STARnet
Science-Technology Activities & Resources For Libraries

NCIL
National Center for Interactive Learning

Computational Thinking: Unplugged

Presenters: Claire Ratcliffe, Brooks Mitchell, Tai Hutchinson

The webinar will begin at 2:00 p.m. (MT) and will be recorded.

While you're waiting:

1) Find the toolbar – it will either be on the bottom or top of your Zoom window
2) Introduce yourself in the chat box (please select "Share with All" *not* "Share with Panelists")
3) Click audio "Join by Computer" – you won't have microphone access

Tip for viewing: You can resize and move the location of the video and slide screens by clicking and dragging them

Facilitator Introduction

Claire Ratcliffe (Space Science Institute)

Brooks Mitchell (Space Science Institute)

Beatrice Chavez (Space Science Institute)

Tai Hutchinson (Girls Who Code)

Today's Agenda

Welcome

Clearinghouse Navigation

Discussion: What is Computational Thinking?

Hands-on Activities: *Binary Bead Craft* and *Passion for Pixels*

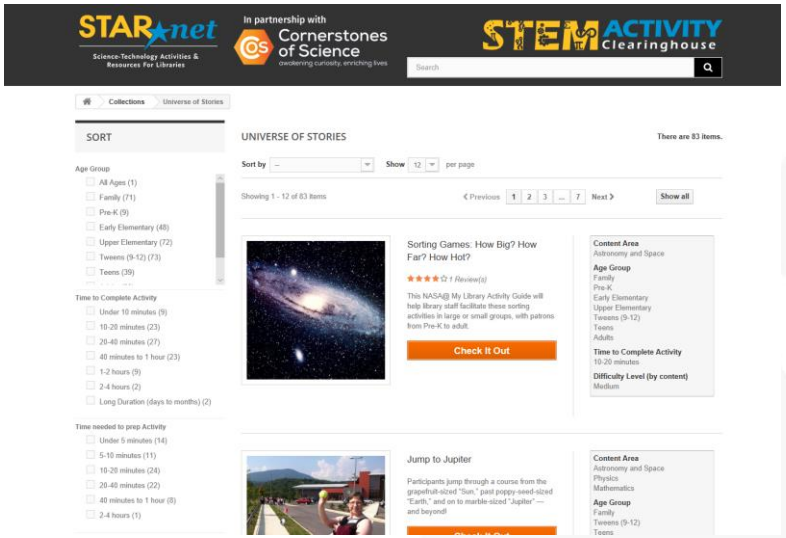
Hands-on Activity: *Something is Different About You*

Hands-on Activities: *Robot Mouse* and *Mars Rover*

Girls Who Code "Unplugged" Resources

Q&A

STEM ACTIVITY Clearinghouse



Computational Thinking

Like an activity and think other library staff should know how great it is? Didn't like an activity or have modifications to make it better? **Make sure to leave a review!**

Poll Question

Have you facilitated “computational thinking” activities in your library programs?

a. Yes
b. No
c. I have no idea what “computational thinking” is

Poll Question

What answer *best* defines “Computational Thinking?”

a. Designing and building a computer
b. Thinking only in “binary code”
c. Thought processes used to evaluate complex problems and their solutions
d. Coding computer programs

What is Computational Thinking?

"Computer Science is no more about computers than astronomy is about telescopes."

