

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

# **Micropumps Overview Learning Module Instructor Guide**

This learning module contains 5 units:

Knowledge Probe (Pre-test)  
Micropumps Overview Primary Knowledge (PK)  
Diaphragm Pump Activity  
Capillary Action Activity  
Final Assessment

A Learning Module Map is provided for the instructor as a suggested outline on how to use this learning module.

*This learning module introduces the micropump, how it works and where it is used in microtechnology. Activities allow for further discovery into the operation of micropumps.*

Target audiences: High School, Community College, University

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Website: [www.scme-nm.org](http://www.scme-nm.org)

# Learning Module Map for Micropumps Overview

*This learning module introduces the micropump, how it works and where it is used in microtechnology. Activities allow for further discovery into the operation of micropumps.*

Learning Module units (5):

- Knowledge Probe (Pre-test)
- Micropumps Overview Primary Knowledge (PK)
- Diaphragm Pump Activity
- Capillary Action Activity
- Final Assessment

The purpose of this learning module is to introduce students to the types and operations of micro and nano-sized pumps, their applications, and their differences and similarities with macro-sized pumps.

Following is a suggested map on the implementation of this learning module.

IMPORTANT STEPS	KEY POINTS	REASONS
Knowledge Probe (KP) as pre-test	Give the participants the <u>Micropumps Overview Knowledge Probe</u> .	The KP can be used to determine the participants' current knowledge of micropumps. When compared with the responses of the Final Assessment, you can determine the effectiveness of this learning module.
Present the <u>Micropumps Overview PK</u>	Participants should read the PK.  A PowerPoint presentation can be downloaded by the instructor from <a href="http://scme-nm.org">scme-nm.org</a> and presented to all participants.	An introduction into micropumps is needed to help participants better understand the two activities.

Complete the activity “Diaphragm Pumps”	Participants design and build a diaphragm pump model that simulates a micro-sized pump.	Participants practice team skills and troubleshooting skills to build this model. A working model will demonstrate their understanding of how these pumps work.
Complete the activity “Capillary Action”.	Participants use two different sizes of fluid channels to demonstrate the capillary action of fluids.	Participants will be able to observe the physical property of fluids that allow them to flow without mechanical means through small channels. They will observe and discuss how the size of the channels affects the fluid’s flow rate.
Final Assessment	Give the participants the final assessment.	Participants are evaluated on what they have learned about micropumps, how they work and how they are used.

*Adapted from Graupp, P. & Wrona, R. (2006) The TWI Workbook: Essential Skills for Supervisors. New York, NY. Productivity Press.*

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