

# THE Write Source, INC.

*Your In School and After School Solution*



Simple Machines Series  
Teacher's Edition

**1-800-466-9927**

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## PROGRAM OVERVIEW

**T**he *PCS Edventures!* Academy of Engineering empowers the student by presenting the foundations of mechanical engineering, structures, and architecture through an exciting series of hands-on activities.

**P**CS Academy students participate in projects that emphasize real world applications. The PCS Academy of Engineering engages students in the design process through the integration of model building, challenges, experiments, and problem solving in an exciting and engaging atmosphere.

## THE SIMPLE MACHINE SERIES

### **ME101 - Introduction to Simple Machines**

The 101 level introduces students to some of the most common simple machines including the lever, inclined plane, wheel and axle, and pulley. Students will participate in projects and challenges to garner an expertise of the forces at work for all machines. Key vocabulary introduced includes: axle, block and tackle, cart, distance, effort, fixed axle, fixed pulley, friction, fulcrum, inclined plane, level, load, mechanical advantage, moveable pulley, pitch, pulley, sled, wheel, and work.

### **ME201 - Modification and Application of Simple Machines**

The 201 level reinforces and adds to student experience of simple machines including the study of the wedge, worm gear and compound machines. Students will participate in projects and challenges to further their knowledge of the modification of simple machines. Key vocabulary introduced includes Archimedes screw, bicycle, complex machine, compound machine, double wedge, pitch, Rube Goldberg, screw, simple machine, wedge, and worm gear.

### **ME301 - Scientific Analysis of Simple Machines**

The 301 level continues to engage student exploration of simple machines through the introduction of the work formula and the use of measuring devices. Student projects and challenges focus on an analysis of simple machines. Key vocabulary introduced includes: conservation of energy, distance, force, work, and work formula.

### **ME401- Independent Study of the Trebuchet**

The 401 level caps student exploration of simple machines through a study of ancient siege weaponry. In addition, students are presented with the opportunity to apply all of their knowledge of simple and compound machines in a final research project. Students are required to make a class or group presentation. Key vocabulary introduced includes: counterweight, projectile, siege weapon, sling, throwing hook and trebuchet.

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## SUGGESTIONS FOR TEACHING

Each PCS Academy of Engineering unit has the same basic components which are designed to be used in the order presented. However, as you become more comfortable with the materials, you will find that the activities can be arranged in different orders to meet your teaching style and the students' needs. The modular components of each course are: Preparation, Background, Project 1, Project 2, Challenges, and a Personal Project. The last unit on each level includes a group Cooperative Challenge. Assessment and student portfolio building is done using the Academy of Engineering Online Assessment Website ([academy.edventures.com](http://academy.edventures.com)).

**Preparation:** This section gives you a brief overview of the unit, itemizes the materials needed for Projects 1 & 2, and presents preparation tips for the unit.

**Background:** This section provides vocabulary terms and the background information of the unit. We recommend you read it before teaching. Terms can be looked up using the Term Browser accessed at the PCS Edventures! Website. "Wow" is an introductory class activity provided for you to capture student interest in the topic and to demonstrate the basic principles covered in the unit.

**Project 1 and Project 2:** These projects introduce the principles and skills needed to master the topic. The three major sections to the projects are the:

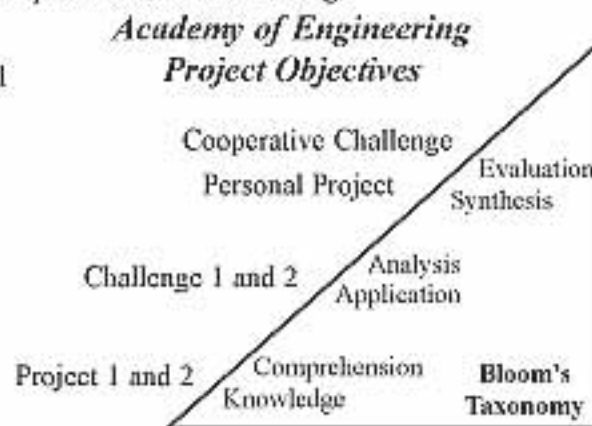
1. "Make sure you have:" section listing the materials;
2. "Build..." section giving the building procedures;
3. "Try this..." section providing the assessment questions and activities.

In the "Make sure you have:" section, lists of materials are presented with pictures for ease of use. The "Build..." section includes text and step-by-step instructions for the project. The "Try this..." section is intended to be used with the Online Assessment process within the Academy of Engineering Online Assessment Website ([academy.edventures.com](http://academy.edventures.com)). Student answers should be recorded on their copy of the project page, then recorded online when convenient. The Answer Key is in the Appendix.

**Challenges:** Each module includes two challenges. These are open-ended activities designed to assess the student's ability to apply the principles learned in Projects 1 and 2. Few instructions or hints are given, and the student is allowed greater latitude in meeting the requirements of the challenge.

**Personal Projects and Cooperative Challenges:** These are synthesis activities. Students should be encouraged to reflect on the content and processes they have learned by doing the projects and challenges. Their personal and cooperative projects should demonstrate their mastery of the material.

*The objectives of the components are intended to correspond with the levels of Bloom's Taxonomy shown to the right.*



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