

# Reinforcement

## Mutations

**Complete this worksheet after you finish reading the section "How DNA Works."**

DNA is made up of nucleotides that each contain a sugar, a phosphate, and a base. The four possible bases are adenine, cytosine, thymine, and guanine. Remember that adenine and thymine are complementary and form pairs, and cytosine and guanine are complementary and form pairs.

- Below is half of a section of DNA that has been split apart and is ready to copy itself. Write the appropriate letter in the space provided to build the DNA's new complementary strand.

**G** - - - - - \_\_\_\_\_

**T** - - - - - \_\_\_\_\_

**A** - - - - - \_\_\_\_\_

**A** - - - - - \_\_\_\_\_

**C** - - - - - \_\_\_\_\_

**T** - - - - - \_\_\_\_\_

**C** - - - - - \_\_\_\_\_

**C** - - - - - \_\_\_\_\_

**T** - - - - - \_\_\_\_\_

**Reinforcement** *continued*

2. Sometimes mistakes happen when the DNA is being copied. These mistakes, or mutations, change the order of the bases in DNA. There are three kinds of mutations that can occur in DNA: deletion, insertion, and substitution.

a. Below are two sequences—an original sequence of bases in DNA and the sequence of bases after a mutation has occurred. On the original base sequence, show where the mutation has occurred by circling the appropriate base pair, and write what type of mutation it is in the space provided.

**C G**

**T A**

**C G**

**C G**

**T A**

**A T**

**A T**

**A T**

**C G**

**C G**

**T A**

**Base sequence in original cell DNA**

**C G**

**T A**

**C G**

**C G**

**T A**

**A T**

**A T**

**A T**

**T A**

**C G**

**T A**

**Base sequence in a cell with mutated DNA**

**Reinforcement** *continued*

**b.** Below are two more sequences—an original sequences of bases in DNA and the sequence of bases where a mutation has occurred. On the original base sequence, show where the mutation has occurred by circling the appropriate base pairs and write what type of mutation it is in the space provided.

**C G**

**T A**

**A T**

**C G**

**C G**

**G C**

**T A**

**A T**

**A T**

**C G**

**A T**

**T A**

**Base sequences in  
original cell DNA**

**C G**

**T A**

**A T**

**C G**

**C G**

**G C**

**T A**

**A T**

**A T**

**A T**

**T A**

**Base sequences in a  
cell with mutated DNA**

**Reinforcement** *continued*

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**3.** Ribosomes “read” a complementary copy of DNA in order to make proteins. Each group of three bases forms the code for an amino acid. When mutations occur in DNA they can change the information that the DNA carries.

To understand this process better, look at the sentence below, which uses only three-letter words.

AMY GOT THE RED HOT POT OFF THE LOG

If one letter is deleted from the sequence, it can become:

AMY GTT HER EDH OTP OTO FFT HEL OG

How is this similar to what can happen when a mutation occurs in DNA?

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