

**STATION 1**

1. What does DNA stand for?
2. What are the pentagons?
3. What are the nitrogen bases?
4. What weak bonds hold the complementary bases together?
5. What is DNA made of?
6. What does the circled structure **A** represent?
7. What does the circled structure **B** represent?
8. What is a monomer of DNA?
9. What type of biomolecule is DNA?
10. Why is the sequence of nucleotides in a gene important?
11. What is the genetic code?
12. What is the shape of DNA?
13. *Circle a gene in the picture of DNA below.*
14. What is the function of DNA?

**STATION 2**

1. Give the complementary nucleotide sequence.
2. If the strand of DNA (gene) above undergoes transcription, what will the sequence of the mRNA be?
3. What anticodons on the tRNA would compliment the codons on the mRNA?
4. After translation, what would the amino acid sequence be for this section of mRNA?
5. What is a codon?
6. Circle a CODON on the mRNA strand (*refer to question 2*).

**STATION 3**

Messenger RNA: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Transfer RNA: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Ribosomal RNA (ribosome): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |  |
| --- | --- | --- |
|  | DNA | RNA |
| Sketch a molecule |  |  |
| Name of sugar |  |  |
| Bases |  |  |
| Number of strands |  |  |
| Where in the cell? |  |  |
| Function |  |  |

**STATION 4**

1. What cellular process is shown above?
2. What process does **Y** represent?
* *What is the purpose of this process?*
* *What is the product of this process*?
* *Where does this process take place?*
1. What process does **Z** represent?
2. *What is the purpose of this process?*
3. *What is the product of this process*?
4. *Where does this process take place?*

**STATION 5**

1. Which cellular process is shown above?
2. What is happening at the point **A**?
3. What is happening at the point **B**?
4. What is happening at the point **C**?
5. What is the product of this process?
6. When do cells make this product?
7. Why this process is called *semi conservative*?

*Draw your answer:*

1. Occasionally, an error is made during this process. For example, an incorrect base pair may be included by DNA polymerase. What do we call errors made in DNA?
2. Such errors can be passed on to the new generation (offspring). The errors in what type of cells can be inherited?

**STATION 6**

1. What is a gene expression?
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7. Gene expression means that the information in a gene is synthesized into a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
8. What molecules ultimately control a cell’s traits (phenotype)? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
9. Do all cells in an organism have the same genes? \_\_\_\_\_

Are they all turned on or expressed?\_\_\_\_\_\_\_Explain. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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