

INVESTIGATE
BioLab

RNA Transcription

Chapter 11

PREPARATION

Problem

How does the order of bases in DNA determine the order of bases in mRNA?

Objectives

In this BioLab, you will:

- **Formulate a model** to show how the order of bases in DNA determines the order of bases in mRNA.
- **Infer** why the structure of DNA enables it to be easily copied.

Materials

construction paper, 5 colors
scissors
clear tape
pencil

Safety Precautions

Be careful when using scissors. Always wear goggles in the lab.

Skill Handbook

Use the **Skill Handbook** if you need additional help with this lab.

PROCEDURE

1. Copy the illustrations of the four different DNA nucleotides on page 302 of your text onto your construction paper, making sure that each different nucleotide is on a different color paper. You should make ten copies of each nucleotide.
2. Using scissors, carefully cut out the shapes of each nucleotide.
3. Using any order of nucleotides that you wish, construct a double-stranded DNA molecule. If you need more nucleotides, copy them as before.
4. Fasten your molecule together using clear tape. Do not tape across base pairs.
5. As in step 1, copy the illustrations of A, G, and C nucleotides. Use the same colors of construction paper as in step 1. Use the fifth color of construction paper to make copies of uracil nucleotides.
6. With scissors, carefully cut out the nucleotide shapes.
7. With your DNA molecule in front to you, demonstrate the process of transcription by first pulling the DNA molecule apart between the base pairs.
8. Using only one of the strands of DNA, begin matching complementary mRNA nucleotides with the exposed bases on the DNA model to make RNA.
9. When you are finished, tape your new mRNA molecule together.

ANALYZE AND CONCLUDE

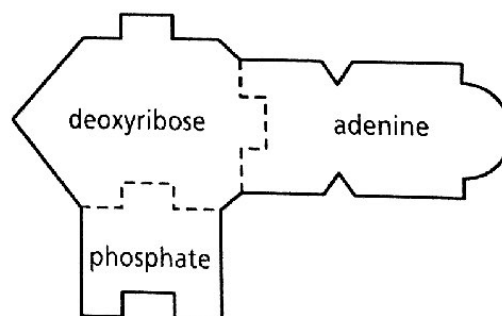
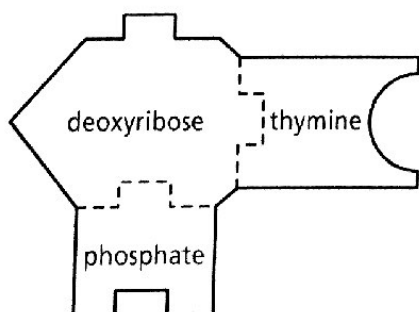
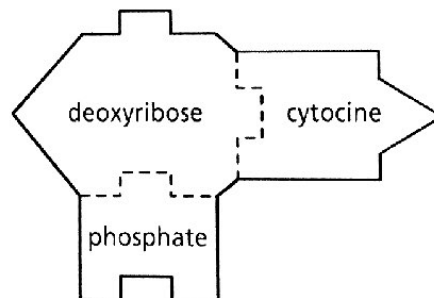
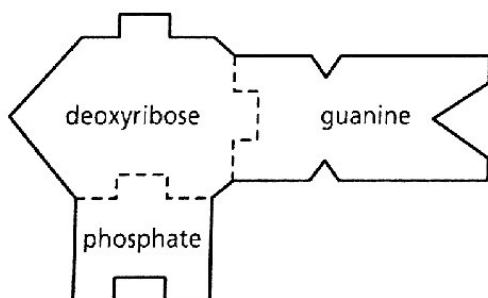
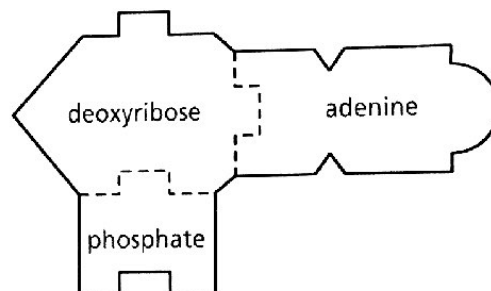
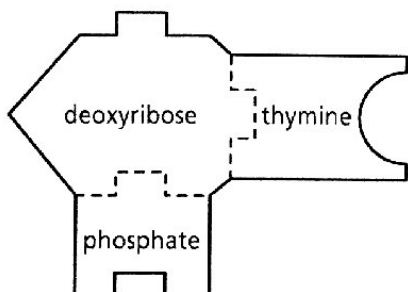
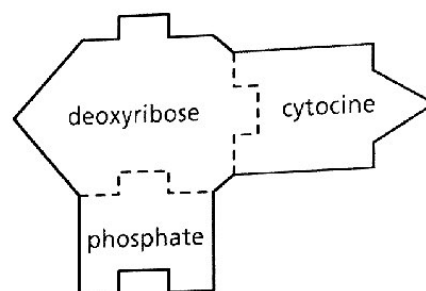
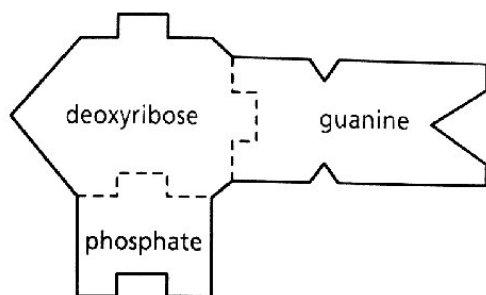
- 1. Observing and Inferring** Does the mRNA model more closely resemble the DNA strand from which it was transcribed or the complementary strand that wasn't used? Explain your answer.

- 2. Recognizing Cause and Effect** Explain how the structure of DNA enables the molecule to be easily transcribed. Why is this important for genetic information?

- 3. Relating Concepts** Why is RNA important to the cell? How does an mRNA molecule carry information from DNA? Where does the mRNA molecule take the information?

DNA Nucleotides for BioLab, Chapter 11 (reproduce 4 copies per student)

Copy these onto white paper and have students color the models with colored pencils—a different color for each nucleotide.



RNA Nucleotides for BioLab, Chapter 11 (reproduce 2 copies per student)

Copy these onto white paper and have students color the models with colored pencils—a different color for each nucleotide.

