# MindSpark Learning® GIRLS INSTEN CLUB PLAYBOOK







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## **OVERVIEW**

The goal for this playbook is to increase access, participation, and identity for girls in STEM by providing a free 12-week STEM club playbook that utilizes high-quality low-cost resources. This playbook uses Makey Makey + Scratch and TinkerCAD + any 3D printer for 12 weeks of collaborative innovation. You will find additional resources for recruitment that can be downloaded throughout this playbook.

MindSpark in partnership with the Gill Foundation worked with a local school district in Colorado for the Girls in STEM project for the 2023-2024 school year. MindSpark is an experienced education consulting nonprofit focused on sustainability, well-being, and innovation and provides professional learning and leadership services across the United States.

The project recruited five K-8 schools equal to 35% of K-8 schools in the district and 20% of overall schools in the district. A total of 94 students participated in the project with 64% of students identifying as girls. More information on the district can be found on page 2. Although the scope of this project is to increase girl's identity in STEM, no students were excluded from this opportunity. This project aimed to bolster and diversify the K-12 talent pipeline in STEM and computer science courses in secondary education in the district and positively increase student's identity in STEM and STEM careers.

The school district recruited has been active in the computer science and STEM space keeping up with Code.org, Common Sense, TeachAl, ISTE, CSTA, Cyber.org, and other key players in the sector, and has preexisting elective pathways and resources in computer science and STEM. The district recently purchased district-wide computer science and STEM resources with ESSER funds.



### **DISTRICT DEMOGRAPHICS**

CATEGORY	COUNT		
Enrollment	15,007		
Male/Female	51.0% Males (7,650), 49% Females (7,357)		
Ethnicity	83.4% Minority (12,524) 77.3% Hispanic (11,600) 2.3% Black (341) 0.6% Asian (88) 0.5% Native American (76) 2.6% Two or more races (396) 0.2% Native Hawaiian (23) 22.7% White, Not Hispanic (3407)		
Free & Reduced Lunch	77.3% (11,442)		
Gifted & Talented	3.9% (592)		
Exceptional Students	14.4% (2,164)		
Online (Paragon/Dutch Clark)	3.8% (576)		
Homeless	2.4% (358)		
English Language Learners	5.0% (750)		
Expelled	<0.1% (<10)		
Migrant	0.1% (10)		
Immigrant	<0.1% (<10)		
Federal Title I	36.6% (5,488)		
Military	0.4% (56)		

## TARGET AUDIENCE

**STEP 1:** Clearly identify the age group and grade levels you'll be working with. Consider their existing knowledge and interests. develop a vision for your STEM club.

FOR THIS PROJECT: We recruited students in grades 3-8.

**PRO TIP:** Review the example vision statement. Modify to connect to the students in your community. Ask yourself, *what do students care about?* Why is this important for them? Consider using generative AI i.e. ChatGPT, Gemini, & CoPilot to help refine your vision.

## **CLUB STEM VISION**

The STEM Girls Club's vision is to inspire, empower, and nurture the future leaders of science, technology, engineering, and mathematics. We envision a vibrant, inclusive, and supportive community where girls in grades 3-8 can discover the boundless possibilities of STEM and develop the skills, confidence, and passion needed to excel in these fields.

Afterschool STEM Girls Club is dedicated to empowering girls to reach their full potential in STEM. We want to provide a supportive and enriching environment where they can learn, grow, and be inspired to pursue their dreams. Our vision is a world where gender diversity in STEM is not only celebrated but also expected, and where our club plays a pivotal role in making that vision a reality.







## **CURRICULUM DESIGN**

**STEP 2:** Review curriculum outline. Each lesson should be engaging, hands-on, and aimed to encourage creativity.

**PRO TIP:** Students should be creating for more time than the instructor is instructing for each club day.

- 1 Introduction to the Enigmatic Makey Makey Switches and Circuits
- 2 Unveiling the Inner Self: A Digital Reflection
- 3 Crafting Code with Makey Makey in the Enchanting Realm of Scratch
- 4 Tales of Interactivity: Unveiling Technology in the Tapestry of Daily Life
- 5 Architects of the Imagination: Forging a Tech-Infused Metropolis
- 6 Weaving Code for a Dueling Duopoly
- 7 Embarking on a 3D Odyssey with TinkerCAD
  7 Delving into the Art of Pig Surgery and the Alchemy of Shapes
- 8 Navigating Dimensions and Crafting Spatial Marvels
- Etching Your Name in the Sands of 3D Printing
  Mastering the Arcane Arts of Advanced Design Techniques
- 10 Venturing into the Realm of Design Thinking and Constructing Robotic Companions
- 11 Embarking on a Design Sprint to Forge a Playground of Dreams
- 12 Revealing Masterpieces: Unveiling the Final Creations and Infusing Them with Colorful Brilliance







### LOGISTICS

**STEP 3:** Determine the program schedule (weekly, bi-weekly, etc.). Secure a suitable location (classroom or library).

**PRO TIP:** Consider other clubs and extracurricular activities that may conflict with your club. Try to avoid scheduling your STEM club on days other clubs have meetings to increase recruitment and participation.

