MakerSpace

2020

STEM

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About Us

Founded in 1979, Allegheny Educational Systems provides innovative, technology-based educational systems and professional services to over 2,000 schools, colleges and universities throughout Pennsylvania, New York and New Jersey.

Through our network of manufacturing partners, we provide the most up-to-date curriculum resources, software, equipment, furniture, professional development and customer support available today, for a wide range of STEM and Career and Technical Education areas.

Celebrating 40 years as your trusted partner in education

Technology-Based Educational Solutions

TABLE OF CONTENTS

What is a MakerSpace / Fab Lab?

MakerSpaces have spread from inner-city Boston to rural India, from South Africa to the North of Norway. Activities in MakerSpaces range from technological empowerment to peer-to-peer project-based technical training to local problem-solving to small-scale high-tech business incubation to grass-roots research. Projects being developed and produced in MakerSpaces include solar and wind-powered turbines, thin-client computers and wireless data networks, analytical instrumentation for agriculture and healthcare, custom housing, and rapid-prototyping of with the use of rapid-prototyping machines.

MakerSpaces share core capabilities, so that people and projects can be shared across them.

This currently includes:

• A computer-controlled lasercutter, for press-fit assembly of 3D structures from 2D parts
• A larger (4'x8') numerically-controlled milling machine, for making furniture- (and house-) sized parts
• A signcutter, to produce printing masks, flexible circuits, and antennas
• A precision (micron resolution) milling machine to make three-dimensional molds and surface-mount circuit boards
• Programming tools for low-cost high-speed embedded processors

These work with components and materials optimized for use in the field, and are controlled with custom software for integrated design, manufacturing, and project management.

http://fab.cba.mit.edu

What can a Maker Space / Fab Lab do?

Here at Allegheny Educational Systems, we help organizations create educational spaces that are functional incubators for ideas, creativity, and learning. These spaces, sometimes referred to as Fab (Fabrication) Labs, Makerspaces, or Techshops, are an excellent investment that will prepare students for future STEM careers while becoming a source of revenue for schools.

PROFIT OPPORTUNITY!

Look for George and our new Profit Opportunity items throughout the following pages, then find out more information and gain inspiration for fundraising projects in our new Profit Center section on Pages 28-31.
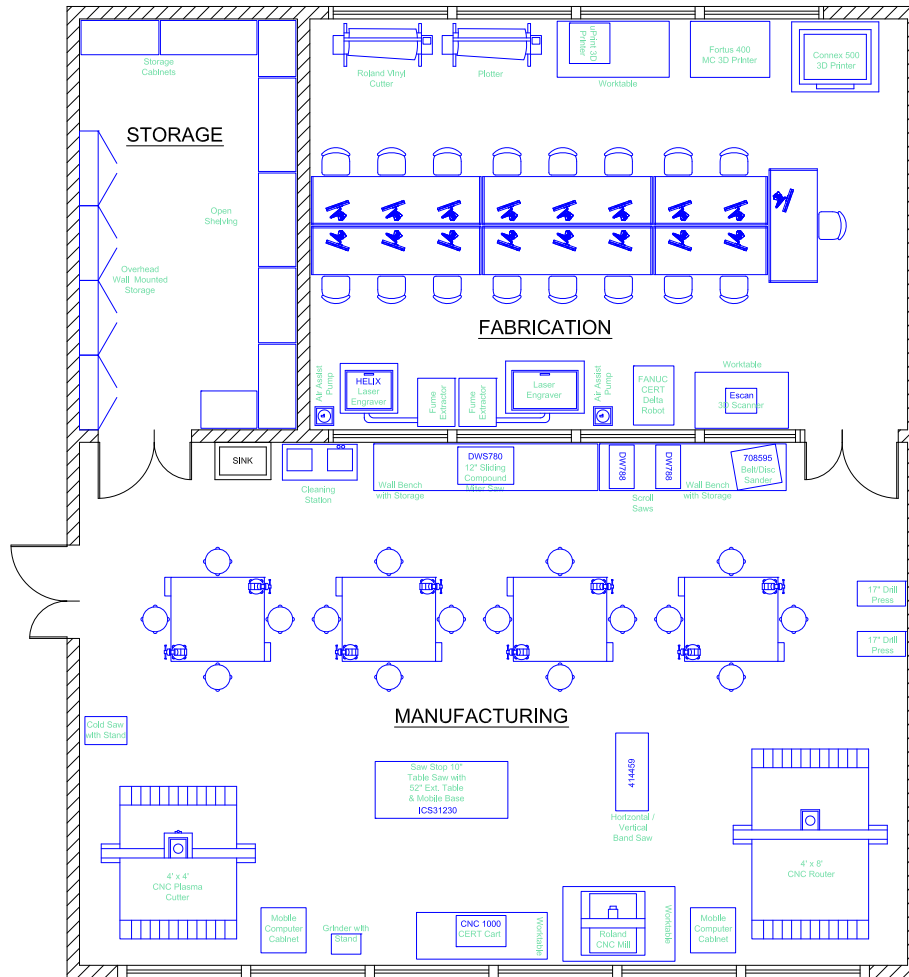
Layout Includes:

FABRICATION				
Roland Vinyl Cutter	Plotter	Stratasys F123 Series 3D Printer	Work Table (x2)	Fortus 450 mc 3D Printer
Connex 500 3D Printer	Air Assist Pump (x2)	Helix Laser Engraver	Fume Extractor (x2)	Epilog Laser Engraver
FANUC Cert Delta Robot	Artec 3D Scanner			

MANUFACTURING				
Sink	Cleaning Station	Wall Bench with Storage (x2)	DWS 780 12" Sliding Compound Miter Saw	DW 788 Scroll Saw (x2)
708595 Belt/Disc Sander	17" Drill Press (x2)	4' x 8' CNC Router	Mobile Computer Cabinet	Herizontal/Vertical Band Saw
Work Table (x2)	CNC Mill	CNC 1000 Cert Cart	Saw Stop 10" Table Saw with 52" Ext. Table & Mobile Base	Grinder with Stand
Mobile Computer Cabinet	4' x 4' CNC Plasma Cutter	Cold Saw with Stand		

STORAGE		
Storage Cabinets	Open Shelves	Overhead Wall Mounted Storage

5

Ultimaker

Fueling innovation-driven education

Ultimaker's products and solutions encourage students to address real-world problems, regardless of the grade level. It's Ultimaker's goal to set the engineers, artists and designers of the future on the right path, and to support their learning along the way. Ultimaker 3D printing solutions are the perfect accompaniment to developing key skills in science, technology, engineering, art and math (STEAM).

Design freedom with industrial-grade materials

Ultimaker's range of materials are formulated to achieve superior results. Optimized Cura profiles offer the best print settings per material and recognize which print core and material you're using. The open filament system lets you experiment with new materials and test the latest market developments.

NEW!

Introducing the Ultimaker S5 Pro Bundle

The Ultimaker S5 Pro Bundle transforms your 3D printing workflow – with automatic material handling, efficient air filtering, and filament humidity control. Ultimaker has integrated the popular Ultimaker S5 printer with the Air Manager and Material Station – boosting productivity, flexibility and the ability to handle complex applications with an extended range of materials.

The Ultimaker S5 Pro Bundle includes:

- **Ultimaker S5** – Trusted by professionals worldwide, the Ultimaker S5 is built to maximize uptime with great print results and a large build volume. The open filament system and Ultimaker Marketplace ensures you have the freedom to choose materials from leading brands. The software simplifies the 3D printing workflow and allows easy integration with leading CAD platforms and managing your printers via network or the cloud.
- **Ultimaker S5 Air Manager** – The closed, inside-out airflow filters up to 95% of all ultrafine particles (UFPs) emitted during 3D printing and forms a safe, physical barrier to the print area.
- **Ultimaker S5 Material Station** – Load up to six material spools inside the humidity-controlled chamber and the Material Station's smart features take care of the rest.

NEW!

MakerBot®

Introducing MakerBot Sketch
The Ideal Classroom Setup

Maximize Student access and Educator success

The MakerBot Sketch is a dual printer system designed to complete your classroom printing faster and boost your students exposure to 3D printing.
Join the largest 3D printing community of educators with access to over 600 lesson plans across various grade levels and subjects and curated lesson plans created by MakerBot Certified Educators.

