MERIT BADGE FIELD LOG

ASTRONOMY

Look up. Find it. Talk about it. Check it off.

spacedew.com/sky **Check it before every night out.** What's in the sky tonight over where you are: the Moon's phase, which planets are up, and when the space station flies over.

Scout name _____ Troop _____ Counselor _____ Start date _____

How this log works

- **This is not a book report.** Most of the badge happens out at the telescope, talking with your counselor. When you have talked something through, your counselor checks the box.
- **Write a few key words, not paragraphs.** Sketches don't have to be pretty; what counts is that you looked and drew what you saw.
- **Bring this log and a red flashlight** (or a white one with red cellophane over it) every time we observe. White light wrecks your night vision for about 20 minutes.

TALK	SKY	SKETCH	HOME
Talk it through with your counselor. Key words only.	Find it in the real night sky and show your counselor.	Draw what you see in the box.	Do it on your own between meetings.

1 Ground Control

Before dark. Safety, Sun, Moon, planets.

2 Telescope Lab

Hands on the gear as the sky darkens.

3 Sky Hunt

Full dark. Stars, constellations, a planet, the Moon.

4 Solo Missions

Sketches and a planet chart on your own.

Counselor sign-off tracker

Req	Topic	Page	Date	Initials
1a	Hazards	2		
1b	First aid	2		
1c	Night and cold clothing	2		
1d	Sun and eclipse safety	2		
2	Light pollution	2		
3a	Why telescopes	4		
3b	Telescope types	4		
3c	Three instruments	4		
3d	Care and storage	4		
4a	10 constellations	5		
4b	8 bright stars	5		
4c	Dipper or Cassiopeia sketches	7		
4d	Milky Way	6		

Req	Topic	Page	Date	Initials
5a	Five planets, phases	3		
5b	12-month planet chart	7		
5c	Planet motion	3		
5d	Observe a planet	6		
6a	Moon sketch, labels	6		
6b	Moon, four nights	7		
6c	Moon's orbit	3		
6d	Phases and eclipses	3		
7a	The Sun	2		
7b	Sunspots	2		
7c	Red, blue, yellow stars	6		
8	Option: ___	8		
9	Option: ___	9		

Requirement wording checked against the official requirements on 2026-11-11. Requirements change, so check the latest official requirements before you start.

1 GROUND CONTROL

Before dark, around the equipment. Almost all talk.

☐ **1a** TALK **Explain the most likely hazards you may encounter during astronomy activities, and what you should do to anticipate, help prevent, mitigate, and respond to them.**

Look around this observing site. Name three hazards and what we do about each.

Hazard	How we prevent it or handle it

☐ **1b** TALK **Explain first aid for injuries or illnesses that could occur during observations.**

- ☐ Heat reactions
- ☐ Cold reactions (hypothermia, frostbite)
- ☐ Dehydration ☐ Bites and stings
- ☐ Damage to your eyes

☐ **1c** TALK **Describe proper clothing and other precautions for safely observing at night and in cold weather.**

My cold-night packing list:

_____

_____

☐ **1d** TALK **Explain how to safely observe the Sun, objects near the Sun, and solar eclipses.**

Never point binoculars or a telescope at the Sun unless it has a _____.

For a solar eclipse I need _____. Sunglasses are **not** enough.

Why a planet or comet near the Sun is risky to hunt for: _____

☐ **2** TALK **Explain what light pollution is and how it and air pollution affect astronomy.**

Turn all the way around. Name two light sources you can see from here: _____ _____

How light and air pollution hurt the view, and one fix:

_____

☐ **7a** TALK **Describe the composition of the Sun, its relationship to other stars, and some effects of its radiation on Earth's weather and communications.**

The Sun is mostly _____ and _____.

Compared to other stars it is _____

It affects our weather and radios by _____

☐ **7b** TALK **Define sunspots and describe some of the effects they may have on solar radiation.**

Sunspots are _____ areas on the Sun.

They come and go in a cycle of about _____ years.

