

# Welcome!

Please introduce yourself in the chat.



National Girls  
Collaborative Project





**NGCP** 

CONNECT + CREATE + COLLABORATE

# Girls STEAM Ahead with NASA: Resources in Action 2024

October 17, 2024



# NGCP Vision

The vision of the National Girls Collaborative Project is to **support and create STEM experiences that are as diverse as the world we live in.**





# Our Goals

Connect + Create + Collaborate

1

**Build and sustain a network** of advocates to provide equitable and inclusive STEM opportunities.

2

**Catalyze equity in STEM** from research to practice by providing actionable knowledge that transforms the STEM experience.

3

**Increase our collective impact** by strengthening organizational effectiveness and enhancing our fiscal sustainability.





# NGCP Resources

- **National Webinars**

- Monthly on relevant topics, speakers include educators, researchers, authors, and diverse STEM professionals

- **Monthly Newsletter**

- National events, STEM resources for girls and youth, professional development opportunities for educators, and research and reports

- **NGCP Website**

- Exemplary Practices pages on Engaging Girls in STEM and Access and Equity, blog posts, and statistics and research related to girls and women in STEM



### NGCP Podcast: Inspiring Curiosity from Early Childhood to Break Gender Stereotypes

In our first episode, we explore the crucial role of early childhood experiences in shaping girls' interest and engagement in STEM



### 5 Ways to Be an Ally to Girls and Women in STEM

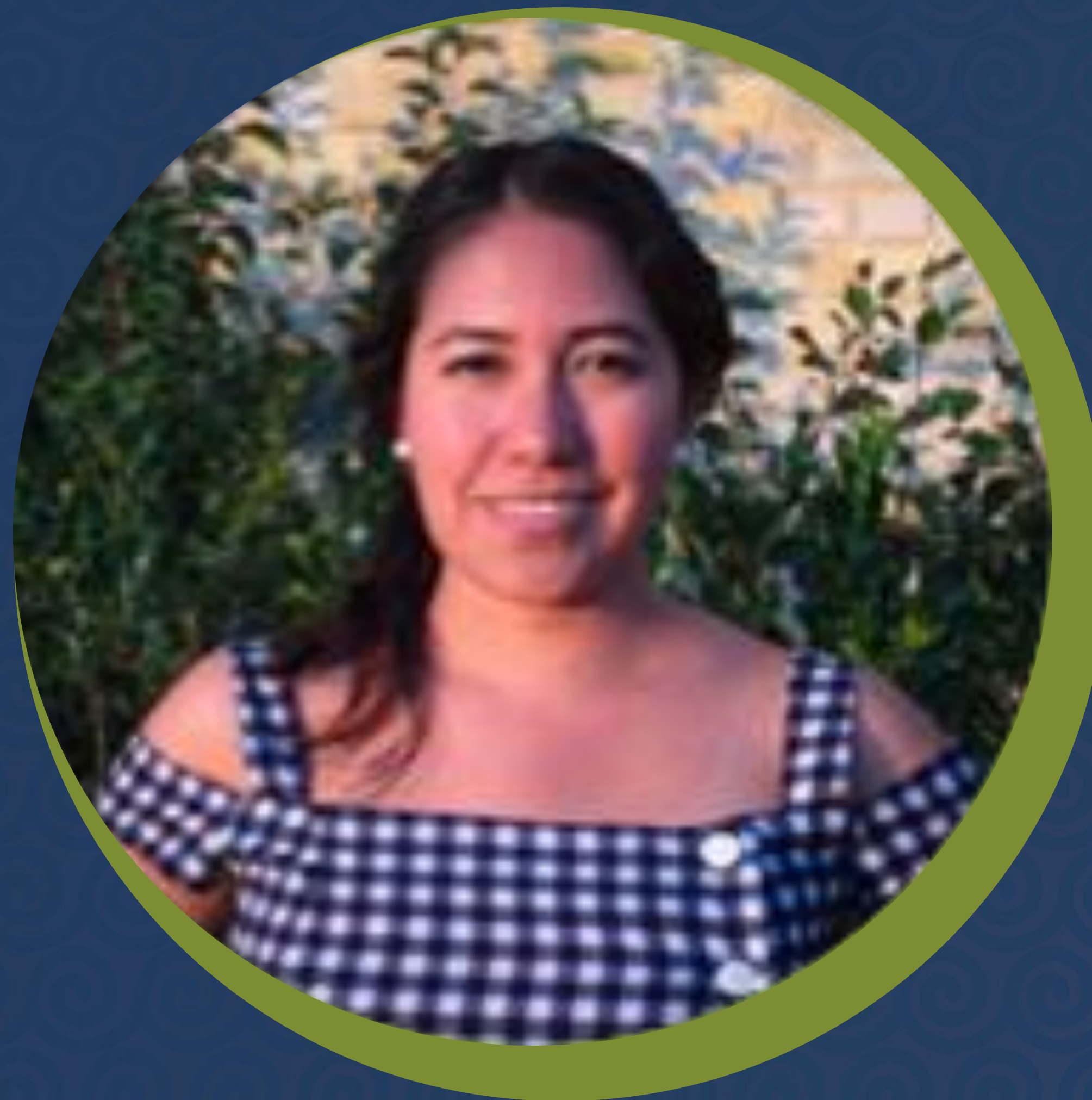
If you think of gender equity in STEM as a “women’s issue” we encourage you to think again!



