Interactive Multimedia Technology Education
BRING THE WORLD OF TECHNOLOGY INTO THE CLASSROOM

**Communications**
- Animation
- Computer Graphic Design
- Computer Problem Solving
- Computer Servicing & Repair
- Computer Software Applications
- Desktop Publishing
- Digital Photography
- Digital Video Editing
- Electronic Music
- Fiber Optics & Lasers
- Network Fundamentals
- Radio Broadcasting
- Video Production
- Web Development

**Transportation**
- Aerodynamics
- Auto Exploration
- Exploratory Electronics
- Flight Simulation
- Space & Rocketry

**Construction**
- Conceptual & Applied Physics
- Design & Construction
- Engineering & Stress Analysis
- Exploring Electricity
- Exploring Mechanisms
- Fluid Power
- Residential Electrical Wiring
- Residential Plumbing

**Bio-Related Technology**
- Alternative Energy
- Biotechnology
- Ecology
- Environmental Technology/Water
- Health
- Meteorology & Forecasting

**Manufacturing**
- Artificial Intelligence
- Automation & Robotics
- CO₂ Raceway Design Brief
- CNC: Lathe
- CNC: Mill
- Computer-Aided Design
- Controls & Sensors
- Manufacturing Processes
- Plastics
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* Each of these modules contains one level, consisting of ten lessons.

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Meeting the Demands of Technology Education

As a leading manufacturer and designer of technical training systems worldwide, Lab-Volt has incorporated the whole of its educational and technical expertise into the design of the curriculum, delivery systems, equipment packaging, and servicing of the Tech-Design program.

Using the most effective educational technologies to provide a multilevel, competency-based, interactive, multimedia curriculum, Tech-Design has led the way in meeting the highest educational standards available in modular technology education today.

Maximize Your Technology Dollar!

Only Tech-Design provides curriculum for two successive courses, allowing you to utilize the lab equipment for more than one course.

Choice One:
Progression from Basic to Advanced Curriculum

- Pre-Test
- Seven 45-Minute Foundational Lessons
- Post-Test

Beginning Level

Advanced Level

- Pre-Test
- Level One Review
- Seven 45-Minute Advanced Lessons
- Post-Test

Choice Two:
Comprehensive Level

- Pre-Test
- Ten 45-minute lessons concentrated with all learning objectives from Beginning and Advanced Levels
- Independent Study Project
- Post-Test

“This is learning for the twenty-first century. It’s challenging, stimulating, and all of our students thoroughly enjoy it.”

Gregg Briggs, Instructor, Mill Creek High School, Michigan
Tech-Design® and STEM

Tech-Design incorporates one of the key goals of the No Child Left Behind (NCLB) Act: boosting student performance in **Science**, **Technology**, **Engineering**, and **Math** (STEM). Our color-coded system indicates STEM topic areas that are introduced to students in each module. Just look for the colored dots! And ask about Lab-Volt’s new mobile STEM cart™!

### The Cost-Effective Tech-Design® Classroom Set Solution

Tech-Design provides exciting educational experiences through interactive multimedia and meaningful hands-on activities. Now, 12 of these dynamic modules, plus introductory lessons, are available as classroom sets. Lab-Volt offers cost-effective classroom sets for classes in which one, two, or a few modules are of interest, with plans for the entire class to take the same module at the same time.

The new Tech-Design® Technology Classroom Sets enable teachers to:

- Facilitate in-depth learning with instructor-led activities and research.
- Enhance instructional effectiveness by reducing curricular preparations.
- Eliminate inventory headaches.
- Engage students in more directed and challenging team projects.
- Supplement deficient areas of traditional technology labs with cost-effective, computer-based training.
- Modify course length to fit any time frame by using the Integrated Course Editor.

This icon on a module description page indicates the module’s availability as a Classroom Set:
Multimedia Curriculum Offers Proven Learning and Teaching Advantages

A well-developed, interactive program, delivered by means of multimedia courseware, ensures that students will remain interested, stay on task, learn faster, and retain more than with traditional, instructor-centered classes.

Every Module is Complete with Effective Instructional Resources

**Standard Materials**
- Technology in Action text book.
- Training equipment and supplies for 30 students.
- Instructor Guide containing inventory and installation; module descriptions; summaries of each lesson; answer keys to all questions, quizzes and tests; project checklists; and required worksheets.
- Student dictionary.
- Tech-Design mouse pad and module placard.
- Module User’s Guide.
- Headphones and adapters.

**Topic-Related Material**
- Application software.
- Reference books and materials.
- Consumable supplies.
- Simulation software.
- Technical equipment and supplies.

Much of the equipment is available internationally in 220V. Contact your local sales representative for details.

"We’ve been using Lab-Volt curriculum for over a year. The students find it interesting and informative. The Tech-Design Manager works well for scheduling and tracking the students’ progress in the 27 stations in our lab."

Lauren Zabel,
Instructor
East High School
Madison, Wisconsin
Dynamic Resources Expand and Reinforce Learning

With Tech-Design's online resources, students improve math, language, science, and social-studies skills as they develop technological literacy.

- **Careers Resource** provides career recommendations, including educational requirements and duties, based on students' responses to an interest survey.

- **Environmental Impacts** presents economic and environmental issues relating to each module.

- **Timelines** present significant developments related to each module. The milestones give students a clear perspective on the history of these developments and a glance at our rapidly changing future.

- **Student Journal** allows students to save notes and submit assignments, and facilitates interaction between teachers and students.

- **Internet Resource** provides links to related, age-appropriate web sites.

- **Academic Package** includes an encyclopedia and a math tutor program.

Learning-Enhancement Activities

In addition to hands-on activities, each module provides several extracurricular projects called Challenges:

- **TD-Quests**: These "Missions" challenge students to work with partners or create teams to analyze tasks; identify necessary resources to develop solutions; and propose viable, problem-solving strategies. Teachers can edit the Quests or create new ones, and incorporate them into the curriculum.

- **Variables**: These include additional short-term activities related to each module for extension and depth.
Instructor in Charge
Easy-to-use tools enable teachers to customize the curriculum and maximize their instructional effectiveness

- **Teacher Annotations**: add supplementary information or instructions on any screen in the curriculum.

- **Integrated Course Editor**: build new modules by combining lessons from various modules and levels of curriculum.

- **Application Launch**: incorporate any third-party software as an addition to, or a replacement of, the provided software; activate software with a single click.

- **Rubrics**: use Lab-Volt's online rubrics or develop new rubrics; observe students performing tasks and evaluate the skill level demonstrated; complete assessments online.

- **Assessment Editing**: edit pre- and post-tests, competencies, and scenario-based assessment grading with rubrics; create tests with linked competencies.

- **Course Content Editing**: link presentations, graphics, video, audio, or Internet sites to any screen.

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**New! Custom Unit Creator**

**Bring Your Expertise into the Curriculum with Lab-Volt's Custom Course Editor!**

We know that teachers bring a wealth of information into the classroom -- and now this information can be incorporated into Lab-Volt's multimedia template. With just a few clicks, create customized lessons for individual students or the entire class -- including competency-based tests, background information, instructions, and more!

- Edit existing modules or create new ones.
- Provide differentiated learning for all students.
- Adapt competencies by state and/or district.
- Build a module around any piece of equipment or software.
- Incorporate videos or PowerPoint presentations into modules.
- Combine the customized units to build complete TechLab modules.
Lab-Volt offers professional seminars for administrators and teachers at our model Tech-Design lab in Farmingdale, New Jersey. Here, participants use and evaluate the curriculum, courseware, and equipment for each of Tech-Design’s 42 modules. Seminar topics and hands-on experiences include:

- Developing a technology-education curriculum.
- Selecting and purchasing modular courseware, hardware, software, furniture, and additional resources.
- Multimedia instruction and evaluation.
- Proven methods of designing and delivering an effective technology program.
- “Selling” the program to the public and the school board.
- Exploration of technology education.
- Launching a successful, modular, technology-education program.
- Designing a technology-education model.
- Managing the modular technology lab.

"Lab-Volt and their associates conduct very professional seminars aimed at meeting the needs of teachers who have varied years of experience, educational philosophies, and teaching styles. They’ve consistently taken time to teach our participants the computer skills necessary for success in the technology education lab."

Anthony E. Schwaller, Ph.D.,
Department of Environmental & Technological Studies
St. Cloud University, Minnesota
 Achieve it All:
Control, Effectiveness, Success
with Easy-to-Use, Efficient,
Classroom-Management System

Class scheduling, grading tests and assignments, record keeping, reporting and other classroom-management functions are a click away with GradePoint 2020.