Setup Includes

• 2 MakerBot Sketch Desktop 3D Printers

• MakerBot Cloud (coming soon)

• 2 Teacher & 10 Student Certification Licenses

• 6 PLA Spools

• 4 Flex build plates, 2 Spatulas and 2 Snips

MakerBot Method
The First Performance 3D Printer

Bridging the gap between Industrial and Desktop 3D printing.

Developed from the ground up by improving upon several patented industrial technologies from Stratasys – technologies that empowered the DNA of an industrial 3D printer from the onset. Combined with MakerBot's industry-leading accessibility and smart workflow features, Method screams past desktop 3D printers while ensuring dimensional accuracy and industrial 3D printing reliability.

Key Features

• Circulating Heated Chamber - Controls the heat of every layer

• Dual Performance Extruders - Maximizes material flow rate

• Precision Dissolving PVA Supports - Fast and easy support removal

• Ultra-Rigid Metal Frame Construction - Offsets flexing for consistent parts

• Smart Sensors & Connectivity - Full control for print & material management

• Dry-Sealed Material Bays - Material is stored in its optimal environment

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Available with a PEPPM
PA State Contract

The F123 Series

Precision printing.
As easy as F123.

The award winning Stratasys F123 Series is easy to operate and maintain, whatever your level of experience. The F123 series combines powerful FDM technology with design-to-print GrabCAD software for the most versatile and intelligent solution available. Produce highly accurate, reliable prototypes, student projects, production parts and more. Do it all without the need for dedicated expert staffing. And share it across classrooms, campuses and a variety of your academic programs.

NEW!

TPU 92A elastomeric material available for F123 Series!

TPU 92A is standard on F370, and as an optional upgrade on F170 and F270.

F123 Series features:

• **Minimal Setup** - simply plug and print. Give your entire workgroup access to professional industrial grade 3D printing.

• **Non-stop printing** - spend less time troubleshooting and more time getting results.

• **Fast and easy material swaps** - maximize your team's productivity.

• **Smart software** - GrabCAD Print™ software simplifies the entire 3D printing process with an intuitive CAD-like application anyone can use.

• **Print up to five different materials** - The F120 supports ABS and ASA; the F170 and F270 models support PLA, ABS-M30, ASA and TPU 92A* materials; the F370 supports PLA, ABS-M30, ASA, PC-ABS and TPU 92A* materials. (PLA uses breakaway support only.)

• A**ll-new fast-draft mode** - prints twice as fast as standard build mode while consuming just a third of the material on average.

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FORTUS™
3D PRODUCTION SYSTEMS

Fortus 3D Production Systems produce accurate, durable prototypes and production-grade parts using high-performance thermoplastics. Each of our digital manufacturing solutions offers:

Sophisticated software and technology • Production-grade materials
Large build capacity • Fast, accurate and repeatable parts

Only Fortus FDM (Fused Deposition Modeling) Technology combines tough, production-grade thermoplastic materials with state-of-the-art hardware and software. Compared to other additive manufacturing systems, Fortus offers unprecedented versatility and capabilities.

Fortus 3D Production Systems use powerful Insight Software to turn CAD files into accurate, stable and durable prototypes, workholding tools or end-use parts. This advanced software automatically generates support structures and build paths. With Fortus digital manufacturing, you can create parts that are up to 300% stronger than those made with other 3D printers, even when using the same materials.

Product Specifications	Fortus 380mc	Fortus 450mc	Fortus 900mc
Build Envelope	14 x 12 x 12 in (355 x 305 x 305 mm)	16 x 14 x 16 in (406 x 355 x 406 mm)	36 x 24 x 36 in (914 x 610 x 914 mm) Platen supports two build zones for either a small or large build sheet
Material Options	ABS-M30™ ABS-M30i™ ABS-ESD7™ ASA PC-ISO™ PC PC-ABS FDM® Nylon 12™	ABS-M30™ ABS-M30i™ ABS-ESD7™ ASA PC-ISO™ PC PC-ABS FDM Nylon 12 FDM Nylon 12CF ST-130 ULTEM® 9085 resin ULTEM 1010 resin	ABS-M30 ABS-M30i™ ABS-ESD7™ ASA PC-ISO™ PC PC-ABS PPSF FDM Nylon 12 FDM Nylon 6 ST-130 ULTEM 9085 resin ULTEM 1010 resin
System Size and Weight	50 x 35.5 x 76.5 in (1270 x 901.7 x 1943.1 mm) 1,325 lbs (601 kg)	50 x 35.5 x 76.5 in (1270 x 901.7 x 1943.1 mm) 1,325 lbs (601kg)	109.1 x 66.3 x 79.8 in (2772 x 1683 x 2027 mm) 6,325 lbs. (2,869 kg)
Achievable Accuracy	Parts are produced within an accuracy of: ± .005 in. (± .127mm) or ± .005 in/in (± .005 mm/mm), whichever is greater.*	Parts are produced within an accuracy of: ± .005 in. (± .127 mm) or ± .0015 in./in. (± .0015 mm/mm), whichever is greater.*	Parts are produced within an accuracy of ± .005 in. (± .127 mm) or ± .005 in/in (± .005 mm/mm), whichever is greater.*
Software	All Fortus systems include Insight™ and Control Center™ job processing and management software. Compatible with GrabCAD Print for use with job reports, scheduling and remote monitoring.		

* Accuracy is geometry dependent. Achievable accuracy specification derived from statistical data at 95% dimensional yield.

9

Objet Connex3
Multi-Material Color 3D Printers

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With the ability to 3D print the full range of Digital Materials including color, the Objet Connex3 3D Production Systems create precise production parts with unprecedented versatility.

Choose from a wide range of material properties, from rubber to rigid, transparent to opaque, neutral to vibrant, and standard to bio-compatible.

3D print custom jigs, assembly fixtures and gauges, and tooling with ultra-fine accuracy and smooth surfaces quickly and easily - no assembly required. Connex3 delivers triple-jetting effciency with the power to serve diverse needs from one system.

Product Specifications	Objet260 Connex3	Objet350 Connex3	Objet500 Connex3
Max. Build Size	10 x 9.9 x 7.9 in (255 x 252 x 200 mm)	13.4 x 13.4 x 7.9 in (342 x 342 x 200 mm)	19.3 x 15.4 x 7.9 in (490 x 390 x 200 mm)
System Size and Weight	34.2 x 47.2 x 29 in (870 x 1200 x 735 mm) 581 lbs (264 kg)	55.1 x 49.6 x 43.4 in (1400 x 1260 x 1100 mm) 948 lbs (430 kg)	55.1 x 49.6 x 43.4 in (1400 x 1260 x 1100 mm) 948 lbs (430 kg)
Layer Thickness	Horizontal build layers as fine as 16 microns (.0006 in.)		
Achievable Accuracy	Up to 200 microns for full model size (for rigid materials only, depending on geometry, build parameters and model orientation)		
Model Material Options	• Rigid Opaque: VeroWhitePlus, Vero PureWhite, VeroBlackPlus, VeroGray and VeroBlue; VeroCyan™, VeroMagenta™ and VeroYellow™ • Rubber-like: Agilus30, TangoPlus, TangoBlackPlus, TangoBlack, TangoGray • Transparent: VeroClear and RGD720 • Simulated Polypropylene: Rigur and Durus • High Temperature • Biocompatible		
Digital Material Options	• Vibrant blended colors in Rigid Opaque • Translucent colored tints • Rubber-like materials in a variety of Shore A values • Digital ABS Plus™ for durability, including blends with rubber • Simulated polypropylene materials with improved heat resistance		
Software	Objet Studio		

10

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Stratasys J750
Digital Anatomy Printers

Unrivaled Accuracy, Realism and Functionality

The J750™ Digital Anatomy™ printer truly brings the look and feel of medical models to life with unrivaled accuracy, realism and functionality. Whether used for surgeon training or to perform testing during device development, its models provide unmatched clinical versatility mimicking both the appearance and response of human tissue.

Create models with an incredible array of microstructures which not only look, but now feel and function like actual human tissue for true haptic feedback. All of this in a single print operation with minimal to no finishing steps like painting, sanding or assembly.

