HANDMADE

Daniel Hand High School Makerspace

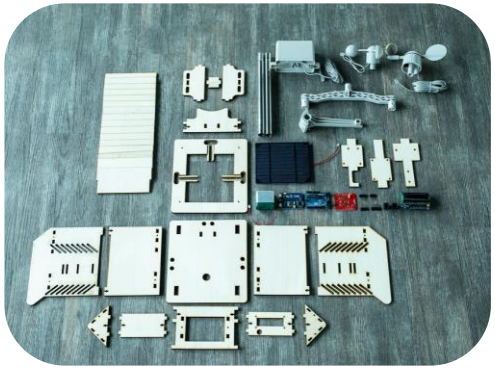
Learning  Fab Lab

Supporting Independent Projects and Innovation

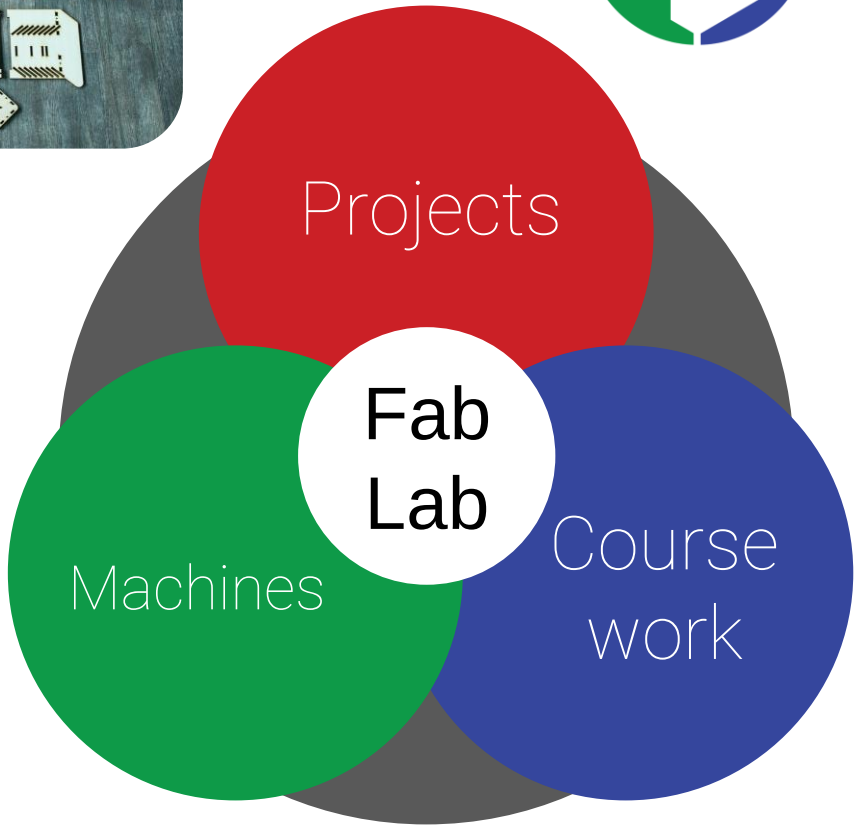
HANDMADE


Language Arts
Engineering
Interior Design
Humanities
HELLO
CIAO
HALO
Science
Art
World Language
Math

Vision:



To provide students individual access to digital design and fabrication technologies



Fabrication Laboratories

A fab lab is a small-scale workshop, offering personal digital fabrication.
Popularized by MIT.
Fits in all educational spaces.

fabfoundation.org

mit.edu/about/labs

SHU Idea Lab

Innovation Center

Pittsburgh Schools

Fab Lab + Hand students = Innovation & Creativity

- Fab Labs are a place where disciplines intersect
- An opportunity for independent exploration
- Opportunity to “make” creatively
- Fab Labs provide tools to get started with big ideas
- A place for undirected learning
- Students & staff can level up their technology skill