# Girls STEAM Ahead with NASA

**Dr. Martha Saladino**

Education and Outreach Scientist  
Space Telescope Science Institute





# Presenters

## 2024 Girls STEAM with NASA Awardees



**Marie Brenna**

Assistant Director

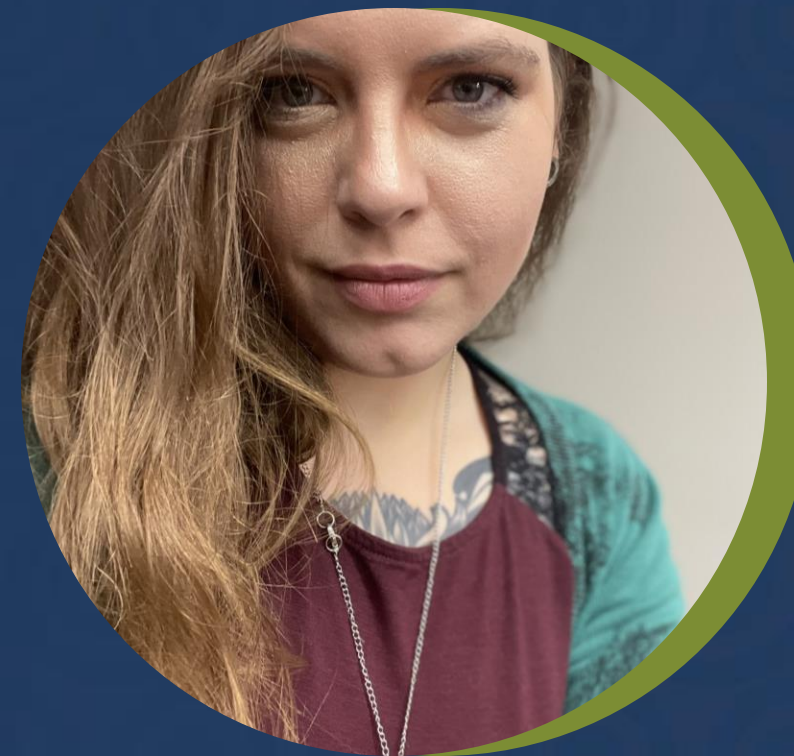
Lawrence County Public Library



**Anna Bottoms**

Library Assistant

Lawrence County Public Library



**Cassandra Taylor**

Technology Engagement Center

Library Association



**Brenda Stanley**

Director

Enosburgh Public Library



**Meghan Tanner**

Science & Makerspace Educator

Discovery Space





# Q & A

We'll take questions from the chat and from people using the 'hand raise' function.





CONNECT + CREATE + COLLABORATE

Learn more at [ngcproject.org](https://ngcproject.org)





NASA'S UNIVERSE OF LEARNING

# Girls STEAM Ahead with NASA

Dr. Martha Irene Saladino

Education & Outreach Scientist

Space Telescope Science Institute



# NASA's Universe of Learning



NASA's Universe of Learning is an integrated astrophysics STEM learning and literacy program funded by NASA.



Learners of all ages and backgrounds are engaged and immersed in exploring the universe for themselves.





# NASA's Universe of Learning



Direct connection to the NASA's  
science & missions





# NASA's Universe of Learning Themes

How does the universe work?

Are we alone?

How did we get here?



Life and Death of Stars



Origin & History of the Universe



Structure & Composition of the Universe



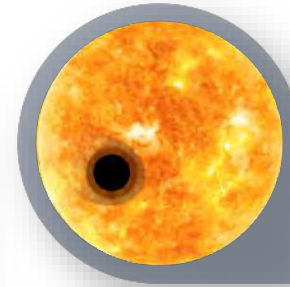
Other Solar Systems, Other Earths



Cosmic Mysteries



Extreme Physics & Phenomena



How Do We Know?





# NASA's Universe of Learning





# NASA's Universe of Learning



Hands-on activities



Videos



Exhibits



Computer-based activities

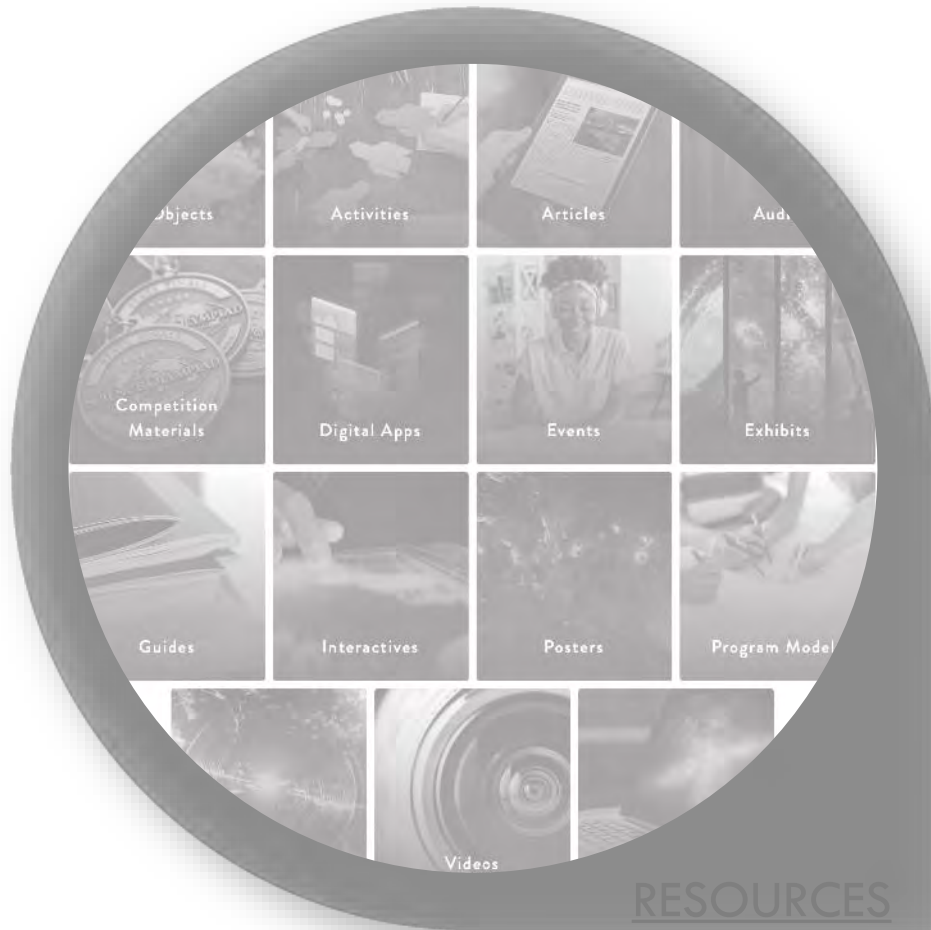


Posters





# NASA's Universe of Learning





# NASA's Universe of Learning





# Girls STEAM Ahead with NASA (GSAWN)



Our **aim** is to empower public libraries and community-based organizations to engage girls and their families in STEM

## GSAWN PROGRAM FACILITATOR GUIDE





# Girls STEAM Ahead with NASA (GSAWN)



## GSAWN Program Facilitator Guide



**EVENT ACTIVITIES & RESOURCES: DATA AND IMAGE PROCESSING**

Click on the event title to view the event page. Click on the resource title to view the resource page. Click on the icon to view the resource page.