New digital anatomy materials GelMatrix™, TissueMatrix™ and BoneMatrix™ are exclusive to the J750 Digital Anatomy printer and can be combined to form hundreds of new, unique digital materials. Integrated into proprietary validated applications, they mimic human cardiac and vascular anatomy from actual patient scans. Select from a range of tissue properties to incorporate microstructures into the anatomy. Construct heart models with functioning cords, annulus, valves and calcification. Vary compliance in vascular models to replicate both healthy and diseased vessels.

Stratasys J8 Series 3D Printers

Designed for designers.

Design and creativity have no limits. Now, with the Stratasys J8 Series, the same is true for prototypes. The Stratasys J826™, J835™ and J850™ 3D printers deliver unrivaled aesthetic results with full-color capability including texture mapping and color gradients. This lets you create prototypes that look and feel like real products, and accurately show design intent in color, material and finish.

These printers are PANTONE Validated™ making the PANTONE MATCHING SYSTEM (PMS) colors available in a 3D printing solution. With expansive color combinations to choose from and multimaterial capability, the Stratasys J8 Series printers let you create the most realistic models and prototypes in the shortest time possible, without the need for painting or assembly.

11

formlabs

Formlabs SLA 3D Printers
Engineered for precision.
Designed for reliability.

Formlabs SLA 3D Printers are desktop stereolithography (SLA) 3D printers ideal for applications such as product design, manufacturing, dental, healthcare, education, entertainment, jewelry, and more. Formlabs printers have been engineered for precision and designed for reliability - offering industrial output at a desktop price. They are extremely versatile with a wide array of photopolymer resins for a full variety of applications and possibilities.

Form 3

Flawless Prints, Every Time

The Form 3 LFS (Low Force Stereolithography) 3D printing balances detail and speed, while the optical system maintains a precise, dense laser spot to ensure accurate, repeatable prints. Easy clean-up and smoother parts with tear-away light-touch supports.

Build Volume: 5.7 x 5.7 x 7.3 in
Laser Power: 1x 250 mW laser

Form 3L

Bring Large Format 3D Printing In-House

Blaze through large parts with two custom-designed Light Processing Units (LPUs). Two lasers simultaneously build large, dense parts fast. Use two of the same resin cartridges that are used by Form 2 and 3 to go longer without running out of resin. Switch seamlessly between 20+ general purpose and specialty resins with the cross-compatible cartridge system.

Build Volume: 13.2 x 7.9 x 11.8 in
Laser Power: 2x 250 mW laser

Small Details, Big Results

Eliminate the turnaround time of outsourcing of the manual work of assembly for large scale 3D prints. The Form 3L offers a massive build volume at an unprecedented value.
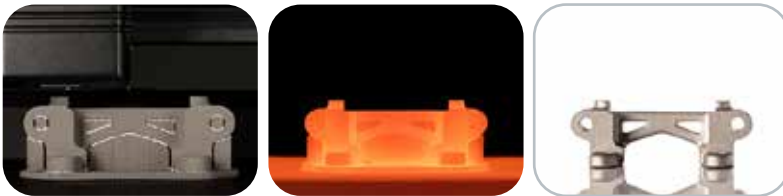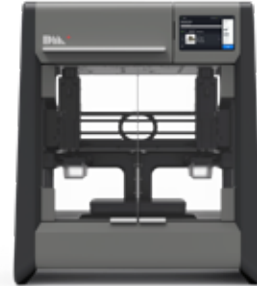
Desktop Metal™
Platinum Partner

Studio System+

The Desktop Metal DM Studio System+ is the world's first affordable, office-friendly metal 3D printing system. Safe and simple to use, the DM Studio System+ was designed to bring metal 3D printing to the shop floor by allowing engineering and design teams to make metal parts faster, without the need for special facilities or dedicated operators.

The Desktop Metal difference

The DM Studio System+ printer is similar to the safest and most widely used 3D printing process, Fused Deposition Modeling (FDM). Unlike laser-based systems, the DM Studio System+ printer extrudes bound metal rods - similar to how plastic FDM printers work. This eliminates safety and facility requirements associated with traditional metal 3D printing, while enabling new features like closed-cell infill for lightweight strength.

Print

The Studio System+ printer extrudes bound metal rods, shaping the "green part" through Bound Metal Deposition™. This process is similar to the safest and most widely-used 3D printing process—Fused Deposition Modeling (FDM) and eliminates safety concerns associated with metal 3D printing.

Debind

The green part is transferred to the Studio System+ debinder where it is immersed in Desktop Metal's proprietary debinding fluid. The primary binding material is removed in order to prepare the part for sintering. The debinder is safe for use in an office environment and does not require any external ventilation.

Sinter

The Studio System+ furnace heats parts to just below their melting point, fusing metal particles to form fully dense parts without residual stresses introduced in laser-based processes. Fully automated and sized to fit through a doorway, the furnace deliveres industrial-strength sintering in an office-friendly package.

Desktop Metal™
Platinum Partner

Shop System

The Shop SystemTM is the world's first metal binder jetting system designed specifically for machine shops—enabling shops to easily produce parts with exceptional surface finish and resolution at scale.

With production rates up to 70kg of metal parts per day, the Shop SystemTM produces parts up to 10x faster than laser powder bed fusion. Employing a ~1pL droplet size and automated drop multiplexing up to 6pL, the Shop System achieves superior surface finish, bleed control and rich feature detail at high speed.

Print

The Studio System+ printer extrudes bound metal rods, shaping the "green part" through Bound Metal Deposition™. This process is similar to the safest and most widely-used 3D printing process—Fused Deposition Modeling (FDM) and eliminates safety concerns associated with metal 3D printing.

Debind

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Fiber System

Fiber™ is the only composite 3D printer to utilize Micro Automated Fiber Placement (µAFP) to produce continuous fiber-reinforced parts stonger than steel and lighter than aluminum.

Choose from a broad range of continuous fiber composites, including those with PEEK and PEKK matrices, to enable applications from consumer electronics to automotive.

With affordable entry prices, intuitive software, and an easy setup process, engineers can begin printing industrial-grade composites from the comfort of their desktop.

Applications include manufacturing jigs and fixtures, durable parts suited for extreme environments, economically replacing aluminum or steel components, and electronics manufacturing and end use parts.

CREAFORM

ACADEMIA 3D Measurement Solutions

Discover Creaform ACADEMIA, a brand-new solution suite for teachers looking to educate and inspire using metrology. Addressing the inherent realities of the academic world, it fosters experienced-based learning and development using tools widely used in Industry 4.0, allowing you to enhance your curricula and better prepare students for their careers ahead.

The solution suite includes the Creaform professional-grade ACADEMIA 3D scanner, free application software, and complimentary add-ons tailored to get you started with industrial 3D measurement technologies. Achieve the highest level of quality teaching possible— all while taking advantage of the latest innovations on the market and not breaking the bank with Creaform ACADEMIA.

Go!SCAN3D Scanner

The Go!SCAN 3DTM is Creaforms fastest, user-friendly handheld 3D scanner. A powerful tool during the product development phase, the Go!SCAN 3D quickly measures any complex surface making it possible to "get it right" the first time.

With its seamless integration to your 3D modelling software and your product life cycle management workflow, it will greatly improve product development, foster innovation and shorten time to market. The level of detail on the Go!SCAN 3D is simply astounding. Featuring full support of color, it provides spectacular results. Most objects can be scanned in mere minutes and quickly integrated into your preferred reverse engineering, computed aided design or 3D printing software.
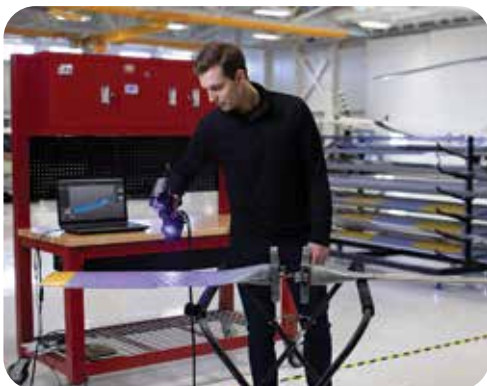
Creaform HandySCAN 3D Scanner

The HandySCAN 3D™ line-up is a proven and trusted patented metrology-grade 3D scanner. Optimized to meet the needs of design, manufacturing and metrology professionals, it provides the most effective and reliable way to acquire accurate (ACCURACY OF 0.025 mm (0.0009 in)3D measurements of physical objects anywhere.

