



## Microcomputer-based Laboratories

Indicates a research-demonstrated benefit

### Overview

Laboratory activities that collect and present data graphically in real time, allowing students to get a direct intuitive sense of fundamental physics concepts that cannot be observed directly. When coupled with research-based curricula (see Similar Methods), MBL tools can lead to improved student learning.



**Type of Method**

Instructional strategy



**Level**

**Designed for:** Intro College Calculus-based , Intro College Algebra-based , High School



**Setting**

**Designed for:** Lab , Studio , Lecture - Large (30+ students)

**Can be adapted for:** Lecture - Small (<30 students), Recitation/Discussion Session



**Coverage**

Few topics with great depth, Many topics with less depth



**Topics**

Mechanics, Electricity / Magnetism, Waves / Optics, Thermal / Statistical



**Instructor Effort**

Medium



**Resource Needs**

Computers for student use in class, Lab equipment for student use - professional



**Skills**

**Designed for:** Conceptual understanding of physics content , Representing knowledge in multiple ways , Laboratory skills

**Can be adapted for:** Connecting conceptual and mathematical understanding, Think like a scientist, Enjoyment of physics, Designing experiments



**Research Validation**

**Based on research into:** how students learn , student ideas about specific topics

**Demonstrated to improve:** scores on multiple choice conceptual tests

**Studied using:** conceptual pre/post exams , research conducted at multiple institutions , research conducted by someone other than developers



**Compatible  
Methods**

[Peer Instruction](#), [PhET](#), [UW Tutorials](#), [JiTT](#), [Ranking Tasks](#), [ILDs](#), [CGPS](#), [Physlets](#), [Context-Rich Problems](#), [RealTime Physics](#), [Workshop Physics](#), [TIPERs](#), [ABP Tutorials](#), [SCALE-UP](#), [Modeling](#), [OSP](#), [SDI Labs](#), [OST Tutorials](#), [ISLE](#), [Thinking Problems](#), [Workbook for Introductory Physics](#), [LA Program](#), [CAE TPS](#), [CPU](#), [SCL](#), [TEFA](#), [EiP](#), [Tools for Scientific Thinking](#), [M&I](#), [Tutorials](#), [Clickers](#), [Responsive Teaching](#)



**Similar  
Methods**

[ILDs](#), [RealTime Physics](#), [Workshop Physics](#), [ABP Tutorials](#), [EiP](#), [Tools for Scientific Thinking](#)



**Website**

<http://physicsed.buffalostate.edu/danowner/whyMBL.html>

