



NISE
NATIONAL INFORMAL
STEM EDUCATION
NETWORK

NISE Network Partner Meeting
Tempe, Arizona
February 2019



EXPLORE SCIENCE
Earth & Space

www.nisenet.org

Resources and Strategies for Engaging Girls



Presenters

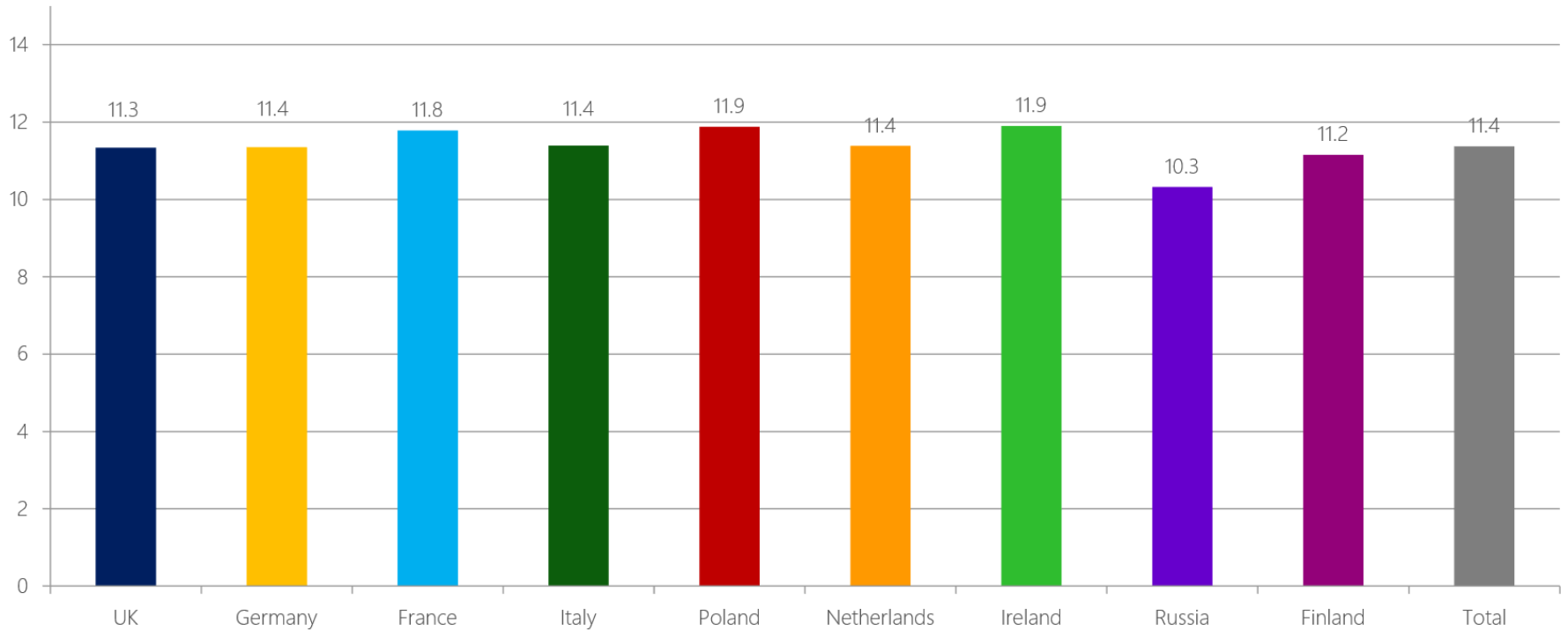
- **Linda Shore**, Astronomical Society of the Pacific (ASP)
- **Erin Hogeboom**, National Girls Collaborative Project (NGCP)
- **Pamela Harman**, SETI Institute
- **Lisa Hoover**, Chabot Space & Science Center
- **Angela Gaige**, Milton J. Rubenstein Museum of Science & Technology (MoST)
- **Karyn Knecht**, Eugene Science Center

Engaging Girls in STEM

Linda Shore, Ed.D, CEO

Astronomical Society of the Pacific

At what age did you become interested in STEM?



Question At what age did you become interested in STEM?

Base School girls between the age 11 to 18

Parameter Mean Scores for becoming interested in STEM

This same survey found that girls lose interest
in STEM at an average age of 15 years

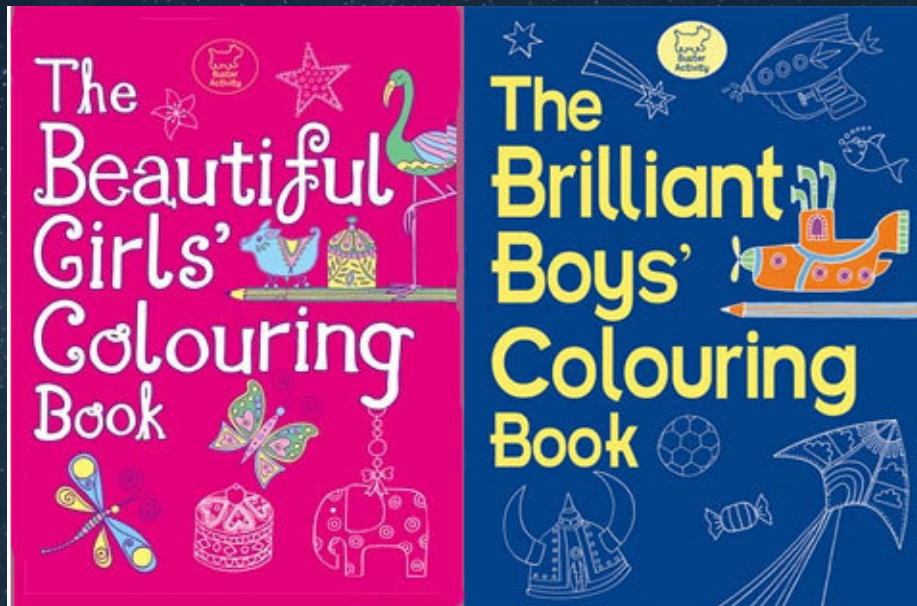
Why Do Girls Lose Interest In STEM?