There are no papers to lose, no handwriting to decipher, and no papers to grade. Real-time data collection ensures that records are always up-to-date. Just a few clicks will result in reports that provide a full picture of every student's progress.

GradePoint 2020 tracks all students' achievements in required competencies. Teachers know instantly who needs help, who can move forward, and how well individuals are understanding the material.

These features allow instructors to focus on students who need one-on-one assistance. Teachers can stay at their desks to monitor students and when necessary, provide assistance via remote-control access to a student's computer. This way, instructors can help students without distracting the rest of the class. At the same time, teachers know they will not miss any detail of any other student's performance.

GradePoint 2020 also enables teachers to customize the curriculum and assessments to achieve their unique instructional objectives.

Computer Specifications:

Recommended Operating System:
Windows® 2000 (Professional) with Service Pack 3.

Other Acceptable Operating Systems:
Windows 98 Second Edition; Windows 2000 (Professional) with Service Pack 4; Novell Client 4.91 with Service Pack 1 (an additional patch is required for use with Windows XP); Windows XP Home with Service Pack 1A; Windows XP Professional with Service Pack 1A.

Minimum Hardware Specifications:
Processor Speed
- Pentium III- 500 or higher

Memory
- 256 MB or higher

Video Card
- 16MB Video card able to support 1024 X 768, 24-bit color

Sound Card
- 16 Bit Sound

DVD-ROM Drive
- 48X or higher

Hard Drive Space Required:
- 30 GB with minimum of 2000 MB free space

Network Interface Card
- 10/100 Mbps Card (recommend 100 Mbps)

We recommend a static IP address for these machines.

Mouse & Keyboard
- No minimum requirements

Monitor
- SVGA
**Class Maintenance**
- Assign students to classes.
- Name classes with up to 76 characters.
- Edit without affecting module assignments or other student information.
- View class roster.
- Quickly create duplicate classes (same modules for different students).

**Interactive Scheduler**
- Schedule students' modular rotations in a fully automatic or completely manual mode, or any combination of these styles.
- Manually override rotations to accommodate students' needs or changes within your class.

**Tech-Lab™ Grades**
- View pre- and post-tests, online activities, assignments, and overall grades in one grid.
- Automatically collect data in real time; monitor students at any given moment.

**Gradebook**
- Automatically compute and record grades for tests and assignments, whether provided with the Tech-Design curriculum or created by instructors.
  - Include other non-Tech-Lab factors, such as other projects, class participation, and effort into students' overall grades, and determine the percentage (weight) for each.
  - Manually override grades as necessary.

**Configurator**
- Set preferences within the Tech-Lab system in six areas:
  - Student (e.g., add, edit, and delete student records).
  - Security (e.g., change instructor password).
  - Media (e.g., enable narration, closed caption, MPEG videos, and teacher annotations).
  - Test (e.g., administer on a group or individual basis).
  - Unit (e.g., set prerequisites and quiz aids, such as "Help," "Exit," and "Feedback").

**Editor**
- Edit and create assessments and modules.
- Add, edit, or delete any of the following: evaluations, introductory assessments, final exams, competencies.
- Link new assignments, questions, and modules to competencies.
- Create custom units to design your own course or supplement current courses.

**Supervision and Control**
- View computer screens of individual or multiple students as they work, and identify who needs assistance.
- Provide instruction via remote-control access to students' computers.
- Facilitate real-time chats, post announcements, and call the class to attention.
- Record students' screens during class to watch later in the day when time allows.

**Student Journal**
- Easily access students' journals to review their notes and other curriculum-related information they have saved.
- Send notes through the journal to any group of students: for example, reminders about a project due, instructions to submit an essay, or directions to complete a test.
- Use the "lock" feature to prevent students from deleting the notes, or set a date for a note to be deleted automatically.

**Student Activity Watch**
- Monitor and track students' activity in real time.
- Set alarms to limit time spent on each task.
- If a student does not complete an activity in a specified amount of time, use Supervision and Control to observe what the student is doing and determine if intervention is necessary.

**Manager Maintenance**
- Set grade weights and competency thresholds, which can be edited through Class Maintenance. The competency threshold is an effective tool for tracking students' achievements throughout the class. Thresholds and grade weights also can be manually defined.
- Personalize the look and layout of the GradePoint screen by adding personal photos.
**Technology Content Standards**

International Technology Education Association (ITEA): Technology for All Americans; listing of Technology Content Standards.

**NATURE OF TECHNOLOGY**

| Students develop an understanding of:                                                                 | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 1. the characteristics and scope of technology    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 2. the core concepts of technology                 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 3. the relationships among technologies and the connections between technology and other fields of study |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |

**TECHNOLOGY & SOCIETY**

| Students develop an understanding of:                                                                 | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 4. the cultural, social, economic, and political effects of technology |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 5. the effects of technology on the environment    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 6. the role of society in the development and use of technology |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 7. the influence of technology on history          |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |

**DESIGN**

| Students develop an understanding of:                                                                 | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 8. the attributes of design                        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 9. engineering design                              |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 10. the role of troubleshooting, research and development, invention and innovation, and experimentation and problem solving |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |

**ABILITIES OF A TECHNOLOGICAL WORLD**

| Students develop abilities to:                      | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 11. apply the design process                       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 12. use and maintain technological products and systems |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 13. assess the impact of products and systems      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |

**THE DESIGNED WORLD**

| Students develop an understanding of and are able to select and use: | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 14. medical technologies                           | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 15. agricultural and related technologies          | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 16. energy and power technologies                  | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 17. information and communication technologies     | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 18. transportation technologies                    | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 19. manufacturing technologies                     | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| 20. construction technologies                      | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
### Skills At A Glance

Skill areas indicated on this chart are not inclusive of all skills addressed in the Tech-Design curriculum and are subject to interpretation. For a more detailed list of skills and competencies, contact your Lab-Volt representative by calling toll-free:

1-800-LAB-VOLT

#### Mathematics

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<th>Skill Area</th>
<th>Algebra</th>
<th>Arithmetic</th>
<th>Boolean Logic</th>
<th>Charts &amp; Graphs</th>
<th>Coordinating Systems</th>
<th>Curves &amp; Angles</th>
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#### Language Arts

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<th>Skill Area</th>
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<th>Vocabulary</th>
<th>Writing</th>
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#### Thinking Skills

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<th>Logical Reasoning</th>
<th>Predicting Outcomes</th>
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INTRODUCTION TO TECHNOLOGY 40090

With the “Introduction to Technology” module, teachers orient students to the universal concepts of technology. After the entire class has completed the five orientation lessons, students are prepared to successfully complete modules that focus on particular technology fields.

The “Introduction to Technology” module guides students to identify the objectives they are expected to achieve throughout the program.

IT FUNDAMENTALS 40073

Students learn what Information Technology (IT) is and discover its far-reaching impacts. They develop basic computer skills and gain an overview of various IT careers.

TOPIC COVERAGE

• What is IT?
• The Impact of Computers on Business and Society.
• IT Careers.
• Environmental Impacts of the Computer.
• The Impact of Computers on the Family.

An entire IT curriculum can be created using IT Fundamentals and any of the following modules:

• Animation
• Artificial Intelligence
• Computer Graphic Design
• Computer Servicing & Repair
• Computer Software Applications
• Controls & Sensors
• Desktop Publishing
• Digital Photography
• Digital Video Editing
• Exploratory Electronics
• Fiber Optics & Lasers
• Network Fundamentals
• Video Production
• Web Development
Did you ever wonder how an airplane flies or how a sailboat glides through the water? This module helps students understand how the principles of aerodynamics affect our lives and how they can launch exciting careers with aircraft manufacturers, the military, and even NASA!

This module comes with:
- A safe, portable wind tunnel; ideal for a technology lab.
- Model airfoils and cars to test in the wind tunnel.
- A complete weather center for taking atmospheric measurements.
- Material to design an aerodynamic vehicle.
- Multimedia curriculum, Student and Instructor Guides, and more!

Activities
- Collect and measure atmospheric data.
- Test a variety of airfoils in the wind tunnel.
- Measure the forces of air on different shapes.
- Design and build an aerodynamic vehicle.
- Safely operate a wind tunnel.

