




## Modeling Instruction

 Indicates a research-demonstrated benefit




### Overview

Instruction organized around active student construction of conceptual and mathematical models in an interactive learning community.



Type of Method

Instructional strategy

**Designed for:** Teacher Professional Development  , High School  , Intro College Calculus-based  , Intro College Algebra-based, Intro College Conceptual, High School Chemistry





Level

**Can be adapted for:** Teacher Prep Course, Intermediate, Upper-level Undergraduate, Graduate School, any science or mathematics course



Setting

**Designed for:** Lecture - Small (<30 students)  , Studio 

**Can be adapted for:** Recitation/Discussion Session



Coverage

Few topics with great depth, Many topics with less depth



Topics

Mechanics, Electricity / Magnetism, Waves / Optics, Thermal / Statistical, Modern / Quantum, Astronomy, Other Science



Instructor Effort

High, Training and practice (a Modeling Workshop) are required to implement this method effectively as the learning environment is discourse-rich and this discourse must be encouraged and managed effectively.






Resource Needs

Computers for students, Advanced lab equipment, Tables for group work



Skills



**Designed for:** Conceptual understanding  , Problem-solving skills  , Using multiple representations  , Designing experiments, Metacognition





**Can be adapted for:** Lab skills, Making real-world connections, scientific argumentation, scientific reasoning



Research Validation


**Based on research into:** theories of how students learn 

**Demonstrated to improve:** conceptual understanding  , problem-solving skills 

**Studied using:** student interviews  , classroom observations  , research at multiple institutions  , research by multiple groups 

 **Compatible Methods** [PhET](#), [JiTT](#), [Physlets](#), [SCALE-UP](#), [OSP](#), [ISLE](#), [LA Program](#), [MBL](#), [CPU](#), [PUM](#), [Clickers](#), [MOP](#), [PRISMS PLUS](#), [Responsive Teaching](#)

 **Similar Method** None

 **Developer(s)** David Hestenes and Malcolm Wells

 **Website** <http://modelinginstruction.org/>