**ENGAGEMENT**

Activity	Duration	Resources
Activity 1	15-20 min	Activity 1
Activity 2	15-20 min	Activity 2

**BACKGROUND INFORMATION**

Topic	Background	Resources
Topic 1	Background 1	Resources 1
Topic 2	Background 2	Resources 2

**EXPLANATIONS**

Topic	Explanation	Resources
Topic 1	Explanation 1	Resources 1
Topic 2	Explanation 2	Resources 2

**EXTENSIONS**

Topic	Extension	Resources
Topic 1	Extension 1	Resources 1
Topic 2	Extension 2	Resources 2

**REAL-WORLD CONNECTIONS**

Topic	Real-world Connection	Resources
Topic 1	Real-world Connection 1	Resources 1
Topic 2	Real-world Connection 2	Resources 2

**THINGS TO TRY AT HOME**

Topic	Thing to Try at Home	Resources
Topic 1	Thing to Try at Home 1	Resources 1
Topic 2	Thing to Try at Home 2	Resources 2

### Activities and resources related to the topic

**THEME 2: DATA AND IMAGE PROCESSING**

**SCENARIO 2-3: CREATING ASTRONOMICAL IMAGES**

**OVERVIEW**

**ACTIVITY 1**

**TARGET AU**

**MATERIALS**

**OPTIONAL MATERIALS**

**TIPS AND ADAPTATIONS**

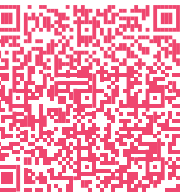
**90 MINUTE OPTIONS**

### Theme with background content for the facilitator

### Sample event scenarios



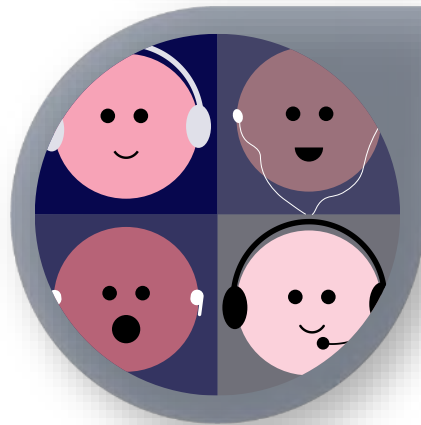
# GSAWN Webinars for Facilitators



A Guide to Celebrating Women in STEM



Star Program Guide Overview



Create Your Own Astronomy Masterpiece to Inspire and Engage





## Contact us...

<https://www.universe-of-learning.org/gsawn>

Email: [girlsSTEAMahead@universe-of-learning.org](mailto:girlsSTEAMahead@universe-of-learning.org)

**Request a NASA Subject Matter Expert for your GSAWN event**

<https://www.universe-of-learning.org/informal-educators/request-an-expert>

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Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Aeronautics and Space Administration.





# GSAWN & NGCP

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at the  
Lawrence County  
Public Library  
Lawrenceburg, TN



# Who We Are

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- We are a public library.
- We are located in rural middle Tennessee, specifically Lawrence County.
- The population of our county is about 45,000 people.
- Our local economy is fueled primarily by agriculture and car-parts manufacturing.

# About Our Program

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- 4 weeks of awesome, scientific fun!
- We marketed to teens ages 12-18. All genders were included.
- We limited spots to 12 teens for Weeks 1-3 and then had open attendance for Week 4.
- Our agenda for the first 3 weeks was to introduce a science or math concept, introduce a STEM professional, do an activity, and make a craft.
- For Week 4, NASA engineers led the program: they spoke about their careers and answered participant questions.



# Week 1: The Electromagnetic Spectrum

## Week 1 featured:

- > Guest meteorologist Kelli Rosson.
- > Slinkys to demonstrate the electromagnetic spectrum.
- > Space bingo with fun prizes from the library.
- > Icosahedron craft made of space photos.



# Week 2: Binary Code



> Mathematician and Educator Debra Barnett taught Base 2 and Binary Code.



> We then "Recolored the Universe" using Post-It notes.



> Beaded Bracelets using Binary Code was the hit for everyone!



# Week 3: Star Cycle



> Cheyenne Hill, a guest chemist from the TN Dept. of Agriculture, taught us about nuclear fusion & nuclear fission.



> We then made two crafts: paper circuits and beaded bookmarks.

# Week 4: Rocket Engineers



> David Brown & Craig Bryson, engineers for NASA's Marshall Space Flight Center, taught us about their careers as rocket engineers.



> They had several interactive props that the audience much enjoyed! This was our most-attended week.



# Teen Participant Feedback

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Question:

*If you were describing this event to a friend, what would you say?*

Teen Answers:

- “I would say it was entertaining, informative, and fun.” Boy 13 (almost 14)
- “It’s Cool!” Boy 13
- “It is a more engaging way to spend the summer.” Boy 13
- “It is so fun.” Boy 12 (almost 13)
- “It was like astrology class with fun stuff.” Girl 14

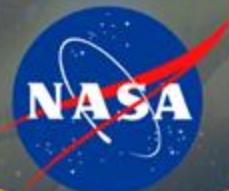
**Thank you!**

We had so much fun working  
on this program!





# GIRLS STEAM AHEAD WITH



at the Technology Engagement Center

**GSAWN Host: Cassandra Taylor**

**Position: Library Associate**

**Organization: Technology Engagement Center**

**Location: Murfreesboro, TN**

# EXHIBITS



## March 2024 Women In STEM Poster Exhibit Series

We utilized content within the Women in STEM poster series for our large electronic display, which is present in the library lounge for anyone to view.

We also reran this electronic display throughout July and August during our GSAWN program.



## June–August 2024 Visions of the Universe Storybook Walk

We also utilized the Visions of the Universe poster series and printed them vertically on yard signs for a sidewalk storybook walk. We installed this passive exhibit outside the library at the end of our first session on the Electromagnetic Spectrum.



# PROGRAM AT A GLANCE

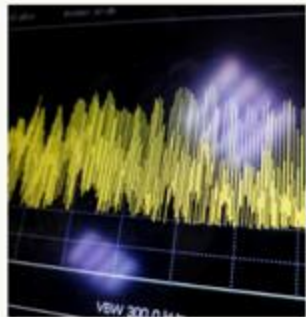
Weekly hour-long sessions for 3rd-12th graders open to all genders.

Total Attendance: 38

Average Attendance Per Session: 7

7/10

**Electromagnetic  
Spectrum**



7/17

**Data and Imaging  
Processing  
Spectrum**



7/31

**Sounds of  
the Universe**



8/3

**Know Your  
Stars**



8/6

**Women in STEM**



## OBJECTIVE:

- Much like humans, stars go through various stages in their lives where they are born, live, and eventually die.
- Stars of different masses have different life cycles.
- Astronomical images are essential for understanding the evolution of objects in the universe.

# ELECTROMAGNETIC SPECTRUM

ASTROPIX SCAVENGER HUNT! GO TO [ASTROPIX.COM](http://ASTROPIX.COM) TO GET STARTED!