Science
- Aerodynamic Forces
- Bernoulli's Principle
- Viscosity
- Airfoil Theory
- Supersonics

Engineering
- Design Analyses
- Engineering Design

Technology
- Technological Design
- Historical Perspectives
- Future Innovations

Math
- 3-D Modeling
- Computations
- Measurements
- Data Analysis and Probability
Everything we do requires energy -- from heating our homes to running our cars. But what happens if this energy runs out? This module helps students understand, in a fun and exciting way, the importance of alternative energy. Students discover the principles of solar, wind, biomass, hydroelectric, and geothermal energy, and learn how the study of alternative energy could lead to a fascinating engineering career in any of these fields. Students even cook their own snacks using a solar oven!

This module comes with:

- An Alternative Energy Trainer, which includes a digital thermometer, heat lamp, and solar panel assembly.
- Wind turbine and fan.
- Solar oven.
- Balloons, pith balls, and wool to demonstrate static electricity.
- Multimedia curriculum, Student and Instructor Guides, and more!

Activities

- Conduct experiments and demonstrations in alternative energy using the Alternative Energy trainer.
- Demonstrate active solar energy.
- Use a solar oven to collect, concentrate, and convert sunlight into usable energy.
- Demonstrate wind energy using the Alternative Energy trainer and wind tunnel.

Science

- AD/DA Conversion
- Experimental Procedure
- Force, Power, and Work

Technology

- Alternative Energy Systems
- Characteristics and Scope of Technology
- Future Innovations

Engineering

- Design Analyses
- Engineering Design

Math

- Algebra
- Boolean Logic
- Charts and Graphs
- Computations
- Energy Conversions
Pixar™! DreamWorks™! Aardman™! How do these animation studios create such amazing animations? The Animation module allows students to discover the principles and techniques of producing computer-generated animations through the use of sophisticated animation software. Students experiment with various animation techniques to create their own animations. They also learn how they can set in motion a career in the animation industry, perhaps even with the most recognized animation studios in the world!

This module comes with:
• Easy-to-use, yet high-level, animation software.
• Software tools for creating highly sophisticated animations, including stereo sound, movie player, printable storyboards, full paint features, and special effects editor.
• Supplies for creating a thaumatrope.

Activities
• Build and use a thaumatrope to explore the basic animation principle of simulating motion.
• Create a storyboard to map out an animated movie.
• Develop and create animated characters using high-level computer software.
• Use advanced animation techniques to produce a short video.

Science
• Cause and Effect
• Optics
• Ergonomics
• Visual Perception

Engineering
• Drawing to scale
• Engineering Design

Technology
• Advanced Animation
• Core Concepts
• Historical Perspectives
• Moving Pictures

Math
• 3-D Modeling
• Coordinating Systems
• Curves and Angles
• Measurements
• Patterns and Numbers
Think about your friends. Are they human? Are you sure? This module enables students to explore the history of Artificial Intelligence (AI) and study the present and future applications of AI. Students create smart programs and work with a “smart” robot to experience first-hand AI’s growing significance in the modern world and the careers that AI makes possible.

This module comes with:
- A programmable AI robot with video camera.
- Lab-Volt’s Visual Expert and Artificial Intelligence® software.
- Family Entertainment Game Pack.

Activities
- Program and operate an AI robot.
- Construct an expert system.
- Explore the future of AI research and applications.

Science
- Experimental Procedure
- Turing Test
- Input-Output Devices
- Rate and Flow

Engineering
- Engineering Design

Math
- 3-D Modeling
- Algebra
- Boolean Logic
- Coordinating Systems
- Measurements
- Ordering Values
- Sequencing

Technology
- Expert Systems
- Natural Language
- Machine Learning
- Neural Nets
- Fuzzy Logic
AUTOMOBILES are everywhere. What is their history? How do they work? This module helps students answer these questions and many more. In Auto Exploration, students use simulation software and hands-on activities to explore the automobile and its impact on society. Students also learn about production and automation in the auto industry and use software to design, build, and test an automobile.

This module comes with:
• Two Windows-based software applications that allow students to design and test computer-generated vehicles and explore auto racing.
• Steering wheel, accelerator, and brakes.

Activities
• Design, construct, modify, and test a model car.
• Demonstrate driving principles by using a racing software program.
• Identify and describe the many systems in an automobile.

Science
• Cause and Effect
• Computer Technology
• Ecological Risk Factors
• Electricity
• Fluid Flow and Pressure

Engineering
• Engineering Design
• Automotive Systems

Math
• Numbers and Operations
• Algebra
• Data Analysis and Probability
• 3-D Modeling

Technology
• Transportation Technologies
• Historical Perspectives
• Production and Automation
How do automated industrial systems work? In this module, students figure out the answer through hands-on robotic programming and operation. Students also study the impact of robotics on industry and our daily lives and explore related careers.

**This module comes with:**
- The Lab-Volt Automation™ 5100 Robot: a five-axis, programmable robot that responds with accuracy and agility to an accompanying teach pendant.
- Rotary carousel.
- Gravity feeder.
- All necessary tools, cables, and accessories.

**Activities**
- Write and execute programs for a robotic arm for single and double operations, then assess the results.
- Experiment with a succession of commands to perform specific operations with a robot.

**Science**
- Cause and Effect
- Experimental Procedure
- Force, Power, and Work
- Input/Output Devices
- Optics
- Rate and Flow

**Technology**
- Computer Technology
- Industrial Automation and Robotics

**Engineering**
- Robotic Systems
- Engineering Design

**Math**
- Boolean Logic
- Algebra
- Coordinating Systems
- Linear and Nonlinear Systems
What is biotechnology and how does it affect our daily lives? These questions and many more are answered in this module. Thought-provoking discussion and hands-on experiments make students more aware of biotechnology and its everyday uses. This module also encourages students to explore the various fields that combine life science with technology, including ergonomics, bioengineering, bionics, health and medicine, nutrition, hydroponics, energy, genetics, and the environment. Students also explore the career options in the field of biotechnology.

This module comes with:
- A scientific microscope with scanning capabilities, built-in illuminator, and low- and high-power magnification.
- A recycled-paper-making kit and basin.

Activities
- Use computer software and games to solve problems related to biotechnological systems.
- Analyze and solve hypothetical problems involving the application of biotechnology to human and environmental concerns.
- Use a microscope to perform a diagnosis and observe living organisms.
- Make recycled paper.

Science
- 3-D Rendering
- Ecological Risk Factors
- Ergonomics
- Experimental Procedures
- Visual Perception
- Waste Management

Technology
- Biotechnology
- Technology and Society
- Bionics
- Hydroponics

Engineering
- Bioengineering
- Environmental Engineering

Math
- Algebra
- Boolean Logic
- Geometry
- Data Analysis and Probability
What are the start-to-finish steps necessary to manufacture an item? In this module, students learn how concepts and designs are developed and examine process production technologies. They design and build CO₂-powered model racecars as the final product of a manufacturing process. Students test the performance of their product through hands-on experiences that help them understand the Universal Systems Model applied in most technology related careers.

This module comes with:
• A raceway, 30 dragster kits, firing pins, and housing.
• CO₂ cartridges, dry transfer decals, consumable construction supplies, and safety equipment.
• Everything students need to design, build, and race their CO₂-powered cars.
• Optional equipment is also available: bench band saw, vice, and grinder.

Activities
• Design and build a prototype vehicle.
• Build and test a CO₂ model car.

Science
• Cause and Effect
• Chemical Properties
• Experimental Procedure
• Rate and Flow

Technology
• Universal Systems Model
• Computer Technology
• Automotive Technology
• Manufacturing Technology

Engineering
• Design Engineering
• Production Engineering
• Manufacturing Engineering
• Engineering Systems

Math
• Forward Drive Force
• Geometry
• Measurement
• Curves and Angles
Did you ever wonder how buildings or cars are designed before they are built? This module teaches students about the role CAD plays in the creation of buildings, vehicles, appliances and industrial equipment. Professional CAD software helps students develop the CAD skills they will use to create technical drawings, floor plans, orthographic projections, isometric drawings, and house designs. Students may even discover their own talent and interest for pursuing architectural or engineering careers!

**This module comes with:**
- Professional-level CAD software program.
- Drafting Kit.

* Laser printer required but not supplied.

**Activities**
- Produce basic and advanced drawings and configurations on the computer using CAD software.
- Use a printer to output a design created on the computer.
- Use CAD software to create technical drawings of a floppy disk, speaker, floor plan, and different views of a boat.
- Use CAD software to scale a drawing, create an orthographic projection and an isometric drawing, and design a house.

