

Girls STEAM Ahead with NASA Exemplary Practices

November 8, 2022

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 Activities

- Network Partnerships
- IF/THEN Collection
- FabFems
- State Leadership Teams



National Webinars

- Offered monthly on topics to help our networks grow and thrive
- Speakers include educators, researchers, authors, and diverse STEM professionals
- Sign up: <https://www.ngcproject.org/events-announcements>

"I have gotten more out of this than the dozens of other presentations I have attended this summer."

"I found this useful and enjoyable."

"I really like all the resources placed in the chat that I can go and flip through to find what is most helpful to my organization"



NGCP Newsletter

- National in-person and online events
- STEM resources for engaging girls and youth, professional development opportunities for educators, and opportunities for youth
- Research and reports related to STEM and equity, informal STEM education and learning
- NGCP updates and events, including webinars, knowledge products, and tools



Today's Presenters



Dr. Quyen Hart

Project Scientist
Space Telescope Science Institute



Dr. Martha Saladino

Education and Outreach Scientist
Space Telescope Science Institute



Jennifer Stuart

Manager – Canton Branch
Haywood County Public Library, NC



Penny Brumbaugh

Supervising Librarian – Youth Services
Apache Junction Public Library, AZ



Heather Kleiner

Region 7 STEM Center Director
Northwest Louisiana

Girls STEAM Ahead with NASA

Dr. Quyen Hart (STScI)

GSAWN Exemplary Practices & Celebration of National STEAM Day

November 8, 2022



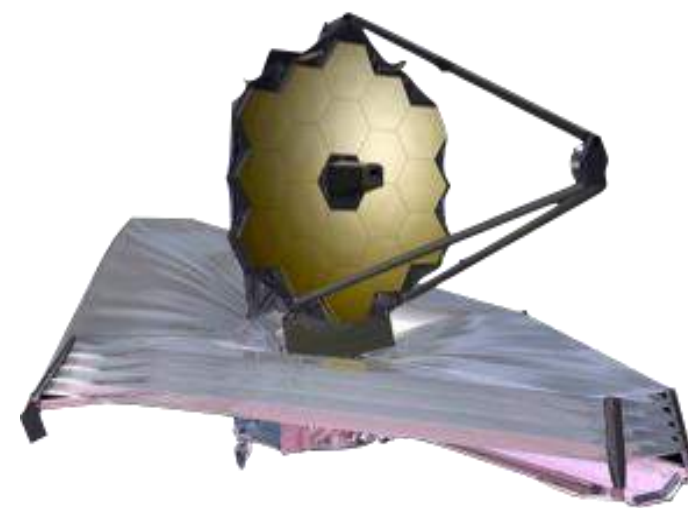
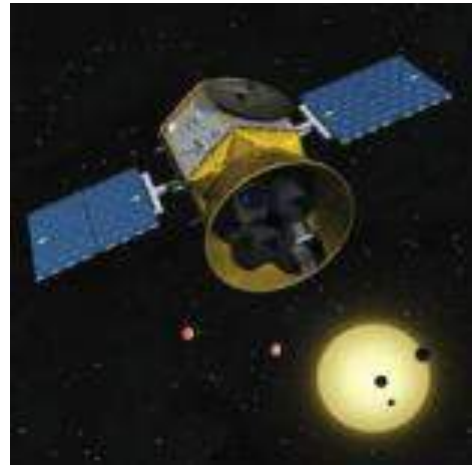
NASA's Universe of Learning is an integrated astrophysics STEM learning and literacy program funded by NASA

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

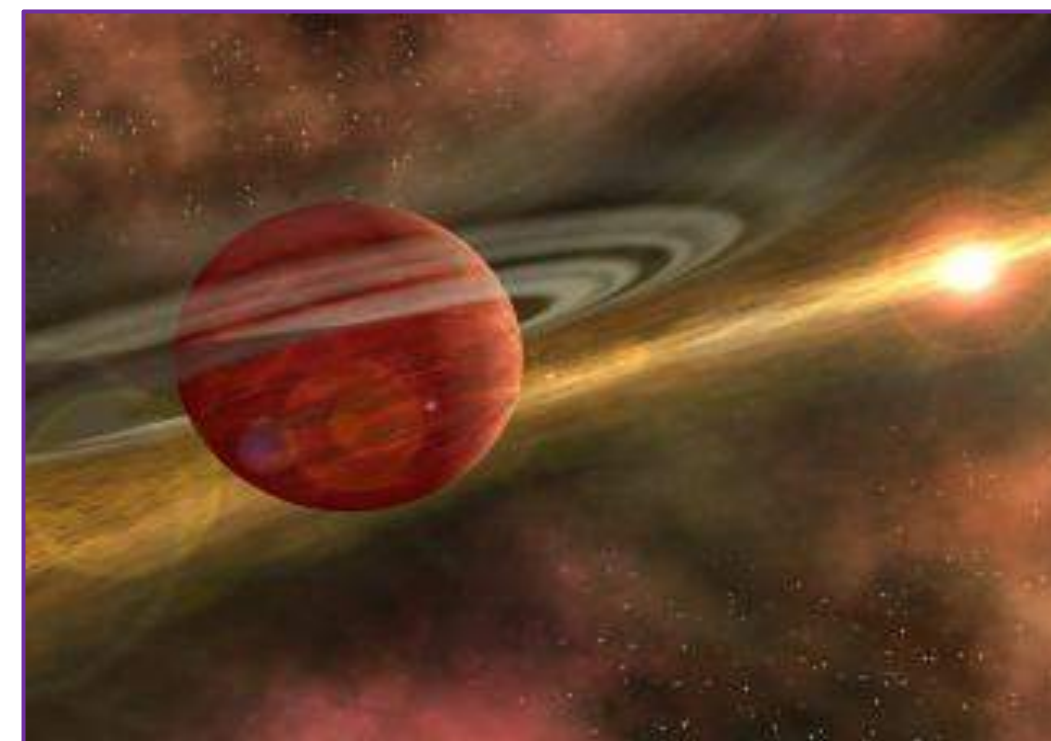


Our Content

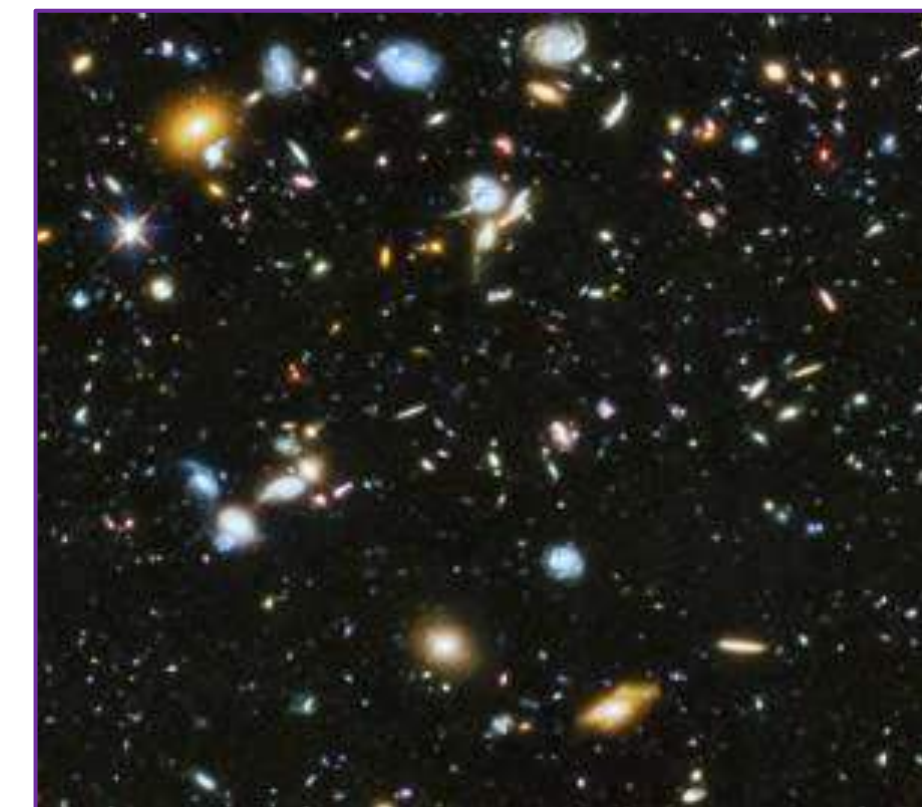
Providing a Direct Connection to the Science



How does the universe work?



Are we alone?



How did we get here?

Girls STEAM Ahead with NASA

Empower public libraries and community-based organizations to **engage girls and their families** in STEM



- Increase awareness of how we know what we know about our universe and foster STEM identity.
- Provide accessible **exhibits, community programs, hands-on resources** that feature NASA Astrophysics science and technology, and interactions with **Subject Matter Experts (SMEs)**.

Our Priorities

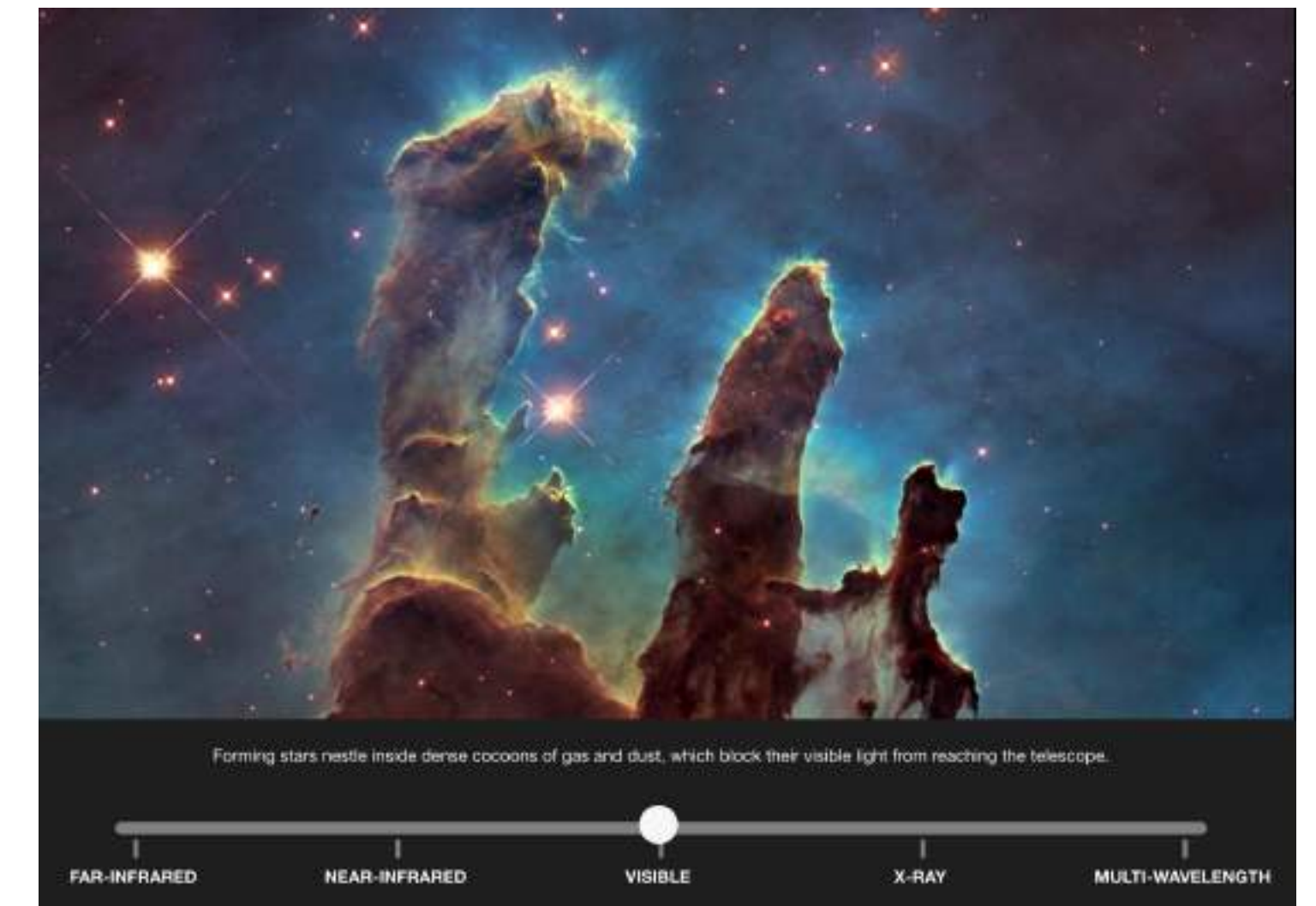
- Increase scientific literacy
- Reach underserved/underrepresented communities
- Reinforce scientific practices
- Support the development of a scientific identity
- Employ emerging technologies



Resources: SME Involvement

Subject matter experts are embedded in everything we do.