Student Access

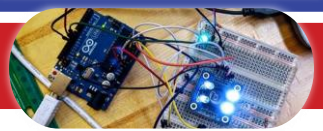
- Independent Project Classes
  - All students will take I.P. class
- Collaborating with teachers
- Dependent on staffing: access throughout the day & after school

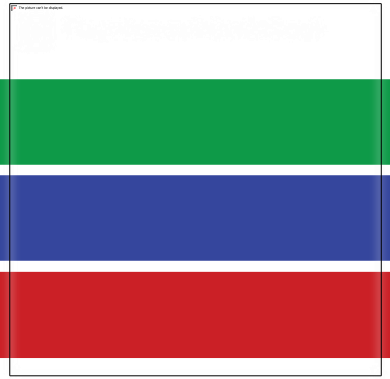
HAND MADE

Corey is a “Fab Lab Guru”

The title is a bit pretentious, but is official. One of a few educators to ever pass ‘Fab Academy’ global course, often for engineers & designers.

Currently works at Fab Foundation education goals by: co-organizing conferences, teaching adult Maker classes, teaching undergraduate & graduate EDU courses, writing/ teaching PD, new electronics course at DHHS and more…





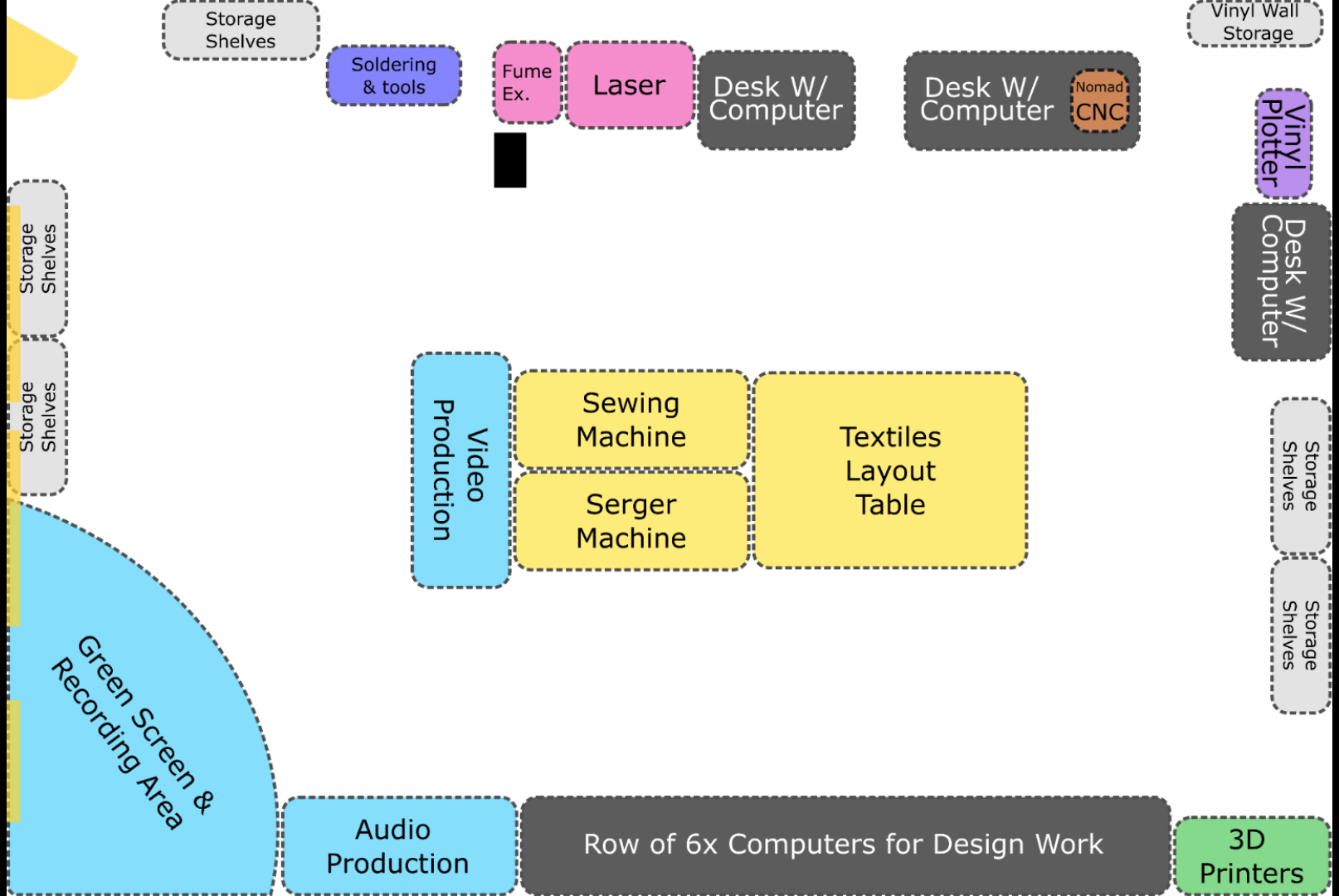
Student-built GPS on a rollercoaster.