**Science**
- 3-D Rendering
- AD/DA Conversion
- Ergonomics

**Engineering**
- CAD Engineering
- Drafting
- Technical drawing
- Orthographic projections
- Isometric drawing

**Technology**
- Computer technology
- CAD

**Math**
- Geometry
- Algebra
- Coordinating Systems
- 3-D Modeling
Can you picture the logo of your favorite soft drink? What makes it memorable? The Computer Graphic Design module introduces students to the techniques and technology that help produce logos and their use in various communications media. Students explore their creative design potential by developing their own logo and transferring it onto a T-shirt. The activities in this module may even inspire them to pursue careers in the graphic design field!

This module comes with:
• An industrial-grade heat-transfer machine, transfer paper, and consumable supplies.
• A professional graphics software program with paint and draw tools, and clip art.

* A color printer is required but not supplied.

Activities
• Create shapes and text using computer software.
• Add colors, patterns, special effects, and textures.
• Design and print a graphic with shapes and text, then transfer the image onto a T-shirt.
• Design and produce a suitable logo and business stationery using complex graphic design principles and the computer.
What does “turning a part” mean and how is it done? The Computer Numerical Control (CNC): Lathe module provides hands-on experience with industrial-grade equipment that allows students to discover the answers to these questions and others. Through programming and operating the lathe, students learn how machines make manufacturing more productive, efficient, and safe. They learn to specify dimensions, program a lathe, and machine a part. Students also explore careers in the CNC field.

This module comes with:
- Lab-Volt Automation 5300 CNC Lathe; a high-powered turning system housed in a safety enclosure, featuring an Emergency Stop button for safe operation.
- Lab-Volt CNC Lathe Windows™-based software.
- Indexable carbide inserts, a set of six HSS cutting tools, safety equipment, rubber mat, and turning stock.

Activities
- Use computer software to program a lathe.
- Follow instructions to safely set up and operate a lathe to create a finished machine part.
- Design and create a complex part according to specifications.
- Apply advanced applications of CNC lathe technology to design and prepare documentation to replicate an item.

Science
- AD/DA Conversion
- Cause and Effect
- Rate and Flow
- Experimental Procedure

Technology
- Computer Numerical Control
- Lathe Technology
- Computer Technology

Engineering
- Engineering Design
- Design Analyses

Math
- 3-D Modeling
- Algebra
- Boolean Logic
- Linear and Nonlinear Systems
COMPUTER NUMERICAL CONTROL (CNC): MILL
40070

What is a mill and what types of parts are milled? The Computer Numerical Control (CNC): Mill module features industrial-grade equipment to demonstrate how the equipment makes manufacturing more productive, efficient, and safe. Students learn how to program and operate the mill, specify dimensions, and manufacture parts that meet these specifications. As a result, students may develop an interest in the field of computer numerical control-related occupations.

This module comes with:
- The Lab-Volt Automation 5400 CNC Mill; a high-powered machining system housed in a safety enclosure, featuring an Emergency Stop button for safe operation.
- Lab-Volt CNC Mill Windows™-based software.
- A milling vise, tool package, safety glasses, rubber mat, milling stock, and accessories.

Activities
- Follow instructions to safely operate a mill, and use computer software to program a mill.
- Use Fabricus CAD/CAM software to easily design parts and compile G & M codes.
- Set up the mill to create projects such as a yo-yo, keychain, and desk organizer.

Science
- AD/DA Conversion
- Cause and Effect
- Rate and Flow
- Experimental Procedure

Engineering
- Engineering Design
- Design Analyses

Technology
- Computer Numerical Control
- Lathe Technology
- Computer Technology

Math
- 3-D Modeling
- Algebra
- Boolean Logic
- Linear and Nonlinear Systems
How do you develop problem-solving strategies and deductive reasoning skills? The Computer Problem-Solving module helps students develop essential problem-solving skills and apply them to various challenging situations. Students also learn how technological problems are solved, what a problem statement is, and how to write a design brief. The hands-on activities reinforce students' learning, which contributes to their success in all areas of their lives and allows them to explore careers that require problem-solving strategies.

This module comes with:
- “Mind bending” software and puzzles
- Computer versions of board games that demonstrate and sharpen problem-solving techniques.

Activities
- Use simulation models and challenging games to solve a variety of conceptual and spatial problems.
- Use existing knowledge to solve problems.
- Use modeling as a method of solving problems.
- Test and evaluate a solution.

Science
- Cause and Effect
- Experimental Procedure
- Proximity Method

Technology
- Computer Technology
- Electronic Problem-Solving
- Simulation Models

Engineering
- Systematic Search
- Logic
- Engineering Design

Math
- Data Analysis
- Problem-Solving
- Reasoning and Proof
- Boolean Logic
- Sequencing
Have you ever wondered what exactly is inside a computer? What makes it work and what makes it not work? The Computer Servicing and Repair module equips students with the necessary knowledge and skills to identify and solve PC operation problems. Students are engaged in hands-on applications with the internals of the computer, such as the video and audio cards and the software drivers that cause them to function properly. Students also identify hardware components, including peripheral devices, and their functions as they perform many software operations and study career options in computer-related fields.

This module comes with:
• Pentium®-class troubleshooting computer.
• Computer tool kit.

Activities
• Perform advanced operations, such as troubleshooting, upgrading a system, running diagnostic routines, assembling and disassembling hardware, inserting and removing cards, and expanding connections on a computer system.
• Examine each part of the computer and perform various activities to test and fix minor problems.

Science
• Magnetism
• Optics
• Input/Output Devices
• Visual Perception

Technology
• Information Technology
• BIOS
• CMOS

Engineering
• Computer Engineering
• Engineering Design

Math
• Algebra
• Boolean Logic
• Troubleshooting
How have computer software programs changed how businesses handle office tasks? The Computer Software Applications module demonstrates the many uses and advantages of business-like application software. Students gain experience with word-processing, database, spreadsheet, and graphics programs, and discover the importance of these programs for business. They also explore related careers.

This module comes with:
- Professional office software, including word processor, spreadsheet program, and database manager.
- Communications and graphics applications.
- On-line tutorial and help.

* Printer required but not supplied.

Activities
- Use a spreadsheet application to determine the cost of a class trip and create a chart.
- Create and search a database.
- Add pictures and special effects to a document.
- Produce and print a report.
- Create a flyer using clip art to enhance its design.
- Use and explain templates.
What exactly are the rules of nature and how does gravity work? In the Conceptual and Applied Physics module, students explore the laws of physics and learn about the physical world and how things work together. Students learn basic and advanced principles of physics, and observe laws and principles as they relate to light, heat, motion, and sound. Hands-on experiments enhance students’ exploration of related career opportunities that may shape their futures!

This module comes with:
- An extensive assortment of tools and materials for exciting experiments in dynamic systems, mechanics, sound, optics, thermodynamics, flow, and electrostatic energy.
- Dynamics system.
- Introduction to optics systems kit.
- 1,000-watt hot plate and mass/hanger set.

Activities
- Perform a variety of experiments that demonstrate the properties and laws of light, optics, waves, mechanics, thermodynamics, sound, and electrostatic energy, calculating physical measurements in SI and the English system of units.
- Use the scientific method of study to demonstrate more advanced concepts of mechanics, thermodynamics, electrostatic energy, acceleration, speed and velocity.

Science
- Physical Science
- Chemical Properties
- Electricity
- Experimental Procedure
- Magnetism
- Optics

Engineering
- Physics Engineering
- Engineering Design

Math
- 3-D Modeling
- Algebra
- Boolean Logic
- Charts and Graphs
- Decimals
- Fractions

Technology
- Computer Technology
- Thermodynamics
How do modern machines know how and when to perform specific tasks? The Controls and Sensors module teaches students about the widespread application and importance of these technologies. This module is designed to expose students to the operating principles of machines that use controls and sensors. Students will build machine models and create software programs used to direct their operation. This module also presents opportunities for related careers and continuing education.

This module comes with:
- The fischertechnik® Control System, including various building blocks and connectors, which are used to build the model's structure.
- Controls and sensors that are incorporated into the structure.
- ROBO Interface for connecting the controls and sensors through inputs and outputs (connects to a USB or serial port on a PC).