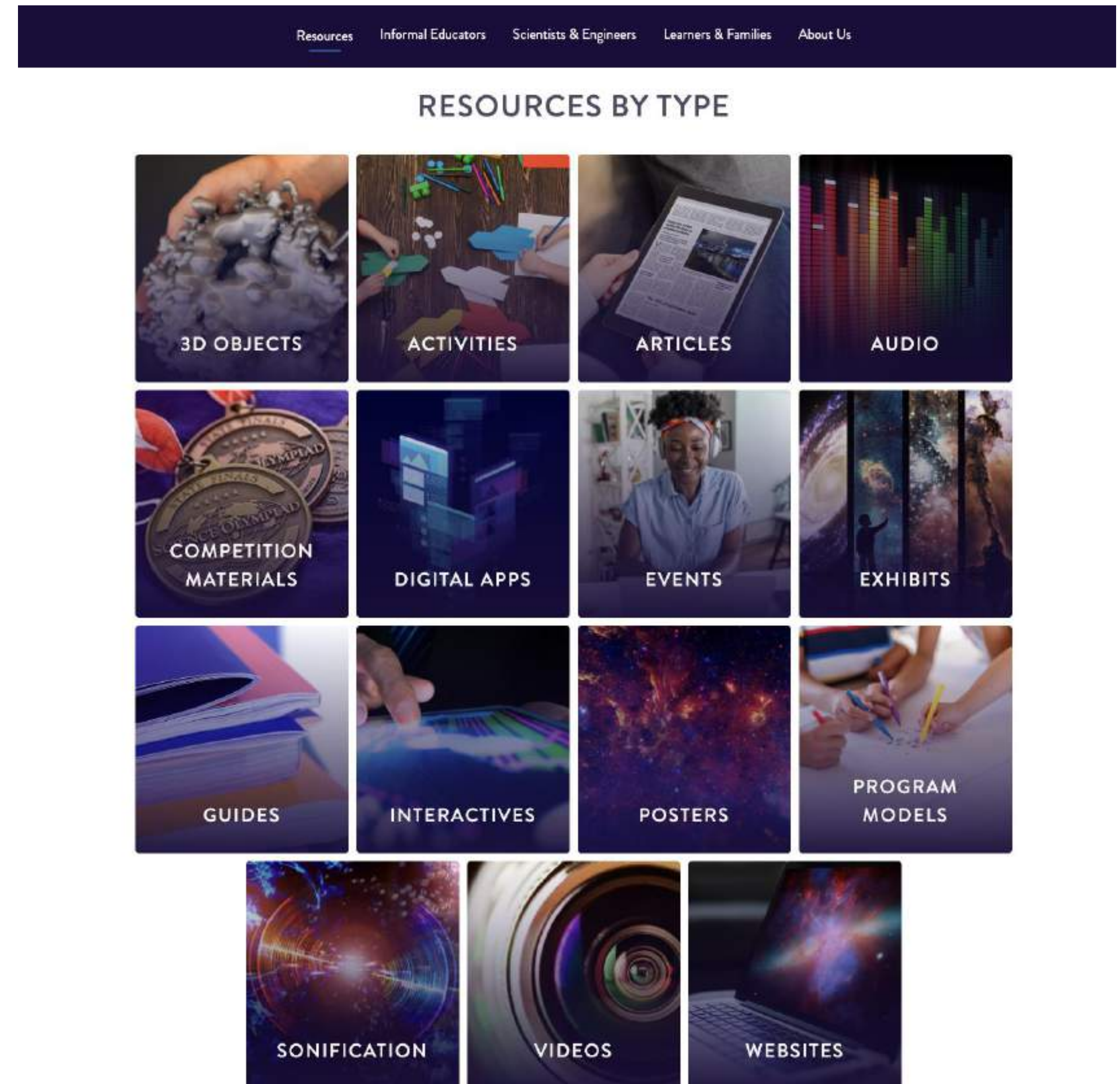
- They work hand-in-hand with education and communications experts to design and implement activities.
- They present the latest scientific results behind our resources.



Explore NASA's Universe of Learning Resources



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

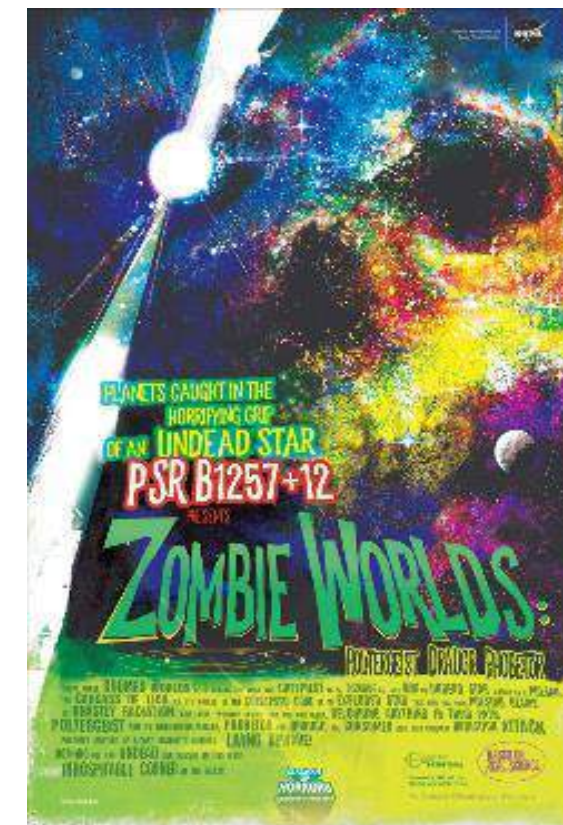
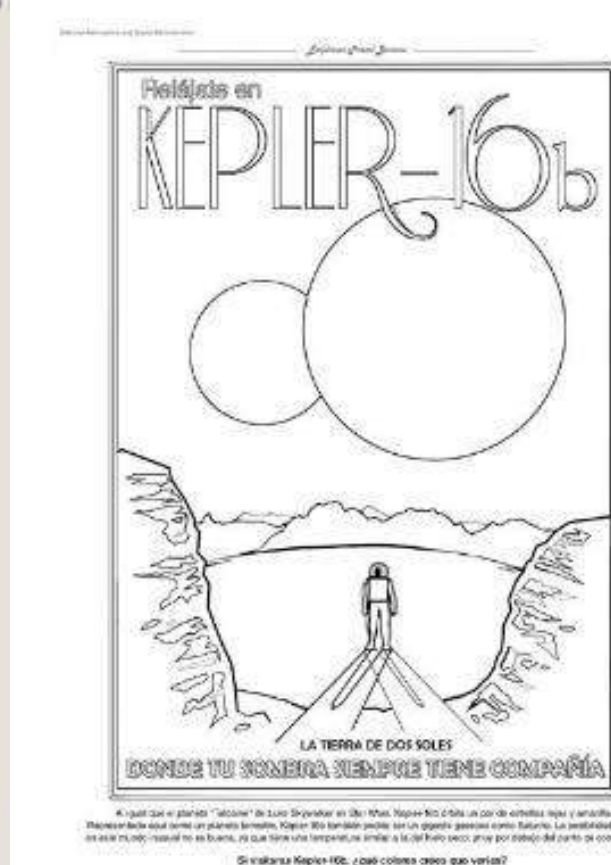
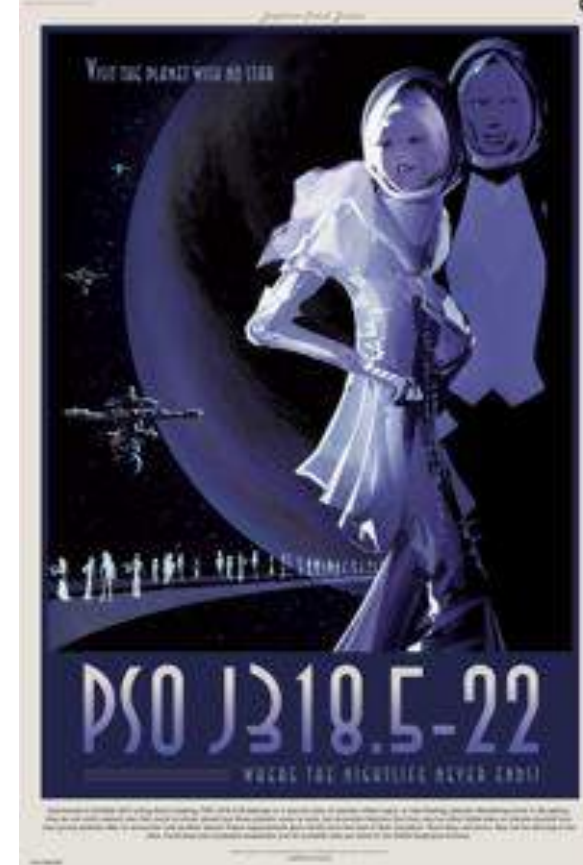


