

Supporting OST Staff in STEM Curricula

An ACT Now STEM Webinar
January 19, 2022



Agenda



- **Welcome and Introductions**
- **Level Setting**
 - Who is ACT Now?
 - What is STEM?
 - Why STEM in OST?
- **Panelists' Presentations**
- **Panel Discussion + Q&A**
- **Breakout Room Activity**
- **Closing and Evaluation**

Chat!

React!

Engage!





Learning Goals

1. Learn about specific resources (and organizations) that aid OST staff in teaching STEM
2. Discover ways of reframing science curricula and questions to make the material more accessible for staff
3. Explore available curricula and analyze it for your own program



Introductions



Lesley Fisher Chapman

she/her

Program Coordinator

Moderator



Nichole Pinkard, PhD

she/her

Associate Professor, Learning Sciences
Northwestern University



Melissa Siska

she/her

Student Programs Manager

Chicago Academy of Sciences / Peggy Notebaert Nature Museum



Brianne Caplan

she/her

Executive Director, Code Your
Dreams



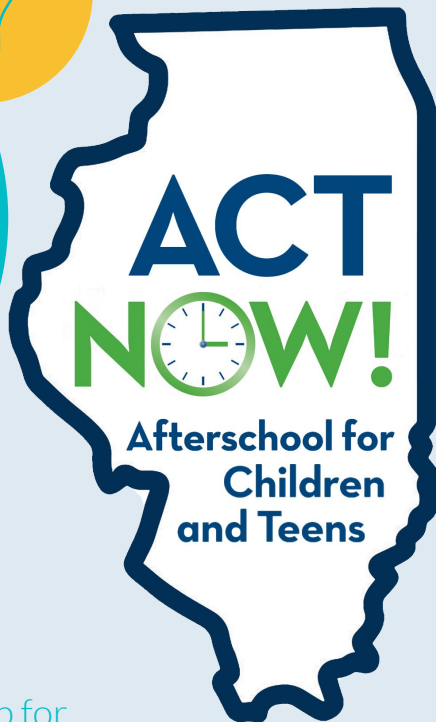
Marwah Saleh

she/her

Education Programs Specialist



ACT Now



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Why focus
on **STEM**?

Science, Technology, Engineering, and Math



Life Skills

College &
Career
Prep

Job
Growth

Economic
Sustainability





Why STEM in afterschool?

- Exposure to wide range of STEM topics and activities
- Hands-on, minds-on learning in an informal environment



- Lack of knowledge is not a barrier to high-quality programming





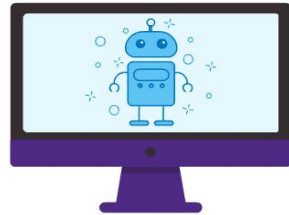
STEAMbassadors

Updated 1/13/21





Nicole Pinkard is testing software she developed, based on playground songs, for effectiveness in improving children's reading skill. Photo by Bob Kalmbach



CHICAGO
STEAMBassadors
From Community for Community



Youmedia Chicago
Youth-powered 21st century learning



The Digital Youth Network
Cultivating Digital Media Citizenship in Urban Communities
Brigid Barron, Kimberley Gomez, Nicole Pinkard, and Caitlin K. Martin





The purpose of STEAMBassadors is to offer an opportunity for Chicago and Evanston area college students to be trained to mentor youth in STEAM fields. STEAMBassadors serve as mentors in Chicago and Evanston organizations supporting programming for Black and brown youth.

This offers a STEAM education to both the youth and mentors involved.



STEAMbassadors

From Community for Community

STEAMbassadors engages 18-24 year-old college students in the Chicagoland area to discover and strengthen their STEAM interests and share those interests with Chicago youth through mentorship and creative activity.

It Takes a Village

STEAMbassadors is a workforce initiative supported by a collaborative partnership between Northwestern University and Chicago Community Colleges.

Founding Partners



Launch Partners



Launch Villages



Camp Partners



Funders



STAKEHOLDERS

Community college students and community educators trained to facilitate Summer of STEAM; Families engaging in the Summer of STEAM challenge; Decision-makers in the community STEM network engaging in community of practice around data-driven ecosystem equity design

SOFT INFRASTRUCTURE

STEAMbassadors training model
DST community of practice
Summer of STEAM parent supports
STEAMville regional activities
Camp HoMaGo

INFORMATION INFRASTRUCTURE

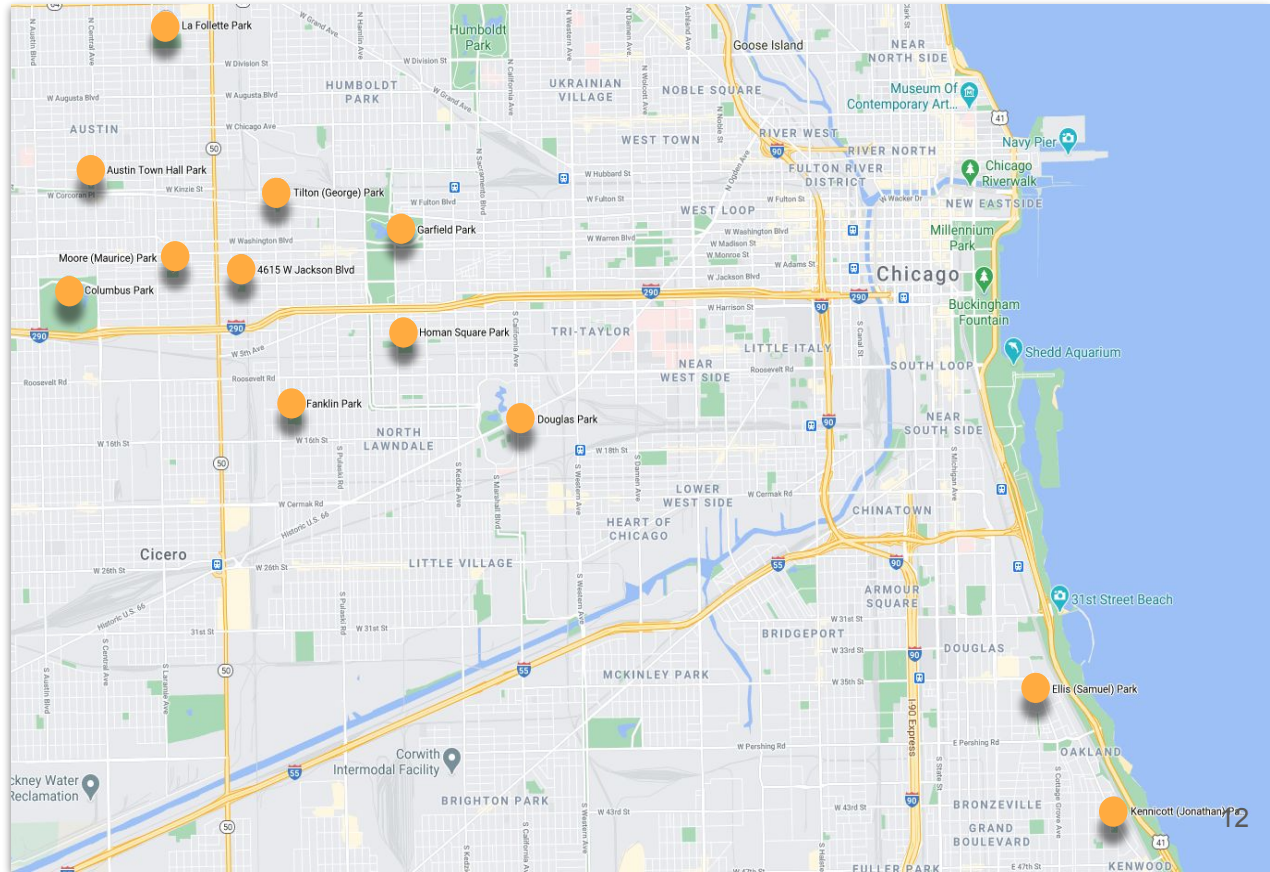
STEAMville learning platform
Dashboard and related practices to support intentional planning
Opportunity landscape
interactive GIS maps