Activities
- Build and program models, such as a hand dryer, traffic light, welding robot, and garage door opener.
- Demonstrate and explain the use of motor controls, limit switches, and light sensors.
- Demonstrate the use and operation of temperature control in heating and air-conditioning systems.
What is involved in designing and building a structure? How are models built to scale? The Design & Construction module teaches basic construction techniques. Students learn how to read basic blueprints and construct various frame members, and they develop construction-related skills, such as drawing, measuring, and calculating. Team projects reinforce these abilities as well as brainstorming and problem-solving skills.

This module comes with:
- Architectural software that automatically renders three-dimensional drawings and creates the same detailed, exterior dimension lines that architects use when house plans are drawn.

Activities
- Draw a floor plan and visualize the relationship between the floor plan, model, wall elevations, and three-dimensional space.
- Construct a detailed, 1/4-inch scale, three-dimensional model of a classroom.
- Duplicate this model, including furniture, windows, and doors, with three-dimensional architectural software.
Think of the cover of your favorite magazine. A lot goes into the design and style to make it appealing. The Desktop Publishing (DTP) module teaches students about the tools and principles for creating effective and visually appealing documents, including layout, page design, and typography. Students practice meeting these criteria with desktop publishing tools, including scanners and printers, and state-of-the-art DTP software. Students may discover their own creative talents and a possible career path in the process!

This module comes with:
- Professional-level DTP software.
- Professional-level software for scanning and modifying images.
- Scanner and laser printer.

Activities
- Design and produce a document that meets specified requirements.
- Write and design original documents in desktop publishing software, applying styles, sizes and colors to text.
- Scan images and import them into a document.
- Create a poster and an advertisement that appropriately combine art with typography.

Science
- Visual Perception
- Input/Output Devices

Technology
- Computer Technology
- DTP Software
- Design

Engineering
- Engineering Design
- Spatial Relationships

Math
- Geometry
- Coordinating Systems
- Curves and Angles
- Decimals
- Curves and Angles
- Fractions
DIGITAL PHOTOGRAPHY
40074

What is the difference between a good photo and a great photo? The Digital Photography module enables students to explore the concepts of photography as an art form and the process of using digital photography equipment and software. Students demonstrate how to merge artistic concepts with the specifics of using a camera and equipment. They also store, transform, and print their images electronically.

This module comes with:
• Point-and-shoot digital camera with optical zoom lens, built-in flash, and rechargeable battery.
• Digital photography software to edit images.
• Tripod and photoflood light kit.
• Photo paper.

* A photo-quality printer is required but not supplied.

Activities
• Capture portrait and still-life photography with the digital camera using automatic and built-in assist modes.
• Compose shots using lighting set-ups, backdrops, and drapes.
• Manipulate, store, and burn electronic files to a CD using digital imaging software.
• Produce a photographer’s portfolio to document progress and show off work.

Science
• Experimental Procedure
• Input/Output Devices
• Optics
• Visual Perception

Engineering
• Engineering Design

Math
• Coordinating Systems
• Curves and Angles
• Geometry
• Percentages
• Sequencing

Technology
• Digital Photography
• Digital Photo-Editing
• Information Technology
• Software
When a film or video is shot, industry practice is to record scenes in a random order to take advantage of particular circumstances. So, how does a group of randomly ordered scenes come together as a flowing presentation? In the Digital Video Editing module, students learn how videos are edited to create outtake-free presentations and how audio content is dubbed into videos. Students are introduced to the basic techniques and principles of storyboarding, voice-overs, and digital video editing. They also explore educational and career opportunities in the exciting field of video editing.

This module comes with:
- Digital video editing software.
- DVD Video-Clip Library.
- Microphone.

Activities
- Write scripts and storyboards and record voice-overs.
- Use an editing worksheet to keep track of dramatic sequences and shots to be edited, and edit a video.
- Select footage from an extensive DVD video-clip library to create a seamless video.
- Create advanced special effects, narration, and titling to prepare a complete video presentation.
- Add audio, titles, and credits.
- Complete math exercises related to video editing.

Science
- Experimental Procedure
- Input/Output Devices
- Optics
- Visual Perception

Technology
- Digital Video
- Digital Video Editing
- Video Editing Software

Engineering
- Engineering Design
- Spatial Relationships

Math
- Coordinating Systems
- Curves and Angles
- Sequencing
What is the “Circle of Life” and how are all living things interconnected? In the Ecology module, students investigate how ecosystems work together and how environmental issues, such as global warming, acid rain, and soil erosion affect the earth. Various activities in this module are designed to increase students' awareness of the Earth and its diverse and delicate life forms. Students explore career opportunities through which they can contribute to a healthier and more balanced world.

This module comes with:
• Several scientific/ecological software applications.
• Interactive games that demonstrate the nature of ecosystems.
• Digital precision scale for measuring small weight changes in experimental material.
• Demonstration supplies.

Activities
• Use computer software to simulate a living planet and balance the Earth's natural resources.
• Prepare a presentation on the Gaia Theory.
• Use database software to record observations about local plant and animal life.

Science
• Cause and Effect
• Chemical Properties
• Ecological Risk Factors
• Ecosystems
• Environmental Impacts
• Waste Management

Engineering
• Engineering Design
• Environmental Engineering

Math
• Algebra
• Boolean Logic
• Charts and Graphs
• Sequencing

Technology
• Computer Technology
• Environmental Technology
What is MIDI (Musical Instrument Digital Interface) technology and how it is used to create music? In the Electronic Music module, students explore the tools and techniques of creating electronic music and sound effects, and develop a basic knowledge of musical elements, such as rhythm, melody, and harmony. They also develop skills and explore their creativity by using highly advanced electronic equipment to produce sound.

This module comes with:
- USB keyboard with velocity-sensitive keys designed to work with MIDI software.
- Professional-level music software.
- Portable audio cassette recorder with tapes and speakers.

Activities
- Follow instructions to compose a simple, initial work.
- Compose and record a piece of music.
- Create sound effects that correspond to a narrative text.
- Use editing and other features offered in the sequencing software.
- Write and add sound effects to a narrative.

Science
- Cause and Effect
- Experimental Procedure
- Input/Output Devices

Engineering
- Engineering Design
- Audio Engineering

Technology
- Audio Devices
- Computer Technology
- Synthesizer Technology
- Software

Math
- Algebra
- Charts and Graphs
- Coordinating Systems
- Curves and Angles
Why do some structures last for hundreds or thousands of years while others break down in short periods of time? In the Engineering & Stress Analysis module, students observe how severe weather, excessive weight, and other forces affect the integrity of structures, such as bridges and buildings. They are introduced to such topics as force, area, stress, strain, tension, compression, and more. Students apply scientific principles that establish strength and endurance in construction projects, and explore educational and career opportunities in engineering and construction.

This module comes with:
- The Stress Analyzer: a self-contained trainer with a computer interface that clearly demonstrates the effects of stress on construction material.
- Virtual engineering software that allows the students to build and test a structure.

Activities
- Test the stress and deflection of a structure using a stress analyzer.
- Design, construct, and test the efficiency of a balsa wood structure.

Science
- Hooke's law
- Cause and Effect
- Chemical Properties
- Fluid Flow and Pressure
- Force, Power, and Work
- Young's Modulus

Engineering
- Architectural Engineering
- Civil Engineering
- Engineering Design
- Stress Analysis

Technology
- Structural Stress Analyzer
- Engineering Technology

Math
- 3-D Modeling
- Algebra
- Boolean Logic
- Curves and Angles
- Linear and Nonlinear Systems
What role does water play in our lives and in the environment? How do we tackle issues like acid rain and water pollution? The Environmental Technology/Water module alerts students to the limits of our clean water supply, and educates them about processes for testing and treating water. Students explore a variety of careers in environmental science.

This module comes with:
• Lab-Volt’s water-filtration-plant simulator, which includes a settling tray, separator screens, recycling pump, and particle and chemical filters.
• Water quality testing kit.
• Water pump.

Activities
• Perform experiments to test the pH levels of drinking water and water from the environment.
• Perform experiments to test water purity and follow procedures to treat wastewater.

Science
• Cause and Effect
• Chemical Properties
• Ecological Risk Factors
• Experimental Procedure
• Waste Management

Engineering
• Environmental Engineering
• Engineering Design

Math
• 3-D Modeling
• Algebra
• Decimals
• Fractions
• Measurement

Technology
• Environmental Technology
• Water Treatment
EXPLORATORY ELECTRONICS
40015

Can you imagine a world without electronics? Think of all the things you would have to do without. The Exploratory Electronics module provides experiments that help students understand the technology and scientific principles at work in computers, automobiles, and countless other innovations. As students learn about circuitry and develop skills in testing and troubleshooting, they may also discover an interest in electronics careers.