Since it performs regardless of environment changes or part movement, it represents the ideal tool for quality assurance and product development applications.

15

Epilog Laser Engravers/Cutters

Laser Engravers/Cutters are the ideal tool for engraving and cutting a wide variety of materials. Use a laser to create a wide variety of products for many different educational applications.

Epilog Zing 16: Entry-level model combining affordability with a convenient small size and 16" x 12" engraving and cutting area. Power choices of 30 or 40 watts.

Epilog Zing 24: Move up to the Epilog Zing 24 for a larger 24" x 12" work area and Radiance High Definition Optics. Power choices up to 60 watts to engrave faster and cut through thicker materials.

Epilog Mini 18 and 24: Epilog Mini 18 is an entry-level model providing a 18" x 12" work area. Though it's more compact, the engraving and cutting results is the same high quality as the large format lasers. Move up to the Epilog Mini 24 for a larger 24" x 12" work area that holds most standard engraving stock materials.

All Mini Systems Feature:
- High speed servo motors and linear encoder drivers
- Automatic focusing to the perfect focal distance from the lens
- Engrave at 1200 dots per inch quality
- Easy-Access Drop-Down Door for loading jigs from the front of the machine

Available with a PEPPM PA State Contract

Epilog Helix 24: For engravers looking to work with larger pieces or products, the Epilog Helix is an ideal choice. The Helix's generous 24" x 18" x 8.5" (610 x 457 x 216 mm) work area will allow you to engrave multiple pieces as well as process thicker materials.

- Radiance™ High-Resolution Optics for a smaller laser spot size across the table
- Easy-Access Drop-Down Door for loading from the front of the machine
- Easy-Access Storage Stand to easily move your laser throughout your office, workshop or school
- 30, 40, 50, 60 or 75 watt CO_2 laser

CorelDRAW GRAPHICS SUITE 2019

Fusion Pro: Introducing the fastest laser engraving systems on the market. Performance and image quality are at the heart of the Fusion Pro line of laser systems. Included IRIS™ Camera Positioning makes positioning your artwork easier than ever!

- **Fusion Pro 32** and **Fusion Pro 48** available
- **CO2**: 50, 60, 80 or 120 watt
- **Fiber**: 30 or 50 watt
- **Dual**: Configure your laser with both CO2 and Fiber sources
- Fusion Pro 32 has a 32" x 20" work area and IRIS 2-camera system
- Fusion Pro 48 has a 48" x 36" work area and IRIS 3-camera system

FiberMark S2: Epilog's FiberMark S2 is your new low-cost solution for etching and marking all types of bare metals and plastics. Print to the laser directly from any graphic software program for easy job setup, and etch an entire table full of parts at one time.

- Directly engrave on most materials
- Mark engineered plastics with your logo
- Etch barcodes, serial numbers, and images
- 24" x 12" engraving area
- 30 watts
- 5" maximum material thickness

Techno CNC Systems

Techno CNC Routers & Plasmas

Techno CNC Systems family of CNC routers represents 30 years of CNC research and development. Since 1986, Techno CNC Systems has been solving the toughest manufacturing challenges by helping sign makers, woodworkers, general fabricators and more with their production needs. Techno CNC equipment is designed to route, carve, drill, and engrave in wood, plastic, foam, aluminum and more for a wide range of applications.

HD II Tabletop CNC Router
- 20" x 34" Process area
- Precision ball screws on all three axes
- 2 HP HSD high frequency collet spindle
- Brushless micro stepper motors and controls
- Vacuum T-slot table for easy part fixturing
- Automatic tool calibration pad
- Linear rails and bearings

PEPPM®
Available with a PEPPM
PA State Contract

BT1212 Benchtop CNC Router
- 11.8" x 11.8" x 4.0" Process area
- Precision ball screws on all three axes
- 800 Watt (1 HP) Kress variable speed spindle (8,000-24,000 RPM)
- Brushless micro stepper motors and controls
- Aluminum T-slot table
- Compatible with G code and M code
- Heavy duty construction

Atlas Series CNC Router
- 4' x 4', 4' x 8' and 5' x 10' stock sizes
- 4 HP HSD high-frequency collet spindle
- Maintenance free brushless stepper drive motors
- Vacuum table with main control gate valve
- Easy to use hand-held controller
- Open architecture works with all industry standard CAD/CAM software

Techno CNC Systems
Educational

Titan Series CNC Router

- 12 HP HSD high frequency automatic tool changer spindle
- Maintenance free brushless motors and drives
- Vacuum t-slot table with main control gate valve
- Pneumatic material pop-up pins
- Automatic tool length calibration via closed loop touch pad
- Automatic z-zero via secondary touch pad
- Easy-to-use hand held controller (optional PC based system available)
- Open architecture works with all industry standard CAD/CAM software

HDII CNC Plasma Cutter

- 4' x 4', 4' x 8', and 5' x 10' sizes
- PC based WinCNC Controller
- Brushless micro stepper motors and drives (servo optional)
- Precision helical Rack-n-Pinion on X and Y axes with ballscrew on the Z axis
- Unique design, easy to learn and operate
- Water table / Steel slats / Down drafts
- All steel construction for rigid platform
- Cuts up to 1.5" thick steel capacity
- High-speed cutting up to 800 IPM
- Magnetic Torch break away
- Multiple torch options available

Forest Scientific Corporation CNC Routers

Forest Scientific Corporation manufactures high-quality CNC Routers, Mills & Lathes, and Plasma Cutters that are the perfect choice for your school. Made right here in the USA and made to last, each machine has precision THK linear ways and bearings to ensure stability; welded steel frames and structural aluminum to ensure alignment over time; and powerful stepper & servo motors to increase reliability and high resolution on each pass.

They are designed to be updated inexpensively as technology changes and all machines use industry standard Fanuc-style G&M codes such as Mastercam, Surfcam, Edgecam, Vcarve, Fusion 360, SolidWorksCam and more.

To ensure that you have successful results, Forest Scientific offers on-site training as well as Project Based Learning curriculum and tutorials with written and video modalities for teachers and students.

Invest with confidence knowing that you have purchased a Forest Scientific CNC system that is of high quality, well supported, and ensures your success in teaching marketable skills.
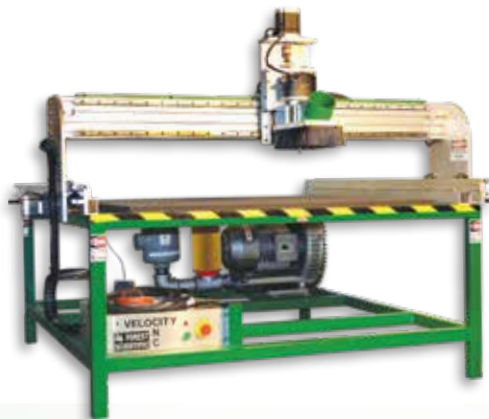
Available products include:

- **FabBot Series Routers and Plasma Cutters** - *Created for home shops and schools on a very limited budget*
- **Convert-A-Table Plasma Cutter/Routers** - *Easily changes from a CNC Router to a CNC Plasma Cutter*
- **Maker-Fab Series Routers and Plasma Cutters** - *Cost effective, heavy duty machines*
- **HS Series Router and Plasma Cutters** - *Standard model for education and small shop*
- **The Michaelangelo 3D Modeler** - *Innovative CNC Router designed for classroom use*
- **The LuthierMax Series Guitar Making CNC Routers** - *Designed in collaboration with engineers from Fender Guitars and www.guitarbuilding.org*
- **The Mitey Series** - *Machines for educational training, prototyping, design, and production worldwide*

