



Solar Eclipse & Space Science Badge Kit

Daisies, Brownies & Juniors

girl scouts 
of greater atlanta

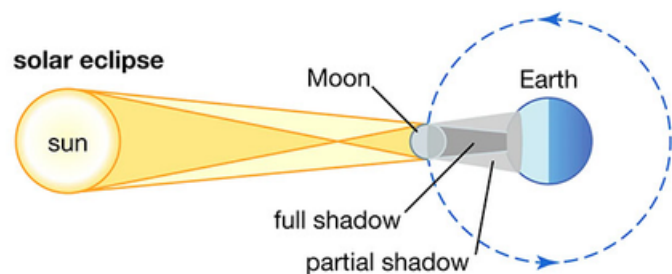
Solar Eclipses

What Are Eclipses?

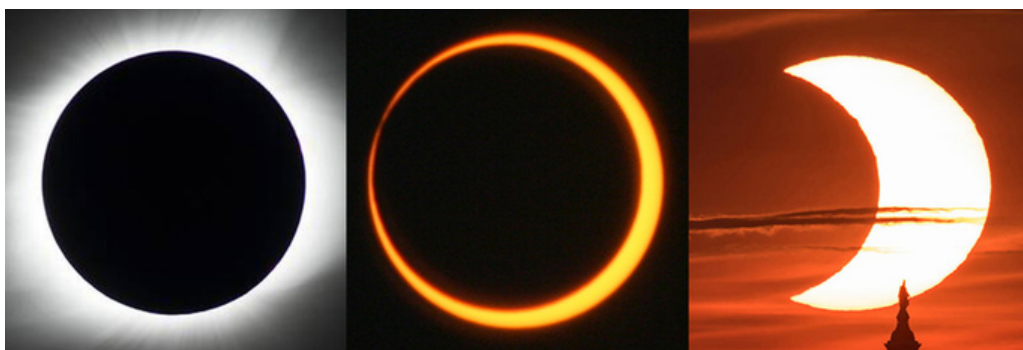
Eclipses are all about shadows. Eclipses occur when one astronomical object moves in front of another, or when an astronomical object moves into the shadow of another object. In the sun-Earth-moon system, eclipses occur when the sun, Earth and moon all line up. In astronomical terms, this is called syzygy, a word derived from Ancient Greek that means “yoked together.”

Solar Eclipses:

Eclipses of the sun occur when the new moon passes between the Earth and sun. When the moon covers the entire disk of the sun, we see a spectacular total eclipse of the sun with a glowing corona.



During the eclipse, the moon’s shadow is cast on the Earth’s surface. You can see in this diagram that some of the Earth will be in “full shadow,” while some of it is in “partial shadow.” Depending on where you are on the Earth, you’ll see a full, or total eclipse, or a partial eclipse. There’s also a third type of eclipse: annular eclipses. We’ll talk more about them later!



Total Eclipse

**Annular
Eclipse**

Partial Eclipse

Types of Eclipses

Total Eclipses:

Seeing a total eclipse is a really awesome experience! First, you have to be careful to protect your eyes. Never look at the sun without proper glasses- you could injure or damage your eyesight!

Next, you have to be at the right place at the right time. Sometimes this is called the “path of totality,” or the parts of the Earth that the moon’s shadow will travel over. NASA puts out maps, like the one here, for eclipses that move across the US.

If you were in space during an eclipse, you would see the moon’s shadow rushing across the surface of the Earth at thousands of miles/hour! If you stand still in the path of totality it will take a couple of hours for the entire eclipse to happen, with only about 7 of those minutes being during the total eclipse.

During an eclipse, you’ll notice the sky start to get darker, like it does in the evening. If you use your eclipse glasses, you will start to see a “bite” taken out of the sun that will grow larger and larger. When the sun is completely blocked it will be pretty dark outside, like it is after the sun goes down. You might hear night-time bugs and frogs start to come out!



Partial Solar Eclipses:

If you aren’t in the “path of totality” you’ll see a partial solar eclipse. The sun will have a “bite” taken out of it. You can use this map (and the NASA website linked on the next page) to see how much of the sun will be covered in your area. Remember, you still need to wear protective glasses during a partial eclipse!

More Info

Annular Eclipses:

Annular Eclipses are a very cool thing to see! But what are they? First, we have to think about how the Earth and the Moon move. The Moon orbits around the Earth, roughly in a circle. But this circle isn't perfect- the Moon actually moves in an oval shape! When the Moon is closer to the Earth, we say it is at perigee; when the Moon is furthest from the Earth, it is at apogee. You can see this in the image from NASA below.



When the Moon is at perigee, or closest to the Earth, we often describe it as a “supermoon.” It can look extra big and bright!

When the Moon is at apogee, or furthest away from the Earth, it can look smaller than usual. If there's an eclipse at this point, the Sun will appear larger than the Moon!

This means that parts of the Sun will stick out from around the sides of the Moon, even in the path of totality, so the sky won't get fully dark. This creates a neat affect called the “ring of fire”- you can see it on the photo on the first page.

More Resources:

NASA is always a great resource for any major eclipses that can be seen from the US. [You can find out more on their page here](#) (or scan the QR code).

GSGATL will be putting out a fun patch kit leading up to both the October 16, 2023 and April 8, 2024 eclipses. You can use these activities to help earn your Space Science badge as well! Watch our [events calendar](#) for fun activities at our Girl Scout Camps too.