This module comes with:
- The Lab-Volt Exploring Electronics Trainer (Model 555A): a self-contained unit ideal for demonstrating electronic circuits and how they work.
- Removable components, a built-in power supply, and fully-protected voltmeter, ammeter, and speaker.

Activities
- Use the Lab-Volt Exploring Electronics trainer to demonstrate safe handling of electronic circuitry while performing various tasks, and use calculated values to predict electrical circuit performance.
- Perform experiments and use measuring devices to demonstrate and test electrical circuitry.
- Troubleshoot electrical circuits using knowledge gained in this module.
- Troubleshoot and repair faulted electrical and electronic systems.

Science
- Cause and Effect
- Electricity
- Experimental Procedure
- Magnetism
- Rate and Flow
- Ohm’s Law

Engineering
- Electrical Engineering
- Engineering Design

Math
- Algebra
- Charts and Graphs
- Linear and Nonlinear Systems
- Measurement
- Sequencing

Technology
- Electronics Technology
- Electrical Technology
EXPLORING ELECTRICITY
40043

How does electricity work and how did people ever live without it? Through the Exploring Electricity module, students discover how electrical circuits are built and tested. They explore the scientific principles that explain how circuits and other components make electric devices operate. With an understanding of these inner workings and possible future innovations, students may consider careers in electrical science, some of which are presented in this module.

This module comes with:
• The Exploring Electricity trainer: a self-contained unit ideal for teaching students the basic principles of electricity. The trainer is completely safe and comes equipped with a built-in regulated power supply.
• Trainer components, including a digital multimeter, an electric relay, and a variety of lamps, switches, and resistors.

Activities
• Build a variety of circuits using electrical leads.
• Measure circuit characteristics with the digital multimeter.
• Use the Lab-Volt Exploring Electricity Laboratory to perform experiments and demonstrate basic electrical concepts, including three-way switching and magnetism.

Science
• Cause and Effect
• Electricity
• Experimental Procedure
• Magnetism
• Rate and Flow
• Ohm's Law

Technology
• Electrical Technology

Engineering
• Electrical Engineering
• Engineering Design

Math
• Algebra
• Charts and Graphs
• Linear and Nonlinear Systems
• Measurement
• Sequencing
What do the inclined plane, the lever, the wheel and axle, and the pulley have in common? They are the four simple machines that make everyday tasks easier. The Exploring Mechanisms module introduces the scientific concepts and components that make machines work. Students also learn about careers in mechanical systems, construction, and manufacturing, where they can expand and apply the knowledge gained in this module.

**This module comes with:**
- Lab-Volt Exploring Mechanisms trainer: a self-contained unit featuring gear trains, timing belt chains, O-ring chains, and pulleys that demonstrate how mechanical advantage is achieved, as well as the direction of rotation and tension.

**Activities**
- Use the Lab-Volt Exploring Mechanisms trainer to demonstrate how gear trains, timing belt chains, O-ring chains, and pulleys perform work, exert force, and achieve mechanical advantage and direction of rotation and tension.
- Define the concepts of power, force, energy, work, and torque.

**Science**
- Experimental Procedure
- Fluid Flow and Pressure
- Magnetism
- Measurements
- Rate and Flow

**Technology**
- Mechanical Power
- Machinery

**Engineering**
- Mechanical Engineering
- Engineering Design

**Math**
- 3-D Modeling
- Algebra
- Boolean Logic
- Decimals
- Fractions
- Ordering Values
How is light used to transmit sound? What is fiber optics? How are codes, data, voice, radio, and light transmitted through optical fibers and over laser beams? The Fiber Optics and Lasers module teaches students the basic concepts of these technologies. Students perform experiments to observe these phenomena, demonstrate how light is used in communications, and explore career opportunities in these continually-expanding fields.

This module comes with:

- Fiber optics trainers with built-in electrical supply, audio interface leads, and fiber optic cables.
- AM/FM radio and Optical Fiber Theory Set.
- Laser education kit, which includes a clear, modulated laser and a voice transmission package.

Activities

- Perform experiments that demonstrate the principles of fiber optics and lasers.
- Generate communication techniques through the use of both a fiber optic cable and a laser beam.
- Demonstrate advanced communication techniques using fiber optics and lasers.

Science

- Cause and Effect
- Experimental Procedure
- Fluid Flow and Pressure
- Magnetism
- Optics

Technology

- Fiber Optics
- Telecommunications
- Laser Technology

Engineering

- Engineering Design
- Communications Engineering

Math

- 3-D Modeling
- Algebra
- Boolean Logic
- Coordinating Systems
- Patterns and Numbers
Did you ever wonder what the cockpit in an airplane is like or what types of controls are used to fly an airplane? The Flight Simulation module offers the students a realistic, professional, pilot-training experience. Students learn about aviation technology and the knowledge and skills required for safe flight. They apply what they learn to virtual flying experiences, which may spark an interest in aviation-related higher education and careers.

This module comes with:
- Flight Simulation software, featuring a photo-realistic instrument panel, three-dimensional scenery, and authentic flight sounds.
- Flight Simulation package which includes a yoke system with throttle control, braking system, and rudder pedals.
- Model airplane kits.

Activities
- Locate and explain the flight instruments and execute basic-instrument flight maneuvers.
- Simulate a flight using flight controls.
- Demonstrate advanced flying skills, including advanced planning and plotting of a course, take-off, simulated flying, communicating, and landing.

Science
- Cause and Effect
- Experimental Procedure
- Fluid Flow and Pressure
- Magnetism
- Optics
- Rate and Flow

Technology
- Aeronautics
- Aviation
- Simulation

Engineering
- Engineering Design
- Aerospace

Math
- 3-D Modeling
- Algebra
- Boolean Logic
- Coordinating Systems
- Curves and Angles
How is power created from liquids and gases? Through the Fluid Power module and hands-on exercises on the Lab-Volt Fluid Power Trainer, students learn the scientific principles and components that make up fluid power systems and how these systems operate in other equipment. Students also explore related educational and career opportunities.

This module comes with:
- The Lab-Volt Fundamentals of Fluid Power trainer: a portable unit with check, flow control, directional control, and relief/sequence valves, vacuum pressure gauge, single- and double-acting cylinders, and other sophisticated components that demonstrate the principles of fluid power.

Activities
- Perform experiments on the Fluid Power trainer to demonstrate the principles being studied.
- Perform mathematical calculations and design pneumatic circuits.
- Define schematic symbols used to diagram a fluid power system.

Science
- Pascal's Law
- Charles' Law
- Boyle's Law
- Gay-Lussac's Law
- Rate and Flow

Technology
- Hydraulics
- Pneumatics

Engineering
- Engineering Design
- System Design

Math
- Algebra
- Boolean Logic
- Charts and Graphs
- Coordinating Systems
- Curves and Angles
HEALTH
40033

The human body is very complex. How can you keep it working well and staying healthy? The Health module introduces students to technologies, including fitness equipment and medical treatments, that help improve health. It emphasizes the importance of nutrition, hygiene, and physical and mental fitness. After completing this module, students may decide to continue learning for their personal benefit and possibly for health related careers.

This module comes with:
- Scientific and fitness software and equipment, including a virtual personal trainer, an exercise mat, and a calorie counter book.
- Breath volume kit, prepared microslides of human and microbe cells, and a microslide viewer.
- Hot plate, heat-resistant gloves, and various measuring devices.

Activities
- View cells and tissue with a microslide viewer.
- Make a lifestyle chart.
- Use a stopwatch and thermometer to monitor own vital signs.
- Use an exercise mat and stopwatch to test flexibility, balance, and coordination.
Manufacturing affects every part of daily life. What would you do without the manufactured products you use each day? There would be no cars, computers, cell phones, televisions, etc. The Manufacturing Processes module teaches students how products undergo several manufacturing processes and procedures before completion. Students also learn about sensors, control routines, ladder logic, and industrial sequencing. The Industrial Control Trainer, along with simulation and ladder logic simulation software, teach students about standards used in industrial processes.

This module comes with:
• The Manufacturing Processes trainer: a highly visual and intuitive system consisting of control devices enhanced with industrial sensors and actuators for instruction in industrial control.
• Simulation software.