-E.W. Dijkstra

Image credit: Pixabay

Libraries Ready to Code

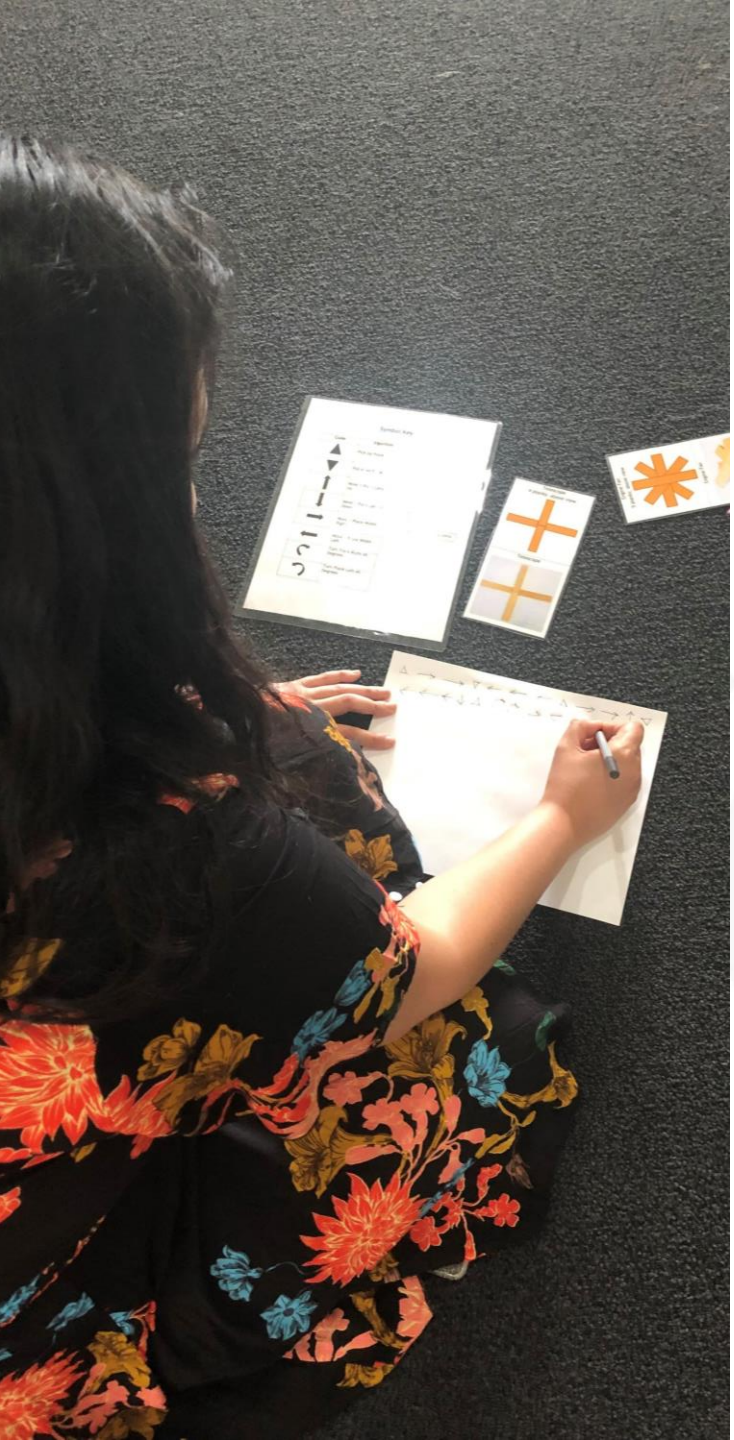
Computational thinking (CT) refers to the thought processes used to formulate problems and their solutions (Wing, 2006). These include breaking down problems into smaller parts, looking for patterns, identifying principles that generate these patterns, and developing instructions that the computers, machines and people, can understand. It is an approach to critical thinking that can be used to solve problems across all disciplines (Google's Exploring Computational Thinking, n.d.).

So…..what?

- Decomposing a problem into smaller pieces to solve: Divide and Conquer!
- Looking for patterns and identifying causes and effects
- Using “Algorithmic Thinking” (creating a series of instructions) to solve problems

Make explicit things humans do implicitly without realizing

Weintrop et al., 2015
Wing, 2006



How do CT Skills Help our Patrons?

- Confidence in dealing with complexity
- Persistence in working with difficult problems
- Ability to deal with open-ended problems
- Ability to communicate and work with others to achieve a common goal or solution
- Enables kids to be creators, rather than just consumers, of technology

Discussion Question

Please answer in the chat box:

How can libraries help their patrons develop CT skills?