NASA's Eclipse
Page

Overview

This fun patch kit includes a customized curriculum for your Girl Scout level, worksheets and printed materials, eclipse glasses, and a fun patch. This kit will help your Girl Scout learn about the 2023-2024 solar eclipses, and you can earn your Space Science badge while doing it! We encourage Troop Leaders and parents to customize this general outline for your Girl Scout's specific needs.

This kit has four sections focusing on different space topics: Fun in the Sun, To the Moon & Back, Around the Solar System, and Starry Night.

Each Girl Scout level will need to complete a different number of activities to earn their fun patch.

- Daisies: complete FOUR activities, one from each section
- Brownies: complete FIVE activities, including one from each section
- Juniors: Complete SIX activities, including one from each section

In order to earn the Space Science badge, look for the activities marked with the badge icon for your level and complete all of them!

Brownies & Juniors:

Finish earning your Space Science Badges by throwing a star party to share what you have learned! You can plan it to be during one of the eclipses in October 2023 and April 2024, or on a different day.

You can also share what you learned online! Ask your parents to post on Facebook or Instagram and tag us @GirlScoutsATL, or use #GirlScoutsATL. You can also email us at STEM@gsgatl.org to show off your hard work!

Badge Requirements

Daisy Space Science Explorer



Explore and observe the sky like a real space scientist.

1. Explore the Sun
2. Observe the Moon
3. Meet the Stars

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

Brownie Space Science Adventurer



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

1. Meet the neighbors
2. See more than before
3. Investigate the Moon
4. Be a stargazer
5. Celebrate and share

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

Junior Space Science Investigator



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

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

Safety Information

Remember: The Sun is never completely blocked by the Moon during a Solar Eclipse. It is never safe to look directly at the Sun without specialized eye protection designed for solar viewing! Sunglasses are not enough to protect your eyes. The GSGATL-provided eclipse glasses in this kit comply with the ISO 12312-2 international standard for safety and will keep your eyes safe.

Viewing any part of the bright Sun through a camera lens, binoculars, or a telescope without a special-purpose solar filter secured over the front of the optics will instantly cause severe eye injury. Your eclipse glasses are NOT appropriate - they are not strong enough to protect against the magnification of the sun through these types of lenses.

Please ensure any Girl Scouts participating in these activities and/or viewing the solar eclipses wear their glasses properly. Always supervise children using solar viewers.

If you don't have eclipse glasses, you can use an indirect viewing method like a pinhole projector. There are instructions in this packet to make one. Do NOT look at the Sun through the pinhole!

Even during an annular eclipse, or during the partial phases before and after annularity, the Sun will be very bright. If you are watching an entire eclipse, you may be in direct sunlight for hours. Remember to wear sunscreen, a hat, and protective clothing to prevent skin damage.

We've included links to outside resources in this kit. Girl Scouts and adults should visit these sites together! We've included internal links (for the PDF) and QR codes to scan (if you have a printed kit).

Included Resources

Remember: Girl Scouts should work with an adult to access these links online!

- [NASA: The Sun](#)
- [Jet Propulsion Laboratory: Make a Moon Crater Activity](#)
- [NASA: What is the Artemis Program?](#)
- [NASA: What is the Space Launch System?](#)
- [JPL: Simple Rocket Science Activity](#)
- [Moon Phases video](#)
- [Gainsville, GA Solar System Hike](#)
- [Earth's Rotation and Seasons video](#)
- [Your Age on Other Planets](#)
- [Night Sky Network](#)
- [Make your own Star Wheel](#)
- [What are Stars? video](#)
- [What are Constellations? from NASA](#)

Activities

Fun in the Sun

Activity	Materials	Badge-Earning
Solar Energy Experiment	• 3-5 small cardboard boxes • 2-4 different materials to wrap the boxes • Scotch tape • Ice cubes	
Pinhole Projector	• A sunny day • 2 sheets of white cardstock • A pin	
Solar Plasma Collage	• Black construction paper • Tissue paper (in a variety of colors) • Glue stick • Scissors • Pencil or chalk	Daisies, Juniors

Activities

To the Moon & Back

Activity	Materials	Badge-Earning
Colliding Craters Experiment	• A shallow pan • Flour • Cocoa powder • Sifter • Cake sprinkles • Various small rocks or toy blocks • Ruler/yardstick	Dasies
Lift Off! Rocket Experiment	• Straw • About 5 balloons • Clear tape • Fishing line • Scissors • Clothespin or binder clip	Juniors

Activities

To the Moon & Back

Activity	Materials	Badge-Earning
Oreo Moon Phases	• Oreo cookies (or generic brand) • Paper plate • Marker • Spoon or butter knife	Brownies
Eclipse Chalk Art	• Dark blue or black cardstock • white chalk • pencil • scissors • masking tape • circle stencil or round item • scrap cardboard	

Activities

Around the Solar System

Activity	Materials	Badge-Earning
Solar System Hike	• Paper or paper plates • Tape or Glue • Each item from chart	Brownies, Juniors
Dance Around the Sun	• A ball • 16 sheets of paper • markers	Juniors
Night Sky Scavenger Hunt	• Scavenger hunt list (in workbook) • Optional: Sky app, star wheel, telescope, binoculars	Brownies, Juniors

Activities

Starry Night

Activity	Materials	Badge-Earning
Crystal Stars	• Borax • Water • Pipe cleaners • Measuring cups & spoons • Star-shaped cookie cutter (optional) • Thin ribbon or string • Popsicle sticks • Mason jars	
Marshmallow Constellations	• Mini Marshmallows • Toothpicks • Paper • Pencil or Pen	Dasies and Brownies
Night Sky Painting	• Bright colored crayons (yellow, orange, white, light blue, fluorescents) • white construction paper • Black or blue acrylic or water color paint	Brownies and Juniors

Solar Energy

Materials:

- 3-5 small cardboard boxes of the same size and material (like tea boxes or cereal boxes)
- 2-4 different materials to wrap the boxes (like aluminum foil, a fabric tea towel, felt or foam sheets, etc.)
- Scotch tape
- Ice cubes

Did you know that the Sun sends us energy? We mostly see and feel this energy as light and heat. This activity will help you explore solar energy and how it works!

