
STEAMing UP
YOUR LIBRARY PROGRAMS
BY LEAH HAMILTON

HOW INNOVATIVE IS YOUR AVERAGE BUMBLE BEE?

DECLINING POPULATIONS

IMPORTANCE TO HUMANS

COMPLEX NAVIGATIONAL SKILLS

EXHIBIT EMOTIONS

USE OF TOOLS

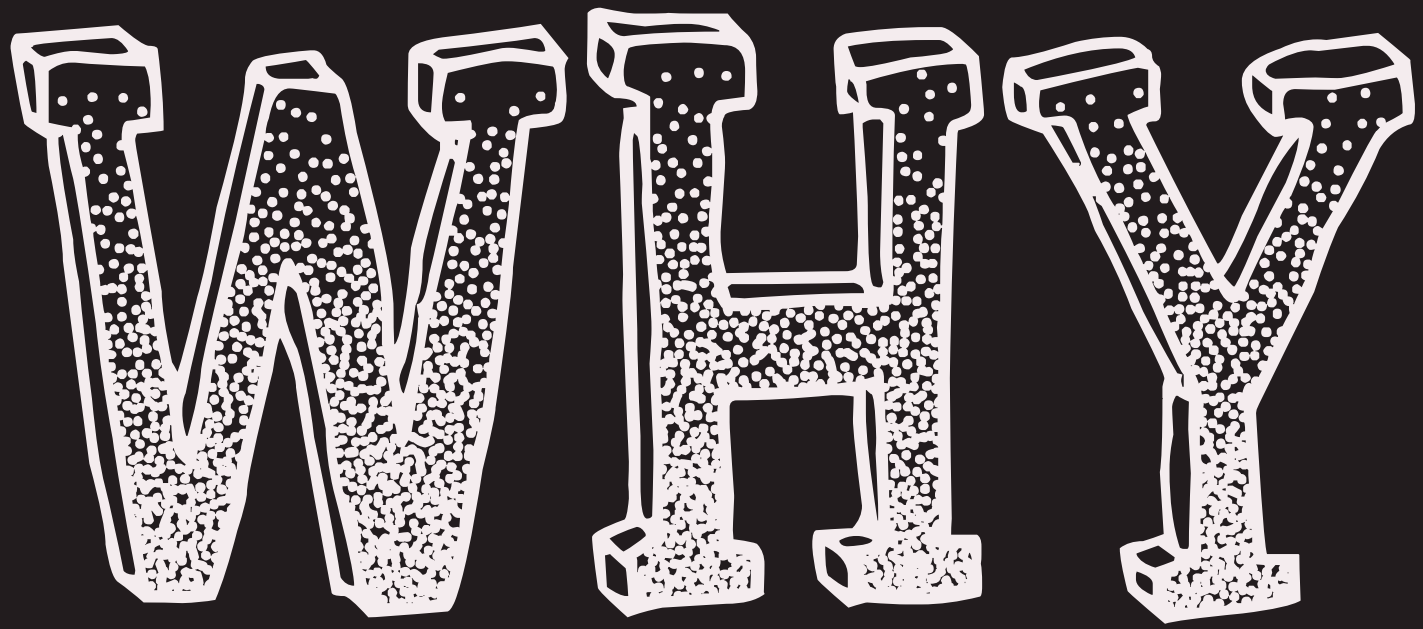
INTELLIGENCE

WHY?

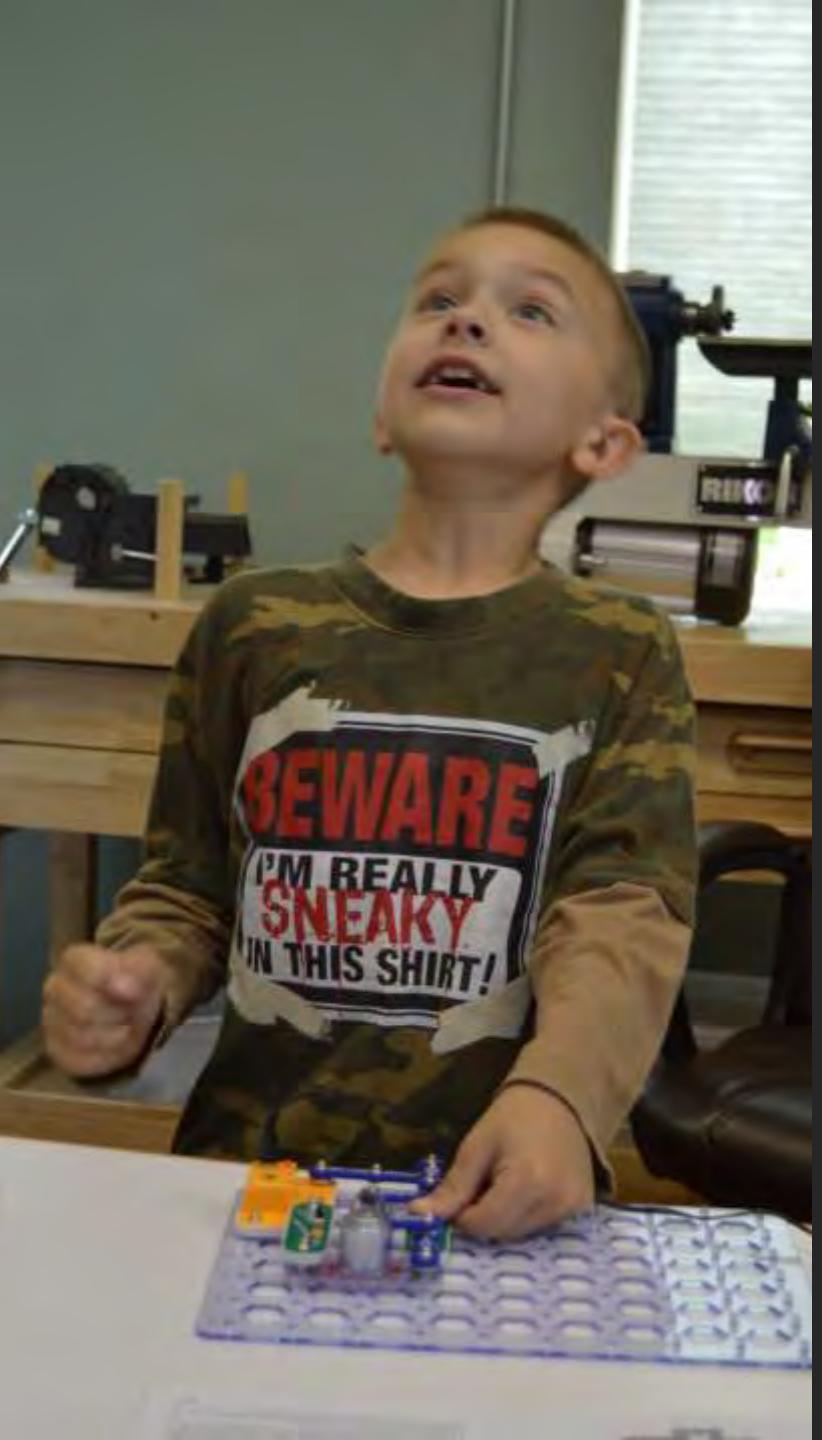
PASSIVE
vs.
CRAFT
vs.
STEAM


STEAMing UP
YOUR LIBRARY PROGRAMS
BY LEAH HAMILTON

KNOW YOUR




New Career Paths
Problem-Solving
Empowerment
Practice for Life
Inspiration
Build Confidence


BEWARE
I'M REALLY
SNEAKY
IN THIS SHIRT!


STAFF
PICKS
MVP
Fox
in
Socks

FACT SHEET

NEW YORK STATE OF OPPORTUNITY. Research and Statistics

Careers in STEM: Science, Technology, Engineering and Math

The median wage of Central New York Region STEM occupations is **$59,970** *a year, which is 59 percent higher than the median annual wage of $37,730 for all workers in the region.*

Do you want to make the world a better place to live?

If you are concerned about changes in the environment, creating better medicines and building new gadgets to make everyday life easier, consider a Science, Technology, Engineering and Math (STEM) education. A STEM education can give you the tools to help solve some of today's most perplexing problems.