FOREST SCIENTIFIC CORPORATION
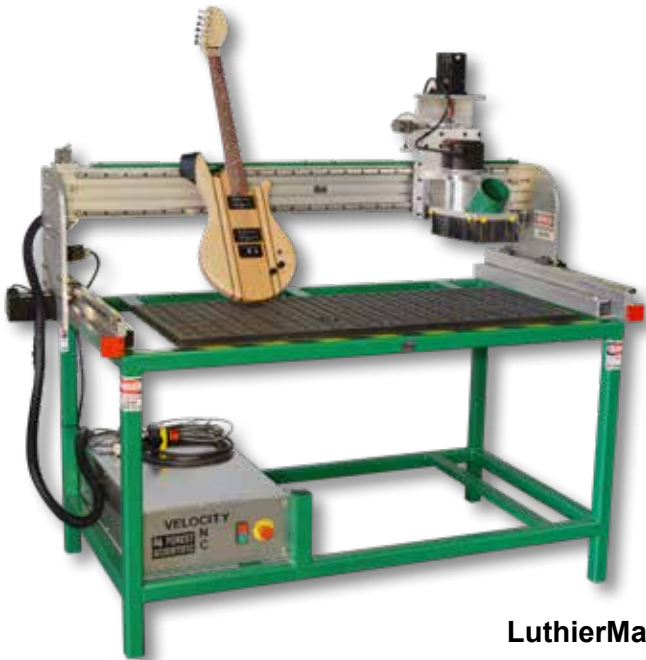
Forest Scientific LuthierMax Series

The LuthierMax Series of CNC routers was designed for guitar making in collaboration with engineers from Fender® Guitars (who are using this model) and www.guitarbuilding.org to make this machine student friendly and robust. Fixtures built into the table make it easy to machine your own guitar necks and bodies for both standard size and longer base guitars. Travels X49" Y20" Z8.5"

LuthierMax CNC Router Models:

LuthierMax CNC Router 110V,20A
LuthierMax CNC Router Hy Servo
LuthierMax PRO with ATC CNC Router

LuthierMax CNC Options:

Vacuum Table System
Guitar Making Class Start-up Kit
Guitar Making CNC Bit Kit

Forest Scientific CNC Plasmas

The Forest Scientific CNC Plasmas are cost effective heavy duty machines made of structural aluminum or welded steel. Each of the CNC Plasma cutters include a Torch Break Away system, Automatic Torch Height, integrated water table, CAD/CAM software, Hypertherm 45 Plasma system, and control computer with arm for a Turn-Key package. Just plug the system into your electric and you're ready to go.

All plasma tables have replaceable leafs that you can easily make by shearing steel so you won't need to buy expensive table parts and pay to ship them across the country.
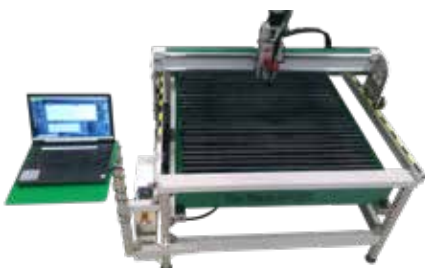
Titan Series Plasma

Maker-Fab Series Plasma

HS Series Plasma

SOLIDWORKS

SolidWorks offers the best suite of tools for engineering design, documentation, simulation, and sustainable design in one easy-to-learn software package.

Certification and experience with SolidWorks is an in demand skill. Making 3D designs that can be exported to a 3D printer, gives students a glimpse into taking a product from design to testing. In today's competitive job market, CAD professionals need every advantage they can get, and the SolidWorks Certification Program gives your students a proven edge. Solidworks offers a host of resources for education and a Solidworks Certification course that can help get your students into careers. Solidworks offers tutorials and specialized curriculum for educators (Including: robotics, STEM, medical, machinery, F1, Formula SAE, and a host of other topics!).

Mastercam

Mastercam delivers CAD/CAM software tools for all types of programming, from the most basic to the extremely complex. 2-axis machining, multiaxis milling and turning, wire EDM, router applications, free-form artistic modeling and cutting, 3D design, drafting, surface and solid modeling – whatever your machining needs, there is a Mastercam product for your budget and application.

There are more curricula available for Mastercam than any other CAM system. The Educational Division continually provides exceptional teacher training and educator support. Years of experience in the educational market has helped Mastercam to understand the specific needs of instructors, schools, and students. Since Mastercam is the most widely used CAM software in the world, the products are industry proven. Mastercam has been designed for any level of skill or machining. From middle school exploratory classes to a university research lab making complex molds, Mastercam provides the tools to fit the application.
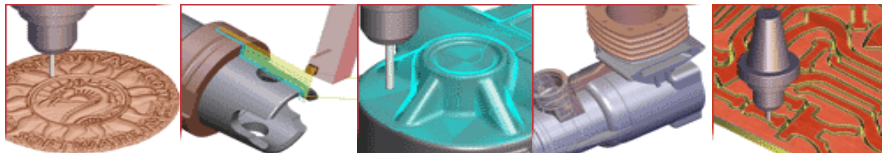
Vectric software is designed to make cutting parts on a CNC an enjoyable and productive experience, the combination of power and simplicity lets you efficiently generate or manage your design, then quickly create precise toolpaths to drive your CNC.

Products Include:

- **Cut2D** - Vector drawing & editing tools for CNC routing, milling & engraving
- **VCarve** - Complete software solution for cutting on a CNC Router
- **Aspire** - Draw & build 3D component models for machining
- **Cut3D** - Converts 3D models into CNC toolpaths
- **PhotoVCarve** - Converts photos and images into high quality toolpaths for CNC and engraving machines

Roland®

Roland Desktop 3D Milling Machines

Widely used in the industry and recognized for ease-of-use and versatility, Roland MDX milling machines offer students a fast learning curve to get them producing finished prototypes that require little to no finishing.

Modela MDX-540 CNC Milling Machine

Enhanced production on a 19.6"x15.7"x6"(z) work area at an affordable price. MDX-540 3D milling machines are some of the fastest, most accurate and accessible devices on the market, ideal for producing everything from functional and snap-fit parts and prototypes to light metal molds and custom jewelry. Available in standard and enhanced models with optional 4th axis and automatic tool changer, MDX-540 benchtop milling machines offer advanced CNC milling at an affordable price.
Project Based Learning available.

Modela MDX-50 CNC Milling Machine

Precise, automated milling combined with unmatched ease-of-use on a 15.8"x12"x5.3(z) work area. An ideal solution for short-runs and proto-types, the MDX-50 reduces operation time and simplifies production so users of all abilities can mill functional parts with incredible quality on a wide range of materials. *Project Based Learning available.*

Modela MDX-40A CNC Milling Machine

An intuitive and easy-to-use rapid prototyping device on a convenient 12"x12"x4"(z) work area. The small footprint fits into any Fab Lab, workshop, office or classroom and allows both novice and advanced users to create precision 3D models. Additional features include a rotary axis for unattended milling and a contact-scanning unit for reverse engineering projects.
Project Based Learning available.

monoFab SRM-20 CNC Milling Machine

As a small milling machine, the SRM-20 offers compact size, 8"x6"x2.38"(z), and powerful functionality at an affordable price. Production of realistic parts and prototypes is made simple and convenient with a device that fits into any office, home, or classroom environment. For users looking for advanced milling capabilities without the need for expert operating skills, the SRM-20 is the easiest and most precise CNC mill in its class.
Project Based Learning available.

Roland ®

NEW!

Metaza MPX-95
Photo Impact Printer

Photo impact printer technology makes gift personalization and direct part marking of tools and medical instruments a clean, quiet and hassle-free experience. Affordable and effortlessly easy-to-operate, the MPX series of devices from Roland DG provide stunning results on metal materials that include titanium, platinum, silver, copper and gold. They are the perfect solution for gift personalization, industrial part marking, and ensuring UDI compliant medical instruments.

VersaSTUDIO BT-12
Direct-to-Garment Printer

Print directly onto cotton t-shirts, apparel, tote bags and other products in minutes from the comfort of your desktop.
The affordable VersaStudio BT-12 printer allows you to get into the profitable world of custom apparel immediately, with a device that's as easy-to-use as an office printer and offers stunning results.

Highlights

- With a simple 3-step process, you can automatically print your design and cure the ink in one smooth workflow.

- Brillant inks and images provide sharp and color-brilliant results

- A clean and fully-enclosed process - safely print onto garments without coming into contact with chemicals, steam or heat.

