PROPOSAL
FOR A STEM SMARTLab™ LEARNING
ENVIRONMENT FOR

Rowland Middle Academy
Harrisburg, Pennsylvania

MAY 10, 2016

“We must prepare all students to be proficient in STEM subjects. And we must inspire all students to learn STEM and, in the process, motivate many of them to pursue STEM careers.”

President’s Council of Advisors on Science and Technology - September, 2010
Creative Learning Systems designs and implements engaging STEM learning environments to build 21st century skills. Combining cutting-edge technology with standards-based curriculum, we help provide students of all ability levels with challenging and engaging learning opportunities. Students learn to use and apply technology. They learn to manage projects and problem solve. They communicate and collaborate. They build skills necessary to compete in our global economy.

Creative Learning Systems corporate offices are in Longmont, Colorado.

Web site:  http://www.creativelearningsystems.com
Address:   1140 Boston Avenue
           Longmont, CO  80501
Phone:    (303) 772-6400 or (800) 458-2880
Fax:       (303) 772-6422

Principal Contacts:
Bill Reinhard
Regional Sales Manager
(732) 762-5704
stem.let@verizon.net

Shelley Nault
Director of Operations
(303) 772-6400 or 800-458-2880 Extension 723
snault@creativelearningsystems.com

Kurt Williamson
Vice President, Learning Environments
(303) 772-6400 or 800-458-2880 Extension 112
kwilliamson@creativelearningsystems.com

Gary Nelson
President
(303) 772-6400 or 800-458-2880 Extension 105
gnelson@creativelearningsystems.com

Matt Dickstein
Chief Executive Officer
(303) 772-6400 or 800-458-2880 Extension 102
mdickstein@creativelearningsystems.com
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Introduction and Overview

Creative Learning Systems has successfully installed STEM learning environments in hundreds of schools nationwide. Our partners include public, charter and private schools serving a wide range of student populations and encompassing varied educational philosophies and program objectives. The common thread among Creative Learning Systems’ clients is a desire to engage, motivate and empower learners to build 21st century skills and to prepare their students to compete in a global economy.

In the 2006 report, “Are They Really Ready to Work” employability skills dominate rankings of knowledge and skills expected to increase in importance over the next five years. Employers identified critical thinking/problem solving, information-technology application, teamwork/collaboration, creativity/innovation and diversity as the top five such skills.*

Our turnkey learning environments feature fully integrated systems of hardware, software, furnishings, online curriculum, educational kits, manipulatives, professional development, assessment tools, ongoing support, training, enhancement and upgrade services. Creative Learning Systems’ hosted curriculum integrates technology education with core academic subjects using a project-based approach to learning. We empower both teachers and students to develop and explore areas of personal interest, while meeting state and national standards.

The environments we design help students learn about technology, but more importantly, students learn how to use technology. Therefore, as technology changes students can quickly and effortlessly adapt. In a Creative Learning Systems environment, technology also functions as a learning tool. Students learn critical problem-solving skills in a multidisciplinary environment. They have numerous opportunities to apply principles of math, science, language arts and other academic disciplines in engaging, relevant ways. As they create and present portfolios of their work, they develop communication skills vital to scholastic and professional success.

In an elementary school SmartLab, students develop foundational technology skills in mechanics and structures, robotics, circuitry, science and data acquisition, computer graphics, and publishing and multimedia. Students learn how to develop project objectives and document their learning in ePortfolios, daily journals and project presentations. The elementary SmartLab is designed to support rotational learning engagements in upper elementary grades and whole-class, teacher led activities for younger learners.

In a middle school SmartLab, students begin to explore a wider range of technology including professional-standard software applications. Middle school SmartLab curriculum explores the scientific principles behind each system of technology in more detail and encourages a greater understanding of academic connections. Projects become more open-ended and learners are encouraged to adapt and expand projects to fit their own interests and connect with academic content from their other classes. Expectations for ePortfolio documentation and presentations are higher and students begin to self-assess performance along with their facilitator.

In a high school SmartLab, students who have been through the middle school program are encouraged to explore specific areas of technology, such as digital media arts, robotics, or alternative and renewable energy in more depth. High school learners are often ready to engage in extended projects of their own design that utilize a broader variety of technology tools and bridging multiple academic subject areas.

The principles that guide the custom design of each Creative Learning Systems learning environment are based on leading-edge research into how people learn. Educational theories of constructivism, brain-based learning and multiple intelligences are combined with over 20 years of field testing, research, development and program refinement. The result is a powerful STEM learning environment that engages learners of all abilities and opens new doors to academic and personal success.

A key element of Creative Learning Systems reputation as a reliable partner in education is our ongoing commitment to service and support. With each new learning environment, Creative Learning Systems provides extensive, on-site professional development and technical training. Facilitators have numerous opportunities for further professional development as well as access to the advice and support of an active community of SmartLab facilitators in other schools. Creative Learning Systems has been at the forefront of learning technologies for over 20 years and, as an educational partner, you have access to ongoing consultative services from our team of experts. At Creative Learning Systems, we are fully committed to the long term success of your school, your staff, and your students. That’s our promise.

Another important factor that sets us apart from other STEM education providers are the key distinctions between the SmartLab and modules-based programs. First, the SmartLab is designed for personalized learning, as a student-centered learning environment. Autonomy and self-direction are encouraged and rewarded. SmartLabs are designed and provisioned with a wide array of technology and learning resources to support learners with different interests and abilities. Modules-based programs guide learners through a more narrow set of learning activities predefined by the vendor.

SmartLab learning engagements are academically-oriented activities designed to focus on the development of 21st century skills - critical thinking, problem solving, collaboration, communication and project management. Learners explore science, math and engineering (STEM) through applied technology; also building connections to social studies, language arts and other academic subjects along the way. Modules-based programs approach technology as a limited set of vocational skills and the integration of multiple technology applications and/or other subjects is not as emphasized.

SmartLabs provide for authentic assessment of learning based on portfolios developed and presented by students to evidence project work and document learning. Modules-based programs rely on a computer-based management system to deliver pre and post-tests to assess a narrowly-defined knowledge/skill set.

The SmartLab is a fully-customized learning environment designed specifically for each school in collaboration with educators, administrators and other school staff. The goal of the program; whether stand alone or used to enhance an existing curriculum, is to engage students and help develop 21st century skills. Modules-Based programs limit customization to the selection of available learning modules.

SmartLab professional development is provided through onsite instruction by a CLS specialist and all ongoing support is also provided directly by Creative Learning Systems. Schools are encouraged to include additional staff members in the initial training and orientation, at no added cost to help increase awareness and practice of the “student centered” learning approach throughout the school. Professional development for modules-based programs is typically specified as group instruction at a vendor location. Support is typically provided by area sales representatives.

SmartLabs are designed to provide resources and practices that can support STEM education throughout an entire school system - using the SmartLab as an interdisciplinary center of application. Modules-based programs are narrowly designed to support a specific vocationally oriented, technology education program.

For all of these reasons, we are proud to present this Proposal about Creative Learning Systems STEM SmartLab program to Rowland Middle Academy.

“Of all the investments we make in educational technology, the SmartLab has been the most effective in actually putting technology in the hands of our students.”

Dr. Velma Villegas, Superintendent
Southwest Independent School District TX
Deliverables and Price

This section provides the details about the purchase price and lists the deliverables. More information about the deliverables can be found in the following sections.

Deliverables

The purchase price includes:

Design and Implementation

- SmartLab system design, consulting, and planning services; including specific facility requirements.
- Network consultative services and coordination with selected wiring contractor.
- Setup, installation, testing and configuration of all hardware, equipment, computers, software, and printers to be used within the SmartLab.
- Coordination and installation of all school owned software within the SmartLab environment.
- Imaging of all SmartLab client workstations and servers for easy recovery.

Deliverables

- **Five Collaboration Cluster SmartLab™ for up to 30 learners**
- Specifications for Customer-purchased Windows based personal computers and software.
- Creative Learning Systems Learning Launcher Curriculum with supportive kits and resources for a 30 student course offering.
- Creative Learning Systems ePortfolio Assessment System.
- All equipment, furnishings, kits, apparatus, libraries, curriculum and software described in the following sections. (See Attachment A for specific list of deliverables)

Professional Development and Support

- **Four days of onsite** professional development and technical training.
- An additional two days of onsite Student Broadcast Studio training.
- Advanced Facilitator Development Conference Tuition Slot.
- Technical and Pedagogical support available via toll-free 800 number.
- Curriculum and Support Agreement (CSA):
  - Access to hosted Learning Launcher Curriculum including all available updates and additions.
  - Access to hosted Facilitator Resources including all available updates and additions.
  - Up to four days additional onsite professional development in the event of facilitator turnover (once per term).
  - Unlimited telephone and online technical & pedagogical support.
  - Discounted rate for onsite technical support and/or additional professional development.
  - Discounted tuition for future Advanced Facilitator Development Conference (AFDC).
  - Up to $1,000 per year in enhancement and replacement parts from the SmartLab catalog.

Additional Rowland Middle Academy SmartLab elements outlined within include:

- Facilitation Zone.
- Custom configured Dell server.
- SmartLab Media Systems/Integration Services.
- SCRS™ (SmartLab Computer Restoration System).
- Replication Platform™.
- 3D Printer System.
- Presentation/Collaboration Collection with the Interactive White Board – interactive white board is customer supplied.
- Computer Control Monitoring System.
- Replacement Construction Sets for Each Class Period.
- Optional Elements:
  - Advanced Exploration Collection - optional.
  - Video Production Workstations™ - *part of the Advanced Exploration Collection*.
  - Student Broadcast Studio - optional.
### Purchase Price

The total purchase price for the Creative Learning SmartLab described herein is a firm quotation valid for sixty (60) calendar days. All amounts are (US) dollars and the purchase price is F.O.B. destination.

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
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<tbody>
<tr>
<td>SmartLab Learning Environment for <strong>up to 30 Learners:</strong></td>
<td>$145,702</td>
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<tr>
<td>Required Furniture System:</td>
<td>$ 5,000</td>
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<tr>
<td>Curriculum and Support Agreement (CSA) Pre-pay 5 Years:</td>
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<td><strong>Subtotal:</strong></td>
<td><strong>$173,202</strong></td>
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<tr>
<td>Optional Advanced Exploration Collection:</td>
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<tr>
<td>Student Broadcast Studio:</td>
<td>$ 55,240</td>
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<td><strong>Total:</strong></td>
<td><strong>$250,256</strong></td>
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**Required but not included:**

- Estimated Cost of CLS Specified Computers: $ 23,543
- Estimated Cost of Seating: $ 4,993

**Customer Facility Improvements:** TBD

This quotation replaces all previous quotations sent prior to 5/10/2016.

### Exclusions

The Rowland Middle Academy SmartLab, as proposed, is a complete full-featured learning environment. The only exclusions are seating, facility improvements, removal of trash and debris, client computer hardware, and network virus protection. The customer must provide these items.

Detailed Exclusions:

- **Seating** – Student and Teacher Chairs should be supplied for the SmartLab by the customer. Student chairs should be adjustable in height and have casters. Creative Learning Systems recommends the Virco SGTASK18, Virco 3860 GC, or the Virco N9TASK16 for student chairs and can make additional recommendations if necessary. Creative Learning Systems recommends the 2635A Ph.D. series task chair with arms for the facilitator. Thirty (30) student chairs and one (1) facilitator chair should be supplied.

- **Facility Improvements** – Electrical and data network services should be installed as per the electrical and data layers of the plan view drawing. Optional facility improvements include anti-static carpeting, dropped acoustical ceiling, marker and tack boards, paint, etc. Creative Learning Systems prides itself on working with district/school administrators and school district architects on final room preparation and provisioning.

- **Removal of Trash and Debris** – The SmartLab environment creates a large amount of trash and debris during the installation process. It is recommended that the district/school provide a 20 yard open top dumpster or equivalent for disposal of all packing materials associated with the SmartLab. Creative Learning Systems is committed to participating in your LEED (Leadership in Energy and Environmental Design) project/certification, and will follow each customer’s instruction during the implementation process.

- **Client Computer Hardware** – Client computer hardware and customer supplied software are specified in Attachment B.
Terms

PAYMENT TERMS
Payment shall be made to Creative Learning Systems and tendered according to the following schedule:

25% of Purchase Price – due as deposit with submission of customer's purchase order

70% of Purchase Price – due upon delivery of factory-wrapped goods to customer’s designated delivery location

5% of Purchase Price – due upon completion of installation

These terms may be modified as necessary due to district requirements. Payments by credit card are subject to a 3% credit card processing fee.

PURCHASE ORDERS: Purchase orders must be made out to Creative Learning Systems. Facsimiles will be accepted pending receipt of original purchase order (Fax to 303-772-6422 Attention: Shelley Nault).

Purchase Order(s) Item Description(s):
SmartLab Learning Environment for Rowland Middle Academy
Per CLS Proposal Dated May 10, 2016 for $250,256.00 (US)

SUPPORT: Creative Learning Systems provides technical and pedagogical support via a toll-free 800 number. Our Facilitator Support Team telephone number is (800) 458-2887; the fax number is (303) 772-6422.

WHOLE UNIT: The instructional plan for this Learning Environment is based on the inclusion of all of the fixtures, equipment, courseware, and supplies listed here. This Proposal is a complete system, and is offered for purchase only on a whole-unit basis.

SUBSTITUTION: Creative Learning Systems attempts to provision each of its learning environments using up-to-the-minute technologies and the most effective learning resources available at the time of implementation. We therefore reserve the right to make equivalent or better substitutions for item(s) described or implied herein.

PROJECT TIMELINE: Delivery, installation, and training dates are scheduled based on resource availability and in consultation with district and/or school representatives. Please plan on typical lead times of approximately eight (8) to twelve (12) weeks from receipt of purchase order, depending on the degree of customization, availability of materials and supplies, and seasonal demand. When we receive your purchase order, we will work with your designated representative to determine suitable delivery, installation, and training dates. Installation typically takes three to five days. Professional development and technical training may be scheduled immediately thereafter. Time is of the essence in the execution and fulfillment of this agreement and each party agrees to use its best efforts to carry out its obligations and responsibilities as stated herein.

OTHER TERMS AND PROVISIONS: Receipt of a valid Purchase Order referencing this proposal will constitute agreement with each of the terms stated herein. The State of Colorado shall govern the interpretation of this agreement, and it is expressly understood that Boulder County, Colorado, is the exclusive forum for any disputes arising under this agreement. Any expenses incurred in collecting past due accounts, including court costs and attorney fees, shall be added to the amount due. Please note that photos appearing in this proposal represent sample configurations and are provided for general information only. Please refer to written descriptions for specifications of equipment to be provided under this proposal.

SIGNATORY PAGE: Photocopy this page, execute, and attach to Purchase Order(s) prior to mailing.

Read, Agreed to, and Signed by:

Approved Customer Representative:

Name:____________________________________ Title:_________________________________
Signature:_________________________________ Date:_________________________________
This SmartLab Curriculum and Support Agreement (“Agreement”) is made on May 10, 2016 and entered into between learnScapes, Inc., dba Creative Learning Systems (“CLS”), and Rowland Middle Academy (“Partner School”).