HARD INFRASTRUCTURE

Training and camps in community hubs
Summer planning utilizing local transportation and internet access opportunities

Implementation Sites

1. Austin Town Hall
2. Clark Park
3. Columbus Park
4. Douglas Park
5. Ellis Park
6. Franklin Park
7. Garfield Park
8. Homan Square Park
9. Kennicott Park
10. Lafollette Park
11. Moore Park
12. Taylor Park
13. Fuller Park
14. Tilton
15. Open
16. Virtual (Online)



The STEAMbassadors

A person is shown from the back, sitting at a desk and using a tablet. The tablet screen displays a complex, circular, fractal-like pattern. To the right, another tablet is visible, showing a document with text. The entire scene is overlaid with a semi-transparent blue filter. The text 'The STEAMbassadors' is prominently displayed on the left side of the image.

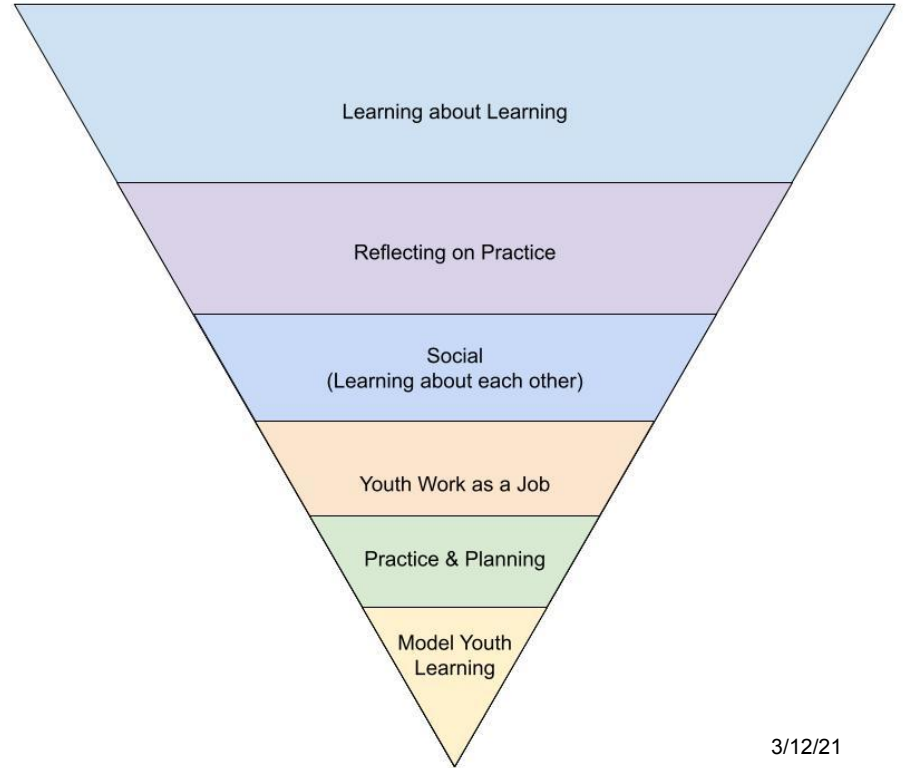
STEAMbassador Timeline



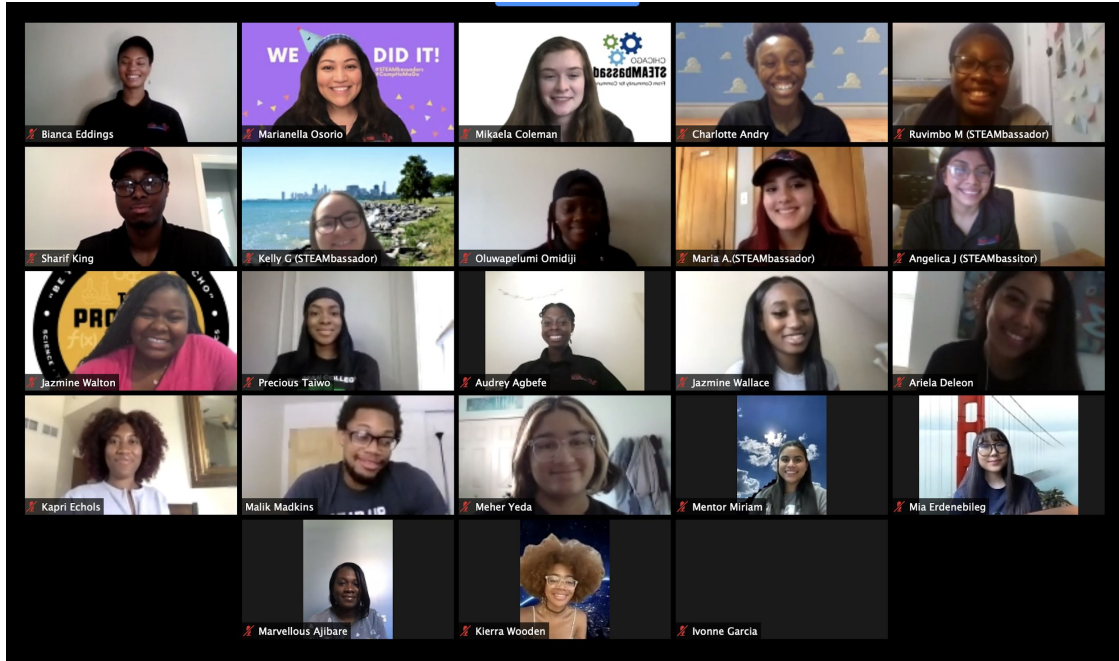
STEAMbassador Training



Phases	Timing
Application Activities	March 19 - April 9
Foundational Training	May 16 - 29
Placement Training	May 30 - June 12
Camps & Facilitation Support	June 13 - August 20
Post-Facilitation	August 20 - onward



STEAMBassadors



Over Two years **103 total mentors** have led STEAMBassadors camps.

*According to the "STEAMBassadors Post Survey 2020" Qualtrics Survey--not every STEAMBassador filled out this survey. **28 total STEAMBassadors responded to this survey. This background information represents ~60% of all STEAMBassadors.**

Youth Camper Experience



Camp HoMaGo: Live Virtual STEAM Schedule

July 6 - August 7

For 5th-8th Graders

MONDAY/WEDNESDAY

Block A | 10:30-12 PM

- Minecraft
- Silhouette Swag
- ProjX Launch

Block B | 1:30-3 PM

- App Design
- SportSense

TUESDAY/THURSDAY

Block A | 10:30-12 PM

- FUSE Studio
- PVC Carnival
- Redesign Play

Block B | 1:30-3 PM

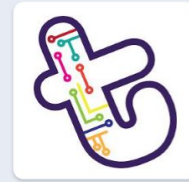
- Coded Beats Club
- Interactive Storytelling

FRIDAY

10:30-12 PM

All campers are invited to join Freedom Fridays. Every week we will highlight campers' work and celebrate each other.

