

Name _____

DNA: The Master Molecule of Life

PRE-TEST

Directions: Answer each question TRUE OR FALSE:

1. Genes are made from DNA. _____
2. The genetic code used in the cells of mushrooms is quite different from genetic code used in human cells. _____
3. The "alphabet" of the genetic code uses the 20 different amino acids for letters. _____
4. Genetic code words are of different lengths according to the information they contain. _____
5. DNA chemically stores instructions for making proteins. _____

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VOCABULARY WORKSHEET

Adenine: A nitrogen containing base found in one of the nucleotide subunits of DNA. Adenine is the "A" of the genetic code alphabet.

Amino Acid: The subunits that are chemically bonded together in proteins. The order of amino acids in a protein is what gives it the ability to do its job.

Anticodon: The three letter word of a transfer RNA that corresponds to the amino acid it carries. The anticodon matches up with the codon of the messenger-RNA.

Bacteria: Simple, one-celled, organisms that lack a nucleus belonging to the kingdom Monera.

Cell Division: The process that results in two cells being formed from one cell. Cell reproduction.

Chemical: Chemicals are substances made from combinations of different elements.

Chemical Bonds: The way in which atoms are joined to one another: For example, in water an atom of oxygen is joined to two atoms of hydrogen by chemical bonds. The subatomic particles called electrons are responsible for creating chemical bonds.

Chemical Reactions: Events in which chemical bonds are broken, rearranged and reformed. Matter is changed by chemical reactions: This is what happens when chemical compounds react with one another and new compounds are formed.

Chromatin: Chromatin is made up of the tangled, thread-like, coils of chromosomes. Chromatin contains DNA plus certain proteins.

Chromosomes: Chromosomes are worm-shaped structures that develop from chromatin before cells divide. Chromosomes contain DNA and protein. Human body cells have two full sets of 23 different chromosomes.

Codon: A code word of messenger RNA that represents an amino acid.

Complementary: Two parts of a jigsaw puzzle fit together to make a whole: Therefore they are called complementary parts. DNA has two complementary strands because they are exact opposites of one another.

Cytoplasm: All the protoplasm located outside the nucleus.

Cytosine: A nitrogen containing base in a nucleotide subunit of DNA. Cytosine is the "C" of the genetic code alphabet.

Deoxyribonucleic Acid (DNA): A long molecule shaped like a twisted ladder(double helix). The plans for running and reproducing cells are chemically stored in the DNA. DNA is found mostly in the nucleus but small amounts of DNA are found in mitochondria and chloroplasts.

Deoxyribose: The sugar part of a DNA nucleotide subunit.

Double Helix: The double spiral shape of the DNA molecule.

Enzymes: Proteins that control the rates of chemical reactions in cells. Most proteins in a cell are enzymes. Digestive enzymes such as pepsin and trypsin are produced by specialized cells. These enzymes are exported from cells to break down food in the digestive tract.

Gene: A region of a DNA molecule that stores the instructions for making a particular protein. Genes are also known as the units of making a particular protein. Genes are also known as the units of heredity.

Genetic Code: The chemical language of the cell. DNA stores its instructions in the genetic code.

Genetic Code Word: Three DNA nucleotide subunits in a row, such as AAA or AGA, that represent amino acids.

Genetic Transcription: The process of copying a gene into messenger-RNA.

Guanine: A nitrogen-containing base found in a nucleotide subunit of DNA that is the "G" of the genetic code alphabet.

Heredity: Characteristics that are passed on from parents to their offspring. Genes are called the "units of heredity".

Hereditary: Passed on from one generation to the next.

Hydrogen Bond: A type of weak chemical bond. Hydrogen bonds exist between the two strands of the DNA molecule and between the messenger RNA codons and the transfer RNA anticodons.

Molecule: A combination of two or more atoms bonded together by strong chemical bonds (covalent bonds).

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Macromolecule: A very large molecule made from thousands of atoms. DNA, messenger RNA and proteins are all examples of macromolecules.

Messenger RNA (m-RNA): Messenger RNA carries instructions for making proteins from the nucleus to a ribosome.