EMPATHIZE
DEFINE
IDEATE
PROTOTYPE
TEST
DESIGN THINKING

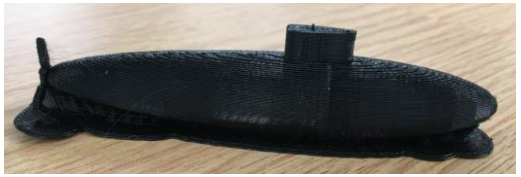
Fab Lab Stations

- Music & Podcasting
- Video Production
- Animation
- Sewing machine
- Virtual Reality (beginner level)
- Work Area
- Baby CNC milling
- 3D Printers
- Vinyl Cutter
- Laser Cutter
- Design Software
- Electronics Center

Current computer lab in the Library


Storage Shelves
Soldering & tools
Fume Ex.
Laser
Desk W/ Computer
Desk W/ Computer
Nomad CNC
Vinyl Wall Storage
Vinyl Plotter
Desk W/ Computer
Storage Shelves
Storage Shelves
Video Production
Sewing Machine
Serger Machine
Textiles Layout Table
Storage Shelves
Storage Shelves
Green Screen & Recording Area
Audio Production
Row of 6x Computers for Design Work
3D Printers

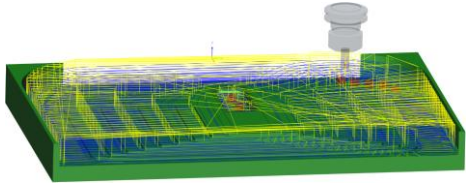
3D Printers



CNC Milling

Computer
Numerical
Controlled machining is how many critical or valuable objects are made - from jet fighters to fine woodworking.

Access to this engineering process helps students better conceptualize their designs.

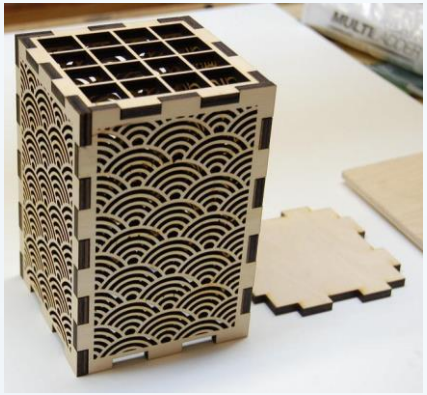


Vinyl Cutter/ Pen Plotter

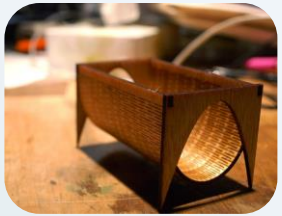
Students can design and cut their own vinyl stickers, just like professional sign shops or marketing departments.