Camp HoMaGo: STEAM Program Partners



Camp HoMaGo 2021: Snapshot of Summer STEAM Offerings

App Design

In Partnership with CECSE

Campers will design and develop an App using the Swift coding language. We do not anticipate a fully functioning app at the conclusion of a 6-week session but it is expected that everything on the app is applied using Swift coding.

Digital Media

A HOMAGO Original

Digital Media will focus on projects that encourage campers to develop and express ideas through video, photography, music and drawing.

asynchronous

comes with kit

Interactive Storytelling

In Partnership with 826 CHI

826CHI seeks to amplify young voices by exploring endless possibilities through the power of writing. Throughout the summer, campers will use their creativity to respond to a number of prompts blending writing and digital media.

PVC Carnival

In Partnership with Project Exploration

Step right up, step right up! This is no regular carnival! Campers will be given weekly engineering challenges and will have to complete builds using PVC pipes. Your camp mentor will assist you with tutorials and incorporating technology, such as sensors or lights, as you create a blueprint, description, and visual documentation.

Each week, the best build will be determined, and will be entered into the end-of-summer showcase!

asynchronous

comes with kit

Silhouette Swag

A HOMAGO Original

Silhouette Swag will encourage STEM identity by designing, creating, and re-imagining everyday artifacts and activities.

comes with kit

Ariela's Drone Squad

A HOMAGO Original

KITS Included - Become skilled coders and drone-flyers in Ariela's Drone Squad! Campers will learn the fundamentals of coding using Swift and by coding fun and challenging routines for a digital drone. By the end of summer, campers will know how and when to apply their knowledge of essential coding concepts and understand the power code has to significantly make a difference in the! Become a part of the Squad this summer - there's a whole new coding universe waiting for you! Note: You'll need an iPad to participate in this camp.

asynchronous

comes with kit

Digital Music

In Partnership with McGaw YMCA

In Digital Music, campers will explore different recording and producing methods that popular artists use to make music. In addition, campers will also explore the use of music and sound within different digital mediums, such as film, television, and more.

asynchronous

comes with kit

Minecraft Mazes

In Partnership with TIILT Lab

Campers will play in and design various world and challenges in the Minecraft Education Edition virtual environment. As part of this experience, campers will be introduced to concepts from computer science that can help them create puzzles for their peers to solve. The focal challenge that campers will interact with is an escape room house where each room features a different puzzle.

Redesign Play

In Partnership with NU/ETHS Partnership

In Redesign Play, campers will use a process of design thinking to reimagine and improve sports, games, and everyday activities. Mentors leading this offering will bring out campers' creativity and collaboration, while exploring identity, empathy, and agency as youth design their world as they envision it could be.

SportSense

In Partnership with TIILT Lab

SportSense highlights the ways that sports and technology can work together to improve learning and athletic performance. Campers will test, design, and critique sports-related technologies. Campers will also create their own sports related app or wearable.

comes with kit

limited availability

Coded Beats Club

In Partnership with TIDAL Lab

Coded Beats Club will encourage campers to explore creative musical expression through computer coding using the Python programming language.

FUSE Studio

In Partnership with FUSE

Using the FUSE website to complete a set of STEAM challenges, campers will create projects of interest to them while learning the tools and skills of STEAM professionals.

comes with kit

ProjX Launch

In Partnership with Project Exploration

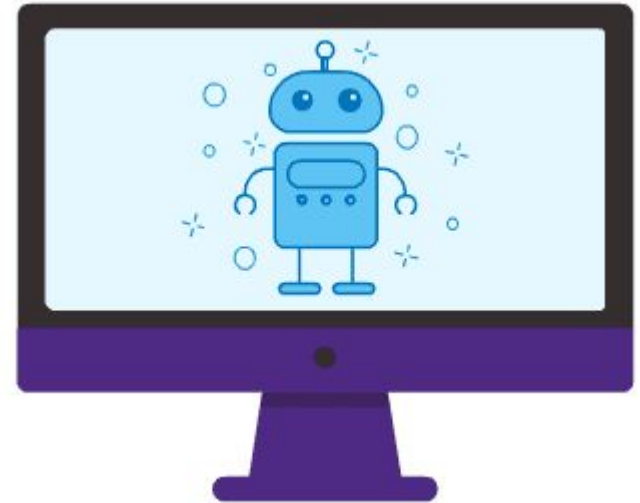
Blast off! During this camp you will learn more about the relationship between earth and space, explore the universe, and understand the innovation and creativity behind space travel. You will also apply your knowledge and build a rocket of your own.

comes with kit



STEAMville Platform

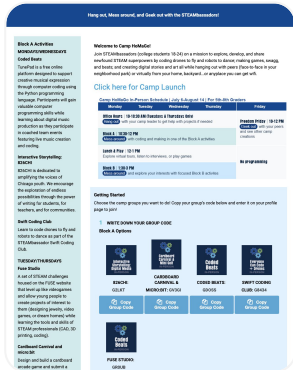
STEAMville is an online platform that curates content such as challenges and activities in a group space for not only STEAMBassadors to complete their training and use during the lesson, but also for youth to engage in activities from various camps.



STEAMBassadors & Youth usage of STEAMville

1

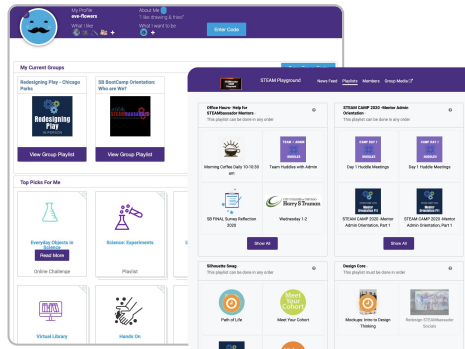
Campaign Page



- Youth select camps & join groups
- Mentors access Freedom Friday Playlist

2

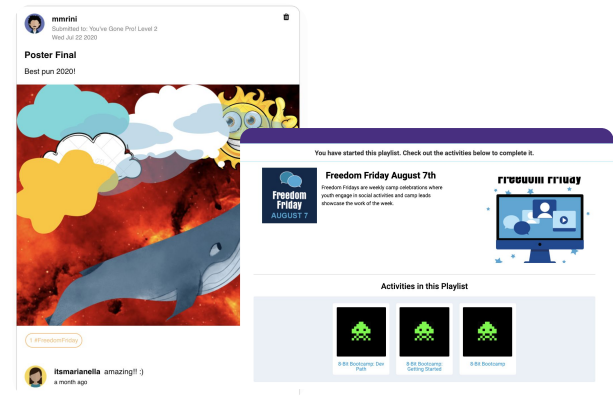
Profile & Groups



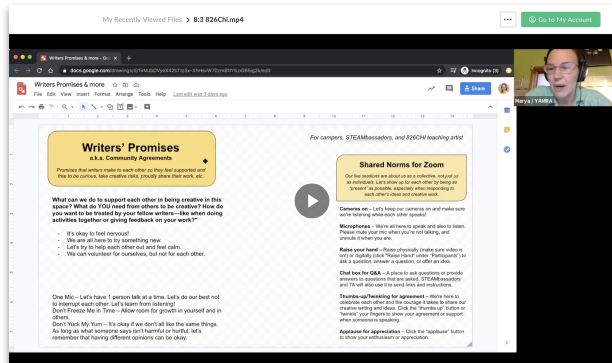
- Profile recommended other activities on SV
- Youth accessed Mentors to train as learners & teach content
- Youth to access content, resources, & zoom links