<table>
<thead>
<tr>
<th>Partner School Information</th>
<th>Partner School Contact Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name: Rowland Middle Academy</td>
<td>Contact Name(s):</td>
</tr>
<tr>
<td>Street Address: 1842 Derry Street</td>
<td>Contact Role:</td>
</tr>
<tr>
<td>City, State, Zip: Harrisburg, PA 17104</td>
<td>Phone(s):</td>
</tr>
<tr>
<td>Phone:</td>
<td>Fax:</td>
</tr>
<tr>
<td>Web Site:</td>
<td>Email:</td>
</tr>
<tr>
<td>Primary Facilitator:</td>
<td></td>
</tr>
</tbody>
</table>

Term of Agreement: July 1, 2017 through June 30, 2022 (“Term”)

Payment Schedule: $22,500 (for the contract period July 1, 2017 through June 30, 2022)

Summary of Services and Benefits to be provided by CLS to Partner School (see details below):
- School-wide access to online Learning Launcher Curriculum (including all available updates and additions)
- School-wide access to ePortfolio and hosted Facilitator Resources (including all available updates and additions)
- Unlimited telephone and online pedagogical and technical support
- $1,000 annual catalog credit for enhancements and replacement parts
- Onsite professional development in the event of Facilitator turnover
- 50% discounted tuition for Advanced Facilitator Development Conference
- 10% discount for other services including onsite technical support and additional professional development

Additional Terms:
Contract Term: This Agreement shall run through the full Term as specified above unless cancelled by Partner School in accordance with the terms of this Agreement.

Cancellation: Partner School may cancel this Agreement prior to any annual contract period by providing written notice to CLS of its intent to cancel this Agreement at least 90 days prior to a contract period start date as specified above.

Pre-payment: A 10% discount on the fees shall be applied on a pre-paid five year contract. All fees paid pursuant to this Agreement are non-refundable.

Hosted Curriculum, ePortfolio and Facilitator Resources: School-wide access to all available SmartLab online curriculum and resources including Learning Launchers, ePortfolio System and Facilitator resources including updates and additions.
Professional Development: Partner School shall designate a Primary Facilitator under this Agreement. In the event of turnover of the Primary SmartLab Facilitator at the Partner School, CLS will, upon request, provide one professional development trip of up to four days per contract term. Professional development for teaching staff other than the Primary Facilitator, and for equipment, if any, requiring specialized training (such as student broadcast studio, laser engraver, etc.) are not covered under this provision but is available at the discounted rate described below. Professional Development will be provided at the Partner School’s location at a time mutually convenient for both parties. Please note that CLS relies on a select group of experienced, trained personnel for this service and advance notice is typically required to schedule professional development, especially during summer months. Additional professional development will be available to Partner School on a preferred scheduling basis at a 10% discount from then current rates at the time of training (please contact CLS for professional development rate information).

AFDC Tuition: Partner School will receive a 50% discount on the then current tuition rate for any staff members attending the annual CLS’ Advanced Facilitator Development Conference (AFDC). This conference is typically held in June of each year with specific dates and locations to be announced. Travel and other incidental expenses are the responsibility of Partner School or its designated staff member and are not covered under this provision.

Catalog Credit: Partner School shall receive an annual credit of $1,000 towards purchases through the SmartLab Enhancement Catalog for each contract period. This credit may be applied to merchandise and applicable shipping charges. $1,000 catalog credits must be used during each applicable contract period and may not be carried over from one contract period to another.

Technical and Pedagogical Support: Partner School is entitled to unlimited toll-free telephone and remote computer support. Partner School will receive a 10% discount on the then current rate for any requested onsite technical support.

Taxes: Partner School shall pay all sales, use and excise taxes, and all other taxes and duties, if applicable, on goods and services provided under this agreement.

Transferability: All services and benefits are non-transferrable and shall be provided only to Partner School listed above.

Execution of Service Agreement
By signing below you certify that you have read and agree to the Terms and Conditions of this Agreement and that you are authorized to sign this Agreement on behalf of the Partner School.

Please return a fully completed and signed copy of this Agreement to:
Creative Learning Systems
1140 Boston Ave.
Longmont, CO 80501
Fax: 303-772-6422

For Partner School:

Signature: ___________________________ Date: _________________
Print Name: ___________________________ Title: _________________________________

For CLS:

Signature: ___________________________ Date: _________________
Print Name: ___________________________ Title: _________________________________

Rev. md 2/4/14
Description of SmartLab Deliverables

This section describes the hardware, software, equipment and educational resources that Creative Learning Systems will provide in your SmartLab learning environments. Also in this section is a description of additional elements that are core to every SmartLab, and optional elements that have been selected specifically for Camp Curtin; as well as the information you requested on curriculum, alignment to standards, and core technological competencies directly addressed through SmartLab learning resources.

General Description

**Creative Learning SmartLab**

The SmartLab is richly-provisioned for advanced technology studies as well as general academics and career exploration.

SmartLab learning resources are organized around eight areas of core technological competency. These are: Alternative and Renewable Energy, Computer Graphics, Scientific Data and Analysis, Robotics and Control Technology, Circuitry, Software Engineering, Mechanics and Structures, and Digital Communications. Each of these core competencies is described below, along with the integrated systems of equipment, software, hardware and educational resources to support project-based, student-centered learning in those areas of study.

**Alternative and Renewable Energy**

Now your SmartLab students can explore one of the most exciting areas of emerging technology - *Alternative Energy*. Alternative energy projects connect core academic content with 21st century skills through engaging, inquiry-based exploration. Students explore this exciting area of technology with hands-on, minds-on activities connecting math, science, social studies and economics. Here are some of the projects your students will explore:

**Solar Energy Discovery Collection**

- Understanding photovoltaic cells
- Solar Energy and High Performance Homes
- Solar cooker design and testing
- Solar race car design and testing

The Alternative Energy Discovery Collection features thirteen of Creative Learning Systems’ **Learning Launchers**™ that cover the introduction to alternative and renewable energy, and solar energy. There are Learning Launchers at three different levels of difficulty to guide your learners though a variety of engaging activities with video tutorials, data collection worksheets, portfolio development suggestions and lots of ideas for extended exploration!
**Computer Graphics**

In Computer Graphics, students explore areas such as graphic arts, image capture, photo processing and manipulation, animation and special effects. They learn to distinguish between, and effectively use, bitmap graphics (digital “painting”), and object-oriented graphics (computer-aided “drawing” or “CAD”) applications. As learners progress, they integrate computer graphics with other software applications to create advanced graphic and commercial art, websites and multimedia presentations. Computer graphics also serves as an important portfolio development tool for documenting projects and learning processes.

Examples of computer graphics tools included in the SmartLab are:

- Adobe Photoshop Elements Software Packages (customer supplied)
- Digital Still Motion Cameras
- Doodle for Google Art Contest
- Google Art Project
- Google SketchUp Software
- Photo Tripod
- Portable Lighting Studio
- Punch Professional 3D Home Design Software – optional, part of the advanced exploration collection
- Tech-4-Learning Introductory Graphics software packages
- Curriculum and/or additional learning resources for all above listed items

**Scientific Data and Analysis**

In this system of technology, students collect experimental data using testing equipment and probeware, typically linked with a computer-controlled interface. Data is then analyzed to draw conclusions from experiments. Students engineer and test scale models and analyze materials and structure. Using chemical, physical and bioscience probeware, students collect and analyze experimental data to explore principles of science though hands-on, inquiry-based projects.

SmartLab scientific data and analysis tools include:

- Astronomy Experiences with MicroObservatory
- Extreme Weather and Monster Storms
- Global Information Systems with ArcGIS
- Laser Exploration Collection – optional, part of the advanced exploration collection
- Probeware for Measuring Light, Temperature, Movement, Voltage, Acidity of fluids and Human Physiology
- Probeware for the Study of Physical Sciences to Integrate with Lego EV3
- Curriculum and/or additional learning resources for all above listed items

**Robotics and Control Technology**

In this area of study, mechanical processes are managed through automation control interfaces and learners design and program robotic systems to perform task-oriented challenges. Students explore logical programming and explore how sensors, electronic and computer controllers are used to manage complex mechanical processes. The concept of sense, decide, and act is introduced and students develop whole-systems perspectives.

SmartLab robotics and control technology resources include:

- Lego EV3 Control System with Software
- Curriculum and/or additional learning resources for all above listed items
All control/robotic systems delivered as construction sets are provisioned to accommodate multiple classes so projects do not have to be deconstructed each class period.

**Circuitry**

The study of circuitry is explored through electricity, pneumatics and microelectronics. Students develop an understanding of the scientific and technological principles underlying each of these systems. With this foundation, students design complex systems utilizing each technology.

SmartLab resources for the study of circuitry include:
- MaKey MaKey Conductivity Exploration System with Accessory Collection
- Pneumatics System with Component Attachment Platform, Pneumatic Service Module, and Portable Silent Compressor – optional, part of the advanced exploration collection
- Snap Circuits Electricity Exploration Collection with Multimeter
- Curriculum and/or additional learning resources for all above listed items

**Digital Communications**

Engagements in the Digital Communications system provides new experience and reinforces the ability to communicate effectively utilizing single, blended, and advanced media. Digital Communications encompasses the capture and production of content in any single media, such as print, sound or electronic media. It includes word processing, presentations, and graphic representation of data or processes in the form of flowcharts, tables and graphs. It also includes the capture, production and presentation of single-media content such as audio, video and digital still images. Learners quickly progress from developing core competencies in these areas to the regular application of these tools to document their learning throughout the SmartLab. Also, learners develop advanced communications skills through the integration of two or more media using technology-based tools. Students explore linear and interactive presentations and the applications for each. Learners progress from basic to more advanced software and production tools, creating dynamic video presentations, animated graphics, websites and interactive e-portfolios.

As with all documentation and presentation applications in the SmartLab, the emphasis quickly shifts from developing necessary skills to the application of the technology for portfolio development and presentation of learning.

Digital communications resources include:
- Tech-4-Learning Claymation Animation Kit and Frames Stop Motion Software Packages
- Camtasia Software
- Comic Life Software (class license)
- Crazy Talk Animator Pro Software Packages
- Crazy Talk Software Packages
- Digital Cameras
- DVD/CD Creation and Labeling Kit
- Google Sites Software for ePortfolio Creation
- Inspiration Software
- Microsoft Office Software Suite – class license (customer supplied)
- Photo Tripod
- Portable Lighting Studio
- Professional Quality SD Card Compatible Camcorder – optional, part of the advanced exploration collection
Royalty Free Audio Clips including Music Beds and Sound Effects
Royalty Free Video Clips
Sony Vegas Video Post-Production Software Packages – optional, part of the advanced exploration collection
Power Production Storyboarding Software – optional, part of the advanced exploration collection
Super Arm Camera Clamping Systems, Video Tripod, and Dolly – optional, part of the advanced exploration collection
STEM Career Exploration
USB Microphone and Stand
Video Accessory Collection including Studio and Lavaliere Microphones – optional, part of the advanced exploration collection
Curriculum and/or additional learning resources for all above listed items

Software Engineering

In this area of study, students learn to create mobile and computer desktop applications. Initially in their experience, students create interactive online greeting cards, and computer animations. They simulate real systems and processes, and even create basic computer games. Later students have the opportunity to create real desktop and mobile app games that they can eventually publish and sell.

Software engineering resources include:
- App Inventor Software
- Digital Sandbox Programmable Microelectronics Collections
- Microsoft Kodu Game Development Software
- MIT Scratch Version 2 Software
- Stencyl Software
- Touch Develop Software
- Curriculum and/or additional learning resources for all above listed items

Mechanics and Structures

In Mechanical Systems, learners create and study structures and machines. Hands-on learning engagements foster an understanding of simple and complex machines and structural physics.

Mechanics and structures construction sets include:
- fischertechnik Mechanisms and Structures Kits
- IQ – Key Capsule Based Modeling Systems
- K’nex Construction Set
- West Point Bridge Designer
- Zometool Geodesic Structuring and Interdisciplinary Learning System – optional, part of the advanced exploration collection
- Zoob Construction System for Rapid Visualization and Prototyping
- Curriculum and/or additional learning resources for all above listed items
- All mechanics and structures collections delivered as construction sets are provisioned to accommodate multiple classes so projects do not have to be deconstructed each class period.
Additional Elements

**Facilitation Zone™**

The Facilitation Zone provides a dedicated work area for SmartLab Facilitators. It is designed and provisioned to support SmartLab management, student guidance and assessment, provide critical professional resources and enable ongoing technical support.

The Facilitation Zone includes a collection of professional-development resources, learner-facilitation aids, application software packages, and systems for remote-connection to software-support and facilitator-support services provided by Creative Learning Systems.

**SmartLab File Server**

The server is the heart of the SmartLab network. Creative Learning Systems technicians carefully develop system specifications and then custom configure each Server to assure stability, functionality, and supportability for each SmartLab learning environment.

**SmartLab Media/Systems Integration Services**

Creative Learning Systems technicians carefully develop system specifications and then work with your technology team to assure stability, functionality, and supportability for each SmartLab learning environment. Our technicians collaborate with your technicians to specify hardware, establish the proper security over specified shares, upload over one hundred gigabytes of resource data to be utilized by facilitators and students, establish the client workstation base image, install the environment’s software, and establish a cohesive redundancy strategy.

**SCRS™ (SmartLab Computer Restoration System)**

The SCRS™ includes a secure lock box containing thumb drives, external hard drives, boot CD’s and, in SmartLabs that have Apple computers, Super Drives. The final configuration of every computer in the SmartLab is stored on SCRS memory and the SmartLab file server. If any or all computers become inoperable, the facilitator can utilize these resources with CLS technical support to restore the computers to their originally installed state.

The SCRS ensures simple, secure system recovery in the event of serious computer malfunction.

**Replication Platform™**

The Replication Platform houses and distributes power and data to a color laser printer device. The printer is fully-networked, enabling learners and facilitators to access the printer from any computer workstation.

**3D Printer**

With the most innovative technology right in your SmartLab, you can unlock the creativity within your learners. Easy to use straight out of the box, you’re ready to start building anything you need, anything you want, or anything the world has been waiting for.

It is easy to build objects with the Dremel on-board software or Tinker CAD, which enables a preview of each model before you build. Additionally, the Dremel 3D Idea Builder comes equipped with a pre-installed extruder (the part where the
filament comes out and builds your model), unlike other 3D printers that require you to install it yourself. This makes setup as simple as plugging in your printer, and you’re ready to build! Along with easy-to-use software, you can start turning your ideas into models and projects in minutes.

The Idea Builder features a closable door that keeps out dust and prying fingers. This fully enclosed workspace also stabilizes the temperature for an optimal build, and reduces noise so your models and projects build quietly in the background while you do other things.

Your Dremel 3D Idea Builder is fully operational even without hooking it up to a computer! With the full color touchscreen, you can select models to build, and can control your print process with Start, Stop, and Pause buttons… and much more.

Replacement Construction Sets for Each Class Period

The system allows a designated storage space for each construction set. The construction sets include:

- fischertechnik Profi Mechanics and Statics
- IQ-Key Capsule Based Modeling Systems (4 ea)
- Lego EV3 Mindstorms control technology collections (4 ea)
- Lego EV3 Mindstorms expansion technology collections (4 ea)
- Solar Energy Automotive Building Collection (4 ea)
- Zometool Mathematical Structuring Collections (4 ea) – optional, part of the advanced exploration collection

Presentation/Collaboration Collection with the 70” LED Display

This collection includes a wall mounted seventy inch LED display, custom cabling, and professional audio system. The collection is also provisioned with a turnkey suite of software and learning media.

Here, groups of SmartLab learners can make or view presentations, and engage in focused discussions and creative team brainstorms. SmartLab Facilitators can use the collection for class meetings, and to provide direction and instruction to learners.