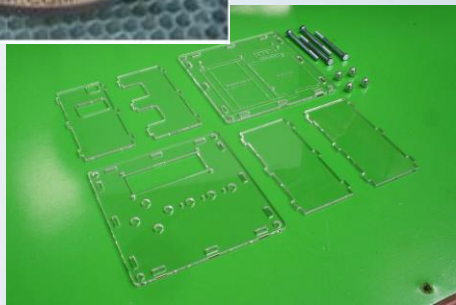
Laser

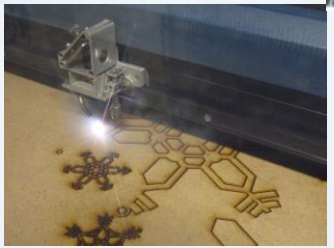
Cut or Engrave materials quickly.



Fastest making in a school.







Lasers can cut many materials

Air filtration is required (see duct above) but can be self-contained.

Design Software
2D and 3D

Students can make their ideas into plans.

2D and 3D design software is used by designers, engineers, machinists, animators, and more.

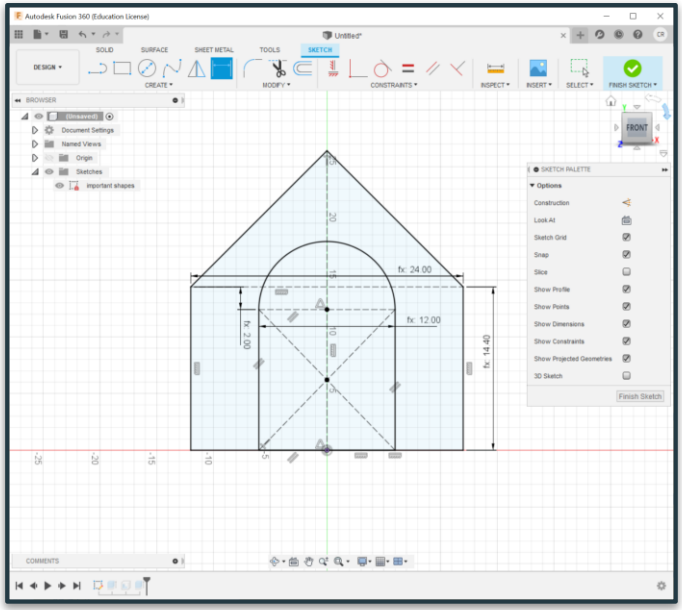
Getting students access to this software early helps them prep for all those possible futures.