Do you wonder what puts the thrill in a roller coaster?

It takes both design and engineering skills to develop a thrill ride. If you are curious about how things work and are a creative and original thinker, a STEM career could be for you.

Do you imagine solving crimes using the latest technology?

You could be a Forensic Science Technician in your local area or travel the world tracking the latest infectious disease. Professionals in STEM careers protect and serve people around the

STEM Careers Pay!

Central New York Region

Occupation	Annual Median Wage*
Architects, Except Landscape and Naval	$87,220
Athletic Trainers	$47,440
Automotive Service Technicians and Mechanics	$35,410
Chemists	$69,210
Clinical, Counseling, and School Psychologists	$69,340
Computer Numerically Controlled Machine Tool Programmers, Metal and Plastic	$51,460
Dental Hygienists	$66,630
Diagnostic Medical Sonographers	$69,260
Electrical Engineers	$91,240
Emergency Medical Technicians and Paramedics	$33,200
Family and General Practitioners	$198,990
Industrial Machinery Mechanics	$55,360
Information Security Analysts	$78,260
Licensed Practical and Vocational Nurses	$38,850
Machinists	$43,180
Medical and Clinical Laboratory Technologists	$56,420
Network and Computer Systems Administrators	$68,040
Nurse Practitioners	$99,160
Pharmacists	$132,730
Physical Therapists	$75,720
Physician Assistants	$108,430
Registered Nurses	$62,420
Software Developers, Applications	$81,790
Veterinarians	$102,300

https://www.labor.ny.gov/stats/PDFs/STEM-Factsheet-Central-NY.pdf

LIBRARIES
ARE
EDUCATION


"THIS IS A BLAST!"
- GAIL, LIBRARY & MAKERSPACE USER


WHERE DO
I START?

CHOICE MATERIAL GLASS OXIDE

PROJECT- BASED LEARNING

(PBL)

More engaging

Increased knowledge retention

Builds success skills

More enjoyable classes for both student and presenter

Connects the Library to the Community

PERSONALIZED LEARNING

(PL)