Activities
• Gain hands-on experience with various types of sensors used in the manufacturing process, including inductive, capacitive, and fiber optic sensors.
• Develop a ladder logic diagram program to complete the assembly and testing of a product.
• Use the Manufacturing Processes trainer to sort and assemble components, and then check for correct assembly.
Did you ever wonder how hurricanes and tornadoes are forecast and measured? The Meteorology & Forecasting module offers hands-on activities that illustrate how weather patterns are recognized and forecasts are developed. Students gain fundamental knowledge about weather and meteorology, and learn about instruments and computer-based tools that are used to predict the weather. They study the Earth’s atmosphere, pressure systems, weather fronts, and storm-tracking, and explore careers in weather-related fields.

This module comes with:

- Weather monitor.
- Receiver with anemometer and barometric pressure sensors.
- Reference book.
- Temperature and humidity sensor.

* Printer required but not supplied.

Activities

- Operate and receive information on a ground-based weather station.
- Read and interpret weather maps and make a 24-hour local forecast.
- Prepare local and national weather forecasts.
- Identify different types of satellites used in forecasting.

Science

- Meteorology
- Experimental Procedure
- Measurements
- Optics

Technology

- Forecasting Technology
- Satellites
- Communications

Engineering

- Earth System Science & Engineering
- Engineering Design

Math

- 3-D Modeling
- Algebra
- Charts and Graphs
- Coordinating Systems
Have you ever wondered how classroom computers communicate with each other as well as with all the other computers on the World Wide Web? This module teaches students what computer networks are and how they work. Students examine a variety of networks, applications, and software. The information throughout this module covers a broad range of networking facts and provides an overview of several Information Technology careers.

This module comes with:
- Flowchart software that enables students to easily develop professional-quality networking charts and diagrams.

Activities
- Compute the power requirements for a UPS (uninterrupted power supply) connected to a specific workstation.
- Produce a rough sketch of the classroom.
- Use flowcharting software to create a diagram of a star topology, a site plan that includes equipment, a physical map of the classroom network, and a small home network.
- Calculate the bend radius of a specified cable, and file-download times.
Plastic is a versatile manufacturing material. But what exactly is it made of? Through the Plastics module, students learn about the past and present uses of plastics and become familiar with the various chemical properties, types, and structures of different plastics. Students operate a thermoplastic molding machine and an injection molding machine to produce parts. They also examine environmental issues related to plastics.

This module comes with:
- Vacuum forming machine.
- Injection molding machine.
- Chemistry kit.
- Tools, molds, heat-resistant gloves, hot pad, and supplies.

Activities
- Use a plastic vacuum forming machine to create a sign.
- Use an injection molding machine to produce plastic parts.
- Use a chemistry kit to determine the composition of an element and to observe chemical properties.

Science
- Chemistry
- Experimental Procedure
- Force, Power, and Work
- Input/Output Devices
- Measurements

Engineering
- Industrial Engineering
- Engineering Design

Math
- Arithmetic
- Curves and Angles
- Measurement

Technology
- Manufacturing
Have you ever listened to the radio and thought “I could do that!”? The Radio Broadcasting module demonstrates the variety of knowledge and skills needed in this industry. Students learn basic radio disc jockey skills, including copywriting, editing, and announcing in the broadcast style. They also produce radio programs and commercials using authentic equipment and learn about government regulations, the media industry, and career opportunities.

This module comes with:

- Radio Broadcasting equipment, which includes: a CD player, stereo cassette recorder/player, five-channel amplifier, dual stereo speakers, microphone and stand, mixing panel with slide controls, cables, wiring harness components, blank cassettes, large-face clock, desktop lectern, and script stand.

Activities

- Produce and record a radio show that includes deejay chatter, music, station ID, three one-minute commercials, newscast with interview segment, and sports, weather, and public service announcements.
- Apply advanced elements of radio production techniques to plan, broadcast, and record a complete radio broadcast. (Note: “Broadcasts” are sent to a cassette recorder; they are not sent over real air waves.)

Science

- Cause and Effect
- Ergonomics
- Experimental Procedure

Technology

- Broadcasting
- Communications

Engineering

- Broadcast and Sound Engineering
- Engineering Design

Math

- Charts and Graphs
- Linear and Nonlinear Systems
- Measurement
- Ordering Values
- Sequencing
If you’ve ever tripped a circuit breaker or blown a fuse, you have probably wondered about electrical wiring. The Residential Electrical Wiring module provides technical knowledge and skills that students can use in their homes or to pursue careers as electricians. Students learn the fundamentals of electricity: alternating current; terminology; basic home electrical systems; circuit basics; service panel; circuit breakers and fuses; grounding; National Electrical Code®; cables and wires; and safety. Several hands-on activities reinforce the knowledge about electrical systems and allow students to realize their interest and potential to succeed in the field.

This module comes with

• Residential Electrical Wiring trainer: introduces electrical wiring techniques; demonstrates the operation of a service panel and how it is used to distribute power and protect various circuits.

* An additional wiring trainer and supplies must be purchased for each class period.

Activities

• Wire and ground a service panel.
• Wire a circuit breaker.
• Wire a receptacle.
• Install a light fixture.
• Install a coaxial cable jack.
• Install a phone jack.

Science

• Electricity
• Input/Output Devices
• Measurements

Engineering

• Electrical Engineering
• Engineering Design

Technology

• Electrical Systems
• Construction

Math

• Arithmetic
• Linear and Nonlinear Systems
RESIDENTIAL PLUMBING
40045

Where does water go after it drains from your shower or sink? How does the piping system work? The Residential Plumbing module prepares students to perform plumbing tasks in their homes. After applying these skills and knowledge through hands-on experiences, some students may realize their interest and potential to succeed in plumbing careers.

This module comes with:
- Residential Plumbing trainer: includes kitchen and lavatory faucets, shower and tub fixtures, and all pipes and fittings needed for the activities.
- CPVC pipe (instead of copper, to ensure safety). CPVC effectively demonstrates how hot and cold supply lines distribute water.

* An additional plumbing trainer and supplies must be purchased for each class period.

Activities
- Rough in a drainpipe and supply pipes.
- Install a faucet, sink strainer, and trap.
- Install a tub drain and trap.
- Troubleshoot a faucet.
- Install a shower valve, showerhead, and tub spout.
- Install faucet shut-off valves, a hose bib, and a soil/vent stack.

* During these activities, pipes will be dry-fitted (without glue) to prevent any problems associated with glues and inadequate ventilation.

Science
- Cause and Effect
- Force, Power, and Work
- Input/Output Devices
- Measurements

Engineering
- Plumbing Engineering
- Engineering Design

Math
- Arithmetic
- Linear and Nonlinear Systems

Technology
- Plumbing Systems
- Construction
Can you imagine traveling to and working on the International Space Station? Or being part of the first manned mission to Mars? The Space and Rocketry module educates students about the past, present, and future of space exploration. They will study the history of human inquiry into the workings of the cosmos, how modern products have been manufactured due to discoveries made in space, and how the future could hold the possibilities of living in space colonies and traveling back and forth to and from space stations. Students simulate and apply the technologies and scientific principles involved in space travel and exploration.

**This module comes with:**

- Deep Space Explorer software.
- Rockets, engines, launch control and pad, altitude finder.
- Builder’s guide and fin-alignment guide.

**Activities**

- Use sophisticated space-simulation software to develop an understanding of outer-space exploration techniques.
- Build and launch a model rocket and apply the principles of rocketry to understand why rockets fly.
- Evaluate two rocket propulsion systems and describe the advantages and disadvantages of each.

**Science**

- Aeronautics
- Astronomy
- Experimental Procedure
- Magnetism
- Rate and Flow

**Technology**

- Propulsion
- Aeronautics

**Engineering**

- Aerospace Engineering
- Mechanical Engineering
- Engineering Design

**Math**

- 3D Modeling
- Algebra
- Coordinating Systems
- Curves and Angles
- Measurement
VIDEO PRODUCTION
40026

Have you ever seen a television show being videotaped or wonder how it’s done? In the Video Production module, students explore their artistic and technical abilities for creating video presentations. They explain the basics of how professional videos are produced, and explore the pre-production phase of videotaping. Through hands-on experiences, they learn how films are created and explore various careers that involve video production.

This module comes with:
• Digital video camera with accessories and director’s tools.
• Lighting kit with studio lights and stands.
• Digital video tapes, cables, and a DVD recorder with blank DVDs.

Activities
• Demonstrate the seven basic shots of composition.
• Use different types of lights to achieve various moods and special effects.
• Record sound.
• Script and storyboard a production.
• Produce and evaluate a fictional talk show.
• Experiment with different types of camera shots, angles, and focusing techniques.
• Videotape a conversation between two people.