Resources: Posters and Exhibits

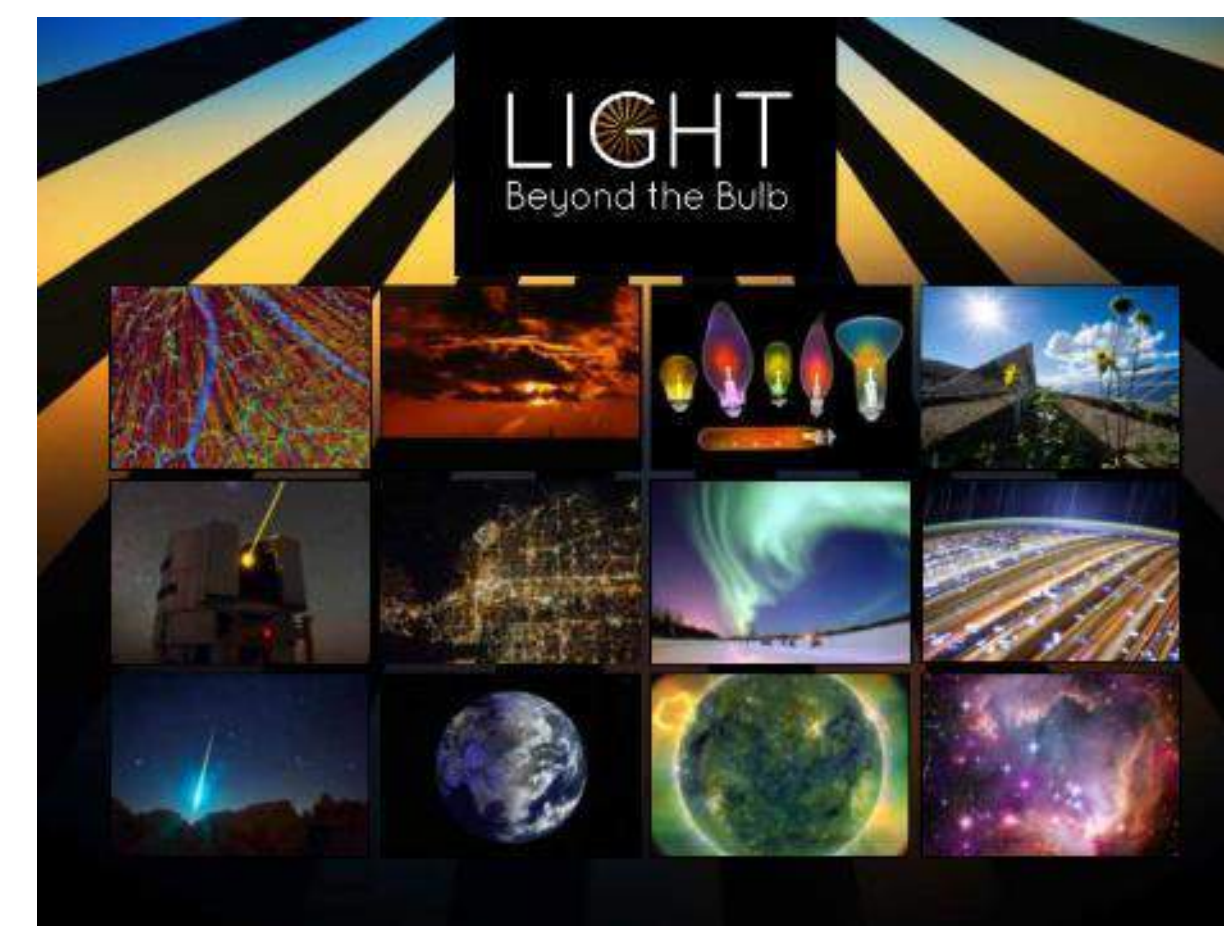


Women in Science
Poster series

Many are available
in Spanish



Exoplanet Posters



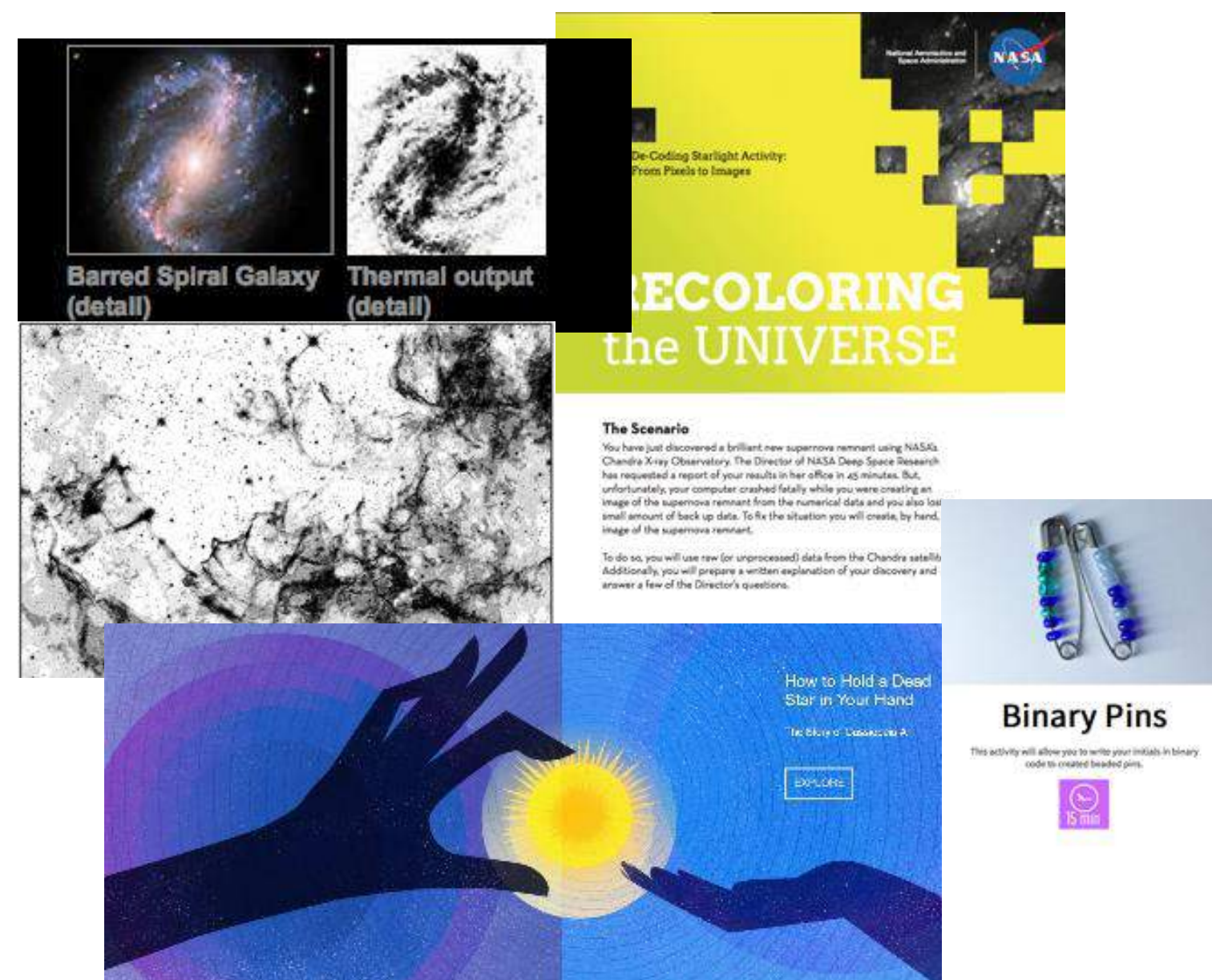
Women of Color: Pioneers and Innovators



Resources: STEM Activities

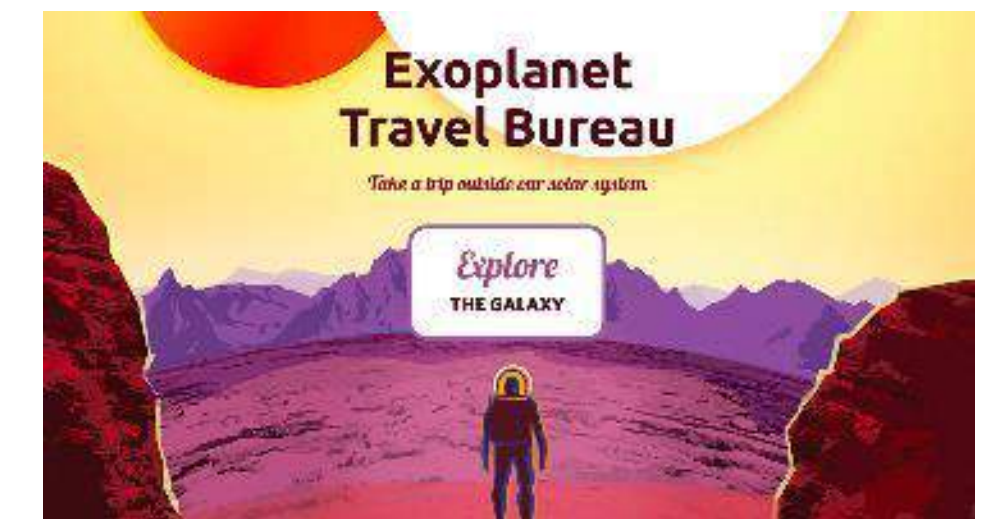
Paper/Pen activities

- Recoloring the Universe
- Scale Models (TRAPPIST-1 and Solar System)
- Binary activities
- Tactile/3D Printing Resources and more



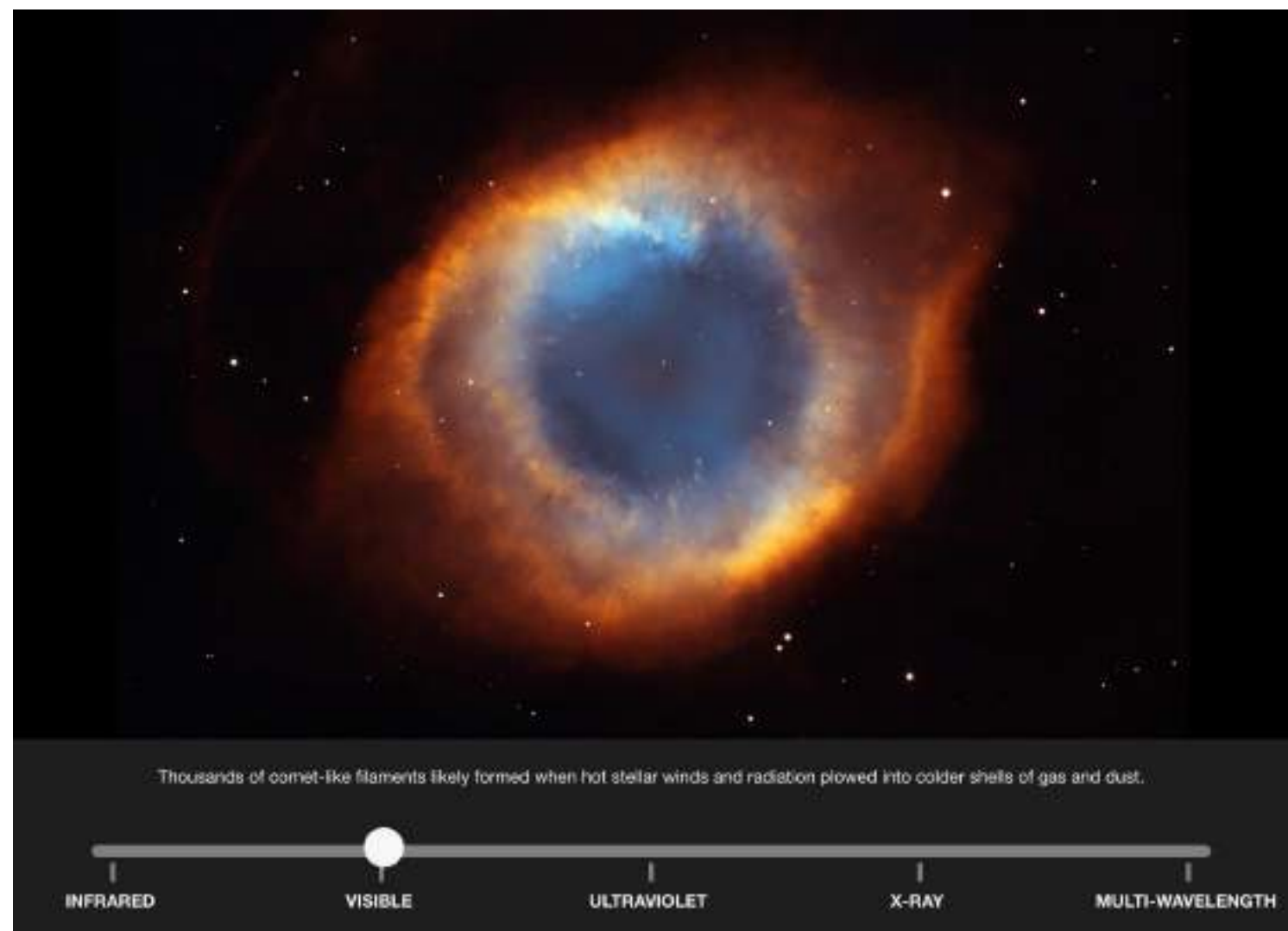
Computer-based activities

- Recoloring the Universe
- MicroObservatory
 - Observing with NASA
 - DIY Planet Search
- Exoplanet Travel Bureau

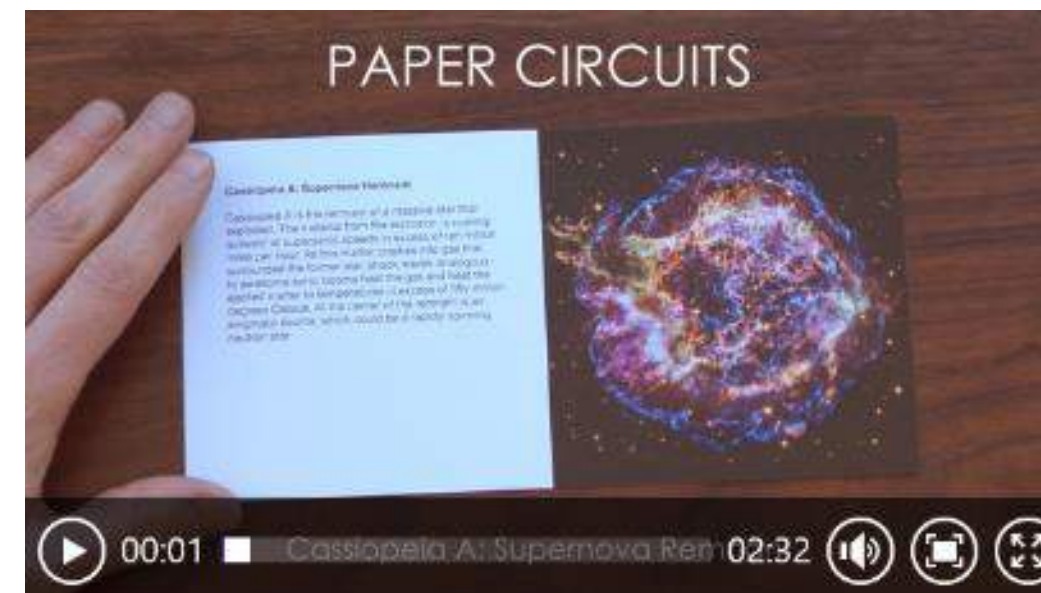


Resources: STEM Activities

ViewSpace – Videos and interactives



Paper Circuits



The Expanded Universe Activity Guide



Activity Guide The Expanded Universe: Playing with Time

Overview

In this activity, participants use balloons to model the expansion of the universe and observe how expansion affects wavelengths of light and distance between galaxies.

Main Takeaways

- The universe is expanding and has done so since the big bang.
- As the universe expands, the distance between the galaxies increases.
- Light from galaxies stretches the wavelength of light increases as the universe expands and the galaxies move apart.

Type of Activity

- ☒ Independent activity
- ☒ Facilitated Activity

Audience

- Families or other mixed-age groups.
- Youth ages 12+

Prep. Time

~ 5 - 20 min.

Activity Time

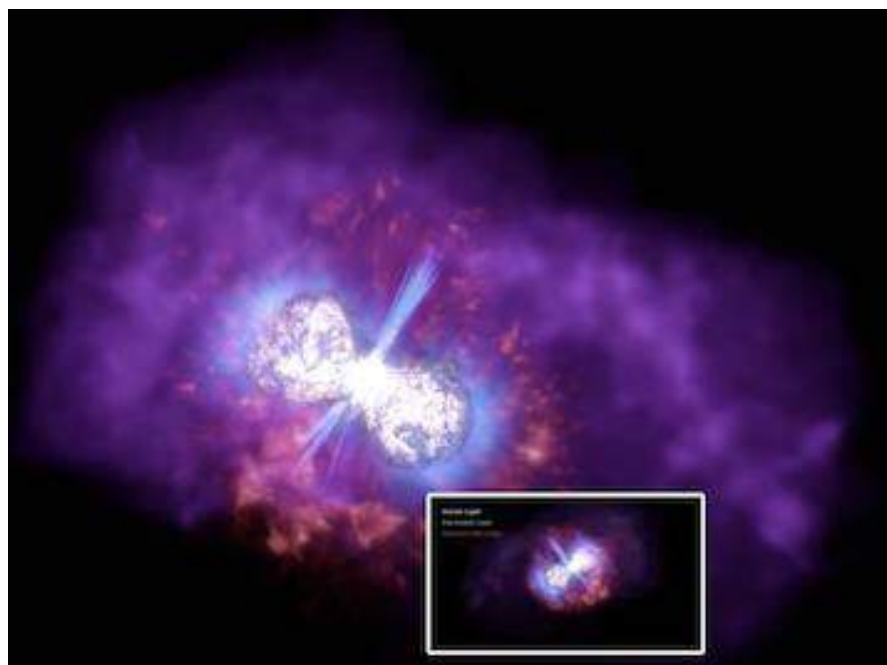
~ 10 - 45 min.

Supply Cost

~ \$20 - \$30 (per activity cost)

