



Name:

Date:

Student Exploration: RNA and Protein Synthesis

Directions: Follow the instructions to go through the simulation. Respond to the questions and prompts in the orange boxes.

Vocabulary: amino acid, anticodon, codon, gene, messenger RNA, nucleotide, ribosome, RNA, RNA polymerase, transcription, transfer RNA, translation

Prior Knowledge Questions (Do these BEFORE using the Gizmo.)

- Suppose you want to design and build a house. How would you communicate your design plans with the construction crew that would work on the house?

Like creating a blueprint.

- Cells build large, complicated molecules, such as proteins. What do you think cells use as their "design plans" for proteins?

DNA

Gizmo Warm-up

Just as a construction crew uses blueprints to build a house, a cell uses DNA as plans for building proteins. In addition to DNA, another nucleic acid, called **RNA**, is involved in making proteins. In the *RNA and Protein Synthesis* Gizmo, you will use both DNA and RNA to construct a protein out of **amino acids**.

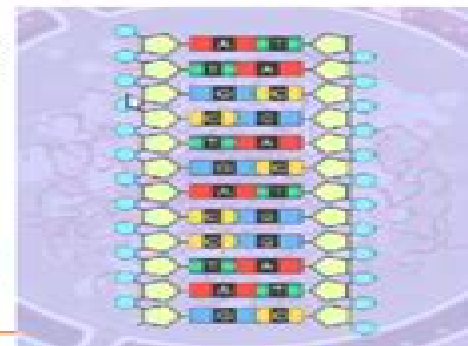
- DNA is composed of the bases adenine (A), cytosine (C), guanine (G), and thymine (T). RNA is composed of adenine, cytosine, guanine, and uracil (U).

Look at the SIMULATION pane. Is the displayed segment a part of a DNA or RNA molecule? How do you know?

DNA bc it has the bases A-T & G-C

- RNA polymerase** is a type of enzyme. Enzymes help chemical reactions occur quickly. Click the **Release enzyme** button, and describe what happens.

It splits the DNA



Activity A:

Transcription

Get the Gizmo ready:

- If necessary, click **Release enzyme**.



Introduction: The first stage of building a protein involves a process known as **transcription**. In transcription, a segment of DNA serves as a template to produce a complementary strand of RNA. This complementary strand is called **messenger RNA**, or mRNA.

Question: What occurs during transcription?

- Experiment:** Like DNA, RNA follows base-pairing rules. Experiment to find which RNA **nucleotide** on the right side of the Gizmo will successfully pair with the thymine at the top of the template strand of DNA. (NOTE: The DNA on the right side is the template strand.)

Which RNA base bonded with the thymine?

Uracil

- Experiment:** The next three bases on the DNA template strand are adenine, cytosine, and guanine. Use the Gizmo to answer the following questions:

Rna And Protein Synthesis Gizmo Answer Key

SA Adler



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