3

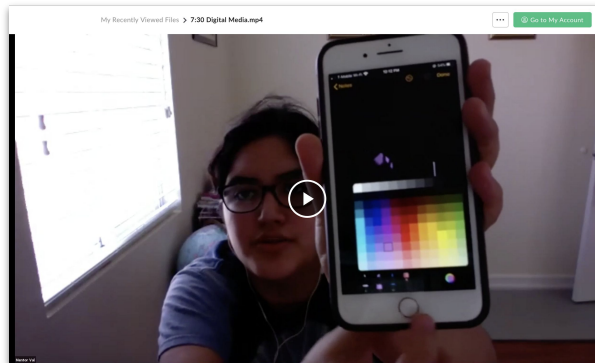
Showcases



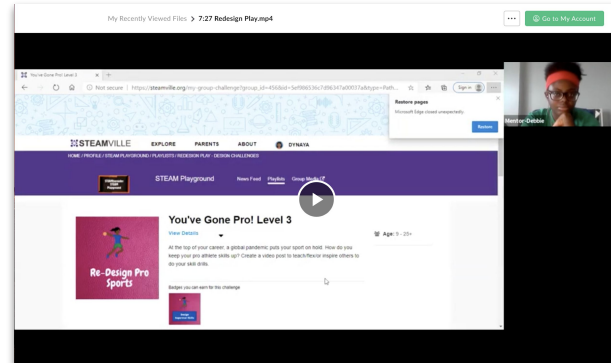
- Mentors used #FreedomFriday reaction as admins
- Youth viewed artifacts through playlist



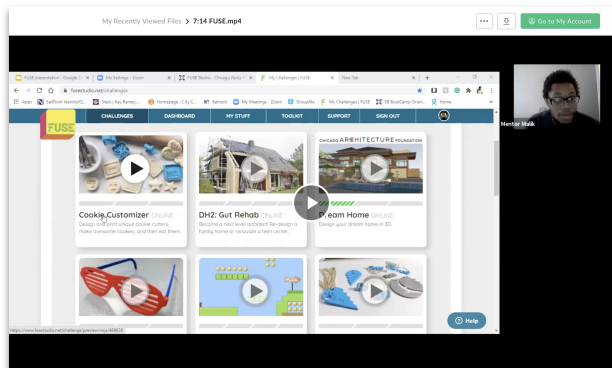
826CHI



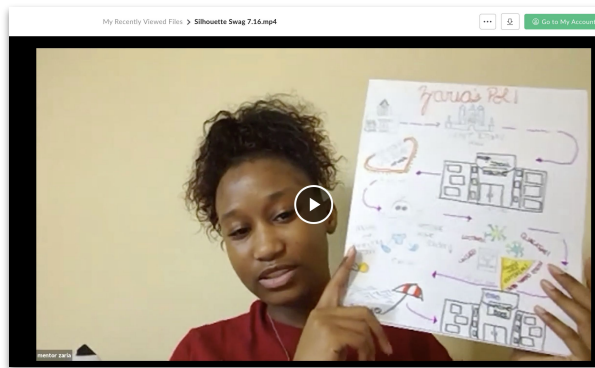
Digital Media



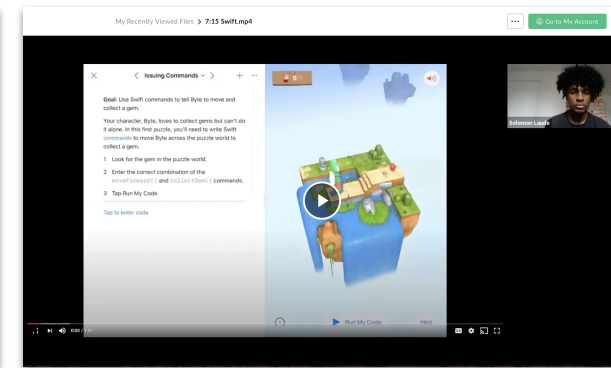
ReDesign Play



FUSE Studio



Silhouette Swag



Swift Coding Club



mmrini
Submitted to: Path of Life
Tue Jul 14 2020

Mehdi.1

It's my path of life, which depicts, in clockwise order, my very first birth(?) (I did not have several), my first baby tooth that paved the way for my current adult teeth, my first ever christmas which was a photo taken with the mall santa, first pet, who was a brave scoundrel called nelly, and graduation of eighth grade, paving the way to high school

A child's drawing on a white background. It shows a path leading through several scenes: a globe, a baby, a tooth, a Santa Claus figure, a dog, and a graduation cap. The drawing is simple and colorful, with stick figures and basic shapes.

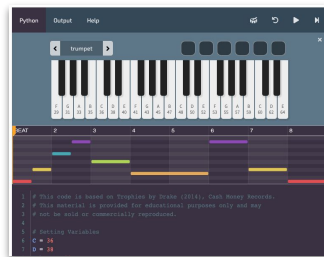
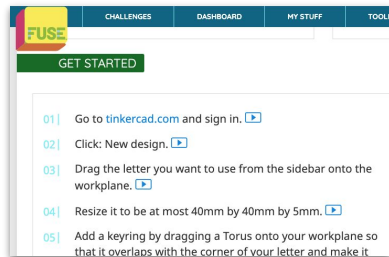
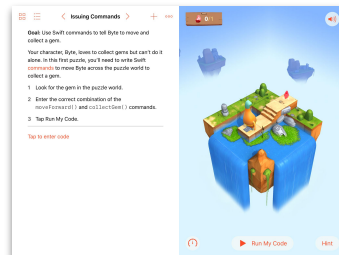
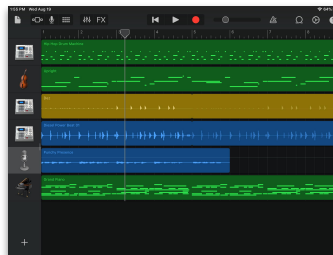
genesis10
Submitted to: Speech! Speech!
Sun Aug 09 2020

Speech! Speech!

“ Hello Chicago!!! I am so excited to be your Mayor. You may ask yourself “Why did she enter office?” Well originally, I wanted to be a children's doctor. After I finish being Mayor, I'm going to be a doctor. I promise you Chicago will be in good hands for the next few years. I know it will take some days to earn my trust. The first thing I will do as mayor would host a food drive for the homeless. Also make the food better at Chicago Public Schools. I will try to fix all your problems. Thank you, Chicago and god bless, you. ”

Communal Activities

- Conversational; Using prompts
- Encourages group work

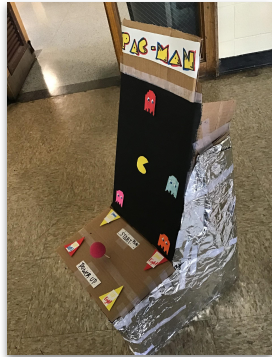
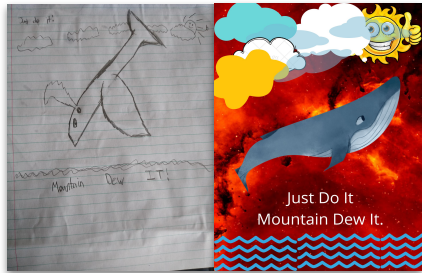


Individual Activities

- Platform specific (TunePad, FUSE Studio, iMovie, etc.)
- Encourages individual work
- Mentor-led introductions

Camp Work on STEAMville

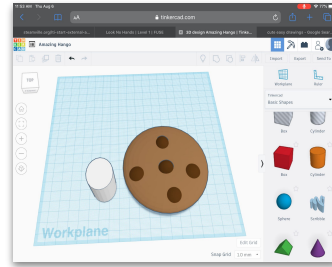
Youth Work



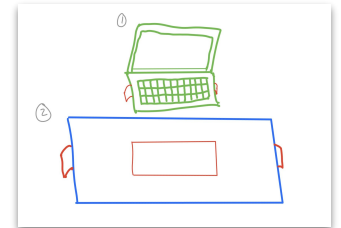
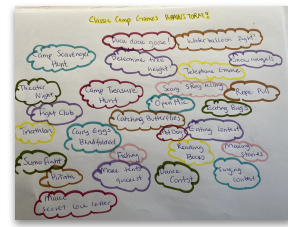
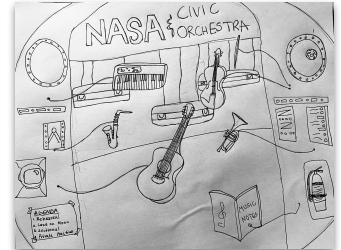
jmorris12
Submitted to: Speech! Speech!
Sun Aug 09 2020

Janiyas speech !

