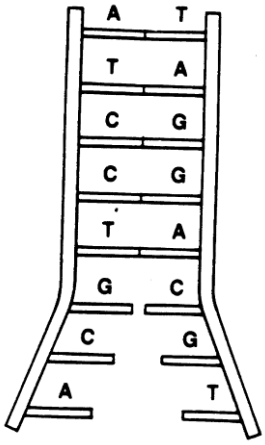
Name:_____ KEY _____**Period:**_____

DNA Replication Practice

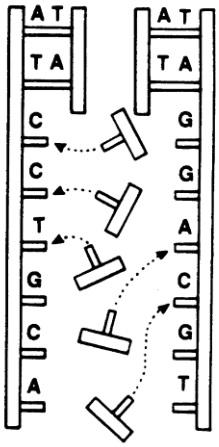
Directions: Below are the 3 steps in DNA replication. Follow the directions for each step and then answer the questions below.

1. -What is happening to the DNA molecule in the figure? (Explain the first step in DNA replication)



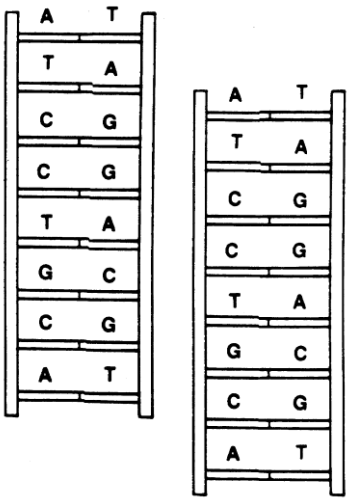
The enzyme helicase untwists the DNA helix and breaks the hydrogen bonds that are holding the nitrogenous bases together.

2. -What happens to the DNA molecule during the second step of DNA replication?



The enzyme RNA primase puts down a short piece of RNA that indicates where replication will begin. DNA polymerase reads each DNA strand and adds complementary nucleotides: A-T / C-G

3. -What happens during the third step of DNA replication?



DNA ligase seals and checks the replicated DNA strands. The replication of DNA is semi-conservative as both strands (leading and lagging strand) act as a template for replication.

How DNA Is Copied

4. What does it mean that the two strands of DNA are complementary? _____
   The nucleotide sequences are matched A-T/ C-G

5. What is **DNA replication?** Making a copy of DNA semi-conservatively.

6. Using your notes, book, and this assignment, place the steps of DNA replication in the correct order.
   2 a. The enzyme DNA polymerase moves along the exposed strands and adds complementary nucleotides to each nucleotide in each existing strand.
   1 b. The DNA double helix breaks or unzips down the middle between the base pairs.
   3 c. A complementary strand is created for each of the two strands of the original double helix.
   4 d. Two new identical DNA molecules have been produced.

7. (True or False) The process of DNA replication results in a copy of the original DNA molecule.

8. (True or False) DNA does not have to break apart to be copied.

9. (True or False) After DNA replication is complete, there are two new DNA molecules; one molecule has both of the original strands and one molecule has two new strands of DNA.

10. Where does DNA replication happen? the nucleus of the cell

11. When does DNA replication happen? During mitosis, after interphase

12. Below are DNA strands. Make the complementary DNA strand:

Original Strand: A T G C A A A T T G C T C A C C G G G G A T C A G C A C C G G
Complementary Strand: T A C G T T T A A C G A G T G G C C C C T A G T C G T G G C C

Original Strand: A G G G G A T C A G C A C C G G A T T T C A T G A G C C C T A
Complementary Strand: T C C C C T A G T C G T G G C C T A A A G T A C T C G G G A T

Original Strand: A A G T A C G A T C G A T G C A C A T G C A T G G C T A C G C
Complementary Strand: T T C A T G C T A G C T A C G T G T A C G T A C C G A T G C G

When a cell copies a DNA molecule:

1. DNA is unzipped. by helicase
2. The complementary bases are added to each template strand. by DNA polymerase
3. The 2 new strands are proofread for errors. by ligase and then DNA winds up