PROGRAM OVERVIEW

The *PCS Edventures!*™ Academy of Robotics empowers students to explore the basic foundations of robotics and programming by completing an exciting array of hands-on activities.

Academy students participate in creating physical and tangible projects. These projects and the setting of the robotics lab are relevant to real-world experiences. The Academy of Robotics compels students to build and program models, design experiments, and solve problems in a challenging, fun atmosphere!

PRINCIPLES OF PROGRAMMING

- **RO103 - Motor Control:**

Students begin their study of programming by exploring the materials they will use in later units. Students learn how to test motors and sensors, control motors, and read and interpret sensor feedback. Students build Rover the Robot in Unit 2 and learn to program it to drive around their work surface. In Unit 4, students add Infrared Sensors to Rover to allow it to "see." Rover then changes its name to Spot the Robot.

- **RO203 - Sensor/Motor Interaction:**

Students begin to program motors to react to readings from the Infrared Sensor and Photo Sensors attached to the front of Spot the Robot. In addition to the Academy of Robotics materials, instructors must supply black electrical tape and colored construction paper for some of these activities.

- **RO303 - End Effectors:**

Students add onto Spot the Robot in a building activity that includes a gripping apparatus. Spot now becomes Fetch the Robot. Fetch is then programmed to retrieve objects. Black electrical tape is also required for some of the challenge activities in Unit 7.

- **RO403 - Putting it all Together:**

Students use what they have learned in the previous sections of this book to program Fetch the Robot to save a Chess Queen from perilous danger. Instructors will need to provide a Chess Queen for each group of students.

SUGGESTIONS FOR TEACHING

Each Academy of Robotics 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 used in any order to meet your teaching style and the students' needs. Whether in RO103 or RO403, the components of the modules in each course are Preparation, Background, Project 1, Project 2, Challenges, and a Personal Project. The last unit in every course includes a long-term group project called a Cooperative Challenge. Assessment and student portfolio building is done using the Academy of Robotics Online Assessment Website (aor.edventures.com).

Preparation: This page gives you a brief overview of the unit, itemizes the materials needed for Project 1 and Project 2, and gives preparation tips for the unit.

Background: This section provides vocabulary terms and 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. PCS Logo commands used in the unit are listed along with the terms. Use the PCS Logo Programming Syntax sheets located in the Appendix for a complete explanation of all PCS Logo Commands. "WOW" is an introductory activity provided for you to capture student interest in the topic and to demonstrate the basic principles covered in the unit.

Project 1: This project either introduces the principles and skills needed to master the topic, or it gives instructions for building a device which will be used in an experiment presented in Project 2. The three major sections to the project 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 photographic instructions for the project. Answers in the "Try this..." section may be recorded on the student reproducibles or online within the Academy of Robotics Online Assessment Website (aor.edventures.com). The Answer Key is in the Appendix.

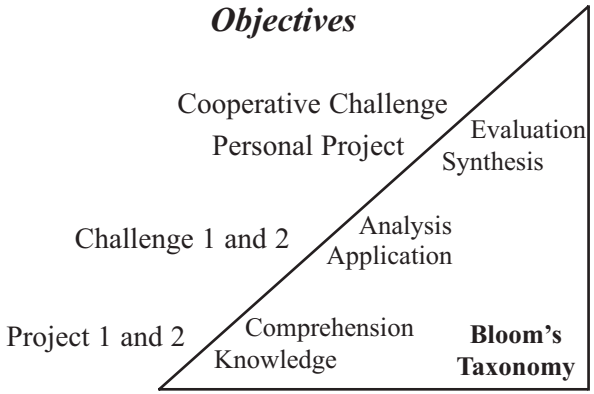
Project 2: This project functions in the same fashion as Project 1.

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. Fewer instructions 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, alone or in groups, should be encouraged to reflect on the content and processes they have learned by doing the projects and challenges. Their project 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.

Academy of Robotics Project Objectives



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