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Nature of DNA

Due Date:

**Guide \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Review \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Critical Thinking \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Concept Map \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Crossword \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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Nature of DNA Guide

Define the following terms.

Nucleic acids

DNA

Nucleotide

Adenine

Thymine

Cytosine

Guanine

Complimentary

Replication

Protein synthesis

Transcription

Translation

Describe the steps of protein synthesis. Include mRNA, tRNA, rRNA and ribosomes.

Step 1-Replication

Step 2-Transcription

Step 3-Translation

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Nature of DNA Review

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | adenine | mRNA | replication | translation |  |
|  | amino acid | nucleic acids | ribosome | tRNA |  |
|  | cytosine | nucleotide | rRNA | uracil |  |
|  | DNA | protein | thymine |  |  |
|  | guanine | protein synthesis | transcription |  |  |

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the nitrogen base that bonds with adenine.
2. Making proteins from the RNA code is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ carries instructions from the DNA to the ribosome.
4. The building blocks of life made from different combinations of amino acids are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
5. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the nitrogen base that bonds with cytosine.
6. One of 20 molecules that combine to form proteins are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
7. A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is an organic molecule made from a 5-carbon sugar, a phosphate group and a nitrogen base.
8. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the process of making an exact copy of DNA.
9. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the nitrogen base that bonds with thymine.
10. The cell organ that makes proteins is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
11. The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ connects amino acids to form proteins.
12. The nitrogen base found in RNA that bonds with adenine is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
13. The process of copying DNA to RNA is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
14. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the nitrogen base that bonds with guanine.
15. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the process of building a protein molecule from RNA instructions.
16. The nucleic acid found in the nucleus that contains the genetic information of the cell is \_\_\_\_\_\_.
17. The \_\_\_\_\_\_\_\_\_\_\_\_\_\_ brings amino acids to the ribosome.
18. Organic acids made of nucleotides are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Replicate the following code.

1. a g g c a g c c g a aa t a c a t t

Transcribe the following code.

1. a t t c a g g c t tttt a g g c a g g c

Translate the following code.

1. a u c g a g a u u c g u a u g u uu
2. \_\_\_\_\_Brings amino acids to the ribosome. a. mRNA
3. \_\_\_\_\_Gets instructions from the DNA. b. rRNA
4. \_\_\_\_\_Builds proteins at the ribosome. c. tRNA
5. \_\_\_\_\_Process of making an exact copy of DNA. a. ribosome
6. \_\_\_\_\_Process of copying DNA to RNA. b. translation
7. \_\_\_\_\_Organelle responsible for building proteins. c. replication
8. \_\_\_\_\_Process of using RNA instructions to build proteins. d. transcription

Determine whether the statement is true (T) or false (F).

1. \_\_\_\_\_Transcription happens at the ribosome.
2. \_\_\_\_\_Translation is the process of copying the DNA code to RNA.
3. \_\_\_\_\_The purpose of transcription and translation is to make proteins.
4. \_\_\_\_\_DNA is made from chains of nucleotides.
5. \_\_\_\_\_tRNA carries instructions from the nucleus to the ribosome.
6. \_\_\_\_\_mRNA brings amino acids to the ribosome.
7. \_\_\_\_\_rRNA connects amino acids to form proteins.
8. \_\_\_\_\_Cells undergo replication to make new, identical cells.
9. An organic molecule made of a 5-carbon sugar, a phosphate group and a nitrogen base. These connect to form the DNA molecule.
   1. Ribosome
   2. Nucleotide
   3. DNA
   4. RNA
10. This brings amino acids to the ribosome. The amino acids are floating in the cell and will be used to make proteins.
    1. aRNA
    2. mRNA
    3. tRNA
    4. rRNA
11. Building blocks of life. They are created by joining amino acids at the ribosome.
    1. Proteins
    2. Amino acids
    3. DNA
    4. Nucleotide
12. This carries instructions from the DNA to the ribosome. DNA cannot leave the nucleus and ribosomes are outside of the nucleus.
    1. aRNA
    2. mRNA
    3. tRNA
    4. rRNA
13. The cell organ that makes proteins.
    1. Nucleus
    2. Nucleotide
    3. Ribosome
    4. RNA
14. This connects amino acids to form proteins. It happens at the ribosome.
    1. aRNA
    2. mRNA
    3. tRNA
    4. rRNA
15. A molecule that contains all of the genetic material of a cell. It is made of nucleotides connected by hydrogen bonds.
    1. DNA
    2. RNA
    3. Nucleus
    4. Nucleotide
16. Molecules that combine to make proteins.
    1. Nucleotide
    2. Amino acid
    3. Ribosome
    4. RNA
17. Process of making an exact copy of DNA. It is the first thing that happens during Prophase I.
    1. Meiosis
    2. Replication
    3. Transcription
    4. Translation
18. The process of building a protein molecule from RNA instructions.
    1. Translation
    2. Transcription
    3. Replication
    4. Protation
19. The process of copying DNA to RNA.
    1. Replication
    2. Transcription
    3. Translation
    4. RNA synthesis
20. A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is an organic molecule made of a 5 carbon sugar, a phosphate group and a nitrogen base.
21. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ brings amino acids to the ribosome during protein synthesis.
22. The building blocks of life are said to be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ because they are the basic unit of all living things.
23. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ carries instructions from the DNA to the ribosome during protein synthesis.
24. The cell organ that makes proteins is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
25. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ connects amino acids to form proteins. It happens at the ribosome.
26. The molecule that contains all of the genetic material of the cell is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. It is made of nucleotides connected by hydrogen bonds.
27. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the nitrogen base found in RNA that bonds with adenine.
28. The nitrogen base that bonds with adenine in DNA is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
29. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ bonds with cytosine.
30. The nitrogen base that bonds with guanine is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
31. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ bonds with thymine.
32. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are molecules that bond to form proteins.
33. The process of making an exact copy of DNA is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. It is the first step of meiosis.
34. Transcription happens at the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
35. Translation happens at the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
36. The building blocks of DNA are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

