



Reaching for the Stars: NASA Science for Girl Scouts

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*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



The Team —



Reaching for the Stars: NASA Science for Girl Scouts

- Women @ NASA are inspirational
- Girl Scout activity keys and processes
- NASA Agreement Goals and GS Stars
- Program Overview and Current Status

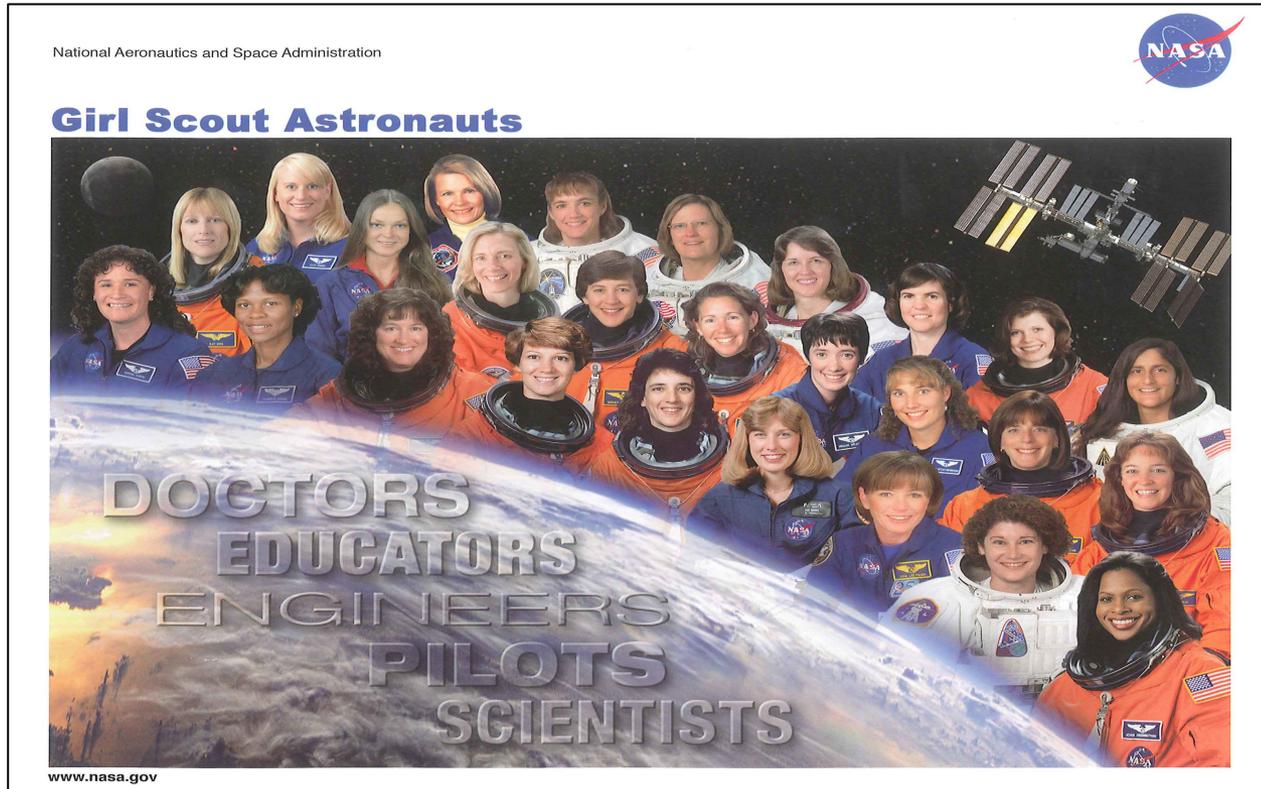


Women@NASA



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

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About half of the female astronauts are Girl Scout Alumnae

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Focus of Girl Scout Activities

Discover: Girls understand themselves and their values and use their knowledge and skills to explore the world.

Connect: Girls care about, inspire, and team with others locally and globally.

Take Action: Girls act to make the world a better place.

Girl Scout Processes

Girl Led

Learning by Doing

Cooperative Learning



Reaching for the Stars: NASA Science for Girl Scouts funded by NASA's Science Mission Directorate



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National Aeronautics and Space Administration



NNH15ZDA004C

Release Date: February 4, 2015

NASA
Science Mission Directorate
Science Education
Cooperative Agreement Notice (CAN)
– Final Text

Notices of Intent Due:

March 4, 2015

Proposals Due:

May 4, 2015

OMB Approval Number 2700-0085

Reaching for the Stars: NASA Science for Girl Scouts

NASA SMD Education Goals

Enable STEM Education

Improve U.S. Scientific Literacy

Advance National Education Goals

Leverage through Partnerships

CoSTEM Goals NSTC

1. **Improve STEM Instruction:** Prepare 100,000 excellent new K-12 STEM teachers by 2020, and support the existing STEM teacher workforce;
2. **Increase and Sustain Youth and Public Engagement in STEM:** Support a 50 percent increase in the number of U.S. youth who have an authentic STEM experience each year prior to completing high school;
3. **Enhance STEM Experience of Undergraduate Students:** Graduate one million additional students with degrees in STEM fields over the next 10 years;
4. **Better Serve Groups Historically Under-represented in STEM Fields:** Increase the number of students from groups that have been underrepresented in STEM fields that graduate with STEM degrees in the next 10 years and improve women's participation in areas of STEM where they are significantly underrepresented; and,
5. **Design Graduate Education for Tomorrow's STEM Workforce:** Provide graduate-trained STEM professionals with basic and applied research expertise, options to acquire specialized skills in areas of national importance, mission-critical workforce needs for the CoSTEM agencies, and ancillary skills needed for success in a broad range of careers.