Computer Control Monitoring System

Facilitators in technology classrooms today are faced with the challenge and opportunity of using technology to teach. Computers are amazing educational tools, but they can also be a huge distraction to learning. The Internet, instant messaging, email and games are a constant temptation for students.

The computer control monitoring system removes these distractions so the facilitator can have a powerful tool to help keep students on task. No classroom management solution is easier to use or better suited for teaching in a 21st century classroom.

Teachers can reduce student distractions by blanking screens, limiting applications and limiting web browsing on student computers. This helps direct student attention from their computer to the teacher and keeps students on task.
Ideal for monitoring student activity within a classroom or lab setting, the thumbnail feature allows you to view all screens as well as see the current application and website that the students are running. Teachers can send messages to all or individual students.

Students can silently request help from the teacher. A small question mark appears on the thumbnail with the student question, which indicates they need help.

Optional Elements

**Advanced Exploration Collection - Optional**

The Advanced Exploration Collection features a wide range of learning resources to facilitate the study of core competencies in greater depth. It provides additional challenges for learners with advance capabilities or those who spend multiple semesters in the SmartLab environment. These resources allow learners to tackle increasingly advanced projects and create sophisticated portfolios of their work.

With this collection, learners utilize resources that feature familiar elements, but are also more complex than the systems they previously experienced. Advanced experiences include integration of physical simulations with computer-controlled interfaces and point-and-click programming languages, microelectronics, prototype development, bio-related technology, team-effectiveness training, advanced graphic design, 3D modeling/animation, project development and more.

Major equipment and software in the Advanced Exploration Collection includes:

- Additional bin and tub storage system
- Laser exploration collection
- Pneumatics System with Component Attachment Platform, Pneumatic Service Module, and Portable Silent Compressor
- Power Production storyboarding software packages
- Probeware to integrate with Lego EV3 for the study of physical sciences
- Professional quality SDHC compatible camcorder
- Punch Professional 3D home design software
- Sony Vegas video post-production software packages
- Super arm camera clamping systems, video tripod, and dolly
- Video Accessory Collection including studio and lavaliere microphones
- Zometool geodesic structuring and interdisciplinary learning system

**Video Production Workstations - (2 included in SmartLab) – Optional, Part of the Advanced Exploration Collection**

The Video Production Workstation allows learners to shoot and edit broadcast quality video. The computer workstation specified in this Proposal will allow for at least ten hours of video storage. The secure digital high capacity (SDHC) is perfect for novice learners. The system also includes video editing software, video DVD creation software, and professional microphones.

Major equipment and software provided include:

- Professional quality digital video camera and accessories collection
- Tripod and dolly for camera
- Flexible camera holding arm with clamp
- Video editing systems
- Professional microphones
- Cables to connect all equipment provide

**Student Broadcast Studio - Optional**

The Student Broadcast Studio allows learners to document events and create original video productions in a dynamic and exciting way. It features professional-grade production equipment integrated in a portable, easy-to-operate system. The heart of the system is a Tricaster editing device that allows for analog input from multiple devices. Any of these signals, whether in single or multiple formats, can be digitally mixed. The system enables output in either DV or analog format.

Inputs consist of a professional-quality video camera, a video bank (integrated with the Tricaster), and/or a computer. Each of the inputs may be previewed on the LCD monitor array.

Output devices consist of a video bank integrated with the Tricaster, a computer, and the streaming capability of the Tricaster that will convert a video signal to a live, closed-circuit internet broadcast. The video bank is unique in that it does not require removable media; it features a very fast internal hard drive, allowing for digital storage of live video. Later, the stored video can be played to a post-production device such as the computer workstation included with the system.

Learners can capture live video sessions so it can be played later, transferred to DVD media, or simply archived. Conversion to Internet compatible formats is also managed through the system, allowing webcasts of either live or pre-recorded, high-quality video to school community members both inside and outside of the school.

Live video can be previewed from the output of the mixer on the monitor array. A professional-grade audio system, including powered desktop speakers and stands, is also included. The system configuration allows for simultaneous amplification of all audio input devices through the integrated speakers.

The system is housed on a workstation that includes rugged oversized casters and surge protected power services. This workstation also features an integrated CPU shelf for mounting computer hardware. The top platform accommodates three arm-mounted, 24 inch wide 16:9 format LCD flat panel displays, powered speakers, the Tricaster, the Tricaster switching control surface, and video production keyboard. Everything included with the Student Broadcast Studio is securely mounted, allowing learners to freely wheel the system around the school without risk of injury or damaging equipment.

In addition, a professional-quality SDHC camera is securely mounted on wheeled tripods providing similar ease of mobility. Also included in is a custom-designed teleprompting system that will allow learners to read a script directly from a teleprompting system mounted on a tripod. Used in tandem, a professional presentation equal to news broadcasts done on mainstream television stations can be produced. The teleprompting system is linked to the computer on the Live Edit Console. Easy to use software allows learners to write scripts for newscasts, announcements and other broadcast productions.

A professional computer is connected to the system through a firewire cable connection and an Ethernet connection to the Tricaster.
Learners can use the Student Broadcast Studio to document school projects and create compelling video presentations. For example, learners could utilize the system to broadcast a news item on school funding from the front of the state capital building, or a robotic Mars rover navigating the surface of the red planet. Such sophisticated effects are easily accomplished through the integrated mixer, dual professional-grade cameras and chroma-key editing features designed into the system.

Similarly, this advanced production system offers many applications for other classes and activities. Examples are as extensive as they are varied. A group of history students may recreate a civil war battle using authentic backdrops. A math student could illustrate a lesson on fractions while standing in front of visual aids, similar to a TV weatherperson. Science students can create a video demonstration of proper dissection techniques. A video-production club could create an informational video about the school. The yearbook staff can create video supplements published to CD or the web. The football team can produce a highlight reel to commemorate a successful season. And, because the entire system is designed around a mobile platform, it can be moved to classrooms to film guest lecturers, the auditorium to record drama presentations and graduation proceedings, or the school gymnasium to broadcast live sporting events.

Teachers may also use the system to create engaging video presentations to supplement regular lessons. Professional development presentations integrating text and graphics are easily produced. Communications of administrative matters can be recorded or broadcast live to the school community.

Many schools also utilize such systems to present video-based announcements. A newscast format creates an especially engaging presentation. The system’s ability to easily generate transitions, fades, and other special effects during a live production, allows such presentations to be created in an attractive, professional manner.

The system may also be made available to assist the general community. Students may use the system to create advertisements for businesses, produce public service announcements, or create video Christmas cards to raise money for charitable causes.

**Chroma-Key Studio**

The Chroma Key studio with Reflect Media ChromaMatte Curtain is fully-integrated with the Student Broadcast Studio, allowing simple, “on-the-fly” creation of chroma-key virtual sets and backdrops. This technology enables learners to enhance video productions by blending video images of, for example, live presenters or scale models, onto virtual backdrops appropriate to their projects. The one camera and another video device such as pre-recorded video or still motion images from the Tricaster provide the input for these special effects. The Tricaster allows learners to easily create these engaging and professional effects. The blended images can be captured for storage, broadcast and/or post-production editing.

A ReflectMedia curtain integrates newly-introduced technology. Students now have access to an easier to use chroma-key system. This is accomplished through an economical, reflective gray curtain, dual blue/green LED light ring that attaches to the camera, and integrated technology to digitally “erase” the studio curtain, substituting sets and backdrops limited only by the learner’s imagination. This new technology also offers other advantages over the traditional cyclical wall; background and subject lighting requirements are minimal, and the screen requires less maintenance than the installed cyclical wall.

The Chroma-Key Virtual Set System includes a camera-mounted, LED light ring and the compatible reflective ChromaMatte curtain.

Any situation that requires a virtual set can be produced with Chroma-Key Video Editing. For example, a news report on school funding can be presented from the state capitol; a presentation on buoyancy can be presented from under the ocean; an operating scale model of a lunar rover can be demonstrated from the surface of the moon. Possible applications for this technology are limited only by the parameters of a given project and the creative energy of the producers.
Confidence Monitor

This collection includes a forty inch LCD display, custom cabling, and mobile cart.

The LCD display allows for the talent in the studio to have a feedback monitor so they can see themselves live and they know where they are pointing on a live virtual set.

Portable Studio Lighting

Portable lighting is accomplished with two 24x32” silver interior soft boxes, tilt brackets, twelve 50W lamps, stands and wheeled carrying case. Three separate controls allow multiple combinations of bulbs together with no color shift.

Learners will be able to set up the perfect lighting situation wherever they desire to create the perfect shoot.

Professional Development

Facilitator training and professional development is a critical element in the success of the SmartLab environment. As such, it is included as an integral element of this Proposal. Creative Learning Systems provides a total of four (4) days of on-site facilitator training and professional development services for the SmartLab.

Technical concepts as well as good facilitation techniques will be discussed and practiced.

Two (2) days are provided for the Student Broadcast Studio. This training and development program is intended for those educators who will be directly involved in the day-to-day activities in the SmartLab (including up to four educators designated as alternate SmartLab facilitators).

In addition to the initial professional development sessions, one tuition slot to the Creative Learning Systems annual facilitator conference, AFDC (Advanced Facilitator Development Conference), is included in this Proposal. Subsequent and additional registrations may be purchased at a discount rate under our curriculum & support agreement.

“Students who typically struggle suddenly become engaged. Mid-level students start pursuing more challenging work - and our high achievers? They soar.”

Dennis Gable
Teacher, Elkhart Central High School IN
**Curriculum Resources**

Every aspect of a SmartLab environment is carefully designed and integrated to foster development of higher-order thinking skills, build 21st century competencies, and support transdisciplinary academic connections. Problem solving, self-direction, analysis and synthesis, creativity, project management, collaboration and communication skills are among the critical abilities students gain from their SmartLab experience.

The SmartLab hosted curriculum system provides an engaging, project-based approach to academic content with particular emphasis in STEM, digital art and communications. Each of the curriculum resources described below work in concert with the environment design, equipment and learning resources, and professional development, to motivate, engage and inspire learners of all interests and abilities.

**Learning Launchers™**

Learning Launchers™ are the most comprehensive, interactive and student-friendly curriculum system ever developed for the SmartLab! Each Learning Launcher lesson features engaging, project-based activities in STEM, digital communications and other academic topics. All Learning Launcher activities utilize applied technology to reinforce academics and build 21st century skills. Many of the Learning Launchers include video tutorials, project worksheets, hyperlinks to rich internet content and other resources that in total help to support core academic content through hands-on exploration. Autonomy is a key element in all SmartLab curriculum. As learners progress from foundational engagements (Level 1) to more advanced engagements (Levels 2 & 3), Learning Launchers gradually offer more complex projects and greater opportunities for students to shape their own learning experience. With these multiple challenge levels, open-ended activities, and lots of “Extend Yourself” activities, Learning Launchers provide personalized learning for students of all abilities in grades 3-12.

The SmartLab LaunchPad™ navigation system makes it easy for students to choose the activities and challenge level that’s right for them. There are currently over 300 Learning Launchers in 60 different content areas, organized into eight systems of technology:

- Alternative Energy
- Mechanics and Structures
- Circuitry
- Robotics and Control Technology
- Computer Graphics
- Scientific Data and Analysis
- Digital Communications
- Software Engineering

The LaunchPad provides learners with an extensive array of choice to utilize applied technologies, explore academic content areas, and select challenge levels that are engaging, ability appropriate and personally relevant.

All of the Learning Launcher curriculum, online interactive resources and facilitator resources (including our electronic Standards Tracker) can be accessed from the online LaunchPad, allowing students, parents and educators to access SmartLab resources from anywhere. In addition, Learning Launcher licenses are school-wide, providing all educators with the opportunity to select and integrate appropriate project-based content into their lesson plans.

“The Learning Launchers make STEM understandable by breaking it down to the ‘root’. Our SmartLab students have grasped engineering concepts that I never imagined possible.”

*Derek Seifried, SmartLab Facilitator, Brighton School District CO*
**Elementary Level Challenges**

Creative Learning Systems’ elementary level Learning Launchers guide project engagements and provide the core educational resources for elementary SmartLab experiences.

Liftoff Challenges feature project-based engagements for younger learners. Liftoff Challenges guide hands-on and computer-based project engagements with age appropriate projects and reading levels. While Liftoff Challenges are specifically targeted towards 4th and 5th grade learners, the content is not specifically identified as elementary curriculum. As a result, these learning engagements are also appropriate for many secondary school special education students. Liftoff Challenges are typically explored as project engagements of 5-7 class periods. Typically, students will rotate through a sequence of technology engagements with several teams of students working on the same Liftoff Challenge simultaneously.

Express Challenges feature shorter project engagements for the full spectrum of elementary grades. Express Challenges can be conducted as whole-class activities and are appropriate for lower grades or when school schedules make longer project engagements difficult.

Liftoff Challenges and Express Challenges provide engaging, hand-on, minds on learning opportunities for elementary age learners and offer schools flexible scheduling options. They provide foundational experiences in STEM/STEAM and give learners early experiences in project-planning, communication and collaboration. All elementary school challenges are designed to support and articulate with secondary level SmartLab curriculum.

**ePortfolio**

Creative Learning Systems provides every SmartLab with easily customizable ePortfolio templates and resources. Student ePortfolios may be hosted on Google Drive or other online educational hosting services enabling student and teacher access from any computer or mobile device. Alternatively, the ePortfolio system may be hosted on a local server within the SmartLab or school.

The ePortfolio system is comprised of three main elements. The **Project Journal** allows students to document their daily project process. The Project Journal is where learners record their objectives and write daily reflections about what they’ve learned and problems they’ve solved. The **Project Presentation** is how learners document results of their project work and communicate what they’ve learned through each project engagement. Project Presentations may be created using PowerPoint, Google Presentation, video or graphic software, or any other digital media appropriate to their project.
The **Self-Assessment** provides an opportunity for learners to reflect and assess the quality of their objective, project work, presentation and collaboration skills, and identify specific areas for future improvement. Self-assessments also provide a foundation for Smartlab Facilitators to have meaningful discussions with students about areas where perceptions of performance differ. This innovative assessment system allows for authentic assessment of project-based, student centered learning.

The SmartLab ePortfolio system provides a platform for learners to document, share and assess their work while building critical writing, presentation and digital communications skills. And the online hosting systems allow anytime, anywhere access to project work by both students and teachers.

**The Learning Score™**

Facilitator-support resources include a wall-sized flow chart called the Learning Score. The Score provides a map to guide teams of learners through an initiatory SmartLab program. The Score is made up of a number of “nodes,” each of which describes location in the SmartLab and the resources the team will need (such as Learning Launcher, software, construction kits, and so on) for a particular learning engagement.

Following the Score, each team of learners will take a different path through the SmartLab, while gaining exposure to each of the eight systems of technology, or core competencies, represented in the environment. In this manner, each team of students gains from a unique learning experience, while assuring a necessary level of predictability in individual learning and proficiency.

The Score is custom designed for each SmartLab based on class size, program length, academic focus, and the equipment and learning apparatus provided. It is developed in collaboration with each school and Facilitator professional development includes training on how the Score may be modified as the needs and resources of the SmartLab evolve.

**Academic Standards**

Creative Learning Systems curriculum is aligned to a wide range of national subject area standards, including the national common core standards, as well as a select group of state standards. Standards are accessed through a fully-interactive online database, allowing searches by standard, grade level, academic subject, Learning Launcher title and more.

