

AFTER THE SCHOOL BELL RINGS:

LIBRARIES
ARE
EDUCATION!

Leah Hamilton

Phelps Library
& STEAM Lab Makerspace
Phelps, New York



The Phelps Library

- Association Library
- Educating 7,100 residents
- 1 FT Director, 4 PT staff
- Budget for classes: \$2,000
- STEAM Lab Makerspace
- Volunteer instructors & staff
- 4600 sq. ft. space



The background image shows a workshop or classroom. In the foreground, there are several black plastic stools and a wooden table. In the background, there is a sewing machine on a table, a mannequin, and a red ladder. The room has a wooden floor and a window on the right side.

STEAM INITIATIVE

BRIDGING THE TECHNICAL SKILLS GAP

STEAM Lab Makerspace

STEM Explorers

STEAM Camps

FLX Maker Fest

STEAM Consultation

STEAM Scholarship





STEAM Lab Makerspace – Clean Technology



STEAM Lab Makerspace – Dirty Technology



STEM Explorers



Augmented Reality Sandbox



STEAM Camps



The Roller Room

Come ROLL around with Ms. Hamilton

STEAM Camps

THANK YOU TO OUR 2018 FLX MAKERS!

Doppler-on-Wheels (DOW)

Mobile Weather Radar
with Hobart William Smith

GW Lisk & The SpaceX Program

Rocket Construction
How-Tos with
Upstate Research Rocketry Group

FIRST Robotics Team Tan[x] 3003

Empire Resource Recycling
Initiatives

Painting with Light with
Rochester Mini Maker Faire's
Dan Schneiderman

Learn to Solder
Electronic Components
with Dan Wheeler

3-D Printing in Manufacturing
with Harbec, Inc.

Create with Thermoplastic
with Interlock Rochester

Magnetic Slime

Build a Cigar Box Guitar

Sour Science with
the Clifton Springs Library.

3D Printing and Scanning
with the Phelps Library
& STEAM Lab Makerspace

Design and Manufacturing
with Nick Hargarther

Crocheting Classes
with Yarnthusiast

Roc City Laser's
Glowforge Laser Cutting

Healthy Science with
Clifton Springs YMCA

Felted Bookmarks
with Feathertree Felt

Exploring the Microscopic World
with Infinite Scope

STEM Challenges with
Pioneer Library System

Blockprinting

Music and Math with
CHORDTEACHER

Patriot Energy - Ambit
on starting a successful,
profitable small business

Engineering Paper
Windows Stars with
Victor Farmington Library

Jewelry Making
with Seamist Designs



phelpslibrary.org/flxmf-home



phelpslibrary.org/flxmf-home



New York State Fair



Rochester Maker Faire

LIBRARIES
ARE
EDUCATION

**GIRLS, IF YOU WANT TO
CHANGE THE WORLD (AND
EARN A LOT), TRY STEM**

FORBES, SEPTEMBER 11, 2018

“To get, and keep, more women in STEM, we need to show girls that STEM careers align with their interests, values, and desire to make an impact. The most efficient and scalable way to do this is by integrating real-world relevance into school... why focus on schools?

Because that's where the kids are.”

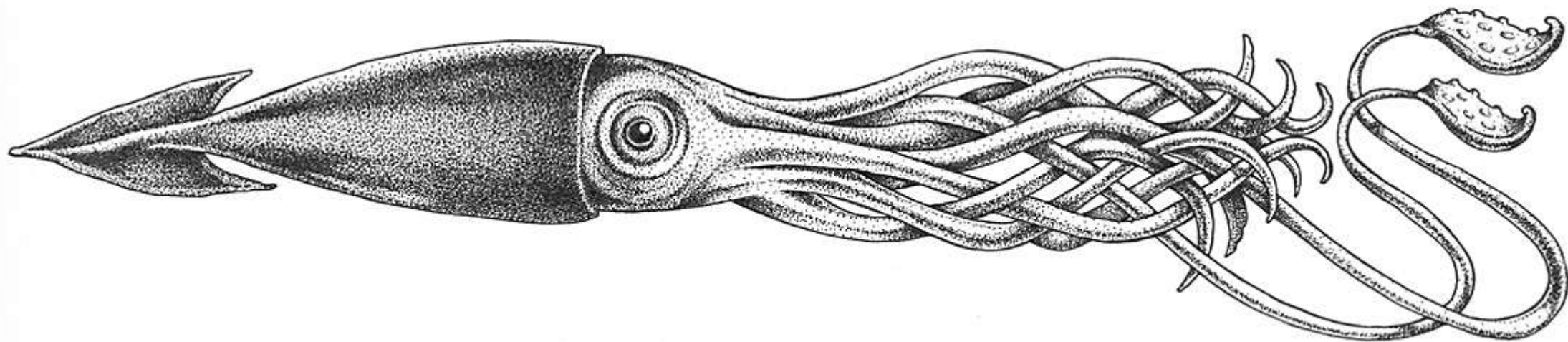


WHERE DO WE GO
FROM HERE?



KNOW YOUR

WHY





Stream Monitoring







CITIZEN SCIENTIST

Scientific research
conducted, in
whole or in part,
by an amateur
(or non-professional)
scientist