CRAFT ⇒ STEAM

Paper Engineering

Beginner's Sewing

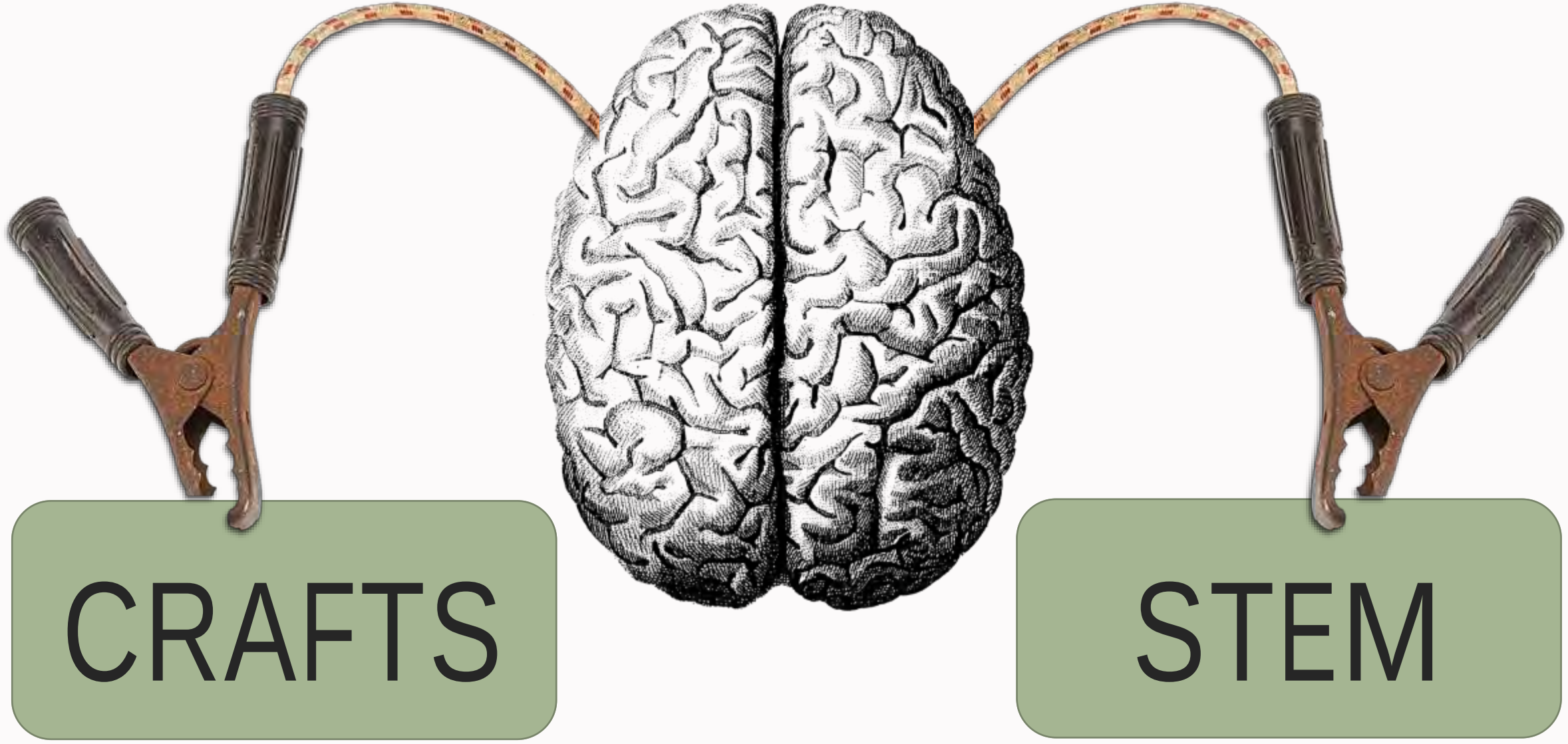
Wreathmaking

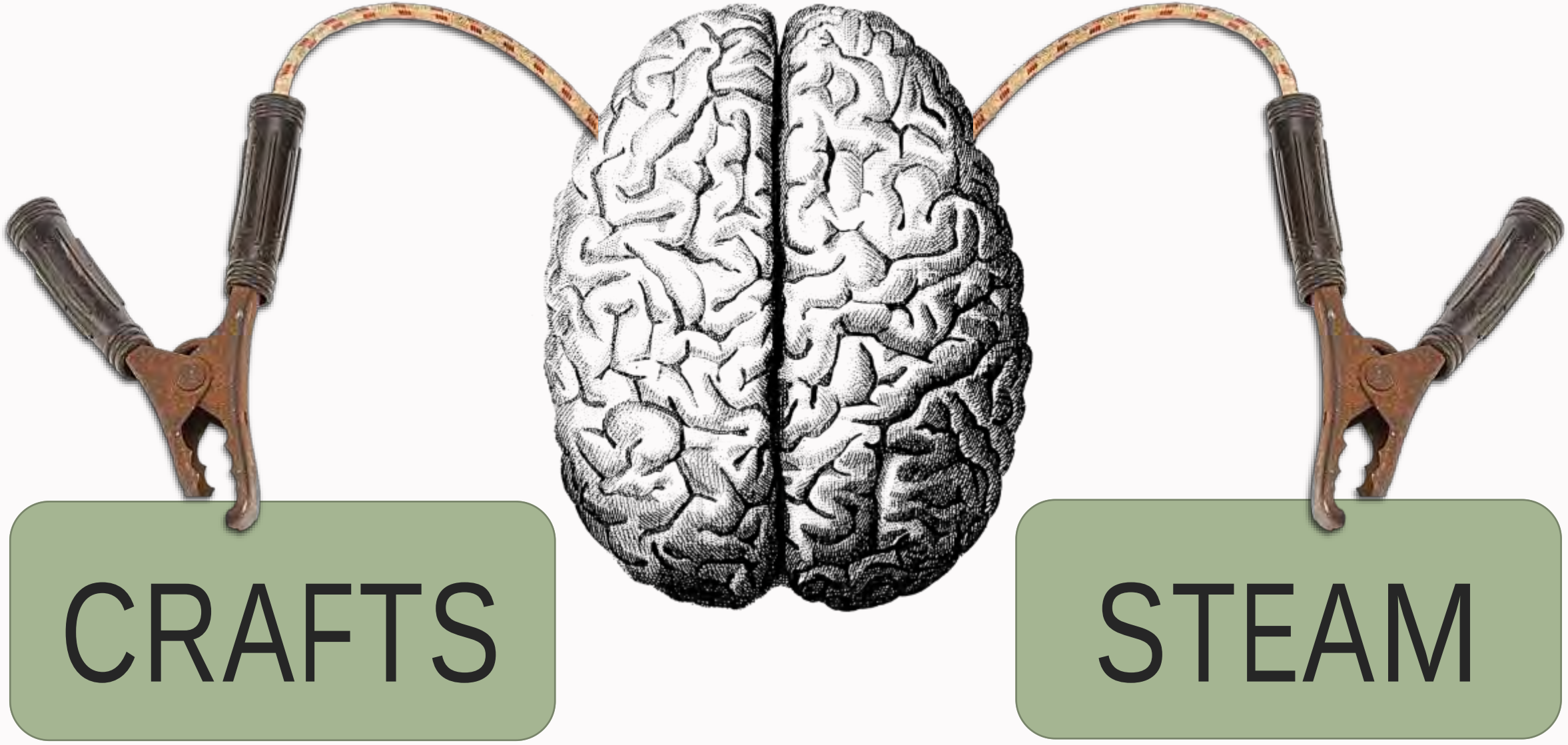
Fiber Dyeing

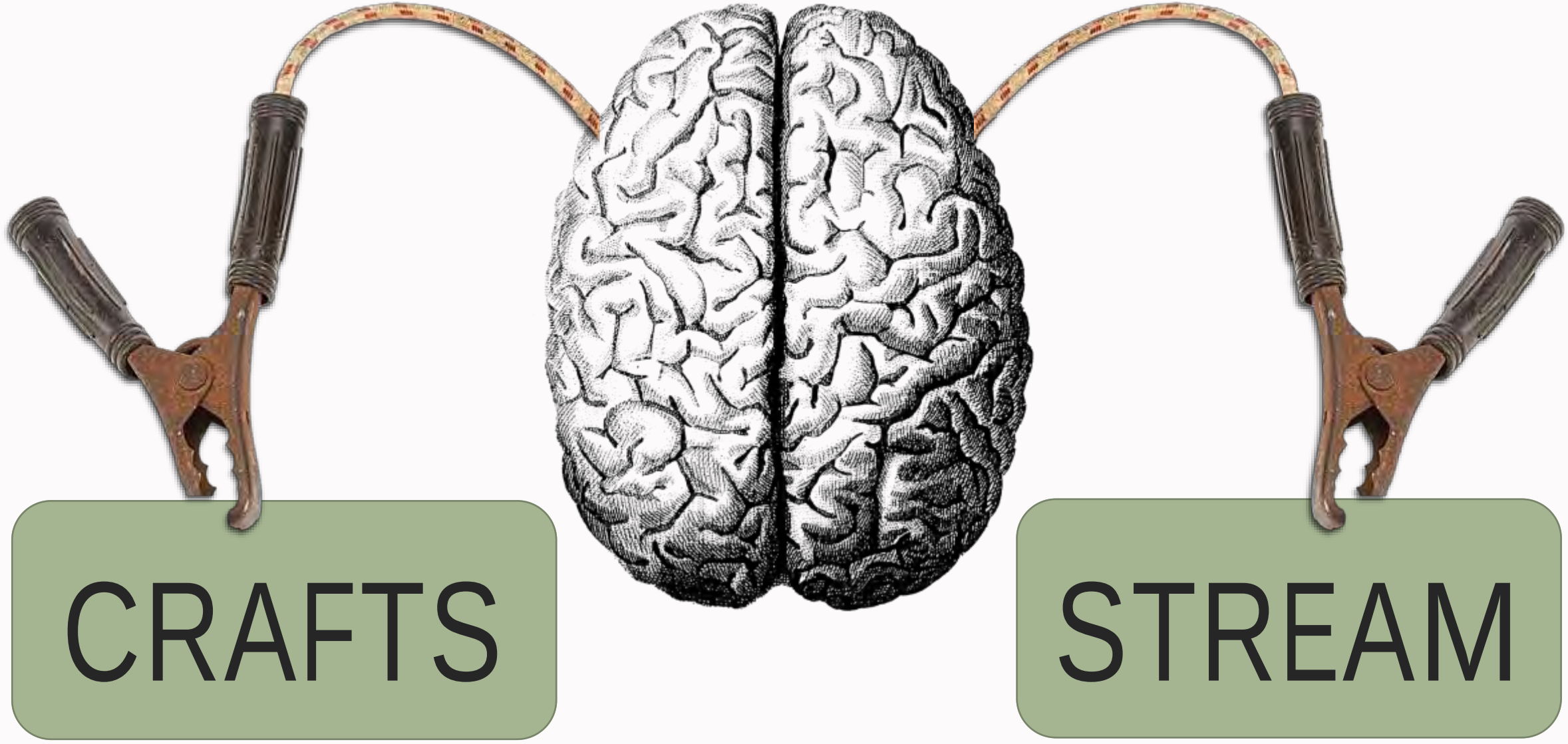
Object Painting

Gardening

Fermented Foods and Cheesemaking


CRAFTS
STEM


CRAFTS
STEAM


CRAFTS
STREAM


PICK A COUPLE
YOU DON'T HAVE TO HAVE EVERY ASPECT OF STEAM


SCIENCE
ASKING THE QUESTIONS

Ask Questions & Construct Explanations

WHAT DO I DO NOW?

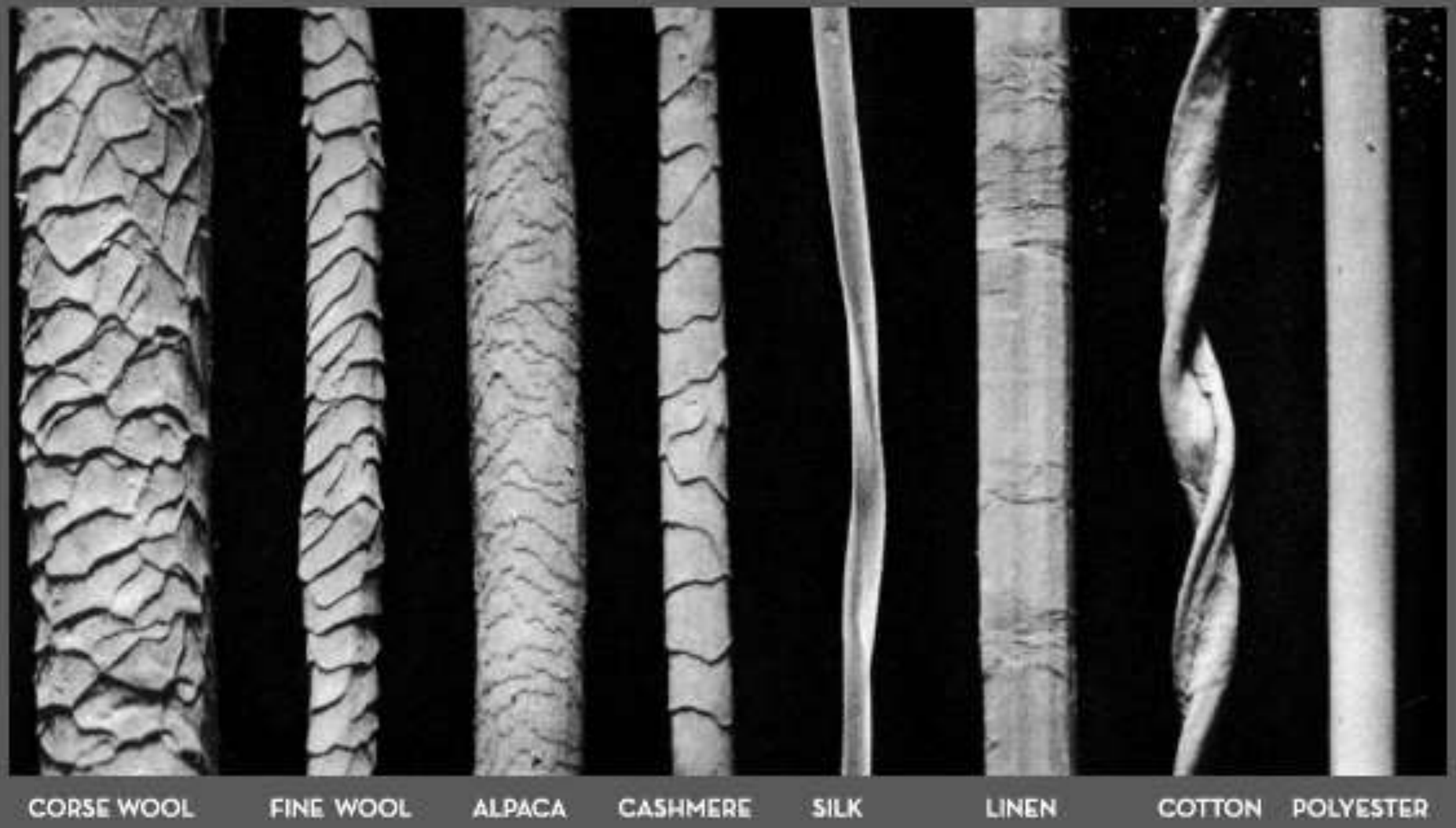
What observations do you have?