These standards include:

- **Common Core Standards** for Mathematics
- **Common Core Standards** for English Language Arts
- **Science - National Science Education Standards**, The National Academy of Sciences
- **Mathematics - Principles and Standards for School Mathematics**, National Council of Teachers of Mathematics
- **Language Arts - Standards for the English Language Arts**, International Reading Association and the National Council of Teachers of English
- **Social Studies - Curriculum Standards for Social Studies**, National Council for the Social Studies
- **Technology - National Education Technology Standards for Students (NETS•S)**, International Society for Technology in Education (ISTE). **Standards for Technological Literacy: Content for the Study of Technology**, International Technology and Engineering Educators Association (ITEEA).
Standards Tracker Database
Creative Learning Systems Standards Tracker™ is an interactive database that provides correlations between the SmartLab Learning Launcher curriculum and a wide array of national and state standards. Using our online Standards Tracker, SmartLab schools can easily align student project activities with academic standards.

The Standards Tracker provides correlations to Common Core, national and state standards in math, science, social studies, English language arts, and technology. The interactive features allow the standards database to be searched and sorted based on a variety of criteria including standard, subject, grade level, topic and Learning Launcher title.
Adjunct Services

This section describes the services Creative Learning Systems provides with each SmartLab installed: facility planning, the installation itself, professional development, and customer support.

Facility Planning

Creative Learning Systems has a track record of successful working relationships with administrators, planning committees, architects, and builders. Our goal is the optimal design configuration for each specific physical setting. Supportive documentation includes customized floor plans along with guidelines for facility preparation, remodeling, and interior design.

Installation Services

Creative Learning Systems provides a team of certified installers to unpack and assemble all CLS-supplied equipment.

The installation team also loads software, establishes the data networks, and brings the SmartLab into operating condition. Installation takes three - six days.

Professional Development

Facilitator training and professional development is included with this Proposal. Creative Learning Systems provides a total of six (6) days of on-site facilitator training and professional development services. This training and development program is intended for those educators who will be directly involved in the day-to-day activities in the SmartLab (including up to four educators designated as alternate SmartLab facilitators). Additional training may be purchased from Creative Learning Systems at or after the time of lab purchase for $1,500 per day.

Scheduling of the on-site learning facilitation professional development sessions is subject to availability of training resources. Creative Learning Systems will determine the timing, length, and number of sessions used to deliver the six (6) days of professional development services in consultation with school representatives.

Customer Support

CLS provides extensive technical and instructional support to all installations via our toll-free 800 number. Our facilitator support team telephone number in Longmont, Colorado is (800) 458-2887; the fax number is (303) 772-6422; and, http://www.creativelearningsystems.com is our website address.

Curriculum and Support Agreement

The SmartLab Curriculum and Support Agreement (CSA) is the most affordable way to protect your investment in STEM education for your school. The SmartLab CSA includes access to all the latest curriculum and classroom resources from Creative Learning Systems. It also provides essential ongoing support and professional development. The benefits of the Curriculum and Support Agreement include the following:

- Access to hosted Learning Launcher Curriculum including all available updates and additions
- Access to hosted Facilitator Resources including all available updates and additions
- Up to four days additional onsite professional development in the event of facilitator turnover
- Unlimited telephone and online technical & pedagogical support
- Discounted rate for onsite technical support and/or additional professional development
- Discounted tuition for future Advanced Facilitator Development Conference (AFDC)
- Up to $1,000 per year in enhancement and replacement parts from the SmartLab catalog

The CSA is a five year agreement that may be prepaid for multiple years at the time of the initial SmartLab purchase or billed annually. The price per year is locked-in once a five-year Curriculum and Support Agreement is signed and there are not penalties for termination.
Warranty

This section provides detailed information about the CLS warranty.

What's Covered?

CLS warrants the materials included with the SmartLab will be free from defects in material or workmanship for a period of one (1) year from the date of installation.

During the warranty period CLS will replace, repair, or facilitate replacement, at its option, any defective equipment components or software.

During installation, our installers shall take all reasonable precautions to avoid injury and damage to property.

What's Not Covered?

CLS shall not be liable for acts of God, or of damages resulting from the use and/or service of the equipment including:

- Operation of the SmartLab outside of its environmental, electrical, or performance specifications, conditions, capabilities, or standards
- Network/client viruses
- Power fluctuation or failure
- Vandalism or any other damage or alteration of the SmartLab by persons other than CLS employees
- Combining incompatible products
- Damage, neglect, alteration, or any impairment of the SmartLab resulting from causes or conditions not associated with ordinary and intended storage, handling, installation, maintenance, service, or use

Warranty Conditions

We warranty only those subsystems and components certified by CLS and delivered by CLS as a part of the SmartLab, or purchased by Customer as per CLS specifications. We assume no responsibility or liability for equipment, software, subsystems, or components that you, the customer, modify, add, or substitute.

This warranty remains valid only if you, the customer, maintain the configuration of the SmartLab as it is originally designed, manufactured, and installed by CLS.

All warranties associated with the SmartLab shall become null and void in the event of any modification, addition, or substitution made without the prior written consent from Creative Learning Systems.

Post-warranty and extra-warranty support

Following the warranty period and for items outside of warranty coverage, CLS will provide, upon request of Customer and at CLS's pricing terms, maintenance service and maintenance parts for the SmartLab including on-site configuration. Whenever possible, CLS will facilitate third party low-cost service, repair, or replacement of items after the warranty period has passed.
Customer Responsibilities

At CLS, we pride ourselves on delivering a turnkey product. We install every bolt, bracket, and bookcase, and deliver all the software, hardware, kits, and apparatus that make up the lab you buy. We do, however, count on you, our customer, to do some preparation for us. This section details those expectations. The more familiar you are with this section, the smoother your installation will go.

Facility Preparation

CLS can only ensure on-schedule completion of the proposed project if the Customer has met all of our facility readiness requirements and computer equipment specifications PRIOR TO arrival of our installation crew.

Facility readiness requirements include:

- **A telecommunication line** at the facilitator’s zone should be included as part of the facility preparation. The line will be used for voice calls to the CLS Customer Service toll-free (1-800) number.
- Installation of data network
- Electrical service
- Computer equipment and software (sixteen client computers) as per CLS specifications.
- **Network Virus Protection**
- Removal of trash and debris

SmartLab Implementation Timeline

In the initial design and planning process of a SmartLab, we will create a *proposed timeline* of target dates and projected milestones so potential customers can clearly see the steps involved in implementing the program for your school and/or district wide initiative. We work backwards from the first day you would like classes to start in your SmartLab and anticipate the standard number of weeks it takes for order delivery, installation and training.

**Delivery, installation, and training** dates are reserved based on the order in which we receive purchase orders. We generally need to allow 8-12 weeks from the time your order is placed to the first day of installation. Installation is anticipated to occur over a consecutive three - five day period.

Our **installers will be onsite to receive all of the furniture and equipment** when it arrives. Installation also includes loading, configuration, and testing of all software programs. A brief orientation in regard to software installation procedures and the location of the original software media, manuals, and registration documents will be provided.

Following installation, Creative Learning Systems provides **four to five days of on-site technical and instructional training** by a CLS Facilitator Support Specialist. Our training sessions are always onsite and at a mutually agreed upon time, based on availability. Training days will be consecutive unless otherwise requested. Training will include instruction in the proper use of the SmartLab, operation and maintenance of equipment, management of resources, and effective utilization of the learning materials.

**Pre-proposal steps:**

- SmartLab first contact presentation for school and/or district administration.
- Subsequent presentations for additional staff, board members and other educational partners.
- Site visits are highly recommended & scheduled for anyone interested in a firsthand experience.
- Your CLS representative will then schedule a design meeting at your school to collect information, evaluate & measure space so a preliminary configuration & estimate can be prepared.
- Two to five days later a Targeted Price Estimate (TPE) is prepared, delivered and presented.
- We encourage a lot of discussion, review and revision of the proposed configuration.
- Subsequent versions are presented, until your TPE is converted into a final proposal; complete with payment terms and a final proposed timeline for you to review & approve.
From receipt of your purchase order:
Week 1: The SmartLab proposal is accepted, a purchase order, signed contracts & deposit received.
Week 2: The proposed Implementation Timeline is reviewed, finalized and materials are ordered.
Week 10-12: Three to four day installation by trained CLS professionals.
Week 13: Four to five days of onsite training by SmartLab Learning Environment Specialist.
Week 14-30: A CLS Support Specialist maintains monthly contact with the SmartLab Lead Facilitator.
Annually: CLS Advanced Facilitator Development Conference held every June
Ongoing: A Curriculum & Support Agreement is in place to provide ongoing assistance & support.
Monthly Email Updates and PD Webinars provided on a regular basis for facilitators.

Typical Training Schedule

Although we tailor our facilitator training to the needs of each school, there are certain topics and experiences that are common to all. Extensive hands-on sessions are used throughout the training days with mind numbing technical stuff to keep everyone honest and smart! The training topics shown below are typical for a SmartLab environment.

Introductions and opening activities
Assess Facilitators’ skills, experience, and goals
Fact finding:
- Expectations of CLS Training Session
- Models of SmartLab usage and scheduling
- Introduction to CLS Learning Philosophy
  - Project Based Learning
  - Constructivist Learning
  - Collaborative Learning
Tour of the Environment
Orientation to Creative Learning SmartLab Zones
Introduction to the Learning Environment Score™
Custom Score development
Introduction to Server Management
Orientation to Lab Components and Resources
Development of a cohesive management strategy
Hands-on Experiences
Introduction to, and hands-on experiences, with all interfaces
- Lego EV3 Mindstorms
- Vernier Science Sensors
Software Experiences
Planning for Learner Environment Management:
- Planning the Orientation
- Assessment Strategies
- Organization of Resources
- Inventory Control
Portfolio development & resource planning

Professional Development Guide
Creative Learning Systems has established a comprehensive agenda for the professional development for each installed SmartLab. We have learned over the last 25 + years in business that making the facilitator(s) aware of the upcoming schedule and detail behind the schedule is advantageous to the ultimate success of the professional development. The guide also captures the majority of information delivered during the professional development; facilitators are able to refer back to the guide if they forget something down the road.
Network Information

Creative Learning Systems, we are committed to using network and computer equipment from only the most reputable manufacturers and integrating only those technologies that have proven themselves reliable in today’s IT Industry. The diagram below shows the primary networking/computer components of a typical Creative Learning Environment installation. The following pages describe each component.
Patch Panel (Customer Supplied)

The patch panel is the central location to which the entire network wiring in the environment is connected. These are fixed connections, which mean that each wire in each cable (eight per cable) is “punched down” into terminal blocks. They are permanent.

Premise Wiring (Customer Supplied)

Premise wiring refers to all wiring and hardware components required to connect the network, from patch panel to pylon panel.

Rack (Customer Supplied)

The rack is where the patch panel and switch are mounted.

Pylon (CLS Supplied)

Each island has a central three-sided pylon, in which all services (network and power) are distributed to each station in the island, as needed. Network patch cables connect the bottom side of the ceiling drop to the top of the pylon. Network wiring then runs inside the service upright to the recessed panel. The network jacks reside in recessed panel; that’s where computers are plugged in.

Switch (Customer Supplied)

The Ethernet switch connects all of the individual network wires, allowing computer devices in the environment to communicate with each other. The switch is mounted next to the patch panel in the rack. Small patch cables connect individual network cables in the patch panel to ports on the switch. The switch contains an uplink port that allows customers to link the Learning Environment to their existing school network.

Lab Server (CLS Supplied)

The server is the heart of the Learning Environment network. The stability, functionality, and supportability of the server is achieved with specific hardware components selected for those characteristics by CLS technicians. For that reason, it is the one computer in the lab that Creative Learning Systems always supplies.

The server’s features are described below.

**Network Operating System**

The server in a standard Creative Learning Environment uses the Windows 2012 Professional Server operating system, which has proven itself as function-rich, reliable, easy to maintain, and very conducive to cross-platform (Macs and PCs) networking.

**File Storage and Security**

All documents created by learners and facilitators are saved to and stored on the lab server in specially designated folders. Facilitators and administrators can secure these folders in any way they see fit.

**System Administration and Recovery**

Creative Learning Systems provisions the server with everything it needs to survive crashes with data intact.

- **Drive Redundancy:** Drive redundancy allows the server to continue running even if one of the hard drives crashes.
- **Drive Backup:** The server has a complete drive backup and restoration system that is effective and easy to maintain. It includes a 1 TB removable hard drive, and a pre-defined backup schedule.
• **Recovery Image:** After we install and customize the server for the Learning Environment (with specific printers, folder structure, and security model), our installers create an image of the server that can be used in the event of a crash to restore the server back to its known-working, post-installation state.

• **Web Serving:** Easy-to-maintain Web server software is built in to the server. It can be used with any of the Web-based content learners and facilitators create. In addition, Facilitators can create an Intranet for learner support materials and individual home pages, where learners can post portfolios and other content.

• **Remote Administration and Support:** Software and hardware components allow CLS support staff to access the server remotely over the Internet for customer initiated remote desktop sessions. For further details on how this works, contact the CLS support team.

• **Content:** The server is pre-configured with a rich supply of technical, facilitation, curricular, and environment-management support resources.

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**Client Computers (CLS or Customer Supplied)**

Client computers are the machines at each learning station. The client computers are powered and networked through jacks in the recessed panel of the pylon at each island or from the wall. Each station’s software configuration provides specific functionality, which in turn provides the foundation for rich learning experiences.

*Customers need to purchase the client computers as per the attached specifications.*

• **Attachment B: Customer Purchased Computer Specifications and Requirements** - provides detailed specifications to follow when purchasing client computers. Specifications for all Windows based PCs can be found in this document.

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**Printer (CLS supplied)**

Standard lab configurations include a high-capacity color laser printer. The printer is “network ready,” meaning that the network line plugs into it directly so it doesn’t have to be connected to the back of a computer.

**Existing School Network and the Internet**

CLS does not provide Internet connectivity. Most customers choose to connect the lab network through uplink ports to their existing school network to allow lab access to such network resources as Internet access. In a typical lab installation, the customer will provide a designated network port inside the lab that is directly connected to the school’s primary network backbone.

All client computers are configured access the Internet, unless customers specifically request otherwise.

Network and computer configuration details, like naming conventions, IP addressing schemes, DNS server addresses, gateway/proxy server Addresses, etc., are coordinated between our installation team and the customer’s on-site technology department representative.

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**Important Security Information!**

*It is very important to note that CLS does not provide hardware, software, or protection strategies with regard to Internet security. It is the responsibility of the customer to ensure the computer systems in the lab are properly protected against all Internet threats, including virus infection and malicious compromise. CLS recommends that the school’s technology department implement the same virus and firewall protection strategies in the lab as it uses campus-wide.*
Attachments

Attachment A:
Detailed List of SmartLab Deliverables

Attachment B:
Computer Specifications and Guidelines

Attachment C:
Learning Launcher/Liftoff Challenge Curriculum Description

Attachment D:
SmartLab Seating Options
The learning environment represented by this Proposal includes without limitation the elements listed in this section.

Market forces dictate the availability of most of the items listed below. As a consequence, brand names and specifications will not be finalized until just before shipment. A detailed inventory list is generated at that time in the form of a receiving document. Customer’s representative and a member of the installation team will complete the receiving document once installation is complete.