What The Research Says...

Girls who retain their interest in STEM generally . . .

- Have access to positive role models and mentors
- Have strong parental support
- Learn science in non-competitive environments emphasizing cooperation, discourse, creativity, and experiences
- Are less affected by gender stereotypes discouraging STEM participation
- Are confident, persistent, and embrace challenges











Heather Maliska

ENGINEERING

Began her career at Nasa as a Space Engineer and is now a Project Manager

[Read more](#)



Hibah Rahmani

ENGINEERING

Rahmani went back to school to earn a Masters degree In Electrical and Computer Engineering

[Read more](#)



Josephine Santiago-Bond

ENGINEERING

Her post-graduate research led her to a summer assistantship at NASA's Kennedy Space Center

[Read more](#)



Debra Zamostny

ENGINEERING

A high school dropout before entering the space Industry - now an Electrical Engineer

[Read more](#)



Wanda Peters

ENGINEERING

Assistant Division Chief with a Masters of Engineering Management

[Read more](#)



Mary Ann Esfandiari

ENGINEERING

Deputy Associate responsible for on-orbit operations and engineering initiatives

[Read more](#)



Maria Nowak

ENGINEERING

Metrology Lead whose high-level career at NASA began with an undergraduate degree in Theater

[Read more](#)



Charmel Jones

ENGINEERING

Lead Aerospace Quality Engineer who aspired to venture into space from the age of ten

[Read more](#)

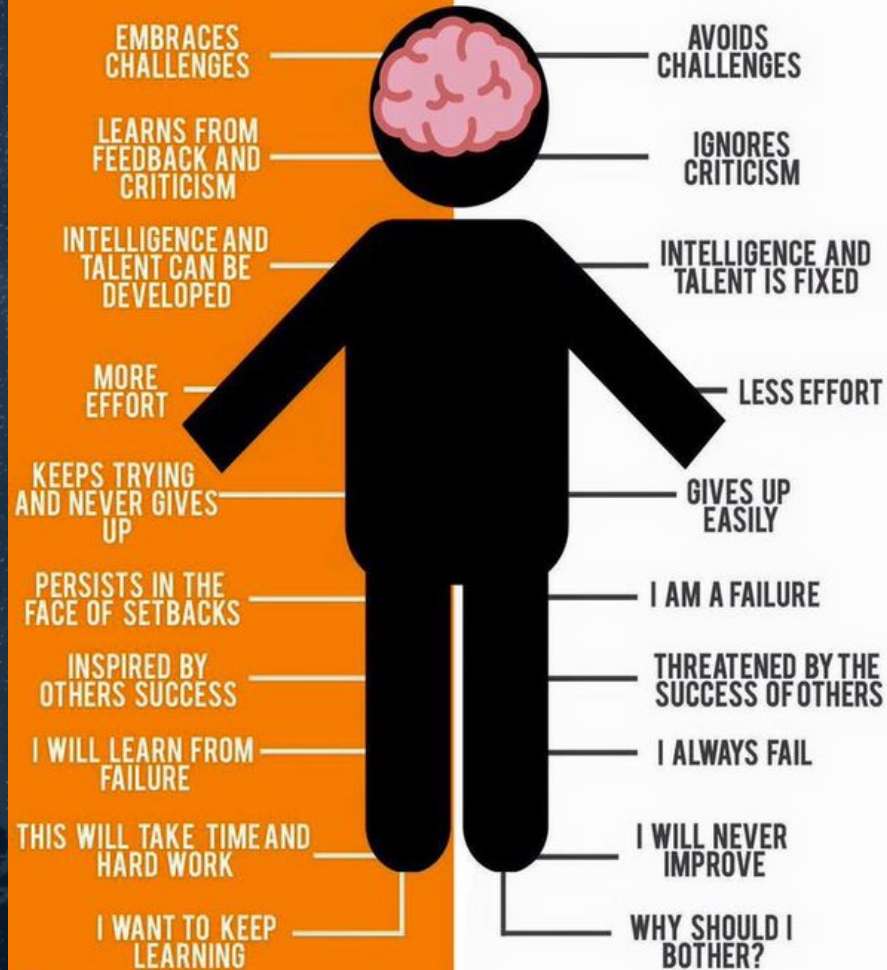




Students with high interest in STEM generally

Have a “Growth Mind Set” vs. a “Fixed Mind Set” and are therefore less affected by gender stereotypes discouraging STEM participation

GROWTH MINDSET VS. FIXED MINDSET



@BELIEVEPHQ



Using Collaboration to Build Capacity and Increase STEM Engagement



Vision

The National Girls Collaborative Project **brings together organizations** committed to informing and encouraging girls to pursue careers in science, technology, engineering, and mathematics (STEM).