What is the problem?

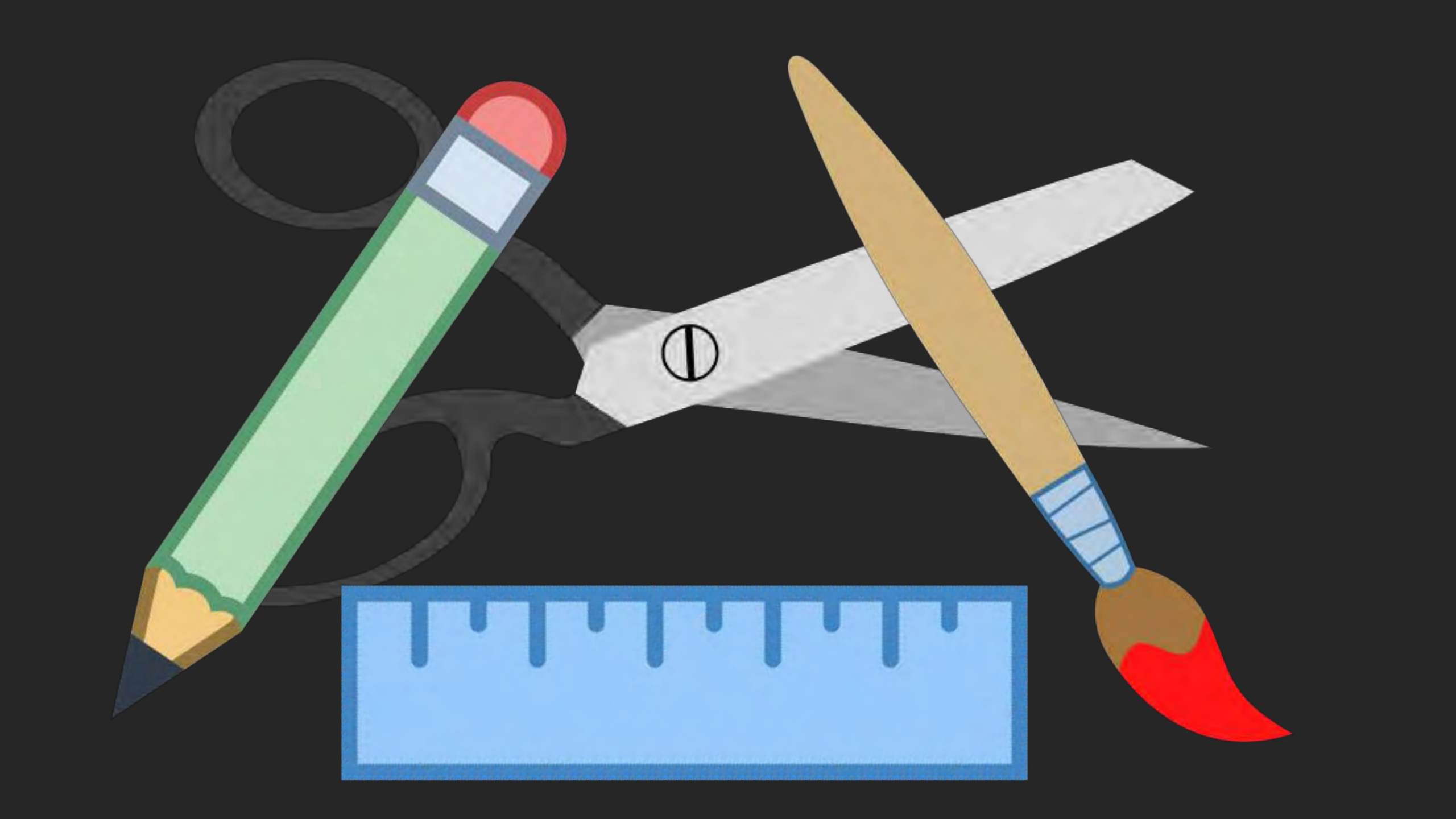
What can you change/do to help us answer this?

Do you have evidence/data to support this?

Can you communicate to the group what is going on?