“ Say if I was elected mayor of Chicago ! Seems pretty fun right ? If I had my first speech. I would say something like "hello this is mayor Janiya speaking! I ran for office to make a change for Chicago ! My biggest vision for Chicago ! Is to stop the violence & make the neighborhood safe again ! I want Chicago too look clean and safe again ! When I go in office I'm gonna go ! Send out some workers to clean up the neighborhoods & ban all weapons there for they will be no violence! ”



STEAMBassador Work



Youth work- Work submitted to STEAMville (Redesigning Play, Cardboard Carnival, 826 Chi, and FUSE)
STEAMBassador work- Work submitted to the STEAM Playground

Camp Work on STEAMville

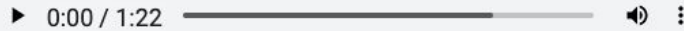


cupcakes

Submitted to: Create Your Own Remix - Alternate Prompts
Tue Jul 21 2020

Ellen

My song created in Edm loops its awesome



Charlotte Andry

Ellen! It was so nice to meet you and to hear your creative process with the songs you submitted! This is definitely a bop, and would be added to my dance playlist if I could LOL:)

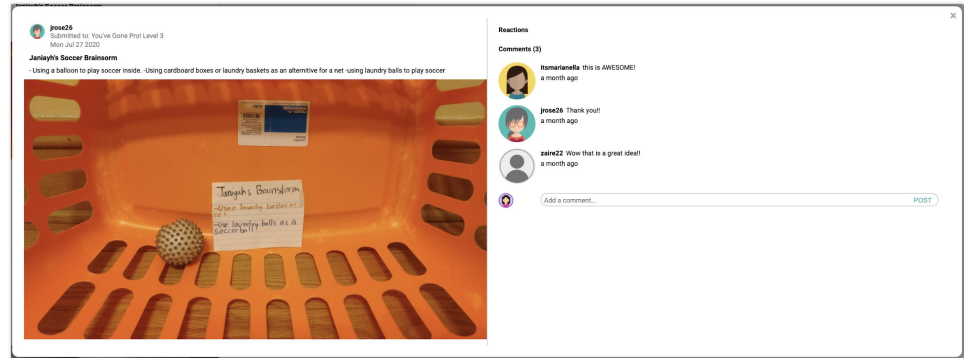
16 days ago

[View All Comments \(2\)](#)

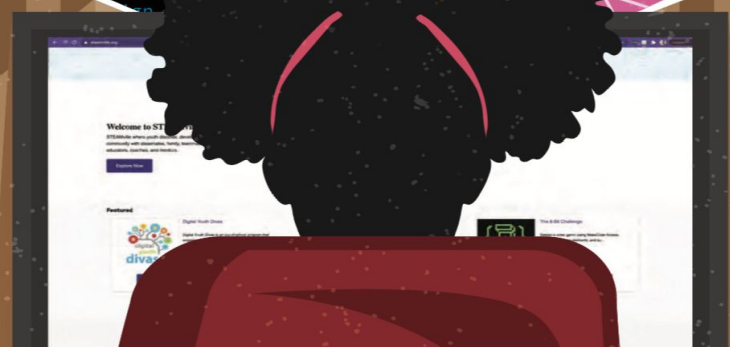


Add a comment...

POST



HTML was last month
Yesterday, I coded my
ery own web page!
Hey, did you hear
my new DJ track
Yeah, I'm definit
onna be famous
TunePad has a
new version.
check it out.
I can show
you how to
I'm reall
good!





The Research & Documentation

Core Research Questions

Social & Program

How are STEAMBassadors engaging with the camps and youth?

Platform

How are STEAMBassadors and youth engaging with the platform?

Ecosystem

How does the STEAMBassador initiative impact the opportunity landscape (opportunities and participation patterns) in our host communities

Social & Program

- How do mentors' interests and identities develop as a result of participating in the SB program?
- How do informal educators learn from their peers in a professional development event?
- How do informal educators reflect on their experiences (especially peer interactions) from professional development to make decisions on their programs, organizations, and students?
- What are mentors' trajectories through multiple STEAM mentoring experiences, and how does their expertise shift over time?

Platform

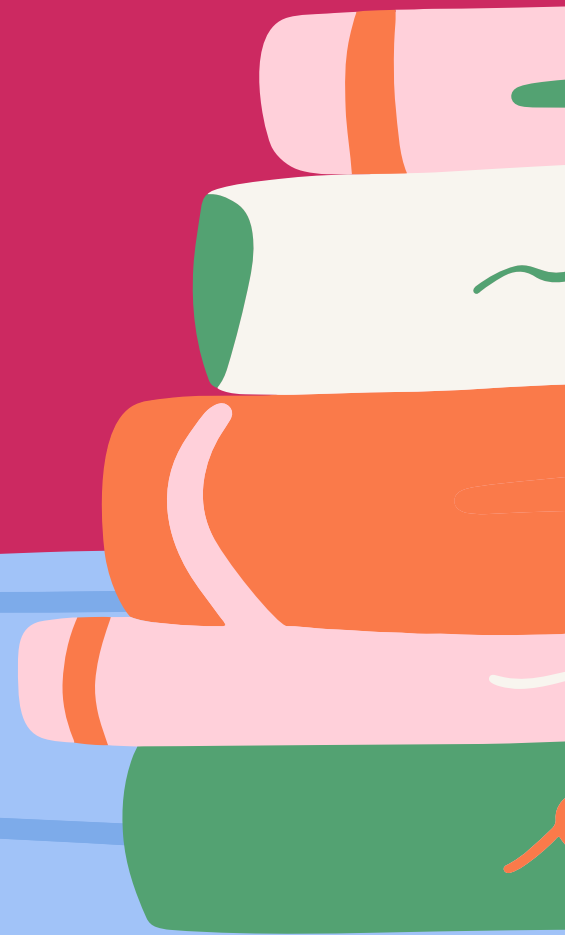
- How are people using villages and groups on STEAMville?
- How do people go about using activities to teach content to learners on STEAMville?
- How do people go about using activities to create content for learners on STEAMville?
- What are some best practices for implementing STEAM content on the STEAMville platform?