INTRODUCES PARTICIPANTS TO THE STAGES IN THE LIFE CYCLES OF MASSIVE, INTERMEDIATE-MASS, AND LOW-MASS STARS. PARTICIPANTS WILL LEARN HOW A STAR'S LIFE CYCLE DEPENDS LARGELY ON ITS MASS



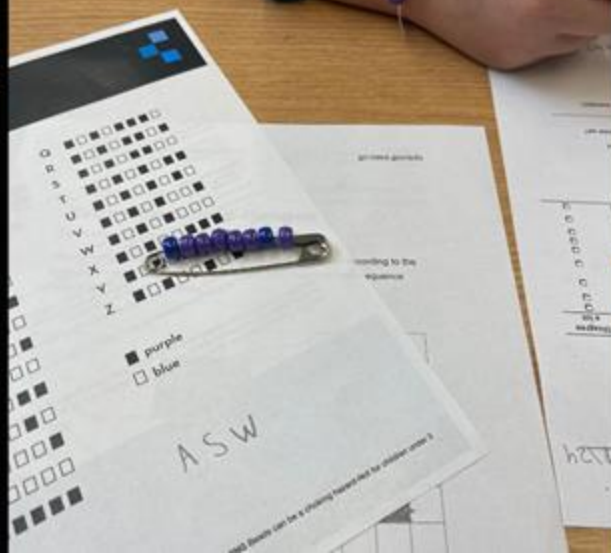
## ACTIVITIES:

- Learn how to communicate in binary code!
- Make binary code pins & bracelets.


# BINARY CODE

OBJECTIVE: HOW WE COMMUNICATE WITH TELESCOPES FROM THE FURTHEST REACHES OF SPACE!

OPEN WITH A VIEW SPACE VIDEO "MYTH VS REALITY: THE WEBB AND HUBBLE SPACE TELESCOPES" & OBSERVATORY COMMUNICATIONS



# SOUNDS OF THE UNIVERSE



OPEN WITH A QUICK VIDEO FROM VEIWSPACE  
CELESTIAL TOUR: MONSTERS IN DEEP SPACE.”  
OBJECTIVE: TO CODE THE SOUNDS OF SPACE  
AND UNDERSTAND HOW WE RECEIVE  
FREQUENCIES FROM SPACE.

TOOLS: NASA'S SONIFICATION WEBSITE AND  
\* NASA'S SPACE JAM FROM CHANDRA



NASA'S  
SPACE JAM



## ACTIVITIES:

- Utilize the Women in STEM resources for the ZINE and Poster Series
- Also allowed attendees to create their own Zines utilizing gel pins and donated scientific magazines, such as National Geographic.



# WOMEN IN STEM ZINE

OBJECTIVE: LEARN OF THE MANY AND DIVERSE WOMEN IN STEM

PRESENTED THE WOMEN IN STEM WEBSITE CONTENT FOUND IN THE PROGRAMMING COOKBOOK TO THE ATTENDEES, AND DIY ZINE TOOLS TO CREATE THE WOMEN IN SCIENCE ZINE ACTIVITY.

OBJECTIVE: HEAR FROM A STAR EXPERT, DR. DENISE STEPHENS OF BRIGHAM YOUNG UNIVERSITY ON STAR LIFECYCLES & CREATE A SENSORY STAR JAR.

OVERVIEW: WE ALLOWED OUR FINALE TO BE FOR ALL AGES WITH PARENTS IN ATTENDANCE TO PROMOTE OUR STAR EXPERT, DENISE STEPHENS, FOR ANY LIBRARY PATRON TO COME AND LEARN AND CELEBRATE STARS.

**FINALE**  
KNOW  
YOUR STARS







# Looking to the STARS & Beyond

GWAWN 7/11-8/1/2024

Enosburgh Public Library

Enosburgh Public Library, Presenter Brenda Stanley, Library Director—GSAWN—Looking to the Stars & Beyond. 4-Thursdays from 3:00– 4:30 pm starting July 11 through August 1, 2024.

Melissa McKinstry, Enosburg Elementary School librarian, presented each of the four weeks. In week 3, we had John Maple from the Space Telescope Science Institute as a guest presenter. John spoke about his role and the MicroObservatory, assisted the girls with their images, and explained how to adjust them.

We targeted girls from grades 4 and up, and we consistently had six girls attend. On our third day, twelve girls came, and on our last day, nine girls attended.

The program was very well done, and the one thing I would do differently is to reach out more to the experts. The girls greatly benefited from being able to interact with John, and I realized I should have tried to have another expert, as it helped reinforce that they could be scientists.

GSAWN is a great opportunity to assist girls in learning about science, space, and beyond. I would greatly reach out again to offer this program over and over, as there are many different lessons and materials to utilize.



# Making Bookmarks

We received the bookmarks, and the girls loved using the beads to attach to then explain what each bead represented.



# First Meeting

This was our first meeting, and Melissa was very excited to present an introduction to Stars to them. We were amazed at the questions we would look up, if we did know, to present at that next session. Lots of questions about black and white holes (I admit I did not know what a white hole was until this session.)





