A BLUEPRINT FOR BUILDING COLLABORATIVE EDUCATIONAL “MAKERSPACES”

October 24th, 2018
WHY DO WE MAKE?

“Making is fundamental to what it means to be human. We must make, create and express ourselves to feel whole. There is something unique about making physical things. These things are like little pieces of us and seem to embody portions of our soul.”

Mark Hatch, The Maker Movement Manifesto
MEET THE PRESENTERS

Stephen Secora
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Dr. Gina Coffaro
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AGENDA

Why is making important in Education?

Types of “Making”

What makes a Makerspace?

Case Studies

Classroom Resources
The Maker Movement is a vehicle that will allow schools to be a part of the necessary return to constructivist education. A movement that will allow students to be creative, innovative, independent, and technologically literate; not an “alternative” way to learn, but what modern learning should really look like.

Gary Stager, Makerspace for Education, 2014
WHAT MAKES A MAKERSPACE?

Learning Components

- Critical Thinking
- Global/Digital Citizenship
- Cross Curriculum Education
- Social/Emotional Learning
WHAT MAKES A MAKERSPACE?

Physical Components

Collaborative Design Area

Launch Pad

Solo Design Area

Bits & Pieces
TYPES OF MAKING

Alternative Energy
Animation
Arduino & Coding Kits
Automobile
Architecture
Arts
Astronomy/Space
Biology
Chemistry
Circuit Boards
Construction Kits (LEGO, K’NEX)
Crafts
Culinary Arts
Design Competitions
Electronics

Engineering
Fashion/Textiles
Fine Arts
Flight
Food/Cooking
Furniture
Gaming
Graphic Design
Industrial Design
Lights/Wiring
Mathematics
Mechanics
Metalworking
Microcontrollers
Music

Papercraft
Photography
Physics
Printmaking
Programming
Prosthetics
Robotics
Rockets
Rube Goldberg Devices
Sewing
Vehicle Prototyping
Video/Film
Weather
Web Design
Woodworking
WHAT MAKES A MAKERSPACE?

Types of Makerspaces

BASIC

ADVANCED

JUNIOR

SPECIALTY
CASE STUDY  Basic Makerspace

Woodbridge Middle School

Maker Equipment

- Whiteboard
- Interactive Teaching
- Display Space
- 3D Printer
CASE STUDY  Basic Makerspace

Woodbridge Middle School

01 Collaborative Design Area
02 Solo Design Area
03 Launch Pad
04 Bits & Pieces
CASE STUDY Junior Makerspace

Oakland Public Schools Elementary STEAM Lab

Maker Equipment

Building

Digital Gadgets

Soft Seating
CASE STUDY

Junior Makerspace

Oakland Public Schools Elementary STEAM Lab

Collaborative Design Area
Solo Design Area
Launch Pad
Bits & Pieces
CASE STUDY  Advanced Makerspace

Bergen County Technical School

Maker Equipment

Prototyping Machinery

Circuit Boards

CNC Routers
CASE STUDY  Advanced Makerspace

Bergen County Technical School

Collaborative Design Area
Solo Design Area
Launch Pad
Bits & Pieces
CASE STUDY  Specialty Makerspace

Leonia High School

Maker Equipment

- Woodworking
- Metal
- Film/Audio
- Culinary
- Architecture/Engineering
CASE STUDY  Specialty Makerspace

Leonia High School

Collaborative Design Area

Solo Design Area

Launch Pad

Bits & Pieces
**Science**

*Passive Speaker*

Equipment: 3D Printer/Smartphone

This two part lesson plan teaches students about different aspects of sound, vibration, echo, and more. Utilizing a premade speaker and alter a custom made speaker, they will explain the properties of sound and decibel measurement.

*View full lesson at*
https://thingiverse.com/thing:1724605

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**Mathematics**

*Euclid’s Shapes*

Equipment: Tablet/Display Board

Students will utilize augmented reality to understand geometry, measurements, ratios, and more. With a variety of digital models, students can combine and separate objects to reinforce mathematics skills in their own virtual space.

*View full lesson at*
https://edu.zspace.com/info/zspace-euclids-shapes

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**Engineering**

*Raptor Reloaded Prosthetics*

Equipment: 3D Printer/CAD Software

Students are provided with a real-world engineering problem and asked to redesign fingers for the eNABLE Raptor Reloaded hand. They will research specific tasks for younger children and create a design to assist in accomplishing the task.

*View full lesson at enablingthefuture.org and at*
https://www.thingiverse.com/thing:1954875

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**Coding/Robotics**

*Juno Rover*

Equipment: Arduino

Students are asked to create a working Juno robot while learning wiring, LED’s, Servo motors, and coding. They can expand upon their JUNO by adding additional sensors, lighting, and functions.

*View full lesson at*
https://thingiverse.com/thing:1720394
LESSONS LEARNED

Today’s education is shifting to focus more interactive educational methods. Schools must align with students’ mindsets by igniting creativity.

Each makerspace is different, and can be modified to cultivate the learned environments needed by your school. By implementing various layout, furniture, and equipment, any classroom can become a makerspace!

Fortunately, there are many resources out there to help a school decide what kind of makerspace it needs, including inspirations, lesson plans, and design competitions.
“To define a school makerspace by its purpose and simplest of terms, it is a place where young people have an opportunity to explore their own interests; learn to use tools and materials, both physical and virtual, and develop creative projects.”

Laura Flemming, Worlds of Making