NGCP Goals

1. **Maximize access** to shared resources within organizations interested in engaging girls in STEM.
2. **Strengthen the capacity** of programs by sharing exemplary practice research and program models.
3. **Use the leverage of a network** to achieve gender equity in STEM.

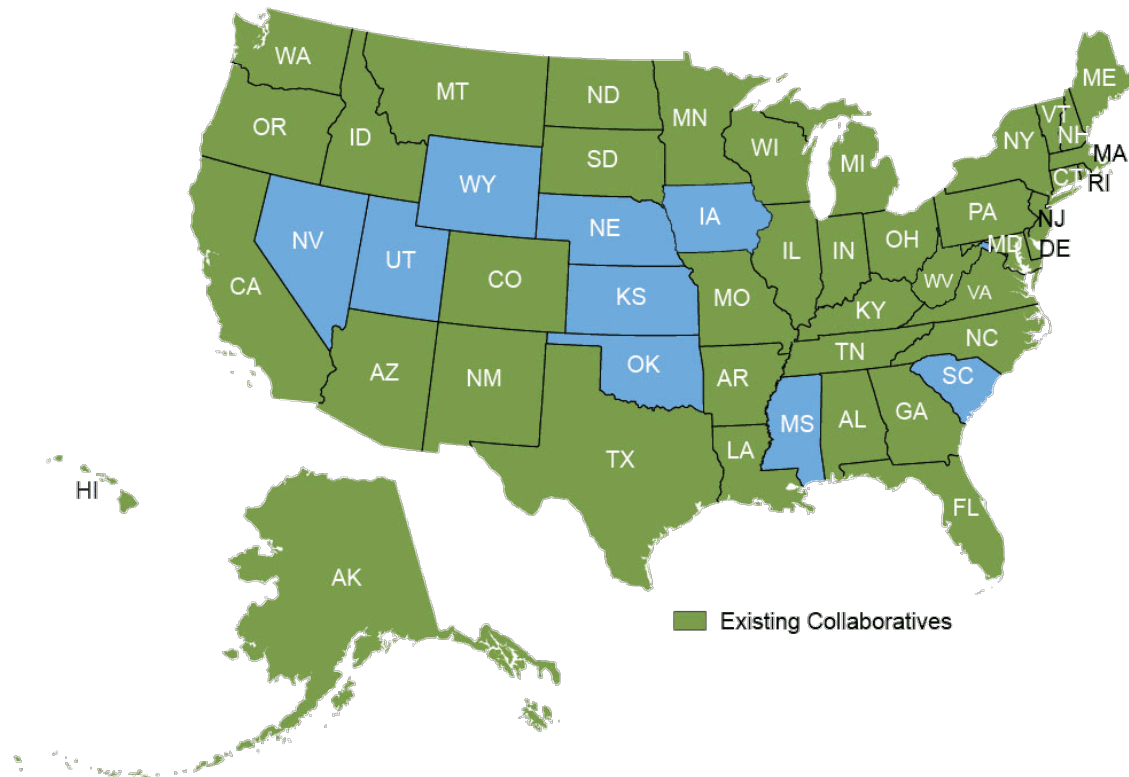


STEM is an Equity Issue...

- Related to economics and social justice.
- As a platform to promote justness, fairness, and balance.
- Lens educators in STEM fields can use to provide equal opportunities to youth.



The NGCP Collaboration Network



- **Collaborative:** State or regional network
- **Convening Organization:** Lead organization with the contract who convenes the Leadership Team.

NGCP Activities

Virtually:

- Content Rich Project Website
- FabFems
- The Connectory
- E-Newsletter and Social Media
- National Webinars



