

Sec.: _____ Name: _____

Experiment: Constructing a Model of DNA
Replication (B. Science 10-12-2b)

Purpose: To make a model to illustrate how DNA replicates.

Materials: colored construction paper (white, red, dark blue, light blue, dark green, light green)
metric ruler
scissors transparent tape

Caution: be careful of scissors

Methods: Steps 1 - 2 has been done for you.

With the scissors, cut out the pieces of colored construction paper as indicated in the chart. Write the name of each part of your DNA model on the appropriate piece of construction paper.

<u>Part of DNA Model</u>	<u>Color</u>	<u>size (cm x cm)</u>	<u>number of each</u>
sugar	white	2 x 2	54
phosphate group	red	1 x 2	54
adenine (A)	(black)dark blue	1 x 2	18
thymine (T)	light blue	1 x 2	18
guanine (G)	dark green	1 x 2	9
cytosine (C)	light green	1 x 2	9

2. To construct a model of a DNA nucleotide, tape a phosphate group, a sugar, and a guanine (G) together in the same manner as shown in figure 12-5 on page 291 of your textbook.

3. Attach the nine nucleotide models together in the following sequence G, T, T, A, C, A, A, T, C by putting the sugar on one nucleotide of the phosphate group on the next nucleotide (**do not tape them together**). This will form the single strand of your DNA model.

4. Using the rules for base pairing, construct a second strand of the DNA model that is complementary to the first strand. Put the nucleotides together as you did in step 3.

Do not tape the two strands of DNA together. Record the sequence of nitrogenous bases of the **complementary strand** of your DNA model.

5. Now separate the two strands from each other and use each to construct a **new complementary strand** for each by adding the appropriate nucleotides to these two strands. At this point, show your teacher the results and have your teacher record his signature on the results section of your lab.

6. Record the sequence of nitrogenous bases for each strand of the double helix pairs.

Results:

4. sequence: _____ 5. signature: _____

6. original strand: **G T T A C A A T C**
 new complement:

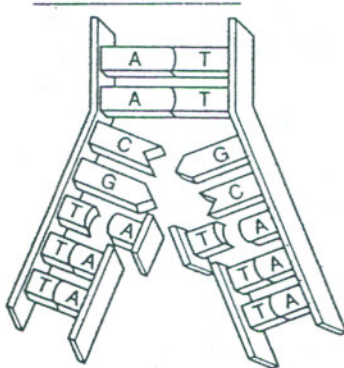
complement strand from original:
 new complement:

Conclusions:

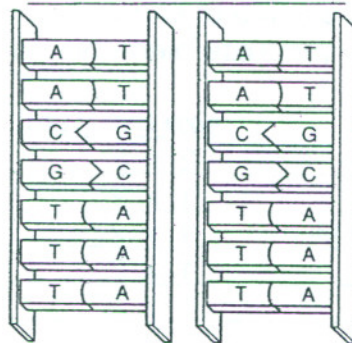
1. Why is complementary base pairing necessary for replication?
2. If each triplet of nitrogenous bases (three bases) on DNA codes for a specific amino acid, how many amino acids will your original DNA model code for?
3. Where, in the cell, does this DNA replication occur?

Discussion:

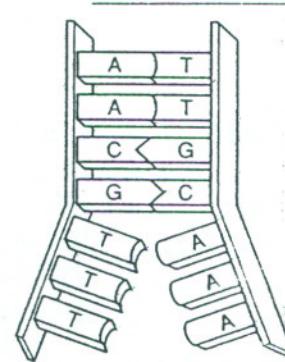
1. Place the diagrams in the correct order by writing the numbers 1 through 3 above each diagram. Then answer the questions that follow.



Complementary bases attach to template.



Two molecules of DNA identical to each other and the original molecule are made.



DNA "unzips."

2. What process is shown in these diagrams?
3. How are enzymes involved in this process?
4. Describe what is happening when the DNA is "unzipping"?
5. Why is it important that exact copies of DNA be made?
6. Suppose that a sequence of one DNA strand is TACAACGTC. Write the corresponding sequence on the other strand.

T A C A A C G T C original strand
 _____ corresponding sequence

7. Read Genesis 1: 24 - 25. What biological term(s) do we use that explains the process "after its kind"?