Download the Planning tool to help you get started.

Click here to download: Planning tool

A	в	С	D	E	F	
art Date						
nd Date						
Time						
ocation						
Week	Date	Extra Dates	Торіс	Lesson	Materials	
			Intro	Google Classroom, Pre-Survey, Draw activitiy, Presentation, Digital Student Journal		
			Makey Makey	Intro to Switches & Circuts		L
			Makey Makey	Self Portrait		-
			Makey Makey	Coding in Scratch		
			Makey Makey	Interactive Stories		
			Makey Makey	Interactive Design		
			Makey Makey	Code A Game		



## RECRUITMENT & OUTREACH

**STEP 4:** Prepare materials to reach out to students, parents, and other teachers to promote STEM club. Be sure to emphasize inclusivity and strategically highlight the benefits of participating in STEM activities.



**PRO TIP:** Use the example recruitment template created by teachers in this project. Be sure to include your vision statement for the STEM club in your recruitment posters, emails, letters home, etc.

Download the Recruitment Poster example to help you get started.

Click here to download: <u>Recruitment</u> <u>Poster Example</u>

## LESSON MATERIALS & RESOURCES

**STEP 5:** Review lessons for Makey Makey + Scratch and TinkerCAD + 3D printing. Materials, links, and videos are embedded in each lesson. Lessons are located in Google Slides.

**PRO TIP:** Lessons can and should be adjusted for your students level. Lessons may take more or less time. Make it your own!

Download the lesson plans to help you get started.

Click here to download: <u>Makey Makey Lessons</u> + <u>TinkerCAD + 3D Print</u> <u>lessons</u>







### **VOLUNTEERS & MENTORS**

**STEP 6:** Consider new and existing community partnerships. What industry partners and businesses are in the area and related to STEM? Take a few minutes to list or research partners that may be a good fit for a guest speaker or expert to attend a club meeting. Volunteers and mentors can share knowledgeable information with students through storytelling and experience.

**FOR THIS PROJECT:** The school district has forged many partnerships. The local universities cyber program and Google help support as guest speakers.

**PRO TIP:** Be sure to partner with volunteers and mentors that relate to your students and community. It is important for students see people who look, act, and think like them in STEM careers.





#### ASSESSMENT & FEEDBACK

**STEP 7:** Regularly assess student progress and use journal entries at each club as a formative assessment. Collect and use feedback from participants, mentors, and parents to help improve the program.

**FOR THIS PROJECT:** Pre and post surveys were given to measure student identity in STEM. More information and data can be found on page 12.

PRO TIP: Review the example feedback and assessment.

Download the feedback forms and survey examples to help you get started.

Click here to download: <u>STEM identity Pre & Post survey example</u> + <u>Parent feedback form</u>





#### **PROJECT DATA** PRE & POST SURVEY RESULTS

Question	Pre-Survey	Post-Survey
Enjoy learning about STEM?	80%	85%
Confidence in STEM abilities?	60%	79%
Interest in STEM topics?	90%	92%
Found STEM too challenging?	40%	35%
Felt supported by teachers?	70%	75%
Interested in pursuing STEM career?	50%	55%
Importance of influence by family and friends supporting STEM?	80%	82%
Importance of influence by teachers in STEM?	60%	65%







## SHOWCASE & CELEBRATE

**STEP 8:** Organize a STEM fair or exhibition to showcase students' work. consider during school and after. During school allows other students who didn't join to see what students did in the STEM club and recruit for future years. Invite parents, celebrate achievements, and recognize participants.

**FOR THIS PROJECT:** Clubs invited parents to an end-of-program showcase.

## ADDITIONAL PROJECT INFORMATION

The cost to buy materials for this project per school was between \$1,500 - \$2,000 to buy class sets of Makey Makeys, 3D printers, film for printers, and other materials. 100% of parents and guardians who participated in Girls in STEM showcases and/or celebrations agreed this experience was valuable in shaping STEM identity for their child. A water leak prevented 1 of 5 schools from completing the program in Spring of 2024. If you would like assistance with STEM, computer science, or career-connected learning, contact us at <u>mindspark.org</u>.