**Equipment**

- 3D printer and accessories collection
- All cables to connect everything
- Business capacity networked color laser printer and start-up supplies
- Digital interactive drawing/painting tablet (3 ea)
- Digital multimeter
- Digital camcorder and accessories collection
- Digital still camera collection (7 ea)
- DVD/CD consumables and labeling kit
- Flexible video arm and clamping system – *optional, part of the advanced exploration collection*
- Label maker collection
- Lavalier microphone system
- Microsoft Xbox controller
- Photo tripod
- Pneumatic service module – *optional, part of the advanced exploration collection*
- Portable lighting studio for small objects and claymation
- Portable silent air compressor – *optional, part of the advanced exploration collection*
- Power adapters to eliminate the need for batteries
- Pre-configured Windows 2012 file server with keyboard, mouse and monitor
- Seventy inch wall mounted high definition LED display w/audio system
- SmartLab Computer Restoration System
- Studio microphone – *optional, part of the advanced exploration collection*
- Super arm camera clamp – *optional, part of the advanced exploration collection*
- Tripod and dolly system – *optional, part of the advanced exploration collection*
- Uninterruptible power supply for file server
- USB jump drive (32 GB) for portable file storage
- USB microphone

**Collaboration Cluster System**

- Facilitator environment with LCD monitor arms
- Mobile K’nex roto-shelf storage pod
- Mobile rack and bin storage pod for general lab storage (2 ea) – *one is optional, part of the advanced exploration collection*
- Mobile Zome roto-shelf storage pod – *optional, part of the advanced exploration collection*
- Replication platform cabinet with surge protected power services
- Collaboration Cluster System (5 ea)
- Technology platform techcell with compatible extrusion for Pneumatic Lab Kit – *optional, part of the advanced exploration collection*
Kits and Apparatus

- Advanced computer based probeware for studies in STEM – physical sciences to integrate with Lego EV3 – *optional, part of the advanced exploration collection*
- Alternative energies base collection
- Alternative energies accessory collection for the study of solar power
- Alternative energies collection for the study of solar power (4 ea)
- Alternative energies electricity collection
- Claymation animation kit
- Claymation refill collection (5 ea)
- Facilitator’s aid collection
- fischertechnik mechanics and statics (4 ea)
- Global sun oven
- IQ Key accessory collection
- IQ Key construction set (4 ea)
- K’nex construction kit
- Laser communication kit – *optional, part of the advanced exploration collection*
- Lego EV3 expansion set (4 ea)
- Lego EV3 robotics collection (4 ea)
- MaKey MaKey accessory collection
- MaKey MaKey circuitry kit (2 ea)
- Pneumatic systems exploration kit – *optional, part of the advanced exploration collection*
- Sensing science probeware interface and software with probes for electric circuits, motion, light intensity, acidity of fluids, and temperature of fluids and solids
- Snap Circuits alternative energy collection
- Snap Circuits electrical circuitry exploration collection
- Snap Circuit rover
- Spark Fun Digital Sandbox (2 ea)
- Zome flexible modeling system (4 ea) – *optional, part of the advanced exploration collection*
- Zoob modeling system (2 ea)

Libraries and Curriculum

- Audio creation source material on DVD and pre-loaded into the file server’s media library including royalty free sound effects, loop libraries, and music beds
- Basic electricity supplementary curriculum
- Beginning laser technology curriculum – *optional, part of the advanced exploration collection*
- Facilitator pedagogical library
- fischertechnik supplementary curriculum
- General SmartLab software tutorial supplementary curriculum pre-loaded into the file server’s media library
- Initiatory Score to aid in the management of the SmartLab scope and sequence of activity for each student
- K’nex supplementary curriculum
- Learning Launcher curriculum, including three levels of Learning Launchers for every learning engagement that students encounter
Rowland Middle Academy
Core Learning Environment Peripherals,
Software, Kits and Apparatus

Libraries and Curriculum - continued
- Lego EV3 Introduction to Programming
- Sensing science probeware supplementary curriculum
- Teacher orientation resource collection
- Video creation source material on DVD and pre-loaded into the file server’s media library including over sixty gigabytes of multiple content oriented royalty free video footage
- Zometool geometry reference – optional, part of the advanced exploration collection
- Zometool lesson plans – optional, part of the advanced exploration collection

Software
- Adobe Photoshop Elements image editing software (5 ea) – customer supplied
- Camtasia screen recording software
- Comic creation software (16 ea)
- CrazyTalk advanced facial animation software (2 ea)
- CrazyTalk voice/facial expression emulation software (2 ea)
- Faronics Deep Freeze computer workstation restoration/security software (16 ea)
- Inspiration mind mapping/ideation software
- LanSchool Classroom Management Software (16 ea)
- Lego EV3 robot control software (16 ea)
- Microsoft Office application Suite (16 ea) – customer supplied
- Microsoft Windows Movie Maker introductory video editing software – supplied with computers
- Microsoft Windows Server 2012 client access licenses (16 ea)
- Power Production Storyboard Quick storyboarding software – optional, part of the advanced exploration collection
- Punch 3D Home Design CAD (Computer Aided Design) software – optional, part of the advanced exploration collection
- Sony Movie Studio advanced video editing software (2 ea) – optional, part of the advanced exploration collection
- Symantec Ghost computer workstation imaging software (16 ea)
- Tech-4-Learning Frames stop motion animation software package (2 ea)
- West Point Bridge Designer bridge building simulation software (free download)
Rowland Middle Academy
Computer Equipment Specifications & Guidelines

The attached pages specify the computer equipment necessary to operate your specific Creative Learning Environment configuration. Please follow these specifications when ordering your computer equipment.*

CLS requires that you purchase the specified computer systems only from a CLS-approved computer manufacturer. This requirement is an express condition of the sale, and is made in the interest of the long-term performance of the system being purchased. As well, CLS must receive a copy of your computer purchase order with detailed equipment specifications for review prior to both your purchasing said equipment and scheduling the installation of your environment.

The following major manufacturers have been pre-approved by Creative Learning Systems as acceptable sources for the specified computer equipment:

**CLS-Approved Computer Equipment Manufacturers**

- Dell (CLS Preferred Vendor)
- IBM
- Apple
- Hewlett-Packard
- Compaq

If it is not possible to purchase from one of the pre-approved manufacturers listed above, you must contact Creative Learning Systems immediately. Special arrangements must be made to ensure that non-approved computers do not interfere with the installation, training, and support of your environment.

The computer equipment purchased must be covered by a vendor/manufacturer’s warranty providing timely onsite support for not less than 3 (three) years. Creative Learning Systems does not offer any warranty, express or implied, for any customer-supplied equipment.

Each specified PC Client Computer should be pre-loaded with Windows 10 Professional 64bit. Each specified Macintosh client computer should be pre-loaded with Apple OSX operating system.

NOTE: The attached specifications should be viewed as minimums; you are welcome to buy more powerful computer equipment. Please contact Creative Learning Systems at 800-458-2880 to discuss potential enhancements.

* Due to the constant evolution of computer hardware/software products, the attached specifications list will quickly become out-of-date. Buyers are therefore STRONGLY advised to contact Creative Learning Systems at (800-458-2880) to obtain the latest specifications list BEFORE PLACING YOUR COMPUTER EQUIPMENT ORDER.

* Failure to follow the Computer Equipment Specifications List can cause last-minute delays in your installation and training, financial penalties, and may jeopardize CLS’s provision of after-sale technical support.
## General Requirements
- All PC computers must include Windows 10 Professional pre-installed, with CD media on site.
- All PC computers must include media for any manufacturer specific hardware drivers.
- All PC computers must share a consistent manufacturer and model number for all components, differing only by the performance specifications listed below.

## Detailed Hardware Requirements

### All-in-One - PC

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chassis:</td>
<td>Desktop All-in-One case</td>
</tr>
<tr>
<td>Ports:</td>
<td>4x USB 3.0  2x USB 2</td>
</tr>
<tr>
<td>User Input:</td>
<td>USB optical wheel Mouse &amp; Multimedia Keyboard with USB Hub</td>
</tr>
<tr>
<td>CPU:</td>
<td>Intel® Core i7-6700 Processor (Quad Core, 8MB, 8T, 3.4GHz, 65W)</td>
</tr>
<tr>
<td>Memory:</td>
<td>8.0 GB 2133MHz DDR4 (installed in sets of 2, i.e. two 4GB modules)</td>
</tr>
<tr>
<td>Hard Drive:</td>
<td>256 GB Solid State (M.2 interface preferred)</td>
</tr>
<tr>
<td>Removable Drives:</td>
<td>Media Card Reader, and 8X Slimline DVD+/-RW</td>
</tr>
<tr>
<td>Video Card:</td>
<td>Recommended: AMD Radeon R7 A370 (Dell part# 490-BCTH)</td>
</tr>
<tr>
<td>Network:</td>
<td>10/100/1000 Ethernet Card or On-Board</td>
</tr>
<tr>
<td>Sound Card:</td>
<td>Integrated Audio</td>
</tr>
<tr>
<td>Monitor:</td>
<td>Integrated 23.8” Full-HD LED-backlit display</td>
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<tr>
<td>Speakers:</td>
<td>Integrated Audio</td>
</tr>
<tr>
<td>Camera:</td>
<td>Integrated Camera</td>
</tr>
<tr>
<td>Warranty:</td>
<td>3 year parts and onsite labor</td>
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<tr>
<td>Operating System:</td>
<td>Windows 10 Professional 64bit</td>
</tr>
<tr>
<td><strong>Recommended Make/Model:</strong></td>
<td>Dell Optiplex 7440 – All-in-One Case</td>
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</table>

**In order to maintain the functional and ergonomic qualities of the computer/furniture integration in a Creative Learning Environment, these computer chassis dimensions cannot be exceeded. Like the minimum performance related requirements, this is an express condition of the Learning Environment sale and failure to comply can add substantial extra time and cost to your installation.**

***In order to maintain the functional and ergonomic qualities of the computer/furniture integration in a Creative Learning Environment, the flat panel all in one computer with **built-in or attached** speakers is required. See diagram on next page.***
CLS furniture has been carefully designed to support a wide range of activities and models of usage while minimizing required space. The picture below shows our standard configuration - a compatible LCD monitor/all in one computer attached to a CLS supplied monitor arm. In addition, the monitors/all in one computers are equipped with an integrated speaker bar or built in speakers keeping the desktop surface free for other project and learning resources. Schools purchasing their own computer equipment must also provide flat panel monitors/all in one computers with built in speakers, or an attached sound bar. Please advise your Creative Learning Systems support team of any preferred vendors and we will be happy to provide specific equipment recommendations.

Since the LCD monitor/all in one computer with attached sound bar/built in speakers does not take up any desk space, the students in the picture below have plenty of room for equipment and learning resources. Another significant advantage of this configuration is that students may work anywhere around the desktop, and in whatever team size is appropriate for their project. The arm-mounted LCD monitor/all in one computer and integrated speakers are easily repositioned at any angle and height for optimal viewing by the full work group.

Technical details concerning monitor arms:
- The monitor arm permits optimal wire management with hidden, organized cables. The desktop is free of cables improving both user functionality and appearance.
- The CLS provided monitor arms are equipped with multiple VESA standardized mounting plates. If monitors are replaced or upgraded in the future, the arms can accommodate all standard monitor mounting configurations.
- The monitor arm is bolted to the work surface improving security and functionality.
- CLS monitor arms feature adjustable tension settings for a range of LCD monitor/all in one computers and speaker weights. The monitor/computer/speaker remain stable at any height and position desired by the user.
<table>
<thead>
<tr>
<th>Title</th>
<th>Version</th>
<th>Platform</th>
<th>Manufacturer</th>
<th>Qty.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Office Professional</td>
<td>2010, 2013, or 2016</td>
<td>Windows</td>
<td>Microsoft</td>
<td>16</td>
</tr>
<tr>
<td>Photoshop Elements</td>
<td>13</td>
<td>Windows</td>
<td>Adobe</td>
<td>5</td>
</tr>
</tbody>
</table>
Learning Launcher Curriculum
Secondary School Challenges

Orientation Collection

Level 1 – Getting to Know Your SmartLab
The SmartLab is a learning experience like no other. Find out what makes it so different! Learn how to find your way around the place. Discover more about the many types of technology you’ll be using. Then begin your first project (don’t worry, this one is easy) and learn how to use SmartLab tools to document your learning.

Level 1 – Introduction to Learning Launchers
Learning Launchers are full of useful information and great activities. Learn about the different sections and how they’re organized. Discover how to choose the Learning Launcher that’s right for you. And find out what’s up with all those monkeys!

Online ePortfolio Student Setup Guide
This guide provides step-by-step instructions for setting up your cloud-based ePortfolio on Google Drive

Alternative Energy

Level 1 – Introduction to Alternative Energy
What is meant by the term alternative energy? Why is it so important? Begin your exploration into alternative energy with this informative overview. Learn how to separate fact from opinion in your online research and then take off on an online alternative energy scavenger hunt.

Level 2 – Fundamentals of Electricity
Alternative energy is all about electricity! Explore the fundamentals of electricity and find out how it applies to the design and use of alternative energy systems. Learn how to measure the voltage and amperage output of energy sources like solar PV panels, wind turbines, and hydrogen fuel cells.

Level 2 – High Performance Home Design
How are homes being designed to be more energy efficient? Find out ways to make your home green!
Level 3 – Capstone Alternative Energy Project
Are you ready to apply all that you’ve learned about alternative energy to create an informative and engaging communications project? Pick a topic that you found interesting during your exploration into solar power, hydrogen fuel cells, wind power and other alternative energy topics. Then build a model information kiosk, create a website, produce a video, or choose another communication method to educate others about your topic.

Alternative Energy – Solar Energy

Level 1 – Solar Water Pasteurization
Find out how solar energy is used around the world to make water safe to drink. Then use a simple solar cooker and see how long it takes to pasteurize water where you live.

Level 1 – Solar Photovoltaics
Photovoltaic panels turn solar energy into usable electricity. Learn how they work and then conduct experiments to discover how much power they produce under different conditions.

Level 2 – Solar Energy and the Earth’s Orbit
The Earth’s orbit has a big impact on solar energy around the globe. Find out how it affects the amount of solar energy where you live!

Level 2 – Passive Solar Home Designs
Find out how homes are designed to use radiant solar energy to provide heat in the winter while keeping homes cool in the summer.

Level 2 – Designing a Solar Box Cooker
Learn how solar box cookers cook food and how they are designed. Then design and build one of your own and test its performance.

Level 3 – Solar Race Car Challenge
Design, build and test a solar race car powered by solar photovoltaic panels. How fast can you go?

Level 3 – Passive Solar Flooring
What flooring materials are the best choices for passive solar rooms? Conduct experiments using different flooring materials and scientific probeware and find out!

Level 3 – Solar Cooker Design Challenge
What kinds of solar cookers are in use today? Explore the engineering principles of each major type. Then design your own from scratch and see what you can cook up!
Alternative Energy – Wind Power

Level 1 – Initial Turbine Blade Test
Measure the energy output of different blade configurations as you experiment with a real wind turbine using Vernier sensors or a Multimeter.

Level 2 – Ultimate Turbine Blade Designs
Expand on what you learned in your initial turbine blade tests with blades you design and test yourself using Vernier sensors or a Multimeter.

Level 3 - Meeting Future Energy Demands
Take your expertise in wind turbine design to the next level by designing, building, and testing a wind power system to meet community energy needs using Vernier sensors or a Multimeter.

Level 3 - Scientific Inquiry with Wind Turbines
Apply your knowledge and experience with the scientific method to answer complex questions about wind power systems using Vernier sensors or a Multimeter.

Level 3 – Calculating Wind Power
Can we predict how much power a wind turbine will produce? Put your math skills to work as you learn about factors that impact wind turbine performance.


