# *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.

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| **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)<br>**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<br>**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<br>**Demonstrated to improve:** scores on multiple choice conceptual tests<br>**Studied using:** conceptual pre/post exams , research conducted at multiple institutions , research conducted by someone other than developers |

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| **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 |

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