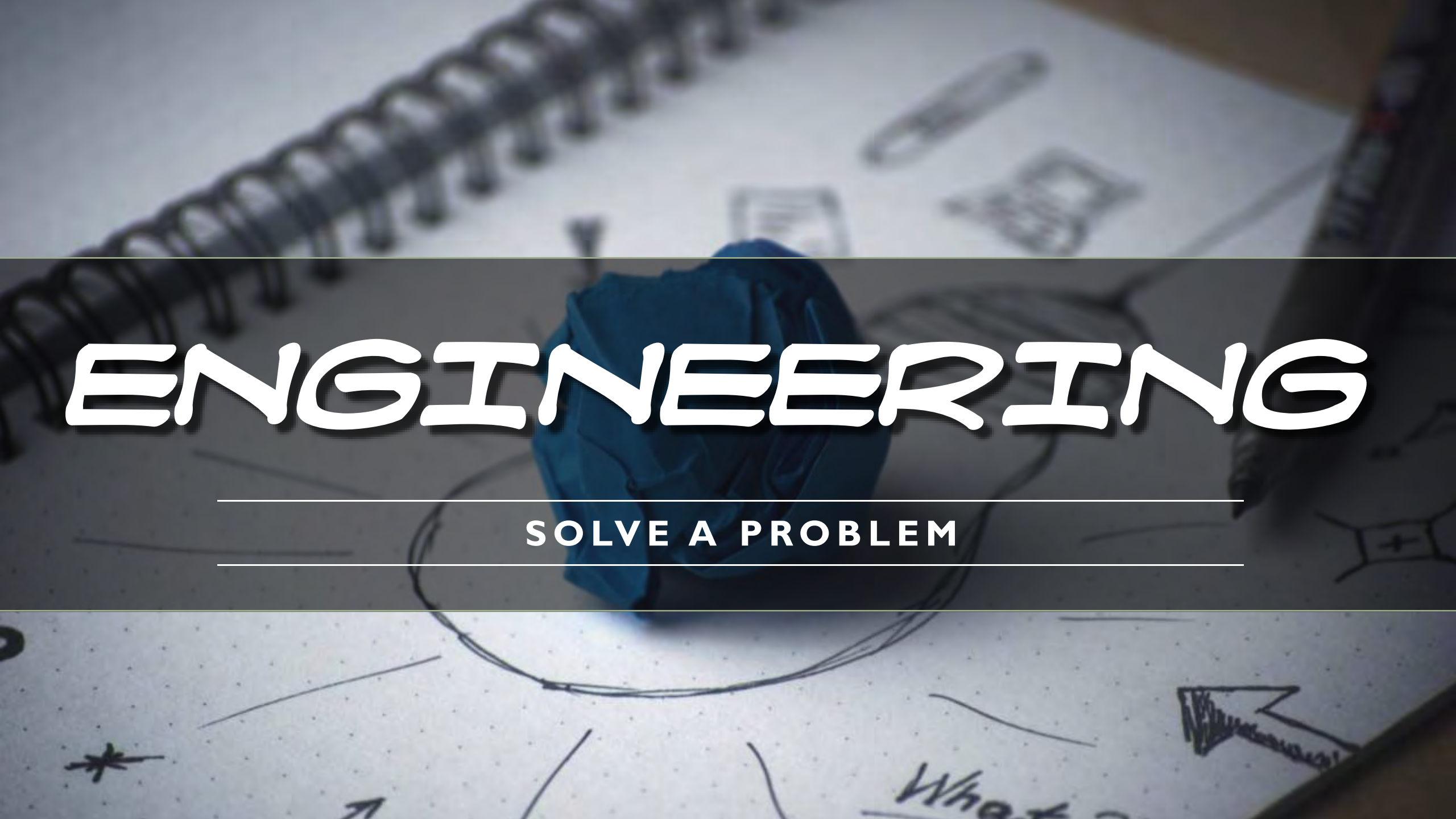

CORSE WOOL
FINE WOOL
ALPACA
CASHMERE
SILK
LINEN
COTTON
POLYESTER


TECHNOLOGY
THIS ONE IS THE EASIEST!



READING

YOU'VE GOT THIS ONE COVERED!


ENGINEERING
SOLVE A PROBLEM

Define Problems & Solutions

WHAT DO I DO NOW?

THE ENGINEERING PROCESS

ASK

1

What's the problem?

How have others approached it?

What are your constraints?

THE ENGINEERING PROCESS

IMAGINE

2

What are some of your ideas or solutions?

Brainstorm ideas.

What one will work best?

THE ENGINEERING PROCESS

PLAN

3

Draw it!

Make a list of materials that you'll need.

Go for it!

Make it!

Try it out!

THE ENGINEERING PROCESS

CREATE

4

What works?
What didn't?

Try it again, and
make it even better!

THE ENGINEERING PROCESS

IMPROVE

5

THE ENGINEERING DESIGN PROCESS

DEFINE
the problem

IDENTIFY
constraints on your solution (e.g. time, money, materials) and criteria for success

BRAINSTORM
multiple solutions for the problem

SELECT
the most promising solution

PROTOTYPE
your solution

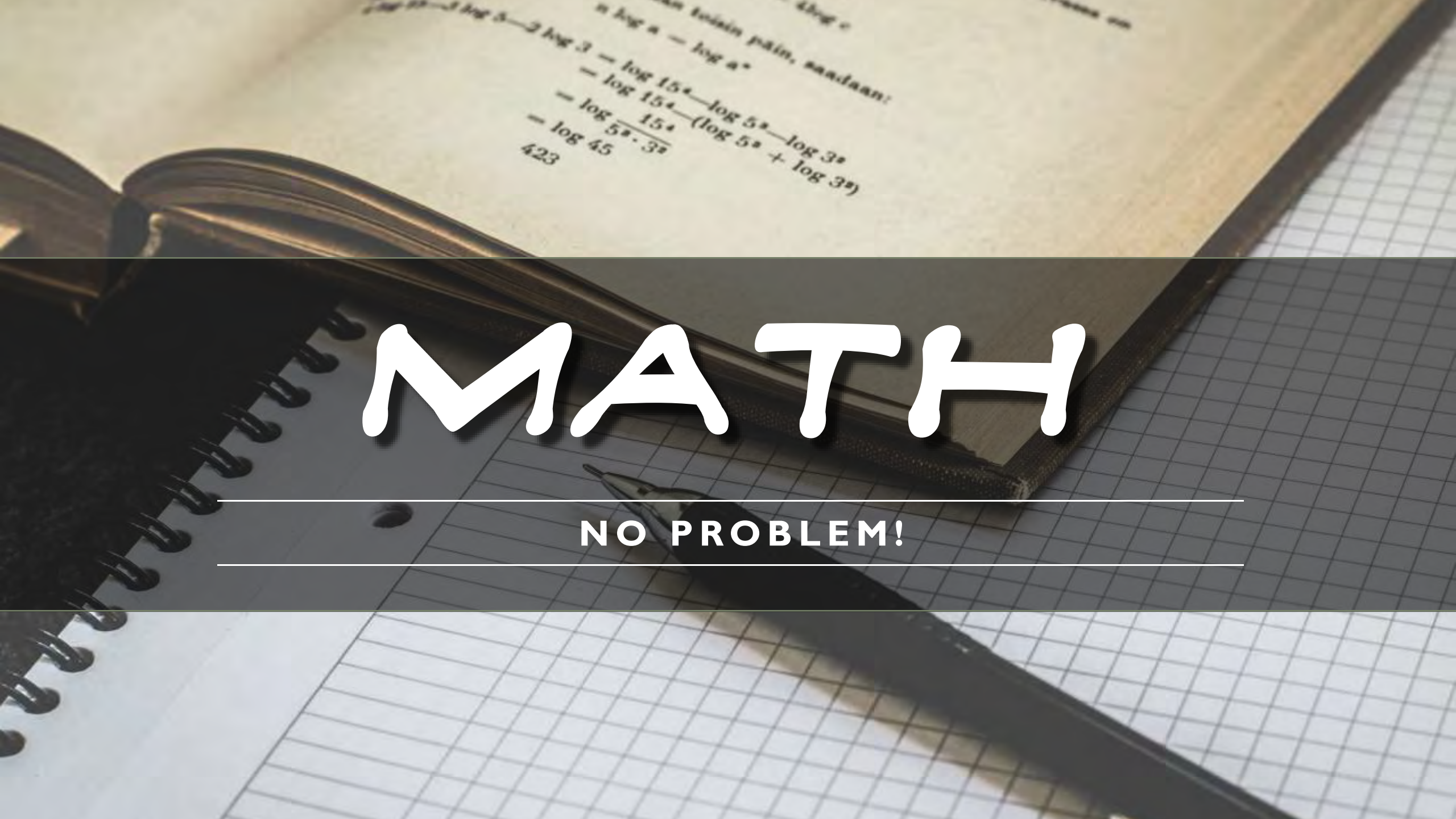
TEST
and evaluate your prototype

ITERATE
to improve your prototype

COMMUNICATE
your solution

https://www.youtube.com/watch?v=MAhpfFt_mWM


ARTS
INFUSE YOUR UNIQUE CREATIVITY


MATH
NO PROBLEM!

Change Your Vocabulary

WHAT DO I DO NOW?