New Career Paths

Problem-Solving

Empowerment

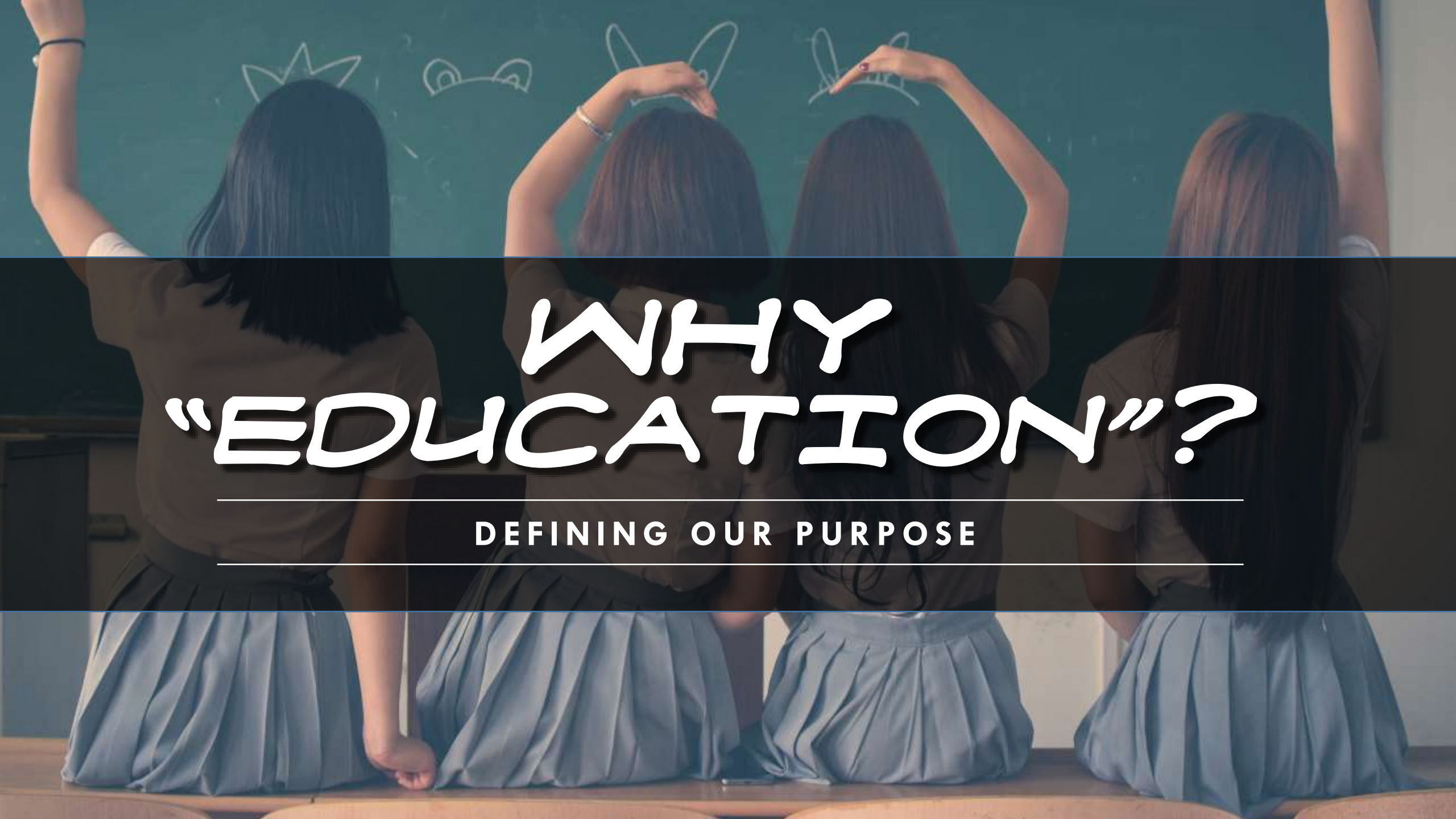
Practice for Life

Inspiration

Build Confidence





A photograph of four students in school uniforms, seen from behind, standing in front of a chalkboard. They are all reaching up with their right hands to draw on the board. The student on the far left is drawing a crown. The second student from the left is drawing a cat's face. The third student is drawing bunny ears. The student on the far right is drawing a butterfly. The students are wearing dark brown short-sleeved shirts and light blue pleated skirts. The chalkboard is green and has some faint, illegible writing on it. The overall lighting is soft and slightly dim, giving it a classroom-like atmosphere.

WHY "EDUCATION"?

DEFINING OUR PURPOSE

A background image showing the backs of several students in a classroom, wearing white shirts and blue skirts, with their arms raised. The image is overlaid with a series of horizontal, semi-transparent dark grey bars that serve as a backdrop for the text.

Equity of Funding & Training

Partnership Development

Library Marketing

Wildly Popular Classes

Workforce & Economic Development

Student Success & Empowerment



Transforming Our Image, Building Our Brand

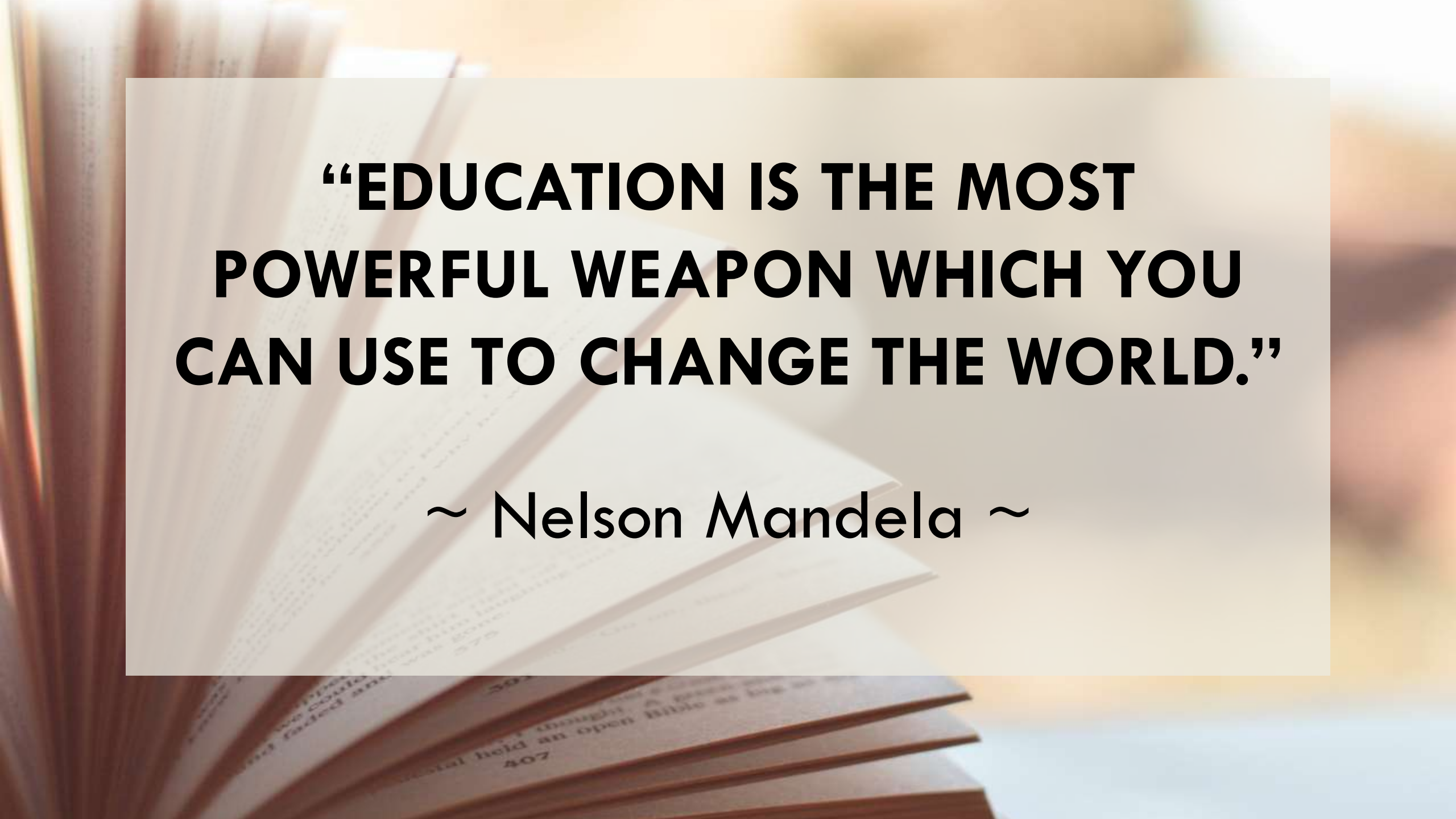
The Education Advantage

Valerie J. Gross



Valerie Gross

https://valeriegross.com/Home_Page.html

The background of the image is a close-up, slightly blurred view of an open book. The pages are white with black text, and the book is bound in a dark cover. The lighting is warm, creating a soft glow around the edges of the pages. The text is centered on the right page of the open book.

**“EDUCATION IS THE MOST
POWERFUL WEAPON WHICH YOU
CAN USE TO CHANGE THE WORLD.”**

~ Nelson Mandela ~

DATA

A NEW WAY PATH TO SUCCESS

2

Bachelor's

•

2

Master's+

•

7

Technical Skills

36%

(

4+ YEARS
OF HIGHER ED

)



82.7%



17.3%



WORKFORCE
MILITARY
BASEMENT MAN CAVE



47%





HEADING TO
SCHOOL
60 COLLEGE
LOCATIONS

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HARRIS

Regions experiencing most difficulty filling jobs



STEM jobs hardest to fill currently, and projected to have shortages over the next 5-10 years



Bridging the STEM Skills Gap: Employer/Educator Collaboration in New York

Issued in 2017 by The
Public Policy Institute of
New York State

The Skills Gap in U.S. Manufacturing: 2015 & Beyond

Manufacturing Institute

Figure 1: Skills gap in the U.S. manufacturing industry, 2015-2025

The skills gap is widening

Over the next decade nearly 3 ½ million manufacturing jobs will likely be needed and



The implications are significant

Every job in manufacturing creates another 2.5 new jobs in local goods and services.