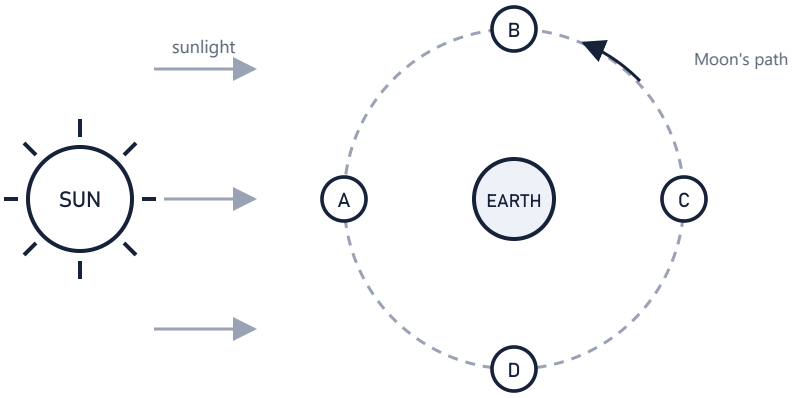
Effects on Earth: _____

1 GROUND CONTROL, continued

The Moon and planets. Bring a lamp and a ball for the Moon demo.

☐ **6d** TALK SKETCH **With the aid of diagrams, explain the positions of the Sun, Earth, and Moon during lunar and solar eclipses, and at new, first-quarter, full, and last-quarter Moon.**

Hands-on first: a lamp is the Sun, your head is Earth, a ball on a stick is the Moon. Turn in a circle and watch the phases happen. Then label the diagram.



Shade the dark half of each Moon. Then name each phase:

A _____

B _____

C _____

D _____

Solar eclipse happens at Moon _____

Lunar eclipse happens at Moon _____

☐ **6c** TALK **List the factors that keep the Moon in orbit around Earth.**

_____ pulls the Moon toward Earth, and its _____ keeps it from falling in.

☐ **5a** TALK **List the names of the five most visible planets. Explain which ones can appear in phases similar to lunar phases and which ones cannot, and why.**

Planet	Phases?
	Y / N
	Y / N
	Y / N
	Y / N
	Y / N

Why some show phases and some don't:

_____

_____

_____

Think about which planets orbit inside Earth's orbit.

☐ **5c** TALK **Describe the motion of the planets across the sky.**

"Planet" comes from a Greek word meaning _____.

Planets always stay close to the band of constellations called the _____.

Sometimes a planet seems to go backward. That is called _____ motion.

2 TELESCOPE LAB

Hands on the gear. Real telescopes beat diagrams every time.

☐ **3a** TALK SKY **Explain why binoculars and telescopes are important astronomical tools. Demonstrate or explain how these tools are used.**

A telescope gathers more _____ than your eye and _____ the view.

☐ Focused the binoculars myself ☐ Lined up the finder scope ☐ Found an object by myself

☐ Swapped eyepieces and saw the change

☐ **3b** TALK **Describe the similarities and differences of several types of astronomical telescopes, including at least one that observes light beyond the visible part of the spectrum (radio, X-ray, ultraviolet, or infrared).**

Type	How it collects light	Good for / example
Refractor		
Reflector		
Compound (catadioptric)		
Beyond visible: _____		

Which type is the one in front of us tonight? _____

☐ **3c** TALK **Explain the purposes of three instruments used with astronomical telescopes.**

Look in the eyepiece case: eyepieces, Barlow lens, star diagonal, finder scope, filters (Moon, solar, light-pollution), camera, spectrograph.

Instrument	What it does
1.	
2.	
3.	

☐ **3d** TALK **Describe the proper care and storage of telescopes and binoculars both at home and in the field.**

In the field

_____

_____

At home

_____

_____

☐ Helped pack up the scope at the end of the night

3 SKY HUNT

Full dark, outside. Red lights only. Point it out to your counselor, then check it off.

Requirement 4 must be done outside under the real night sky. Practicing in a planetarium is great, but it doesn't count for these.

☐ **4a** (SKY) **Identify in the sky 10 constellations, at least four of which are in the zodiac.**

#	Constellation	Zodiac?	Found
1		☐	☐
2		☐	☐
3		☐	☐
4		☐	☐
5		☐	☐
6		☐	☐
7		☐	☐
8		☐	☐
9		☐	☐
10		☐	☐

Fall and early winter evening ideas
Overhead and north: Cassiopeia (the W), Cepheus, Ursa Major, Ursa Minor, Cygnus, Lyra, Pegasus (the Great Square), Andromeda, Perseus, Auriga.
Rising later: Orion, Canis Major.

