

Pre-Lab, Skills, and Standards Alignments

RNA TRANSCRIPTION

Genes are like recipes that tell cells how to make proteins that build structures, catalyze chemical reactions, and act as molecular messengers. Students will explore the Central Dogma, including RNA transcription and translation - two important steps in the protein production pathway—and will build a model that shows both steps.

Lab Length: 2 hours

Suggested Pre-Lab Teaching

- DNA structure and function
- Heredity
- Cell anatomy

Lab Skills

- Compare and contrast DNA and RNA.
- Decode genetic information in RNA to reveal the amino acids involved in protein production.
- Build a model that shows understanding of both RNA transcription and translation.

Conceptual Knowledge/Skills

- Describe the steps of RNA transcription and translation using the 2-D model.
- Explain how a genetic mutation might affect the production of a protein, and why sometimes the mutation may be neutral.

New York State Science Learning Standards/NGSS

Science and Engineering Practices	Disciplinary Core Ideas	Cross Cutting Concepts
<p><u>Developing and Using Models</u> Develop and/or use a model to predict and/or describe phenomena.</p>	<p><u>LS1.A: Structure and Function</u> Within cells, special structures are responsible for particular functions, and the cell membrane forms the boundary that controls what enters and leaves the cell. (MS-LS1-2)</p> <p><u>LS3.A: Inheritance of Traits</u> Genes are located in the chromosomes of cells, with each chromosome pair containing two variants of each of many distinct genes. Each distinct gene chiefly controls the production of specific proteins, which in turn affects the traits of the individual. Changes (mutations) to genes can result in changes to proteins, which can affect the structures and functions of the organism and thereby change traits. (MS-LS3-1)</p>	<p><u>Structure and Function</u> Complex and microscopic structures and systems can be visualized, modeled, and used to describe how their function depends on the shapes, composition, and relationships among its parts; therefore, complex natural and designed structures/systems can be analyzed to determine how they function.</p> <p><u>Patterns</u> Patterns can be used to identify cause and effect relationships.</p> <p><u>Cause and Effect</u> Cause and effect relationships may be used to predict phenomena in natural or designed systems.</p>



	<p><u>LS3.B: Variation of Traits</u></p> <p>In addition to variations that arise from sexual reproduction, genetic information can be altered because of mutations. Some changes are beneficial, others harmful, and some neutral to the organism. (MS-LS3-2)</p>	
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