Note: Goal 5, while shown here for completeness, is not an objective of the scope of this CAN. NIFS are the responsibility of NASA's Office of Education

"Although the Federal Government plays an important role in STEM education, it cannot achieve success by itself. To effectively leverage its investments, the Federal Government must coordinate its efforts strategically and collaborate with non-Federal partners to support institutional, state, and local efforts. Local and state education agencies, institutions of higher education, professional and scientific societies, philanthropic and corporate foundations, aquaria, botanical gardens, museums, science centers, after-school providers, and private industry, for example, play potentially significant roles in growing our Nation's STEM education pipeline and creating pathways to STEM."

CoSTEM Goals NSTC

2. **Increase and Sustain Youth and Public Engagement in STEM:** Support a 50 percent increase in the number of U.S. youth who have an authentic STEM experience each year prior to completing high school;

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Office of Education Lines of Business and SMD Science Education (SE) CAN Synergies

NASA Education Business Lines

• **NASA Internships, Fellowships, and Scholarships (NIFS):** Utilize NASA facilities and assets to provide work experiences and research and educational opportunities to improve retention in STEM and prepare students for employment in STEM jobs;

• **STEM Engagement (SE):** Provide opportunities for participatory and experiential learning activities to connect learners to NASA-unique resources;

• **Educator Professional Development (EPD):** Prepare STEM educators and leaders to deliver quality STEM instruction utilizing unique NASA assets and content; and,

• **Institutional Engagement (IE):** Improve the capacity of U.S. institutions to deliver effective STEM education.

NASA SMD SE CAN Scope

• Not specifically included. SMD is supporting OEd efforts

• Primary focus – Enable STEM Education

• Primary focus – Advance National (Educational) Goals

• TBD – Leverage Through Partnerships

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GS Stars Support for Office of Education Key Lines of Business

STEM Engagement: Provide opportunities for participatory and experiential learning activities to connect learners to NASA-unique resources through the specific badge content and activities, SME connections and *Destinations* program.

Educator Professional Development: Prepare informal STEM educators and GS leaders to facilitate quality STEM learning utilizing unique NASA assets and content through the new Space Science Girl Scout badges and volunteer leadership training that enables Girl Scouts across the nation to be engaged with NASA.

Institutional Engagement: Improve the capacity of U.S. institutions to deliver effective STEM education through the partnership of GSUSA and NASA.

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- 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 GSUSA leaders at authentic observatory and NASA sites
- Offer **GSUSA Destinations**; Astronomy and 2017 total solar eclipse
- Provide **interactive experiences** in person and online with NASA SMEs (kits, camps, badge steps, astronomy clubs)
- Create a **network of NASA SMEs** and space science volunteers (camps, badge steps, astronomy clubs) to support Girl Scouts



- Develop a **sustainable relationship** between NASA and GSUSA (SSA).

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New Space Science Badge Sequences 'looking up'

A badge for each level

- Daisies, Grades K – 1
- Brownies, Grades 2 -3
- Juniors, Grades 4 -5
- Cadettes, Grades 6 -8
- Seniors, Grades 9 -10
- Ambassadors, Grades 11 -12

Badge = 5 steps with 3 options/step



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Badge Development

- Badge Requirements
- GS USA Volunteer Tool Kit (VTK) (digital resource)
- Dissemination workshops and webinars
- Council funding through GSUSA for testing and dissemination
- Northern California and national testing and evaluation, 3 rounds total
- Release in Fall 2018 and 2019