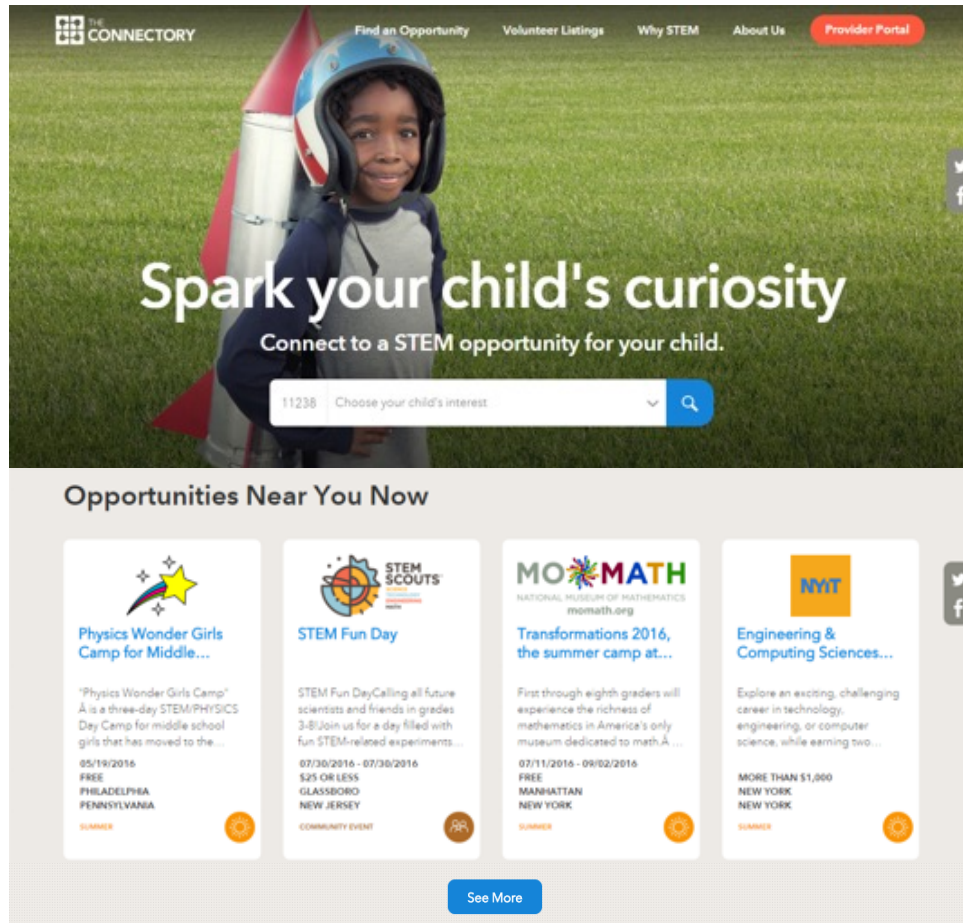
Locally:

- Professional Development via Conferences and Forums
- Incentives to Collaborate
- Newsletters and Local Resources

Nationally:

- Partnerships, Network Projects, and Mini-Grants
- Collaboration Institute

The Connector Overview



- Largest and most comprehensive directory of youth-serving STEM programs and opportunities
- Online collaboration and capacity-building tool
- Showcase STEM opportunities to families

FabFems Directory

The FabFems directory is an international, online, searchable directory of women STEM professionals interested in outreach to girls

Audience:

- Role Models
- Girl-Serving Programs
- Parents and Girls

www.fabfems.org



Collaboration Networking



Collaboration Networking

With your neighbor, share...

- Your Name
- Your Organization/Program/School & Role
- 1 Resource (*what do you have to share?*)
- 1 Need (*what do you need to meet your goals?*)
- 2 Minutes Each (4 Minutes Total)

Tip:

- Exchange business cards and write down your great ideas on it!

Contact Information



Erin Hogeboom

Director of Strategic Partnerships

ehogeboom@ngcproject.org

Reaching for the Stars: NASA Science for Girl Scouts

Pamela Harman, PI, SETI Institute

*Every great dream begins with a dreamer.
Always remember, you have within you the
strength, the patience, and the passion to
reach for the stars to change the world.*

..... Harriet Tubman

<https://www.seti.org/girlscoutstars>



The Team —



Reaching for the Stars: NASA Science for Girl Scouts AKA Girl Scout Stars

Why?

- Women in STEM are inspirational
- Science research is multi-generational
- Space science explores and explains our world and the relationship to the objects in the sky.

Women@NASA



*Science is fun. Science is curiosity. We all have natural curiosity.
Science is a process of investigating. It's posing questions and
coming up with a method. It's delving in.*

..... Sally Ride, First American Woman in Space

Girl Scout Stars



About half of the female NASA astronauts are Girl Scout Alumnae

- Create a new sequence of Girl Scout **Space Science Badges**
- Develop **Virtual Tool Kit (VTK) Space Science Badge** online support for girls and leaders
- Provide **Train-the-Trainer experiences** for GS leaders at authentic observatory and NASA sites
- Offer **GSUSA Destinations**; Astronomy and 2017 total solar eclipse camps
- Provide **interactive experiences** in person and online with NASA SMEs (via kits, camps, badge steps, astronomy clubs)
- Create a network of **Girl Scout Astronomy Clubs**
- Distribute Sun – Earth – Moon activities and materials.



- Develop a network of Subject Matter Experts and space science volunteers (via camps, badge steps, astronomy clubs) to support Girl Scouts

Girl Scout Stars



Grade K-1 2-3 4-5 6-8 9-10 11-12

Girl Scout Stars



SENSE OF SELF



POSITIVE VALUES



CHALLENGE SEEKING



HEALTHY RELATIONSHIPS



COMMUNITY PROBLEM SOLVING

Take Action to Change the World



STEM



Outdoor



Life Skills



Entrepreneurship

Girl Scout Leadership Experience

K – 5 Space Science Badges

Feature

- Indoor, outdoor, and online choices
- Free / low-cost options
- Star party / field trip step

Daisy: 3 Steps with 2 choices each

TWO 90-minute meetings

Brownie & Junior: 5 Steps with 3 choices each

THREE 90-minute meetings



Badge Overnights at Planetariums, Science Centers, Museums

After School Program, start a badge to be finished with troop.

Girl Scout Stars

Daisy (Kindergarten & 1st grade)

Explore and observe the sky like a real space scientist.

1. Explore the Sun

Shadow Poster, Day Sky Book, Day-Night Dance.

2. Observe the Moon

Moon Sky Book, Observe with Binoculars.

3. Meet the Stars

Make a star pattern, find stars.

