

## CADETTE NIGHT OWL BADGE – MEETING 1

**Badge Purpose:** When you've earned this badge, you'll have uncovered the mysteries of the world after dark.

**Activity Plan Length:** 1.5 hours

Time	Activity	Materials Needed
5 minutes	Getting Started + Scheduling After Dark <ul style="list-style-type: none"> <li>Begin the meeting by reciting the Girl Scout Promise + Law.</li> </ul>	<input type="checkbox"/> (Optional) Girl Scout Promise and Law poster
20 minutes	Stellar Scopes <ul style="list-style-type: none"> <li>Make constellation scopes to learn to recognize star formations when you go out at night.</li> </ul>	<input type="checkbox"/> Cardboard toilet paper tubes or paper towel tubes <input type="checkbox"/> Scissors <input type="checkbox"/> Glue sticks or tape <input type="checkbox"/> Pencils <input type="checkbox"/> Markers <input type="checkbox"/> Flashlights <input type="checkbox"/> Constellation Patterns handout (at the end of this activity plan) <input type="checkbox"/> (Optional) Tinfoil and toothpicks
10 minutes	Red Light at Night <ul style="list-style-type: none"> <li>Learn how to change your regular flashlight into a tool that will help your eyes see better at night.</li> </ul>	<input type="checkbox"/> Flashlights <input type="checkbox"/> Red cellophane or red plastic (i.e. from food packaging) <input type="checkbox"/> Scissors <input type="checkbox"/> Tape <input type="checkbox"/> Rubber bands
15 minutes	Starry Snack Chat <ul style="list-style-type: none"> <li>Get a hands-on taste of star patterns and moon phases.</li> </ul>	<input type="checkbox"/> Chocolate sandwich cookies <input type="checkbox"/> Mini marshmallows <input type="checkbox"/> Toothpicks <input type="checkbox"/> Wooden craft sticks <input type="checkbox"/> Spoons <input type="checkbox"/> Paper plates + napkins <input type="checkbox"/> Writing utensils <input type="checkbox"/> Constellation scopes <input type="checkbox"/> Moon Phases handout (at the end of this activity plan)
35 minutes	Night Walk <ul style="list-style-type: none"> <li>Take a walk to explore the night sky.</li> </ul>	<input type="checkbox"/> Constellation scopes <input type="checkbox"/> Flashlights with red attachments <input type="checkbox"/> Journal or notebook <input type="checkbox"/> Writing utensil <input type="checkbox"/> (Optional) Bug spray



5 minutes	Wrapping Up	<input type="checkbox"/> (Optional) Make New Friends lyrics poster
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## Getting Started + Scheduling After Dark

Time: 5 minutes

Materials Needed: (Optional) Girl Scout Promise and Law poster

Welcome everyone to the meeting, recite the Girl Scout Promise and Law.

For most of these badge activities, you'll need to meet after dark. Be sure to only head outdoors at night with a group of friends and a trusted adult.

## Activity #1: Stellar Scopes

Time: 20 minutes

Badge Connection: Step 1 – Take a field trip to explore the night and Step 4 – Explore nature at night

Materials Needed: Cardboard toilet paper or paper towel tubes; scissors; glue sticks or tape; pencils; markers; flashlights; Constellation Patterns handout (at the end of this activity plan); (optional) tinfoil; (optional) toothpicks

Prep Needed:

- Print one copy of the Constellation Patterns handout for each person.
1. People have been looking to the night skies to find their way and learn about the world around them for centuries. Ancient cultures used the stars to create images in the sky, called constellations, that helped with navigation and understanding the seasons.
  2. For this activity, you'll be making your own constellation scopes to help you recognize star patterns when you go out for your night walk.
  3. Use the scissors to cut out the constellation patterns from your handout. You can choose to make a complete set of constellation scopes per person, or divide up the constellations and share the scopes (it depends on how many cardboard tubes you're able to collect).
  4. Place the constellation pattern over one end of the tube and fold the edges down. Use glue or tape to keep it in place. Using a sharp pencil, poke a small hole where each star is indicated on the pattern to reveal the constellation. Decorate the side of the tube and write the constellation's name on it.
  5. Hold the constellation scope to your eye and look at a light. You'll see light coming through the holes you marked for the constellation. Rotate the scope and look at the constellation from different orientations to see how the real constellation changes as the earth moves.
  6. For more fun, turn out the lights and use a flashlight to project your constellation on the wall or the ceiling.
  7. Optional: You can also use tinfoil on the end of your cardboard tube and poke the star holes in the foil with toothpicks or a sharp pencil. You can draw lines on the foil to connect the dots to make the constellation image clear.