Zodiac (along the planets' path, low in the south): Sagittarius (setting at dusk), Capricornus, Aquarius, Pisces, Aries, Taurus, Gemini (rising later).

Trick: the two end stars of the Big Dipper's bowl point straight at Polaris.

☐ **4b** (SKY) **Identify in the sky eight conspicuous stars, five of which are of magnitude 1 or brighter.**

Smaller magnitude = brighter. Negative is brightest of all. The "color I saw" column also helps with requirement 7c.

Star	In	Magnitude	Color I saw	Found
Vega	Lyra	0.0		☐
Capella	Auriga	0.1		☐
Altair	Aquila	0.8		☐
Aldebaran	Taurus	0.9		☐
Rigel	Orion	0.1		☐
Betelgeuse	Orion	about 0.5		☐
Sirius	Canis Major	-1.5		☐
Deneb	Cygnus	1.3		☐
Fomalhaut	Piscis Austrinus	1.2		☐
Polaris	Ursa Minor	2.0		☐
				☐

3 SKY HUNT, continued

Star colors, the Milky Way, a planet, and the Moon.

☐ **7c** SKY **Identify at least one red star, one blue star, and one yellow star (other than the Sun). Explain the meaning of these colors.**

Red star: _____ Blue star: _____ Yellow star: _____

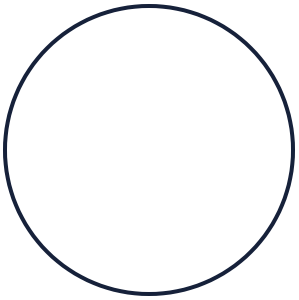
Star color tells you its _____. Hottest color: _____ Coolest color: _____

☐ **4d** TALK SKY **Explain what we see when we look at the Milky Way.**

That faint cloudy band is really _____ _____

☐ I saw it myself (needs a dark site, like a campout)

☐ **5d** SKY SKETCH **Observe a planet and describe what you saw.**



Planet _____ Date _____ Time _____

Telescope or binoculars _____ Power _____

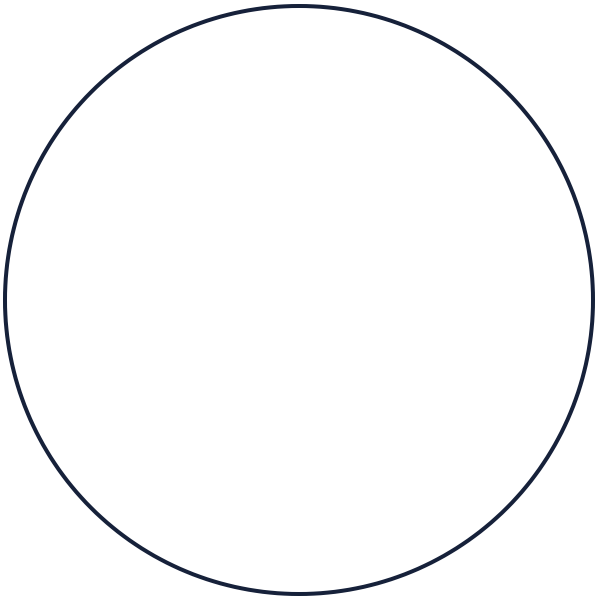
What I saw (moons? rings? cloud bands? color? a phase?):

_____

_____

_____

☐ **6a** SKY SKETCH **Sketch the face of the Moon and indicate five seas and five craters. Label these landmarks.**



Seas

_____

_____

_____

_____

_____

Craters

_____

_____

_____

_____

_____

Seas: Tranquility, Serenity, Crises, Rains (Imbrium), Clouds, Fertility, Nectar, Ocean of Storms. Craters: Tycho, Copernicus, Kepler, Plato, Clavius, Aristarchus, Grimaldi. Craters pop near first quarter, along the shadow line.

4 SOLO MISSIONS

On your own, between meetings. Your backyard counts.