Connecting Resources: Sample Pathways

Engagement/Excitement



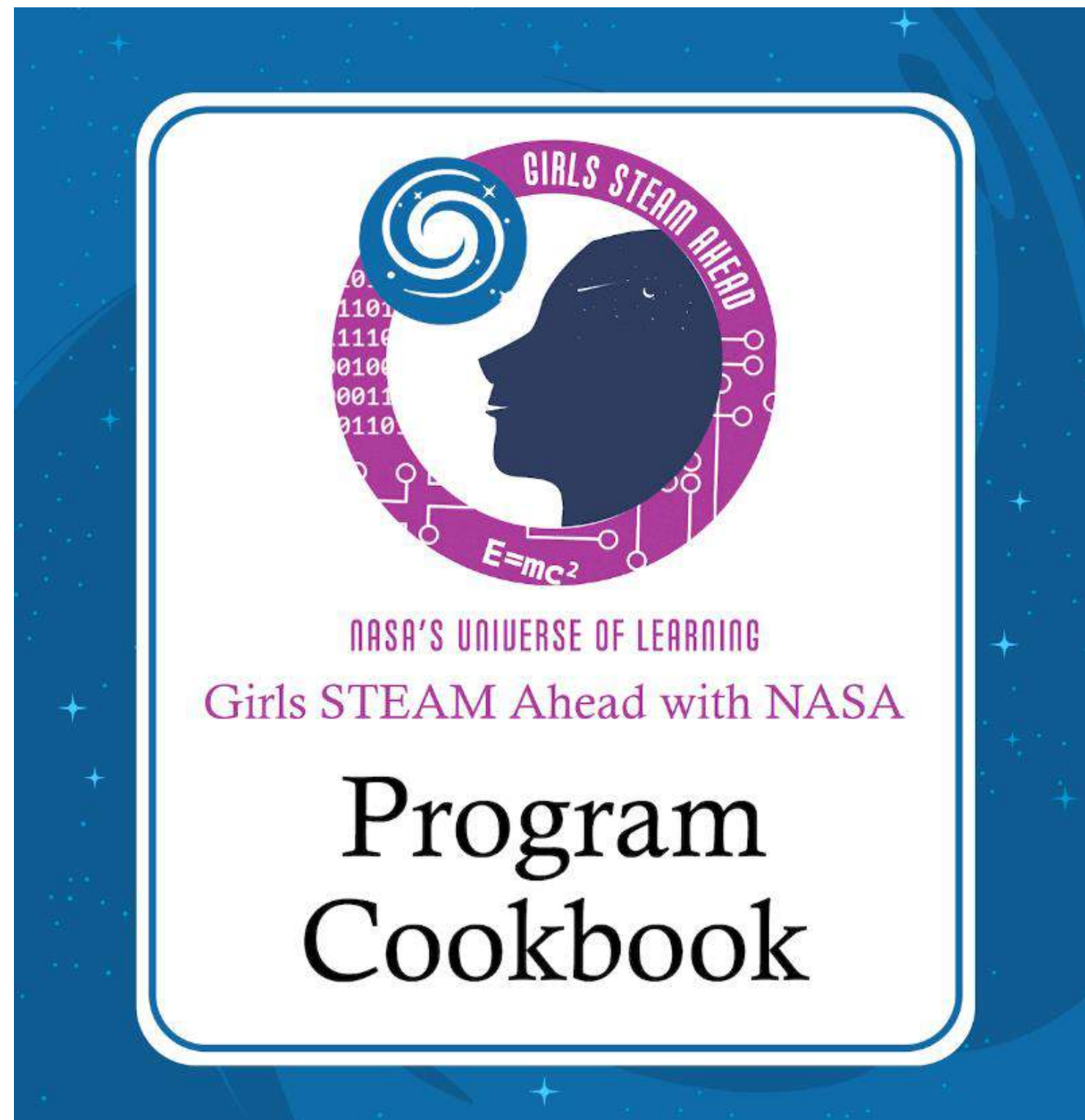
Exploration



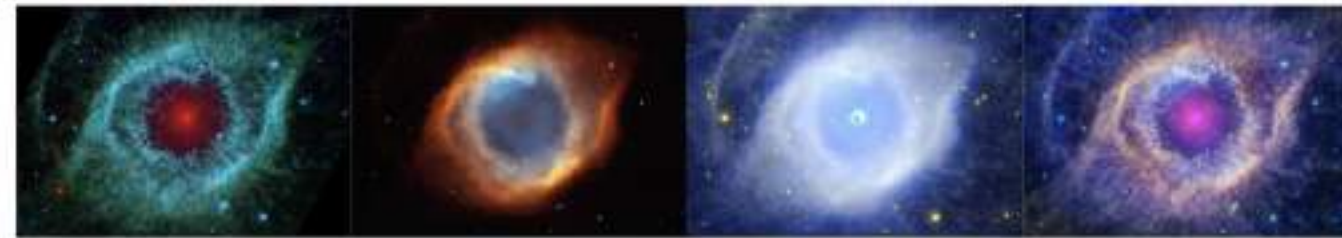
Scientific Identity



Girls STEAM Ahead with NASA Program Cookbook



RECIPE 1: ELECTROMAGNETIC SPECTRUM



(From left to right) The Helix Nebula in infrared, visible, and ultra-violet light. The last image on the right is a multiwavelength image. Explore more with the [Helix Nebula Interactive on ViewSpace](#). Image Credits: NASA.

RECIPE 3: CELEBRATING WOMEN IN STEM



Illustration Credits: Chandra X-ray Center

RECIPE 2: DATA AND IMAGE PROCESSING



The data path from the cosmic source, to the satellite, to Earth. The data transmitted in binary code before being translated into a visual representation of the object. Credit: NASA/CXC/SAO

In development and coming soon

Recipe 4: Lifecycle of Stars!

This Program Cookbook is designed to guide FACILITATORS as they create their event using NASA's Universe of Learning resources. Use the "Menu of Activities and Resources" and planning worksheet to tailor your event for your audience's needs. Program Cookbook includes background material, sample event scenario, facilitator scripts, vocabulary lists, and event tips.

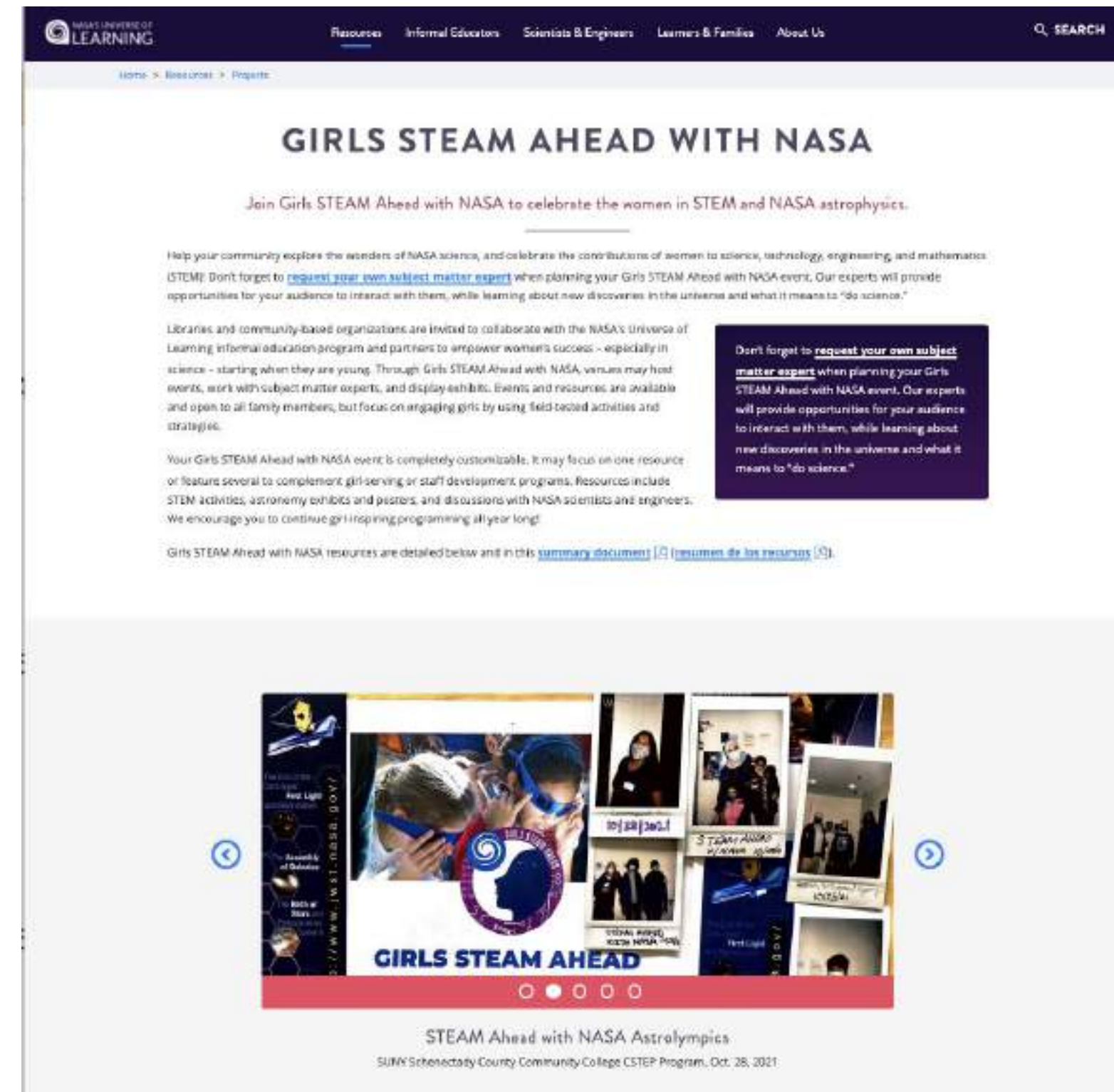
Putting it into Action



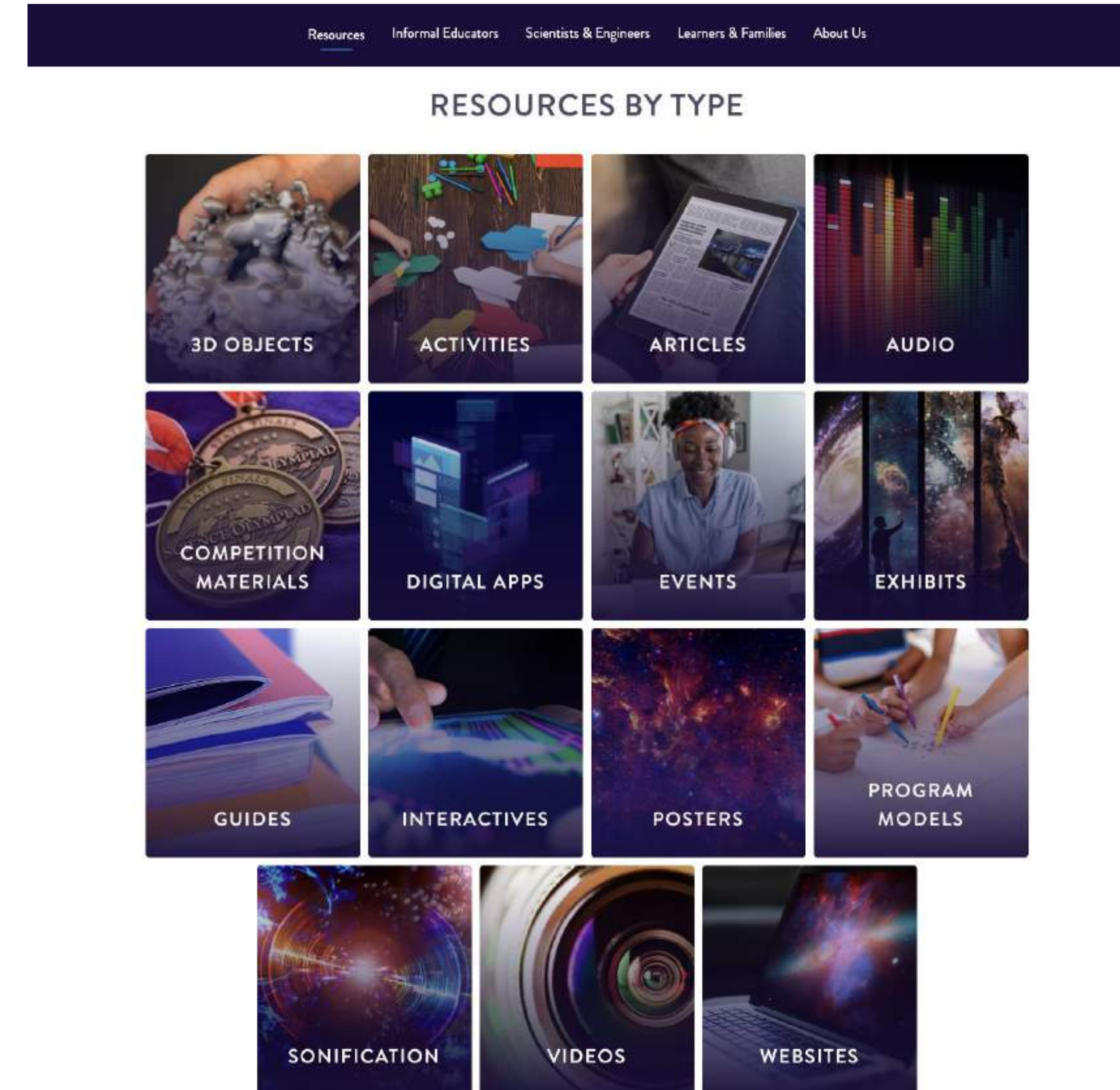
Learn More!



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



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



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



Contact us...

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

Email: girlsSTEAMahead@universe-of-learning.org

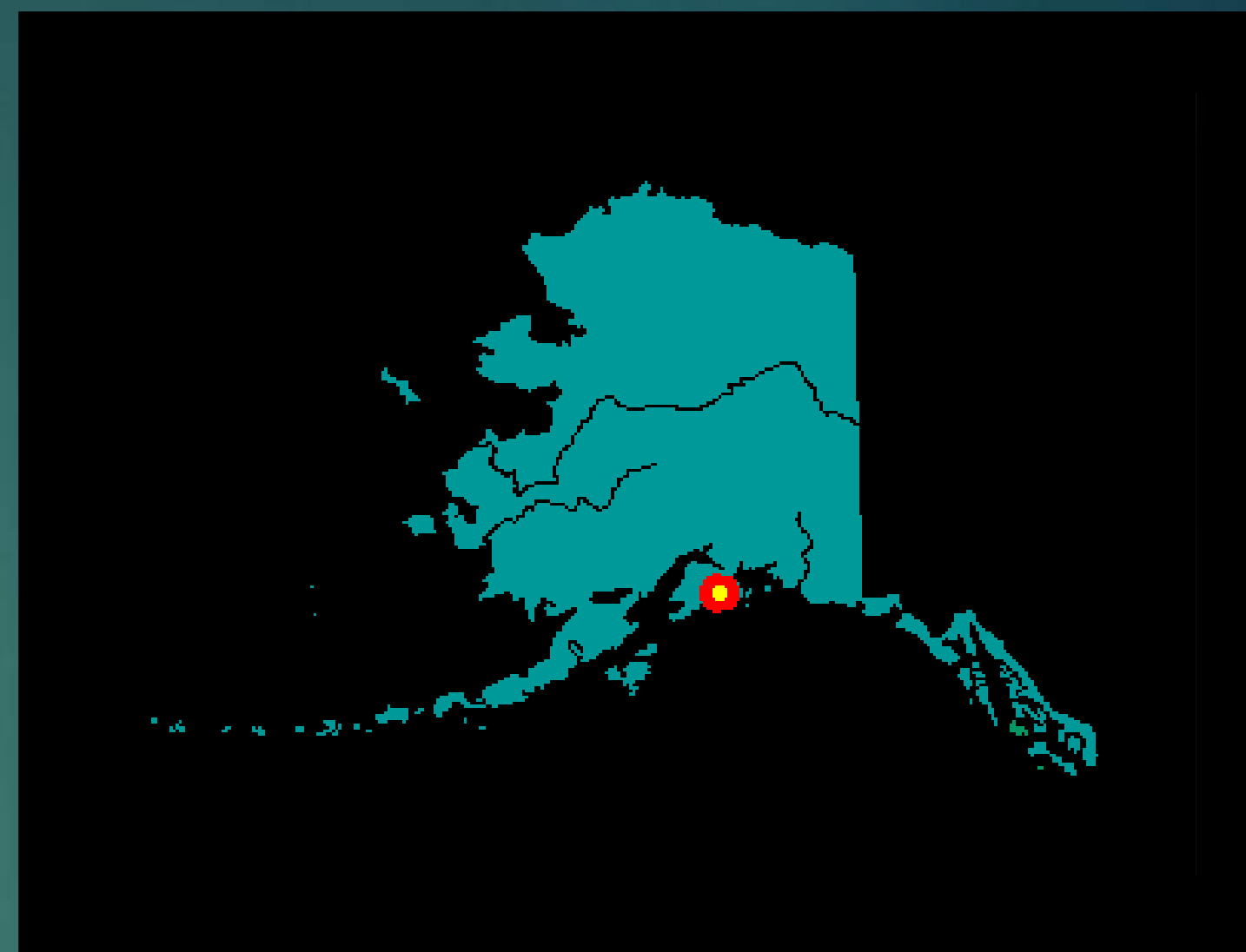
Request a NASA Subject Matter Expert for your GSAWN event

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

This product is based upon work supported by NASA under award number NNX16AC65A to the Space Telescope Science Institute, working in partnership with Caltech/IPAC, Center for Astrophysics | Harvard & Smithsonian, and the Jet Propulsion Laboratory.