CS Ed Week

- December 9-15
- Week dedicated to inspiring K-12 students to take interest in computer science
- Held in recognition of the birthday of Admiral Grace Murray Hopper (December 9, 1906

Image credit: Wikipedia Commons

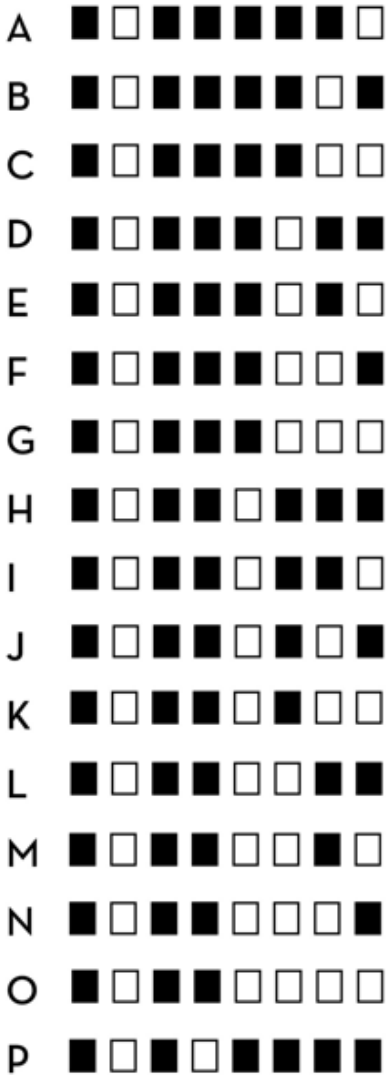
The Hour of Code map only shows the first 200,000 registered events. All registered events with a valid address can be viewed on the events page.

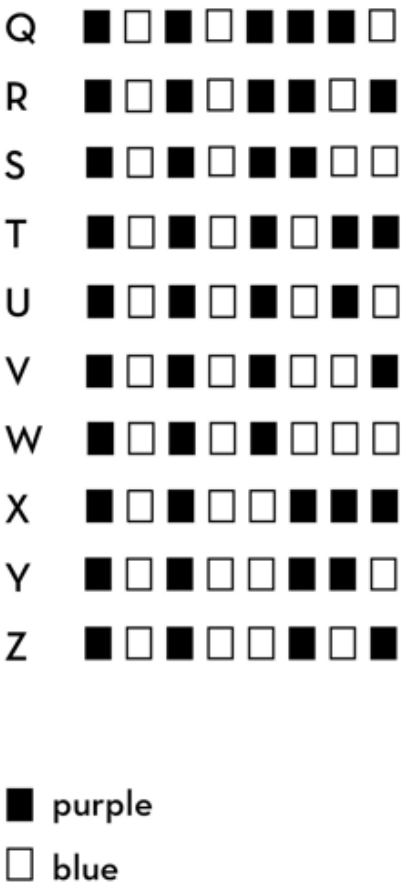
www.csedweek.org

Image credit: csedweek.org

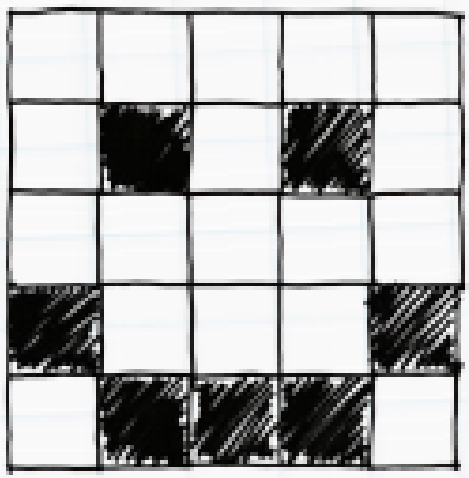
Hands-On Activities: Binary Bead Craft, Passion for Pixels

