# Comprehensive Conceptual Curriculum for Physics ($C^3P$)

**Publisher and Developer:** University of Dallas, Department of Physics

**Grade levels:** 9–10

**Scientific domain:** Physics

**Web site:** http://phys.udallas.edu/

**Year profiled:** 2002

*$C^3P$*, developed in 1998, is a structured collection of lesson plans on CD-ROM, developed through a grant from the National Science Foundation. There are two routes for users to take to reach the activities: (1) The user can enter a virtual room containing various devices for accessing physics lessons and activities. Selecting a topic listed on a blackboard, the user can link to numerous learning objectives related to the topic chosen and then to lessons that pursue those objectives. There is also access to alternative activities appropriate to the lessons. (2) Users can access the list of topics from a computer screen in the room. Each topic takes the user to a list of related activities, which, in turn, are linked to the lessons for which the activities are suited. Throughout this process, the program provides a context for the activities, rather than presenting them in isolation or randomly. The virtual room contains a History of Physics Timeline and a "bookshelf" of resources that reflect the thinking of the developers, including background information on the learning objectives, story line, learning cycle, etc.

## SCOPE/CONTENT

*$C^3P$* is a physics curriculum organized around seven main topics: habits of mind, physics for the next generation, kinematics, forces and Newton's laws, energy, electricity and magnetism, and waves. Under each topic are a number of subtopics. The topic "energy," for example, includes sections on characteristics of energy, temperature and the first law, internal energy, transfer of energy, conservation of energy, conservation of momentum, collisions, conservation of momentum and relativity, work, and power. Each subtopic contains plans for structuring a teaching and learning context and for implementing related learning activities.

*$C^3P$* also includes the following features:

- Terminology, which includes over 50 pages of terms with scientific definitions, reworded in everyday language, with related possible misconceptions.
- Learner Outcomes taxonomy.
- Web links.
- Overview of *$C^3P$* in a slide presentation.
- Curriculum alignment with science standards of the states.
- Story Line, which discusses the major ideas behind the design of *$C^3P$.*
- Assessment Items.
- Learning cycles discussion.
- Physics Cartoons and Physics Songs.

### FORMAT

The CD-ROM provides a list of topics, subtopics, lessons, and activities for instruction. Each lesson is organized as a learning cycle consisting of three parts: Exploration, Concept Development, and Application. In most cases, the students perform the activity on their own according to the directions provided rather than on the CD. Some activities contain video clips and other forms of non-text media. The activities have been collected from various sources. Schools must provide physics lab equipment, a computer, graphing calculators, and computer-based laboratory equipment.

### ASSESSMENT INSTRUMENTS

The program provides assessment materials through links in the Resources section of the CD-ROM. Assessment tools include portfolios, teacher observables, multiple choice, and open-ended essays. The program provides pre- and post-assessment tests that are aligned with the curriculum.

### PROFESSIONAL DEVELOPMENT SUPPORT

Teachers must participate in a workshop in order to receive the CD-ROM. The CD-ROM includes a list of master teachers from around the country who are available to provide assistance as needed.

### STAND-ALONE VS. SUPPLEMENTAL

The developers of $C^3P$ consider the program to be a comprehensive curriculum.