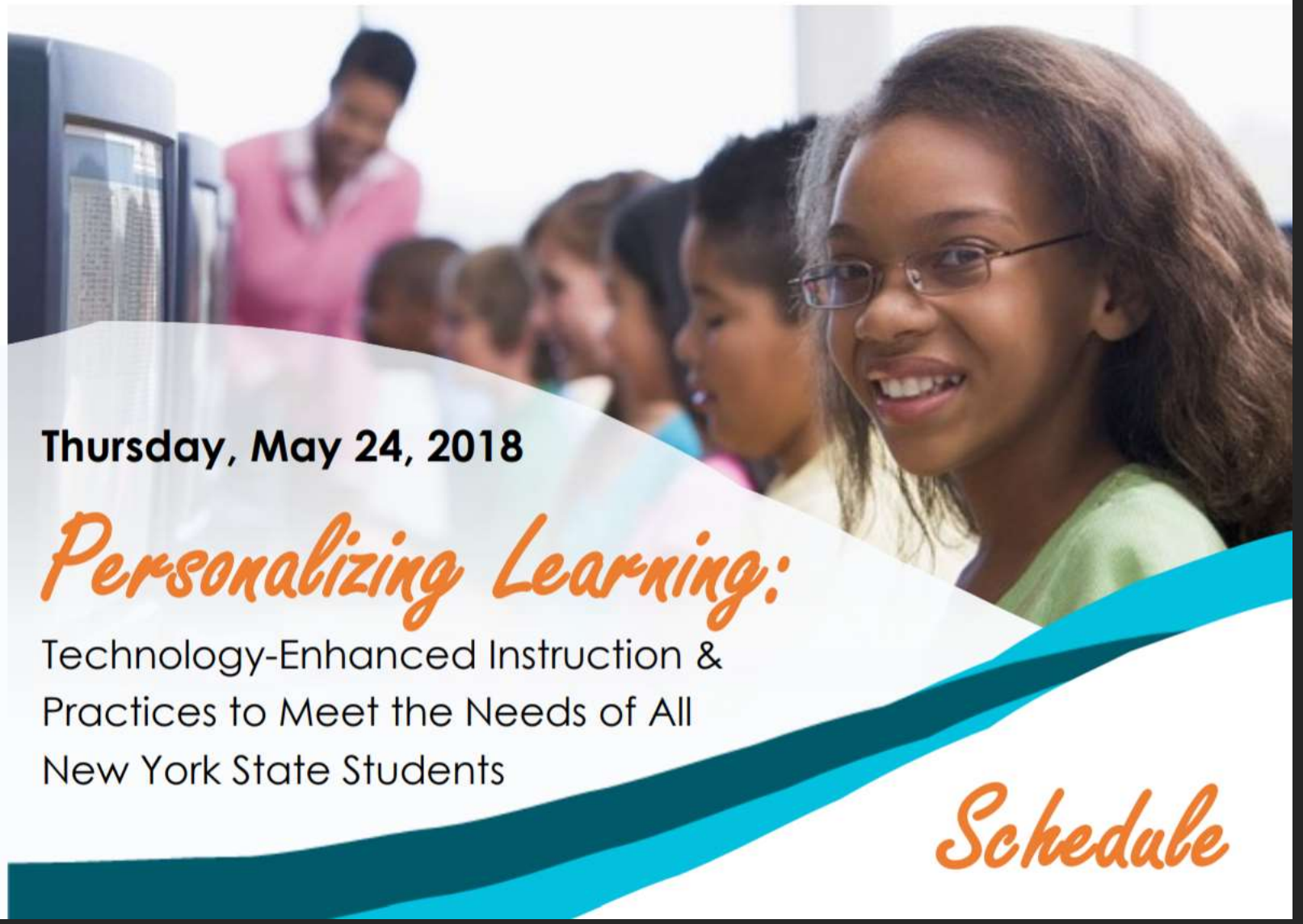
ENGINEERING VERBS

Accelerate
Adapt
Alleviate
Condense
Decrease
Elevate
Eliminate
Improve
Increase
Lighten
Maximize
Minimize
Optimize
Reinforce
Stabilize
Strengthen


COLLABORATE
FIND YOUR LOCAL EXPERTS

EMPIRE STATE STEM LEARNING NETWORK


TRAINING
LEARN FROM YOUR LOCAL EXPERTS



FREE

CONFERENCE

SPONSORED BY

NYSCATE

NYSED


RESOURCES
NO NEED TO REINVENT THE WHEEL


Globetrotting
Gabe Trionfi
Style for Him
Alexandra Bond

"STEM ACTIVITY"
"ALUMINUM FOIL"

CREATEMAKELEARN.BLOGSPOT.COM/

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.

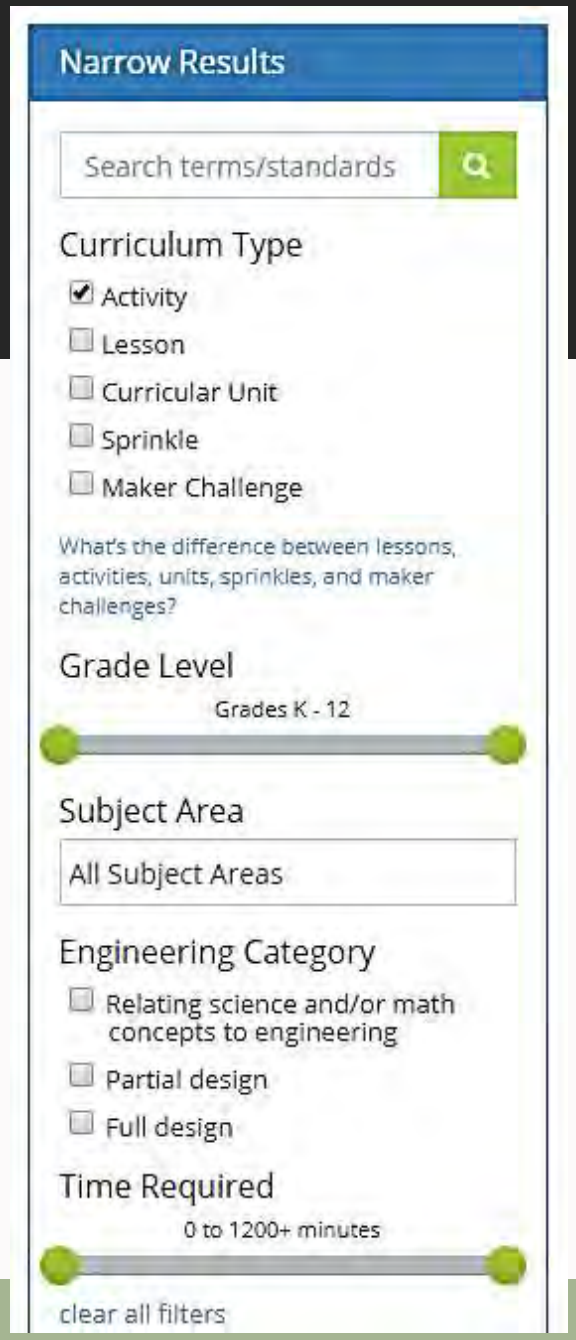
We've been able to transfer the expertise of the many skilled makers who work and play there into our school. It has also increased our confidence as makers.

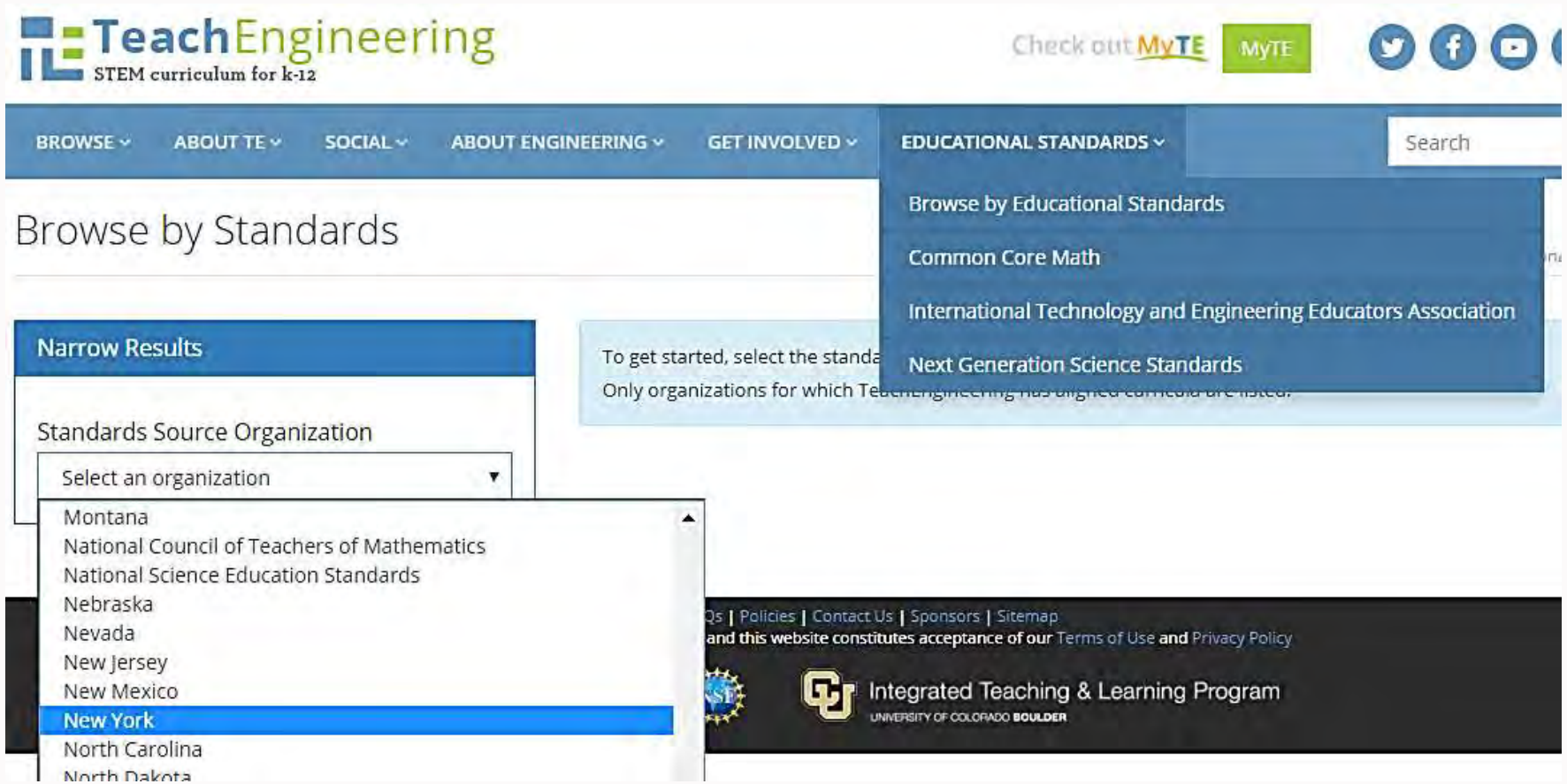
As we've become more confident makers, our students and colleagues have become more engaged learners. They've taken more risks and stepped outside their comfort zones with us. We look forward to sharing everything we've learned with the community at large."