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 EVENT

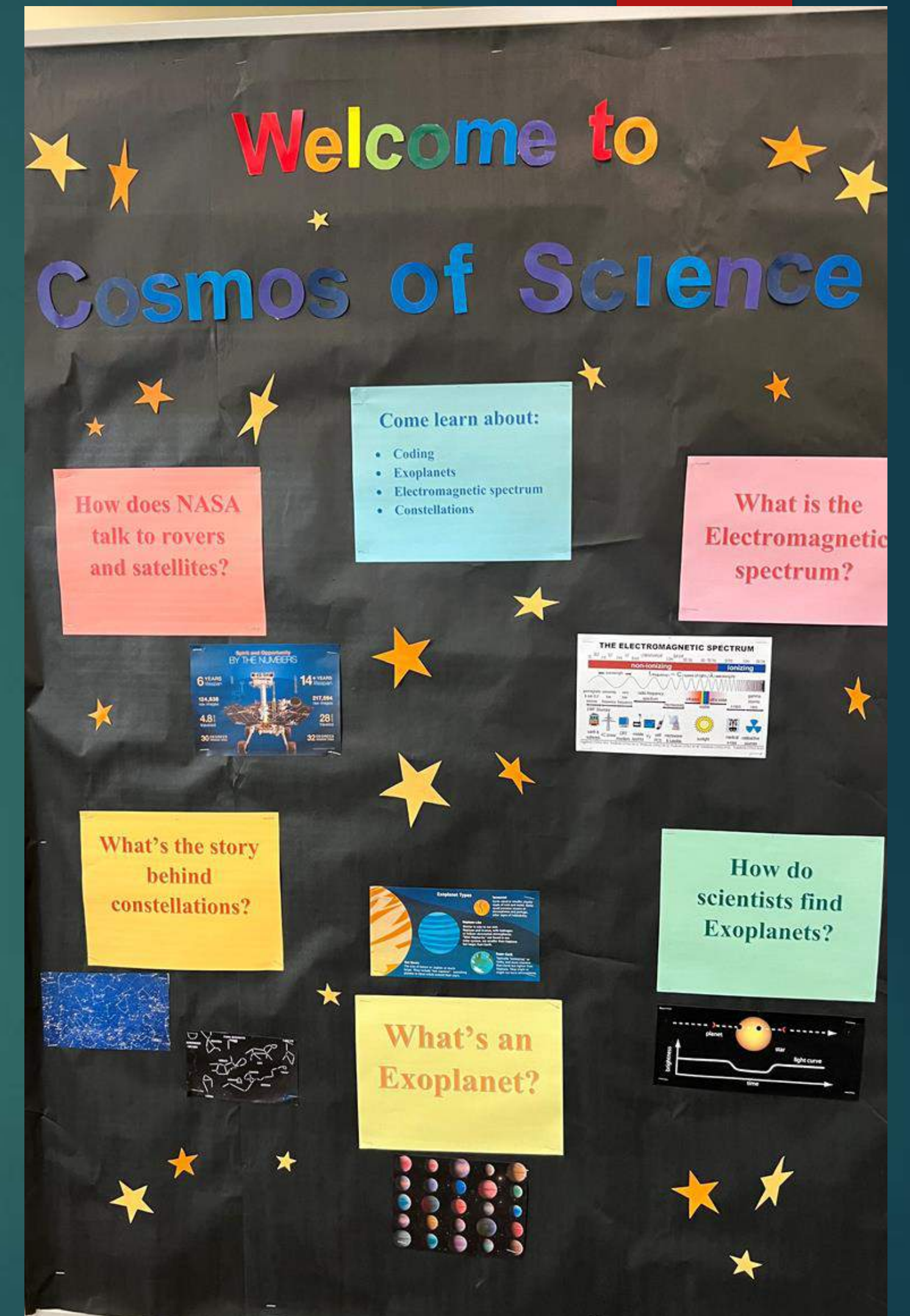
JUNE 15TH 2022

SEWARD COMMUNITY LIBRARY

SEWARD, ALASKA



Our greeters Aspen and Lily handing out photo releases, passports and chalk.



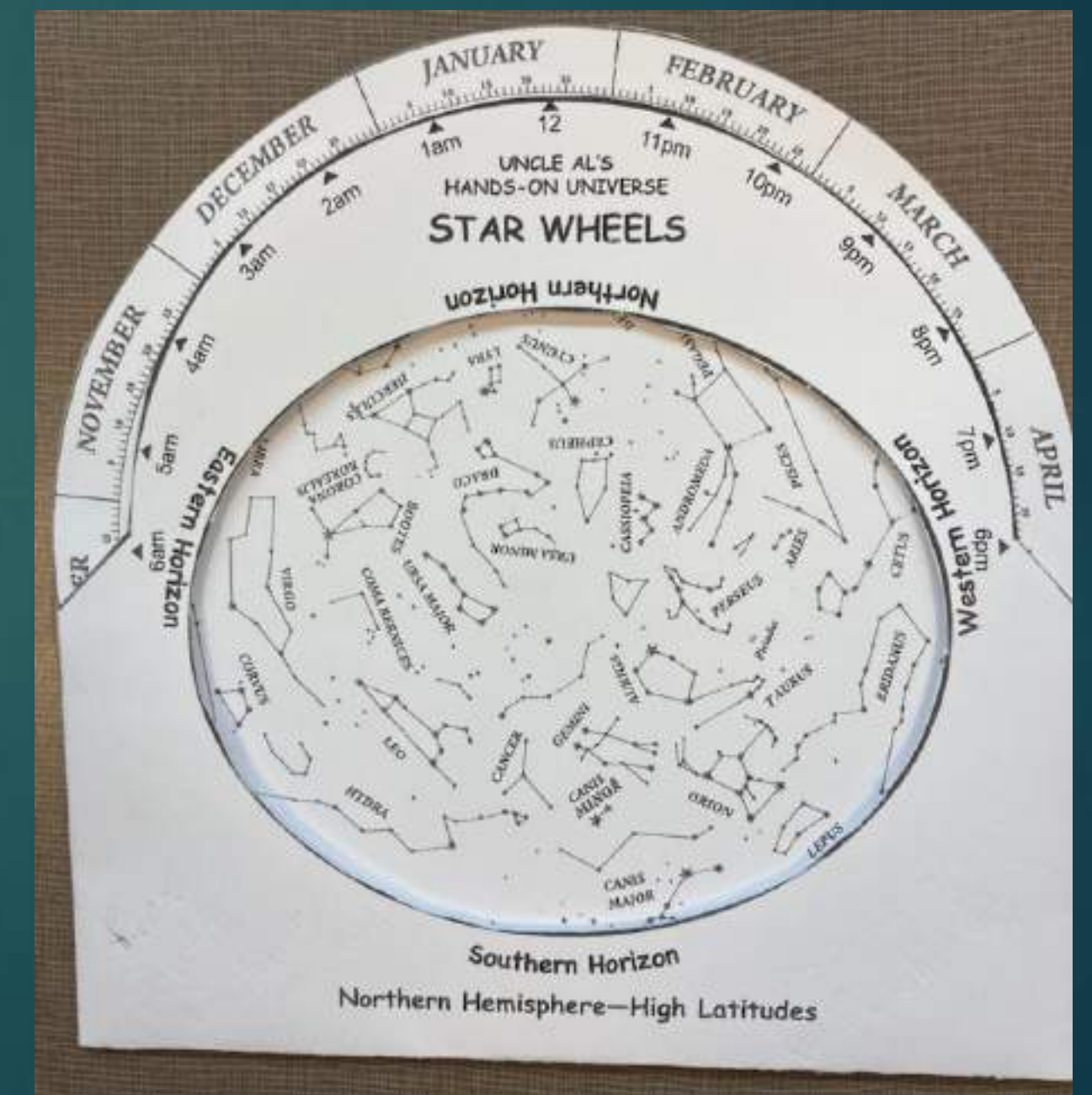
Coding

- ▶ Kids learned about coding by making black and white beaded bracelets with their names in binary coding. Coloring pixel art and trying out the code.org website.



Constellations

- ▶ Paper towel tube telescopes were made.
- ▶ Constellation wheels were handed out.
- ▶ Information about the history of constellations and their use was presented, including Native Alaskan, Greek and Roman myths.
- ▶ NASA's current use of constellations/star charts was highlighted.



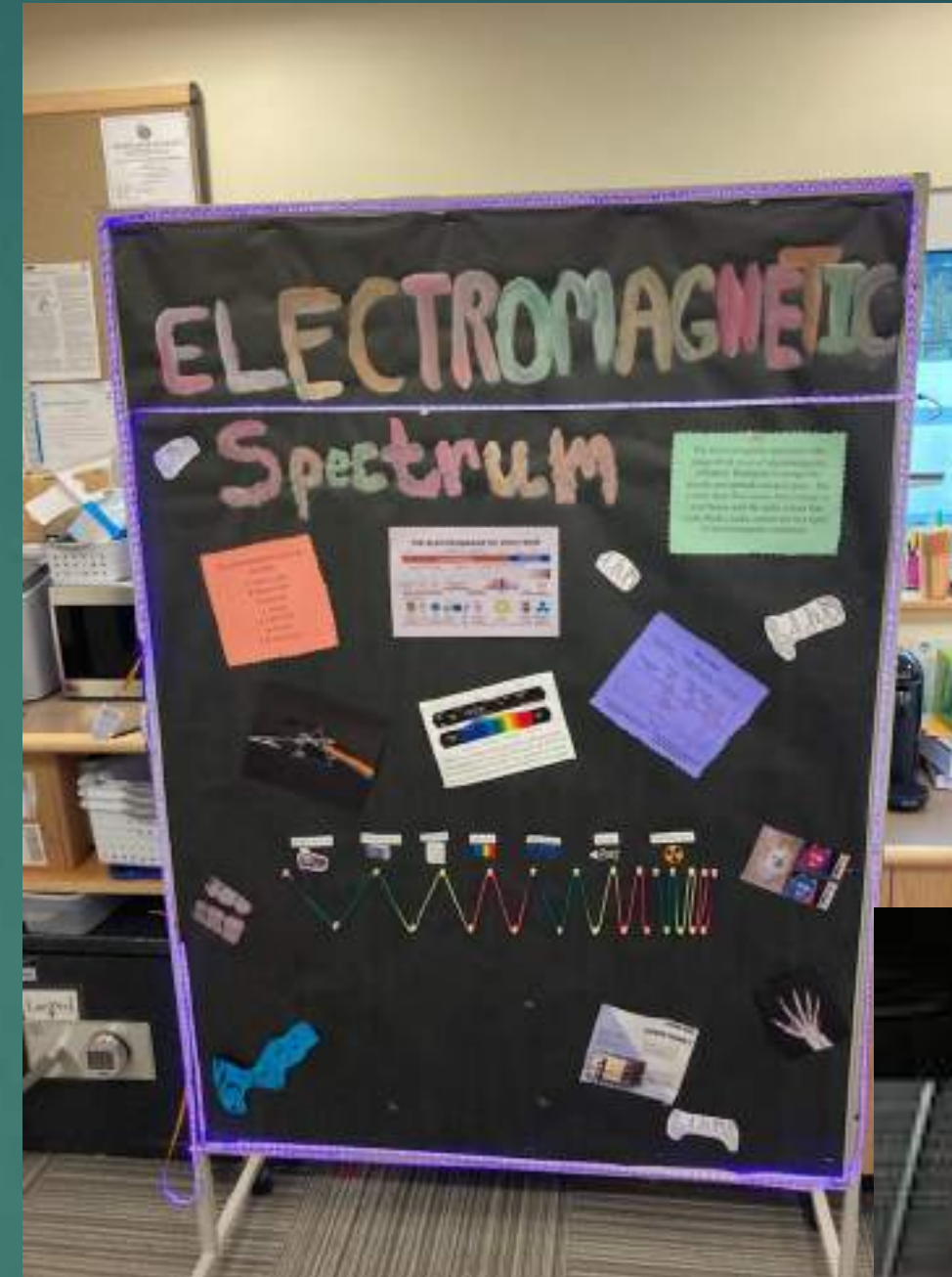
Painting Exoplanets

- ▶ Paper Mache' balloons were prepared ahead of time and dried. Kids painted them all kinds of different colors. They were then displayed in the atrium of the Library.