For every \$1 invested in manufacturing, another \$1.37 in additional value is created in other sectors.



Source: Deloitte analysis based on data from U.S. Bureau of Labor Statistics and Gallup Survey.

By 2025 the skills gap is expected to grow to **2 million**

In 2011, **600K** jobs were unfilled due to the skills gap



COMMUNITY PARTNERS

WHY YOU DON'T HAVE TO DO IT ALL YOURSELF



Parents

Maker Community

Municipalities

Local Industry Leaders

Schools



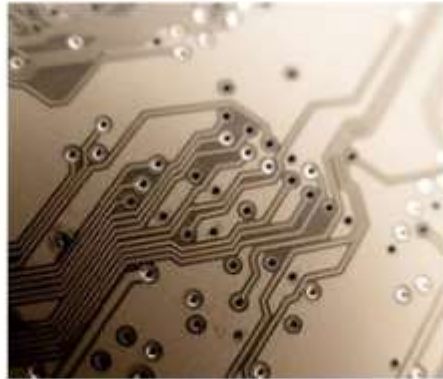
Parents



Municipal Collaboration



Finger Lakes **Advanced Manufacturers' Enterprise**
Building Minds that Make It





Local Businesses

AGGREGATE CLUSTER - MANUFACTURING

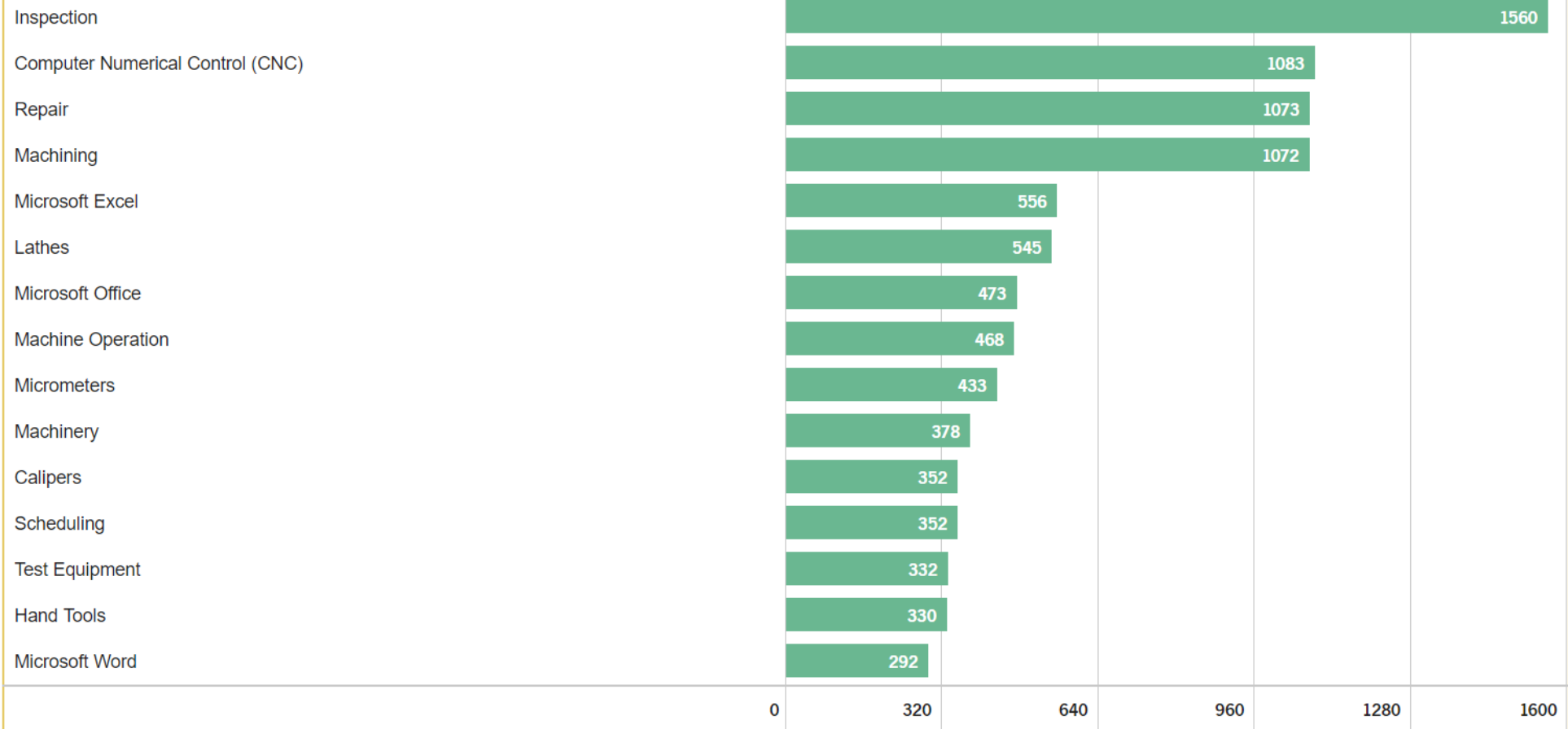
AGGREGATE CLUSTER - MANUFACTURING - FINGER LAK

1. OCCUPATIONAL GROUP
DEFINITION

2.

6. REAL-TIME LABOR MARKET
DATA

ABOUT



The background of the image is a close-up of an artist's palette and a row of paint containers. The top portion shows a palette with various colors of paint, including red, orange, yellow, and blue, some of which are smeared and mixed. Below the palette is a row of several rectangular paint containers, each filled with a different color of paint, such as green, dark blue, brown, purple, and light blue. The overall image has a textured, artistic feel.

PROJECTS

MAKING IT COME TO LIFE



Style & Art
Emma Kungu

Globe Trotting
Gabe Trionfi

Fashion Magic
Anna Lee

Food & Travel
Emma Kungu

Recipes to try
Mariana Adrago

Style for Him
Alexandra Bond

Delicious Food
Anna Lee



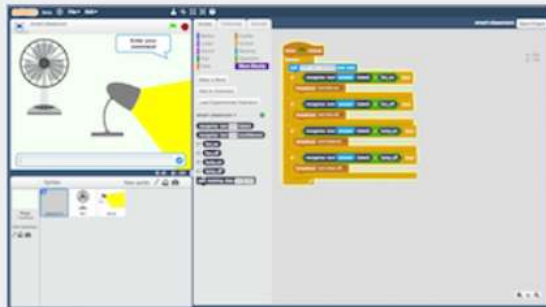
"STEM ACTIVITY"
"ALUMINUM FOIL"

machinelearningforkids.co.uk

Smart classroom

Create a smart assistant in Scratch that lets you control virtual devices.

