PCS edventures!™ EXPERTS IN HANDS-ON STEM EDUCATION

Discover Robotics & Physics

Grades: 4-8

Students: 1-3 per Kit

Contact Hours: 25+

Recommended Settings:
- Traditional classrooms
- After-school programs
- Home learning
- Makerspaces

Pricing Options:
- Single Kit: $549
- Value Pack (5 Kits): $2595
- Classroom Set (16 Kits, stored in a high-quality hardwood furniture unit with rolling casters): $8995

Materials:
- Physics LABCards (20-card curriculum printed on heavy duty no-tear paper)
- Physics and Robotics Building Instruction Cards for all 15 Builds printed on heavy duty no-tear paper
- The Brain™ & Cortex user guide printed on heavy duty no-tear paper
- Expanding file folder for easy access and storage of all no-tear curriculum pages
- Engineering building manipulatives from fishertechnik™ with advanced pneumatic parts
- Specialized PCS Robotic Controller - The Brain™
- Bluetooth Dongle
  - Available in BLE for iPads or Classic for all computers and Android-based tablets
- USB Cable
- Touch sensor and sensor cable
- 9V DC motor and motor cable
- Rechargable 11.1V LiPo battery and DC wall adapter
- Compartmentalized Gratnell storage bin with lid

Technical Requirements:
- One device per kit with Windows, Os X, iOS or Android operating system. Cortex is currently not compatible with Google Chromebooks.
- All tablets require Internet connection to enable wireless communication via Bluetooth.

Robotics & Physics Content:

YELLOW

Level 1, PNEUMATIC VISES
- Gas pressure and pneumatic forces
- Energy transfer
- Drag-and-drop programming in Cortex and connecting The Brain microcontroller
- Programming basic motor commands

ORANGE

Level 2, RACERS
- Types of energy and energy transformation
- Physics of motion (1D kinematics)
- Programming advanced motor commands

PURPLE

Level 3, MARBLE LAUNCHERS
- 1D kinematics, velocity, and acceleration
- Physics of collisions
- Programming solenoid valves
- Touch sensors and programming with logic and loops

BLUE

Level 4, CATAPULTS
- Integration of pneumatic forces, energy transformation, and programming skills
- 2D kinematics
- Focus on optimized engineering design

Mastery-based Assessment:
- Students track progress towards mastery with LABCard point system.
- Each card includes Check for Understanding questions that instructors can use for discussion, reflection, formative assessment, and deepening student understanding as they serve as facilitators and guides.

Training:
- Half hour free webinar training for purchases of $500+
- One hour free webinar training for purchases of $1000+
- Additional training available for purchase

Alignments & Standards

Habits of Mind

16 "thinking habits" developed by Art Costa and Bena Kallick to empower students to succeed in a 21st century learning environment

- Applying Past Knowledge to New Situations
- Creating, Imagining, Innovating
- Gathering Data Through All the Senses
- Managing Impulsivity
- Persisting
- Remaining Open to Continuous Learning
- Taking Responsible Risks
- Thinking Flexibly

21st Century Skills

A set of widely-applicable abilities essential for success in the information age.

- Creative Thinking
- Critical Thinking
- Initiative
- Productivity
- Technology Literacy

Next Generation Science Standards

- 4-PS3-1: Use evidence to construct an explanation relating the speed of an object to the energy of that object
- 4-PS3-2: Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.
- 4-PS3-3: Ask questions and predict outcomes about the changes in energy that occur when objects collide.
- 4-PS3-4: Apply scientific principles to design, test, and refine a device that converts energy from one form to another.
- MS-PS2-2: Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object.
- MS-PS3-2: Develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system.
- MS-ETS1-1: Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.
- MS-ETS1-2: Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
- MS-ETS1-3: Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.
- MS-ETS1-4: Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

Common Core State Standards for Math and Language Arts

- CCSS.MP1 Make sense of problems and persevere in solving them.
- CCSS.MP4 Model with mathematics.
- CCSS.MP5 Use appropriate tools strategically.
- CCSS.MP7 Look for and make use of structure.
- CCSS.ELA-Literacy.RST.6-8.3 Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.
- CCSS.ELA-Literacy.RST.6-8.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics.

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