“When you’ve earned this badge, you’ll have explored and observed the Sun, Moon, and stars.”



Girl Scout Stars



Poster Adaptation, tape or sidewalk chalk
and an object.

Girl Scout Stars

Brownie (2nd -3rd grade)

Investigate the complexities of the sky as you learn to see things in a new way.

1. Meet the neighbors

Pocket Solar System, Mnemonic, Drawing.

2. See more than before

Build a telescope, Use a telescope, Use software.

3. Investigate the Moon (phases)

Model, Moon Art, Prediction

4. Be a stargazer

Constellation Viewer, Story or New Constellation

5. Celebrate and share

Hold a Star Party, Attend an Event, Share with Daisies.

"When you've earned this badge, you'll know how to investigate the Sun, Moon, planets, and stars."



Girl Scout Stars



Space Science Investigator

"Science is full of researchers working to understand nature. There's no way to tell what will help humans and our world in the years to come, but some discoveries certainly will."

—Lori Fenton,
planetary scientist who studies
how the wind shapes the surfaces
of Earth, Venus, and Mars

Our Solar System spreads out across space. It's much larger than you might think and the stars are even farther away than you can imagine. Venture through the Solar System and beyond, and discover that space is even bigger than you thought.

Steps

1. Model the Solar System
2. Circle the Sun
3. Discover the stars
4. Use tools to explore
5. Share your sky

Purpose

When I've earned this badge I will understand that the Earth orbits the Sun and how far away the Sun, Moon, planets, and stars are from our home planet, Earth.

SPACE SCIENCE INVESTIGATOR | 1



Venture through the Solar System and beyond, and see that space is even bigger than you may have imagined.

1. Model the Solar System

Scale Models

2. Circle the Sun

Dance Earth's Year, Age on Other Planets, Year in Photos.

3. Discover the stars

3-D Constellation, Girl Scout Minute, Scavenger Hunt\

4. Use the tools to explore

Mission Specialist, Mars Rover, Planisphere

5. Share your sky

"When you've earned this badge, you'll understand that the Earth orbits the Sun, and how far away the Sun, Moon, planets, and stars are from our home planet, Earth."

Gr. 6 – 15 Space Science Badges (7/19)

Feature

- Indoor, outdoor, and online choices
- Free / low-cost options
- Career exploration
- Star party / field trip step

Cadette, Senior and Ambassador : 5 Steps with 3 choices each
THREE 90-minute meetings

Older girls often lead activities for younger girls.
Bronze, Silver and Gold service awards.

www.seti.org/girlscoutstars



Eclipse Box Activity Guide

**Our Place in the Solar System —
Sun, Earth, Moon and Eclipses**



Credit: Girl Scouts of Northern California

daisies  brownies  juniors  cadettes  seniors  ambassadors 

Reaching for the Stars: NASA Science for Girl Scouts

ACTIVITY OR RESOURCE	AUTHOR and SOURCES
LIVING IN A BUBBLE—PLAY WITH MAGNETS AND COMPASSES	L. Mayo, and Multiverse—UC Berkeley Space Sciences Lab
SUNBURN—ULTRAVIOLET LIGHT DETECTORS	L. Mayo, E. DeVore
SEEING THE INVISIBLE—INFRARED LIGHT DETECTORS	L. Mayo, NASA Airborne Astronomy Ambassadors
LET'S SEE LIGHT IN A NEW WAY—DIFFRACTION SPECTRA	L. Mayo, E. DeVore
A LIGHT SNACK—COOKIE BOX SPECTROMETERS	L. Mayo, E. DeVore, NASA: The Science of the Sun
MAKE SUN S'MORES!	NASA Climate Kids
HOW BIG IS BIG? SOLAR PIZZAS	L. Mayo, NASA Sun-Earth Day
EARTH AS A PEPPERCORN—SIZE AND SCALE OF THE SOLAR SYSTEM	Guy Ottwell, The Thousand Yard Model
SUN TRACKING	J. Henricks, P. Allan and D. Schatz, Pacific Science Center
WAXING AND WANING—PHASES OF THE MOON AND ECLIPSES	E. DeVore, L. Mayo
HOW DO ECLIPSES WORK? YARDSTICK ECLIPSE	Astronomical Society of the Pacific
WHEN DAY TURNS TO NIGHT	L. Mayo, P. Harman, E. DeVore
MAKE AN ECLIPSE VIEWER	L. Mayo, J. Henricks E. DeVore
ECLIPSE CHALK ART	J. Henricks, L. Mayo, E. DeVore
NASA ECLIPSE GUIDE	NASA
HOW TO VIEW THE 2017 SOLAR ECLIPSE SAFELY COMO VER EL ECLIPSE SOLAR DEL 2017 CON SEGURIDAD	American Astronomical Society, American Academy of Ophthalmology, NASA, American Academy of Optometry, NSF
NASA ECLIPSE RESOURCES	NASA: https://eclipse2017.nasa.gov
MORE RESOURCES	Astronomical Society of the Pacific, SETI Institute
COMPLETE LIST OF MATERIALS	E. DeVore

Girl Scout Stars

You do not have to be an astronomer!