Step-by-Step

- Take your boxes and cover them with different insulating materials you have around the house. (We recommend aluminum foil and some sort of fabric, but be creative!) Leave one box uncovered (just plain cardboard).
- Use the worksheet to make a hypothesis, or prediction, about each box. How long will it take an ice cube to melt inside the box?
- Set the boxes outside in a sunny spot. Check the ice cubes every 5 minutes, but don't open the boxes too much!
- What happened to the ice cubes?

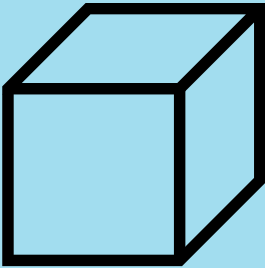
Sun Fact

The Sun puts out more than you think! In addition to the light we can see, it also emits ultraviolet light, infrared light, radio waves, X-rays, and gamma rays. It also creates a “solar wind” of magnetic charged particles that reach out to Neptune and beyond!

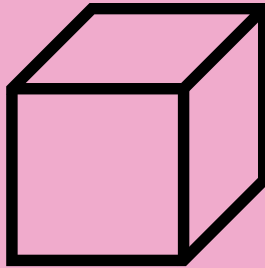
Solar Energy

Worksheet

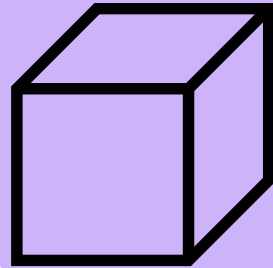
Box #1



Box #2



Box #3



No cover	Material:	Material:
Hypothesis:	Hypothesis:	Hypothesis:
Actual Time:	Actual Time:	Actual Time:

What's going on here?

These materials act as insulators for the ice cubes. They either make the inside of the box feel hotter or cooler.

You successfully harnessed the power of the sun! What material would you want to wear on a hot day? What about on a cold day?



For More **FUN**:

Make a Pinhole Projector

Scientists know that it's dangerous to look at the Sun, because it can damage their eyes. They use special tools to study the Sun safely. You can do this, too, with a tool called a pinhole projector. With an adult, follow these instructions to make your projector. Then head outside and try it out! After you try it, talk about what you saw.

You will need:

- A sunny day
 - Two sheets of stiff white paper
 - A pin
- 1 Have an adult use a pin to make a hole in the center of one piece of paper.

- 2 Go outside (with your adult). Put your back to the Sun and hold the paper out so the Sun shines on it. Just make sure you don't look at the Sun through the hole or any other way.

- 3 Use the other piece of paper to "catch" the image of the Sun that will come through the hole. Move the paper back and forth and see how it changes the image. What you see on the paper is an image of the Sun!



This is a safe way to see the Sun without hurting your eyes—using tools just like scientists do.

*"Make a Pinhole Projector" activity is courtesy of Stanford Solar Center.



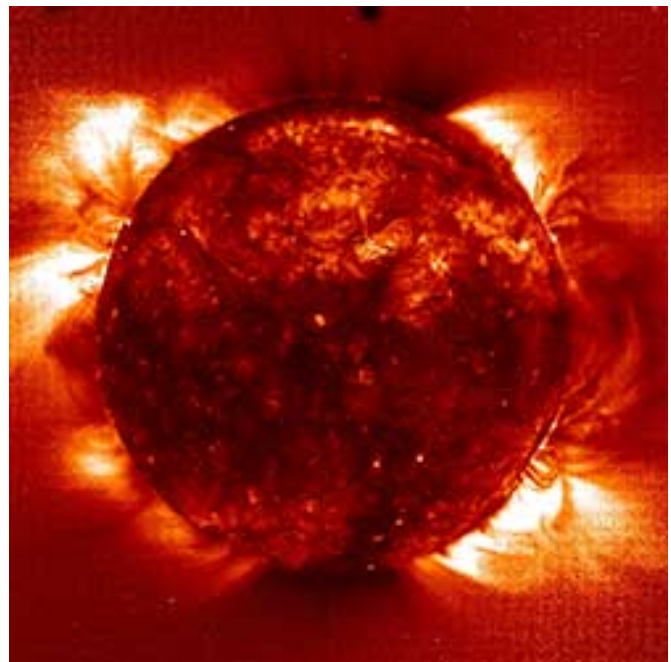
Solar Plasma Collage

Materials:

- black construction paper
- tissue paper (in a variety of colors)
- glue stick
- scissors
- pencil or chalk

The Sun is made up of different layers! Check out NASA's website about the Sun (with an adult), then create your own collage Sun that shows off the different parts of the Sun.

- The Sun has THREE main layers you can show in this collage: the photosphere, the chromosphere, and the corona.
- Older Girl Scouts might want to add sun spots and solar wind to their collage!



NASA: The Sun
website

Fun in the Sun

Fun Facts

The Sun is the star at the center of our Solar System. It is a massive hot ball of plasma that provides the light and heat we need to survive! Below are some fun facts about the Sun.