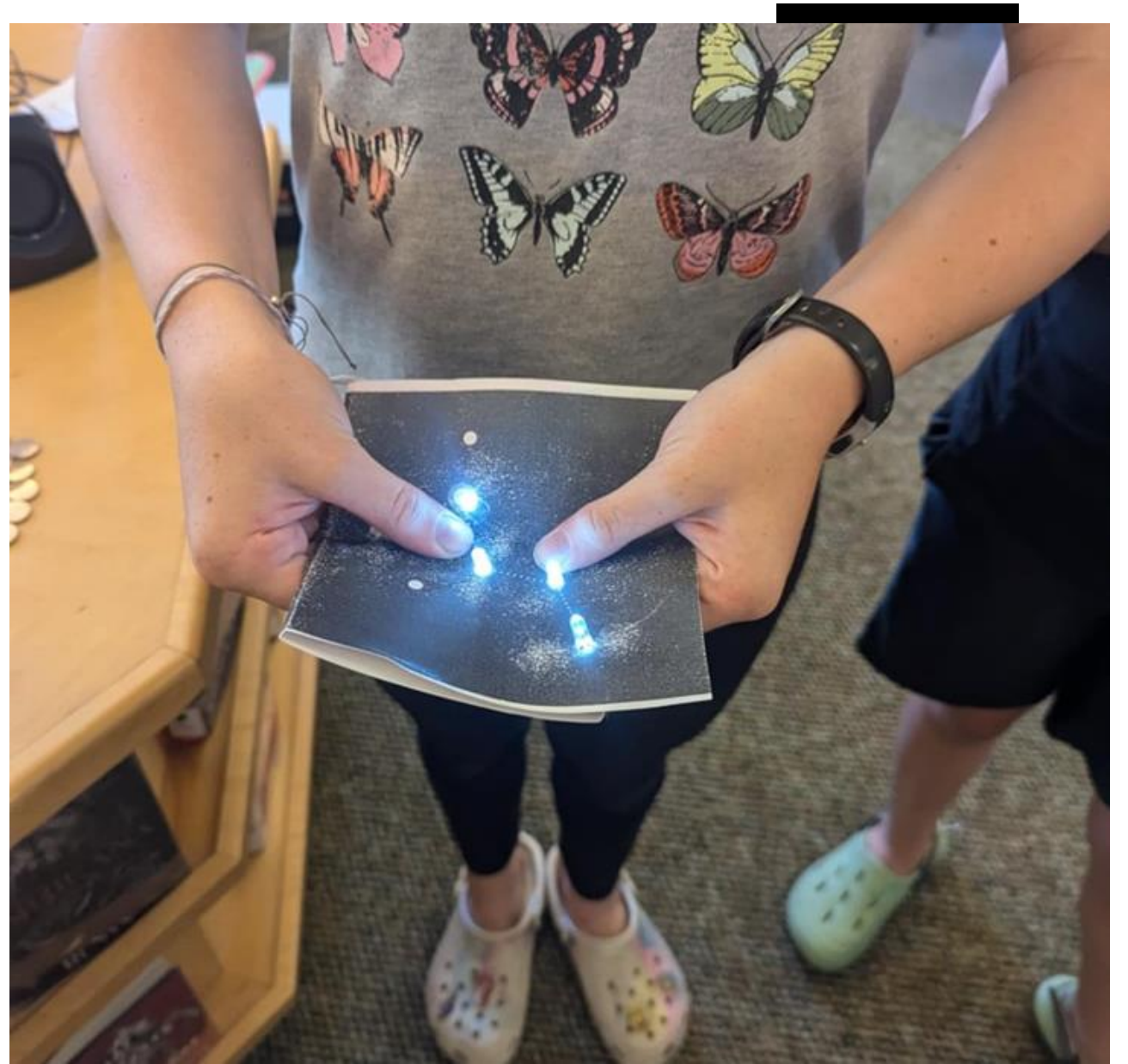
# Circuits

After our slide show and discussion on the second day, they were able to make Circuit Constellations. This was a great learning experience, and some did get frustrated at first, but once they supported each other, they were excited to problem-solve.



# Circuit Constellation

A sample of the success.

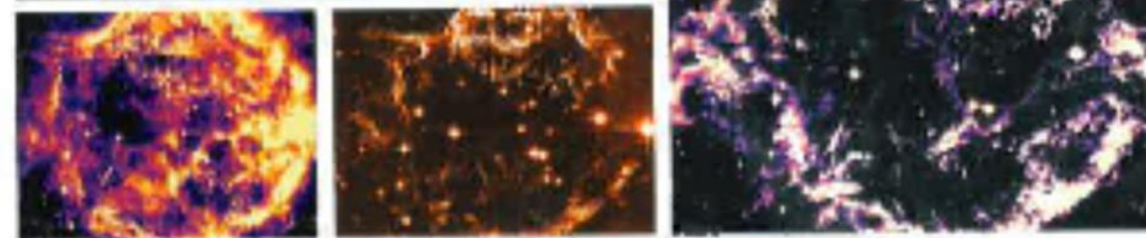
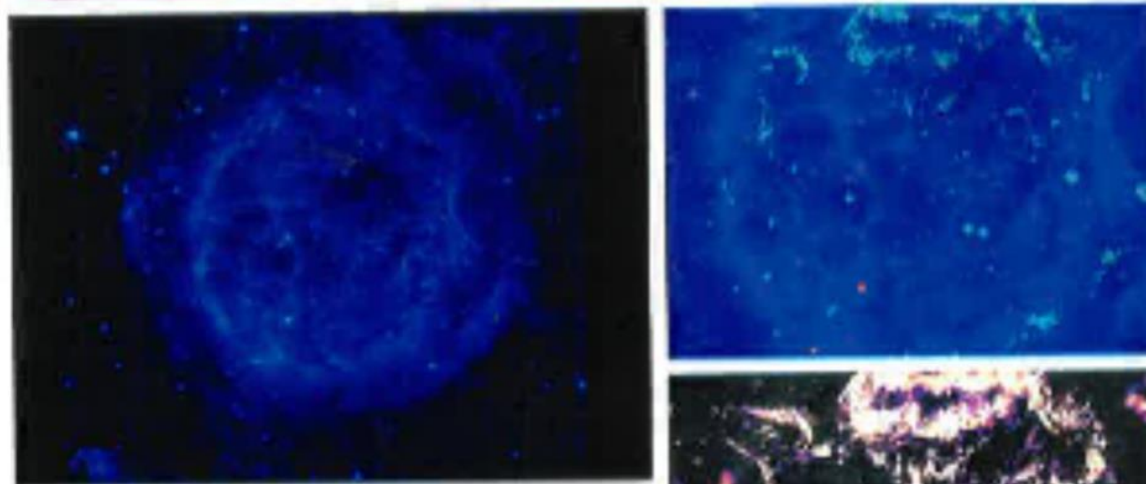
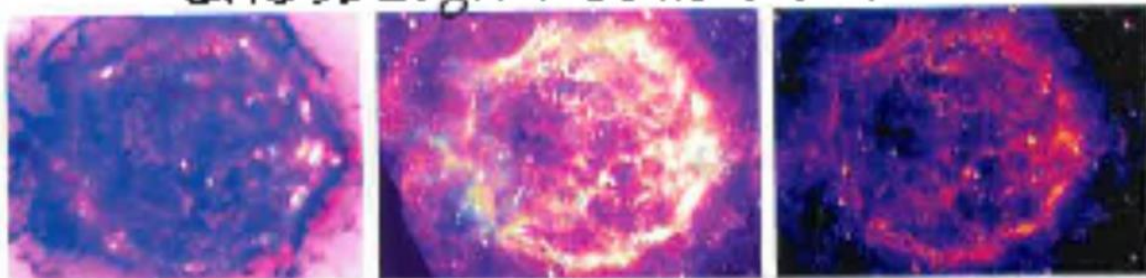




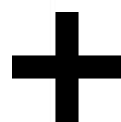
Bella showing her constellation in process.