-Carrie Speranza & Jennifer Jacobson

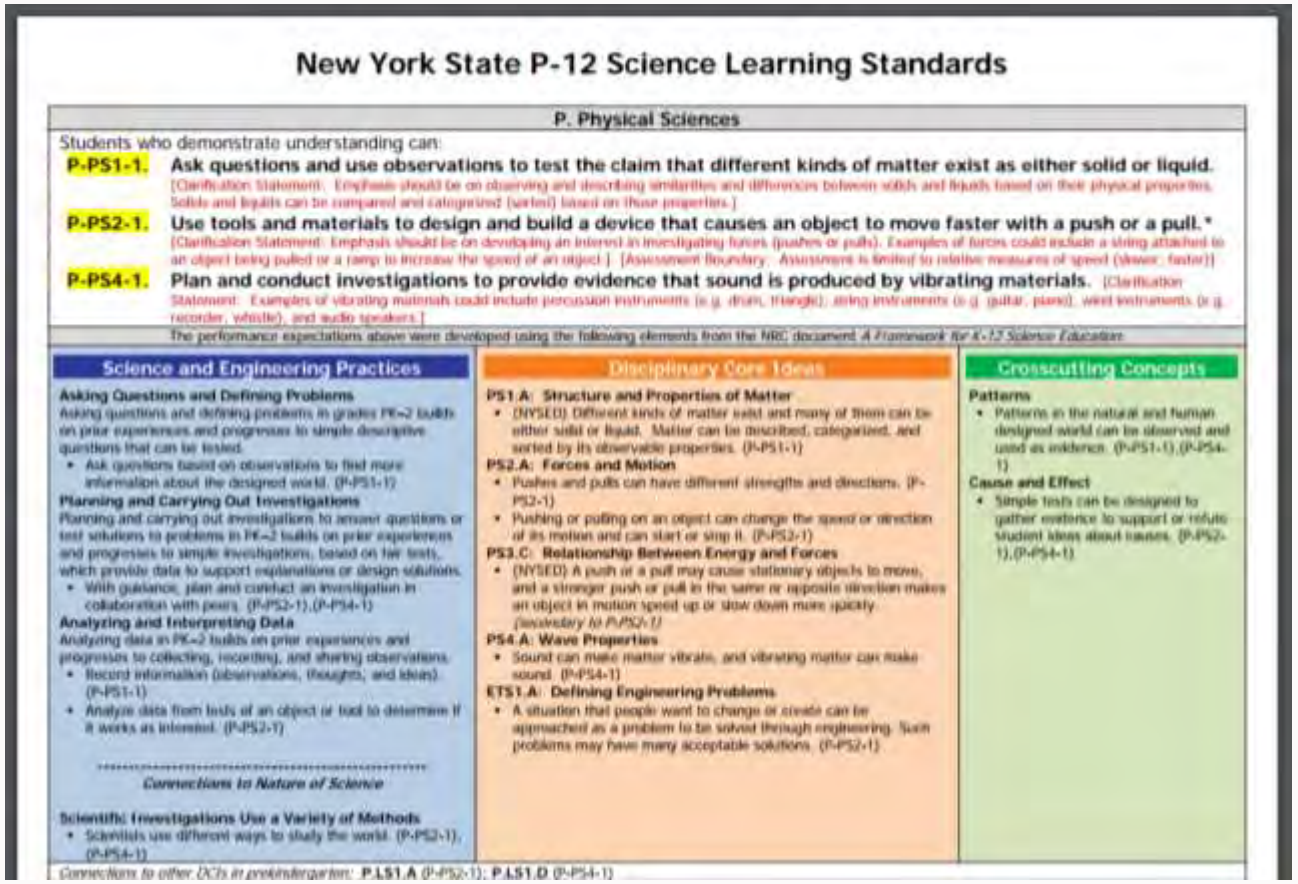
HTTP://TRYENGINEERING.ORG

TEACHENGINEERING.ORG





NEW YORK STATE P-12 SCIENCE & ENGINEERING LEARNING STANDARDS



New York State P-12 Science Learning Standards

P. Physical Sciences

Students who demonstrate understanding can:

P-PS1-1. **Ask questions and use observations to test the claim that different kinds of matter exist as either solid or liquid.** [Clarification Statement: Emphasis should be on observing and describing similarities and differences between solids and liquids based on their physical properties. Solids and liquids can be compared and categorized (sorted) based on those properties.]

P-PS2-1. **Use tools and materials to design and build a device that causes an object to move faster with a push or a pull.*** [Clarification Statement: Emphasis should be on developing an interest in investigating forces (pushes or pulls). Examples of forces could include a string attached to an object being pulled or a ramp to increase the speed of an object.] [Assessment Boundary: Assessment is limited to relative measures of speed (slower, faster).]

P-PS4-1. **Plan and conduct investigations to provide evidence that sound is produced by vibrating materials.** [Clarification Statement: Examples of vibrating materials could include percussion instruments (e.g. drum, triangle); string instruments (e.g. guitar, piano); wind instruments (e.g. recorder, whistle); and audio speakers.]