Size

- The Sun is the biggest object in our Solar System! You can fit 1.3 million Earths into it.
- Compared to other stars, the Sun is pretty average. It is a yellow dwarf star. Some stars are much smaller than the Sun, and some are much bigger.

What's it made of?

- The Sun is a ball of gas and plasma, like all stars. Our Sun is mostly made of hydrogen gas (91%)
- The hydrogen gas is SO hot that it turns into plasma. Plasma is another state of matter (like solids, liquids, and gasses).

Temperature

- The Sun is super hot! The core is 27 million degrees Fahrenheit! (15 million degrees Celsius)
- The Sun, like other stars, creates heat and energy due to thermonuclear fusion. Hydrogen atoms fuse together to create helium atoms. This fusion of atoms releases energy, which we see as heat and light.
- The Sun is hot enough to melt and boil diamonds!

Cool - or HOT - Facts

- Sunspots are cooler parts of the Sun's surface that look darker to us. They can be huge or tiny! Scientists are still researching why these occur.
- Solar flares are huge explosions of plasma into space. Scientists are still studying why these happen too!
- In addition to light, the Sun puts out a "solar wind," or magnetic field. This reaches all the way out past Neptune and Pluto!



Colliding Craters

Materials:

- A shallow pan (like a pie pan or baking dish)
- Flour (can substitute gluten-free for allergies)
- Cocoa powder
- Sifter (or slotted spoon)
- Cake sprinkles
- Various small rocks or toy blocks
- Ruler/yardstick

The first thing you might notice in a photo of the Moon are the large, circular craters. Have you ever thought about how these were formed? This experiment will help you discover what made the moon's best feature!

Pro Tip: this experiment gets messy! Try setting up outside. *We borrowed this experiment from NASA and the Jet Propulsion Laboratory. [You can see their helpful pictures and video here.](#)*



JPL: Crater Activity

Step-by-Step

- Start by setting up your “lunar surface.”
 - Start by adding about an inch of flour in your pan. This represents the Moon's crust
 - Add sprinkles as rocks and minerals.
 - Then sift or spoon on a thin layer of cocoa to represent the Moon's surface. Make sure the flour is completely covered.
- Next is the fun part! Drop your “space rocks” or toys onto your pan!
 - Brownies and Juniors might enjoy using the experiment record worksheet. Daisies might have fun trying different toys, heights, and angles.
- What happened? What patterns do you see? How do these compare to photos of the Moon?

Colliding Craters

Experiment Number	Object	Height of release	Hypothesis	Result
	<i>What are you using to make a crater?</i>	<i>Measure from the pan to your hand before you release the object</i>	<i>How big do you think the resulting crater will be?</i>	<i>What actually happened?</i>
1				
2				
3				
4				
5				
6				

What's going on here?

Impact craters were formed on the Moon by asteroids and comets slamming into the surface. These impacts were so powerful they pulverized the Moon's crust and sprayed it out!



Lift Off!

Materials:

- Straw (plastic or metal- straight)
- About 5 balloons
- Clear tape
- Fishing line (any size)
- Scissors
- Clothespin or binder clip
- Construction paper & markers
- Stopwatch (optional)
- Balloon hand pump (optional)

Did you know that NASA is working to send people back to the Moon? The last time a human was on the moon was in 1972!

Did you know that all the female astronauts have been Girl Scouts? But not a single woman has been to the Moon!

The upcoming Artemis missions will put a woman on the Moon! There are three missions planned: one to test the newly designed rocket, one to circle past the Moon and return to Earth, and the third will land on the moon.

You can read more about the Artemis missions on NASA's website (with an adult).

NASA designed a brand-new rocket for this mission. It is called the Space Launch System (or SLS), and it's the most powerful rocket ever!

You can read more about the SLS on NASA's website (with an adult).

This activity is all about rockets. You can test out different types of "rocket fuel" and create your own SLS! We borrowed this activity from JPL, and you can see their process here.

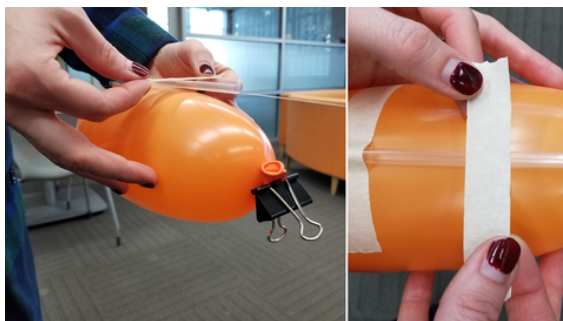


JPL: Rocket
Activity

Lift Off!

Step-by-Step

- Start by setting up your experiment.
 - Tie one end of the fishing line to a chair or door handle. Measure about 10-15 feet of fishing line and cut it off the roll.
 - String the straw onto the fishing line.
 - Loosely tape the other end to another chair. The fishing line should be tight, but not stretched.
- Think about how a rocket works. Fire comes out of one end, and it goes the opposite direction. There's a great video on the JPL page linked above to show this!
 - The rocket is being pushed by the rocket fuel burning. This is Newton's third law: for every action, there is an equal and opposite reaction.
- Next is the fun part! Blow up a balloon and use the clothespin to pin it closed.
 - Tape the balloon to the straw on the fishing line.
 - Take the clothespin off and step back!
- What happened? Why do you think that happened?
- Older Girl Scouts might enjoy making a hypothesis- ask some of these questions before opening the clothespin:
 - What will happen when we open the clothespin?
 - Will it move fast or slow? What direction will it move in? Why?
 - You can even time the balloon- do different balloon shapes move with different speeds?
- Some Girl Scouts might want to use construction paper to decorate their balloons before "launching" them.