☐ **4c** HOME SKETCH **From direct observation, make two sketches of the Big Dipper or Cassiopeia: one in the early evening sky, and one several hours later. Show the North Star and the horizon in both, and record the date and time of each.**

Face north. In fall, Cassiopeia (the W) rides high in the north and is easier than the Big Dipper, which sits low on the horizon early in the evening. Circle the one you drew: ***Big Dipper / Cassiopeia***

Sketch 1: early evening	Sketch 2: several hours later
north horizon	north horizon
Date _____ Time _____	Date _____ Time _____

☐ **6b** HOME SKETCH **By direct observation, sketch the phase and position of the Moon at the same hour and place for four nights (or days) within one week. Include horizon landmarks such as hills, trees, and buildings. Explain the changes you observe.**

Stand in the exact same spot each time (mark it). Draw the trees and roofs first, then the Moon. A daytime Moon counts too.

Sketch 1	Sketch 2	Sketch 3	Sketch 4
Date _____ Time _____	Date _____ Time _____	Date _____ Time _____	Date _____ Time _____

What changed, and why:

_____

☐ **5b** HOME **Using the internet (with your parent or guardian's permission) and other resources, find out when each of the five planets from 5a will be observable in the evening sky during the next 12 months. Show it as a chart or table.**

With a parent: start at **spacedew.com/sky** to see which planets are up tonight, then look ahead month by month.

Write the months across the top, starting with this month. Shade the box when the planet is up in the evening.

Planet												

8 BIG FINISH: PICK ONE

With your counselor's approval and guidance, do ONE of these.

- ☐ **8a** Visit a planetarium or astronomical observatory. Afterward, give your counselor a written report, a scrapbook, OR a video covering: activities there, exhibits and displays you saw, telescopes and other instruments being used, and celestial objects you observed.
- ☐ **8b** Plan and take part in an observation session using binoculars or a telescope that includes **at least 10 celestial objects beyond the ones from requirement 4**. List them, find each one in a star chart, guidebook, or app, and keep a log (below). Talk over your plan with your counselor before, and review your log with them after.
- ☐ **8c** Plan and host a star party for your troop or another group, such as your class at school. Use binoculars or a telescope to show and explain celestial objects to the group.
- ☐ **8d** Help an astronomy club in your community hold a star party that is open to the public.
- ☐ **8e** Take your own series of photos or digital images of the movement of the Moon, a planet, an asteroid, a meteor, or a comet. Label each image with the date and time, show all positions on a star chart or map, show the display at school or a troop meeting, and explain the changes you observed.
- ☐ **8f** With your parent or guardian's and your counselor's approval, use an online observing service such as SkyNet to observe planets, comets, galaxies, or the Sun. Describe your experience to your counselor.

My pick, and when and where:

_____

8b (SKY) **Observation log (for 8b; also handy for a star party)**

Ideas beyond requirement 4: lunar craters and mountains, the Andromeda Galaxy (M31), the Pleiades (M45), the Orion Nebula (M42), the Double Cluster in Perseus, Jupiter's moons, Saturn's rings, the International Space Station, other satellites.

Date _____ Start time _____ End time _____ Location _____

#	Celestial object	Found it on: chart / book / app	Seen	What it looked like
1			☐	
2			☐	
3			☐	
4			☐	
5			☐	
6			☐	
7			☐	
8			☐	
9			☐	
10			☐	
11			☐	
12			☐	

☐ Talked over my plan with my counselor before ☐ Reviewed my log with my counselor after

9 WHERE COULD THIS GO? PICK ONE

Do ONE of these, then talk it over with your counselor. Do it any time.

☐ **9a** TALK **Career. Identify three careers that would use astronomy skills and knowledge. Pick one and research it, then discuss what you learned with your counselor and whether you might be interested in it.**

Ideas: research astronomer, planetarium director, telescope or optics engineer, spacecraft mission controller, satellite data analyst, science writer, astrophotographer.

Three careers: 1. _____ 2. _____ 3. _____

The one I picked	
Training, education, certification	
Experience needed, and cost to get started	
Job prospects and starting salary	
Advancement and career goals	
Am I interested? Why or why not	

☐ **9b** TALK **Hobby. Identify how you might use astronomy skills and knowledge as a personal hobby. Research it, then discuss what you learned with your counselor and share your short-term and long-term goals.**

Ideas: backyard observing, astrophotography with a phone or camera, building a telescope, meteor counting, tracking the ISS, joining a local astronomy club.

My hobby idea	
Extra training I would need	
Expenses (gear, dues, travel)	
Clubs or organizations to join	
Short-term goal	
Long-term goal	

JUST FOR FUN **The coolest thing I saw while earning this badge**