

Hands-On Physics

Publisher and Developer: Concord Consortium

Grade levels: 9–12

Scientific domain: Physics

Web site: <http://hop.concord.org>

Year profiled: 2002

Hands-On Physics, developed in 1995, is a series of six project-based modules developed with funding from the National Science Foundation and disseminated through Concord Consortium's Web site. It is designed primarily to meet the needs of students entering advanced technical careers, but also describes itself as an alternative to standard high school or college physics courses. The modules' projects require equipment and materials that can be purchased at an electronic supply or hardware store or through kits from Kelvin Electronics (<http://www.kelvin.com>).

SCOPE/CONTENT

Each of the six units is approached through a project, with concepts developed as the students proceed through the unit. The electronics unit is designed to be an introduction, but implementation of other units is at the teacher's discretion. The available modules are listed below:

- Security System: an electronics module, addressing concepts that include electronic components, circuits, voltage, and current.
- Aircart: a mechanics module, with concepts that include energy, speed, and acceleration.
- Synthesizer: a sound module, with concepts that include properties related to human perception of sound and properties of sound waves.
- Incubator: a heat and temperature module, with concepts that include heat, temperature, flow, and mathematical representation.
- Bungee Escape: an advanced mechanics module, with concepts that include models and data, math modeling, free fall, electrical components, capacitors, and mathematics of the timer.
- Sun Photometer: a light and optics module, with concepts that include sun's angle, calibration, and photometer data.

FORMAT

Each of the six modules has five sections:

1. Information.
 - Unit Overview.
 - Notes for Teachers.
 - Index.
2. Concepts to be explored in the module.
 - Some modules include a glossary with formulas.
3. Messing Around (a relatively open-ended pursuit of a challenge).
 - Background: Things to think about while "messing around."
 - Questions: Challenge questions that the Messing Around research activities are designed to answer.
 - Tools: List and description of tools needed for the activities.

- Materials: List, description, and suggestions for use of materials needed for the activities.
 - Activities: Hands-on activities that investigate various aspects of the module’s concepts.
 - Reporting: Suggestions for collecting, synthesizing, and reporting the work done in the activities.
4. Core Project: a whole-class challenge to carry out a project applying ideas developed in Messing Around
 5. Extensions: elective projects for individual students related to the concepts of the module

ASSESSMENT INSTRUMENTS

The only assessment available is the guidance that the curriculum provides for students to report about each project. The extensions can serve as assessments in some cases.

PROFESSIONAL DEVELOPMENT SUPPORT

The last time such support was scheduled was in 2000. The contact for further information is habbott@mail.stcc.mass.edu.

STAND-ALONE VS. SUPPLEMENTAL

The *Hands-On Physics* curriculum modules can be used in conjunction with a complete physics curriculum. As supplements, they can still be a substantial component of a physics program.