Level 1 – Electrolyzing Water with Hydrogen Fuel Cells
Learn how hydrogen fuel cells electrolyze water to produce hydrogen fuel and experiment with real hydrogen fuel cells.

Level 2 – Power from Hydrogen Fuel Cells
Use hydrogen fuel cells to produce usable electricity from hydrogen gas. How much power can you generate?

Level 3 – Hydrogen Fuel Race Cars
Use what you’ve learned about using hydrogen fuel cells to design and test a hydrogen powered model race car.

Level 3 – Hydrogen Highway Challenge
Can you plan a cross-country trip using nothing but renewable energy to produce hydrogen fuel for your car? Take the Hydrogen Highway Challenge and see!
**Circuitry – Arduino**

**Level 1 - Introduction to Arduino**  
What's Arduino? It's a tool for anyone interested in inventing and working with programmable circuits that interact with the environment. Learn to design, build, and test circuits that control lights, make noise, respond to changes in light, and more!

**Level 2 - Advanced Programmable Circuits**  
Can you write code and build circuits? In this Learning Launcher you will tackle advanced design challenges allowing you to combine your experience with software programming and circuitry. Learn to design, program, and troubleshoot Arduino devices that use motors, sensors, and advanced components.

**Level 3 - Inventing with Arduino**  
Are you an inventor? Take your creativity to the next level and design, build, and test your own Arduino device. This is your opportunity to demonstrate your expertise with software programming and circuit design.

**Circuitry – MaKey MaKey**

**MaKey MaKey: Quick Start Guide**  
Does your SmartLab have MaKey MaKey? MaKey MaKey gives you creative ways to control the keys and mouse of your computer. With MaKey MaKey you can substitute almost any object for a keyboard or mouse. Turn bananas into piano keys, make the floor of your classroom a board game, the possibilities are endless.

**Circuitry – Pneumatics**

**Level 1 – Getting Started with Pneumatics**  
Get familiar with the components in your pneumatics kit as you explore how they work and what they do. Learn about the compressibility of gases and how liquids compare. Build your first air powered circuits with special valves to control the speed of your pneumatic cylinders.

**Level 2 – Bernoulli’s Principle**  
Can you balance a ping pong ball on the end of a small pneumatic air tube? Can you spin a golf ball in the palm of your hand at more than 1000 rpm without burning your hand? Do you know why airplane wings give lift to the airplane? You will learn all of this and more from this Learning Launcher.
Level 2 – The Reciprocating Circuit Challenge
Learn the secrets necessary to design and build self-cycling reciprocating pneumatic circuits that are sure to attract the attention of all your classmates. Enjoy the journey by creating your own entertaining documentary video showing what your struggles and successes with your pneumatics projects.

Level 3 – The 4-Way Crusher Challenge
If you are clever enough to figure out the solution to this challenge, you will successfully invent your own 4-way can crushing monster machine. It makes you think, but the rewards are well worth it.

Level 3 – Electro-Mechanical Pneumatic Circuits
Expand and enhance your pneumatic circuits by adding electrically controlled pneumatic solenoids. What’s a solenoid? You’ll soon find as you continue your explorations of pneumatic circuits.

Circuitry – Snap Circuits Electricity and Electronics
Level 1 – Getting Started with Electricity
Begin your exploration of electricity and electronics as you build real working circuits with Snap Circuits.

Level 2 – Magnetism: The Invisible Force
Did you know that electricity and magnetism are closely related? Discover these fascinating connections and build electrical circuits that demonstrate these scientific principles.

Level 2 – 2-Way Switch Circuits
Have you ever noticed that some lights in your house can be controlled from two different switches? Find out how these and other circuits work as you build your own circuits with a variety of useful switch combinations.

Level 2 – Designing Alarm Systems
Learn about specialized electrical components called sensors and integrated circuits. Then apply your new knowledge as you build a variety of working alarm system circuits!

Level 2 – Motors, Generators and Green Energy
Where do we get the electricity we use? Learn about motors, generators and green energy as you build model circuits to explore these fascinating topics.
Level 3 – Series and Parallel Circuits
How loads and power sources are arranged in a circuit can make a huge difference in how your circuit performs! Learn the differences between series or parallel circuits as you build, test and compare a variety of circuits. Discover how to use a digital multimeter to measure current and voltage in the circuits you build.

Level 3 – Building Logic Gate Circuits
Logic gates are the building blocks of modern digital technology. Use your Snap Circuits kit to build working logic gate circuits and discover how computers really work!

Computer Graphics – Doodle 4 Google

Level 3 – Doodle 4 Google
It's all about expanding your artistic and creative abilities! Learn from the Google Pros like Ken Saunders and Dennis Hwang. Dive in and don't be shy. Use your favorite graphics program and get started. You could be the next national winner of the Doodle 4 Google competition.

Computer Graphics – Google Art Project

Level 1 – Become a Gallery Curator with Google Art Project
Explore the Google Art Project online. Choose a theme for your personal art gallery then collect art from all over the world to display in your gallery!

Level 2 – Interpreting Art with Google Art Project
Learn to see and interpret art like an expert! Then choose your favorite artwork and pick a creative project to explore it more depth.

Level 3 – Remix, Recreate and Reinvent with Google Art Project
It’s your turn to be the artist! Discover art that inspires you. Then use that inspiration to create an art project of your own!

Computer Graphics – Illustrator

Level 1 – Introduction to Graphics
Adobe Illustrator is the professional standard in vector graphics software. Learn and practice basic skills with these fun drawing challenges!

Level 2 – 3D Art
3D graphics are everywhere! Learn different ways to create 3D graphics in Illustrator. Then draw a few objects of your own!
Computer Graphics – Image Blender

Level 1 – Enhancing Photos

Computer Graphics – Irfanview

Irfanview Tutorial – Resizing and Editing Images
Learn how to quickly crop, resize and save images with free Irfanview software.

Computer Graphics – Photoshop

Level 1 – Enhancing Photos
An introduction to Photoshop - learn about basic tools and menu options and how they’re used to improve a photograph.

Level 1 – Morphing Photos
Photoshop has some fun features that let you “morph” photos. Have fun turning people into crazy cartoon aliens while you learn how to use some basic Photoshop tools and techniques.

Level 2 – Selective Color
Layering allows you to do all kinds of advanced project work in Photoshop. Learn how to use this feature while you create black and white images with color elements.

Level 2 – Text Layers
Integrate text into your Photoshop projects. Explore text layers and layer styles.

Level 3 – Photomontage
Take a virtual “visit” to a foreign country or be part of an historical event. Learn about layers, masks and other useful Photoshop techniques as you create a digital composite image.

Level 3 – Pop Art
Can you use Photoshop to create work in the style of famous 20th century pop artists? Test your Photoshop skills with this fun and challenging project.

Computer Graphics – Photoshop Elements

Level 1 - Editing Photos
If you're new to Photoshop Elements, this is a great place to start! Learn to use Elements' tools and editing features to improve your photographs.
Level 2 - Selective Color
Layers and layer masks are your key to creating amazing images in Photoshop Elements. Learn how to use these powerful features as you create images that combine black and white with color.

Level 3 - Pop Art
Can you use Photoshop Elements to create work in the style of famous painters from the pop art movement? Test your creative editing skills with this fun challenge.

Level 3 - Compositing
Take a virtual trip to a foreign country or be part of an historical event. Learn about layers, masks and other powerful processing techniques as you create a digital composite image.

Computer Graphics – Picasa
Picasa Tutorial
Picasa is free, easy-to-use photo editing software. This tutorial will help you learn how to use Picasa to organize and edit your pictures, add text, create collages, make movies and more!

Computer Graphics – Punch Home Design Suite
Level 1 - House Design
Discover the world of architecture. Explore principles of home design as you create detailed plans for a house with Punch Home Design Suite.

Level 1 - Interior Design
If you're interested in interior design and decorating, than this activity is for you! Learn principles of design as you create beautiful interiors for your "client" homeowner.

Level 1 - Landscape Design
There's a lot more to landscape design than you might have thought! Discover the many factors landscape designers must consider. Then create your own landscape plan in Punch Home Design Suite.

Level 2 - Designing Within a Budget
Every project must work within budget. Learn money-saving design tips and explore the many trade-offs necessary to design a home without "breaking the bank".

Level 2 - Thematic Landscape Design
Explore the creative side of landscape design. Let your imagination run wild as you develop a landscape theme. Then use both hardscape and softscape features as you design a detailed landscape plan around your theme.
Level 3 - Elevation Variety in Landscape Design
Use Punch to design landscapes in 3-dimensions! Add berms and retaining walls to your landscape plan. Learn how to create and design with topographic maps.

Level 3 - Putting it all Together: The Dream Home Challenge
The ultimate home design challenge. Use what you've learned about house, interior and landscape design with Punch Home Design Suite to create a dream home for you or your "clients".

Computer Graphics – SketchUp

Level 1 – Drawing 3-D Objects
An introduction to SketchUp. Learn about vector and bitmapped graphics. Explore basic SketchUp tools and techniques. Then create a 3-D object of your own design!

Level 2 – Visualize and Design
Discover how computer graphics helps us visualize and design ideas. Learn more advanced SketchUp tools and techniques and explore the SketchUp object warehouse. Then create your own complex object or scene.

Level 3 – Exploring Patterns in Design
Explore repeating patterns in nature, design, art and architecture. Learn how to use SketchUp to duplicate and repeat objects. Choose or create a SketchUp design challenge using repeating objects and patterns.

Level 3 – Product Design Challenge
What makes a great product design? Learn about the design process and how it is used in product development. Then design a product of your own in SketchUp. Can you create a “better mousetrap”?

Level 3 – Drawing Models from Photos
Discover how to use photographs to draw accurate and detailed models of existing buildings, structures and objects in SketchUp. Use these techniques to create a model of your own choosing. Once created you can modify or add to your model to make it better.

Computer Graphics – Tinkercad

Level – 1 Drawing 3-D Objects
Learn the basics of drawing and painting with computer software. Apply your knowledge to designing objects in three dimensions with Tinkercad. Use Tinkercad to create an original product. With a 3-D printer, print your design.
Level 2 - Prototyping and Modeling
Description: Use Tinkercad to design and produce prototypes of your original concepts or scale models of existing objects. With a 3-D printer, print your design.

Digital Communications – ACID Music Studio

Level 1 – The 12 Bar Blues
Discover digital sound engineering as you explore the basic elements of music – beats, bars and scales. Learn a traditional blues progression and the history of blues music in America.

Level 2 – Remixed
Discover how to remix music using the ACID Music Studio Beatmapper. Explore musical concepts like beats-per-minute and learn how to recognize downbeats, on-beats and backbeats.

Level 3 – Composing
Explore advanced sound engineering as you produce your own musical composition. Plan and record musical performances. Add loops and sound effects, and mix your final production with ACID Music Studio.

Level 3 – Exploring Science and Sound
Design and conduct a science experiment on the topic of sound. Use ACID Music Studio and other SmartLab resources to help you investigate and answer your experimental question.

Digital Communications – Camtasia

Level 3 – Creating Video Tutorials
Explore the power of multimedia for learning applications. Then create your first CrazyTalk project while you learn basic facial animation techniques like face-fitting, audio recording, and the animation options in CrazyTalk.

Digital Communications – CrazyTalk

Level 1 – Introduction to Facial Animation
Explore the power of multimedia for learning applications. Then create your first CrazyTalk project while you learn basic facial animation techniques like face-fitting, audio recording, and the animation options in CrazyTalk.

Level 2 – Enhanced Animation with Auto Motion
Take your facial animation skills to the next level! Learn how to use the auto motion features in CrazyTalk 7 to add more expression to your animated characters. Then apply these animation techniques to your own educational video!
Level 3 – Advanced Puppeteering
CrazyTalk’s custom motion and advanced puppeteering features give you even more control over your animations. Learn about the science of facial expressions. Then apply your new knowledge to create an entertaining educational video.

Digital Communications – CrazyTalk Animator

Level 3 – Animate Yourself
CrazyTalk Animator is a professional 3D animation application. Learn basic and advanced animation skills and then create an animation of your own. You can even put yourself into your animation!

Digital Communications – Dreamweaver

Level 1 – Creating a Personal Web Page
Explore the history of the World Wide Web and learn how to use Dreamweaver to create a great looking personal web page.

Level 2 – Creating a Business Website
Almost every business needs a website. Find out what goes into creating a great business website; then make your own using a Dreamweaver template.

Level 3 – Creating a Restaurant Website
Are you ready to create a website from scratch using Adobe Dreamweaver? Take this Learning Launcher challenge and show-off your website design skills!

Digital Communications – Flash

Level 1 – Introduction to Animation
Start animating games, websites and more with Adobe Flash. Explore Flash websites and games. Then create Flash animations on your own as you learn three basic animation techniques.

Digital Communications – Frames

Level 1 – Introduction to Stop Motion Animation
Learn what Stop-Motion Animation is and how is it done. Learn how to use the Frames software to make your first animated video using existing media content.

Level 2 – Clay Animation
Learn how Hollywood professional make and use animated clay characters. Write your own movie script and have some fun with claymation.
Level 2 – Chroma Key
Learn how to float animated characters over any background you want using a technique called chroma key to define solid colors to be transparent.

Level 3 – Drawing Tools
Learn how powerful and fun it can be to artistically create your characters and backgrounds right in the Frames software using the graphic drawing tools.

Digital Communications – Garage Band

Level 1 – The 12 Bar Blues
Discover digital sound engineering as you explore the basic elements of music – beats, bars and scales. Learn a traditional blues progression and the history of blues music in America.

Level 2 – Remixing Songs
Discover how to remix music using tools and features in GarageBand. Explore musical concepts like beats-per-minute and learn how to recognize downbeats, on-beats and backbeats.

Level 3 – Composing
Explore advanced sound engineering as you produce your own musical composition. Plan and record musical performances. Add loops and sound effects, and mix your final production with GarageBand.

Level 3 – Exploring Science and Sound
Design and conduct a science experiment on the topic of sound. Use GarageBand and other SmartLab resources to help you investigate and answer your experimental question.

Digital Communications – Google Sites

Level 1 – My First Website
Learn how to create websites easily using Google Sites templates. Then create a website about a topic of your choice!

Level 2 – Creating a Website from Scratch
Take your website development skills to the next level as you create a Google website of your own. Start with a blank template and develop your design from scratch!

Level 3 – Using Google Forms
Learn how to combine Google Forms and Google Sites to collect useful information from website visitors. Then use your new skills to create a website featuring two-way information sharing!
Digital Communications – PowerPoint

Level 1 – Famous People
An introduction to PowerPoint - learn basic tools and techniques as you create a PowerPoint presentation about the famous person whose name appears on your SmartLab computer.

Level 2 – Animation Mania
PowerPoint has lots of great animation features to help you make your presentation come alive. Learn how to use these features effectively. And learn when animation can become too much of a good thing.

Level 2 – Importing the Fun Stuff
Explore the multimedia features of PowerPoint. Add movies and video to make your presentations even more engaging.

Level 3 – Great Presentations
What makes a great presentation? Research the opinions of experts and then use your own best judgment as you explore this rich question. Then create a PowerPoint presentation to teach others by example.

Digital Communications – Publisher

Level 1 – Business Cards and Stationery
An introduction to Publisher - learn how to use basic tools and techniques as you create business cards and letterhead for your personal “business”.

Level 1 – Greeting Cards
Publisher has lots of great templates for creating greeting cards. Learn how to use them and create your own cards for someone special.

Level 2 – Creating Resumes
If you look for a job you’ll need a professional looking resume to let people know why you’re the best candidate. Learn what makes a great resume and how to use Publisher to create one for yourself.