Enosburgh Public Library



Girls STEAM Ahead With NASA 2024







**CERTIFICATE**  
OF PARTICIPATION

NASA's Universe of Learning is proud to present this certificate to

***Ariabella C***

In acknowledgement of participating in the  
NASA's Astrophoto Challenge



Exploring our place in space and time  
[universe-of-learning.org](http://universe-of-learning.org)



# Girls STEAM Ahead with NASA

at Discovery Space &  
The Rivet

Discovery  
Space &  
The Rivet



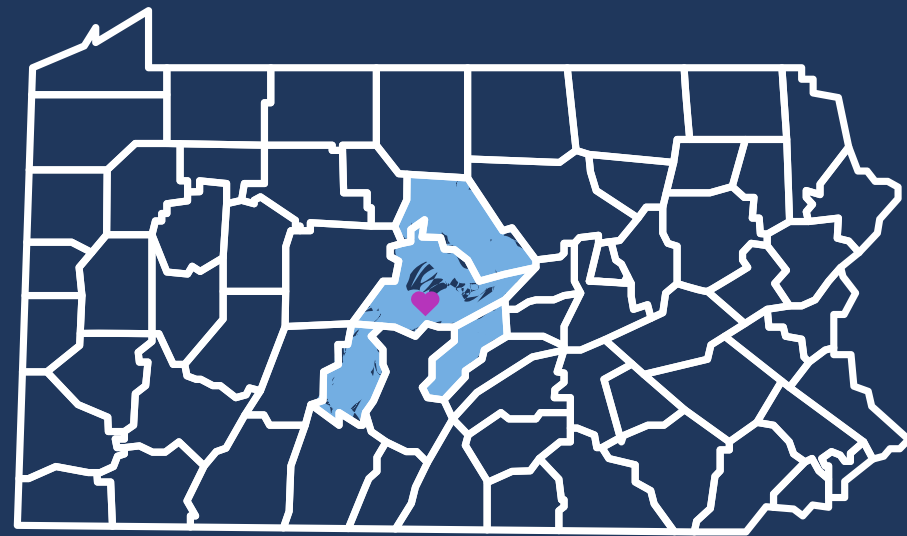
NASA'S UNIVERSE OF LEARNING





# Discovery Space & The Rivet

- Non-profit children's science center and community makerspace
- Located in State College, PA
- Primarily serve families in Blair, Centre, Clinton, and Mifflin counties
- Offer classes, camps, and field trips in addition to our regular open hours.





# Lifelong Learning

**Babies, toddlers, & young children** explore exhibits, practice fine motor skills and begin to build their science vocabulary.



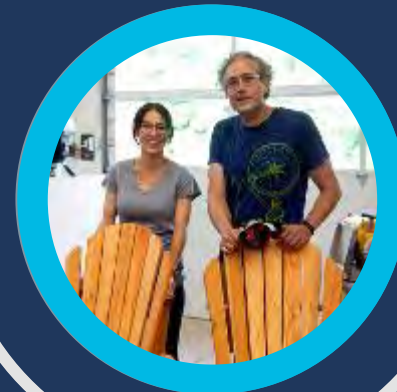
**Kids ages 6 - 10** engage with a wide range of STEM fields through hands-on activities, day camps, and summer camps.



**Pre-teens & teens ages 11 - 17** expand their STEM skills, begin to specialize their interests, and explore career paths.



**Adults ages 18 - 64** find an escape from the daily grind, furthering their knowledge and skills alongside fellow makers and artists..



**Members, makers, and class - takers ages 65+** may find their way back to a long lost hobby or dive head first into a new one.



The cycle continues when caregivers bring young explorers to Discovery Space and lay the groundwork for a lifetime of learning.





# Scouting the Stars

- Held September 29th, 4:00pm - 6:00pm
- Provided 22 local Girl Scouts the opportunity to earn their Space Science badge.
- Divided into 3 groups: Daisies, Brownies, Juniors/ Cadettes
- Each group completed 2 activities
- Scouts were also given the chance to explore our exhibit floor