CODE
your
DREAMS

SUPPORTING OST STAFF IN STEM CURRICULUM

Code Your Dreams

Empowering the next generation of
community-minded tech leaders





Brianne Caplan

Executive Director @ Code Your Dreams



The value of a computer science education

\$.58M

lifetime earnings of a high school graduate*



\$1.19M

lifetime earnings of a college graduate*



\$1.67M

lifetime earnings of a computer science major*



A computer science major can earn **40% more** than the college average

*Net present value t

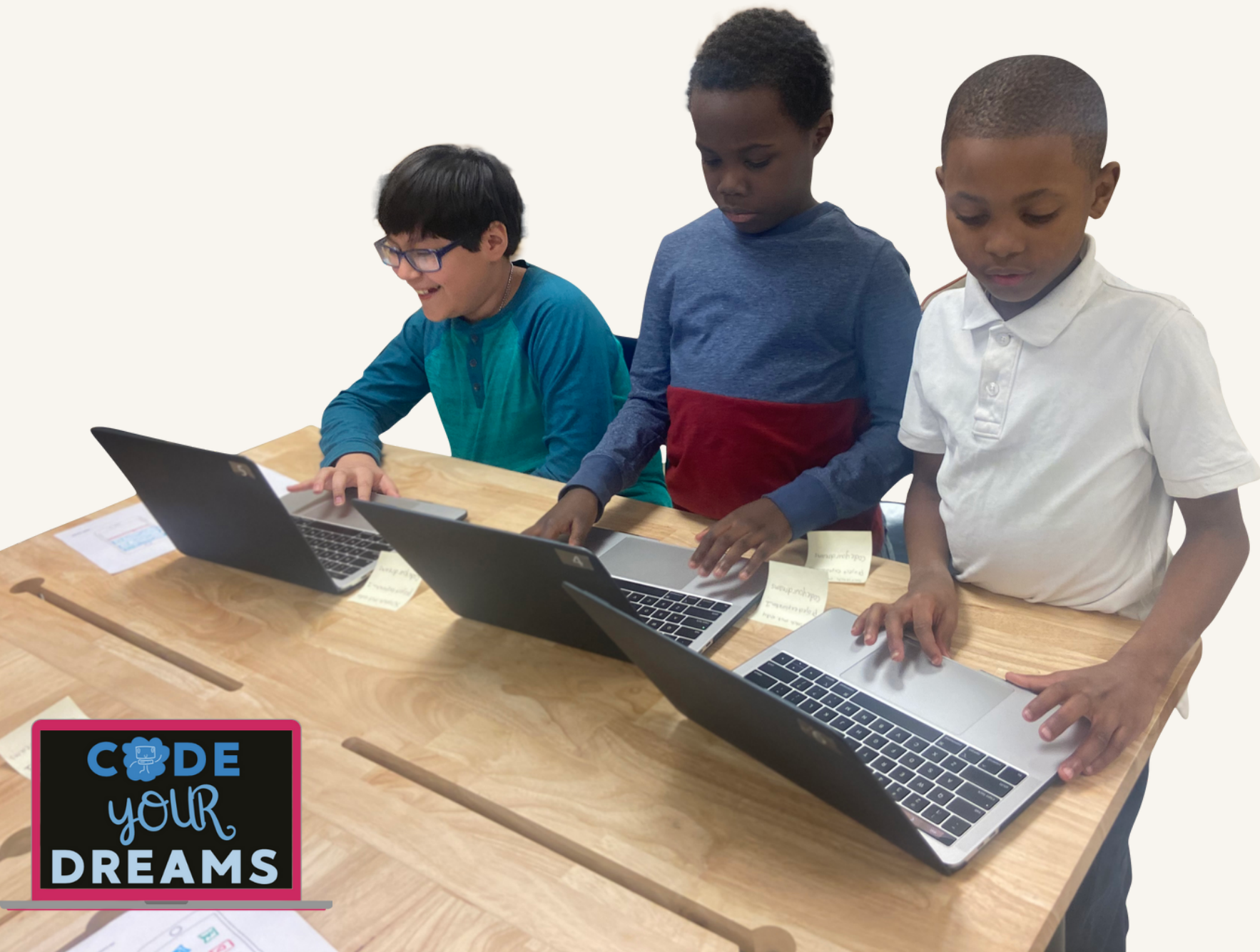
What inspires
our curriculum?



#1: COMMUNITY DEVELOPMENT

Students are not just coders.

They are activists, builders, change-makers, advocates and disruptors.



Example 1:

COMMUNITY CENTERED DESIGN THINKING

- Classroom conversations
- Community values inventories
- User interviews with community members



Community-based Problem Solving

List communities you are a part of and why they are important to you:

Examples include: family networks, sports teams, interest groups, friend groups, school groups ...

My Communities:
Hispanic
Teen
Gen Z
DJ
Volleyball player
Cubs fan

Choose one of these communities. Identify some of the defining characteristics of this community:

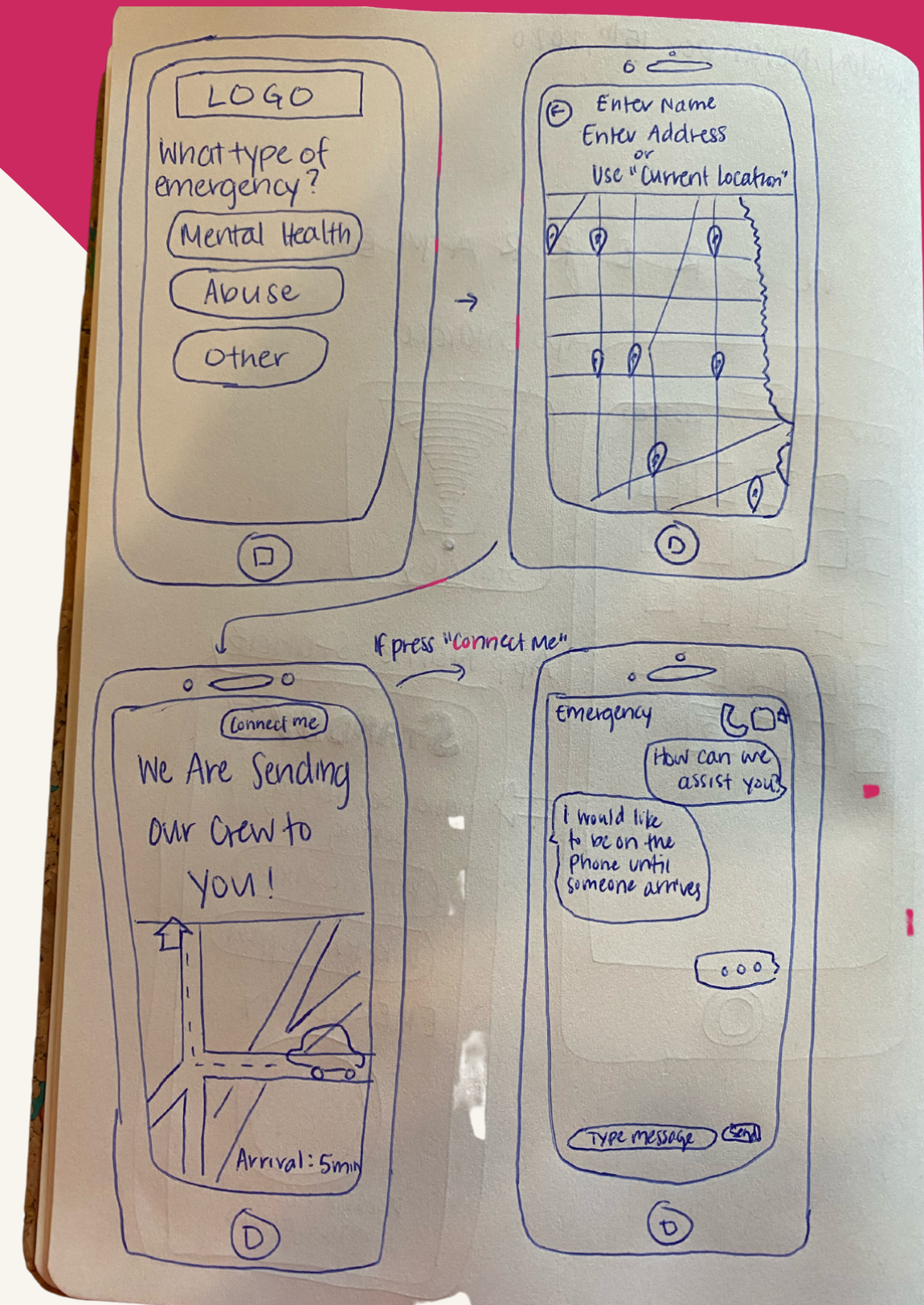
You can use the rows provided as a starting point but feel free to add or change row labels to reflect what you think is most important in this community. You can work with a fellow member of your chosen community to complete