Nitrogenous Bases: The nitrogen containing bases of the DNA nucleotide subunits whose chemical names are Adenine, Thymine, Cytosine, and Guanine.

Nuclear: Refers to the nucleus.

Nucleic Acids: DNA or RNA nucleus (Plural: Nuclei)
A rounded structure located in the cytoplasm. The nucleus is the cell's control center because it is where most of the DNA is located.

Nucleolus (New-kee-oh-lus): "Little Nucleus" The area of the nucleus where ribosomes are made. Cells can have more than one nucleolus.

Nucleotide Subunit: The Subunits that make up DNA. Each nucleotide has a phosphate group, a deoxyribose sugar group and a nitrogen-containing base; either Adenine, Thymine, Cytosine or Guanine.

Organelles: "Little Organs". Structures in the cytoplasm such as mitochondria, ribosomes, chloroplasts, and Golgi bodies where different tasks are performed in the cell.

Proteins: Molecules made up of long chains of amino acids (polypeptides). Proteins build living material, fight disease, and help transport things out of the cell. The important class of proteins called **enzymes** act to control the rates of chemical reactions. Most proteins are enzymes.

Replication of DNA: The process that occurs when DNA makes an exact copy of itself before cell division.

Ribosomes: The organelles where proteins are assembled.

Ribonucleic Acid: A type of nucleic acid that contains the sugar ribose instead of deoxyribose, has one strand and that has the base Uracil instead of Thymine.

Ribose: A sugar group found in RNA nucleotide subunits.

Structural Formula: A diagram used by chemists that shows how atoms are arranged in molecules.

Synthesis: To make complex substances from simpler parts. Proteins are synthesized from amino acid subunits. DNA is synthesized from nucleotide subunits.

Sugar-Phosphate Bonds: Strong (covalent) bonds between the deoxyribose sugar of one nucleotide and the phosphate group of the adjoining nucleotide is what forms the "backbone" of the DNA molecule.

Terminator Codons: Every messenger RNA message ends with one of three different "terminator" codons: UAG, UAA or UGA. Since there are no transfer RNAs with anticodons to match these messenger RNA codons protein synthesis stops whenever a terminator codon is reached.

Thymine: A nitrogen containing base found in one of the nucleotide subunits of DNA. Thymine is the "T" of the genetic code alphabet.

Transfer RNA (t-RNA): A small RNA molecule that can pick up amino acids. By matching the transfer RNA anticodon to the messenger RNA codon the amino acid is put into the protein chain correctly.

Translation: The process of making proteins using the instructions of messenger RNA molecule.

Uracil: A nitrogen-containing base used in RNA molecules instead of Thymine.

VOCABULARY ACTIVITY

From the vocabulary list find the correct word to fill in the blanks.

- _____ are proteins that control the rates of chemical reactions.
- Two or more atoms strongly bonded together is called a _____
- Instructions from DNA are carried to ribosomes by molecules of _____
- Amino acids are picked up by special RNA molecules called _____
- The process of making something from simple subunits is called _____