## Activity #2: Red Light at Night

Time: 10 minutes

Badge Connection: Step 4 – Explore nature at night

Materials Needed: Flashlights; red cellophane or red plastic (i.e. from food packaging); pencil; scissors; tape; rubber bands

1. Have you ever experienced that shocking feeling of turning on a bright light when you wake up after being in a dark room? Or the opposite—when you step outside into the dark from a well-lit room and it takes a few minutes for your eyes to adjust to the change in light? What you're experiencing is your pupils dilating and



closing depending on how much available light there is. Believe it or not, there *is* light available on a dark night outside, it just takes a little more time to get used to seeing in the dark.

2. When you're outside at night on a stargazing adventure, you'll still want to have a flashlight, so you don't trip on tree roots or other obstacles. But that bright white light from your flashlight can ruin your chances of seeing the night sky clearly! Going back and forth between bright light to dark sky is just like flipping on that light in the morning when your eyes weren't ready for the switch.
3. One solution is to transform your regular flashlight into a red light. The red light is dim enough to leave your pupils dilated, which allows them to take in more natural light from the night. And the red light is just bright enough to guide your steps in the dark, so you can be safe.
4. There are two inexpensive ways to turn your flashlight into a red light. You can choose which works best for your supplies and flashlight.
  - **Style 1:** Take a large square of red cellophane and fold it many times until it's a small enough square to fit over your flashlight. The trick to knowing when you have a thick enough layer of red cellophane is that you should not be able to read through the cellophane if you hold it over some text on a paper before putting it on your flashlight. You can then use tape and rubber bands (choose one or use a combination of both) to secure the red cellophane over the flashlight end.
  - **Style 2:** Unscrew your flashlight and remove the clear lens that protects the bulb. Trace the lens on a piece of red plastic (from food packaging, like the lid of a spice jar or the side of a coffee container) and cut the plastic to match the lens. Place the red plastic behind the clear lens and screw the flashlight back together.
5. Now try your flashlight in the dark! Remember when you couldn't read that piece of paper through the thick cellophane with no light shining through it during your test? Try it again with the flashlight turned on. It won't be crystal clear reading, but you should be able to make out the words and images well enough.
6. Note: If you have a mini-Maglite or similar small flashlight, a red plastic soda bottle cap can also work. You would place the bottle cap over the entire flashlight head. You may need to insert a piece of paper, cardboard, or small rubber band into the bottle cap to make it fit over your small flashlight head securely.

### Activity #3: Starry Snack Chat

Time: 15 minutes

Badge Connection: Step 4 – Explore nature at night

Materials Needed: Chocolate sandwich cookies; mini marshmallows; toothpicks; wooden craft sticks; spoons; paper plates + napkins; writing utensils; constellation scopes from previous activity; Moon Phases handout (at the end of this activity plan)

Prep Needed:

- Print out multiple copies of the Moon Phases handout before you begin.
1. Building on what you learned about constellations in the first activity, use mini marshmallows and toothpicks to assemble tangible constellations. Connect the dots between your marshmallow “stars” with the toothpicks. Use your constellation scopes as a guide.
  2. The stars aren't the only thing to look at in the night sky—don't forget the moon! Share copies of the Moon Phases handout, and then alter your chocolate sandwich cookies to look like each moon phase. Use the wooden craft sticks and spoons (spoons will help you get a better curved line) to remove and shape the cream filling to form moon phases. Make the following moon phases from your chart, place them on your paper plate and label them:
    - New moon
    - Waxing crescent
    - First quarter
    - Waxing gibbous
    - Full moon
    - Waning gibbous
    - Last quarter
    - Waning crescent
  3. As you're making your constellations and moons, chat about what you think you might experience on your night walk for the next activity.
    - Find out if anyone in your group has been on a night walk or gone camping before.
    - Is anyone in your group afraid of the dark? How do you think you can help them on your walk?