Oreo Moon Phases

Materials:

- Oreo cookies or similar generic brand
- A paper plate
- Marker
- Spoon or butter knife (for carving out the moon phases)
- Glass of milk (optional for dunking the Moon)

You've heard of "phases of the moon" - but have you seen them made out of cookies? Have you ever noticed that the Moon looks a little different each night? Watch this short video to find out why, then make your own moon phases with a sweet snack!

Step-by-Step

- Carefully twist 8 Oreo cookies apart. The goal is to preserve the icing on one side of the cookie and the other side is icing-free.
- Check out the example photo here- you will be scraping off cookie icing to represent each moon phase. We'll be working counter-clockwise from the top!



YouTube: Moon
Phases

Oreo Moon Phases

Step-by-Step

- Have the Girl Scouts use the edge of a spoon or butter knife to scrape off part of each cookie's icing. Each cookie will be a different phase.
 - First Quarter: draw a line down the center of the icing and scrape off half the icing.
 - Waxing Gibbous: scrape off just a little bit of icing (about 1/4)
 - Full Moon: leave all the icing
 - Waning Gibbous: scrape off just a little bit of icing (about 1/4)
 - Third Quarter: scrape off half the icing
 - Waning Crescent: scrape off almost all the icing (about 3/4)
 - New: scrape off ALL the icing
 - Waxing Crescent: scrape off almost all the icing (about 3/4)
- Arrange all your cookies on a paper plate and write which moon phase they represent.
- Dig into snack time!



Eclipse Chalk Art

Materials:

- Dark blue or black paper. (cardstock works best, but not construction paper)
- White chalk
- Pencil
- Scissors
- Masking tape
- Circle stencil or round item (bowl, cup, etc.)
- Scrap cardboard (ex: cereal or tissue box)

Observing a total solar eclipse can be an exciting, once-in-a-lifetime experience! Long before there were cameras or telescopes, eclipse watchers recorded what they saw in the sky in words, drawings, and paintings. You can have fun creating your own picture of a solar eclipse with chalk and paper!

Step-by-Step

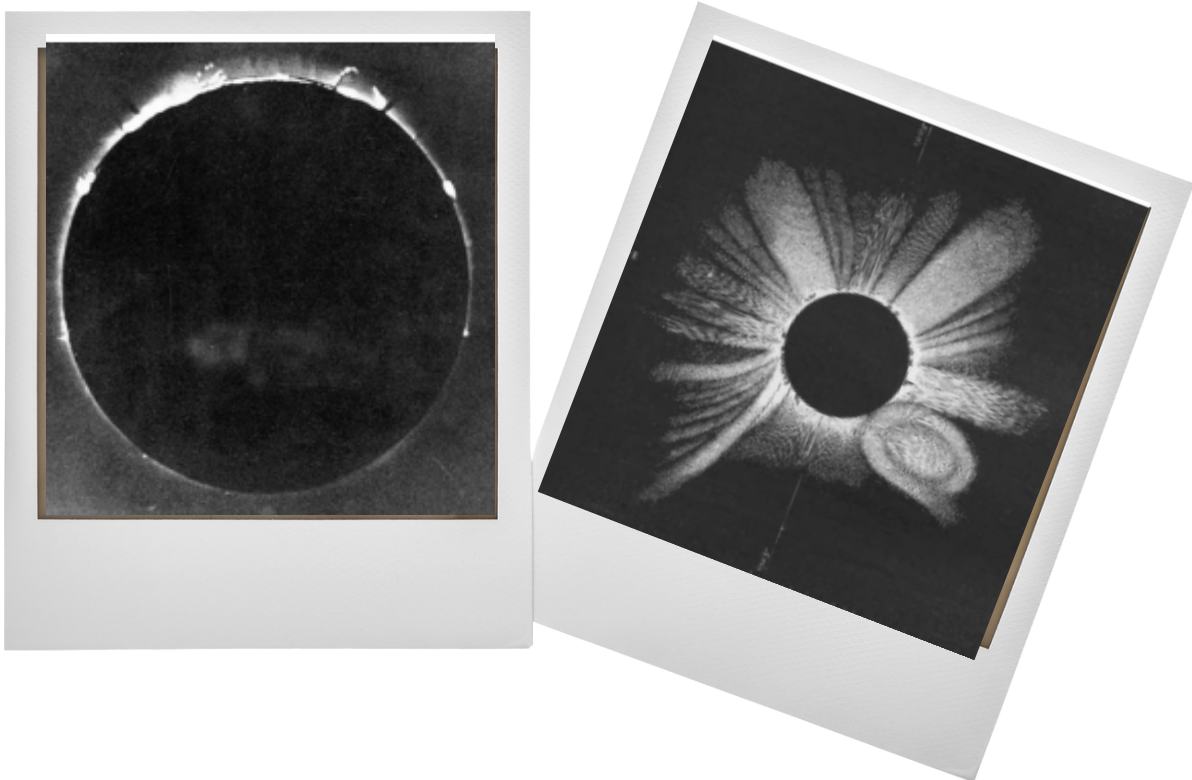
- Make a circle template tracing something round (like a bowl or circle stencil) onto a piece of scrap cardboard. Cut it out. Make one for each Girl Scout.
- Place the template on a piece of dark paper. Secure with masking tape or simply hold down with one hand.
- Draw a thick circle of chalk around the template. Go around 2 or 3 times. It does not need to be neat.
- Holding the circle in place, smudge the chalk away from the center of the circle using a finger to create the corona of the sun.
- When you are done smudging, remove the circle template.
- Add words, pictures, or fun designs. You've made total solar eclipse art!