Binary Bead Bracelet





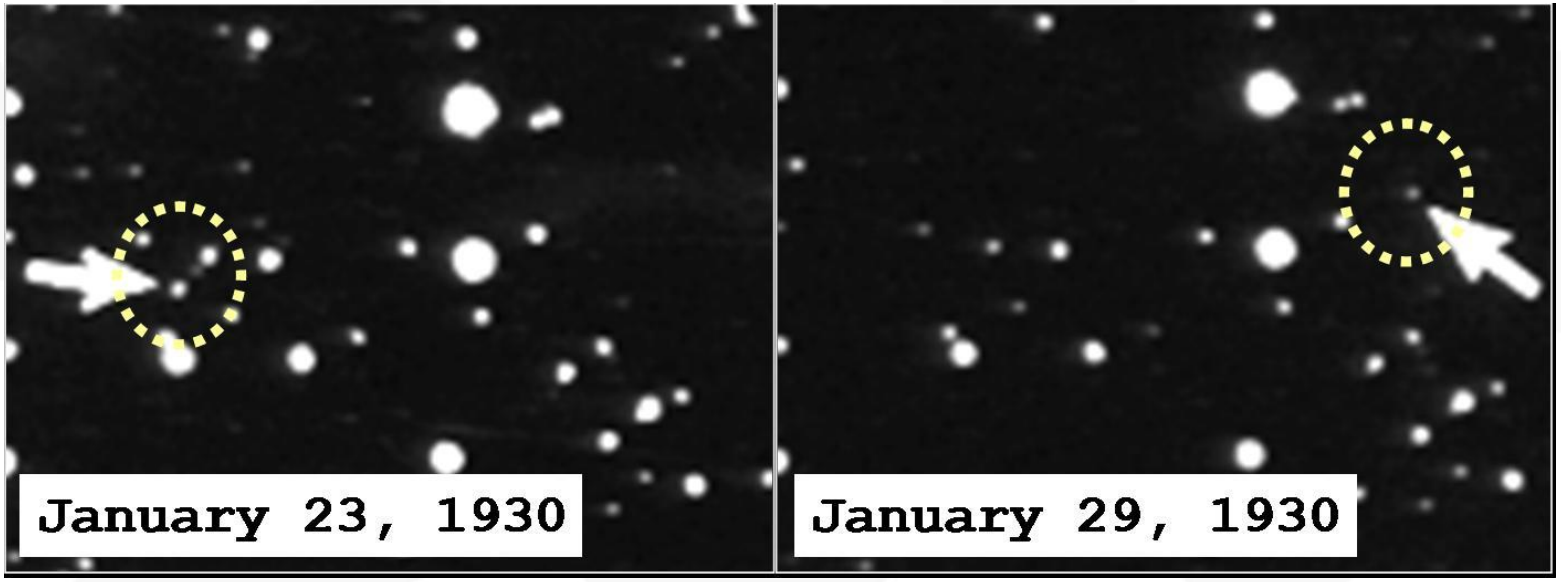
Passion for Pixels



Challenge: “Transmit” an image digitally to a partner using a code of zeros and ones

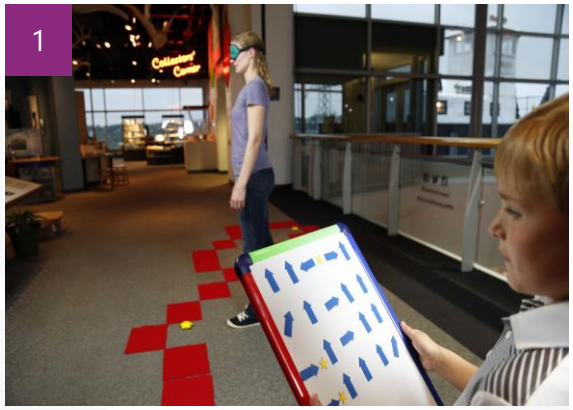
- The “sender” draws on a grid then reads the picture to the “receiver” square by square
- 0 for a blank square, 1 for a filled square

Hands-On Activities: Something is Different About You



Anomaly Detection

Hands-On Activity: Mars Rover



After setting up the pretend Mars landscape, *Mission Control* walks through and uses the program board to create a set of instructions for the *Rover* to follow.