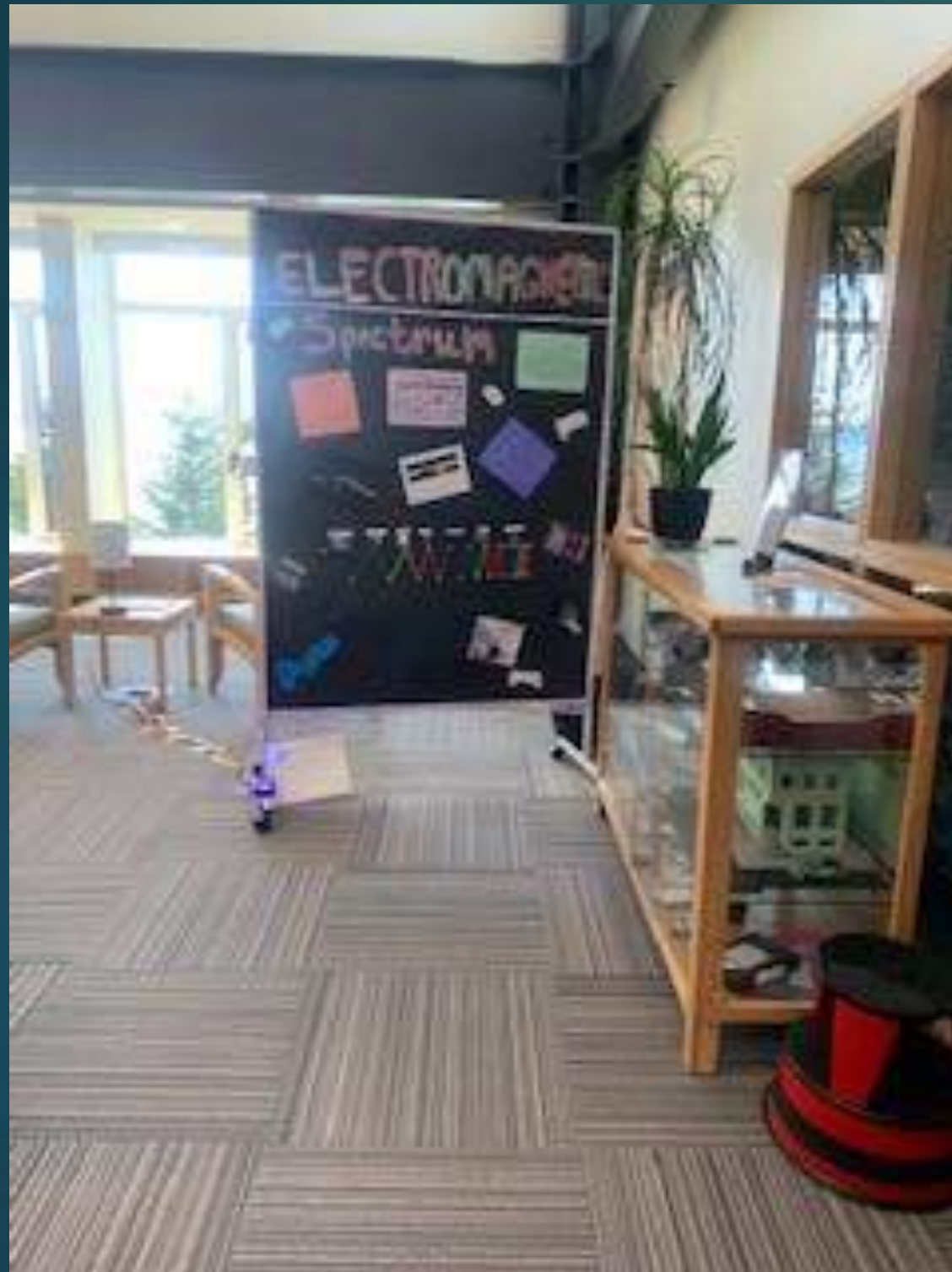


Electromagnetic Spectrum

- ▶ Highlighter art was made and put under a Black light to explore UV light.
- ▶ Educational material displayed explaining what the electromagnetic spectrum includes.
- ▶ Electromagnetic Spectrum radiation was also explained and examples were given.
- ▶ Lights, radio waves, and microwaves.
- ▶ Paper Circuits were made.
- ▶ Diffraction glasses were used to look at different light sources.



Electromagnetic Spectrum



Scientist Examples

- ▶ Framed pictures and descriptions were displayed along the stairs leading up to and during the event to show kids that anyone can be a great scientist.
- ▶ Albert Einstein
Stephen Hawking
Mae Jemison
Vera Rubin
Neil deGrass Tyson
Carolyn Porco
- ▶ At the end a mirror was placed, with text saying “The next one could be you!”



Solar System Felt

- In the children's room a hands on felt poster was placed for little learners to become familiar with planets in the solar system, astronauts, constellations and outer space themes. We also had coloring pages and simple word games for them.



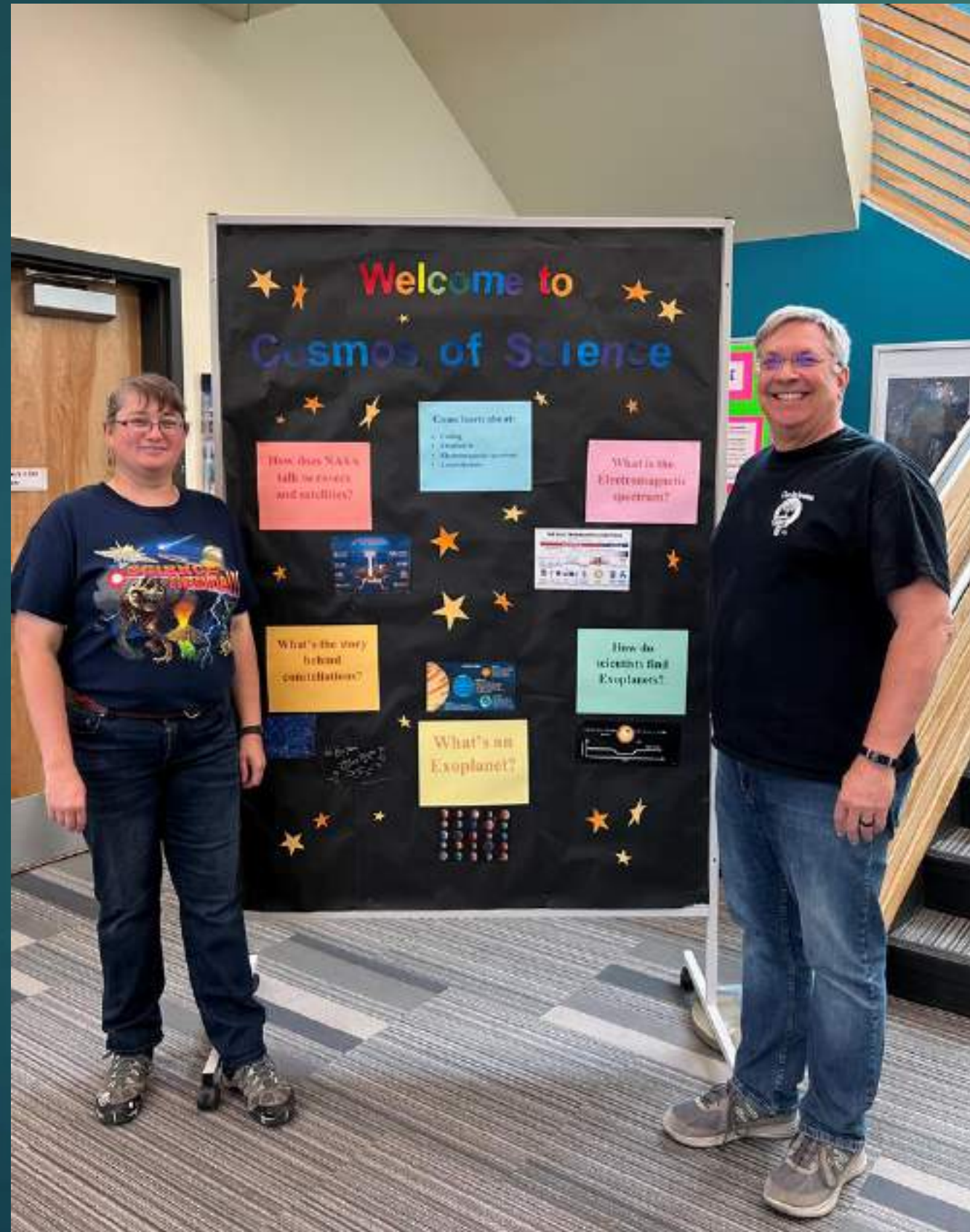
A few things to take home!

- ▶ **Exoplanet trading cards** were cutout and laminated ahead of time to hand out at the event.
- ▶ When kids finished all of the stations they stopped by the front counter and received take home bags with straw rocket instructions, word searches and a variety of other activities.



Thank you!

- ▶ Becky Roy and Nicholas Mesloh; a visitor/tourist in town from NASA who happened to stop by our event.



- ▶ Thank you for the opportunity to present a fun, and educational event to our little community in the corner of Alaska. Kids and adults both seemed to really enjoy the event, activities, and take with them new knowledge.



Girls STEAM Ahead with NASA

November 2022

About Us

- Western North Carolina
- Haywood County
- Population 62,476
- Canton 4,418



**HAYWOOD COUNTY
PUBLIC LIBRARY**

About Us

- Town of Canton
- Population 4,418
- Known for : papermill, music, Cold Mountain, and football



Canton Branch Library

STEAM Club

- **Monthly**
- **Average 15 participants**
- **Majority girls**

NASA's Universe of Learning



Paper Circuits: Light Up Exploded Stars

Tips for Program Day

- Prep & Practice
- Tables of 2-4
- Demo



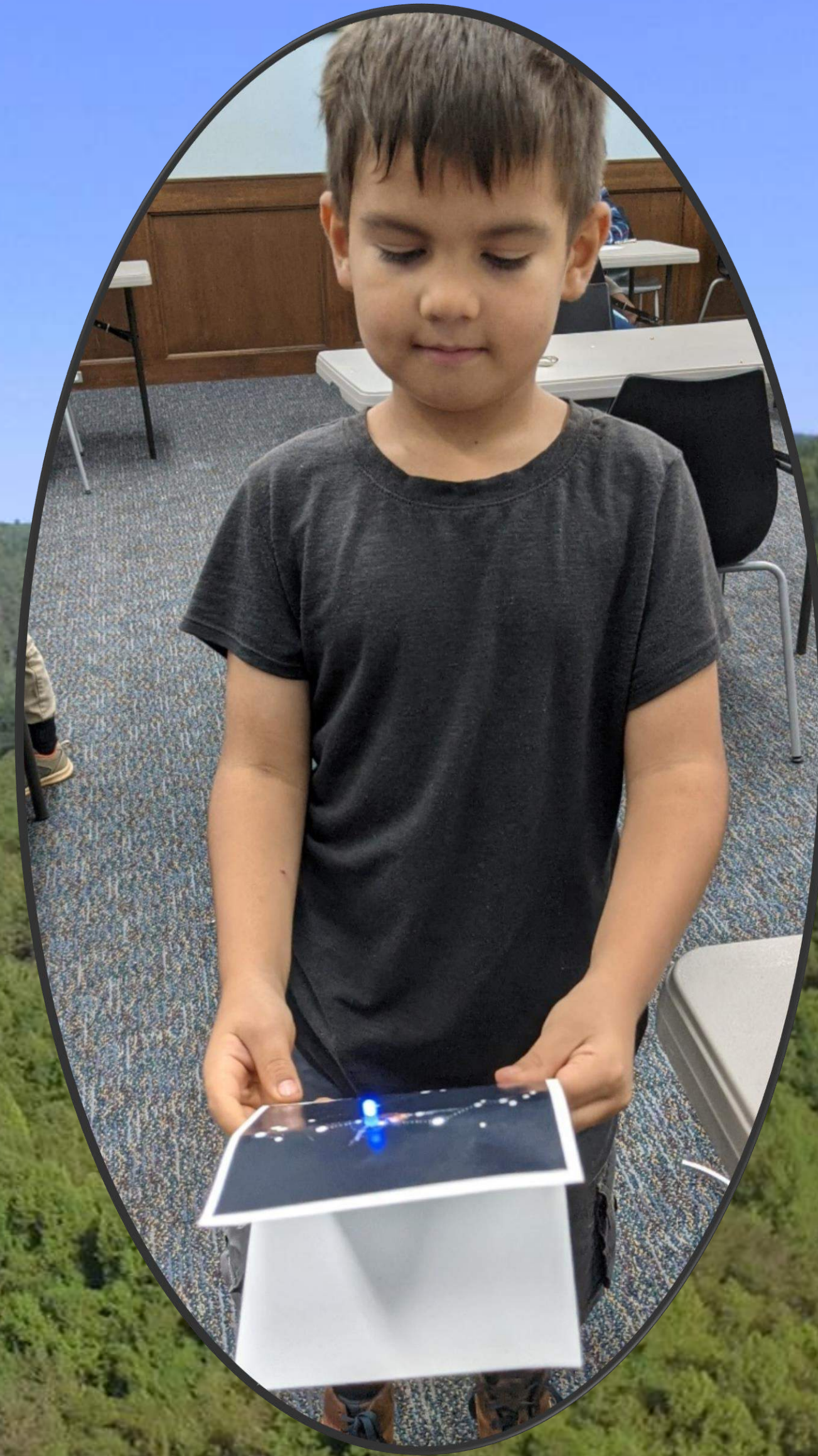
Paper Circuits: Light Up Exploded Stars & Constellations

Moving Forward

- Utilize:
 - Request an expert
 - **Girls STEAM Ahead With NASA Program Cookbook**

Observations

- Kids are helpful, smart and resilient!



**HAYWOOD COUNTY
PUBLIC LIBRARY**

Thank you!

Jennifer B Stuart, MLIS
Haywood County Public Library - Canton Branch
11 Pennsylvania Ave, Canton, North Carolina 28716



“WOMEN IN SPACE”

+

•

○

June 18, 2022 10am– 2pm



Penny Brumbaugh



Women in SPACE

Saturday,
June 18

10AM-2PM

Chat virtually with LIVE

Astrophysicist, an Astrobiologist & an Astronaut!

