



## Thinking Problems

 Indicates a research-demonstrated benefit

### Overview

Questions for homework, clickers, and exams that help students connect mathematical and conceptual reasoning and relate physics to the real world.



#### Type of Method

Curriculum supplement



#### Level

**Designed for:** Intro College Calculus-based, Intro College Algebra-based, Intro College Conceptual

**Can be adapted for:** Teacher Prep Course, Teacher Professional Development, High School, Intermediate



#### Setting

**Designed for:** Lecture - Large (30+ students), Lecture - Small (<30 students), Recitation/Discussion Session, Homework, Studio

**Can be adapted for:** Lab



#### Coverage

Few topics with great depth, Many topics with less depth



#### Topics

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





#### Skills

**Designed for:** Conceptual understanding, Problem-solving skills, Making real-world connections

**Can be adapted for:** Metacognition



#### Research Validation

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



#### Compatible Methods

[Peer Instruction](#), [PhET](#), [UW Tutorials](#), [JiTT](#), [Ranking Tasks](#), [ILDs](#), [CGPS](#), [Physlets](#), [Context-Rich Problems](#), [TIPERs](#), [ABP Tutorials](#), [SCALE-UP](#), [OSP](#), [SDI Labs](#), [OST Tutorials](#), [Workbook for Introductory Physics](#), [LA Program](#), [CAE TPS](#), [MBL](#), [New Model Course](#), [CPU](#), [SCL](#), [TEFA](#), [CU Modern](#), [IQP](#), [M&I](#), [Tutorials](#), [Clickers](#), [Responsive Teaching](#)



#### Similar Methods

[Ranking Tasks](#), [TIPERs](#)



#### Developer(s)

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**Website**

<http://www.physics.umd.edu/perg/problems.htm>

