

Girl Scouts and STEM: New Space Science Badges and Opportunities to Connect with the NISE Network Explore Science: Earth and Space Toolkits

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ASTC 2018 CONFERENCE SESSION PRESENTERS

From Thin Mints to Thin Films: Museum Partnerships Engaging the Girl Scouts in STEM Education

- Pamela Harman, SETI Institute, Reaching for the Stars: NASA Science for Girl Scouts, pharman@seti.org
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- Kristen Martin, The Tech Museum of Innovation, kmartin@thetech.org

GIRL SCOUTS OF THE USA and GIRL SCOUT STARS RESOURCES

- Girl Scouts Stars Splash page: <https://www.seti.org/girlscoutstars>
- Girl Scouts of the USA shop (to purchase badges): <https://www.girlscoutshop.com>
- Girl Scouts of the USA and Badge Explorer: <https://www.girlscouts.org/badgeexplorer>
- Girl Scout Council Finder
<https://www.girlscouts.org/en/about-girl-scouts/join/council-finder.html>

RECORDINGS OF NISE NETWORK ONLINE WORKSHOPS

- **Online Workshop: Girl Scouts & STEM: New Space Science Badges and Connections to the Explore Science: Earth & Space Toolkits (Recorded 8/21/2018)**
<http://nisenet.org/catalog/online-workshop-girl-scouts-and-stem-new-space-science-badges-and-opportunities-connect>
- **Online Workshop: Museum Community Partnerships – Girl Scouts (Recorded 11/14/2017)**
<http://nisenet.org/catalog/online-workshop-museum-community-partnerships-part-2-girl-scouts-recorded>

NISE NETWORK RESOURCES

Collaborations:

- **Museum & Community Partnerships: Collaboration Guide and Additional Resources**
Museums can be a convener for Girl Scouts to bring together subject matter experts and Girl Scouts to supplement and potentially satisfy these badge requirements. This guide offers an introduction to collaborations between museums and youth-serving community organizations. While this guide is designed specifically for museums and community organizations, much of the content contained in this document can be applied to all kinds and levels of partnerships. This guide includes an overview of why to collaborate, levels of partnerships, how to start a partnership, and a variety of resources to sustain and deepen your collaborative relationships
<http://www.nisenet.org/collaboration-guide>

Using NISE Network's Explore Science: Earth & Space toolkits with the new Girl Scouts Space Science Badges

Girls Scouts of the USA released new Girl Scout Space Science badges in 2018 for Daisy (Grades K-1), Brownie (Grades 2-3), and Junior (Grades 4-5) girls. All of these badges encourage girl-led explorations of space science, highlight female astronomer role models, and focus on cooperative, hands-on learning by doing. Studies show that connecting young girls with positive science experiences is the first step in a life of engaging scientific explorations. The NISE Network supports the Girl Scout goals of increasing science interest, confidence, competence, and value for the girls. Many of these girls may have heard the message that science is not for them; together we can be a voice that tells them they are welcome and encouraged to reach for the stars.

Activities from the NISE Network's Explore Science: Earth and Space toolkit can supplement, and in one case satisfy some of the requirements for a Girl Scout to earn a Space Science badge. Below, you will find suggestions of activities from the NISE Net's Explore Science: Earth & Space toolkits that are relevant to the content highlighted in a given "Step" of the badge process. Digital versions of the 2017 & 2018 Earth & Space toolkits, as well as other activities, are available for download from <http://www.nisenet.org/>

- 2017 Explore Science: Earth & Space toolkit: <http://www.nisenet.org/earthspacekit-2017>
- 2018 Explore Science: Earth & Space toolkit: <http://www.nisenet.org/earthspacekit-2018>

Learn more about the toolkits and apply for the physical 2019 toolkit here. Digital 2019 toolkits will be available online in January 2019.