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Nature of DNA Critical Thinking

1. Describe the process of replication.
2. Describe the process of transcription.
3. Describe the process of translation.
4. Why does DNA replicate?
5. What is the purpose of the DNA code?
6. How is DNA different from RNA?
7. Where does replication happen?
8. Where does transcription happen?
9. Where does translation happen?
10. What makes a nucleotide?
11. What are the building blocks of proteins?
12. What are the building blocks of DNA?
13. Which nucleic acid transcribes DNA?
14. Which nucleic acid builds proteins?
15. Which nucleic acid brings amino acids to the ribosome?
16. Describe the structure of DNA.
17. Describe the process of protein synthesis using the following terms: Transcription, translation, mRNA, tRNA, ribosome, rRNA, amino acid, protein, DNA. Underline each term.
18. What is the purpose of the DNA code? Be specific.
19. Where in the cell does transcription happen? Why?
20. What does rRNA do in protein synthesis? Where is it located?

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Nature of DNA Concept Map

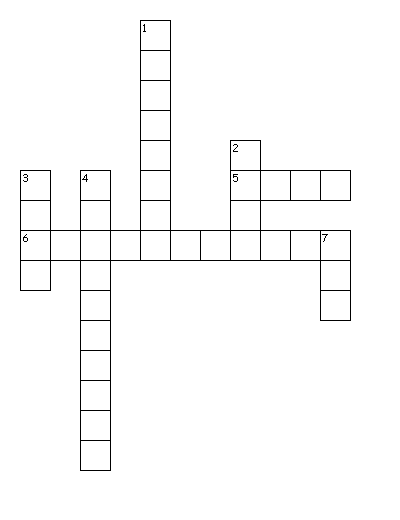
Use the following terms to create a concept map: translation, mRNA, tRNA, translation, rRNA, transcription, nucleus, ribosome, protein synthesis.

1. Give the complimentary base pairs for the following genetic sequence.

A T G G T C T A A

1. Where does transcription take place?
2. Where does translation take place?
3. Where does replication take place?
4. What is the purpose of DNA?
5. What does mRNA do?
6. What does tRNA do?
7. What does rRNA do?
8. What doe chains of amino acids make?
9. What do chains of nucleotides make?

**Nature of DNA**



Across

5. attaches amino acids to form proteins

6. organic acids that control all the activities of the cell

Down

1. location of protein synthesis

2. carries information out of the nucleus

3. brings amino acids to the ribosome

4. an organic molecule mad of a 5 carbon sugar a phosphate group and a nitrogen base

7. contains the genetic information of the cell

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| K | Z | V | X | B | D | I | X | D | D | T | H | D | B | I |
| O | Y | T | D | I | D | R | P | B | A | B | T | I | Z | G |
| X | T | J | R | A | T | C | I | Q | U | S | L | C | N | T |
| J | E | R | O | N | Z | D | L | O | O | A | D | A | Q | C |
| K | K | Z | R | W | A | X | N | V | A | V | B | C | N | E |
| S | T | Z | R | Q | G | Q | A | N | E | D | Q | I | M | M |
| I | Z | L | N | B | S | X | U | D | N | T | K | E | P | I |
| K | S | A | A | O | Q | R | I | A | H | I | T | L | F | L |
| Y | D | V | J | Z | X | T | D | Z | Y | R | C | C | T | V |
| M | R | N | A | O | O | A | J | Y | Q | O | P | U | D | O |
| T | R | D | C | E | U | Q | E | O | T | Z | Z | N | Z | K |
| S | U | O | L | T | P | W | U | I | K | Y | F | D | V | J |
| A | N | C | I | C | M | O | I | B | U | K | U | W | D | H |
| S | U | S | B | I | G | L | C | W | W | Z | M | B | U | A |
| N | F | N | R | V | N | J | Q | L | L | Q | J | C | K | N |

|  |
| --- |
|  |
| DNA | MRNA | NUCLEICACID |
| NUCLEOTIDE | RRNA | TRNA |

**Nature of DNA**

