Paradigms in Physics

Indicates a research-demonstrated benefit

Overview

A restructuring of the upper division physics program, replacing standard courses on subfields of physics with short courses on the basic principles that broadly underlie these subfields: energy, symmetry, wave motion, rotations and so forth. Includes novel teaching strategies such as kinesthetic activities, computer simulations, integrated whiteboarding, and other small group activities. Paradigms course components and teaching strategies can be incorporated into more standard courses.

Type of Method	Instructional strategy, Full curriculum, Curriculum supplement, Computer simulations
Level	**Designed for:** Intermediate Undergraduate, Advanced Undergraduate
Setting	**Designed for:** Lecture - Small (<30 students), Recitation/Discussion Session, Lab, Homework **Can be adapted for:** Lecture - Large (30+ students), Studio
Coverage	Many topics with less depth
Topics	Mechanics, Electricity / Magnetism, Waves / Optics, Thermal / Statistical, Modern / Quantum, Mathematical
Instructor Effort	High
Skills	**Designed for:** Problem-solving skills, Conceptual understanding of physics content, Connecting conceptual and mathematical understanding, Coherent framework for physics, Understanding how physics relates to the real world, Think like a scientist, Enjoyment of physics, Laboratory skills, Representing knowledge in multiple ways **Can be adapted for:** Reflecting on one's own learning, Self-confidence around physics
Research Validation	**Based on research into:** how students learn , student ideas about specific topics **Demonstrated to improve:** retention of students **Studied using:** student interviews , classroom observations , video of students , analysis of written work

Compatible Methods	Peer Instruction, PhET, JiTT, CGPS, Physlets, SCALE-UP, OSP, LA Program, CAE TPS, CPU, TEFA, CU Modern, CU E&M, CU QM, QuILTs, Thermal Tutorials, Mechanics Tutorials, PI QM, Tutorials, Clickers, Responsive Teaching
Similar Methods	CU E&M, CU QM
Developer(s)	Oregon State University Physics Department
Website	http://physics.oregonstate.edu/paradigms