- <http://www.nisenet.org/earthspacekit-apply>

Daisy (grades K-1) Space Science Explorer badge

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

Step: Explore the Sun

- *NISE Net’s Exploring Earth: Bear’s Shadow* is a hands-on activity designed primarily for young visitors and their families. Participants move a flashlight around an object to make and experiment with shadows. The activity can be connected to a storybook about a little bear exploring his own shadow, and also has connections to the geometry of a solar eclipse as the Moon and Sun cast a shadow onto Earth.
 - This activity serves as an introduction to the nature of shadows, leading up to the “Explore the Sun: Make a shadow poster” option.
 - Learn more about the activity, watch a training video, and download written materials here: <http://www.nisenet.org/catalog/exploring-earth-bears-shadow>

Step: Observe the Moon

- *NISE Net’s Exploring the Solar System: Hide and Seek Moon* is an engaging way for early childhood learners to experiment with some of the tools scientists use to study objects that are very, very far away, and to learn about how cultures around the world have viewed the Moon. Easy-to-use binoculars and a hidden object Moon poster let young participants discover how some tools can make distant objects appear closer and brighter, and the *Moon Rope* storybook shares a story of one of the ways people have made meaning out of the shapes they see on the Moon.
 - This activity can introduce binocular use and safety, and share some cultural significance of the Moon through the *Moon Rope* picture book, written and illustrated by Louis Elhert and translated by Amy Price, before girls observe the Moon in “Observe the Moon: Take a closer look.”
 - Learn more about the activity, watch a training video, and download written materials here: <http://www.nisenet.org/catalog/exploring-solar-system-hide-and-see-moon-2018>

Step: Meet the Stars

- *NISE Net’s Exploring the Universe: Filtered Light* demonstrates how scientists can use telescopes and other tools to capture and filter different energies of light to study the universe. Most objects in the universe are so distant from us that we can only study them through light. Filters allow us to block some energy levels of light and isolate others; each energy of light can offer new information about the object of study. In “Filtered Light,” participants discover how colored filters can help reveal more about an image. They can also make and study colorful images of their own.

- This activity can add another layer of learning to the option, “Meet the Stars: Make a pretend telescope,” by allowing girls to discover an important feature of real telescopes.
- Learn more about the activity, watch a training video, and download written materials here: <http://www.nisenet.org/catalog/exploring-universe-filtered-light-2018>

Brownie (grades 2-3) Space Science Adventurer badge

“When I’ve earned this badge, I will know how to investigate the Sun, Moon, planets, and stars.”

Step: Meet the Neighbors

- *NISE Net’s Exploring the Solar System: Pocket Solar System* is a hands-on activity in which visitors make a scale model of the distances between objects in our solar system. They learn that there is a lot of space between planets, and that our solar neighborhood contains many other interesting features and objects. They can even imagine where they might like to send a NASA mission spacecraft in the future!
 - This activity is specifically listed in the Badge guide and will satisfy the option, “Meet the Neighbors: Make a pocket Solar System.”
 - Learn more about the activity, watch a training video, and download written materials here: <http://www.nisenet.org/catalog/exploring-solar-system-pocket-solar-system>

Step: Investigate the Moon

- *NISE Net’s Exploring the Solar System: Solar Eclipse* is a hands-on activity demonstrating how the particular alignment of the Sun, Earth, and Moon can cause an eclipse. Visitors investigate the positions of these objects to create shadows and learn about solar eclipses.
 - This activity can supplement the option, “Investigate the Moon: Model the Moon” by encouraging girls to further explore the Sun, Earth, Moon system and its visible effects on Earth.
 - Learn more about the activity, watch a training video, and download written materials here: <http://www.nisenet.org/catalog/exploring-solar-system-solar-eclipse>
- OR *NISE Net’s Exploring the Solar System: Craters* is an active, hands-on activity that demonstrates how craters form, and what they can teach us about the history and composition of planets and moons. By dropping objects of various sizes and shapes into a tub full of sand and other materials, participants simulate the formation of a meteorite crater, and then study the craters using special tools. Scientists use similar methods to study the geological processes on other planets, moons, and asteroids.
 - This activity can supplement the option “Investigate the Moon: Make a Moon art project.” The simulated Moon landscape that girls create by making craters can be

considered a temporary art project, reminiscent of a sand mandala, or the girls can document their project by taking photos of it. They might even attempt photographing the landscape in different lighting and from various angles.