Astronomers and Resources:

www.seti.org/girlscoutstars

bitly/astroall

ASP's Night Sky Network nightskynetwork.org

Growth Mindset Online Training

NASA Solar System Ambassadors

<https://solarsystem1.jpl.nasa.gov/ssa/home.cfm>



Night Sky Network
Astronomy clubs bringing the wonders of the universe to the public

In partnership with the
Astronomical Society of the Pacific

CLUBS & EVENTS NIGHT SKY PLANNER OUTREACH RESOURCES ABOUT THE NETWORK

FEATURED

CURRENT LOCATION
San Francisco, CA 94112, USA

Search US zip, city or place

set to current location
clear location
advanced event search
advanced club search

FOLLOW THE NIGHT SKY NETWORK

33,598 Events held since 2004
3,590,904 People Reached

CLUBS & EVENTS

EVENTS IN YOUR AREA

7:30 PM - 10:00 Public Night @ Chamberlin

Winter Stargazing Tips: Stay Warm and Cozy!

Some of the most impressive sights in the skies of the Northern Hemisphere are very prominent in the winter nights. Orion, the Hyades, and the Pleiades are all lined up and shine like jewels in the night, with many the constellations and deep-sky objects ready to take your breathe away. Just don't let the cold take your breathe away too!

Talking to Girls, Working with Girls

Girls “Do Science”

Subtle Linguistic Cues Increase Girls’ Engagement in Science

Rhodes, M. et al, Psychological Science

Growth Mindset – build resilience!

Fixed: You are natural. You are smart.

Growth: How much research did you do to understand ___?

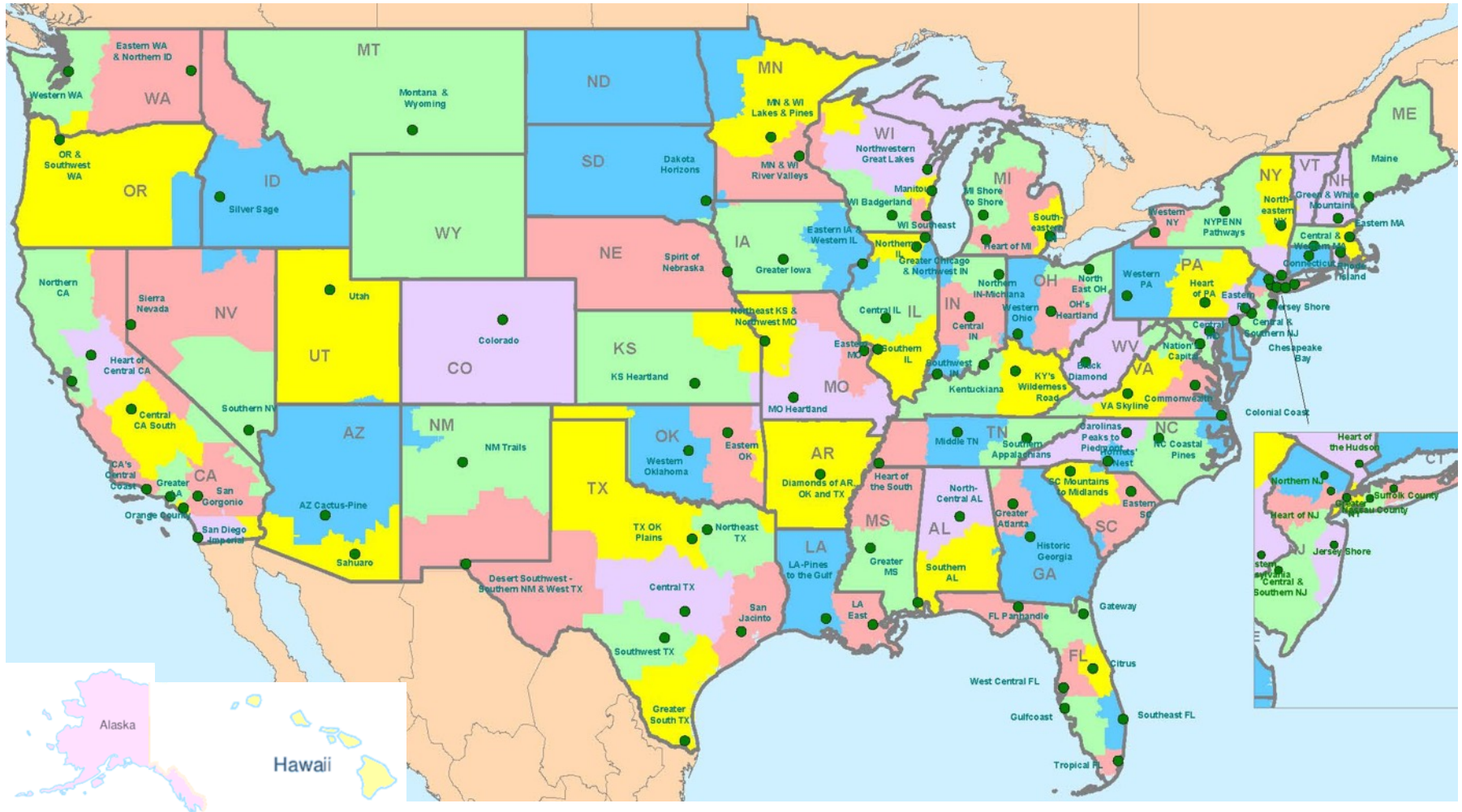
Fixed: I don’t know how to do this.