- Includes super-easy design software for users of all abilities

Roland®

Roland Printers/Cutters

Roland printers/cutters are real world devices, providing real world graphic applications for your students. These devices can print and cut an incredible variety of jobs on a full spectrum of media.

VersaStudio BN-20 Desktop Printer/Cutter

One compact device for apparel, packaging, posters and more - features 8-channel printheads for outstanding photographic and vector output. *Project Based Learning curriculum available.*

TrueVIS SG2 Printer/Cutters

Whether you're just starting out or wanting to expand production, TrueVIS SG2 printer/cutters offer high-performance printer/cutter technology with unbeatable new color quality and cutting features at a very reasonable price. Flexfire print heads, increased print/cut accuracy, and automatic pinch rollers. 3M MCS and Avery Dennison ICS certified. Available in 64", 54" and 30" models.

TrueVIS VG2 Series
Large-Format Printer/Cutters

Available in 64" and 54" models. TR2 Ink color modes offer detailed color reproduction and expanded gamut. 3M MCS and Avery Dennison ICS certified for added print confidence. Four FlexFire™ printheads, increased print/cut accuracy, and automatic pinch rollers. Efficient and productive TrueVIS VG2 printers enable users to produce dynamic decals, brilliant banners, striking signs, and vibrant vehicle graphics on demand.

SOLJET Pro 4 XR-640
Large-Format Printer/Cutter

With its two inline, mirrored print heads, integrated printing and contour-cutting technology, and GREENGUARD Gold Certified Eco-Sol MAX 2 inks in 7 or 8-color configurations, the XR-640 large format printer/cutter with metallic and white ink delivers maximum versatility and productivity with unsurpassed image quality. Produce everything from banners, vehicle wraps and fine art to print/cut labels, decals, point-of-purchase displays and so much more.

25

PROFIT OPPORTUNITY!

Roland®

Roland Flatbed Printers

Introducing the amazing LEF benchtop UV flatbed printers. Print directly on dimensional objects such as awards, giftware, packaging and products with spectacular results. Instant drying and flexible ECO-UV inks deliver high color density and a wide gamut for exceptional images print after print. Specialty inks, including white and clear, allow printing on clear, reflective and colored surfaces and finish graphics with dazzling embossing and varnishing effects. *Project Based Learning curriculum available.*

Roland Vinyl Cutters

Offering plug-and-play ease, technological sophistication, compact convenience, and the reliability you expect from Roland, these high performance vinyl cutters accelerate your ability to create professional signs, displays, vehicle graphics, decorated apparel and window tinting. Each comes with all the hardware and software you need to get started immediately — right out of the box.

Models Available:

- **CAMM-1 GR-640, GR-540, GR-420 Large Format Cutters**
  Available in 42", 54" and 64" model sizes, GR cutters are powerful, easy-to-operate devices. Packed with advanced and versatile new features, they are designed for a whole new level of sign, apparel, vehicle graphics and packaging production.

- **GS-24 Desktop Cutter**
  Desktop cutter boasts 350g of downforce, making the cutting of magnetic materials, corrugated cardboard and other thick substrates child's play. 22.9" maximum cutting area. *Project Based Learning curriculum available.*

- **STIKA Desktop Design Cutters**
  The STIKA makes it easy to create every thing from POP displays and iron-on graphics for T-shirts to vehicle graphics. Available with 8", 12", and 15" maximum cutting areas.

Roland®

Roland Project Based Learning

The Ready-to-Teach and Easy-to-Learn Solution

Project Based Learning (PBL)

Roland's step-by-step tutorials work seamlessly with Roland software and machines, making it easy for educators to teach and for students to learn design and engineering skills.

A Simply Smart Solution	Made for Teachers	Made for Students	Foundation For Success
Fun, simple-to-understand, hands-on engineering, design and art projects promote intuitive learning — teaching digital fabrication to students of all skills and abilities.	PBL tutorials reduce time-consuming prep and planning. They help teachers develop lessons that support curriculums and solve issues associated with teaching digital fabrication to large classroom sizes.	PBL tutorials allow students to work at their own pace and without strict supervision — offering student's fast results and an immediate sense of achievement.	Each web-based PBL package contains a series of device specific tutorials to quickly familiarize students with hardware and software — key safety and machine maintenance topics are also covered.

27

PROFIT OPPORTUNITY
You have the equipment – now turn a profit!

After you and your students feel comfortable using your digital fabrication equipment, it's time to take it to the next level! Get the ideas flowing and start earning money for your school using your educational space!

T-Shirts

Golf Balls

Phone Cases

Drinkware and More!

PROFIT OPPORTUNITY
Shirts for the Big Game

Create shirts for your school's upcoming football or basketball game against your rival team. Design and print customized shirts for the Spanish Club's annual banquet. Make bags featuring the school logo for the Band's fundraiser!

Your imagination is the limit for all that you can do and earn with your Roland DGA Printers and Vinyl Cutters!

Roland Vinyl Cutters

Ideal for: Simple, one or two color graphics

Find it! Page 26

Additional Equipment: Heat Press Vinyl, Heat Press, Teflon Sheets, Transfer Tape

Tip! Our Vinyl Starter Packs come with every thing you need to get started!

Roland Print/Cutters

Ideal for: Full color graphics, light and dark colored fabrics

Find it! Page 25

Additional Equipment: Roland Heat Soft or Satin Poly Heat Transfer Vinyl, Medium Tack Polyester Transfer Mask, Heat Press, Teflon Sheets

Roland Direct-to-Garment Printers

Ideal for: Full color graphics, light colored fabrics

Find it! Page 24

Additional Equipment: None! The Roland BT-12 is a complete direct-to-garment printing system!

PROFIT OPPORTUNITY

Customizable Phone Cases, Golf Balls and Awards

Custom, personalized phone cases, golf balls and awards will be a huge hit at your school and in your community! Sell cases with your school's mascot at athletic events or take design requests as custom orders. Local businesses will be coming back regularly for branded golf balls and awards for the next golf outing.

Roland DGA LEF UV Printers are designed to print onto a virtually limitless choice of three-dimensional media!

Custom Digital Cases

Ideal for: Phone and small electronic device cases

Find it! Page 26

Additional Equipment: BOFA Filter, Device template

Tip! Check with us about available device templates!

Branded Golf Balls

Ideal for: School and local businesses promotional events

Find it! Page 26

Additional Equipment: BOFA Filter, Golf Ball Template

Tip! Check with us about available device templates!

Awards and Plaques

Ideal for: School Clubs and Associations

Find it! Page 26

Additional Equipment: BOFA Filter, Award template

PROFIT OPPORTUNITY
Giftware for Your Next Fundraiser

Engrave water bottles and keytags for your hometown team and embellish luxe fleece jackets with your school mascot. Produce themed glassware for holiday sales and special events.

Engrave your custom message on a variety of materials - from glass to metal and so much more! Epilog Laser Engravers give you options when it comes to profit!

Fabric Marking

Ideal for: Fleece, Sweatshirts, Denim, and some Linens

Find it! Pages 16-17

Additional Equipment: BOFA Filter

Waterbottles/Keytags

Ideal for: Aluminum waterbottles and keytags

Find it! Pages 16-17

Additional Equipment: BOFA Filter, Epilog Rotary Attachment and/or tag template

Glassware

Ideal for: Glasses, mugs, cutting boards, vases, etc.