**Girls (and Boys) engage in STEM
experiences and NASA Science!**

Advertising:

This was sent to schools, added to Kiosk's in town and at Library site, along with social media.

AGENDA



Zoom Interviews:

Meet Scientists! Listen as tell about themselves and their fields. Ask questions!

Women in Space.

Collect your stamps, complete back and turn in for your NASA Sticker!

June 18, 2022 10am– 2pm

Studio:

- **Travel Brochure** – this will be the opportunity to use the green screen to take a photo using a variety of backdrops, and to learn about exoplanets.

Job Center:

- **Investigating Wavelengths** – Megan S. will be coordinating this program. Engaging participants in the study of various wavelengths of stars and nebulae. They will have the opportunity to print their results.

Enchanted Forest:

- **“Mission Control ”** – The Enchanted Forest will be turned into Mission Control and kids link to an “astronaut” in space. The activity requires the participants to conduct a series of system checks with the “astronaut” following their directions as they explore the galaxy.

North Program Room:

- **Moon Ooze-** – This project is edible. It demonstrates the reaction from an impact. It explains the dark spots on the moon. Can be related to any object where the mantle is disrupted and lava seeps out.
- **Crater Creations** – This project provides the opportunity to see the impact of a meteor. The participant can use a variety of objects to observe the effects.
- **Heavyweight Champion** – The purpose of this to explore the causes of gravity. Participants can experience their weight on different worlds
- **Water in the Solar System** – The conversation is about the importance of water. The participants guess where they might find water, and learn of its abundance
- **Searching for Life – What is life?** How do we know? This is an experiment of observation.
- **Paper Helicopter** – This is a craft activity where participants build a basic helicopter.
- **Touchdown** – The challenge is to build a shock absorbing system that will protect two astronauts when they land.

Speakers:

10:30 – Charity Woodrum (Astrophysicist) She spoke about the cosmos and how the telescopes (Hubble and Webb) are instrumental in gathering information. She shared how the Universe is a time machine and told the story of how galaxies evolve over cosmic time. She discussed the observations of galaxies, their star formations, and chemical enrichment histories; introducing patrons to the various wavelengths of light. An excellent segue to the activity in the Job Center.

11:00 – Schelin Ireland (Astrophysicist) She will be talking about her study of moon rocks, and the importance of using resources available on planets to build habitats for Astronauts to live. How do they travel, what do they need, and what they can expect when they get there. She gave a call to action to encourage youth to explore science and to consider being a part of the exploration of space.

11:30 – Claire Weichselbaum (Neuroscientist) She spoke about the brain. She shared her studies of mouse brains. The information she shared included the different types of brains and structures.

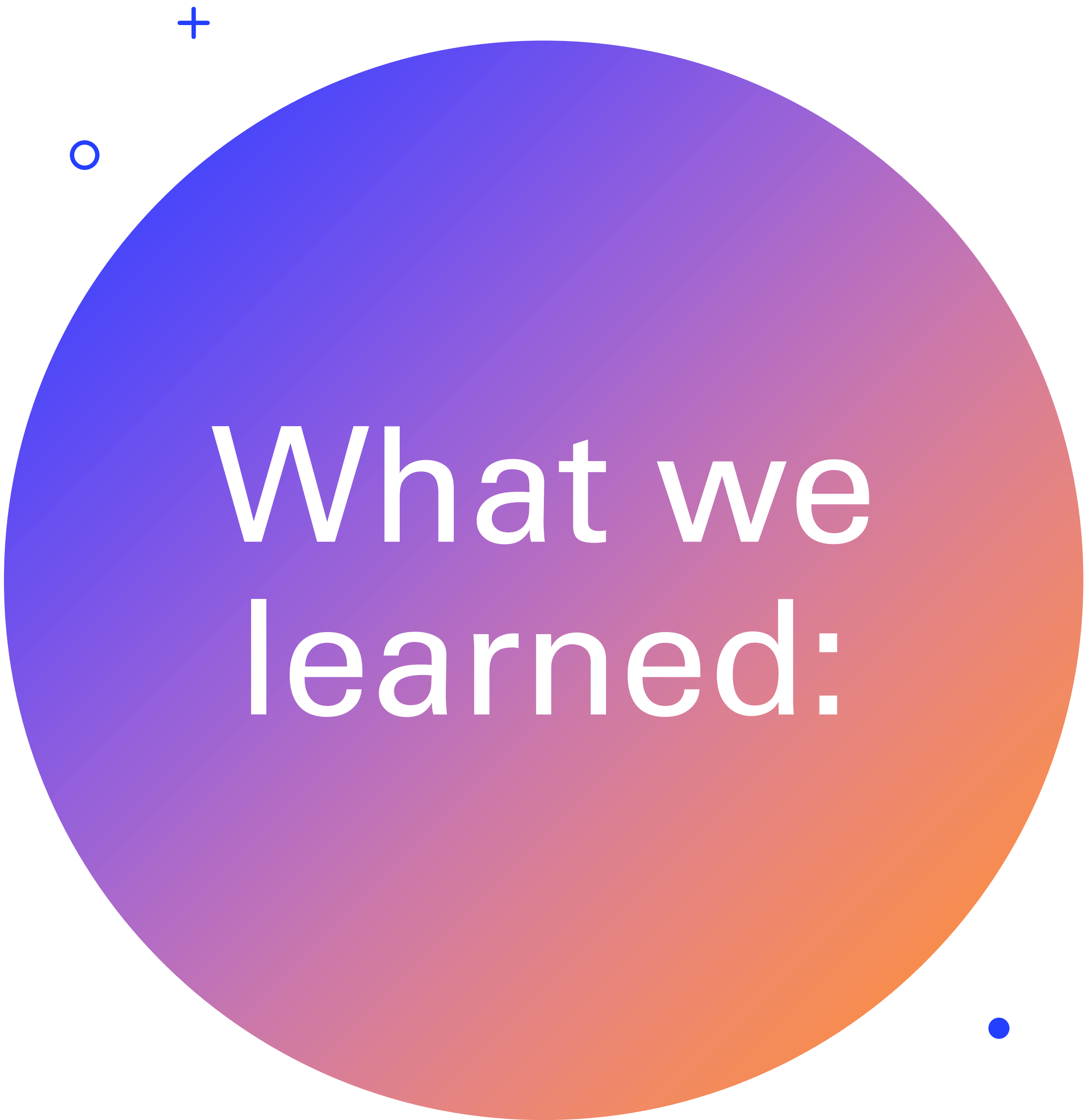
1:00 – Amy Rhymes (Chemist) She spoke about the importance of chemistry in life and encouraged children and parents to get engaged.



Attendance:

- 110 total participants:
- 96 Attendees
- 3 Teen Volunteers
- 1 Adult Volunteer
- Library Staff:
 - Meg
 - Penny
 - Megan S
 - Michelle
 - Smith
- 4 Speakers
- 1 Guest leader: Mission Control, Rick Gutridge (TREC) He brought the equipment and led “Mission Control” exploration of space. The children involved “flew” the spacecraft to various destinations and explored.





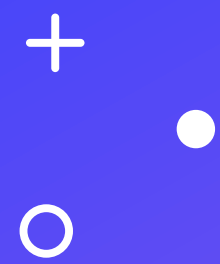
What we learned:

Pros

- . The presenters chosen were great and interactive and the kids really were interested in the variety of topics available.
- . The activities we had were timed perfectly, not too long, and held the kid's attention long enough for each station/table. Fun and informative.
- . Mission Space Control was a huge hit! Kids are still talking about it; this was such a cool interactive way to get the kids excited and participating.
- . The volunteers were great, the kids loved them, and they were approachable and kind.

What we could grow and learn from...

- . We learned that we need to make sure that everything we put on a brochure or activity is done by us, volunteers are capable to assist, but not lead unless it's their program.
- . Although the presenters were awesome, we had some people trickle out when they were speaking and not finish the stations because their child lost interest and they felt like they had to leave rather than make noise and finish their craft. This was particularly true for those presenting after lunch.
- . We need to do a better job at advertising our programs, whether it be on Instagram or Facebook, we feel we can do better at getting the word out.
- . Although it was a large age group range, we need to brainstorm ways we can incorporate all age groups when it comes to programs such as these. It's important to include activities for the various age levels. Many families came to participate.



SUMMARY

There was definite interest in further programs like this. As a result, we now have an Astronomy club, and are active in the “Mission to Mars” program. We are partnering with the local Astronomy organization and are engaging in Star Parties.



WOMEN IN SPACE

+



○



●



THANK YOU

Penny Brumbaugh
Apache Junction Public Library
pbrumbaugh@apachejunctionaz.gov

GSAWN Event: Juneteenth Open House at Sci-Port Discovery Center, Shreveport Louisiana

Heather Kleiner, Ph.D.



GSAWN Event: Juneteenth Open House at Sci-Port Discovery Center, Shreveport Louisiana

Event included:

- Exploding Star Cards*(UoL)– 35 participants
- Free Admission – 636 participants
- Women of Color poster (UoL)
- The Electromagnetic Spectrum (UoL)
- Chandra Exhibit
- Viewspace (UoL) showing
- Planetarium shows – Beyond Universe

**(GSAWN funded)*



GSAWN Event: Juneteenth Open House

Printed Items from UoL:

- Paper Circuits - 200 sets of 5 originals, 4 x 8 White House Digital Gloss Cover, 100#, 5 sheets, *printed on 2 sides*
- Ems poster combined 2012 Poster 25 X 35, 100# Photo gloss Paper and mount on foamboard, printed on 1 side
- Women of Color Poster 15"w x 23", 100# Photo gloss Paper on foamboard, *printed on 1 side*
- Logo, surveys, press release