Characteristics	Notes
Age Range	varies
Language	english and spanish
Location / Setting	worldwide
Nationality	varies
Race or Ethnicity	varies
Mottos or tag-lines	
Important symbols	
Gender identity	varies

Example 2:

UI/UX DESIGN AND TESTING

- User Personas
- Wireframing and user testing activities
- Allows students to quickly mock-up their ideas and show them to peers and community members



#2: DIVERSE CAREER EXPLORATION



Program Overview

- Design Thinking
- UI/UX Design
- App Development
- Web Development
- Branding/ Marketing
- Data Analytics/Science



CAREER PATHWAYS



Product Manager

UX Researcher

Product Designer

Software Developer

Data Analyst/Scientist

Marketer

Sales Associate

Entrepreneur

Activist



**How do we support
staff who might not
consider themselves
coding experts?**





Bring Industry Experts In





Prioritize Online Support Resources





Empower Teachers as Learners





Establish Teacher Community

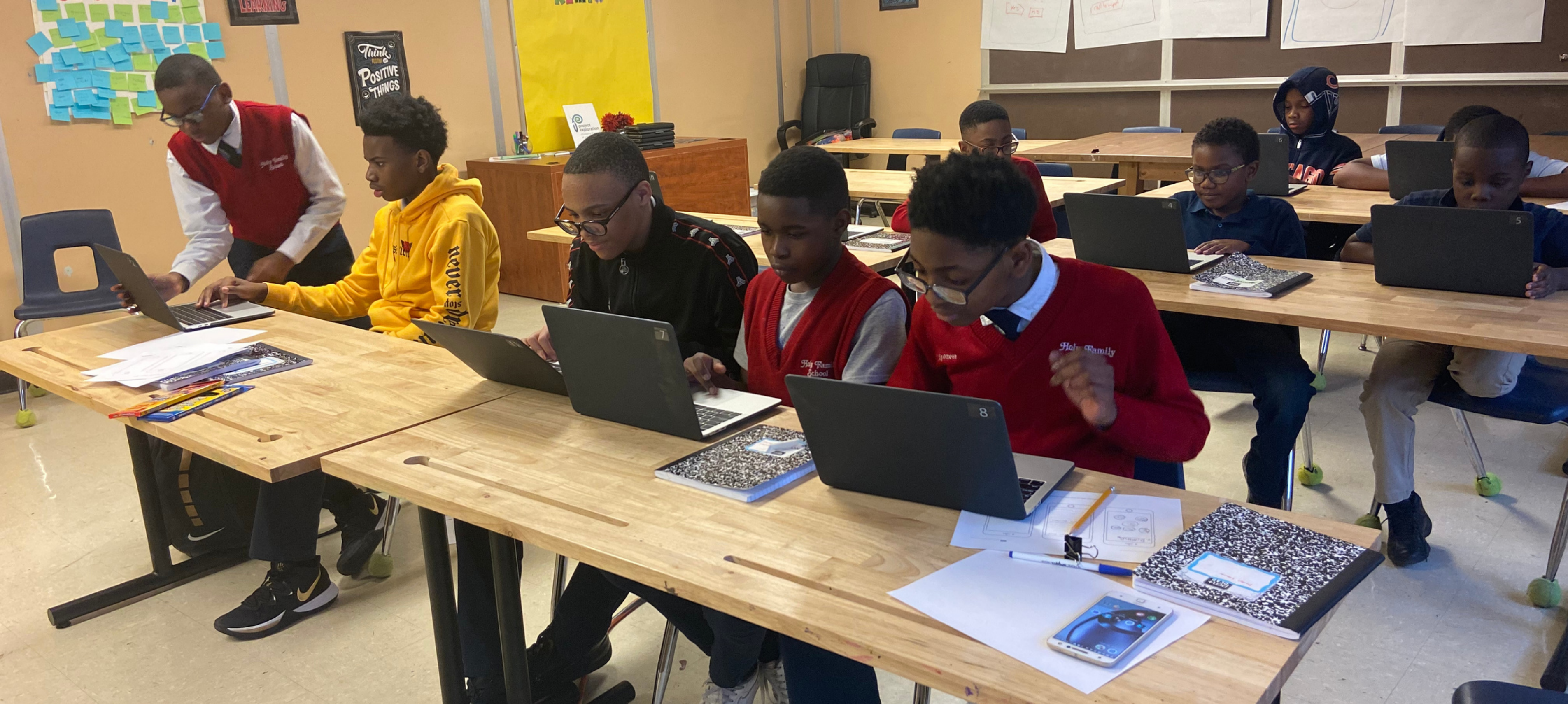


**"THERE IS NO GREATER
POWER THAN A
COMMUNITY
DISCOVERING WHAT IT
CARES ABOUT."**

-Margaret Wheatley



**CODE
your
DREAMS**



Start Backwards: What's Your Goal?



Goal Setting Examples

- Do we want students to have a finished product at the end of the program?
- Or, are we more interested in empowering students with the skills/resources to continue learning after the program (and potentially create finished products after the program)?
- Are there certain careers that we want students to have exposure into?
- Are there certain skills (technical and non-technical) that we want students to gain experience/confidence with?
- What is the challenge level for this program?
 - Can students of diverse backgrounds/experience levels be in the same program?
 - Are there programs for students to enter after the program?



CHICAGO
ACADEMY OF
SCIENCES

PEGGY NOTEBAERT
NATURE
MUSEUM



Melissa Siska - Student Programs Manager

Marwah Saleh - Education Programs Specialist

CHICAGO
ACADEMY OF
SCIENCES

PEGGY NOTEBAERT
NATURE
MUSEUM





Create a positive relationship between people and nature through collaborations, education, research and collections, exhibits and public forums that fosters urban connections to our region's nature and science.

How do we design our curricula?



Youth development

(critical thinking,
cooperative learning,
Interest in science,
self-efficacy
student discourse)

**PK-12
Science education
(NGSS)
+**

**Environmental education
best practices
(including place-based)**



**Inquiry-based,
participant-driven science
education**

Museum education

object-based learning
(living & preserved collections,
PNNM grounds)
& out of school STEM

**Midwestern and
urban ecology**



Examples of topics we like to cover



Illinois Butterflies



Urban Birds



Local Habitats

Using Real Things!