Find it! Pages 16-17

Additional Equipment: BOFA Filter, Epilog Rotary Attachment

MobilemakerEd Cart
The Mobile Fabrication Lab for Education

Bringing the empowering maker learning experience to any classroom
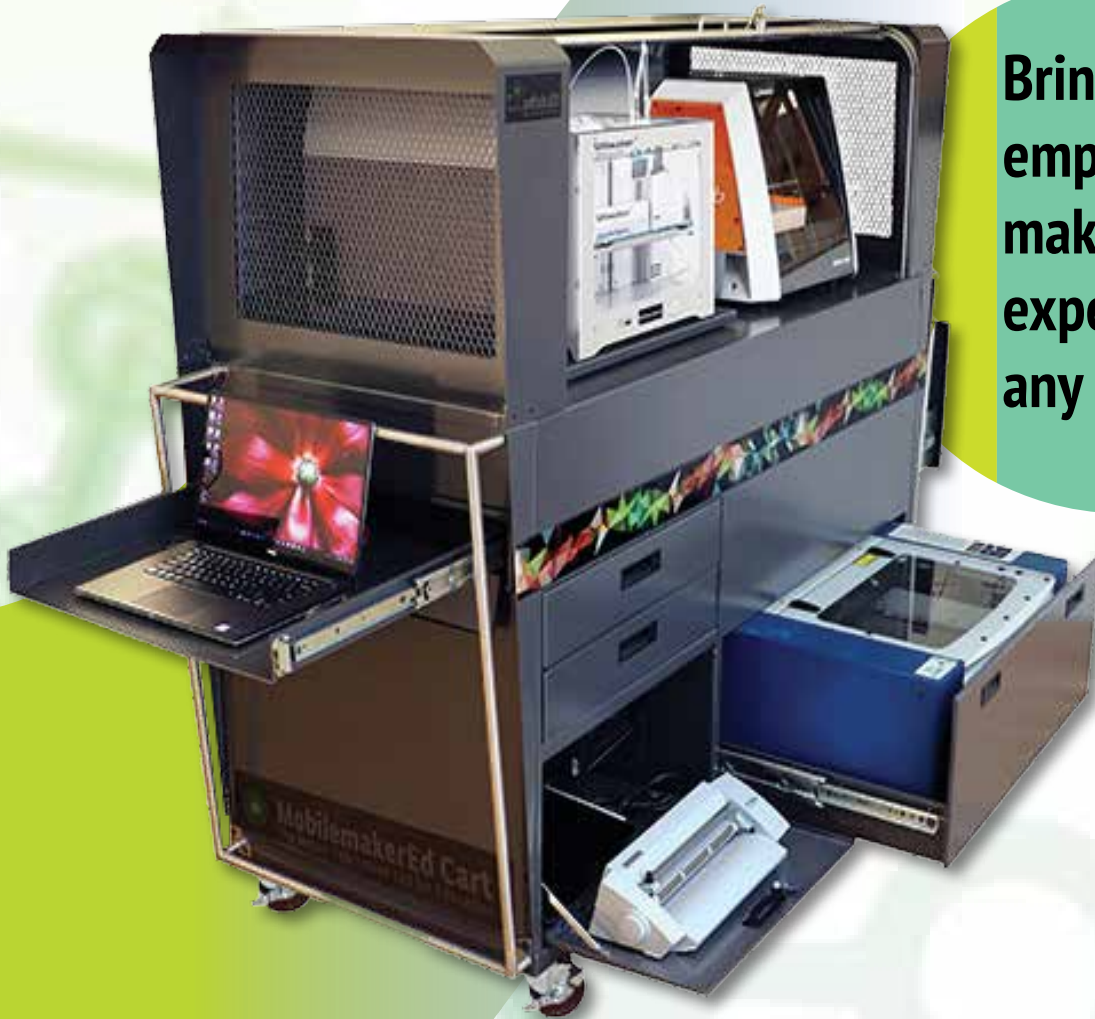
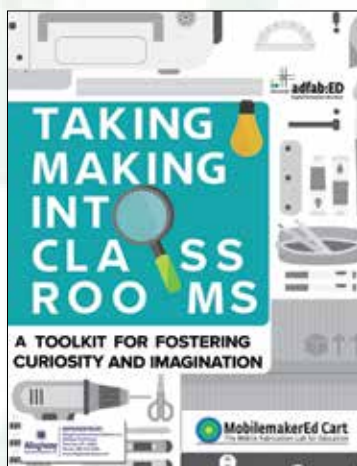**Alliance for adfab:ED**
Digital Fabrication Education

3D Printer	Ultimaker S3, Makerbot Replicator Plus, Print wash system
Laser Cutter	Epilog Mini 16, Air compressor
3-axis Milling Machine	Roland SRM-20
Fume Extractor	BOFA, AD350
Vinyl Cutter	Roland SV-12
Computer Hardware and Software	Dell XPS-15 laptop, Wireless high-gain antenna, 3D Design software, CAM
Tools	Common hand tools, Soldering station, Cordless power tool system with drill, saw and oscillating tool
Maker Electronics	Set of 12 Ardunio physical computing kits, 12 Grove sensor kits, Flora wearable electronics, Collection of standard electronic building components
Mobile Cart	Custom designed mobile workstation with drawers, table, equipment slides and locking compartments, Internal fume extraction, 2400w power conditioner, Retractable electric power tether, All steel construction, Powder-coated finish
Materials	2 Filament cartridges, Assorted milling material, Assorted laser material types
Dimensions	28.25"W x 65"D x 60"H
Weight	350 lbs
Power Requirement	25 amps at full operation

Taking Making Into Classrooms Curriculum Available!
Topics covered include:

- The Maker Movement And Its Place In North American Lives
- Making The Connection: Designing, Making, And A New Culture Of Learning
- Design Challenges: Prompts For Learning And Hard Fun
- Assessment: Reimagining Ways To Value Process, Product, Creativity, And Learning
- Honouring The Parts That Make The Process Whole
- Why We Need Our Students To Be Design Thinkers
- Intent And Choosing A Maker Experience For Your Classroom
- *And much more!*

mindsieducation.com

An interactive approach to teaching STEM Education through Robotics

MINDS-i Robotics Education is designed to give students an interactive approach to applied science, technology, engineering and math (STEM). MINDS-i is rocking the Robotics Education world with a high-technology platform that is simple to use, extraordinarily durable, infinitely modifiable, and will prepare students with the skills they need to excel in the 21st century.
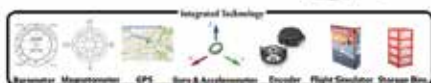
We inspire a rigorous college and career relevant experience through STEM Robotics in the everyday classroom in a format that can impact each and every student.

LAB Kits Include:
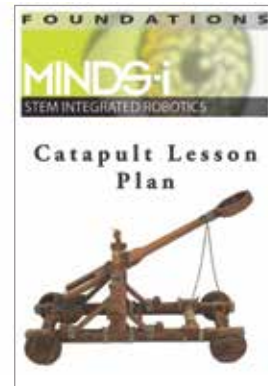
MINDS-i Catapult LAB

STEM Robotics DRONES LAB

**STEM Robotics
FOUNDATIONS LAB 4X4**

**STEM Robotics
FOUNDATIONS LAB 6X6**

Building the next generation of STEM leaders

Fun and affordable STEM education programs

Kid Spark gives your students the skills and confidence to solve everyday challenges through technology. The elementary and middle school STEM education programs are a fun, effective, and affordable way to develop your students' STEM Identity and Technology Fluency.

The Kid Spark curriculum follows the NGSS Three Dimensions of Science Learning; Crosscutting Concepts, Science and Engineering Practices, and Disciplinary Core Ideas.

Kid Spark PK - 8 STEM Programs

Kid Spark offers comprehensive, applied STEM programs for elementary and middle school that include curriculum, professional learning, and mobile STEM labs. The Kid Spark curriculum consists of four progressive learning phases that span from PK to 8th grade.

