3-D Molecular Designs
...where molecules become real ™

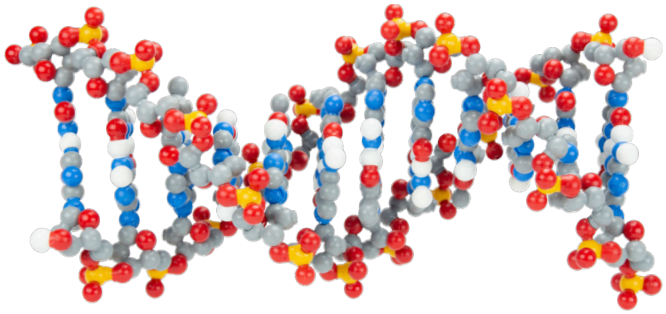
DYNAMIC DNA KIT©

Student Answer Sheet

Part 2 - Modeling DNA Function: Replication

Date: _____ Student Name: _____

1. Label the 5' and 3' ends of the model pictured to the right:



2. Record the parental DNA nitrogen base sequence you are using to model DNA replication paying attention to the 5' and 3' ends. Circle which end you intend to use as the point of origin of your replication fork.

5' _____ _____ _____ _____ _____ _____ 3'

3' _____ _____ _____ _____ _____ _____ 5'

3. As you untwist and separate your DNA strands, which enzyme are you simulating in this process?

_____

4. In what direction is the **new** DNA strand synthesized?

_____

5. Calculate the length of time in days it would take to copy the human genome. Show all calculations including units.

_____

_____

6. Why do you think multiple replication bubbles form during the process of DNA replication?

_____

_____

7. What enzyme are you simulating as you add nucleotides to synthesize the new DNA strands?

_____

8. Is the DNA polymerase acting on the leading DNA strand being moving into OR moving away from the replication fork? Explain why.

_____

_____

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9. Is the DNA polymerase acting on the lagging DNA strand moving into OR moving away from the replication fork?

10. How do the DNA sequences in the newly synthesized DNA molecule models compare?

11. Which of the three mechanisms of DNA replication explains how two molecules of DNA are synthesized from one?

12. Create a schematic model showing DNA replication. Include and label the parental strands of DNA, the leading strand, and the lagging strand in your diagram. Be sure to label the 3' and 5' ends of the DNA strands and indicate the direction of DNA synthesis.

13. Evaluation of the model. What steps are missing in the simulation of the process of DNA replication when using this model?