

Active Reading

Section: The Replication of DNA

Read the passage below. Then answer the questions that follow.

The process of making a copy of DNA is called **DNA replication**. It occurs during the synthesis (S) phase of the cell cycle, before a cell divides. The process can be broken down into three steps.

Step 1: Before replication can begin, the double helix must unwind. This is accomplished by enzymes called **DNA helicases**, which open up the double helix by breaking the hydrogen bonds that link the complimentary nitrogen bases. Once the two strands of DNA are separated, additional enzymes and other proteins attach to each strand, holding them apart and preventing them from twisting back into their double-helical shape. The two areas on either end of the DNA where the double helix separates are called **replication forks** because of their Y shape.

Step 2: At the replication fork, enzymes known as **DNA polymerases** move along each of the DNA strands, adding nucleotides to the exposed nitrogen bases according to the base-pairing rules. As the DNA polymerases move along, two new double helixes are formed.

Step 3: Once a DNA polymerase has begun adding nucleotides to a growing double helix, the enzyme remains attached until all of the DNA has been copied and it is signaled to detach. This process produces two DNA molecules, each composed of a new and an original strand. The nucleotide sequences in both of these DNA molecules are identical to each other and to the original DNA molecule.

SKILL: READING EFFECTIVELY

Read each question, and write your answer in the space provided.

1. What is replication?

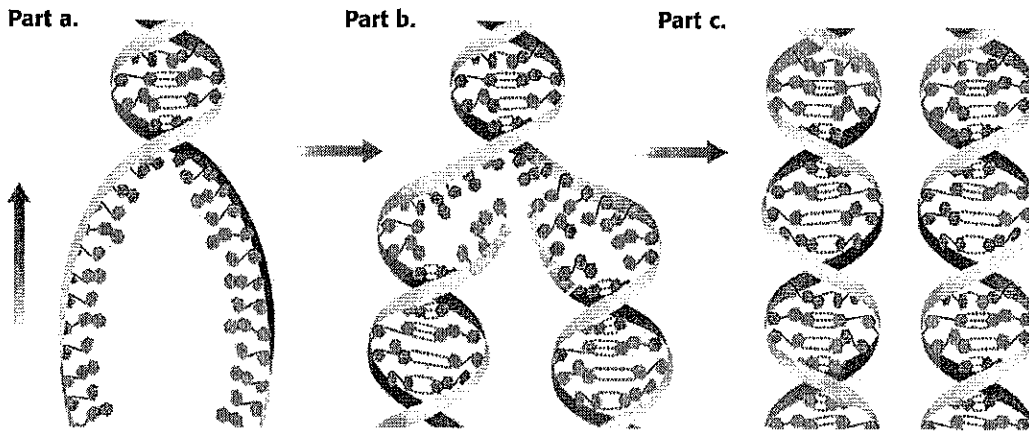
2. When does replication occur?

Active Reading *continued*

3. What must occur before replication can begin?

SKILL: INTERPRETING GRAPHICS

4. The figure below shows DNA replicating. In the space provided, describe what is occurring at each lettered section of the figure.



Part a. _____

Part b. _____

Part c. _____

In the space provided, write the letter of the term or phrase that best completes the statement.

- _____ 5. DNA helicases and DNA polymerases are alike in that both are types of
- a. nucleotides.
 - b. nitrogen bases.
 - c. enzymes.
 - d. Both (a) and (b)