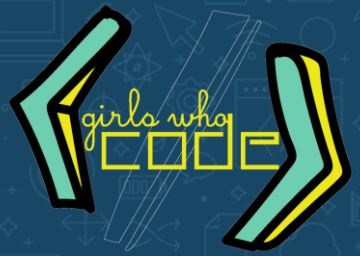
Next, *Mission Control* reads the commands to the *Rover,* who must follow them exactly (blindfold optional)

After going through the landscape, talk about what was hard or easy. What would you do differently next time?

Images source: Lunar Planetary Institute

girls who code

Tai Hutchinson
Manager, Community Partnerships & Outreach



2019-2020

GIRLS WHO CODE UNPLUGGED

AGENDA

- Why Gender Equity?
- Unplugged Club Curriculum Deep Dive
- What's Next?

WHY GENDER EQUITY?

WHY GENDER EQUITY?

The tech industry is booming! By 2026, there is expected to be more than half a million jobs available, making computing the most sought-after in the US job market, with demand growing 3X the national average.

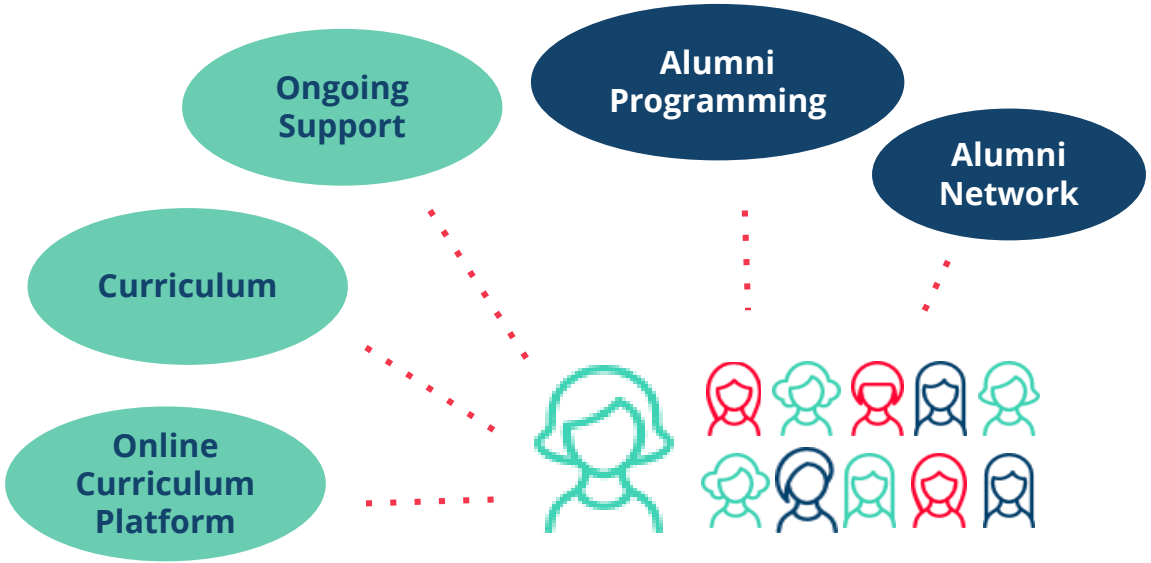
However, only 19% of students who receive degrees in computing are women, and only 2% of students who receive degrees in computing are women of color.

We can't leave behind the ideas and innovations of half the population, nor can we shut girls out of the economic opportunity represented by the tech sector—on average, tech jobs pay over $100K/year!

We need to make a change!

GIRLS WHO CODE CLUBS OVERVIEW

Clubs are FREE after-school programs for 3-12th grade girls to join our sisterhood of supportive peers and role models and use computer science to change the world.



Clubs are led by **Facilitators**, who can be teachers, librarians, parents, or volunteers from any background or field.

