



## 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)**

E. F. Redish and the University of Maryland Physics Education Research Group



**Website**

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