- What are some good safety tips to keep in mind as you head out?
- Is it cloudy? Clear? Windy? Rainy? How will the weather affect your night walk? (There's no need to cancel it if the conditions aren't perfect! It's harder to see stars with cloud-cover, and you may not want to go out in severe temperatures or storms, but a little rain and wind will just add to your night walk story!)

## Activity #4: Night Walk

Time: 35 minutes

Badge Connection: Step 1 – Take a field trip to explore the night, Step 2 – Tour your world after dark, and Step 4 – Explore nature at night

Materials Needed: Constellation scopes from previous activity; flashlights with red attachments; journal or notebook; writing utensil; (optional) bug spray

Prep Needed:

- Check out your trail or walking area during the day, so you know what to expect before you go at night.
  - Be sure to go in a group and bring at least one trusted adult.
1. For this activity, you can choose anywhere to walk outside. If you go farther out from the main city/suburban areas that have lots of lights, you'll be able to see more stars. But walking in your neighborhood is great, too!
  2. Bring your constellation scopes and your red flashlights. See if you can find an open spot away from lights where you can look up at the sky and find some constellations.
  3. Use your journals to record your thoughts and feelings about being outside at night (your red flashlights should be enough light to write outside in the dark, give it a try!):
    - How do things change after dark?
    - What do you think ancient cultures thought when they looked up at the stars?
    - Can you come up with your own constellation stories about images you see hidden in the stars?

## Wrapping Up

Time: 5 minutes

Materials Needed: (Optional) Make New Friends song lyrics poster

Close the meeting by singing Make New Friends and doing a friendship circle.

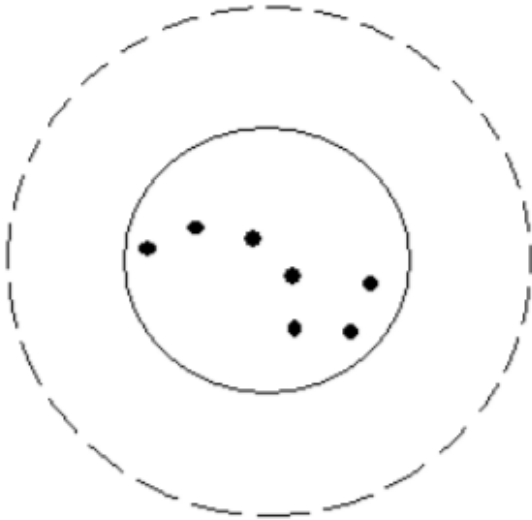
## More to Explore

- Field Trip Ideas:
  - Visit a museum to learn about the science and art of the night sky.
  - Go to a planetarium to explore constellations.
  - Turn this badge into an overnight slumber party.
- Speaker Ideas:
  - Invite an astronomer or expert on the night sky to visit your group and give you the lowdown on how to stargaze.
  - Invite a park ranger or other naturalist to your meeting to learn about hiking at night, and how natural areas change at night.