Many Facilitators have no computer science experience and learn to code alongside their Club members with our comprehensive resources and support.

UNPLUGGED CURRICULUM DEEP DIVE

PROGRAM LOGISTICS BY AGE GROUP

Our Club programs differentiated by age group features the following:

3-5TH GRADE CLUBS UNPLUGGED PLUGGED

Time & Logistics:
- ➔ 5+ sessions
- ➔ ~45-60 min per session
- ➔ $300 per club!

Skill Level:
- ➔ Beginner

Curriculum Features:
- ➔ Book Club Model
- ➔ Chapter Guides for non-fiction and fiction books
- ➔ Online or Unplugged Options

6-12TH GRADE CLUBS CS

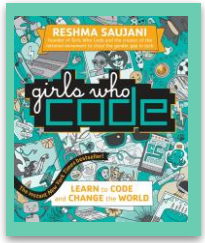
Time & Logistics:
- ➔ 10+ sessions
- ➔ ~1-2 hours per session
- ➔ $300 per club!

Skill Level:
- ➔ Beginner, Intermediate, Advanced

Curriculum Features:
- ➔ Girls Who Code Project Focus
- ➔ Project-based learning
- ➔ 120+ hours of Curricula
- ➔ Beginner to Advanced Self-Guided Tutorials
- ➔ Plug and Play Model - **FLEXIBLE!**

3-5TH GRADE CLUB CURRICULUM FOCUS

GIRLS WHO CODE BOOKS



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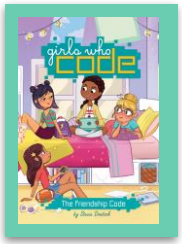


BRAVERY & RESILIENCE

Teaching girls to be brave and resilient early in their lives has the potential for **enormous impact on how they approach challenges**—and whether they stick with coding in the years to come.

COMPUTER SCIENCE

3rd–5th Grade Clubs introduce computer science to girls in a **fun and creative way**, at the exact moment when their interest is high.

3-5TH GRADE CLUB LESSON PLANS

IF YOU HAVE 45 MINUTES...

1. **Build Sisterhood (5 minutes)**
   - Make time for a quick activity that breaks the ice at the beginning of a meeting. Take a peek at the Sisterhood Activity Section for ideas.
2. **Read & Reflect (15 minutes)**
   - Read a suggested passage from the book, and discuss the related questions. Check out our Discussion Tips to guide you.
3. **GWC Challenge (20 minutes)**
   - Complete one of the suggested activities that connects to the passage you read. Challenge your girls to be brave, bold, and creative! If you're trying an online challenge or using HQ with your students, read the Logistics section for more information.
4. **Close-Out (5 minutes)**

IF YOU HAVE AN HOUR OR MORE...

1. **Build Sisterhood (10 minutes)**
   - Make time for a quick activity that breaks the ice at the beginning of a meeting. Take a peek at the Sisterhood Activity Section for ideas.
2. **Read & Reflect (15+ minutes)**
   - Read a suggested passage from the book, and discuss the related questions. Check out our Discussion Tips to guide you.
   - If time allows, consider reading another passage together!
3. **GWC Challenge (20+ minutes)**
   - Complete one of the suggested activities that connects to the passage you read. Challenge your girls to be brave, bold, and creative! If you're trying an online challenge or using HQ with your students, read the Logistics section for more information.
4. **Close-Out (5 Minutes)**

3RD-5TH GRADE CLUB CURRICULUM FOCUS

girls who code /HQ

Getting Started Help Community

3rd-5th Grade Club QA

CLUB35

Your club's name and address

Monday, Tuesday, Wednesday, Thursday, Friday 8:30am - 12:30pm

6 students enrolled

INVITE STUDENTS | RENEW YOUR CLUB

JOIN A NEW CLUB | CHANGE PROGRAMS

Facilitator Toolkit

- **Launch Your Club Webinar**
- **Plan Your Club Checklist**
- Sisterhood Activities
- Printable Curriculum

Facilitator Toolkit

Facilitator Toolkit

Launch Your Club Webinar

Sign up for a live Launch your Club facilitator training or watch our pre-recorded training webinar.