Level 3 – Designing Ads
What makes a great ad? Learn what the experts have to say and then create a newspaper ad to promote your “business”.

Level 3 – Designing Brochures
Many businesses use brochures or pamphlets to describe their product or service. Find out how to use Publisher to create this important type of business communication.
**Digital Communications – STEM Career Exploration**

**Level 1 – STEM Career Quest**
Learn about the wide variety of STEM careers with online interactive games. Find a STEM career that’s interesting and learn more about it. Maybe you’ll discover your perfect career match!

**Digital Communications – Video Production**

**Level 1 - Introduction to Video Editing**
Find out how the filmmaking industry got started and how it evolved as the technology changed. Learn the basic elements required to create good movies and become familiar with the basic features common to all video editing programs.

**Level 2 - Creating Video Storyboards**
Learn about the Four C's and why they're important for every great story. Explore different film genres. Discover how films are carefully planned using storyboards and then create your own using the technology tools of your choice.

**Level 3 - Introduction to Filming**
It's time to pick up the camera and make an original video. Here's where your editing, scripting, storyboarding, and production skills will all come together. How will you engage and entertain your audience?

**Mechanics and Structures – fischertechnik Mechanic + Static**

**Level 1 - Machines and Gears**
Learn the principles of simple and compound machines. Discover how to build machines with great mechanical advantage by using worm gears and toothed gears.

**Level 1 - World of Statics**
Discover how to construct strong efficient truss systems using Fischertechnik static components and good engineering design principles.

**Level 2 - Building Bridges**
Expand your engineering skills with more advanced projects like complex bridges.

**Level 2 - Heavy Loads**
Design and build simple machines that use engineering principles to gain sufficient mechanical advantage to lift heavy loads.

**Level 2 - Levers and Scales**
Learn how scales are engineered to measure how much things weigh, then build and test your own balance scales.
Level 3 - A Car Full of Gears
Cars have transmission full of gears. Why do cars need gears, what is their purpose? Learn more about gears and then design and build your own functioning transmission.

Level 3 - The Marvelous Mixer
Learn what planetary gears are and how they work in common tools like an egg beater. Design and build your own mechanisms that use planetary gear systems.

Level 3 – Super Crane Challenge with fischertechnik
Can you build it bigger? Learn how to use compound pulley systems to gain enough mechanical advantage to lift super heavy loads.

Mechanics and Structures – IQ Key

Level 1 – Torque it Up Design Challenge
Introducing gear powered vehicles with IQ Key. Learn about force, torque and energy. Build a car and then redesign it for better performance.

Level 2 – Geared for Speed
Experiment with different gear capsules to see which makes the fastest race car. Learn about speed and velocity.

Level 2 – Mighty Machines
Explore the concept of mechanical advantage. Design and measure the might of your machine!

Level 3 – Advanced Design Challenges
Are you a pro? Do you understand how to design high-performance machines? Test your abilities with one or more of the advanced design challenges.

Mechanics and Structures – K’nex

Level 1 – Levers
Discover the fascinating world of simple machines. Then build a variety of lever machines and explore how they work.

Level 1 – Wheels and Axles
Discover the fascinating world of simple machines. Then build a variety of wheel and axle machines and explore how they work.

Level 1 – Inclined Planes, Wedges and Screws
Discover the fascinating world of simple machines. Then build a variety of inclined plane, wedge and screw machines and explore how they work.
Level 2 – Pulleys
Expand on your knowledge of simple machines. Learn about force, work and mechanical advantage as you build pulley systems and machines and explore how they help us do difficult jobs.

Level 2 – Gears
Expand on your knowledge of simple machines. Learn about force, work, gear ratios and mechanical advantage. Build gear systems and machines that use gear systems and explore how they help us do difficult jobs.

Level 3 – Rube Goldberg Machine Challenge
Rube Goldberg was famous for imagining wacky machines that do the simplest tasks in the most complicated ways. Learn more about him and his wonderful cartoon inventions. Then use them for inspiration as you design and build your own Rube Goldberg machine with K’nex!

Level 3 – Rolling Ball Sculptures and the Big Ball Factory
Discover the world of machines as art. Design and build a rolling ball sculpture of your own or take the challenge of building the ultimate K’nex model, the Big Ball Factory.

Mechanics and Structures – Bridge Designer

Level 1 – Exploring Virtual Bridge Design
Learn about different types of bridges and how they are engineered for strength. Then begin exploring virtual bridge design with West Point Bridge Designer (WPBD).

Level 2 – Design Decisions with Estimation
Use WPBD’s load test simulations to analyze compression and tension forces. Can you use this information to lower the cost of your bridge by 30% in 10 iterations?

Level 2 – Design Decisions Charts and Graphs
Learn how to access and use WPBD’s detailed information on strength of building materials. Use this information to reduce the cost of your bridge by 30% or more in as few steps as possible!

Level 3 – Designing from Scratch
Instead of starting with a standard WPBD bridge template for your design, try taking what you’ve learned to engineer a low-cost design from scratch!

Level 3 – How Low can you Go?
Ready for a WPBD competition-style challenge? Design the lowest cost bridge possible in one of several design challenges. See if you can set a new SmartLab record!
Mechanics and Structures – Zometool

Level 1 – Bridges
Learn about different types of bridges and how they are engineered for strength. Then test your knowledge with a bridge you design and test yourself.

Level 1 – Spinning Top Challenge I
Why does a spinning top stay upright? Learn about the physical science behind this simple toy. Then experiment with tops you build and test for yourself.

Level 1 – Plato’s Perfect Shapes
Who was Plato and what are “perfect” shapes? Explore this question with Zometool. Can you create all five of Plato’s perfect shapes?

Level 2 – Spinning Top Challenge II
Apply what you’ve learned about the laws of physics and design tops for a series of advanced design challenges.

Level 2 – Tall Towers on a Budget
Test your engineering skills and build the tallest Zometool tower possible. But be careful every part has a price and you have to stay within budget!

Level 3 – Colossal Bridge Challenge
SmartLab City has asked you to design a bridge big enough to cross a wide river. Create your model with Zometool, calculate how much it will cost and submit your proposal to the city.

Level 3 – Spinning Top Challenge III
What’s your SmartLab record for Zometool spinning tops? Can you design a top that will spin longer?

Robotics and Control Technology – fischertechnik Robotics

Level 1 – Motor Controller
Need some help getting started with fischertechnik robotics? This is the place for beginners to start. You will become familiar with the Robo Pro icon-based programming software as you learn to control a set of simple motors.

Level 2 – Hand Dryer
Put your programming skills to work building something practical. You will learn how to add sensors to your machines in order for the software to make intelligent decisions about what to do, and when to do it.
Level 2 – Pedestrian Light
Can you design a pedestrian crosswalk system? This launcher will guide you in building and programming this public safety system.

Level 3 – Analog Displays
Learn to add sophisticated feedback and input displays in your programs.

Level 3 – Subprograms
Make your programs more streamlined and efficient by adding subprograms.

Level 3 – Theme Park
Use your skills to make money in the growing entertainment industry. This project will give you a real opportunity to show how creative you can be.

Level 3 – Traffic Light
This learning launcher takes the pedestrian light project to the next level. This traffic light controls both the pedestrians (as you did before) and the motor vehicle traffic at the same time.

Robotics and Control Technology – Lego EV3

Level 1 – The Basics: Engineering Process and Programming
Learn about robots and how they work. Explore programming and the engineering process with Carnegie Mellon Robotics Academy. Then build and program your first EV3 robot!

Level 2 – Driving with Sensors
Robots frequently use sensors to guide their movement. Choose an EV3 sensor and complete a series of challenges moving around a challenge board.

Level 3 – Decisions, Loops and Switches
Explore advanced programming techniques using loop and switch commands. Then apply your new knowledge and test your robot on the challenge board!

Level 3 – Engineering for Complex Tasks
Learn about Switch-Loop and Line Follower robots. Then expand your EV3 skills by building and programming switch-loop and line follower robots of your own!

Robotics and Control Technology – Sphero

Level 1 – Getting to Know Sphero
Robots do only what you tell them to do. Learn basic robotics control and programming with Sphero.
**Level 2 – Sphero on the Move**
Go beyond the basics of robotics control. Learn to control a robot to perform complex tasks and challenges.

**Level 3 – Programming with orbBasic**
Use your software programming skills and knowledge to write code for Sphero.

**Robotics and Control Technology – VEX Robotics**

**Level 1 – Taking Command**
Explore advanced robotics with VEX and the Carnegie Mellon Robotics Academy. Build and program your first VEX robot. Then take on the Labyrinth Challenge!

**Level 2 – Take a Spin with Time, Torque, Power and Distance**
Take your VEX programming skills to the next level with intermediate robotics challenges including Basketball Drills and Sumo Bot!

**Level 3 – Close-up with Remote Control**
Test your creativity and ingenuity with these advanced robotic engineering challenges. Learn how to control your robot with a remote-control joystick!

**Level 3 – Sensible Sensors**
Test your creativity and ingenuity with these advanced robotic engineering challenges. Learn how to use sensors to make “smart” robots!

**Scientific Data and Analysis – ArcGIS Online**

**Level 1 – Getting Started with ArcGIS Online**
Discover how ArcGIS Online lets you combine maps with information to see the world in a whole new way!

**Level 2 – Geographic Inquiry Process**
Combining maps with information gives us a powerful tool to ask and answer questions about our world. Learn about the geographic inquiry process and explore how to use ArcGIS Online to help organize, analyze and present geographic information.

**Level 3 – Creating an Original GIS Map**
Learn how to use advanced map building features with ArcGIS Online. Investigate a GIS question that interests you and create an original map project to learn more about your chosen topic.
Level 3 – GIS Mobile App Development
GIS is for mobile app development is huge – you probably have lots of GIS apps on your Smartphone right now! If you’re already experienced with ArcGIS Online, take your skills to the next level with ArcGIS Mobile!

Scientific Data and Analysis – Astronomy with MicroObservatory

Level 1 – Introduction to MicroObservatory
Discover the world of astronomy and telescopes. Explore MicroObservatory and learn how to use MOImage software to enhance and analyze your images. Then program a telescope to take a picture of an astronomical object of your choice!

Level 2 – Using Telescopes to Understand our Universe
Learn about the history of telescopes and how they work. Discover how telescopes compare to the human eye. Then use MicroObservatory and MOImage software to take a “group portrait” of astronomical objects or measure the moon!

Level 3 – Voyage to Europa
Learn about different types of planets in our solar system. Explore Jupiter and its many moons, including Europa – a planet some people think could support life. Create a digital movie of Jupiter’s moons in motion and plan a journey to Europa.

Level 3 – Exploring Stars, Galaxies and the Big Bang
Travel beyond our solar system and learn about distant stars, planets and galaxies. Plan a voyage to a distant star or use MicroObservatory to explore the origin of the universe!

Level 3 – AstroPhotography
Learn about light, color and filters. Use MicroObservatory and MOImage software to create color photographs of astronomical objects.

Scientific Data and Analysis – Extreme Weather and Monster Storms

Level 1 – Weather, Climate and Monster Storms
Learn about weather and climate. Discover how extreme weather and monster storms are formed. Then choose a project to explore an extreme weather topic in more depth!

Level 2 – Tornadoes
Did you know that 75% of the world’s tornadoes occur in the central U.S? Explore the science of tornadoes. Then choose a project to explore tornadoes in more depth.

Level 3 – Earth’s Energy Budget
What is the relationship between solar energy and monster storms? How does the atmosphere affect global temperature? Explore these concepts with science experiments you can do right in the SmartLab!
Scientific Data and Analysis – GIS Websites

Level 1 – Mapping Your World with Google Maps
You’ve probably used web-based resources like Google Maps to find places of interest and get directions. In this Learning Launcher you’ll create your own map to organize and present information on a topic of your choice.

Level 1 – Maps and Geographic Information with Worldmapper
Learn about maps and GIS. Discover how maps can look very different depending on their purpose. Then go online and explore the WorldMapper.com website. Find out what some very strange looking maps can tell you about our world.

Level 3 – Landscape Ecology: The Welikia Project
The Welikia Project is an ambitious research project to recreate New York City’s island of Manhattan and surrounding boroughs before the arrival of European settlers. Travel back in time 400 years to explore this pristine wilderness!

Level 3 – Natural Hazard Evaluation with GIS
Learn about our dynamic planet and discover the source of earthquakes, volcanoes and tsunamis. Then explore some fascinating web-based GIS resources to learn more about our planet and conduct your own investigation into these natural hazards

Scientific Data and Analysis – Google Earth

Level 1 - Mapping Your World
Take a virtual tour of historic New Orleans as you learn to customize maps in Google Earth. Then choose a place that interests you and create a map of your own!

Level 2 - Multimedia Tours
Explore advanced customization techniques as you learn to geotag images and add audio to your Google Earth tours.

Level 3 - Mobile Apps and Google Earth
Learn how to collect information with a smart phone or GPS device and analyze it using Google Earth.

Scientific Data and Analysis – Jet Stream 500 Wind Tunnel
Aerodynamic Testing
This Learning Launcher is loaded with project ideas and examples to show you how to setup test fixtures that will enable you to test airfoils, model cars and trucks, clay models, simulated Olympic athletes, fabric tester, and much more.
Scientific Data and Analysis – Laser Technology

Level 1 – Laser Technology Basics
Learn how lasers work. Explore your SmartLab laser Collection and learn how to use it safely. Then conduct your first laser experiment.

Level 2 – Laser Security System
Design a laser security system to protect a model home or valuable object. Can you create a foolproof system?

Level 2 - 3D Vision and Stereograms
Discover how your eyes are able to see 3 dimensions. Learn how to create 2D images that contain hidden 3D images and learn how to make your own.

Level 3 – Laser Light Show
You’ve probably seen laser light shows at concerts and sporting events. Integrate Fischertecnik RoboPro components with your Laser Collection to create a computer controlled light show.

Scientific Data and Analysis – Vernier Scientific Sensors

Level 1 – Reflectivity of Light
Learn about wavelengths and color attributes of light. Use Vernier light sensors to learn how different colors and materials reflect and absorb light.

Level 1 – Measuring Temperature
What are different ways to measure temperature? Choose from 13 interesting experiments measuring and analyzing temperature data with Vernier probes and software.

Level 1 – A Distant Light
Learn how distance affects light intensity. Use Vernier light sensors to measure light on other “planets” in a model solar system.

Level 2 – Measuring Motion
Did you know you can use sound waves to measure motion? Use Vernier ultrasonic sound sensors and analytical software to explore a variety of motion experiments.

Level 2 – Measuring Heart Rates
Learn how the heart and cardiovascular works. Use the Vernier heart-rate monitor to conduct of variety of experiments on heart rates and human physiology.

Level 3 – Heart Rate Advanced Exploration
Design your own research experiment using the Vernier heart-rate monitor, computer interface and analytical software.
Level 3 – Environmental Study
How do scientists survey environmental conditions in an area? Conduct a survey using Vernier sensors and software to collect and analyze data. What will your research tell you about an area near your home or school?

Scientific Data and Analysis – Vernier Structures Tester

Level 1 – Design, Build, Crush!
Design, build, and crush a model bridge! Use the Vernier Structures Tester to gather and analyze data about the strengths and weaknesses of your design.

Level 2 – Build a Better Bridge
Build a better bridge by applying the design cycle and your understanding of forces during the design process..

Level 3 – Competition Bridges
Are you ready to compete? Build a bridge to meet regional, national, and even international competition design specifications. Compare your bridge to other competitors.