Teach a computer to recognise the meaning of your commands



Difficulty: Beginner

Recognising: **text**

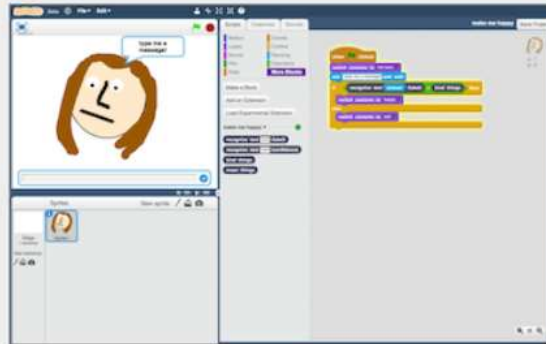
Tags: digital assistants, supervised learning

[Download](#)

Make me happy

Create a character in Scratch that smiles if you say nice things to it and cries if you say mean things to it.

Teach a computer to recognise compliments and insults



Difficulty: Beginner

Recognising: **text**

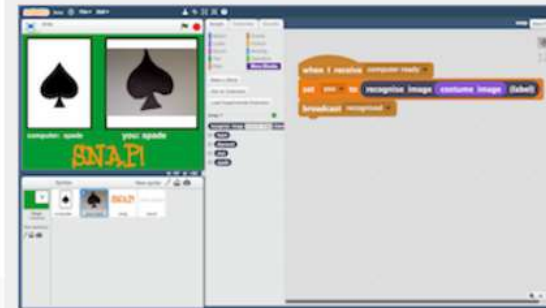
Tags: sentiment analysis, supervised learning

[Download](#)

Snap!

Make a card game in Scratch that learns to recognise pictures of your card.

Teach a computer to recognise what icons look like



Difficulty: Beginner

Recognising: **images**

Tags: image classification, supervised learning

[Download](#)

Mailman Max

Make a postal sorting office in Scratch that can recognise handwritten postcodes on envelopes.

Teach a computer to recognise handwriting



Difficulty: Beginner

Recognising: **images**

Tags: optical character recognition, handwriting recognition, image classification, supervised learning

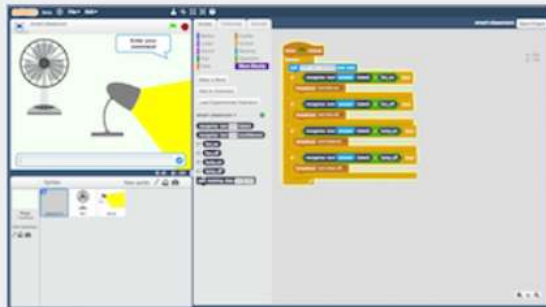
[Download](#)

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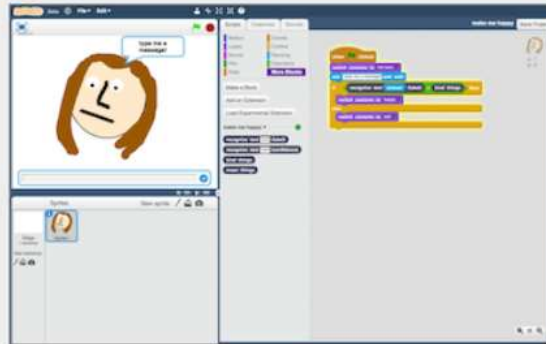
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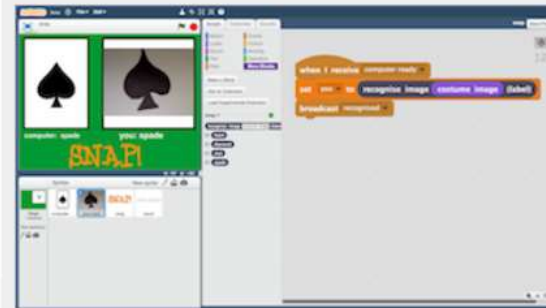
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Lesson Plans

135 PDFs
22 million downloads



Ages

4 - 7 | 8 - 12 | 12 - 14 | 14 - 18

Category



 New Lesson Plans

 Most Popular

 All Lesson Plans

teachengineering.org

Narrow Results



Curriculum Type

- ☒ Activity
- ☐ Lesson
- ☐ Curricular Unit
- ☐ Sprinkle
- ☐ Maker Challenge

What's the difference between lessons, activities, units, sprinkles, and maker challenges?

Grade Level

Grades K - 12

Subject Area

All Subject Areas

Engineering Category

- ☐ Relating science and/or math concepts to engineering
- ☐ Partial design
- ☐ Full design

Time Required

0 to 1200+ minutes

clear all filters



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ABOUT ENGINEERING ▾

GET INVOLVED ▾

EDUCATIONAL STANDARDS ▾

Search

Browse by Standards

Narrow Results

Standards Source Organization

Select an organization ▾

Montana
National Council of Teachers of Mathematics
National Science Education Standards
Nebraska
Nevada
New Jersey
New Mexico
New York
North Carolina
North Dakota

To get started, select the standards source organization.
Only organizations for which TeachEngineering has aligned curricula are listed.

Browse by Educational Standards

Common Core Math

International Technology and Engineering Educators Association

Next Generation Science Standards

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Curriculum Planning



Introduce a different way of thinking to your classroom

- › **Planning an NGSS Curriculum**
- › **Designing Units & Lessons**
- › **Selecting Materials**
- › **Conducting Assessments**

Know Your **WHY**

Why connect with the maker community?

"Through working with the community maker space, we have been able to bring new ideas and skills to our school.

We've been able to transfer the expertise of the many skilled makers who work and play there into our school. It has also increased our confidence as makers.

As we've become more confident makers, our students and colleagues have become more engaged learners. They've taken more risks and stepped outside their comfort zones with us. We look forward to sharing everything we've learned with the community at large."