Growth: I don’t know how to do this, YET.

GS Councils



<https://www.girlscouts.org/en/about-girl-scouts/join/council-finder.html>



Need to make contact?



***Pamela Harman
pharman@seti.org***



NEW SPACE & ASTRONOMY
ODYSSEY OVERNIGHTS FOR
GIRL SCOUTS

Lisa Hoover, Programs Manager
LHoover@ChabotSpace.org



OVERNIGHT PROGRAMS AND PARTNERS

PROGRAMS

- Odyssey Overnights
 - Scouting Groups
 - Youth Groups
 - Schools
- Girl Scouts
- Slumber with the Stars
 - Public
 - Members
 - Adults and Families
- 3,000 served annually

PARTNERS





Girl Scout Badge Overnights

Discover the wonders of the universe as you earn one of the NEW Space Science badges overnight. Your evening will be filled with interactive explorations at Chabot Space & Science Center. Venture through our Solar System and beyond in the planetarium. Investigate the night sky using telescopes. Gain confidence in your astronomy skills and have a blast on this stellar overnight experience.

November 3-4 | Juniors
Space Science Investigator Overnight

April 13-14 | Daisies & Brownies
Space Science Explorer/Adventurer Overnight

June 22-23 | Daisies, Brownie, & Junior Families
Space Science Badge Overnight – Family Edition

CHABOT
SPACE & SCIENCE CENTER

10000 Skyline Blvd. in Oakland
ChabotSpace.org

OVERNIGHT STRUCTURE



WORKSHOP

DINNER

LIVE PLANETARIUM SHOW

HANDS-ON ACTIVITIES

TELESCOPE VIEWING

BREAKFAST

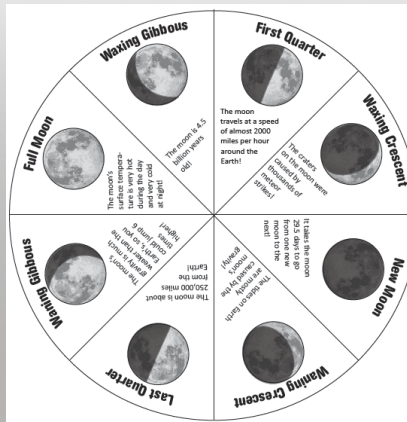
MORNING PLANETARIUM SHOW

BADGE DISTRIBUTION



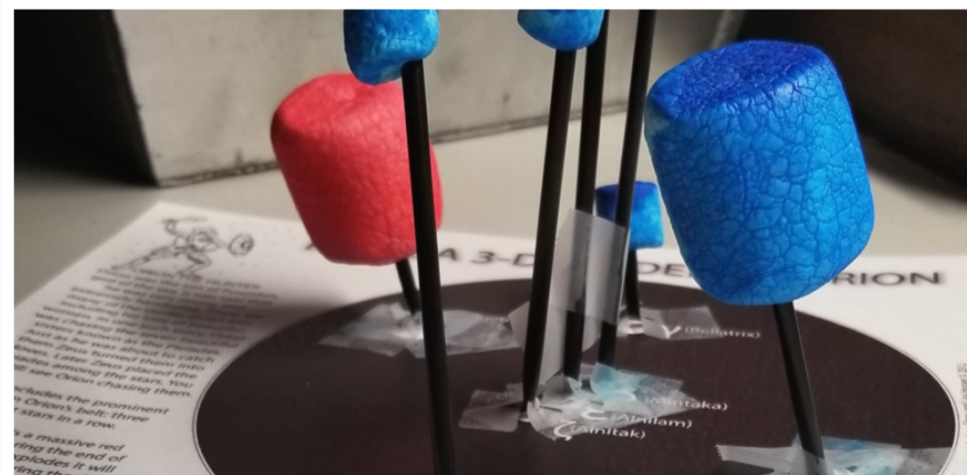
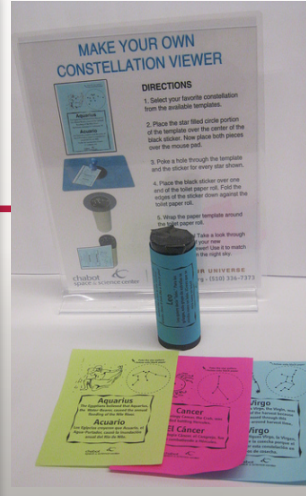
BROWNIES & DAISIES

- POCKET SOLAR SYSTEM
- TELESCOPE VIEWING
- MODEL THE MOON/MOON PHASES
- CONSTELLATION VIEWER
- SUNION
- BIG SUN, SMALL MOON
- FILTERED LIGHT



ACTIVITIES





JUNIORS – SPACE SCIENCE INVESTIGATOR HIGHLIGHTS

- SOLAR SYSTEM
 - SCIENCE THEATER
 - CLAY SOLAR SYSTEM MODEL
 - POCKET SOLAR SYSTEM
 - SOLAR SYSTEM JEWELRY
 - SOLAR SYSTEM WALK
- CONSTELLATIONS
 - 3-D MARSHMALLOW CONSTELLATION
 - PLANISPHERE
 - SCAVENGER HUNT
- STAR PARTY