# Daisies



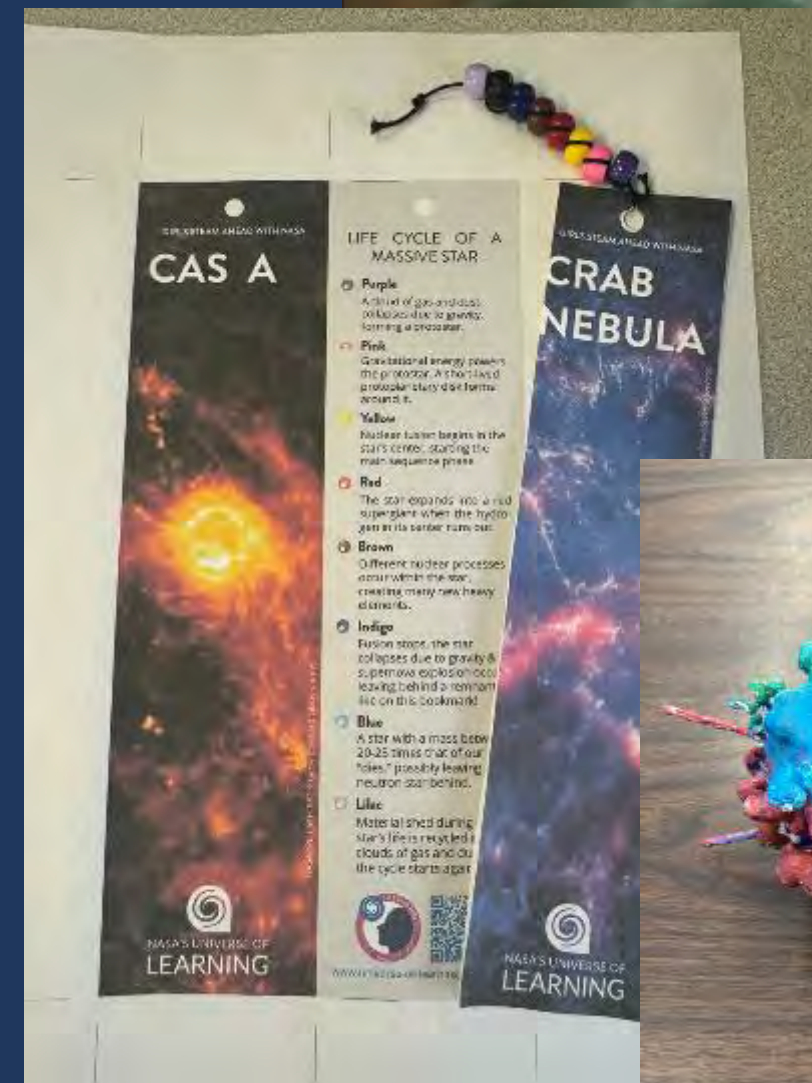
## Station 1 - Earth Orbit

### Model



## Station 2 - Stellar Life Cycle

### Bookmarks Life Cycle of Stars

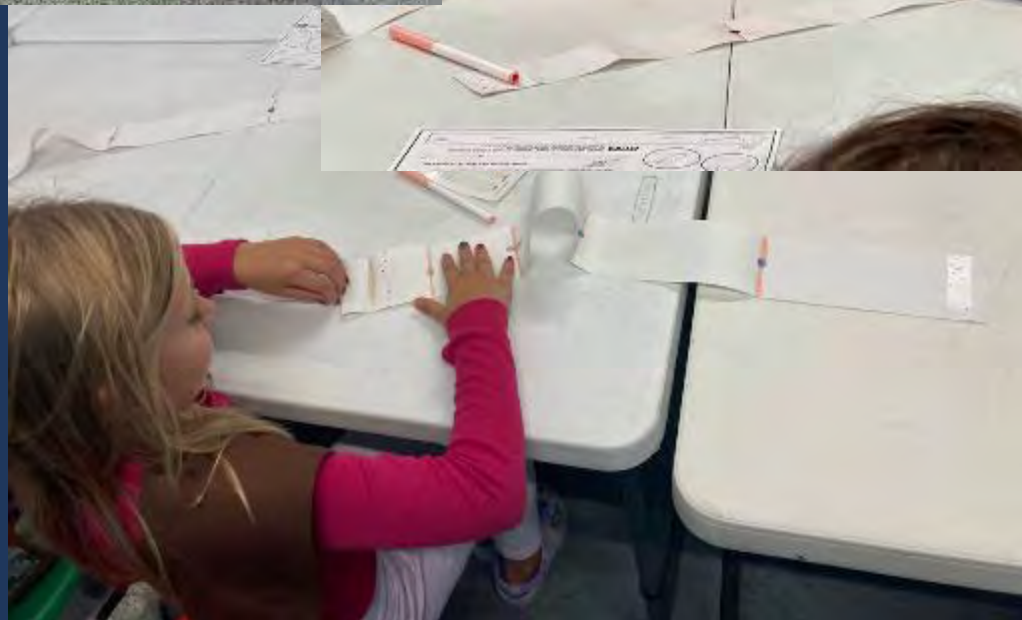
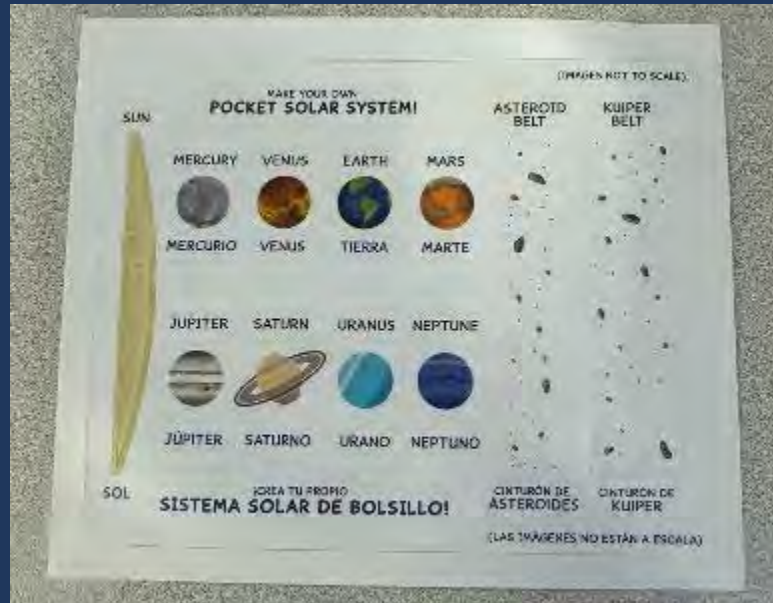




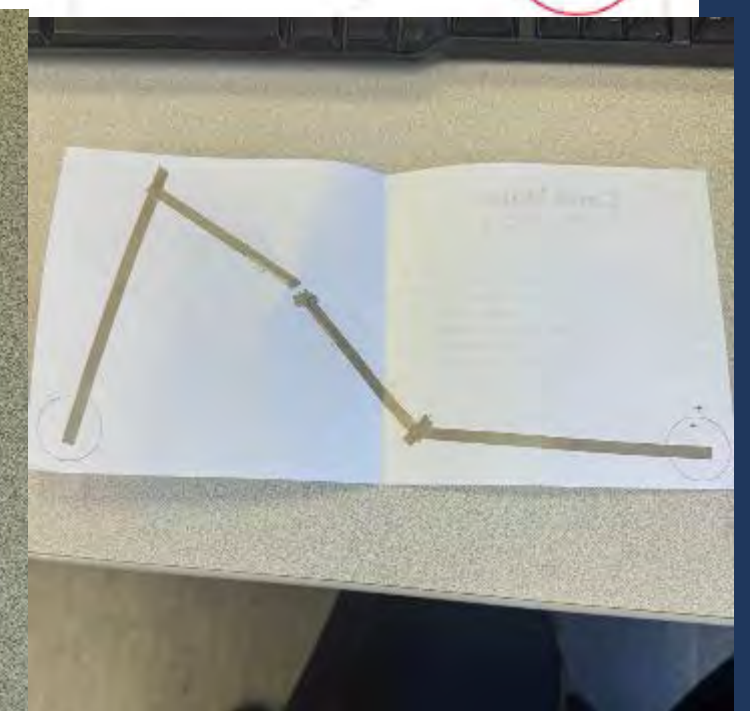
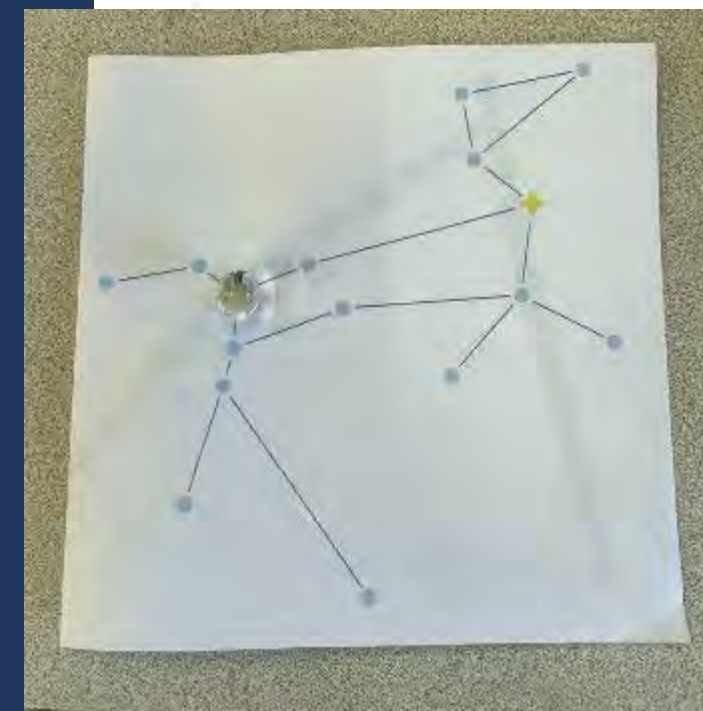
# Brownies