-Carrie Speranza & Jennifer Jacobson

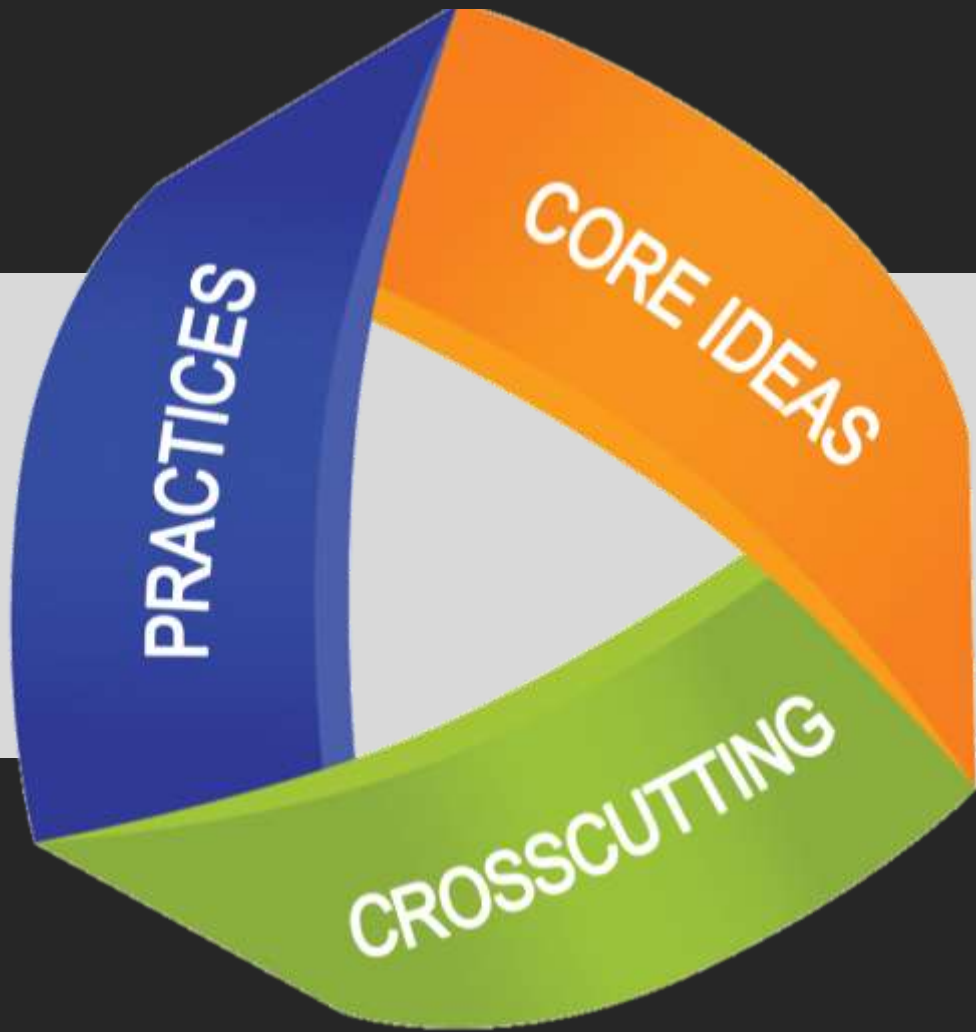
createmakelearn.blogspot.com/



A large, rustic wooden wheel, possibly a water wheel or a carriage wheel, is the central focus. It is made of dark, weathered wood with several spokes. The wheel is positioned in a field of tall, green grass and reeds. The background is slightly blurred, emphasizing the wheel. The overall tone is natural and earthy.

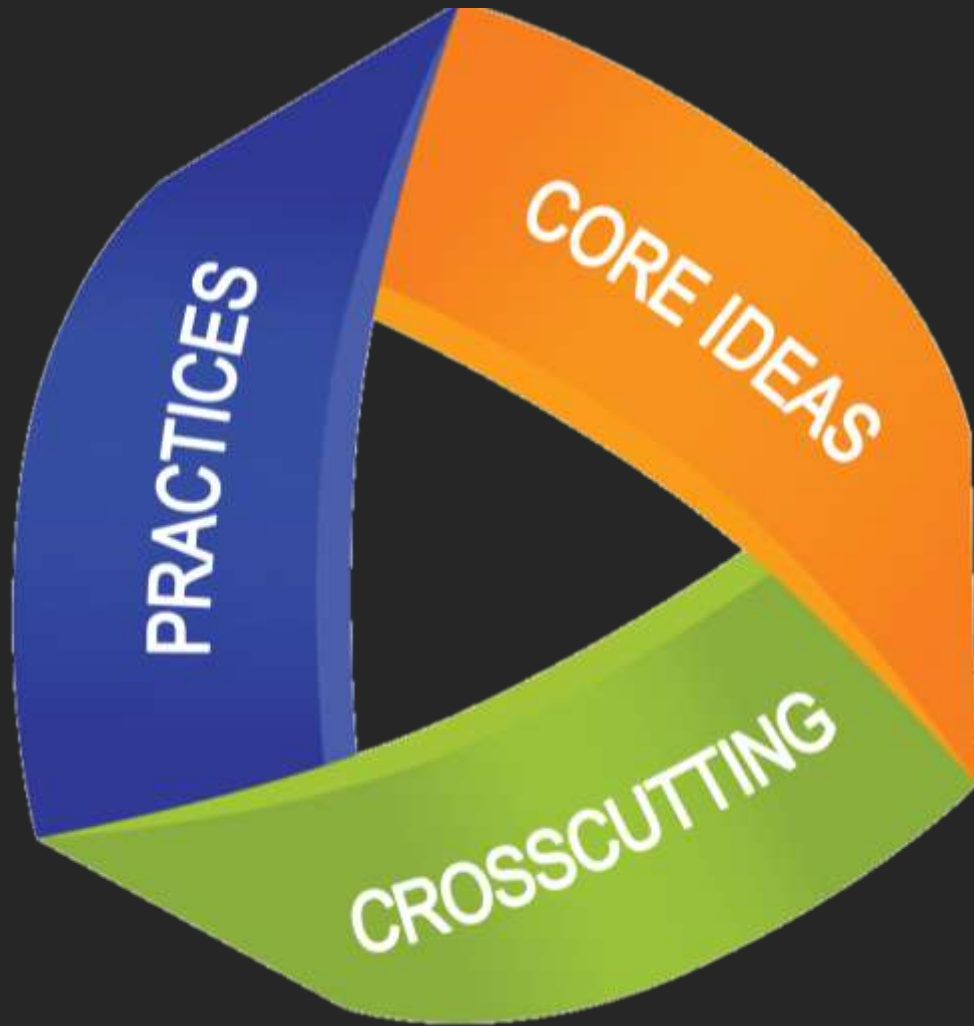
METHODS

THREE DIMENSIONAL TEACHING & LEARNING



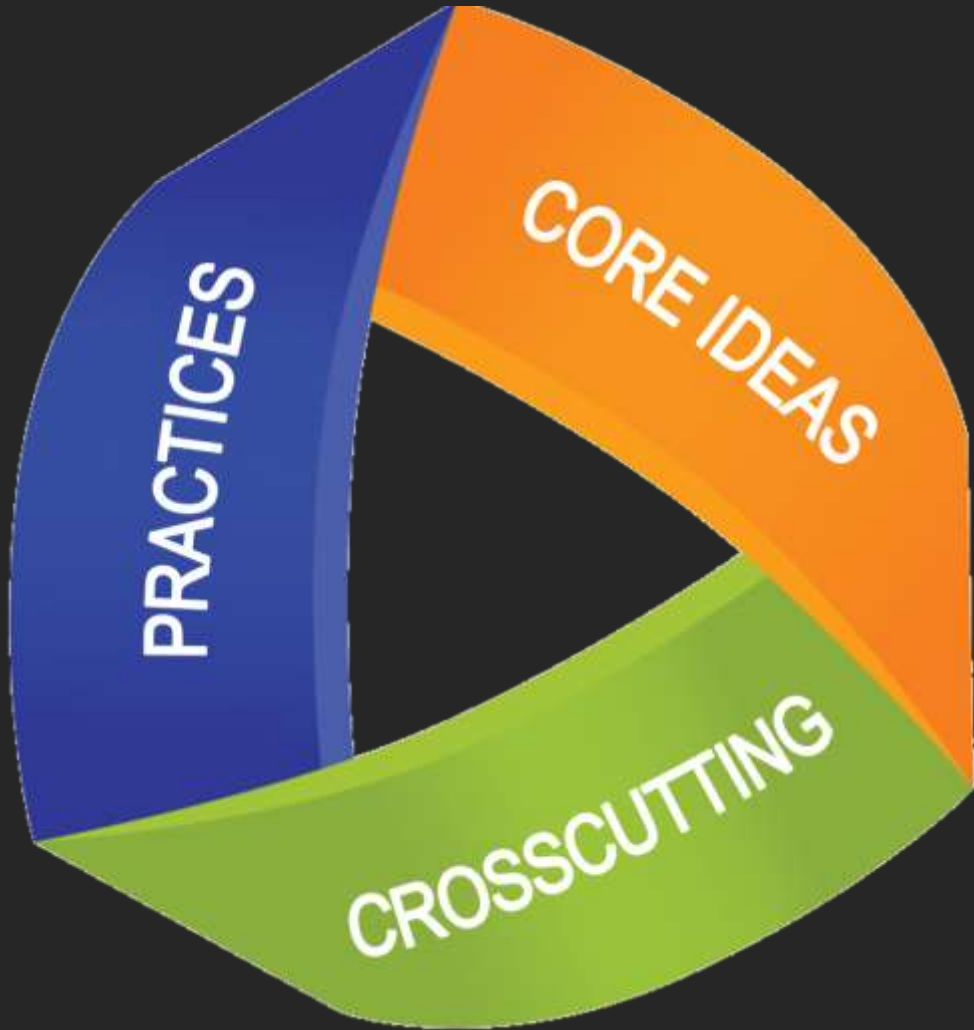
THREE DIMENSIONAL LEARNING

NEXT GENERATION
SCIENCE STANDARDS (NGSS)