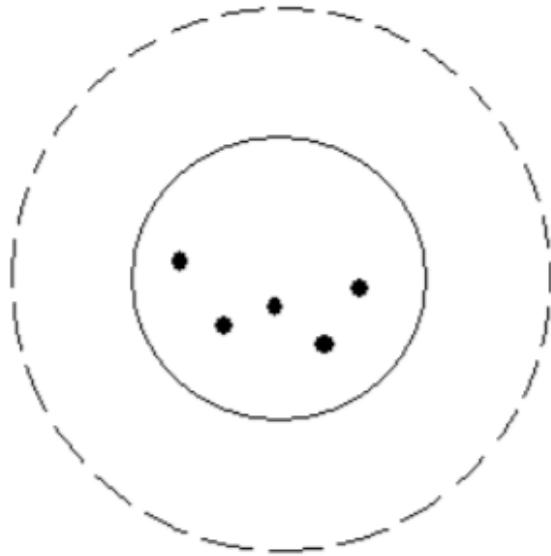


## Constellation Patterns

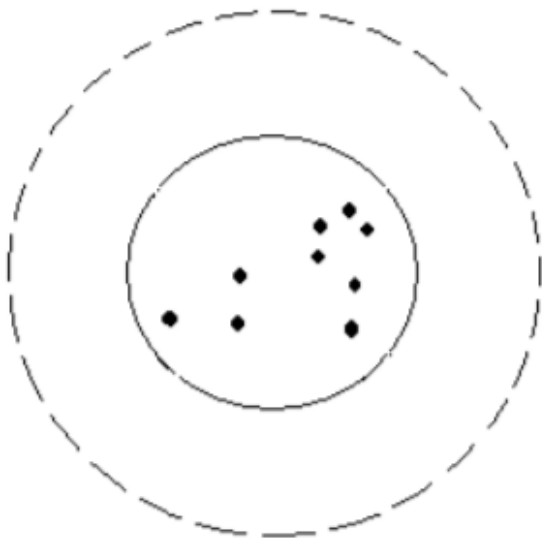
(Instructions: Cut out patterns along the dotted lines, not the solid lines.)



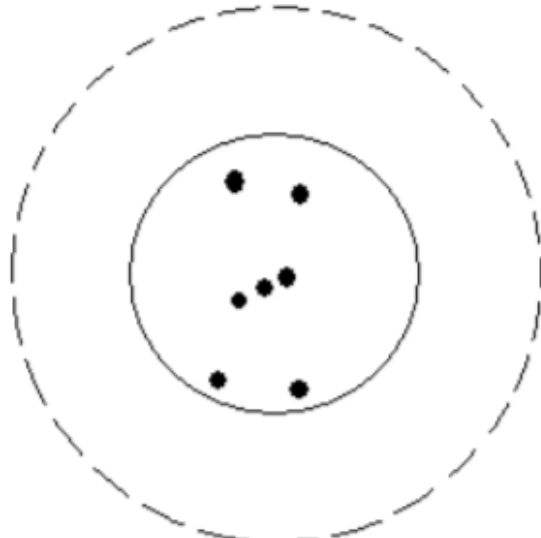
THE BIG DIPPER, part of the  
Great Bear