## Station 1 - Pocket Solar System



## Station 2 - Paper Circuits



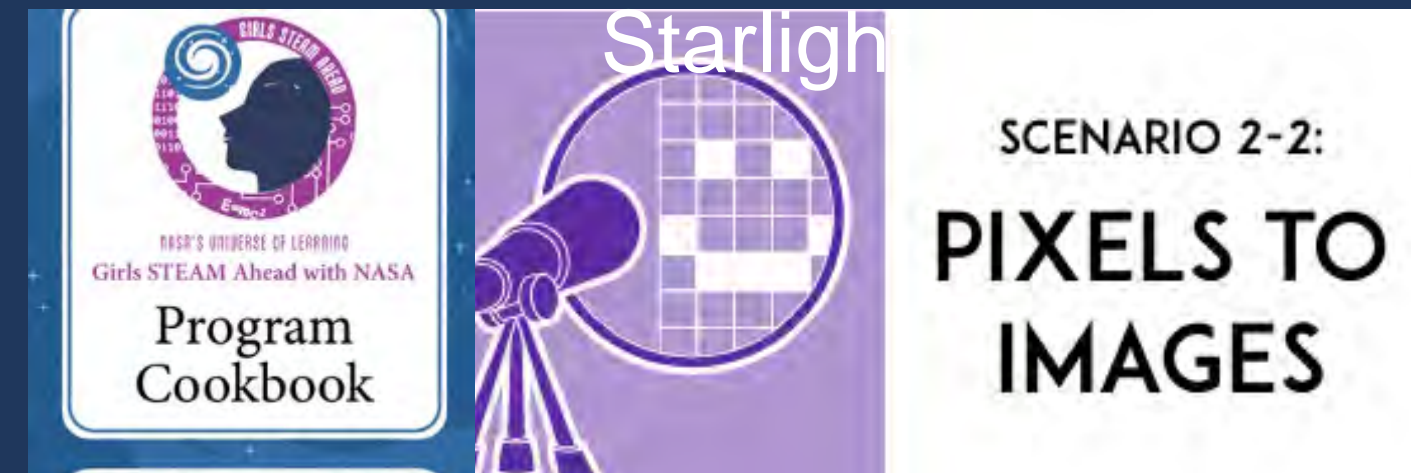


# Juniors/Cadettes

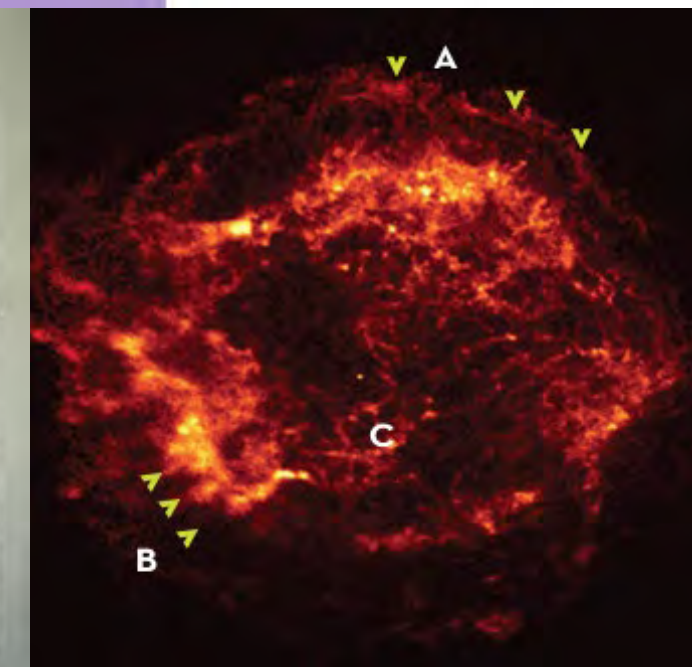


Station 1 - Space

Station 2 - Decoding



	A	B	C	D	E	F	G	H	I	J	K
1	11	12	13	14	15	16	17	18	19	20	21
2	22	23	24	25	26	27	28	29	30	31	32
3	33	34	35	36	37	38	39	40	41	42	43
4	44	45	46	47	48	49	50	51	52	53	54
5	55	56	57	58	59	60	61	62	63	64	65
6	66	67	68	69	70	71	72	73	74	75	76
7	77	78	79	80	81	82	83	84	85	86	87
8	88	89	90	91	92	93	94	95	96	97	98
9	99	100	101	102	103	104	105	106	107	108	109
10	110	111	112	113	114	115	116	117	118	119	120
11	121	122	123	124	125	126	127	128	129	130	131

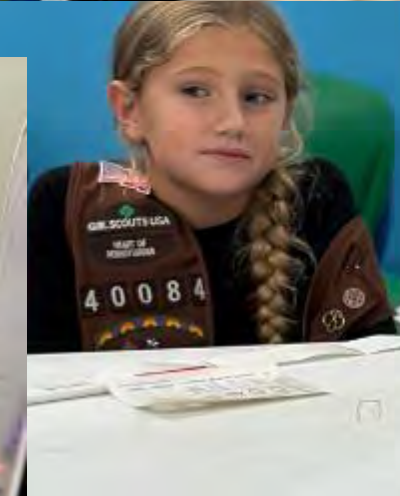


Discovery  
Space &  
The Rivet



# Lessons Learned

- Keep in mind the age of participants.
  - Ex: Daisies & tying beads on string
- Time of day can affect the mood of the event.
  - Ex: “Is it dinner yet?”
- Great opportunity to include volunteers!
  - Ex: Penn State Students





Thank you  
very much!

Discovery  
Space &  
The Rivet



NASA'S UNIVERSE OF LEARNING



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