Dissemination

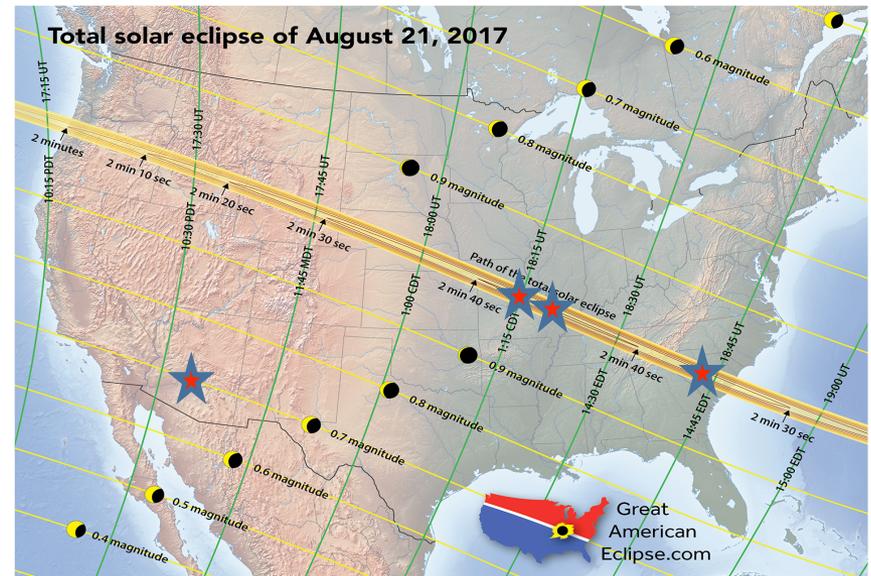
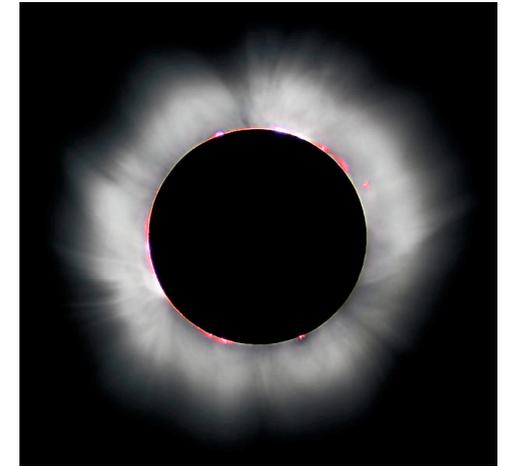
- GS USA online store, VTK
- 2017 G.I.R.L. Convention (preview)
- 2019 and 2020 Bridging Event



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Interactive Experience: Astronomy Event of the Decade: 2017 Total Eclipse of the Sun

- “Evergreen” Kit Boxes and Guides to councils
- “Evergreen” Guides available on-line
- Eclipse viewing glasses in GS Store
- Connections:
 - Night Sky Network
 - Libraries
 - Science Centers
 - Planet



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Eclipse Box Activity Guide

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



Credit: Girl Scouts of Northern California



Partial view



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 EXLIPSE 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 |

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Girl Scout Patch for participation in Eclipse Event

Annual GS Bridging Event in Golden Gate Park
Girls Bridge from Junior to Cadette
8000 from across U.S.
Hands-on activities from the kit/guide

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Train-the-Trainer Experiences

Volunteer Astronomy Camp at University of Arizona,
Mt. Lemmon and/or Kitt Peak, led by Don McCarthy & Larry
Lebofsky, Co-Is

Twice per year, began Spring of 2016



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Train-the-Trainer Experiences

- Goddard Space Flight Center, led by Lou Mayo, Co-I
- Week-long workshop by application, once per summer Yrs 2- 5
- Council team: GS Volunteer, Two Senior or Ambassador GS, and an amateur astronomer
- Telescope for each council to launch Astronomy Club



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Destinations:

Girl Scout Destinations are adventures for individual girls ages 11 and older. Girl Scouts travel to camp and are inspiring, life-changing experiences. Destinations are in collaboration with one of the 112 Girl Scout Councils, applications are reviewed by GS USA.

Councils recommend girls for Destinations travel, and provide some scholarships.



Astronomy Camp

Location Catalina Observatory, Mt. Lemmon, Arizona

Date June 30 - July 4, 2017

This is an adventure in scientific exploration where you will use mountaintop telescopes at the Catalina Observatories atop scenic Mt. Lemmon in southern Arizona to explore the sky both day and night, creating your own observations and images.



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The Great Eclipse Adventure:

STEM immersion at University of Missouri, Columbia with women professors and students, plus total eclipse observing at a regional Girl Scout camp! August 19-21



Total Eclipse of the Heartland:

Trip to the St. Louis Science Center, Challenger Learning Center, and Zoo in St. Louis, MO and then total eclipse viewing in Carbondale IL! August 18-21



2017 Destinations for Girl Scouts: Total Solar Eclipse and Astronomy Camps

Astronomy Camp— University of Arizona:

An adventure in scientific exploration at mountaintop telescopes at the Catalina Observatories atop scenic Mt. Lemmon in southern Arizona. Girls explore the sky both day and night, creating their own observations and images.

June 30-July 4

Eyes to the Sky — A Once in a Lifetime Destination:

A total solar eclipse weekend in the Blue Ridge Mountains of South Carolina! Visit science center, observatory, and observe the eclipse from a Girl Scout Camp on the centerline! August 19-22

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Amateur Astronomer Training led by Vivian White, Co-I. Star Parties and online resources for amateurs and the GS Councils.

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Rockman et al and Girl Scout Research Institute evaluating badge development, camp experiences, and astronomy club development.

Need to make contact?



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