Eclipse Chalk Art

Early Solar Eclipse Pictures

Until the advent of sophisticated and highly specialized ground and space based solar telescopes, the only opportunity anyone had to observe the sun's corona was during a total solar eclipse. Eclipse photography was not used until about 1860. Before that, astronomers would sketch what they saw at the eyepiece of their telescopes.

The picture on the far left is the first photograph of a solar eclipse by Charles A Young, July 18, 1860. The picture on the right is a sketch of the 1860 total solar eclipse by G. Temple showing a coronal mass ejection.



Solar System Hike



Materials

- Sheets of paper or paper plates
- Tape or glue
- Each material listed for the planets (on chart below):
 - An 8 inch ball
 - Two peppercorns
- Each material listed for the planets:
 - Two pins with heads
 - One large marble
 - One smaller marble
 - Two beads.

How can we find out how big our solar system is? We can take a walk! Using math, we can create a scale model of our solar system. Earth will be represented by a peppercorn- how big would you be in this solar system model?

You will need about half a mile worth of space to finish this activity. Don't have enough space? No problem! Just "walk" to Mars and figure out how far the other planets are using landmarks around you.

Step-by-Step

- Before you begin your hike, glue or tape each "planet" item to either a piece of paper or paper plate. Label them according to the planet they represent.
 - Start your hike by setting down the Sun.
 - Use the chart below and walk giant steps to the first planet, Mercury. Place each planet down as you count the steps between them.
 - Look back at the Sun and planets you have marked as you continue your path. What are you surprised by?
- What do you notice?

Did you know?

Gainesville, GA has a scale model of our solar system along a 1.8 mile walk. To learn more about this tour, [visit their website.](#)



Gainesville Solar
System

Solar System Hike

Object	Model & Size	Giant Steps (About 3 feet) to Next Planet or Dwarf Planet	Total Steps = Total Yards from the Sun	Approximate Miles from the Sun
Sun	8-inch ball	0	0	0
Mercury	Pinhead (0.03 inches/0.08 cm)	10	10	36,000,000
Venus	Peppercorn (0.08 inches/0.2 cm)	9	19	67,000,000
Earth	Peppercorn (0.08 inches/0.2 cm)	7	26	93,000,000
Mars	Pinhead (0.03 inches/0.08 cm)	14	40	142,000,000
Jupiter	Large marble (0.9 inches/2.3 cm)	95	135	484,000,000
Saturn	Marble (0.7 inches/1.8 cm)	112	247	887,000,000
Uranus	Bead (0.3 inches/0.8 cm)	249	496	1,783,000,000
Neptune	Bead (0.3 inches/0.8 cm)	281	777	2,794,000,000
Pluto	Pinpoint or smaller	242	1,019	3,666,000,000

At this scale, Pluto is about half a mile from the model Sun and the next closest star would be over 4,000 miles!

“Take a Solar System Walk” activity is courtesy of Guy Ottewell, based on “The Thousand-Yard Model,” or “Earth as a Peppercorn” (published by Universal Workshop)



Dance Around the Sun

Materials

- A ball (beach ball or basketball-sized)
- 16 sheets of paper
- Markers/crayons

Each year in our calendar represents one orbit (or rotation) of Earth around the sun. It takes the earth 365.25 days to make it all the way, which is why every four years we have an extra day called Leap Day, to make up for this extra .25 days. In this activity, you will dance the Earth's year!

Do you know why we have seasons? It has to do with how the Earth is tilted! [Watch this short video](#) to learn more about this!



Seasons Video

Step-by-Step

- Use the paper and markers/crayons to make four signs, one for each season: winter, spring, summer, and fall.
 - What is your favorite things to do each season? Draw it on your sign.
- Make 12 more signs, one for each month.
 - Decorate your signs with things that happen in your life each month. Think about holidays, birthdays, and other family traditions.
- Put the ball in the center of an open area to represent the Sun. Then, place the season and month signs around it as shown in the illustration.



Dance Around the Sun

- Form a circle around the Sun, with everyone standing by their birthday month.
 - Think and discuss: What season is it? What happens to the plants, animals, and weather this time of year?
- The seasons change as the Earth takes trips around the Sun. This trip is called an orbit. What direction do you think the Earth orbits the Sun?
 - Hint: Imagine that you are the Earth. As you move around your Sun (the ball), the months and seasons should pass by in order. Try it!
- Now take a trip around your Sun, starting and returning to your birthday month. One full orbit around the Sun means you'd be a year older. How many trips (orbits) have you made in your life around the real Sun?

Extra:

Your age is the number of orbits you have taken around the Sun, but each planet is a different distance from the Sun, and they all orbit at different speeds. You can look at this website to discover your age on different planets! How old are you on Mars? Jupiter? Did any of your discoveries surprise you?

Inspired by and adapted from "Kinesthetic Astronomy: The Sky Time Lesson" by Dr. Cherilynn Morrow and Mike Zawaski



Planets- Ages

Night Sky Scavenger Hunt



Materials

- Scavenger Hunt List (on left, repeated on next page)
- Eyes
- A clear night sky
- Optional: Smartphone, telescope, binoculars, star wheel

Humans have been watching and admiring the stars for hundreds of years! In this activity, you'll use your eyes to find landmarks in the night sky.