ROK Blocks
Grades: PK-5
Core lab for Elementary School Programs
• Ideal for learning the Kid Spark Elementary Program and/or for students needing foundational fluencies
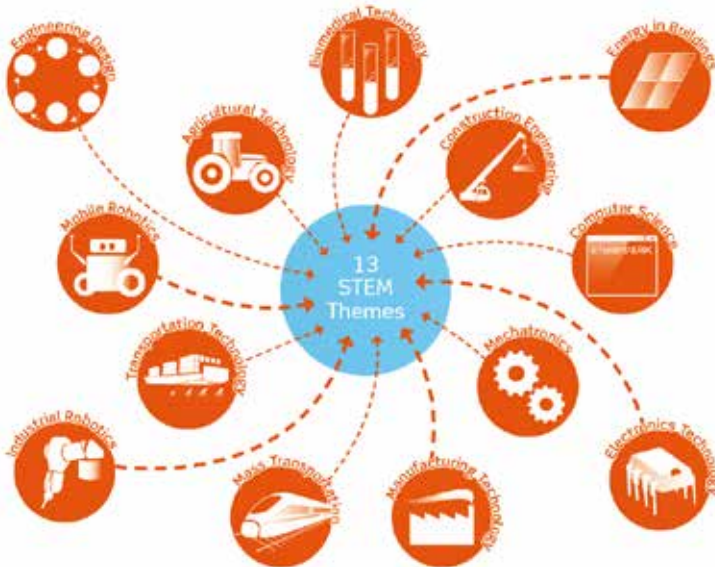
Engineering Pathways
Grades: 4-8
Core lab for Elementary and Middle School Programs
• Ideal for introducing students to computer sciences and robotics as well as teaching systems thinking
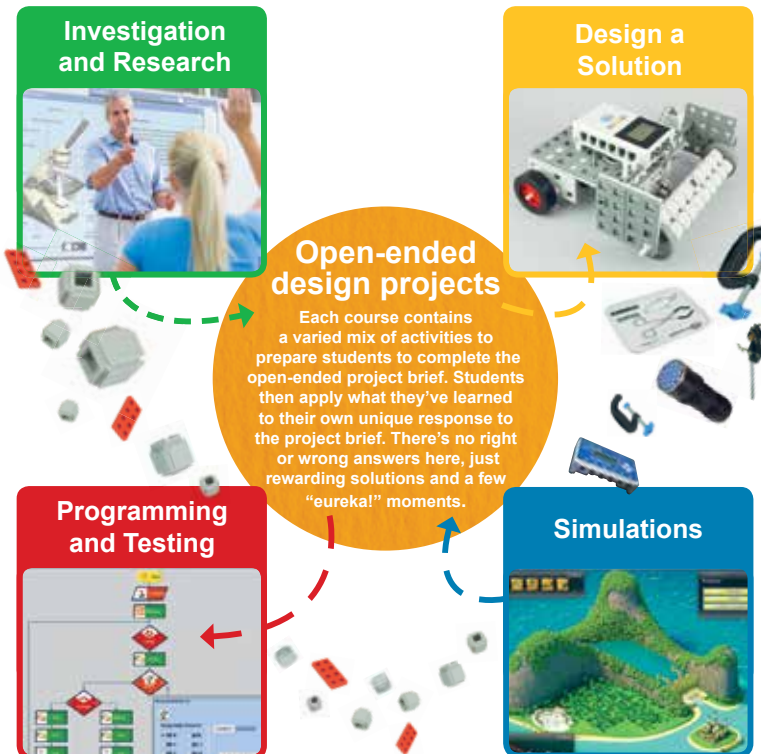
35

Exploring STEM Activity Kits
### Active Learning - bringing STEM together with project-based learning

Curriculum material uses **Active Learning** to foster a range of important skills across the core STEM subjects. The **Presentations** and **Investigations** promote processing, questioning and analyzing information.

The **Simulations** and **Practical Tasks** involve problem solving, creativity and critical thinking, while enhancing manipulative skills.

Finally, each course concludes with a **Design Project**, to develop computer programming skills, and promote communication and interpersonal skills through team working.

Investigation and Research

Design a Solution

Open-ended design projects

Each course contains a varied mix of activities to prepare students to complete the open-ended project brief. Students then apply what they've learned to their own unique response to the project brief. There's no right or wrong answers here, just rewarding solutions and a few "eureka!" moments.

Programming and Testing

Simulations

Elementary Kits such as:
- Tactic Construction Kits
- Problem-Solving Kits
- Math & Science Kits
- Electrical Circuits Kits and More!
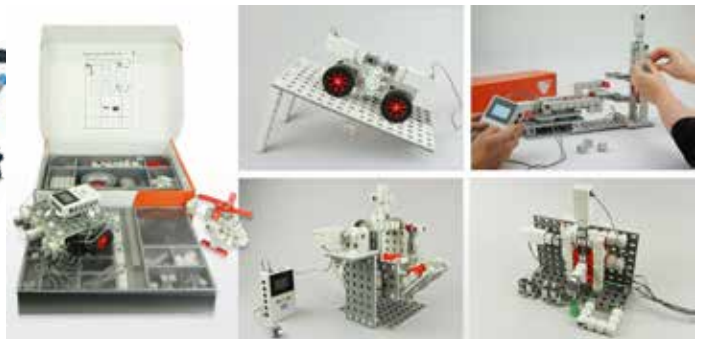
Middle Level Kits such as:
- Engineering & Design
- Manufacturing Technology
- Mechatronics
- Agriculture
- Mobile Robotics

With Hann Manufacturing furniture you will never say "...they don't build them the way they used to." Hann uses time tested methods and materials to construct furniture that will hold its own in the classroom year after year. Hallmarks of quality such as mortise and tendon joinery and dovetailing are present in every piece built.

For 40 years, Shain by Diversified Woodcrafts, Inc. has been providing quality maple furniture, built by craftspeople that take pride in building furniture used by teachers and students. In fact, many of the employees grew up using Shain products in their classrooms and that is where they learned their craft.

Today that same workforce uses cutting edge technology to produce innovative and quality products for the education, art, and technical markets. Quality maple hardwoods and veneers and fine details like fully dovetailed drawers are signature hallmarks of Shain's product line.

Interior Concepts™
solutions that fit.

Higher education is not a one size fits all approach — and neither is the furniture or design. It goes without saying that today's students and instructors require furniture that allows collaboration and looks professional. But facilities managers want solutions that can withstand years of use, look great, and maximize space available in both old and new buildings.

Interior Concepts delivers on all counts. Furniture that meets the demands of students and staff. Specializing in educational furniture for over 20 years consistently delivering quality solutions in environments such as lecture halls, classrooms, instructor spaces, computer labs, and administrative areas — Interior Concepts furniture solutions are just plain smart.

www.cefinc.com

The Stewart Storage Cart

Want a great addition to your makerspace, classroom, art class or any other area where you need mobile storage? Then the Stewart Cart is perfect! This thoughtful design was created by students with makerspace in mind! The Stewart Storage Cart comes in two different sizes; a double sided 10 bin cart or a compact single sided 5 bin cart. Either cart features a peg board side and 5" heavy duty casters. Optional lids and dividers are available for the storage bins and an additional peg board can be added to the other side.

The Multi-Maker Cart

This compact, feature-rich Multi-Maker Cart has a small footprint with a big impact. The Multi-Maker Cart can be used as a presentation cart, a great addition to your Makerspace room, or a charging and storage solution for a classroom or media center. Let the Multi-Maker Cart help you organize so you can teach and make!

The Quad Pod

The Quad Pod is a revolutionary concept in educational furniture design! Allows you to customize your table according to the storage and functionality needs that you may have in a makerspace or classroom!

Pick a Pod! Choices include:
• Basic Adjustable Shelf Storage with 2 shelves included
• Storage Bins - 3 bins with lids
• 15 Slot Device Storage & Charging
• Trash Bin (grommet hole in tabletop)
Pods are placed inside steel frame (as shown). Pods create the base which is secured by the butcher block top.

38

cef
www.cefinc.com

The Ed Table

With breakthrough solutions packed into every inch, the Ed Table truly embodies a spirit of invention. The Ed Table provides the most complete maker experience available. Maximizing creative time while minimizing the amount of logistical preparation work and clean-up was the driving factor behind the design concept. For schools and teachers interested in project-based learning, the Ed Table is a natural extension and fundamental element for engaging learners.

IIDA INTERNATIONAL INTERIOR DESIGN ASSOCIATION

EDspaces INNOVATION AWARDS 2017 WINNER

The IDEA Island

The creation of the IDEA Island was inspired by the many makers in schools, libraries and museums across the nation that are dedicated to inspiring creativity and discovery. The marriage of industrial design with warm wood, strength, and innovation, immediately inspires when you step up to the IDEA Island. It can be ordered basic as table only, or can be dressed up with technology and seating for up to 8 people.

✓ *ADA Compliant*

Optional Monitor Arm

Optional Electrical

6'

3'

Optional Casters

The Butcher Block Table

The Butcher Block Table for makerspace environments allows students to design and build creative projects and empowers students to work together. By offering a hardy work surface, adjustable height legs for sitting or standing, optional power unit and monitor arm, the sky is the limit.