WOMEN OF COLOR
PIONEERS & INNOVATORS

www.nasa.gov



WOMEN OF COLOR

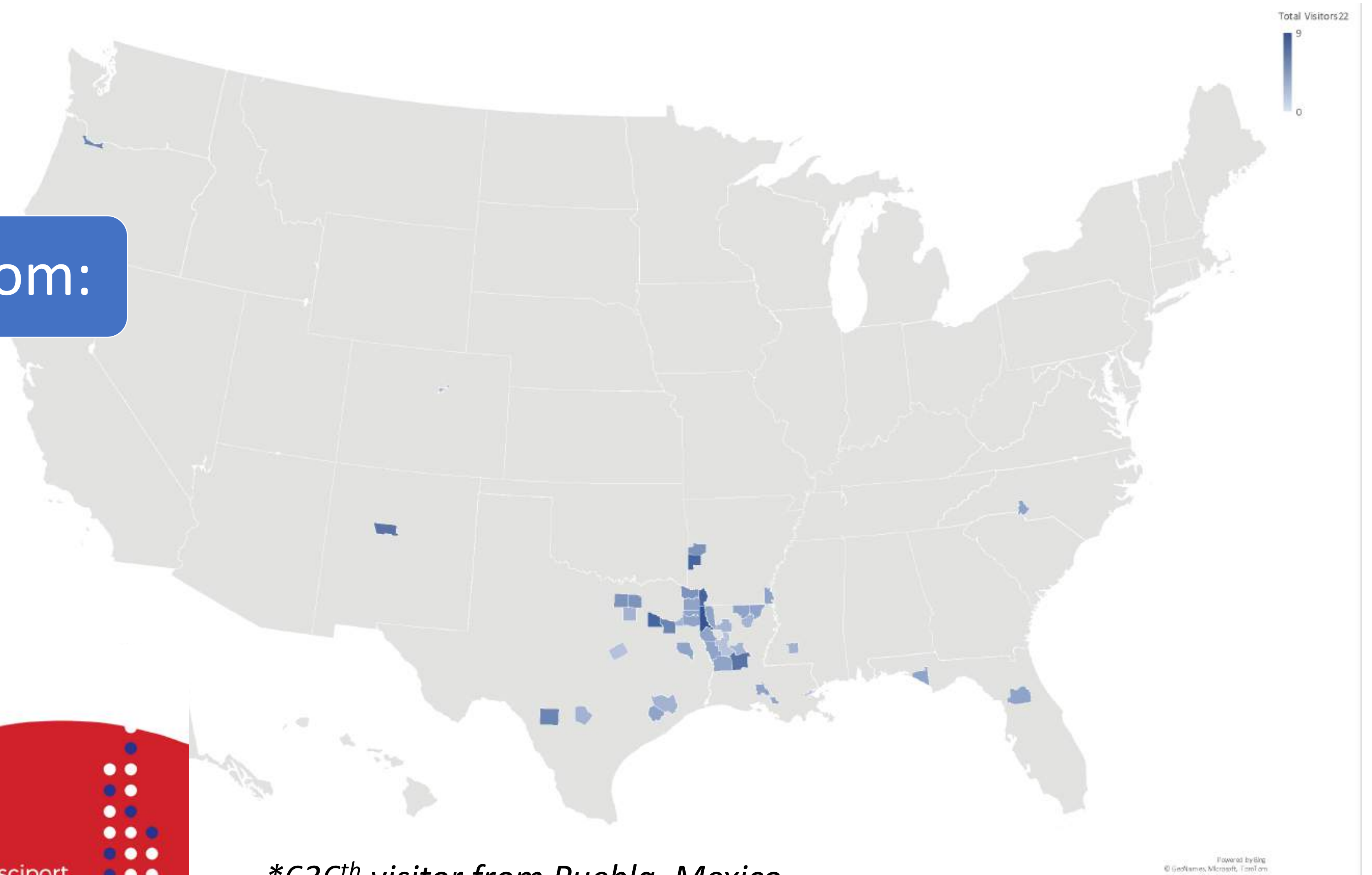
1. Elizabeth "Bessie" Coleman—Born to Texas sharecroppers in 1892 as the 10th of 13 children, Ms. Coleman became the first woman of African-American descent to become a pilot and to hold an international pilot license. After hearing stories from pilots returning from World War I, Ms. Coleman determined to learn to fly. She finally went to France for lessons because no one in the United States was willing to teach her.
2. Sunita L. Williams (Captain, U.S. Navy)—As an astronaut, Ms. Williams has been a flight engineer and an International Space Station Commander. She holds the female records for the longest cumulative spacewalk time (50 hours 40 minutes), longest single spaceflight (195 days), and second longest time in space (322 days). As a pilot and test pilot for the U.S. Navy, she logged more than 2000 flight hours in over 30 different aircraft.
3. Arlita D. Liang—Ms. Liang serves as NASA's Glenn Research Center's Director of Safety and Mission Assurance. Her Government career has spanned 18 years, with previous positions at Glenn including Deputy Director of the Facilities and Test Directorate, Associate Director for Aeronautics, and Chief of the Aeropropulsion Project Office.
4. Yvonne D. Cagle, M.D. (Colonel, U.S. Air Force, retired)—Dr. Cagle, an astronaut and flight surgeon, is qualified as a mission specialist. She is assigned to NASA's Johnson Space Center's Space and Life Sciences Directorate and is currently in detail as a visiting university professor. Her groundbreaking work is preserving historic space data as well as NASA's lead in global mapping, sustainable energies, green initiatives, and disaster preparedness.
5. Felicia Selton Jones—Ms. Jones serves as the Director of Engineering at the NASA's Johnson Space Center. She leads one of the largest engineering organizations at NASA responsible for the technical implementation of NASA and other Government agencies' spaceflight programs. She provides executive leadership to a multidisciplinary, technical organization charged with advancing the Nation's science, human exploration, and space technology programs through all phases of the system life cycle in support of NASA's Earth Science, space science, and exploration missions.
6. Ellen Ochoa, Ph.D.—Dr. Ochoa, a former astronaut, has been Director of the NASA's Johnson Space Center since 2012. She is Johnson's first Hispanic woman to go to space. She has flown in space four times, logging 978 hours in orbit. Prior to her astronaut career, she was a research engineer and co-inventor on three patents for critical systems.
7. Christine E. Easley—Ms. Easley began her career as a "human computer," at the Glenn Research Center doing computations for researchers. This involved analyzing problems and doing calculations by hand. Her earliest work involved running simulations for the newly planned Plum Brook Reactor Facility. Using languages like the Formula Translating System (Fortran) and the Simple Object Access Protocol (SOAP) to support a number of NASA's programs, she developed and implemented code used in researching energy-conversion systems, analyzing alternative power technology—including the battery technology that was used for early hybrid vehicles, as well as for the Centaur upper-stage rocket. Later in her career, she took on the additional role of equal employment opportunity (EEO) counselor. In this role she helped supervisors address issues of gender, race, and age in discrimination complaints at the lowest level and in the most cooperative way possible.
8. Christine Mann Darden, D.Sc.—Dr. Darden served as NASA's Langley Research Center's Director of the Office of Strategic Communications and Education before retiring in 2007. An internationally known researcher in aerodynamics for nearly 30 years, she authored over 57 technical publications about sonic booms, supersonic wing design, and other topics.
9. Mary Jackson—Ms. Jackson began her career as a research mathematician, or "computer," at the Langley Research Center in her hometown of Hampton, Virginia. In 1953 she moved to the Compressibility Research Division. After 5 years at NASA and after taking several additional courses, she joined a special training program and was promoted to aerospace engineer. She then worked to analyze data from wind tunnel experiments and real-world aircraft flight experiments at the Theoretical Aerodynamics Branch of the Subsonic-Transonic Aerodynamics Division at Langley. Her goal was to understand air flow, including thrust and drag forces. Many years later, she was assigned to work with the flight engineers at NASA. Jackson worked to help women and other minorities to advance their careers, including advising them how to study so that they could change their titles from "mathematicians" to "engineers" to increase their chances of promotion, which she did herself.
10. Joan E. Higginbotham—Before she retired as an astronaut in 2007, Ms. Higginbotham logged over 200 hours on Space Shuttle Discovery, where her primary task was to operate the Space Station Remote Manipulator System as the International Space Station was constructed. Previously, she was the lead for experiments on Space Shuttle Columbia and actively participated in 53 shuttle launches.
11. Joan E. Jackson, M.D.—Dr. Jackson, the first African-American woman to travel in space, logged over 190 hours on Space Shuttle Endeavour as she conducted experiments in life sciences, material sciences, and bone cell research. Prior to being an astronaut, she was an Area Peace Corps Medical Officer and a medical doctor. Today, she owns and runs a company that researches and develops science technology for daily life.
12. Mae C. Jemison, M.D.—Dr. Jemison, the first African-American woman to travel in space, logged over 190 hours on Space Shuttle Endeavour as she conducted experiments in life sciences, material sciences, and bone cell research. Prior to being an astronaut, she was an Area Peace Corps Medical Officer and a medical doctor. Today, she owns and runs a company that researches and develops science technology for daily life.
13. Robin N. Gordon—Ms. Gordon has been the Director of Center Operations at the NASA's Johnson Space Center since 2009 and was the first African-American woman named into the Senior Executive Service at Glenn. Her previous positions include Deputy Director of Glenn's Center Operations Directorate and Chief of the Diversity Management Office.
14. Diana Carballo—Ms. Carballo is the director of Human Resources (HR) at NASA's John F. Kennedy Space Center in Florida. She leads the organization that oversees training and development, recognition, workforce strategy and planning, Federal labor relations, employee services, and operations. With more than two decades of proven leadership experience and subject matter expertise, Carballo develops innovative human capital management strategies and implements customer-focused and compliant HR operations. Highlights include sustained standards of excellence, reputable and diverse experience developing and implementing Government-wide and Center-specific HR policy, and alignment of human capital strategy to organizational goals. She consistently delivers results by aligning human capital strategy with mission priorities and business considerations and successful outcomes.
15. Marie E. Pérez-Davis—Dr. Pérez-Davis serves as the deputy director of the NASA's John F. Kennedy Space Center in Cleveland. In this capacity she shares with the center director responsibility for directing, organizing, and managing the Agency-level programs and projects assigned to the Center. Immediately prior to her current assignment, Pérez-Davis served as deputy director of the Research and Engineering Directorate, a post she held since 2014. In this position, Pérez-Davis was responsible for leading, planning, coordinating, and managing all phases of Glenn's research and engineering activities to accomplish NASA's missions.
16. Amie Easley—Ms. Easley began her career as a "human computer," at the Glenn Research Center doing computations for researchers. This involved analyzing problems and doing calculations by hand. Her earliest work involved running simulations for the newly planned Plum Brook Reactor Facility. Using languages like the Formula Translating System (Fortran) and the Simple Object Access Protocol (SOAP) to support a number of NASA's programs, she developed and implemented code used in researching energy-conversion systems, analyzing alternative power technology—including the battery technology that was used for early hybrid vehicles, as well as for the Centaur upper-stage rocket. Later in her career, she took on the additional role of equal employment opportunity (EEO) counselor. In this role she helped supervisors address issues of gender, race, and age in discrimination complaints at the lowest level and in the most cooperative way possible.
17. Davie E. Lacy—Ms. Lacy is the chief of the Office of Communications and External Relations where she oversees a staff of civil servants and contractors who develop and implement programs, outreach activities and communication strategies. Specifically, she ensures that all engagement activities foster interactions with learners of all ages to spark an interest in STEM using NASA materials and resources. Lacy develops partnerships to share NASA Glenn's expertise and achievements with diverse audiences. She also leads a staff that communicates Glenn's achievements via electronic, print, and web-based media.
18. Christine Mann Darden, D.Sc.—Dr. Darden served as NASA's Langley Research Center's Director of the Office of Strategic Communications and Education before retiring in 2007. An internationally known researcher in aerodynamics for nearly 30 years, she authored over 57 technical publications about sonic booms, supersonic wing design, and other topics.
19. Mary Jackson—Ms. Jackson began her career as a research mathematician, or "computer," at the Langley Research Center in her hometown of Hampton, Virginia. In 1953 she moved to the Compressibility Research Division. After 5 years at NASA and after taking several additional courses, she joined a special training program and was promoted to aerospace engineer. She then worked to analyze data from wind tunnel experiments and real-world aircraft flight experiments at the Theoretical Aerodynamics Branch of the Subsonic-Transonic Aerodynamics Division at Langley. Her goal was to understand air flow, including thrust and drag forces. Many years later, she was assigned to work with the flight engineers at NASA. Jackson worked to help women and other minorities to advance their careers, including advising them how to study so that they could change their titles from "mathematicians" to "engineers" to increase their chances of promotion, which she did herself.
20. Dorothy Vaughan—In 1949, Vaughan became the acting head of the West Area Computers, a work group composed entirely of African-American female mathematicians. It would take 2 more years until she would be officially appointed the title of section head in January 1951. Mathematician Katherine Johnson was assigned to Vaughan's group before being transferred to Langley's Flight Research Division. Vaughan continued at Langley after NASA became NASA, specializing for the rest of her career in electronic computing and FORTRAN programming. She worked in the Langley Research Center's Analysis and Computation Division and also participated in Secret Project (Solid Controlled Orbital Utility Test system) tests at Wallops Flight Facility.
21. Katherine Johnson—Ms. Johnson helped track NASA's orbital missions from 1953 to 1966. She calculated the flight trajectory for Alan Shepard as



GSAWN Event: Juneteenth Open House – Origin of 635 Visitors*

Visitors Came from:

- 9 States
- 13 parishes of LA
- 16 Counties of TX
- Another country



**636th visitor from Puebla, Mexico*

Exploding Star Cards are Perfect for Community Outreach & STEM Backpack Kits!

Outreach Events included:

- Back2School Blast – 45 kits
- YWCA Girls Empowerment Series – 16 kits
- 318Makes Block Party – 72 kits
- SUSLA STEM Fair – 129 kits
- Hope4Youth Mission, Trunk or Treat – 200 kits

*Total: 446 Kits from
July 16 to Oct. 31*



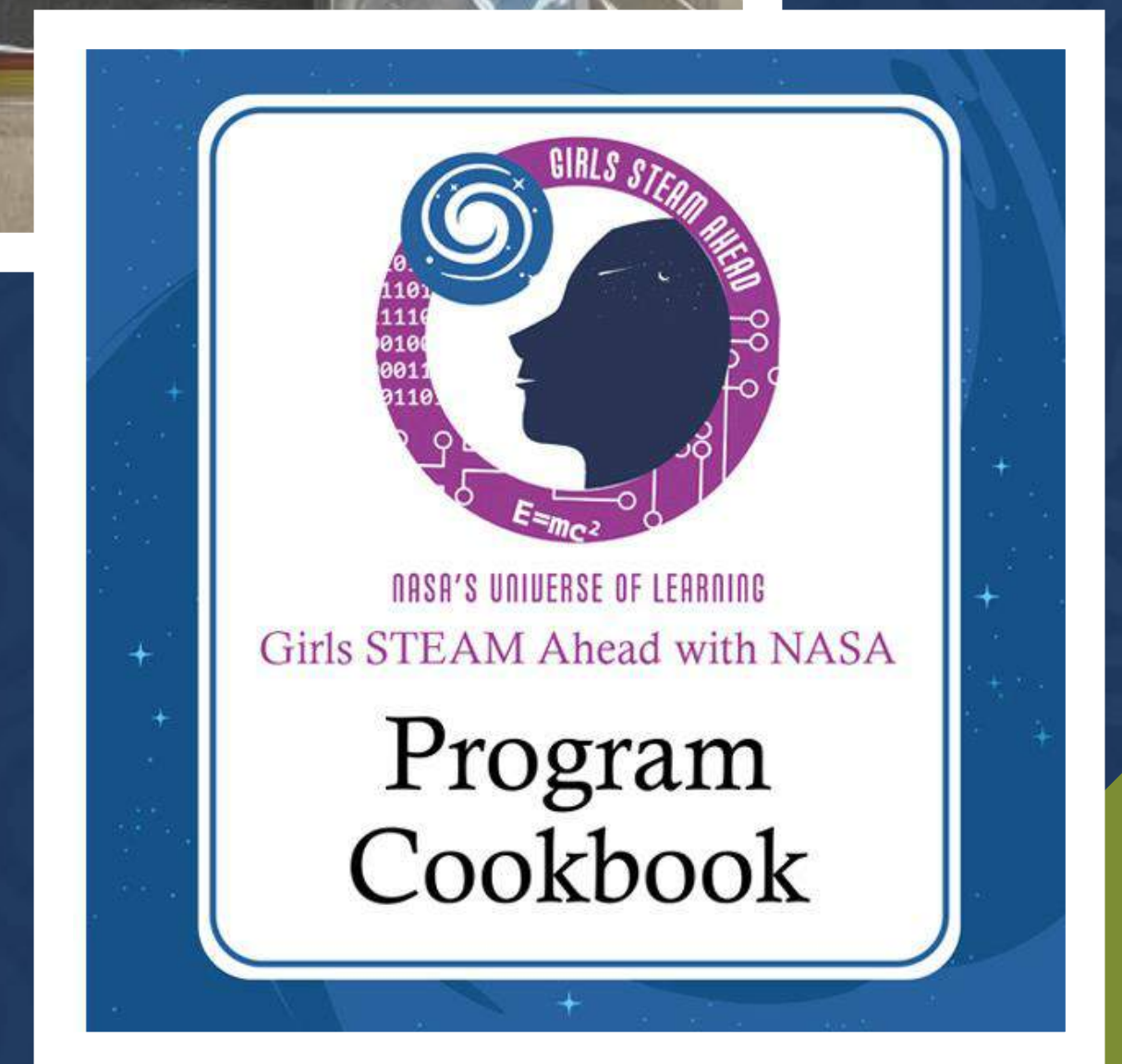
Q & A

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

Call to Action

Type in the chat....

- Share one activity, resource, activity, or approach you will put into practice after this webinar!
- Keep an eye out for future Implementation Stipends released in early 2023 to plan your next GSAWN Event.



Upcoming NGCP Events

- **Enjoy Computer Science Education Week with Microsoft MakeCode** – Tuesday December 6th, 2022 at 11am Pacific / 2pm Eastern
- **NGCP Holiday Sweater Networking** – Tuesday December 13th, 2022 at 10am Pacific / 1pm Eastern





20 YEARS OF TRANSFORMING STEM

Learn more at ngcproject.org