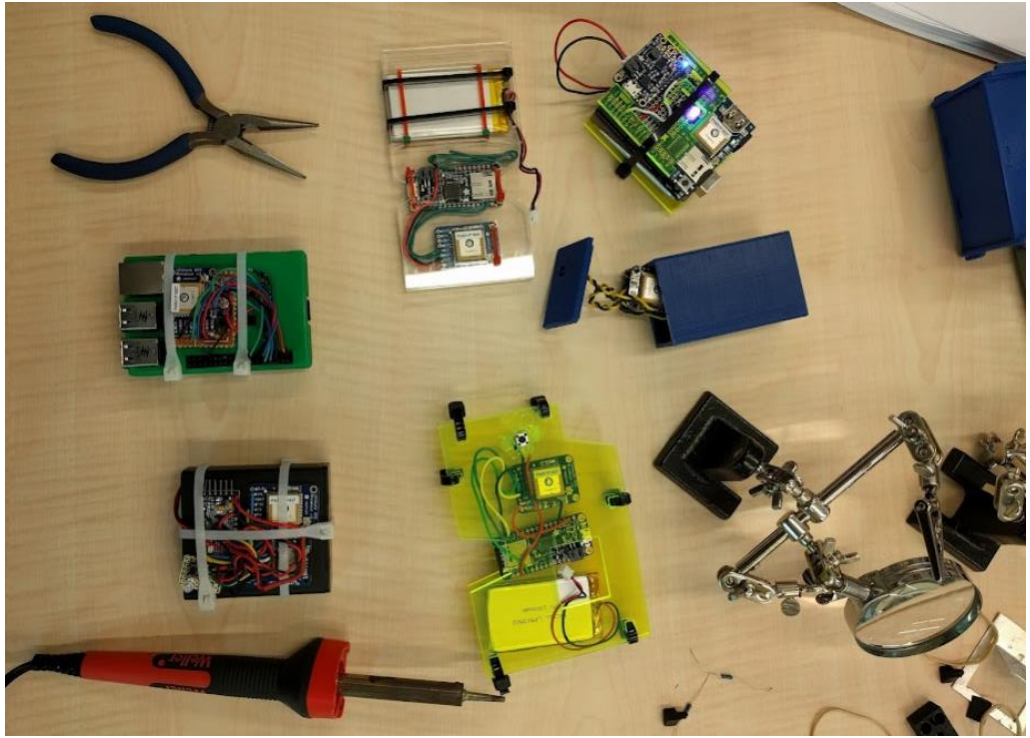
onshape®

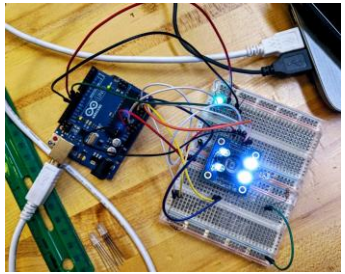
TINKERCAD

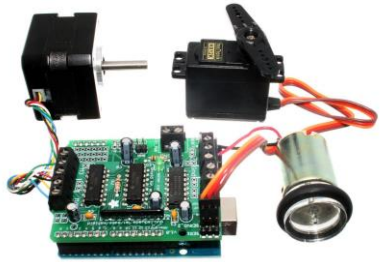
AUTODESK®
TINKERCAD®

CorelDRAW
GRAPHICS SUITE









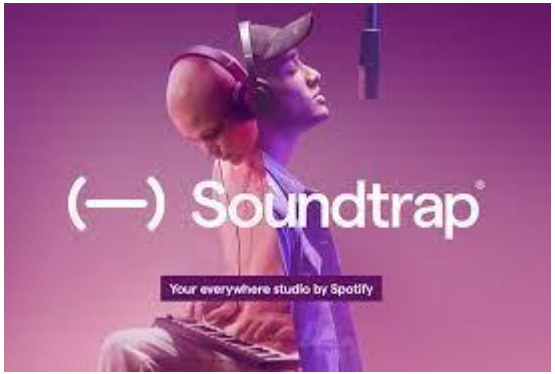
Electronics Center

Electronics are omnipresent in our lives. Students with access to build or alter them feel more enabled to help build our future technology.

The tools needed are surprisingly affordable and fairly safe to use.

This work supports our science and coding classes in having projects with relevance for students.

Music Recording & Podcasting



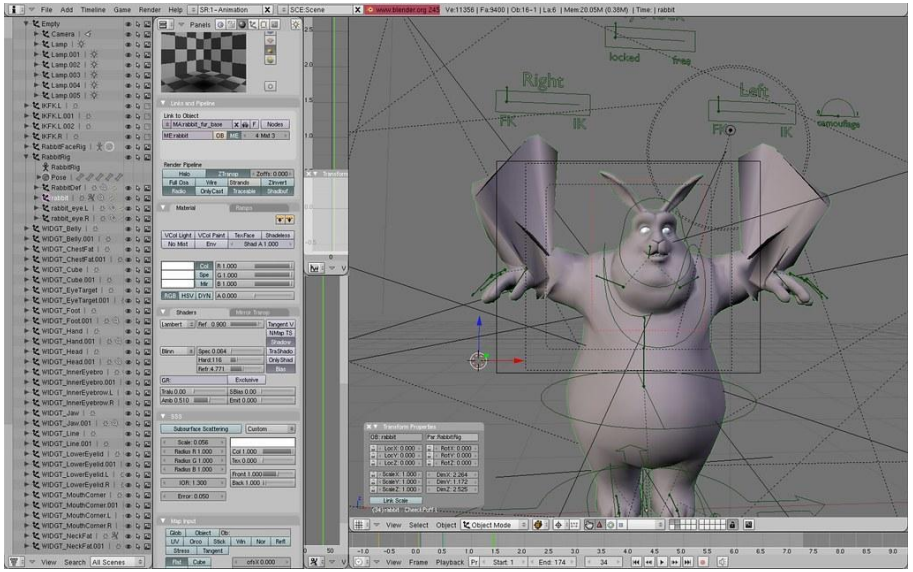
In the last two years, students have been introduced to this technology in some music classes at Polson.