CASSIOPEIA, the Queen

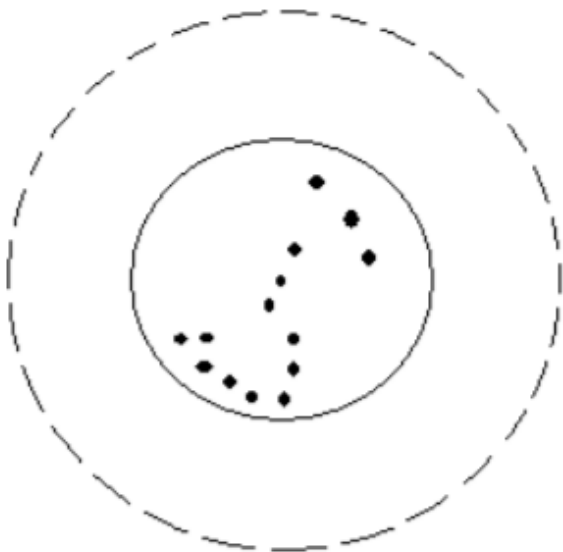


LEO, the Lion

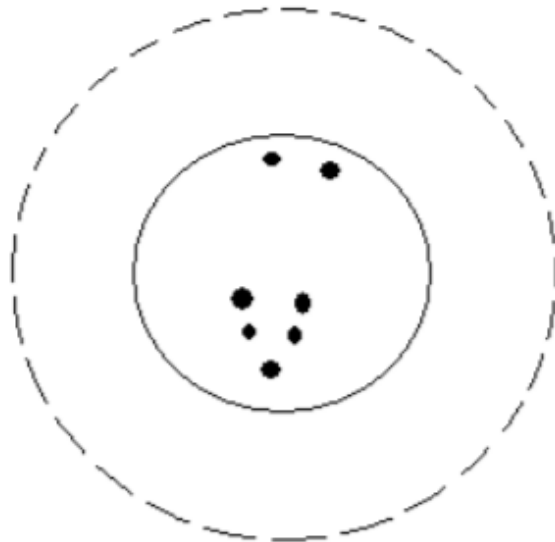


ORION, the Hunter

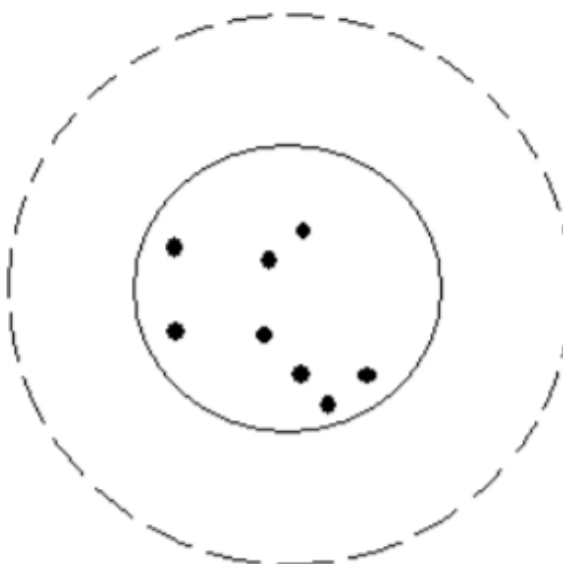




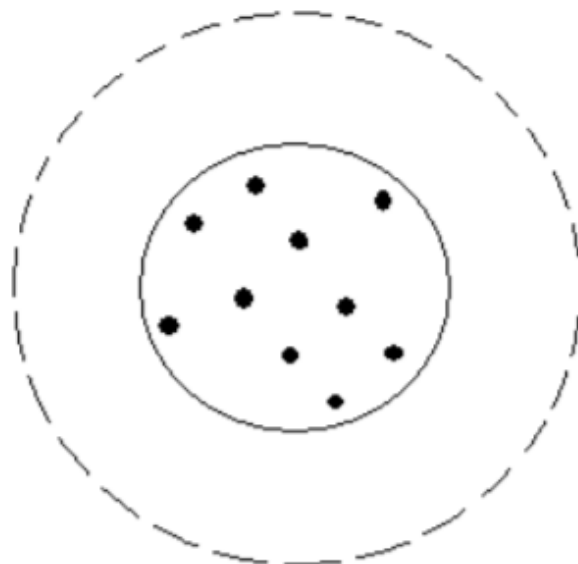
SCORPIUS, the Scorpion



TAURUS, the Bull



PEGASUS, the Horse



GEMINI, the Twins

Source: Activity adapted from the Museum of Science, Boston, MA



# M o o n P h a s e s



**New Moon** - The Moon's unilluminated side is facing the Earth. The Moon is not visible (except during a solar eclipse).



**Waxing Crescent** - The Moon appears to be partly but less than one-half illuminated by direct sunlight. The fraction of the Moon's disk that is illuminated is increasing.



**First Quarter** - One-half of the Moon appears to be illuminated by direct sunlight. The fraction of the Moon's disk that is illuminated is increasing.



**Waxing Gibbous** - The Moon appears to be more than one-half but not fully illuminated by direct sunlight. The fraction of the Moon's disk that is illuminated is increasing.



**Full Moon** - The Moon's illuminated side is facing the Earth. The Moon appears to be completely illuminated by direct sunlight.



**Waning Gibbous** - The Moon appears to be more than one-half but not fully illuminated by direct sunlight. The fraction of the Moon's disk that is illuminated is decreasing.



**Last Quarter** - One-half of the Moon appears to be illuminated by direct sunlight. The fraction of the Moon's disk that is illuminated is decreasing.



**Waning Crescent** - The Moon appears to be partly but less than one-half illuminated by direct sunlight. The fraction of the Moon's disk that is illuminated is decreasing.