DO IT

Build something
Design a solution
Job Shadowing
Take something apart
Fail
Try Again



SEE IT

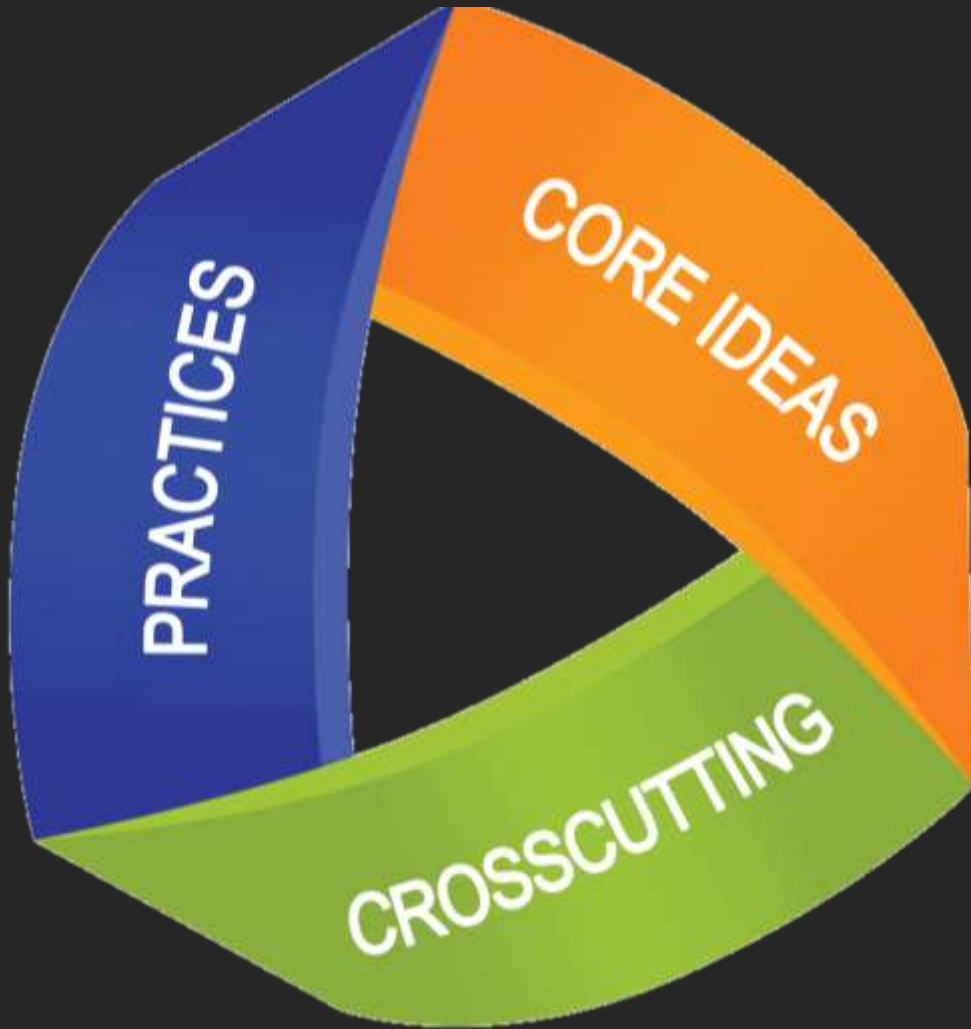
Go on field trips
Learn how things work
Discover
Explore



Water Jet Cutter



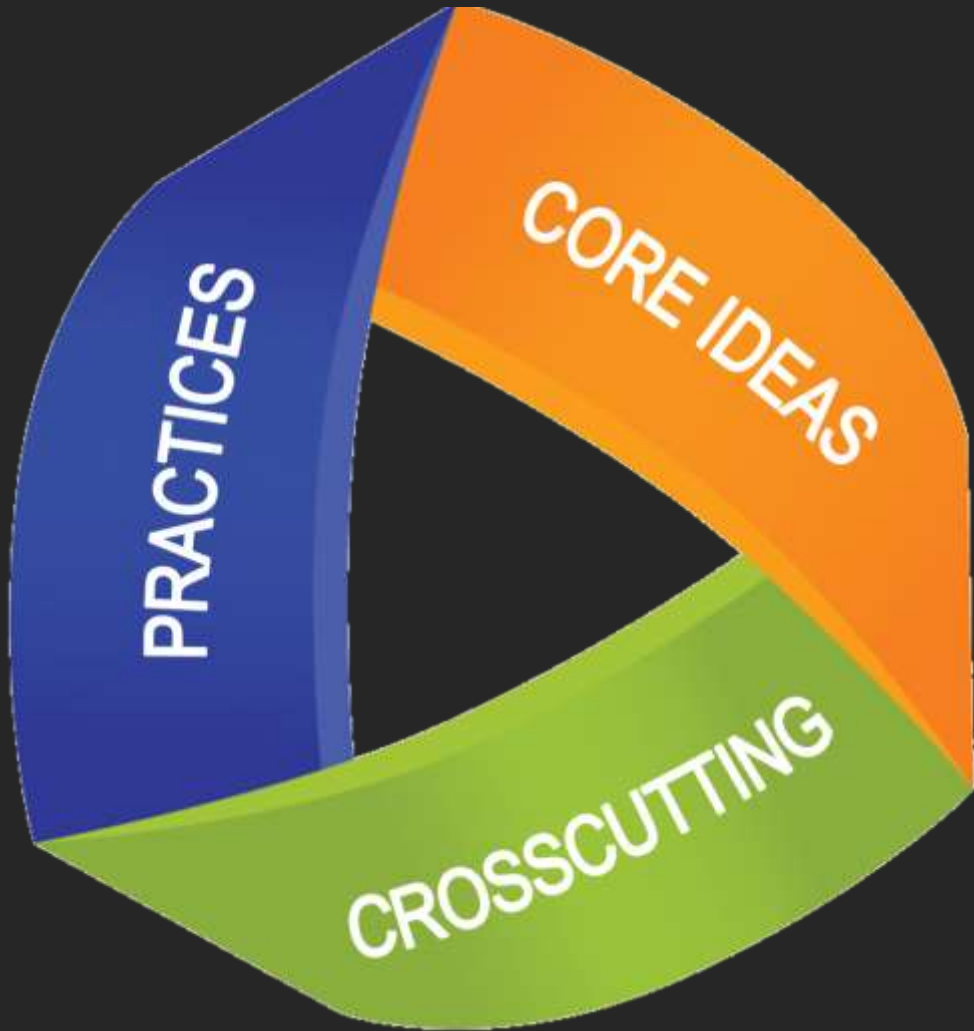
Field Trips and Job Shadowing



TALK IT

Ask Questions:

- What observations do you have?
- What is the problem?
- What can you change/do to help us answer this?
- Do you have evidence/data to support this?
- Can you communicate what is going on?



