



## Matter and Interactions

Indicates a research-demonstrated benefit

### Overview

A modern calculus-based introductory curriculum with an emphasis on the application of fundamental principles and on the atomic nature of matter.



**Type of Method**

Full curriculum



**Level**

**Designed for:** Intro College Calculus-based , Teacher Professional Development



**Setting**

**Designed for:** Lecture - Large (30+ students), Lecture - Small (<30 students)  
**Can be adapted for:** Studio



**Coverage**

Many topics with less depth



**Topics**

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



**Instructor Effort**

Medium



**Resource Needs**

TAs / LAs, Projector, Computers for students, Cost for students



**Skills**

**Designed for:** Conceptual understanding , Model-building, To see clearly that a small number of fundamental principles can explain a very wide range of phenomena, To apply fundamental principles to new problems, To see the place of classical physics in the larger physics framework, Computational skills  
**Can be adapted for:** Problem-solving skills



**Research Validation**

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

**Demonstrated to improve:** conceptual understanding , beliefs and attitudes

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



**Compatible  
Methods**

[Peer Instruction](#), [PhET](#), [JiTT](#), [Ranking Tasks](#), [CGPS](#), [Physlets](#), [Context-Rich Problems](#), [TIPERs](#), [SCALE-UP](#), [OSP](#), [Thinking Problems](#), [LA Program](#), [CAE TPS](#), [MBL](#), [CPU](#), [SCL](#), [TEFA](#), [Clickers](#)



**Similar  
Method**

None



**Developer(s)**

Ruth Chabay and Bruce Sherwood



**Website**

<http://www.matterandinteractions.org/>