



TIPS FOR HOSTING A SUCCESSFUL SKYWATCHING SESSION

Understanding the Universe

ncscifest.org/starparty

SUGGESTED MATERIALS

- + Telescopes
- + Binoculars
- + Table
- + Star charts
- + Trimmed red balloons (to cover white flashlights)
- + Activity materials
- + Red lights
- + Orange traffic cones
- + Stepstool (as an aid while viewing)
- + Green laser

ACTIVITY IDEAS

- + Preview what you expect to see in the sky and teach how to use star charts.
- + Viewing through telescopes and binoculars
- + Star party kit activities
- + Storytelling
- + Sky tour

SETTING UP YOUR SITE

- + Choose a viewing area away from unshielded lights. Turn off outdoor lights where possible.
- + Shield the viewing area from headlights. Traffic cones can help you block off areas from parking.
- + Consider marking telescopes and tripods with glow-in-the-dark tape, red lights, or red glow sticks.
- + Mark the path to the viewing area with red light, glow sticks, or solar lights. Or escort visitors with a red flashlight.
- + Have an “orientation” table marked with red light that has star charts, trimmed red balloons, and activity materials.
- + Offer a sky tour and other activities away from the telescopes to help spread out crowds.

GETTING THE MOST FROM THE VIEWING EXPERIENCE

- + If possible, gather groups as they arrive for a briefing so they will feel comfortable and safe, know what to expect, and help protect equipment.
- + Ask for no white light in the telescope viewing area from flashlights, cellphones, or flash photos. Pass out trimmed red balloons to cover white flashlights and cellphone lights.
- + Explain other rules, e.g., no smoking, alcohol, running, or pets.
- + Let people know where to find the telescopes, how many there are, and what kinds of objects they’ll see. You may want to introduce the telescope operators.
- + Ask visitors to touch the telescope only with permission. If telescope operators have a chair or stepstool, they can use a red light to direct visitors to “put your hands on the stool to steady yourself” and then (aiming the light at the eyepiece) “look here.”
- + Parents with young children should look through the telescope before their children do. Then they’ll be in a better position to help their child.
- + Visitors who wear glasses should try looking first with glasses on.
- + Encourage visitors to ask questions and to speak up if they don’t see anything. Telescope operators should give visitors meaningful information (say “This is the Orion Nebula, a place where stars are forming” rather than just “This is M42”).

USING A GREEN LASER?

Green lasers can damage eyesight and cause problems for aircraft. Be mindful of safety:

- Use only lasers <5 milliwatts.
- Choose a laser that requires you to continuously depress the button to operate it. Use the laser sparingly.
- Keep the laser on a lanyard around your neck or otherwise attached to yourself. Don’t let anyone else touch the laser.
- Never point a green laser near a person, vehicle, wildlife, reflective material (such as a road sign) or aircraft — even if it seems to be at a great distance.
- Avoid aiming the laser close to the horizon.
- Circle any object in the sky that you are not absolutely positive is a star, rather than holding the laser on it — in case the “star” is actually an airplane.

SKY TOUR: “THE SKY IS A TIME MACHINE”



Below is a suggested sky tour that helps your Star Party visitors get a sense of the scale of the universe by organizing what objects they see in the sky by their relative distance and the time it takes their light to reach us.

1. Introduction

You see objects because they make or reflect light. That light takes time to get to your eyes. Light travels really fast, 186,000 miles per second, so you won't notice that travel time when you look at something nearby.

But when you look into space—at planets, stars, or other galaxies—the objects are so far away that it takes real time for their light to get to your eyes. Because you see objects as they looked back when the light left them, when you look into space you look into the past. The farther away the object, the longer its light has to travel and the farther back in time you see. The sky is like a time machine!

(Note: 1 light-year = the distance that light travels in a year = almost 6 trillion miles.)

2. Within our solar system, the light we see has traveled less than a day

The light we see from objects in our own solar system, such as the Sun, Moon, and planets, has traveled less than a day to reach us. On the 2022 Star Party dates (April 8-9), look for the first quarter Moon in the afternoon and evening sky. It's about 240,000 miles, or 1.3 light-seconds, away. Because moonlight takes 1.3 seconds to reach you, you see the Moon as it looked 1.3 seconds ago. Distances of the planets from Earth vary; on the Star Party dates, Mercury, Venus, Mars, Jupiter, and Saturn are 11, 7, 15, 49, and 87 light-minutes away, respectively. Dwarf planet Pluto is 5 light-hours away. (The Sun is 8 light-minutes from Earth.)

3. Within our galaxy, the light we see has traveled for up to thousands of years

Our solar system is a small part of the Milky Way Galaxy. The individual stars we see at night are part of our galaxy, and their light has been traveling for a few years to thousands of years to reach us.

One of tonight's stars might be your “birthday star”—that is, a star whose light you see tonight left it around the time you were born. Is anyone 9 years old? Then Sirius, the brightest star in the night sky, is your birthday star because it's 9 light-years away. The light you see from it is as old as you are. (Note for sticklers for accuracy: we're doing some rounding.)

Some other birthday stars you may see at nightfall on the 2022 Star Party dates: Procyon, 11 light-years; Pollux, 34 light-years; Arcturus, 37 light years; Capella, 43 light-years; Castor, 51 light years; Aldebaran, 65 light-years; Regulus, 79 light-years. Find a more complete list at <http://www.pbs.org/seeinginthedark/explore-the-sky/birthday-stars.html>

Some of the starlight you see left well before any of us were born. For example, Polaris, also known as the North Star, is roughly 400 light-years away. Its starlight you see tonight left the star near the beginning of the 17th century. In 2008, NASA beamed the Beatles' song “Across the Universe” toward Polaris. Traveling at the speed of light, the transmission of the song will finally reach the star in another 400 years, in the early 25th century.

4. Outside our galaxy, most of the light has traveled millions to billions of years

Through a telescope, you can see even farther. Most light from other galaxies has traveled for millions or billions of years to reach us. NASA's James Webb Space Telescope is a powerful time machine that can study every phase of cosmic history and peer back over 13.5 billion years to see the first stars and galaxies forming. The telescope's discoveries will help us better understand the origins of our universe and our place in it.

Extension: Use the Passport Through Time handout to record what objects you see tonight, https://nightsky.jpl.nasa.gov/download-view.cfm?Doc_ID=89



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