12 Molecular Genetics

2 Replication of DNA

TEKS 4(A), 4(B), 5(A)

MAIN IDEA

Write the Main Idea for this lesson.

Review Vocabulary

template

Recall the definition of the Review Vocabulary term.

template

New Vocabulary

semiconservative replication

DNA polymerase

Okazaki fragment

Use your book to define the following terms. Then look through the section to find a sentence with each term. Write the sentence.

semiconservative replication

DNA polymerase

Okazaki fragment

2 Replication of DNA (continued)

Student Edition, pp. 333–335

Reading Essentials, pp. 132–133

Describe semiconservative DNA replication.

Model	During replication, the parental strands	The new DNA molecule is composed of
Semiconservative replication		

Sequence and model each step in the replication of a DNA molecule. Write about what happens, and draw a DNA molecule going through each step. In the last box, describe and draw the products of replication.

A.	**B.**
C.	**D.**

GET IT? **Explain** how base pairing during replication ensures that the strands produced are identical to the original strand.

2 Replication of DNA (continued)

Complete the table below on the role of each protein in DNA replication. The first one has been done for you.

Protein	Stage of DNA Replication	Activity
DNA helicase	unwinding	unwinds and unzips the DNA
DNA ligase		
DNA polymerase		
RNA primase		
Single-stranded binding protein		

Contrast the differences between prokaryotic and eukaryotic DNA replication.

	Eukaryotes	Prokaryotes
Number of origins for DNA replication		
Where replication takes place in the cell		

SUMMARIZE

Analyze how the activity of DNA polymerase is consistent with Watson and Crick's model of semiconservative replication.

2 Replication of DNA (continued)

REVIEW IT!

1. **MAIN**IDEA **Indicate** the sequence of the template strand if a nontemplate strand has the sequence 5′ ATGGGGCGC 3′.

2. **Describe** the role of DNA helicase, DNA polymerase, and DNA ligase.

3. **Diagram** the way leading and lagging strands are synthesized.

2 Replication of DNA (continued)

4. Explain why DNA replication is more complex in eukaryotes than in bacteria.

5. If the bacteria *E. coli* synthesize DNA at a rate of 100,000 nucleotides per min and it takes 30 min to replicate the DNA, how many base pairs are in an *E. coli* chromosome?