It might be helpful to have a star wheel or smartphone app to help you identify different stars, constellations, and planets. If you have access to a telescope or binoculars, now is the perfect time to pull them out!

Keep in mind that not everything is visible in the sky on the same night or time of year. That's part of the fun! Just mark off what you can find, and keep going outside on different nights to search the sky.

Step-by-Step

- Set up outside with all your equipment.
- Look for all the items on the scavenger hunt in the night sky! Check them off as you go.

Night Sky Scavenger Hunt

Scavenger Hunt

(feel free to customize this list based on your location, the time of year, and what you think is exciting to find!)

- The Moon
 - Draw the phase it is in tonight.
- The brightest star in the sky
 - Is it in a constellation?
- A planet
 - Use a star app to look for Venus, Mars, or Saturn!
- Orion (the hunter)
 - Look for “orion’s belt,” or three stars in a row.
 - Orion’s shoulder is Betelgeuse, a super giant due to go supernova any decade!
- Cygnus (the swan)
 - This constellation looks like a cross.
 - The tail star is Deneb- another bright star.
 - The eye is Albireo, a binary star with two different colors!
- Ursa Major (or the Big Dipper)
 - Can you find Mizar and Alcor in the tail? This double-star pair is 86 light years away!
- Aldebaran
 - This red giant is one of the brightest stars in the sky!
- Canis Major (the large dog)
- Taurus (the bull)
- Pegasus (the flying horse)
- Leo (the lion)
- Scorpius (the scorpion)

Remember: Astronomy is the study of stars, and astronomers examine the positions and movement of things in the sky. Astrology is a practice that uses the positions of things in the sky to explain or predict human behavior.



The Night Sky Network



The Night Sky Network (NSN) is a group of thousands of volunteers from local astronomy clubs across the United States who love to spread the joy of viewing the night sky. To find the free club nearest you, get an adult and visit them online.

Make your Own Star Wheel

All you need to make a star wheel at home is a printer and scissors! Find out more online here.



The International Astronomical Union, an organization of scientists from around the world, sets guidelines for naming planets, moons, and other objects.



Crystal Stars

Materials:

- Borax
- Water
- Pipe Cleaners
- Measuring cup and spoons
- Star-shaped cookie cutter (optional)
- Thin Ribbon or String
- Popsicle Sticks (or spare pencils)
- Mason Jars

We are going to create our own beautiful crystal stars! In space, stars are giant balls of burning gas- just like our Sun. To us, they look very small and twinkle in the night sky. Want to learn more about stars? [Watch this short video](#), then get to work creating your own cool and sparkly stars at home!

Step-by-Step

- Bend the pipe cleaner around a cookie cutter to make a star shape (or twist the pipe cleaner in a star shape without a cookie cutter). Twist the pipe cleaner closed at the end of the shape.
 - Be sure the shape fits into your mason jar!
 - You might be able to fit 2 or 3 stars in each jar, depending on their size.
 - Be creative with different star shapes!
- Use the string to hang each star from a popsicle stick. The star should hang in the middle of the jar, without touching the top or the bottom.
- Lower two stars into each mason jar. Rest the popsicle stick on the rim of the jar.
 - Make sure the pipe cleaner stars aren't touching each other.



What are Stars?
video

Crystal Stars

- With adult help, measure out two cups of boiling water and six tablespoons of borax. Add both of these ingredients to the mason jar.
 - Be sure the water reaches to the top of the star, but doesn't overflow!
- Carefully stir the mixture until the borax is dissolved.
- Leave the jar alone for 6-24 hours. Check on it periodically and describe what you see!
 - Crystals will slowly grow on the pipe cleaner!
- After 24 hours, take your star out of the mixture and place on a paper towel to dry.
- Now you have a star of your own!

We borrowed this activity from Steve Spangler Science and One Little Project





Marshmallow Constellations

Materials

- Mini Marshmallows
- Toothpicks
- Paper
- Pencil or Pen

Did you know that there are 88 recognized constellations recognized by the International Astronomical Union (IAU)? For this activity, you will be able to re-create many of these constellations using mini marshmallows and toothpicks.

Constellations are groups of stars in the night sky that look like pictures. Many constellations were first described hundreds of years ago. They often have stories that go along with them from ancient Greek or Roman mythology!

Constellations can look like a connect-the-dot drawing from here on Earth, but in space these stars are not related at all. They are all billions of miles away from Earth- some further than that! To learn more about constellations, [check out this page from NASA.](#)



What are
Constellations?