Video Production

Students have used WeVideo throughout middle school and in video production classes at Hand.

Animation

Mac & Animation software



Students are introduced to Adobe Animate in Animation classes at Hand and have no access to it after that class.

Sewing Machines

Crafts

Lettering pens

Polymer clay

Art supplies

Yarn

Looms

Virtual Reality

Google Cardboard has the widest variety of educational content at the moment.

Procuring class sets for the building will provide students with virtual field trips.

Safety & Storage

Ventilation for the Laser cutter estimate includes a self-contained filtering unit.

All major equipment is contained in **safety boxes that hold back curious fingers**.

Machines with safety boxes **auto shut off** if they are opened during operation.

The most exposed/ dangerous equipment is the sewing machine & soldering iron.

Open and closed **storage units** are included to **keep the room clean & safe**.

Fab Lab Stations Estimates

These numbers are based on specific purchase suggestions.

The vision is to ensure acquisitions are focused on bringing staff & students access to tools they may not otherwise be able to use for generating products in their independent project or other academic work.

For this reason, some items included are not common in-home devices (such as the laser). Other items (such as high-end VR:Oculus) are not included because they are relatively affordable for a family that is interested in such pursuits. The selections were also curated to ensure a low barrier to entry.

CNC	$3,000
3D Printer	$3,500
Vinyl cutter	$2,500
Laser & Ventilation	$27,500
Design Software	$400
Electronics	$2,000
Recording & Podcasting	$2,000
Video Production	$250
Animation	$1,200
Sewing	$850
Craft	$300
Virtual Reality	$400
Storage & Logistics	$1000
Total	**$44,050**

Category	Startup $44k	Startup Purchases	Maintainer Cost	Yearly estimates $3.5k
CNC Machine	$3,000	Carbide3D ‘Nomad’	End mills & material	~ $200
3D Printers	$3,500	3x Prusa $1000 || Maintenance parts $200 || Filament $150 || Filament storage $150 || Dehumidifier 2x per bin= $40	Filament & Parts	~ $300
Vinyl cutter	$2,500	Roland GS-24 vinyl cutter & vinyl	Vinyl	~ $500
Laser Cutter & Ventilation	$27,500	12”x24” 60W Fusion Edge $23,500 || Ventilation $3,475 || Laser accessories $2000 || 3xCorel	Air filters, optics & material to cut	~ $700
Electronics Center	$2000	Locking Tool Chest $500 || 5 Arduino kits $500 || 5 Raspberry pi kits $250 || 2x Solder stations $300 || electronics supplies $700	solder + electronics	~ $300
Audio & Podcasting	$2,250	Sound mixer $599, Audiobox $99, Microphone $99, Keyboard controller $119 Patch cords 3@$15 $45, Sound proofing $80, Speaker and/or headphones $530 II Soundtrap sub $4250	Subscription to Soundtrap	~ $250
Video Production	$270	Video camera $150 II Tripod $20 Lighting $50 II SD Cards & adapters $50	No new upkeep (already have subscription)	
Digital Animation	$1400	Mac Mini ~$1000	Adobe Animation	$400
Design Software	$400	On Shape (free), Tinkercad (free)	Chief Architect (add seats)	$400
Sewing Machines	$850	Sewing machine $300 || Serger $250 || Material: $300	Thread & Fabric	$300
Virtual Reality	$400	40 & $10 each Google Cardboards	Annual replacements (hopefully just a few)	
Storage	$1000	Shelving & Logistics	More as needed	$250