TALK IT

Ask Questions

Work in groups

Brainstorm

Presentation

Introduce vocabulary

Accelerate

Increase

Decrease

Optimize

Adapt

Lighten

Elevate

Reinforce

Alleviate

Maximize

Eliminate

Stabilize

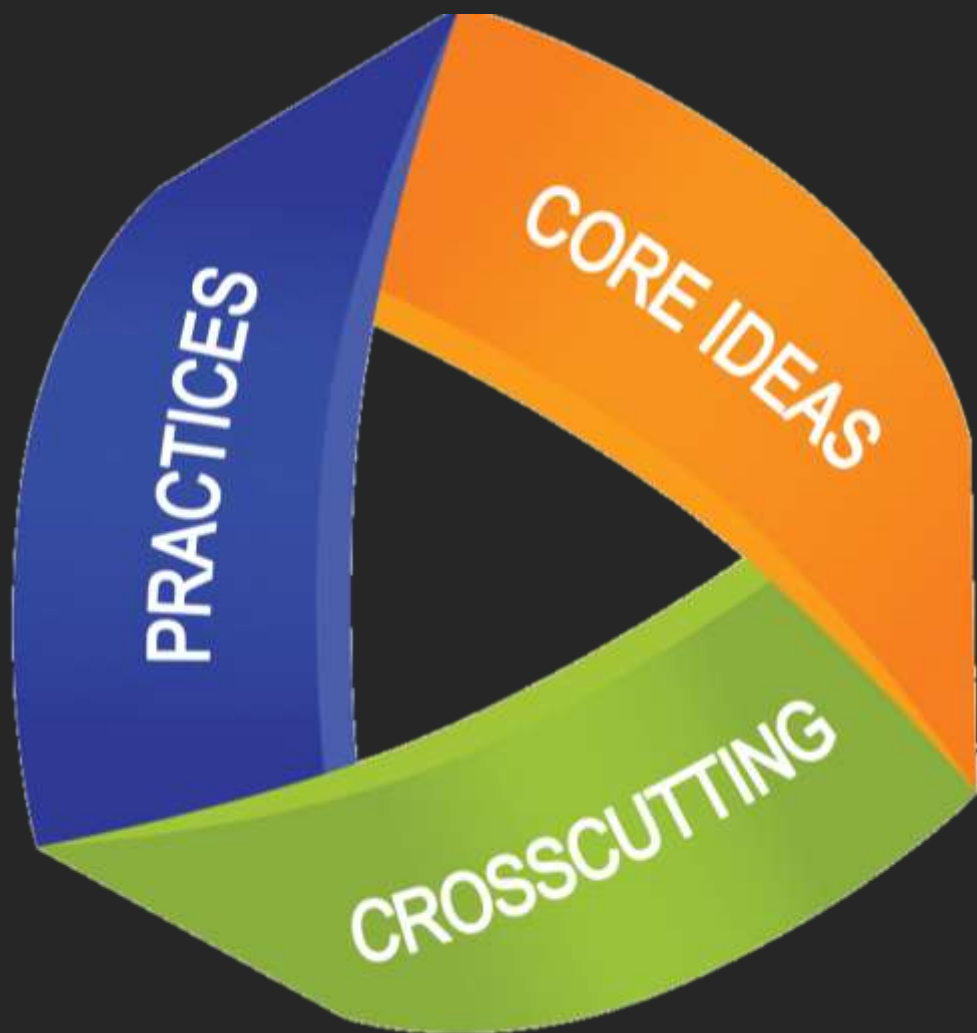
Condense

Minimize

Improve

Strengthen

ENGINEERING VERBS

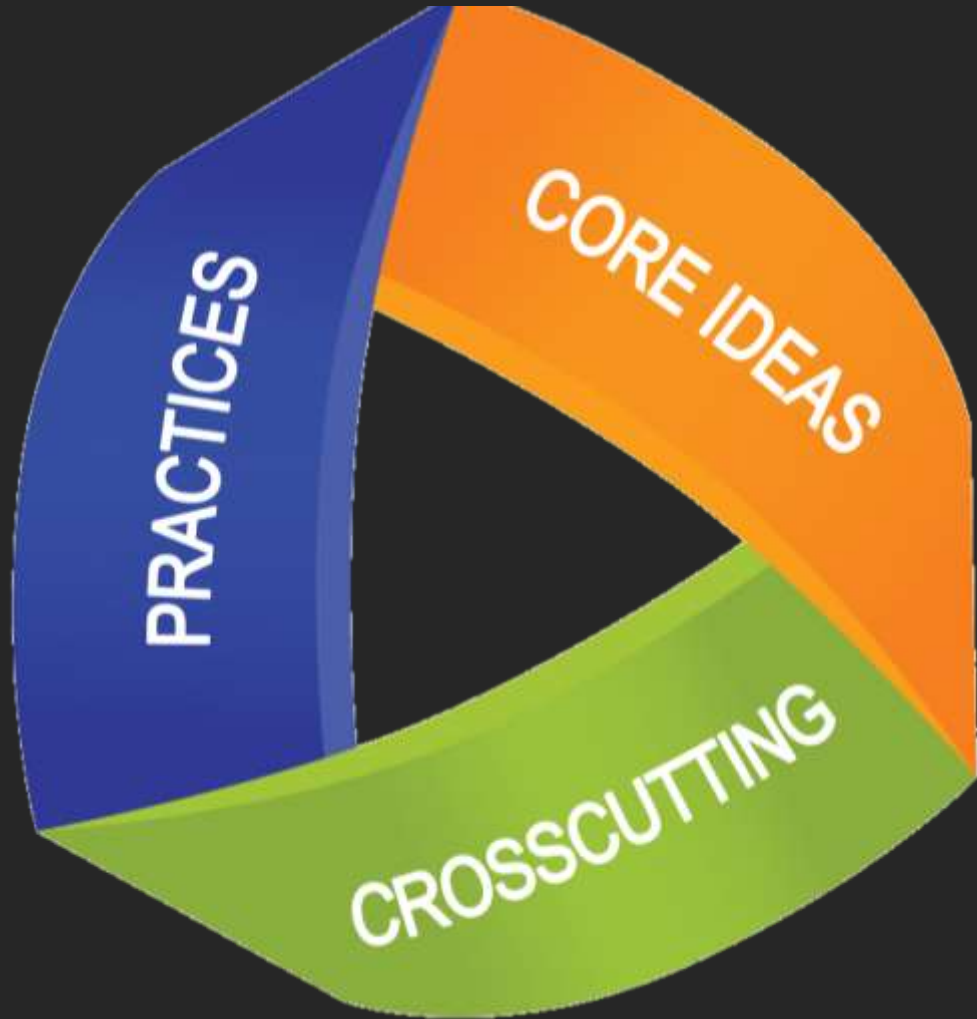


READ IT

Non-fiction

Picture book

Online research



WRITE IT

Make a list of materials

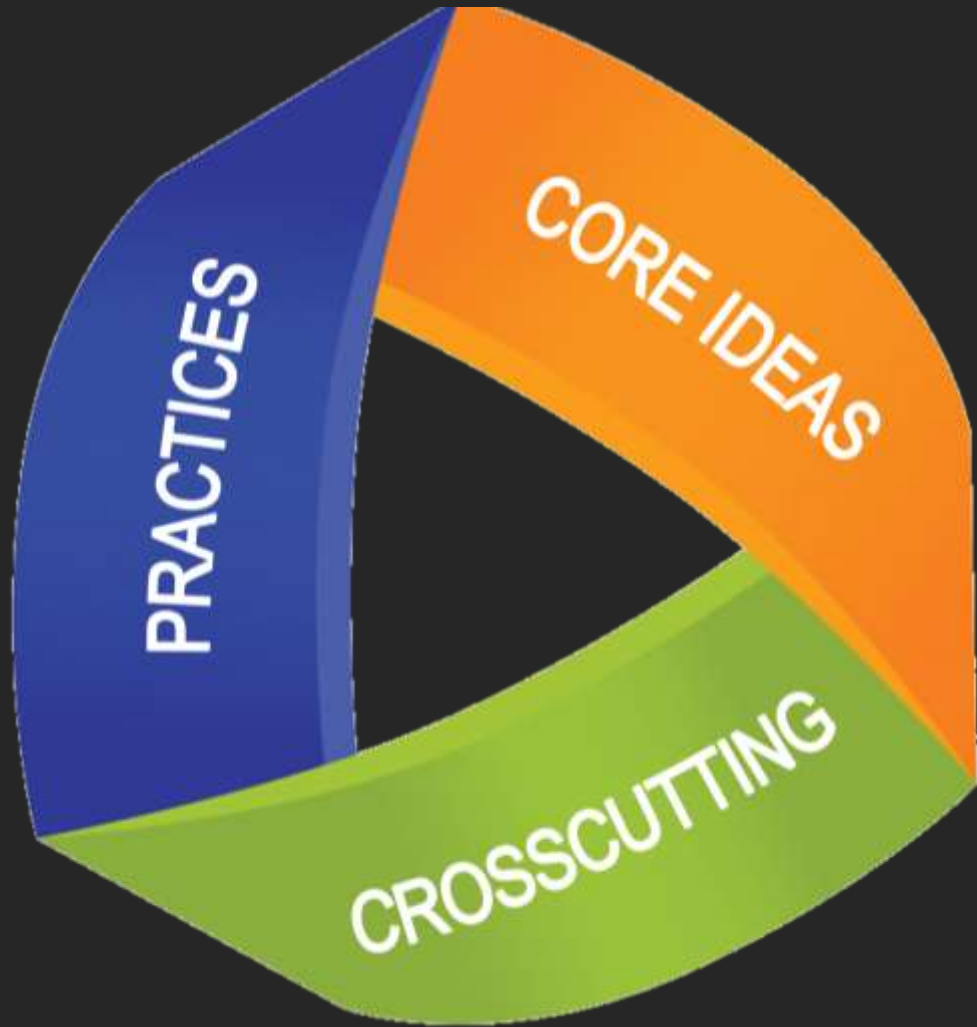
Draw a design

Color a picture

Compose a story or song

Make a video

List the steps that made it
successful



DO IT
SEE IT
TALK IT
READ IT
WRITE IT



STEAM Camps

A spiral-bound notebook with a light blue grid pattern is shown. A blue pen with a silver tip and clip is resting diagonally across the notebook. A dark grey horizontal band is overlaid across the middle of the image, containing the text.

CHALLENGES

MAKING IT ALL HAPPEN



**Make Education
your philosophy.**

**Make yourself
an invaluable resource.**





Promote scientific inquiry.

Know that you
don't need to be an
Expert





Teach what you
know or are
passionate about.

“The biggest challenge and the biggest opportunity
for the maker movement is to
transform education.

My hope is that the agents of change will be the
students themselves.”

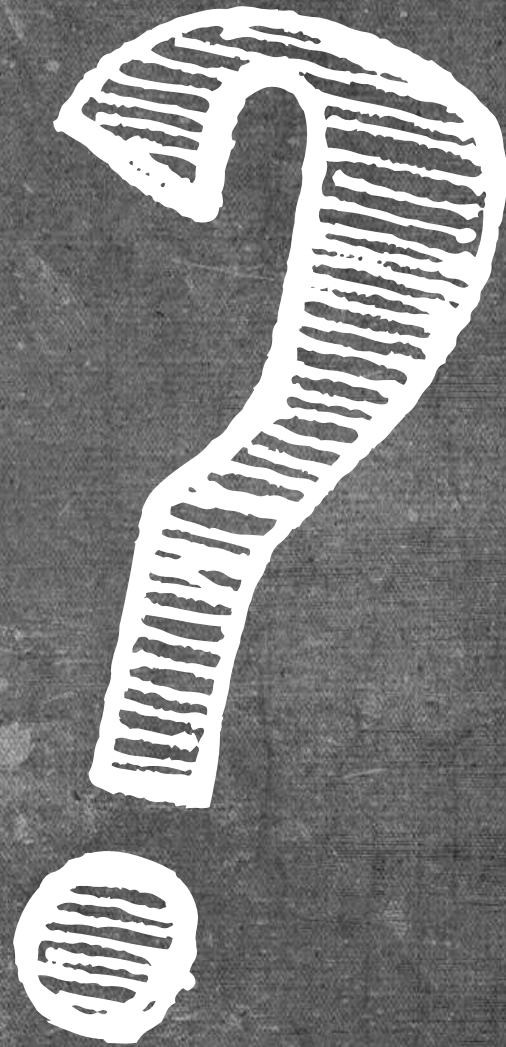
- Dale Dougherty, Founder of *MAKE* magazine

<https://llk.media.mit.edu/courses/readings/maker-mindset.pdf>

Help others
overcome fear.



Ask
WHY





**Be aware that not
everyone is as open
to change as
you
might
be.**



Remove all
preconceived
notions of what
you can
and/or can't
(or aren't
supposed to)
do as a library.

Think beyond
the outside of that
proverbial box.





Start
meaningful
conversations.

Advocate.

**LIBRARIES
ARE
EDUCATION!**



Enter through the back door.