Facilitator Toolkit

Plan Your Club Checklist

Get everything ready for your Club by following these simple steps

Resources

Sisterhood Activities

Break the ice and build sisterhood in your Club with these quick icebreakers.

3RD-5TH GRADE CLUB CURRICULUM FOCUS

girls who code /HQ

Getting Started Help Community

- Facilitator Code of Conduct
- HQ Registration Flyer
- Student Recruitment Resources
- Learn to Code and Change the World Chapter Guides
- Scratch Tutorials
- Fiction Curriculum - COMING SOON!
- Announcements
- Project Gallery

© 2019 GIRLS WHO CODE

Resources

Printable Curriculum

Download a printable PDF version of our curriculum here. Always check in here, at GWC HQ, for the most up-to-date version of our curriculum!

Facilitator Toolkit

Facilitator Code of Conduct

Set the tone for your Club to create an environment where girls can be brave.

Resources

HQ Registration Flyer

OUR IMPACT

The National Pipeline

3rd-5th Grade Clubs — 6th-12th Grade Clubs — College Loops — Alumni

6,500+

2018-19 CLUBS

185,000

GIRLS SERVED TO DATE

50%

are from historically underrepresented groups.

Majoring in CS-related fields:

15-16X

the national rate.

PARTNERSHIP

Our organization relies on **collaboration with Community Partners** to drive our work and reach even more girls in your community. We create partnerships with state and local leaders, school districts, community organizations, library networks and colleges/universities to **launch multiple Girls Who Code Clubs**.

- **Access to the Community Partner Fund:** $100 in grants in addition to the Clubs Fund $300 to be used for snacks, books, school supplies, field trips, and more (for partners with 5+ Clubs with 3+ students enrolled)

OAKLAND UNIFIED SCHOOL DISTRICT
Community Schools, Thriving Students

KIPP SoCal PUBLIC SCHOOLS

RIVERSIDE COUNTY OFFICE OF EDUCATION

MATANUSKA-SUSITNA BOROUGH SCHOOL DISTRICT

girl scouts of kansas heartland

Kentucky Department of Education

SFUSD

LOS ANGELES PUBLIC LIBRARY

VC STEM

Chicago Public Schools

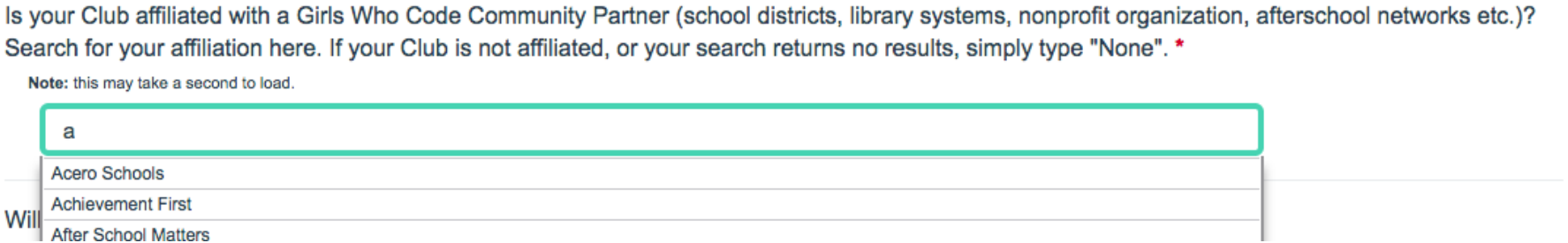
long beach unified school district

NEOSTEMeco
Northeast Ohio STEM Ecosystem

ACCESSING PARTNERSHIP BENEFITS!

Affiliate yourself with an existing partner to get access to partnership benefits & support when you apply at girlswhocode.com/clubsapply !