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices

Asking Questions and Defining Problems
Asking questions and defining problems in grades PK–2 builds on prior experiences and progresses to simple descriptive questions that can be tested.
- Ask questions based on observations to find more information about the designed world. (P-PS1-1)

Planning and Carrying Out Investigations
Planning and carrying out investigations to answer questions or test solutions to problems in PK–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.
- With guidance, plan and conduct an investigation in collaboration with peers. (P-PS2-1),(P-PS4-1)

Analyzing and Interpreting Data
Analyzing data in PK–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.
- Record information (observations, thoughts, and ideas). (P-PS1-1)
- Analyze data from tests of an object or tool to determine if it works as intended. (P-PS2-1)

Connections to Nature of Science

Scientific Investigations Use a Variety of Methods
- Scientists use different ways to study the world. (P-PS2-1), (P-PS4-1)

Disciplinary Core Ideas

PS1.A: Structure and Properties of Matter
- (NYSED) Different kinds of matter exist and many of them can be either solid or liquid. Matter can be described, categorized, and sorted by its observable properties. (P-PS1-1)

PS2.A: Forces and Motion
- Pushes and pulls can have different strengths and directions. (P-PS2-1)
- Pushing or pulling on an object can change the speed or direction of its motion and can start or stop it. (P-PS2-1)

PS3.C: Relationship Between Energy and Forces
- (NYSED) A push or a pull may cause stationary objects to move, and a stronger push or pull in the same or opposite direction makes an object in motion speed up or slow down more quickly. *(secondary to P-PS2-1)*

PS4.A: Wave Properties
- Sound can make matter vibrate, and vibrating matter can make sound. (P-PS4-1)

ETS1.A: Defining Engineering Problems
- A situation that people want to change or create can be approached as a problem to be solved through engineering. Such problems may have many acceptable solutions. (P-PS2-1)

Crosscutting Concepts

Patterns
- Patterns in the natural and human designed world can be observed and used as evidence. (P-PS1-1),(P-PS4-1)

Cause and Effect
- Simple tests can be designed to gather evidence to support or refute student ideas about causes. (P-PS2-1),(P-PS4-1)

Connections to other DCIs in prekindergarten: **P.LS1.A** (P-PS2-1); **P.LS1.D** (P-PS4-1)

Yellow = New

Blue = Practices

Orange = Core Ideas

Green = Concepts


LET'S
STEAM
IT UP

A. Two personal goals
B. Two professional goals
C. Schedule Activities
D. Choose Resources

TO DO LIST

Know that you don’t need to be an expert in any technologies.

TO DO LIST

Start meaningful conversations.

TO DO LIST

Change your vocabulary.

TO DO LIST

Promote scientific inquiry.

TO DO LIST

Remove all preconceived notions of what you can and/or can't do as a library or as an individual.

TO DO LIST

Look for grants & organizations
focused on women and girls
in engineering and sciences.

TO DO LIST

Advocate for tech programs within your school district.

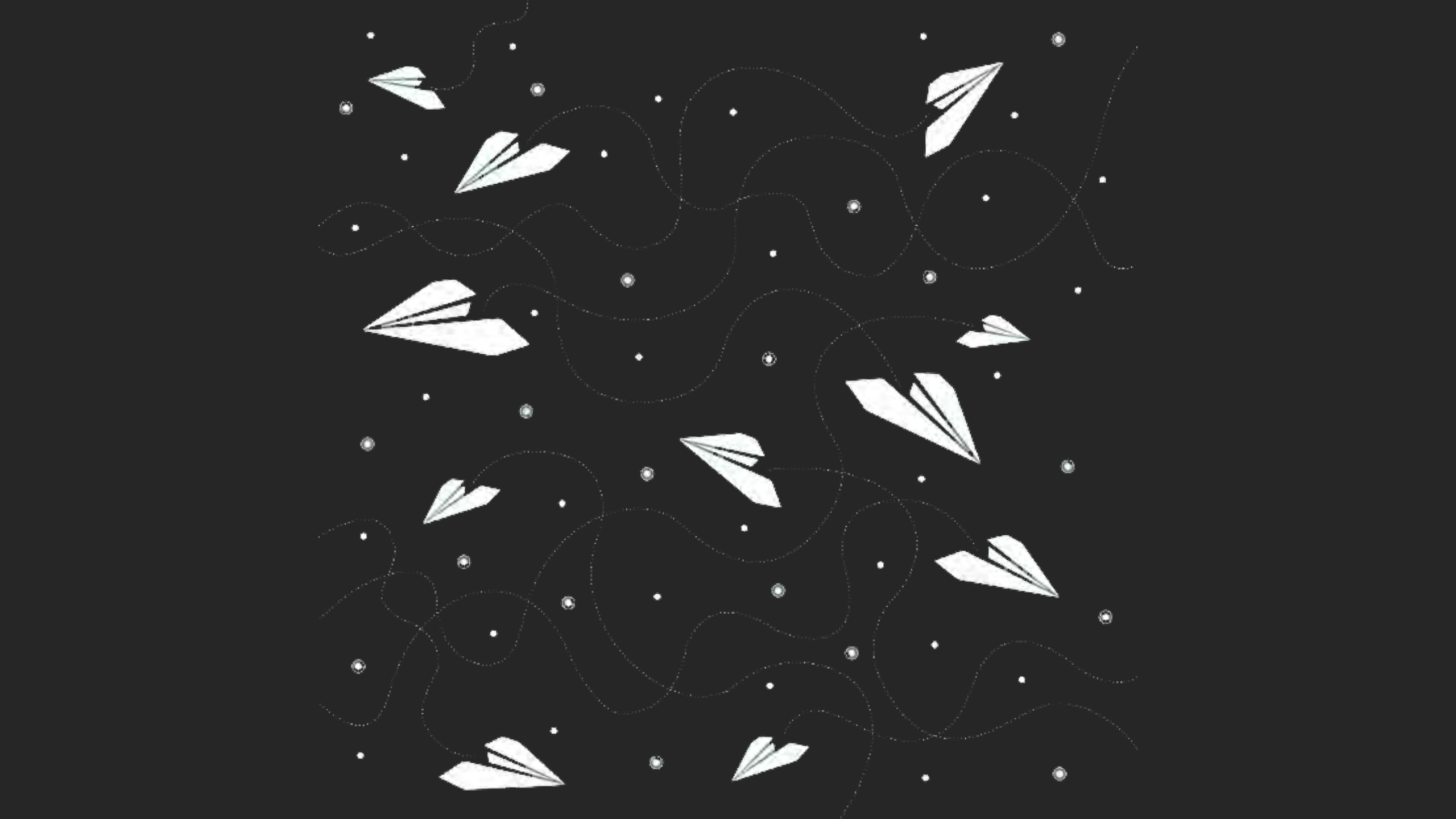
TO DO LIST

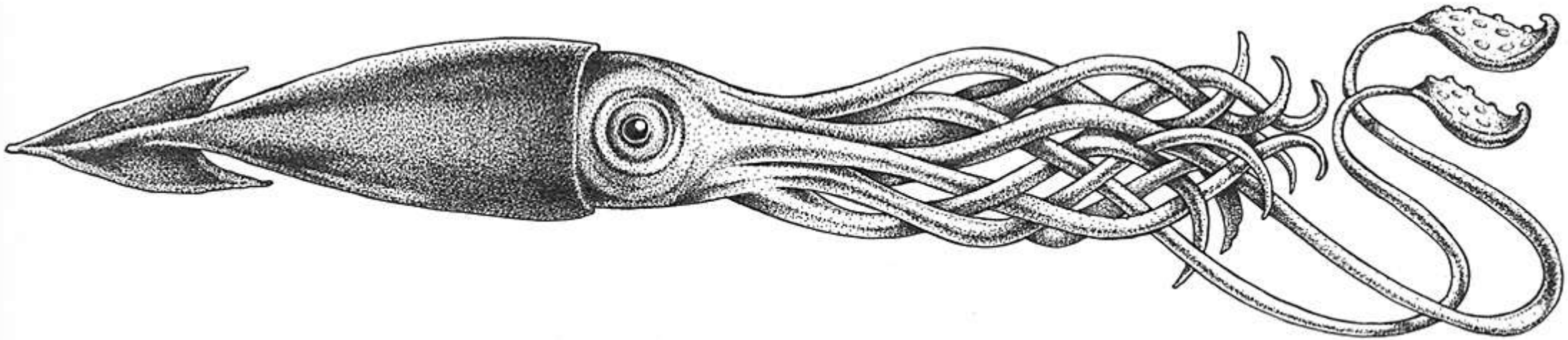
Collaborate.
Collaborate.
Collaborate.

TO DO LIST

PROJECTS

GETTING HANDS-ON





CITIZEN SCIENTIST

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

li brary
is more funer
than you think.

Leah Hamilton, Executive Director
Phelps Library
8 Banta St, Ste 200, Phelps NY 14532
315.548.3120

PCMLdirector@gmail.com

www.phelpslibrary.org

www.facebook.com/PhelpsLibrary/

#the_phelps_library

Presentation:
https://www.phelpslibrary.org/clrc