**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. -Color the **DNA molecule** **red**.

 -What does the diagram to the right show happening

 to the DNA molecule? (Explain the first step in DNA replication).



2. -Color the **new DNA nucleotides** in the diagram to

 the right **blue**. Color the **original DNA** strands **red**.

 -What happens to the DNA molecule during the second

 step of DNA replication?



3. -Color the **new DNA** **strands blue** and color the **other DNA**

 **strands red**.

 -What happens during the third step of DNA replication?

 -What happens during the fourth step of DNA replication?

 -Explain why the fourth step is necessary?

 -Which color, red or blue, represents the original template? \_\_\_\_\_\_\_\_\_\_\_\_

 -Explain the term **semi**-**conservative** and how it relates to what you just colored in this activity.

1. What does it mean that the two strands of DNA are **complementary**?
2. What is **DNA replication?**

6. Using your notes and this assignment place the steps of DNA replication in the correct order.

 \_\_\_\_ a. An enzyme moves along the exposed strands and adds complementary nucleotides to each nucleotide in each existing strand.

 \_\_\_\_ b. The DNA double helix breaks or unzips down the middle between the base pairs.

 \_\_\_\_ c. A complementary strand is created for each of the two strands of the original

 double helix.

 \_\_\_\_ d. DNA polymerase “proofreads” the new strand to check for errors. Two new identical DNA molecules have been produced.

1. (True or False) The process of DNA replication results in a copy of the original DNA molecule.
2. (True or False) Sugars and phosphates break off from the DNA nucleotide to provide energy for DNA replication.
3. (True or False) DNA does not have to break apart to be copied.
4. (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.
5. Where does DNA replication happen? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
6. When does DNA replication happen? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
7. Explain why it is necessary for DNA to replicate BEFORE cellular division.
8. 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:

 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:

1. What do you think would happen if there was no enzyme to “proofread” this process?

Let’s See What Happens: Mutations (we will come back to this later)

* + - * POINT Mutation- one base is substituted for another

*Example*:

Original: GGT ATC GGA TTA

Replicated: GGC ATC GGA TTA

* + - * FRAME SHIFT Mutation- one base is added or deleted and it shifts sequence

*Example*:

Original: GGT ATC GGA TTA

Replicated: GGA TCG GAT TA

1. What type of mutation has the greater effect on the DNA? Why?