When you reach the below question on the last page of the Clubs Application, please list "Name of Organization" as your partner affiliation for the following question:



Meet Bethany, GWC Facilitator

3 REASONS WHY
SHE WAS HESITANT TO START A CLUB

No teaching experience

No formal CS experience

Nervous if the Club would be received well or highly attended

3 REASONS WHY
SHE WAS GLAD SHE DID

“There is no perfect time to do something - **just take a leap, be brave, and try it**!"

"It was totally **well-received** because in just 3 weeks after we started the Club, we grew from 2 members to 25."

"The curriculum that GWC provides.. **sets you up with literally everything you need**.. I didn't have to worry about curriculum, and I could **focus on building relationships with the girls** and helping to develop their skills.”

3 THINGS
HER CLUB GIRLS LEARNED

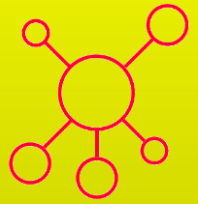
“Coding is more accessible to learn than it seems”

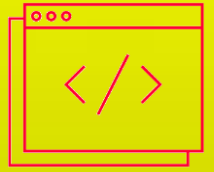
"The payoff of struggling and persevering is really worth it."

"Working together always builds stronger results."

WHAT'S NEXT?

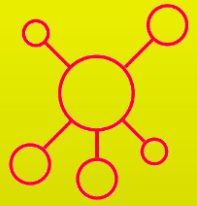
What You Need





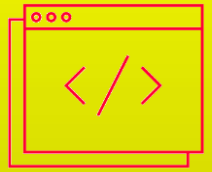
SPACE + **BOOK PASSAGES (3rd-5th grade)**
TECNOLOGY IS OPTIONAL + **FACILITATOR & DECISION MAKER**

What GWC Provides



LOGISTICS SUPPORT

- Customizable Club Plans
- Student Recruitment Resources
- Clubs Fund, mini-grant $$



CS SKILLS

- Custom Online Training
- Girls Who Code HQ Platform
- 120+ Hours of Curriculum
- Extended CS PD Resources

COMMUNITY

- Clubs Success Specialist
- In-person and virtual events
- Alumni programming and networking post-Club

How to Get Started

5 min	15 min	5-10 days	Prior to Launch	Ready?
Create an HQ account	**Fill out the Clubs Application**	**Get your Approval Email**	**Review resources & meet your CSS**	**Launch Your Club!**
Create a Girls Who Code HQ login to access the application	Fill out the 15 min Clubs Application **Complete the background check only if you are a Facilitator who is NOT employed by the host site*	Receive our Welcome Email with access to your Club Code for our curriculum! (i.e. HI123)	Log into HQ to access: • Training webinar (15 min) • Recruitment materials • 120+ hr curricula • And more!	Recruit students and help them enroll on HQ. Enrolled students receive access to our curriculum. 3+ enrolled students gives you access to Clubs Fund!

GET STARTED TODAY!

Launch an individual Club at **girlswhocode.com/clubsapply**.
Interested in exploring a Community Partnership? Contact the respective staff member or complete the **Community Partnership Confirmation Form**!

Girls Who Code Staff	Email	States
Jálynn Castleman-Smith	jalynn@girlswhocode.com	DC, DE, MD, NJ, PA, VA, WV
Tai Hutchinson	tai.hutchinson@girlswhocode.com	FL, GA, NC, SC
Valerie Tomici	valerie.tomici@girlswhocode.com	AK, CA, ID, MT, NV, OR, WA, WY
Johana Rendon	johana.rendon@girlswhocode.com	CT, MA, ME, NH, NY, RI, VT, US Territories
Josué De Paz	josue.depaz@girlswhocode.com	AR, KY, LA, MO, MS, OK, OH, TN
Key Session	key@girlswhocode.com	IL, IN, IO, KS, MI, MN, ND, SD, WI,
Amanda Souza	amanda.souza@girlswhocode.com	AZ, CO, NM, TX, UT

Thank you for joining!

Have questions? Email Tai Hutchinson at tai@girlswhocode.com

Thank you!

Any Questions?