

**Southwest Center for Microsystems Education (SCME)
University of New Mexico**

Overview of DNA Learning Module

This Learning Module contains five (5) units:

Knowledge Probe (KP or pre-test)
Primary Knowledge (PK)
Exploration of DNA Concepts Activity
Exploring DNA Applications Activity
Final Assessment

A map is provided as a suggested outline for this learning module.

This learning module provides an overview of the DNA molecule, its role as genetic material, its molecular components and structure and DNA replication. This information is necessary to understand the role of DNA in bioMEMS (bio MicroElectroMechanical Systems). Activities provide the opportunity for more exploration in DNA concepts and DNA applications in microtechnologies.

Target audiences: High School, Community College, University

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Website: www.scme-nm.org

Learning Module Map for Overview of DNA

This learning module provides an overview of the DNA molecule, its role as genetic material, its molecular components and structure, and DNA replication. This information is necessary to understand the role of DNA in bioMEMS (bio MicroElectroMechanical Systems). Activities provide the opportunity for more exploration in DNA concepts and DNA applications in microtechnologies.

Learning Module units (5):

- Knowledge Probe (pre-test)
- Overview of DNA Primary Knowledge (PK) Reading unit
- Exploration of DNA Concepts Activity
- Exploring DNA Applications Activity
- Assessment

Following is a suggested map on the implementation of this learning module. This map is strictly a suggestion. You may use any unit in this learning module as a stand-alone unit or activity OR in any sequence that best fits your classroom.

IMPORTANT STEPS	KEY POINTS	REASONS
Knowledge Probe (KP)	This is a pre-assessment that the participants could take prior to starting this learning module.	This KP helps to determine the participants' current knowledge of DNA concepts, the DNA molecule and applications within microsystems.

<p>Inquiry activity 1</p>	<p>Assign each student a letter A, T, G, or C. Have half of the students create a ssDNA sequence. Have the other half “match” correctly to the sequence. Questions that you could ask: <i>What have you just formed?</i> <i>What happens during transcription?(the dsDNA separates)</i> <i>What happens during reverse transcription? (the 2 ssDNAs joined together)</i> <i>Can you think of any fields or careers that rely on or use DNA?</i></p>	<p>This activity gets the participants thinking about DNA and what it is.</p>
<p>Assign the primary knowledge (PK) unit as a reading assignment.</p> <p>Review the Overview of DNA PK and address any questions.</p>	<p>A PowerPoint presentation can be downloaded by the instructor from scme-nm.org and presented to all participants.</p>	<p>This introduction will help participants better understand the activities.</p>
<p>Complete the activity “Exploration of DNA Concepts”</p>	<p>Participants explore the timeline for the development of the DNA concepts that we know today. They also explore DNA structure, code, applications and the genome.</p>	<p>This online tutorial allows the participants to explore at their own pace several concepts related to the DNA molecule.</p>
<p>Complete the activity “Exploring DNA Applications”</p>	<p>In this activity the participants further explore, and in more depth, the way DNA is used in a variety of applications. They learn about genes and how the few genes that differ in humans can be used to assist in forensics as well as medical diagnosis of a disease.</p>	<p>This activity is allows the students to better understand why DNA is important to microsystems and how it is used in a variety of applications. Participants will discover the areas that interest them the most.</p>

Final Assessment	Give the participants the <u>Overview of DNA</u> assessment.	Participants are evaluated on what they have learned about DNA, its basic concepts, and applications.
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