

### Targeted Instructor Training

All instructors utilizing the STEM<sub>CART</sub><sup>™</sup> are offered the following professional growth path:

- Phase One – Six hours of initial training and orientation of the STEM<sub>CART</sub><sup>™</sup> and its curriculum content.
- Phase Two – Six hours of practical training and exploration of advanced features. Training can be adapted to include any special requirements or objectives specific to a school or district.

### Connect Online

In addition to CPS lessons supplied with the STEM<sub>CART</sub><sup>™</sup>, instructors can create and share their own lessons through the STEM<sub>CART</sub><sup>™</sup> website! Create a login identity at [www.stemcart.com](http://www.stemcart.com). Log in to your account and start sharing! Post lessons you've created with notes on what teaching methods work best. Download lessons from other instructors and learn from their experiences.

### Instant Electronic Feedback

The STEM<sub>CART</sub><sup>™</sup> by Lab-Volt features the Instruction Classroom Performance System (CPS), an easy-to-use IR (Infrared) student response system that creates interactivity for every student and returns immediate feedback, automatically plotting and displaying results within seconds! The CPS response system consists of response pads and a coordinating receiver unit. Each uniquely-numbered pad transmits student responses, which the receiver then records. The CPS software automatically attributes responses transmitted from each pad to the student assigned that pad number.

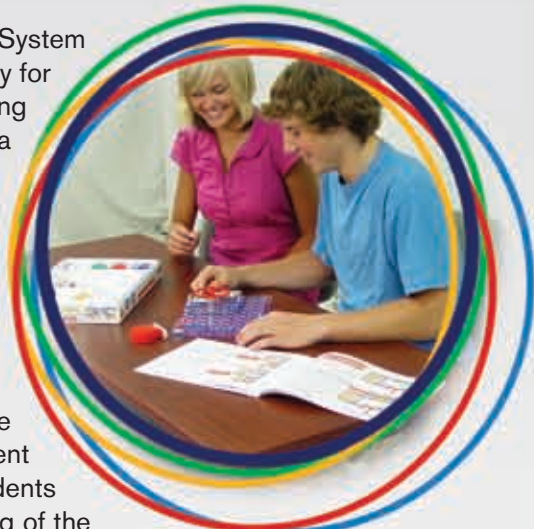
The CPS system creates a fun, non-threatening environment that encourages participation by all students. The experiments in the STEM<sub>CART</sub><sup>™</sup> system are embedded within the CPS software. Each experiment contains background content in the form of slides, videos, and PowerPoint presentations to prepare students to understand the context and purpose of the lab. Each student is assigned a response pad and answers questions linked to the software, so the teacher can establish student readiness. Once the demonstration or student team experiment is complete, the students again use their response pads to answer questions that evaluate their understanding of the lab experience.

### eLearning

- The included instruction software provides on-screen introductions and background information for each experiment, facilitating class discussion of content.
- Excitement and interest are added through screen links to multimedia resources, such as DVDs, PowerPoint materials, and recorded television programs.
- Student response questions presented before experiments ensure comprehension of the learning experience.
- Experiments are performed by student teams or can be demonstrated from the cart.
- Team data is uploaded wirelessly to the Media Center PC, enabling class discussion of all data sets.
- CPS-based assessment questions ensure student comprehension of important concepts.



Professional Development



Student Involvement

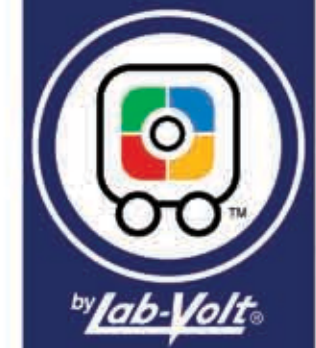


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# STEM<sub>CART</sub><sup>™</sup>



## Mobile Multimedia Resource Center

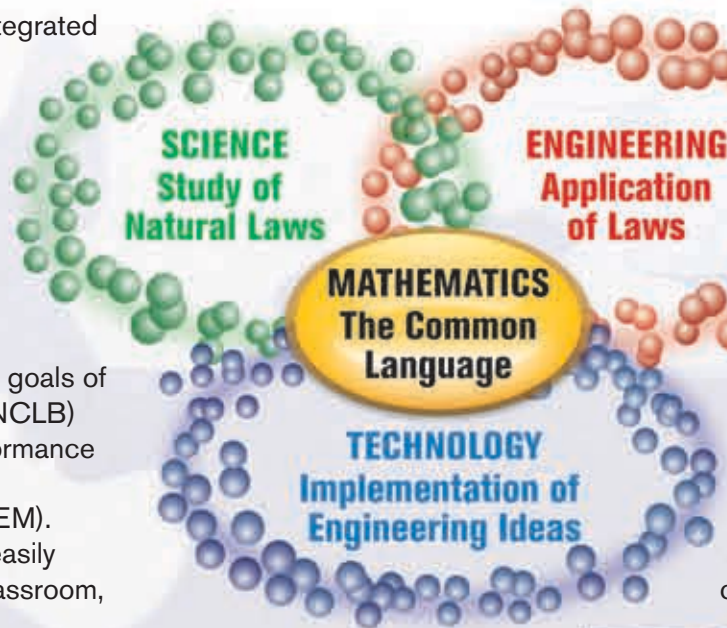


# Integration is the Solution

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Theory

STEM is integrated Science, Technology, Engineering, and Math education for all students. STEM<sub>CART</sub><sup>™</sup> by Lab-Volt<sup>®</sup> is a complete mobile demonstration lab with flexible resources that incorporates one of the key goals of the No Child Left Behind (NCLB) Act: boosting student performance in Science, Technology, Engineering, and Math (STEM). This self-contained cart is easily rolled from classroom to classroom,



safely secured and stored when not in use, and designed to be shared among grades and classrooms. The STEM<sub>CART</sub><sup>™</sup> provides physical and multimedia presentation resources specifically developed for teaching adaptability and flexibility and features a desktop computer with Windows<sup>™</sup> Media Center software connected to a projector allowing for the presentation and capture of assorted media types.