Level 3 – Experimental Testing
Apply the scientific process to bridge building and testing. Build and break different materials, shapes, and structures. Gather and analyze data to better understand the outcomes of your tests.

Software Engineering – App Inventor 2

Level 1 – Getting Started with Apps
Learn how to use App Inventor to program apps for Android smartphones.

Level 2 – Developing and Testing Apps on a SmartPhone
Build your App Inventor skills with programming challenges you can test live on your Android smartphone.

Level 3 – Create Your Own App
Do you have an idea for the next great smartphone app? This advanced challenge will test your creativity and programming ability…and maybe even make you rich!
Software Engineering – Digital Sandbox

Level 1 – Blink!
How does your alarm know to wake you or the garage door to open? We are surrounded by programmable digital devices. In this Learning Launcher explore Digital Sandbox and learn to program digital lights, buzzers, and other devices.

Level 2 – Digging Deeper into Printed Circuit Boards
Take the next step with Digital Sandbox. Learn to program more complex events and combinations of sensors and devices. This Learning Launcher will prepare you for designing and programming your own digital devices.

Level 3 – Analog Inputs and Digital Devices
Not all devices are digital. Many of the appliances around us combine digital and analog devices. Learn to use code to program analog devices to behave as if they were digital.

Software Engineering – Kodu Game Lab

Level 1 – Computer Game Design
Discover how easy it is to program computer games with Kodu!

Level 2 – Programming Complex Behaviors
Make your computer games even better as you learn new skills and tackle new programming challenges.

Level 3 – Create a Game from Scratch
Are you a Kodu programming pro? Show off your skills by creating a new game entirely from scratch!

Software Engineering – Scratch 2

Level 1 – Programming and Animation
Learn how to program in Scratch as you follow along with a series of helpful video tutorials. Then take what you’ve learned and modify one your tutorial projects to do something new!

Level 2 – Intermediate Programming
Discover more advanced programming techniques in Scratch. Explore the many sample projects available in Scratch and on the Scratch website. Then pick one and reprogram it to something different.
Level 2 – Animated Greeting Cards
Do you think you could be the next great greeting card designer? Use Scratch to create an animated, interactive greeting card. Maybe you can use it to surprise someone special!

Level 3 – Computer Animation
Create your own computer animation. Use Scratch to tell an animated, interactive story.

Level 3 – Computer Models and Simulations
Researchers and scientists often use computer modeling to learn about real systems in the natural world. Can you create a computer model to simulate a real system or process?

Level 3 – Designing Computer Games
Ever dreamed of being a computer game designer? Here’s your chance! Design and program your own interactive computer game as you learn advanced programming techniques in Scratch.

Software Engineering – Stencyl

Level 1 – Introduction to Game Design
Do you enjoy playing computer games? Stencyl is a great way to design and build computer games of your own! Explore the world of game design as you learn to use Stencyl and make your first games.

Level 2 – Computer Game Design – Beyond the Basics
Take your Stencyl skills to the next level! Learn advanced design and programming skills in Stencyl. Then test your knowledge and creativity as you choose a computer game to modify and make it even better!

Level 3 – Developing Original Desktop Games
What are the characteristics of great computer games? How does the design process apply to computer games? Do you have the programming and creative skills to design your very own game with Stencyl? It’s a big challenge, but it can be very rewarding if you’re up for it!

Level 3 – Developing Mobile Game Apps
Did you know that you can publish your Stencyl games to mobile app marketplaces like the Apple App store? Learn what it takes to create a successful mobile game app. Then use your advanced Stencyl skills to design and build your own mobile game. If it’s good enough, maybe you can even publish and sell it!

Level 3 – Teaching Game Design
Are you a Stencyl wizard? Would you like to teach Stencyl and share your passion with others? Learn how to create great lessons. Then teach a class, or launch your own blog or YouTube channel with your favorite Stencyl tips and techniques.
Software Engineering – TouchDevelop

Level 1 – Writing Computer Code
Have you mastered block programming with tools like Scratch, Stencyl and App Inventor? Learn how to begin writing actual code with TouchDevelop!

Level 2 – Intermediate Coding
Take your TouchDevelop skills to the next level with these intermediate level programming challenges.

Level 3 – Creating Your Own App
Learn how to create your own app with TouchDevelop. What kind of app will you create?
Learning Launcher Curriculum
Elementary School Challenges

**Liftoff Challenges**

**SmartLab Orientation**
This is where to begin your SmartLab adventure. Find out why, in the SmartLab, we say, “learning’s different here...”!

**Astronomy: Exploring Space**
Explore the solar system and beyond. Program real telescopes to take pictures of astronomical objects right over the internet!

**Animation-ish: Wiggledoodle and Flipbook**
Make drawings come alive with Wiggledoodle-ish and FlipBook-ish. Learning Wiggledoodle and FlipBook allow you to quickly animate stories and ideas.

**Animation-ish: Advanced-ish**
Master animation with Advanced-ish. Advanced-ish allows animators to add background images and to move their characters around inside the frame. Animate more complex ideas and stories.

**Comic Life: Storytelling**
Have you ever dreamed of having super powers? Create a comic strip with Comic Life where you're the hero!

**Google Maps: Exploring Your World**
Learn how to create custom maps using Google Maps. Then pick a place you find interesting and create your own map to show why it's so special!

**IQ Key: Engineering Design Challenges**
Design, build, test and evaluate moving machines. Compare your own design to the performance of a basic car or crane. Find ways to improve your designs.

**K’nex Simple Machines: Levers**
Learn about the different type of simple machines. Build different types levers with K’nex.

**K’nex Simple Machines: Inclined Planes**
Build models of screws and inclined plane machines to learn more about simple machines.

**K’nex Simple Machines: Wheels and Axles**
Build models of wheel and axle machines. Learn more about how simple machines help us do work.
**Kodu: Programming Games**
Discover the exciting world of computer programming as you learn to create computer games with Kodu!

**Kodu: New World Treasure Hunt**
Learn how to use terrain tools to create game worlds. Then program a treasure hunt game in your new world!

**MaKey MaKey: You’re in Control**
Turn your whole world into a keyboard and mouse with MaKey MaKey.

**PowerPoint: Teaching Preschoolers**
How do young children learn? Create a PowerPoint presentation to teach preschoolers about numbers, shapes, colors or letters.

**Pixie: State Portrait**
Learn how to create pictures with Pixie software. Learn fun facts about your state as you add pictures, drawings, labels and shapes to create a state “portrait”.

**Pixie: 3 R's Comic**
Do you know about the 3 “R’s”: Reduce, Reuse, Recycle? Explore “Recycle City” online. Then use Pixie to create a comic book about a 3 R topic of your choice!

**Pixie: Safety Video**
You can also create animated slide shows in Pixie. Pick a topic and create a public service video to teach important safety tips to kids.

**Scratch: Coding: It's a Snap!**
Learn Scratch in a snap! With just a few clicks of your mouse you will make computer games, animations, and more!

**Scratch: A Code of Your Own**
Create your own computer game or animation with Scratch. Use Scratch Challenge Cards and Starter Programs to learn more about Scratch. Then write your own code!

**Snap Circuits Alternative Energy: Hand Crank**
Learn about alternative energy and turbines. Then build your own circuits with hand crank power!

**Snap Circuits Alternative Energy: Wind Power**
Learn about alternative energy systems and wind power. Then build your own wind power circuits!
Snap Circuits Alternative Energy: Solar Energy
Learn about alternative energy systems and solar energy. Then build your own solar powered circuits!

Snap Circuits Alternative Energy: Liquid Battery
Learn about alternative energy systems and batteries. Then build your own circuits powered by a liquid battery!

Snap Circuits Electricity: Getting Into the Flow
What is electricity? What is a circuit? Explore these topics and more, as you build and test circuits of your own.

Snap Circuits Electricity: Making Connections
Learn more about electricity and circuits. Experiment with different materials to see which conduct electricity. Then explore short circuits – a type of circuit you should never build…except this once!

Snap Circuits Electricity: Series and Parallel Circuits
What are different ways to create circuits with more than one light or power source? Learn about parallel and series circuits as you build and test types of different circuit design.

Snap Circuits Electricity: Sensors and Chips
Explore sensors and integrated circuits. Build musical circuits, burglar alarms and more!

Tinkercad: Introduction to 3D Drawing
Learn to draw in 3D with Tinkercad.

Vernier Science: Digital Data
Learn about the “scientific method” and discover how to collect experimental data with digital sensors and software. Experiment with sensors that measure light, motion, force and temperature.

Vernier Science: Go Temp!
Investigate different ways to measure temperature. Then choose a temperature experiment using the Vernier temperature probe and Logger Lite software.

Vernier Science: Go Motion!
What are sound waves and how can we use them to measure motion? Choose an experiment using the Vernier motion sensor and Logger Lite software to explore this amazing science topic.

Vernier Science: Best Cup Design
Explore how insulators keep hot things hot and cold things cold. Can you design the “best” insulated cup?
WeDo Robotics: Kicking It!
Explore the exciting world of real robots! Learn how to use the WeDo robotic system to build and program your own robots. Then design a robot to kick a ball as far as possible.

WeDo Robotics: Gearing Up!
Discover how gears help us do work. Then use what you’ve learned to build a spinning robot. How long can you make your robot spin?

WeDo Robotics: Hungry Robots!
Explore how gears and pulleys are used in machines. Then build a robot alligator and teach him to do a new trick!

WeDo Robotics: Scratch the Alligator
Combine Lego with Scratch to reprogram your WeDo Hungry Alligator using Scratch blocks. Teach your alligator lots of new behaviors!

WeDo Robotics: Programs and Sensors
Use Scratch and Lego WeDo sensors to control the behavior of Scratch Sprites. Design, build, and program sensors that move the Scratch Sprites through a maze, up and down on a see-saw and more.

Zometool: Spinning Tops
What keeps spinning tops from falling over? Discover the world of Zometool and explore this area of cool science. Then take the spinning top challenge. How long will your top stay up?

Zometool: Exploring 3D
Build and explore the properties of three dimensional shapes. Points, lines, polygons, and now polyhedral or solids come to life with Zometool.
Express Challenges

**Animation-ish: Learning to Animate**
Make your drawings come alive with Animation-ish. Animate your stories or ideas with this easy to learn software.

**Animation-ish: Alphabet Soup**
Use Animation-ish to form words and phrases from a group of letters.

**Animation-ish: Express Yourself**
Express yourself. Learn to animate emotions with Animation-ish.

**Comic Life: Introduction to Comic Life**
Learn to creatively express yourself and your ideas with Comic Life.

**Hour of Code**
Write your first computer programs as you solve 20 game puzzles in the Hour of Code challenge!

**Introduction to Computer Animation with Play Lab**
Complete ten Play Lab puzzles to create your own computer animation. Play Lab, by Code.org, introduces block programming in the context of computer animation.

**Introduction to Block Programming with Flappy**
Complete ten Flappy puzzles to create your own computer game. Flappy, by Code.org, introduces block programming in the context of game design.

**K’nex: Discovering Levers**
Learn about levers as you build and test your own lever machines with K'nex!

**Kodu: First Computer Game**
Discover how easy computer programming can be as you create your first computer game with Kodu!

**Language Arts - My Hero**
What is a hero? Who is your hero? Create a presentation about someone you think is a true hero!

**Picasa - Editing Photos**
Picasa is free, easy-to-use photo editing software. Learn how to use Picasa to organize and edit your pictures, add text, resize, and more!

**Pixie: Exploring Patterns**
Use Pixie to create intricate patterns. Learn about rotation, reflection, and symmetry.
Pixie: Fairy Tale Endings
Using Pixie, students create an alternative ending for a fairy tale.

Science - The Air We Breathe
Learn about the air that surrounds us as you read a NASA poem called "The Air We Breathe."

Science - How the Body Works
Learn about different body parts on the Kids Health.org website. Then pick a body part to explore in more depth and create a presentation to show what you’ve learned!

Science - Mixing Color
Learn about primary colors and how they mix to create new colors. Visit Exploratorium online and play the mix-n-match game to learn about mixing colored light.

Science - Optical Illusions
Sometimes the mind can play tricks with what we see. Visit the Exploratorium online. Explore amazing optical illusions and learn how they work!

Science - Simple Machines with Edheads
Learn about the 6 types of simple machines. Then explore the Edheads website. Can you find and identify all the simple machines?

SmartLab Hero
Explore the hero for whom your computer is named. Create and share a presentation about that hero.

STEM Career Quest
Have you ever considered a career in STEM (science, technology, engineering and mathematics)? The iON Future website has fun games to help you learn about STEM careers and which one might be right for you!

Tessellation Mania
Create exciting patterns called tessellations with your choice of software or construction kits.

Vernier: A Hot Hand
What can make our hands hotter or colder? Design an experiment to explore using Vernier temperature sensors and Logger Lite software.

Vernier: Hot Hands and the Scientific Method
What is the scientific method? Learn how the scientific method helps us do great science experiments. Then practice the scientific method while you use temperature sensors and Logger Lite software to see who has the hottest hand!
Zometool: Bubble Adventure
Take the Bubble Adventure. Explore and observe how bubbles form. Develop ideas about the nature and science of bubbles.

Zometool: Discovering Polygons
Build shapes with Zometool as you learn about polygons.

Zometool: What's Your Angle
Learn about different types of angles as you build shapes with Zometool.

Zometool: Discovering Quadrilaterals
Discover four-sided shapes. Use Zometool to build, measure, and classify quadrilaterals.

Zometool: Discovering Triangles
Explore the many types of triangles. Use Zometool to build, measure, and classify triangles.
**Online Interactive STEM Resources**

**Astronomy**  
Guide to engaging online resources for exploration of astronomy

**Biology**  
Guide to engaging online resources for exploration of biology

**Earth Science**  
Guide to engaging online resources for exploration of earth science

**Engineering and Design**  
Guide to engaging online resources for exploration of engineering and design

**Physical Science**  
Guide to engaging online resources for exploration of physical science

**Power My Learning**  
Interactive online games in math, language arts, science, social studies, art & music, technology, world languages, your life and more!

**Science Projects with Science Buddies**  
Over 1000 ideas for science fair projects, classroom activities and much, much more!
Student and Teacher Chairs should be supplied for the SmartLab by the customer. All seating selections that we recommend are manufactured by Virco. More information can be found at [www.virco.com](http://www.virco.com)

**Ph.D.® Executive Chair**—Facilitator Chair

When it comes to ergonomically contoured comfort, style and support, Richard Holbrook’s Ph.D.® Executive Series delivers unsurpassed seating performance.

**Model Number**

2635A

**Sage™ Mobile Task Chair**—Student Chair

Virco's Sage™ Series combines a large, comfortably sculpted shell with a supportive backrest to provide outstanding furniture solutions for adult education venues and high school settings. This Sage task chair gives you the comfort and convenience of pneumatic seat-height adjustment.

**Model Number**

SGTASK18
Student and Teacher Chairs should be supplied for the SmartLab by the customer. All seating selections that we recommend are manufactured by Virco. More information can be found at www.virco.com

9000 Classic™ Series Mobile Task Chair with Fabric Pads
This Classic Series™ mobile chair features a gas cylinder for easy height adjustment. A color-coordinated padded seat and back provide added comfort.

Model Number
9260PGC

3000 Series Hard Plastic Mobile Task Chair
Virco's model 3860GC mobile chair features the colorfast durability of a Martest 21® hard plastic seat & back, and the easy seat height adjustability of a gas cylinder.

Model Number
3860GC