“Objects can easily spark questions, which can be fairly simple such as ‘what is that?’ but can act as a **stepping stone to critical thinking.**¹

Objects are not age, language, or literacy-level specific



Learning through objects, particularly museum objects, is therefore a democratizing endeavor that can **help students gain confidence and express their curiosity.**

1. Paris, S.G., Hapgood, S.E. (2002) Children Learning with Objects in Informal Learning Environments. In S.G. Paris (Ed.)
2. Shuh, J. H. (1999). Teaching yourself to teach with objects. *The educational role of the museum*, 2, 80-91.

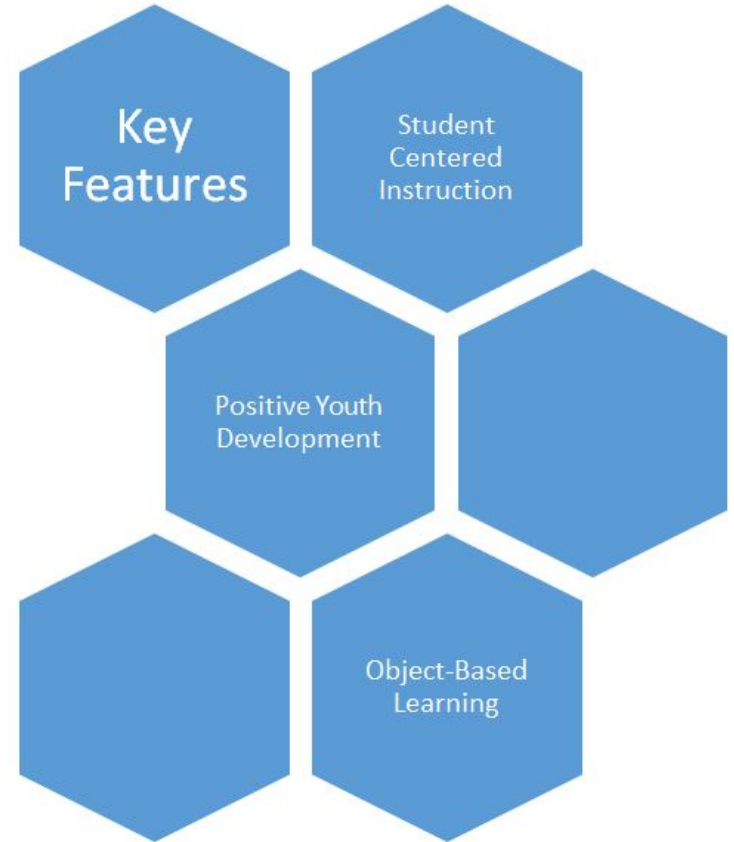
OST Programming Components

- Museum educator taught lessons with unique museum specimens at your location
- STEM curriculum with hands-on materials prepped and ready to go
- Professional development workshop
- Community and family engagement through a Field Trip to Nature Museum with bus reimbursement



How do we support our OST staff?

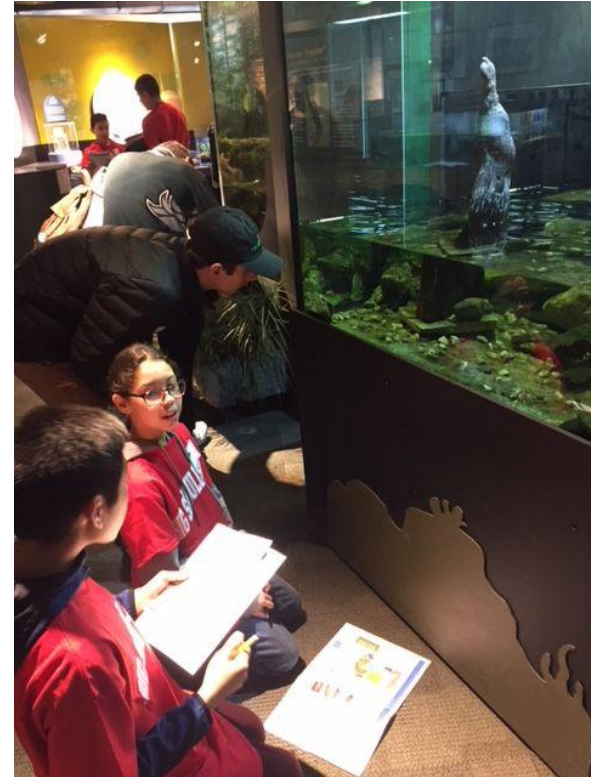
- Teacher PD workshop to support with teaching pedagogy
- Modeling lessons in a we teach, you teach model
- Ready to go materials



Written curricula with prepped and ready to go materials



Field Trip to the Nature Museum to connect learning in and out of school




4 Pillars of the Education Department

**What do
you notice &
wonder?**



Questions? Comments? Stay in touch!

- Visit us at naturemuseum.org/SES
- Marwah Saleh, msaleh@naturemuseum.org
- Melissa Siska, msiska@naturemuseum.org

A close-up photograph of a butterfly with white wings and orange markings, perched on a bright yellow flower. The background is filled with lush green leaves, some of which are slightly out of focus. The overall scene is vibrant and natural.

Let your *imagination* take flight

Questions for our presenters?





Explore the **STEM Curricula Matrix**

Breakout Activity!

In small groups, focusing on one letter of STEM, **choose 1 resource that you want to explore more**

- Are the topics **relatable/interesting?**
- Do they use **accessible materials/objects?**
- Are there **built-in supports?**





Upcoming ACT Now Events

[SEL Webinar: Creating an Intentional SEL Framework in Afterschool Environments](#)

Tuesday, 2/8 from 10 am - 11 am on Zoom

[Quality Standards Training 101](#)

Thursday, 2/17 from 10 am - 1pm on Zoom

[February Membership Exchange](#)

Tuesday, 2/22 from 10 am - 11 am on Zoom

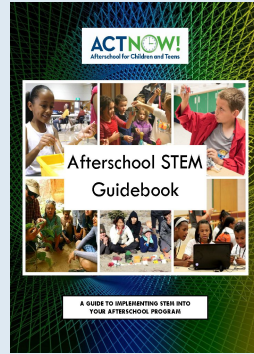
[STEM Webinar: Big, Blue Rock \(Integrating Geosciences into STEM Afterschool\)](#)

Thursday, 4/7 from 10 am - 11 am on Zoom





Additional Resources



[Afterschool STEM Guidebook](#)

Resource Name & Link	Description & Specific STEM Themes	Grade Levels & Facilities	S	T	E	M
			Environmental Science, Agriculture, and Land Use	Design, Art, Development, and Energy Design	Engineering and Coding	Robotics
STEM for All STEM for All STEM for All STEM for All	STEM for All, which is in partnership with the International Technology and Engineering Education Association (ITEEA) and aims to bring high-quality STEM lessons, focused primarily on engineering and building, that are standards-aligned to interested education and CDE providers. *Note: These resources are only available to those that are approved by ITEEA and ITEEA and available over their time to use on their closed servers in order to be included in the registered list.	Pre-K-2 through 12 *in person and virtual facilitation		☑	☑	☑
STEM Curriculum Standards Guide	The Colorado Consortium offers high-quality STEM curricula and resources in a variety of topics for students. The curricula is K-12 aligned and the online modules allow educators to track students' progress, and identify gaps and needs for providers which you are facilitating lessons.	K through 12 *in person and virtual facilitation	☑	☑	☑	☑

[STEM Curricula Matrix](#)

[Equity and Inclusion Assets for Afterschool and Summer Programs](#)

Access code: **MGM2021**



THANK YOU!



Don't forget to fill out the evaluation so we can continue to offer free PD and training opportunities to our members!

Questions?
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