Science
• Chemical Properties
• Experimental Procedure
• Input/Output Devices
• Measurements
• Optics

Technology
• Audio/Video
• Communications

Engineering
• AV Engineering
• Engineering Design

Math
• 3D Modeling
• Algebra
• Coordinating Systems
• Curves and Angles
• Sequencing
Think of all the websites you visit in a week and how different they are from each other. Maybe you’ve thought of creating a website of your own. This module introduces students to the process of creating web pages through the use of Hypertext Markup Language (HTML) and professional web-development software. Using the provided software package, students learn the tools necessary for creating their own web pages, and they explore possible careers in web design and related fields.

This module comes with:
- Professional-level software for web development, photo imaging, graphic design, and clip art.

Activities
- Create and modify web pages with HTML tags, specified formatting, text, and graphical elements.
- Insert images into tables and modify image properties.
- Add sound and animated text.
- Prepare files and folders for publishing.

Science
- Experimental Procedure
- Input/Output Devices
- Optics
- Visual Perception

Engineering
- Internet Engineering
- HTML Engineering
- Engineering Design

Technology
- Internet Technology
- Communications
- Software

Math
- Charts and Graphs
- Linear and Nonlinear Systems
- Sequencing
Have you witnessed the frustration of your students as they struggle to find an effective plan for completing a team project? Have you questioned the value of taking class time for project work in which students seem “lost” with no direction on how to succeed? Project Summit offers an effective solution with well-managed projects -- not last-minute panic.

The Expedition lessons of Project Summit guide students through each stage of efficient project development. Students practice each step through directed instruction on the software and then apply their skills to the team project. This guidance ensures that students come away from the team experience with more than a hastily thrown together project. They move forward with team-building skills that they will apply throughout their careers.

Project Summit is available in a cost-effective classroom set, in which an entire class simultaneously works through certain modules and then completes Project Summit. See page 3 for details.

**TOPIC COVERAGE**

**Expedition One: Team Building**
- Team Roles
- Plan of Action

**Expedition Two: Solving Problems**
- Specification and Research Reports
- Brainstorming and Design Selection
- Proposals

**Expedition Three: Project Management and Completion**
- Project Management & Product Development
- Marketing
- Presentations
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Hands-on training in Design, Electricity and Electronics, Quality, Mechanical Systems, Manufacturing Processes, and Automation & Material Handling.
THE TECHNOLOGY LABORATORY:
FLEXIBLE, MODULAR FURNITURE & WORKSTATIONS

LAB-VOLT’S 41000 SERIES
WORKSTATIONS
Lab-Volt’s 41000 Series workstations come in various styles that allow units to be positioned along the perimeter of the classroom, in the center of the room as islands, and around inside or outside corners -- taking full advantage of limited space. Each workstation is freestanding with a smooth laminated work surface, and provides ample space for two students to perform computer tasks and hands-on activities.

Both the Standard Style Workstation and the Streamline Style Workstation are L-shaped units designed as 1/4-quad stations, accommodating two students. They can be integrated with additional units to form 1/2-quads (two stations/4 students), 3/4-quads (three stations/6 students), or full quads (four stations/8 students).

STANDARD WORKSTATION
Model 41500-20 (81” x 81”)
Model 41500-30 (69” x 69”)

The standard style frame, made of heavy-weight material suitable for stationary placement in the lab, includes a lower, polygon-shaped pylon mounted to the work surface and modesty panels.

Work Surface Depth: 30"
Upper Divider Panels: 22” H
Lower Modesty Panels: 16.5” from floor
Leg Panel: 23.5” x 28.5”
Center Pedestal: 18” x 18” clipped at 45 degrees

STREAMLINE WORKSTATION
Model 41600-30 (81” x 81”)
Model 41600-40 (69” x 69”)

The streamline style ¼-quad frame features lightweight steel leg assemblies for mobility, modesty panels, and an open-style oak-grained riser cabinet.

Work Surface Depth: 30"
Upper Divider Panels: 22” H
Lower Modesty Panels: 16.5” from floor
Leg Panel: 23.5” x 28.5”
Center Pedestal: 18” x 18” clipped at 45 degrees
Lab-Volt Workstations

INLINE WORKSTATION
The Inline Workstation is constructed of the same heavier-weight material as the standard style, but is unique in its rectangular shape. Several units, configured side-by-side, permit workstations to be positioned “in line.” The inline workstation features a shelf for books and other supplies, and a center console containing power outlets on either side and an on/off power switch on the front.

Work surfaces are laminated and include holes in the back corners to accommodate cables and wiring.

Modesty panels are mounted to the leg assemblies and/or lower power pylon to provide additional stability to the workstation and privacy for students.

STREAMLINE INLINE WORKSTATION
Model 41800-60 (30” x 72”)
Model 41800-70 (30” x 84”)

Work Surface Depth: 30”
Upper Divider Panels: 22” H
Lower Modesty Panels: 16.5” from floor
Leg Panel: 23.5” W x 28.5” H

STANDARD INLINE WORKSTATION
Model 41800-40 (30” x 72”)
Model 41800-50 (30” x 84”)

The standard version of the inline workstation has the same dimensions as the streamline version, with sturdy leg panels designed for stationary placement in the lab.

INSTRUCTOR WORKSTATION
Remove the riser and privacy panel from the standard or streamline units, and you have the Instructor Workstation, a desktop workplace that provides ample area for a computer, keyboard, bookshelves, and floor cabinets. The Instructor Workstation is available in both standard and streamline versions.

STREAMLINE INSTRUCTOR WORKSTATION
Model 41600-50 (81” x 81”)
Model 41600-60 (69” x 69”)

The streamline version of the instructor workstation has the same dimensions as the standard version, with lightweight metal legs for mobility.

STANDARD INSTRUCTOR WORKSTATION
Model 41500-40 (81” x 81”)
Model 41500-50 (69” x 69”)

Work Surface Depth: 30”
Lower Modesty Panels: 16.5” from floor
Leg Panel: 23.5” x 28.5”
UTILITY TABLE
Model 41004-10 (24” x 65”)
Model 41004-20 (30” x 72”)

The utility table is an ideal mobile unit that provides additional workspace for large module equipment, such as the CNC mill and lathe or the Aerodynamics wind tunnel. A full-length storage shelf provides additional space for accessories and other materials.

Height: 28”
Lower Shelf: 18” W x 10-1/2” H
Leg Panel: 23.5” x 28.5”

OCTAGONAL TABLE
Model 41007-30

The octagonal table is designed for comfort, safety, and durability. Each table measures 60”* x 60” x 28” and provides ample room for eight students to sit side by side. The table surface is made of smooth, durable material, and is trimmed with an attractive black edging.

*Width of the octagonal table is measured as the distance from one edge to its parallel.

COLOR OPTIONS
Series 41000 furniture is available in a variety of work surface and cabinet colors. **You must specify the following model numbers for each when ordering:**

**WORK SURFACE**
41000-TA Almond
41000-TE Gray Spectrum
41000-TK Putty Gray
41000-TQ Green Spectrum
41000-TR Graphite Spectrum
41000-TS White Spectrum
41000-TT Cloud Spectrum
41000-TU Blush Spectrum
41000-TV Sand Spectrum
41000-TW White Jaguar

**CABINET COLOR**
41000-CB Deep Teal
41000-CC Royal Blue
41000-CD Verde Jaguar
41000-CF Navajo Red
41000-CG Boxwood
41000-CH Iris
41000-CJ French Blue
41000-CN Bittersweet
41000-CO Fine Oak
41000-CQ Green Spectrum
41000-CR Graphite Spectrum
41000-CT Cloud Spectrum
41000-CX Burgundy
FOUR-DRAWER MOBILE CABINET
Model 41001-10

The four-drawer cabinet is a convenient lockable mobile storage unit that fits under the workspace for easy access and spatial economy. Each unit has four swivel casters and recessed handles, and measures 18" W x 20" D x 27.75" H. The cabinet provides an excellent space for storing module supplies, such as pens, rulers, and scissors.
FLEXIBLE DESK AND LAB CONFIGURATIONS
The 1390 Series Workstations come in two styles. A flexible desk configuration provides an ideal workstation for a computer and small equipment, such as the Lab-Volt FACET program. The lab configuration is ideal for larger, heavier equipment, such as the Lab-Volt Automation ArmDroid, which requires students to stand up during its operation.