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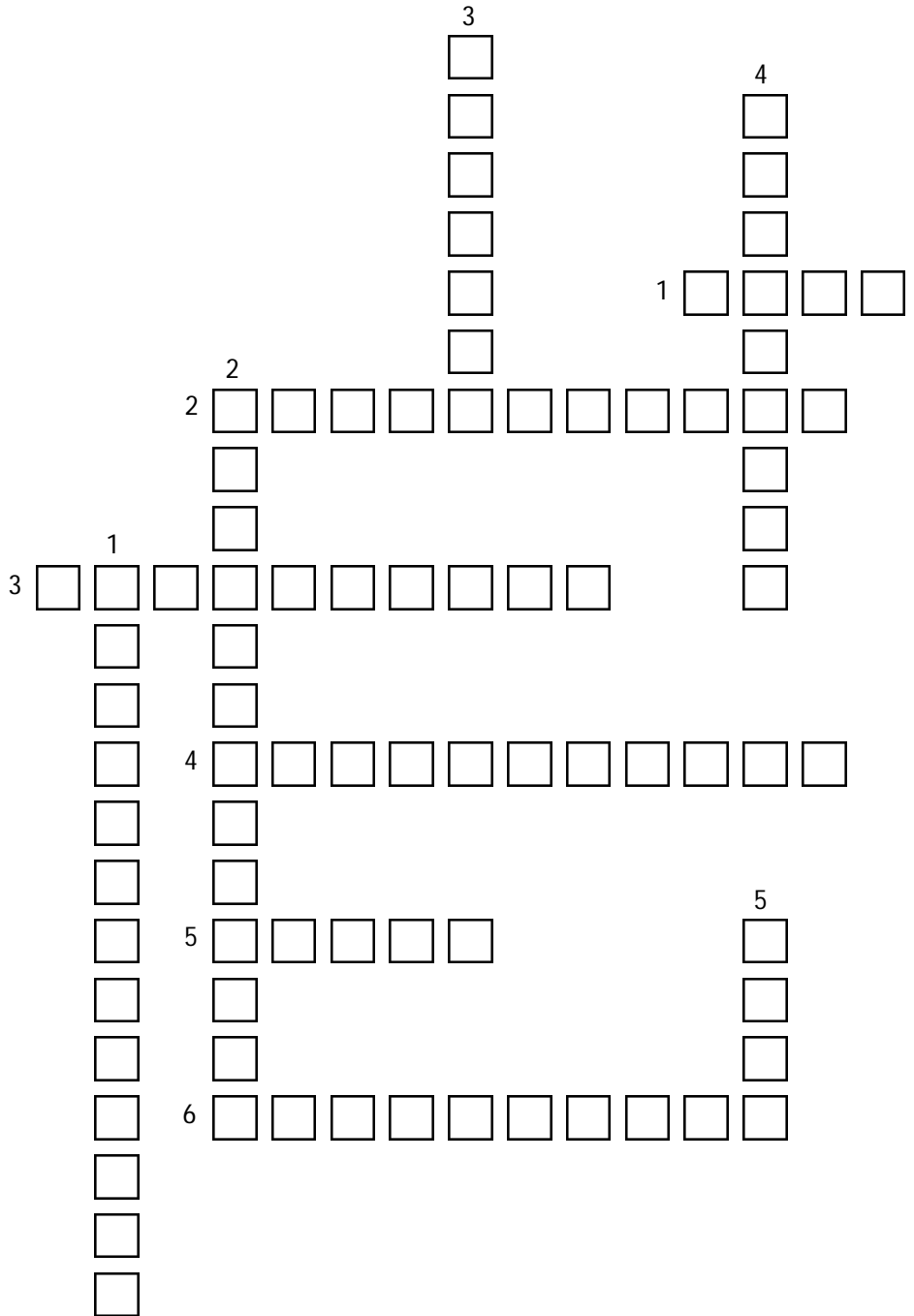
CROSSWORD PUZZLE

Across:

1. A messenger-RNA code word is called a _____.
2. _____ is the process that takes place when proteins are made from the instructions of messenger-RNA.
3. Transfer-RNA carries _____ to the messenger-RNA.
4. _____ is the process that takes place when DNA makes a copy of itself.
5. All genetic code words have _____ "letters".
6. Four _____ subunits are needed to make a DNA molecule.

Down:

1. The DNA molecule is called a _____ because it is very large.
_____ is the process by which DNA is copied into messenger RNA.
3. Most of a cell's DNA is found in its _____.
4. Proteins are made on organelles called _____.
5. A region of the DNA molecule that stores instructions for a protein is called a _____.



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PRE-TEST

Directions: Define each of the following.

1. Messenger RNA–
2. Genetic code word–
3. Anticodon–
4. Transfer RNA–
5. Proteins–
6. Ribosome–
7. Amino acid–
8. Nucleotide Subunit–
9. Macromolecule–
10. Replication of DNA–

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VIDEO QUIZ

Directions: Define each of the following.

1. **True or False?** The four subunits of DNA are used as the "letters" of the genetic code alphabet. _____
2. **True or False?** Genetic code words represent different proteins. _____
3. **True or False?** Translation takes place on ribosomes. _____
4. **True or False?** There is usually one gene on each chromosome. _____
5. **True or False?** DNA is transcribed into messenger RNA in the nucleus. _____