Cygnus

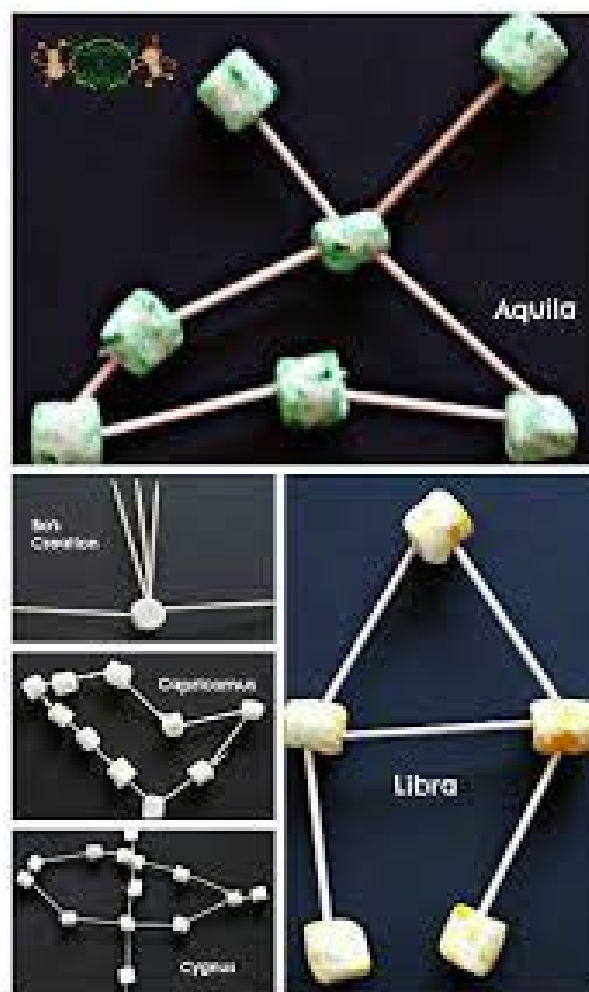
Remember: Astronomy is the study of stars, and astronomers examine the positions and movement of things in the sky. Astrology is a practice that uses the positions of things in the sky to explain or predict human behavior.



Marshmallow Constellations

Step-by-Step:

- On a piece of paper, draw out the constellations you want to create.
 - An adult can help you find a picture of your favorite constellation online.
 - Use a dot for each star and connect the dots with lines.
 - You might think that the constellations don't really look like what they are supposed to! You'll have to use your imagination to finish the picture.
- Place marshmallows over your dots/stars and connect them with the toothpicks.
 - The toothpicks should squish into the marshmallows easily, but ask an adult if you're having trouble!
- Bonus: If you have time, create your own constellation, give it a name, and write a story about it!





Night Sky Painting

Materials

- Bright colored crayons (yellow, orange, white, light blue, fluorescents)
- White construction paper
- Black or blue acrylic paint or water color

The stars are beautiful to observe in the sky and can be a great inspiration for a piece of art inside your home. In this activity, you'll use your creativity to design your own interpretation of the night sky!

Pro Tips:

- If you are using acrylic paint, you may need to use a small cup and thin out the paint mixture. You can mix a little bit of water into the paint, just a few drops at a time.
- When you are using your crayons during the process, make sure you use a lot of color! Push into the white construction paper to add more color to the page. The darker the crayon (or more concentrated the color), the better the final project will be.



*Starry Night Over the Rhone
by Vincent van Gogh*

Night Sky Painting

Step-by-Step:

- Draw stars, a moon, planets (anything that you love to draw in the night sky) using your bright colored crayons on your white construction paper.
 - It may be a little difficult to see what you draw on the white paper because the colors are so similar, so take your time.
- Once you are finished coloring, take your black or blue acrylic paint or watercolor paint, and paint over your entire picture
 - Don't worry about painting around what you drew in crayon. The paint will not stay and dry over the wax crayon drawings.
- Allow your picture to dry and hang in a fun spot!



Fishermen at Sea by J. M. W. Turner



The Moon by Tarsila do Amaral

Real-Life Space Scientists



Mae Jemison

was born in Decatur, Alabama. On her first day of kindergarten, Mae's teacher asked what she wanted to be when she grew up.

"A scientist," she said. She became a doctor and worked in Africa for many years. Then Mae decided that she wanted to become an astronaut.

She was accepted into NASA's astronaut program. (NASA stands for National Aeronautics and Space Administration.) In 1992, Mae became the first African American woman to travel in space—on the Space Shuttle Endeavour. "I felt like I belonged right there in space," she said.



Huy Tran

grew up in a small village in a country called Vietnam. In 1969, when she was six years old, astronauts first landed on the Moon. There were very few televisions where she lived and a large crowd gathered to watch the event on a tiny black-and-white TV on someone's front porch. Huy was too small to see the TV from the back of the crowd—so she climbed a mango tree to get a better view. "I watched the people in the control room celebrate and wished that I could be one of them," she says.

Many years later, her family moved to the United States—and she went to work for NASA as a materials engineer, testing tiles that would be used on the Space Shuttle.

Her childhood dream
came true!



Meet Some Space Scientists

Sally Ride was born in Los Angeles, California. Growing up, she loved science and sports—her parents encouraged her to pursue both. While Sally was in college, she replied to an ad in the school newspaper asking women to apply for NASA's astronaut program. Six women were picked—and Sally was one of them! In 1983, Sally Ride boldly went where no American woman had gone before: space. As a mission specialist on the Space Shuttle Challenger, Sally became the first woman from the United States to fly into space. On the Challenger, her job was to work the Space Shuttle's robotic arm. The arm was used to help put satellites into space. Sally thought her experience with sports helped her hand-eye coordination, which was important for working the arm. Later in her career she founded Sally Ride Science, a company that encourages children's interest in science, technology, and math. She passed away in 2012.



Victoria Garcia grew up in Miami, Florida. She is the daughter of Cuban immigrants and was born deaf. As a child, she loved solving problems and fixing things. She even made her own hoverboard one summer—out of plywood and a vacuum cleaner! Today, she works for NASA as an aerospace engineer, helping to design tools that make it safer and more comfortable for astronauts to live and work in space. "In life, there are two main things that I have learned," Victoria says. "One is to never let other people's expectations define you. People had low expectations of me with the sole basis that I cannot hear. Another lesson that I learned is that there will always be barriers in life. How you deal with the barriers make you who you are."