

## Amateur Astronomers: Girl Scouts are Heading Your Way!

New Girl Scout Space Science badges were released in 2018 and 2019 for all levels of Girl Scouts. Each badge includes an observing component and encourages troops to reach out to their local astronomy club. You may get contacted by troop leaders to let you know that their girls are coming to one of your events. Here's what the girls are learning in their badges and some engaging ideas to support their understanding.

**For more information: [bit.ly/astroall](http://bit.ly/astroall)**

### **Daisy (Grades K-1) Exploring the movement of the Sun, Moon, and stars.**

At this age, the focus is on play and discovery. They may have made up a constellation or imagined a "woman in the moon." This encourages observing skills at an age-appropriate level. If they arrive early, it can be fun to see who can spot the first star of the evening. Good observing targets for this age include the Sun, Moon, star clusters like the Pleiades, and simple constellations with a laser pointer. Tell stories, and encourage their new skills with phrases like, "I like how you talked about the detail on the moon" and, "What do you see differently through the telescope?" Lightweight, low-magnification binoculars work well for the youngest visitors!

### **Brownie (Grades 2-3) Investigate planets, telescopes, constellations, and Moon phases.**

These girls are learning about our planetary neighbors and you may be able to show them some through your telescope. Rather than drilling them on facts, find out if they have a way to remember the order of the planets or which one is their favorite. If the Moon and Sun are up during your event, hold a ball up next to the Moon and show them how it is lit up in the same way. Model other phases and be ready to talk about an eclipse as the ball enters their shadow. Show them how your telescope works - where the light comes in and how the eyepiece magnifies the image. If they are interested, try out different eyepieces on the same target and let them notice the difference – the Moon, Saturn and Jupiter are great for this.

### **Junior (Grades 4-5) Exploring size and distance scales and movements in the Solar System.**

By late elementary school, girls are ready to begin exploring the Solar System and beyond. Help them imagine how long it would take to travel to planets they can see through your scope. Think about how old you all are in Jupiter or Mercury years. Now that they have a handle on maps, you can introduce star wheels and help them find things in the night sky. Show them the gems hidden in their favorite constellations – the Orion nebula, colorful stars, clusters, etc.

**Cadettes (Grades 6-8) Exploring light in new ways.** Middle school girls are beginning to understand how visible light can be broken apart into colors and how this is just a small part of the electromagnetic spectrum. This is the age that many girls decide that science is "not for them" and being an encouraging mentor can make the difference between a girl believing she can "do science" or not. They may have used prisms and cameras to explore how we see light, including night photography. They may be interested in drawing or photographing night sky targets or writing with light in their images. There is also an interest in preserving dark skies and how they can make a difference in their communities. See if they notice the difference between what they see in their neighborhood versus under a dark sky - magnitudes are a concept they can understand now.

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Copies for educational purposes are encouraged.

Additional astronomy activities can be found here: <http://nightsky.jpl.nasa.gov>



**Seniors (Grades 9-10) Understanding our place in the Universe.** In high school, there is much more complex ability to categorize and understand our place in the Universe. They will begin to understand how our earth and lives relate to the life cycle of stars and how telescopes are used to learn more about our place in space. Showing the different stages of a star's life, from nebula to red giants will connect what they are learning to the night sky. Talk about optics, from candles as they adapt to the dark to magnification and resolution as they compare different telescopes at a star party.

**Ambassadors (Grades 11-12) Lifelong engagement with space science.** From investigating distant worlds to accessing citizen science projects and exploring careers in space science, these young women are looking towards the future. They may be familiar with the stories of women in space science and want to share. Ask if any of the current NASA missions interest them. Ambassadors may have started building their own telescopes or using remote telescopes. They may be interested in amateur astronomy as a hobby or talking with professional astronomers to understand what the career entails.

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. You won't find a list of constellations they need to memorize. Rather, studies show that connecting young girls with positive science experiences is the first step in a life of engaging scientific explorations.

We support the Girl Scout goals of increasing science interest, confidence, competence, and value for the girls. Realize that these girls may have heard the message that science is not for them. Be the voice that tells them they are welcome and encouraged to reach for the stars.

