

NAME _____

PERIOD _____

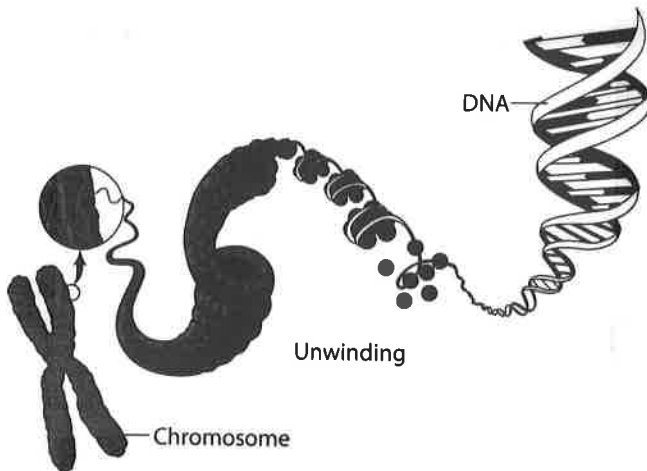
DUE DATE _____

DNA STRUCTURE

BACKGROUND: DNA, the abbreviation for deoxyribonucleic acid, is sometimes called the "blueprint of life." This is because the DNA molecule contains the

plans for the building of an organism. The chemical, DNA, is the building block of genes. Each gene carries the "recipe" for the synthesis of a protein. These proteins then determine the traits of an organism such as hair color and height.

DNA is composed of sugars, phosphates, and 4 bases (A,C,G,&T) formed into a twisted ladder shape. The order of the bases determines the protein coded for. A mutation is a change in the normal order of bases usually resulting in a harmful change to the protein product.



- OBJECTIVES:**
- To construct a model of the DNA molecule
 - To relate the structure of DNA to its function

MATERIALS: Scissors 6 crayons Glue

PROCEDURE:

- (1) Complete the Color Key below using 6 different colors.
- (2) Color in each figure on the Molecule pages using the respective colors from your Color Key. The different types of molecules are represented by single letters as follows:

S = Sugar

P = Phosphate

C = Cytosine

G = Guanine

A = Adenine

T = Thymine

- (3) Cut the colored molecules out.
- (4) On a blank sheet of paper correctly arrange the molecules into an "unwound" DNA structure. Glue the molecules into place.

C O L O R K E Y



= SUGAR



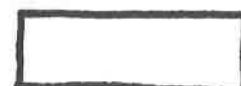
= PHOSPHATE



= CYTOSINE



= GUANINE



= ADENINE



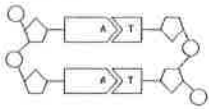
= THYMINE

CONCLUSIONS AND REGENTS PRACTICE

1. What do the letters DNA stand for? _____

2. Where is DNA located in a cell? (circle one) CYTOPLASM NUCLEUS

A portion of a molecule is shown in the diagram below.



3. Which statement best describes the main function of this type of molecule?

- A) It is a structural part of the cell wall.
- B) It stores energy for metabolic processes.
- C) It determines what traits may be inherited.
- D) It transports materials across the cell membrane.

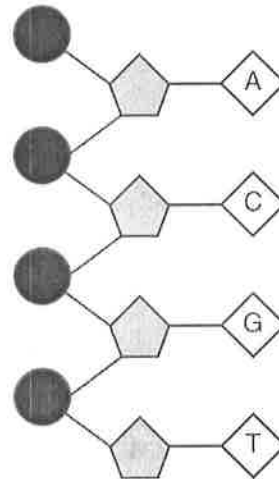
4. Hereditary traits are transmitted from generation to generation by means of

- A) specific sequences of bases in DNA in reproductive cells
- B) proteins in body cells
- C) carbohydrates in body cells
- D) specific starches making up DNA in reproductive cells

5. In a DNA sample, 15% of the bases are thymine (T). What percentage of the bases in this sample are adenine (A)?

- A) 15% B) 30% C) 35% D) 85%

The diagram below represents a portion DNA molecule.



6. The letters represent different types of

- A) sugar molecules B) molecular bases
- C) enzymes D) proteins

7. Which statement is correct concerning hereditary information?

- (1) A chromosome is composed of many genes.
- (2) A gene is composed of many chromosomes.
- (3) Each chromosome carries the same information.
- (4) Each gene carries the same information.

8. Which series is arranged in correct order according to increasing size?

1. DNA, gene, chromosome
2. Chromosome, gene, DNA
3. DNA, chromosome, gene
4. Gene, chromosome, DNA

9. The shape of a DNA molecule is
(a) straight. (b) circular. (c) flat. (d) spiral.

10. A short section of DNA that codes for a trait is a
(a) protein. (b) sugar. (c) chromosome. (d) gene.

11. Four different segments of a DNA molecule are represented below.

Segment 1	Segment 2	Segment 3	Segment 4
T-A-G-G-C	G-G-T-G-A	G-A-T-T-A	C-A-A-T-G
A-T-C-C-G	C-C-A-C-T	C-C-A-A-T	G-T-T-A-C

There is an error in the DNA molecule in

- A) segment 1, only B) segment 3, only
C) segments 2 and 3 D) segments 2 and 4

Base your answers to questions 12 and 13 on the information below and on your knowledge of biology.

In 2003, as a result of the Human Genome Project, the complete sequence of all the bases in human DNA was released to the public. Although knowing the entire sequence of bases has proven valuable, scientists are currently working to map genes. Mapping genes involves determining the exact location of each gene. Since much of human DNA does not code for a protein, it is challenging to figure out which segments are actual genes. Often, scientists look at the percent composition of bases in a segment of DNA. If the segment of DNA has a large percentage of C and G bases (together over 50%), it is likely that it is a gene and codes for a protein.

12. A scientist analyzes the bases in a segment of DNA from a human skin cell to determine if it codes for a protein. The base A is 12% of the bases in this segment of DNA. Calculate the percentage of bases that would be C. [1]

_____ %

13. Is it likely this segment of DNA codes for a protein? Circle yes or no and support your answer. [1]

Circle one: Yes or No