How and why do sea breezes form? Why does the earthworm come up to the surface when it rains? What is the relationship between light brightness and distance? Where are magnetic fields found? Students discover the answers to these questions and many others through exploration and experimentation – a hands-on approach that maintains interest and excitement! Inquiry and Discovery, Earth Science, Life Science, and Physical Science are among the topic areas covered. Experiments include:

- Buoyancy
- Crash Dummies
- Endothermic and Exothermic Reactions
- Growing Crystals
- Half-Life Dating
- Investigating the Earth Worm
- Ocean Floor Mapping
- Photovoltaic Cells
- Population Growth
- Soil and Acid Rain
- The Greenhouse Effect
- Volcano's Magma
- Warming Function of Nasal Passages
- What Causes the Seasons?
- Yeast Beasts in Action

How are deviation and percent deviation calculated? How can a farmer mathematically predict the amount of corn harvested each year? What are the transect and quadrat methods in statistics? Students use skills developed in Algebra, Data Analysis, Geometry, Measurement, Numbers and Operations, and Problem Solving to discover solutions to varied mathematical queries, including the following:

- Accuracy and Precision
- Analysis of Complex Graphs
- Balancing Chemical Equations
- Correlation Between Variables
- Crystal Geometry
- Delta Means Change
- Dependent and Independent Variables
- Empirical Relationships
- Interpreting & Plotting a Graph
- Linear vs. Exponential Graphing
- Mean, Median, Mode
- Percent Computations
- Powers of Ten
- Ratios, Percents, and Comparisons
- Sampling Techniques
- Solving Equations
- Solving Problems Using Scientific Notation
- Temperature Conversion
- Translate Word Problems

## Interactivity

The STEM<sub>CART</sub><sup>™</sup> provides teachers with flexible resources for lectures, video demonstrations, lab demonstrations, and student assessments. The STEM<sub>CART</sub><sup>™</sup> also includes materials for hands-on student experiments and data logging.

## Curriculum:

Currently, over 200 lessons are packaged in the CPS system to introduce experiments in Science, Technology, Engineering, and Math. More lessons are added regularly. STEM<sub>CART</sub><sup>™</sup> also includes:

- DVD collection of proven experiments.
- PowerPoint<sup>®</sup> theory presentations from Oxford University Press.
- Adventures with a Microscope DVD.
- Worksheet-based data-logger projects with assessments.
- Electronics module from Snap Circuits with over 100 projects.
- Set of materials required for instructor demonstrations.
- Correlative class planning package. And more!

## Standards Alignment

Each question that is built into the CPS is linked to the national standards, including the International Society for Technology in Education (ISTE), National Council of Teachers of Mathematics (NCTM), and National Science Education Standards (NSES). Performance reports of student achievement on these standards are easily generated in the built-in reporting system. Additionally, a library of state standards, selectable by state, is available for free download from the eInstruction web site and can be manually linked to questions as appropriate. The CPS system also works with the available ExamView<sup>®</sup> Learning Series, which offers a variety of unique questions that can be used for daily monitoring of student achievement and progress. With ExamView<sup>®</sup>, educators can create assessments that measure and promote progress on academic standards at different cognitive levels.

## Grading

- Record all student grades, whether or not they are generated from the CPS system.
- Conduct assessments, including Homework, Quiz, Exam, Test, Other, or Class
- Participation.
- Add assessments and enter grades from non-CPS sessions.
- Calculate averages as specified.

Multimedia Tools



What technologies are available today for accelerating the recovery of severely broken bones? How do Global Positioning Systems work and how would they be applied in the development of autonomous vehicles? Each technology lesson students complete explores the various solutions possible due to ever-expanding, life-changing technologies. Other lessons in the fields of Agriculture and Related Biotechnology, Construction, Energy and Power, Information and Communication, Manufacturing, Medical Technology, and Transportation include:

- Automation in Manufacturing
- Electrical Grid and Power Distribution
- Fiber Optics and Lasers
- Genetically Enhanced Seeds
- GPS Technology
- Keeping Cargo Ships Afloat
- Maglev Trains Technology
- Modern Prosthetics
- Motors in Manufacturing
- Principals of Flight
- Purification of Water
- Rockets, Satellites, and Space Probes
- Sketching and Perspectives
- Solar Power
- Strength of Materials
- Technical Illustration
- Telecommunications
- Wind Power

SCIENCE

TECHNOLOGY

MATH

ENGINEERING



What challenges might you face as an architect, engineer, or contractor of an under-the-sea building? Why might you design a space elevator and how would it work? What planet besides Mars might be or might have been capable of sustaining some type of life form and how would you engineer a probe to explore that planet? Students are challenged to complete intriguing projects such as these as they explore the limitless possibilities presented through research and imagination. Other projects in the fields of Agriculture and Related Biotechnology, Construction, Energy and Power, Information and Communication, Manufacturing, Medical Technology, and Transportation include:

- Bullet Trains
- Civil Engineering
- Cryogenics
- Design a Water Shortage Solution
- Design an Under-the-Ocean Building
- Explore for Life in Space
- Forces in Architectural Design
- Global Positioning System
- Nature's Home Heating Systems
- Progress Through Engineering
- Refrigeration & Air Conditioning
- Space Elevator