PLANET HUNTER







Resources and strategies for engaging girls

Educational Programs

- * Scouts
- * Science Learning Partnership
- * Camps
- * Museum visitor's
- * Afterschool Partnership

Educational Programs

* Scouts

- Overnights

(Engineering & Science)

- Day programs

(Robots, Mechanical Engineering &
Space)

Workshops for Girls



Scouts

- * Build & Launch Stomp Rockets
- * Families working together





Science Learning Partnership

- * Access to science content
- * 1500 Kindergarteners participate
- * Exploring Earth: Bear's Shadow (2017)

Camps

- * Mission to Mars
- * Resources for staff and campers



Museum visitor's

- * Access and engagement with the public
- * Little to Big



Crater Drop



Hands-on Experiences

Solar Viewing Party, August 21, 2017





Afterschool partnership

- * 11 sessions STEM education
- * Bridges, Science Fair & Rocketry

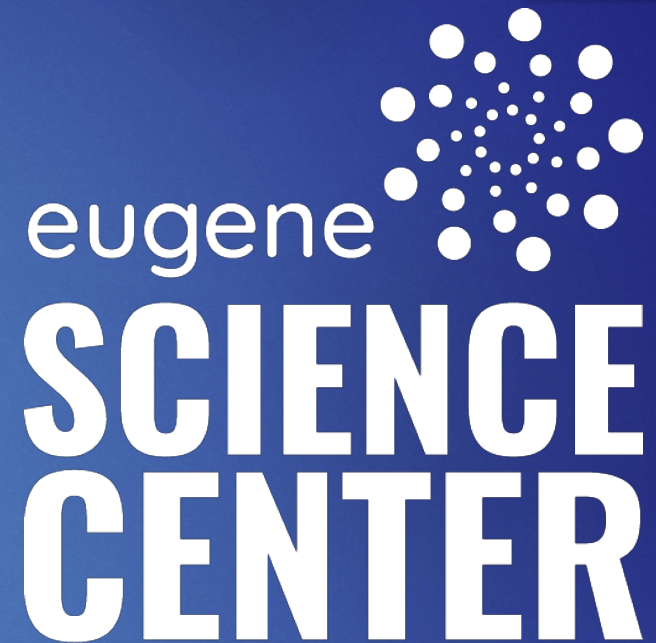


Afterschool partnership

- * Rocketry
- * Exploring the Solar System: Stomp Rockets (2018)
- * Exploring the Solar System: Mars Rover



Thank you

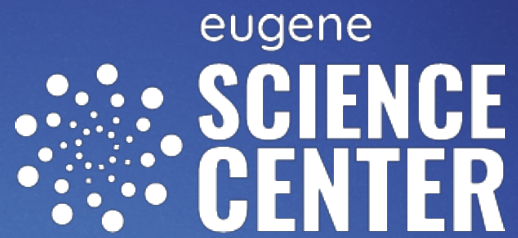


Collaborating with role models to engage girls in
STEM

Karyn Knecht, Education Director

education@eugenesciencecenter.org

Where am I?



Girls' Science Adventures

- 6 week program
- Saturday morning workshops
- For girls in 4th – 6th grade
- Led by community partners
- Themes relate to research focus of mentors



University of Oregon

Women in Graduate Science









Collaboration

- First, listen
- Empower ideas
- Provide support
- Who can you work with in your community?
- What challenges might you face?



NISE Network Resources

Calendar of STEM-related seasonal events and holidays

<http://www.nisenet.org/seasons>

- **Computer Science is for Everyone** toolkit for middle and high schools to increase diversity in computer science education
- **Introduce a Girl to Engineering Day (February)**
 - SciGirls Seven: How to Engage Girls in STEM
 - Books to inspire science-loving Mighty Girls from A Might Girl
 - State of Girls and Women in STEM by NGCP
- **Women's History Month (March)**
 - National Women's History Project
 - NASA Modern Figures Toolkit

NISE Network Resources

Museum & Community Partnerships: Collaboration Guide

<http://www.nisenet.org/collaboration-guide>

This guide provides an introduction to collaborations between museums and youth-serving community organizations, providing guidance on how to start partnerships and sustain and deepen your collaborative relationships.



NISE Network Resources

Program Development: A NISE Network Guide to Creating Effective Learning Experiences for Public Audiences

<http://nisenet.org/catalog/nise-network-program-development-guide>

This guide offers a practical introduction to the approaches, methods, and tools the Network uses to ensure our programs provide effective learning opportunities for all public audiences.

Page 48 highlights tips for engaging girls



Relevant NISE Net Online Workshops

<http://nisenet.org/event-type/online-workshop>

- Girl Scouts and STEM: New Space Science Badges and Opportunities to Connect with the Explore Science: Earth & Space Toolkits (2018)
- Museum Community Partnerships – Part 2: Girl Scouts (2017)
- Tips and Tricks for Engaging Girls in Museum Programming (2014)





Other Resources

A Mighty Girl

The world's largest collection of books, toys and movies for smart, confident, and courageous girls

<https://www.amightygirl.com/>

SciStarter

Citizen Science database

<https://scistarter.com/>

Girls RISEnet (Raising Interest in Science and Engineering) Museum Network

Project to raise capacity of science centers and museums to engage girls, especially minority girls, to explore and pursue science and engineering careers

<http://girlsrisenet.org/>

Questions?



Thank You