A person in a dark jacket and orange pants stands on a dark, mossy rock formation, looking out over a massive, powerful waterfall. The water is white and turbulent, cascading over a series of rock formations. The surrounding landscape is rugged and green, with hills in the background under a cloudy sky. The text "Be brave." is overlaid on the left side of the image.

Be brave.

A close-up photograph of a person's hand holding a small, white rectangular card. The hand is positioned on the left side of the frame, with the thumb and index finger gripping the card. The card is held against a dark, out-of-focus background, likely a person's clothing. The card itself is white and features the word "Collaborate." printed in a bold, black, sans-serif font, repeated three times in a vertical stack. The lighting is soft, highlighting the texture of the skin and the card.

Collaborate.
Collaborate.
Collaborate.

Be passionate!



MACGYVER

HIS MIND IS THE ULTIMATE WEAPON



LINKS:

Phelps Library

Phelps Library STEAM Initiative
Leah's Summer STEAM Camp (3 workshops)

New York State

Bridging the STEM Skills Gap
FAME - Finger Lakes Advanced Manufacturers Enterprise
FAME Sheet for Educators
FAME Sheet for Parents/Students
FAME Sheet for Manufacturers
MCC Economic Development & Workforce Center
Corning Technician Pipeline Program

USA/Canada STEM/STEAM

STEM State-Level Analysis (Georgetown University)
Illinois Pathways - STEM Learning Exchanges
Government of Canada & STEM

STEAM Activities & Ideas

Code.org
Machine Learning
Try Engineering
Teach Engineering
National Science Teachers Association
Create Make Learn
STAR Library Network
NASA - STEM Lessons from Space

Articles

STEM Starts Earlier Than You Think - Forbes
Free 2-year Tuition for students in Wisconsin



Presentation:

www.phelpslibrary.org/ARSL2018

Leah Hamilton

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