- Learn more about the activity, watch a training video, and download written materials here: <http://www.nisenet.org/catalog/exploring-solar-system-craters-2018>

Junior (grades 4-5) Space Science Investigator badge

“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.”

Step: Model the Solar System

- *NISE Net’s Exploring the Universe: Objects in Motion* encourages participants to explore the complex but predictable ways objects in the universe interact with each other. Stars, planets, moons, and other objects in space orbit around each other because of gravity, and NASA scientists can use what we already know about the laws of physics to make new discoveries and predictions. Participants in this activity use "orbiting" clay balls to make simple, functioning models of interacting objects in space.
 - This activity includes an optional extension called “Exploring Ratios,” in which participants make Play-Doh balls with mass ratios that match real object pairs in space.
 - Learn more about the activity, watch a training video, and download written materials here: <http://www.nisenet.org/catalog/exploring-universe-objects-motion-2018>

Step: Circle the Sun

- *NISE Net’s Exploring the Universe: Orbiting Objects* is a hands-on activity that invites visitors to experiment with different sized and weighted balls on a stretchy fabric gravity well. The activity models gravitational attraction in space. Participants investigate how changing conditions can cause phenomena like stellar wobble and planet formation.
 - This activity can supplement the learning in the option, “Circle the Sun: Dance the Earth’s year” by inviting girls to explore the motions of bodies in space, and the relationships between mass, gravity, and acceleration.
 - Learn more about the activity, watch a training video, and download written materials here: <http://www.nisenet.org/catalog/exploring-universe-orbiting-objects>

Step: Use Tools to Explore

- In *NISE Net’s Exploring the Solar System: Mars Rovers*, participants learn about how scientists and engineers use robotic rovers and other vehicles to explore distant worlds, and experience some of the challenges and teamwork required to navigate a rover across the

surface of a planet millions of miles away. Players acting as "Mission Control" and a "Rover" must work together to navigate a large obstacle course. Participants can also design their own rover to fit the particular challenges of exploring a distant planet.

- This activity can supplement the option, "Use tools to explore: Make a Mars rover," by allowing girls to act out a Mars rover mission in a full-body, cooperative challenge.
- Learn more about the activity, watch a training video, and download written materials here: <http://www.nisenet.org/catalog/exploring-solar-system-mars-rovers-2018>

ADDITIONAL RESOURCES

- The Night Sky Network in partnership with the Astronomical Society of the Pacific has compiled a list of resources to support the Girl Scout Space Science badges to make meaningful connections with girls.
https://nightsky.jpl.nasa.gov/download-view.cfm?Doc_ID=618
- **Connect with your local astronomy club**
The Night Sky Network is a nationwide coalition of amateur astronomy clubs bringing the science, technology, and inspiration of NASA's missions to the general public. Clubs share their time and telescopes to provide you with unique astronomy experiences at science museums, observatories, classrooms, and under the real night sky.
<https://nightsky.jpl.nasa.gov/>

Night Sky Network astronomy events in your area
<https://nightsky.jpl.nasa.gov/clubs-and-events.cfm>
- **NASA Solar System Ambassadors**
The Solar System Ambassadors (SSA) program works with motivated volunteers across the nation to share the latest science and discoveries of NASA's missions through a variety of events that inspire their communities.
Use the directory to find an SSA near you or check the Event Calendar to see if an Ambassador event near you.
<https://solarsystem1.jpl.nasa.gov/ssa/directory.cfm>
- The Astronomical Society of the Pacific Early Learners
<https://www.astrosociety.org/education/early-learners-2/>