



Science of Summer Family Activities

Stargazing

Overview

Do you know the difference between a planet and a star? Do stars really twinkle? Is it better to gaze at the stars when the moon is bright? In this activity, your whole family can answer these questions and show off your “star power.” All you need is a clear night and your eyes!

Materials

- Binoculars
- Blanket
- Snack
- Journal/pen or tape recorder

Thought Starters

Ask these questions before you begin:

- *What is astronomy?*
 - *A: Astronomy is the science of studying matter in outer space. Scientists who study this matter are called astronomers.*
- *How many planets are there?*
 - *A: There are 8 planets that orbit the sun. There used to be 9 planets but astronomers now determined that Pluto is a dwarf planet. The planets rotate counterclockwise around the sun.*
- *How are stars formed?*
 - *A: They are formed initially from gas and hydrogen.*
- *Is the sun a star?*
 - *A: Yes! Although the sun appears to be the largest star, it is really just an average-sized star.*
- *Is it better to stargaze on a dark night or a moonlit night?*
 - *A: Moonlight brightens the sky but actually reduces the number of stars you can see.*
- *Do stars really twinkle?*
 - *A: No. They just appear to twinkle because of the effects of our atmosphere.*
- *Why do stars only come out at night?*
 - *A: They are out day and night but the sun makes it too bright during the day for us to see them.*

Activity

School's out, summer's here, but there's still important work to be done! Here is your assignment:

- Follow weather forecasts and choose a clear night for your star gazing. Try not to pick a night that is too windy, cloudy or humid.
- Invite a friend, family member or pet. Grab a snack, a blanket, and a flashlight.
- Head outdoors (just be sure to get your parent's or guardian's permission first).

- Choose a location that is safe but not right by streetlights and houselights. The lights make it hard to see!
- Allow your eyes several minutes to adjust to the darkness.
- Now look... observe... wonder... stargazing can take a little time so be patient!
- Get out your journal or tape recorder and record everything you observe. This will help you remember and see similarities and differences each time you stargaze!
- Try to observe the same object at different times. It may have a different appearance each time you look at it. Make a wish upon a star while you're at it.
- Now it's time to get started! You can start by finding the most recognizable object in the sky: the moon! Talk about the shape of the moon tonight and why it appears as a different shape each night. We actually see a portion of the moon every day until we are able to see it as a whole.
- The next set of stars to find is the Big Dipper (also called Ursa Major). A "dipper" is a small pot with a long handle, and that's just what this constellation looks like! The Big Dipper is the third largest constellation. It is one of the most easily recognizable groups of stars in the sky since it never sets below the horizon and is therefore visible in northern skies year-round. To find the Big Dipper, look for a constellation with seven stars in it. Often, it's easiest to begin by searching for the "handle" of the Big Dipper. The handle has three stars that form an angle. The other four stars form the bowl portion of the dipper.
- Once you find the Big Dipper, you can easily find the North Star (also called Polaris). Imagine a straight line continuing from the two stars that form the vertical line on the far end of the dipper's bowl. Follow this imaginary line until you see a star that is brighter than the stars surrounding it. This is the North Star, and it is the end of the handle of the Little Dipper (also called Ursa Minor). The Little Dipper is a constellation somewhat resembling the Big Dipper, and the North Star is the last star in its tail. The two front stars of the "little dipper" (smaller and more square than the big one) are fairly bright, but other stars are rather dim and require good eyes and a dark sky.
- Now see if you can spot Venus and Jupiter, the two brightest planets in the summer sky. See if you can detect the following constellations easily seen in summer: Cygnus the Swan, Lyra the Harp, Aquila the Eagle, Sagittarius the Archer, and Scorpius the Scorpion.
- To check out what you can see above your house tonight, go to <http://nightsky.jpl.nasa.gov/planner.cfm>!
- Before your next appointment with the night sky, make your own star finder or star wheel (see instructions below), and see how many objects you can identify. Be sure to bring your flashlight so you can see your star finder or wheel in the dark!
- The countryside is ideal for viewing, as it's far away from city lights. Ask a parent if they fancy a trip to a state park or other safe place that's far away from streetlights. Watch the weather reports and plan for a night that's clear from cloud cover. Better yet, check a moon chart as well and pick a clear night with minimal moonshine.

Make a Star Finder

Download and print the template from the website below, fold it origami-style according to the directions, and make your own star finder in a snap. NASA Space Place:

<http://spaceplace.nasa.gov/en/kids/st6starfinder/st6starfinder.shtml>

Materials

- Computer printer paper
- Scotch™ Precision Scissors or Scotch™ Kids Scissors

Make a Star Wheel

Star wheels help you locate and identify constellations of stars and other objects in the night sky. You can adjust them for any time of night, in any month of the year!

These web pages have downloadable masters for printing and photocopying, plus assembly instructions.

Uncle Al's Star Wheels

Lawrence Hall of Science / University of California, Berkeley

<http://www.handsonuniverse.org/activities/uncleal/>

Materials

- Computer printer paper (preferably heavy weight or card stock)
- Thin cardboard (like a file folder or cereal box)
- Scotch™ Precision Scissors or Scotch™ Kids Scissors
- Scotch® Glue Stick or Scotch® Double-Sided Tape
- Scotch® Magic™ Tape
- Stapler

Discussion Points

- The Solar System is made up of the sun and everything that travels around it. In addition to planets, the Solar System also consists of moons, comets, asteroids, minor planets, and dust and gas. The sun contains 99.86% of the mass of the solar system! Everything in the solar system orbits around the sun.
- Astronomers used to think that the Earth was the center of the universe but, in the 17th century, Nicholas Copernicus presented the concept that the center of the universe is really the sun.
- Scientists estimate that there are 100 billion galaxies in the universe, with about 100 billion stars in each one.
- On a clear night, you can see about 3,000 stars with your eyes!
- Stars change over time. It may take millions to billions of years for a star to live out its life!
- Not all stars have the same brightness as you can see if you go out at night and look up at the sky. Some appear much brighter because it is closer to the Earth.
- It might be fun to make a planet chart with all eight planets that orbit the sun!

To Learn More

Ask an Astronomer

Frequently asked questions about stargazing, moon watching, planet watching, meteor showers, shooting stars, comets, constellations, galaxies, and more.

<http://curious.astro.cornell.edu/stargazing.php>

Hubblesite: Tonight's Sky

Your guide to constellations, deep sky objects, planets and events

http://hubblesite.org/explore_astronomy/tonights_sky/

Printable Zodiac Constellation Maps

<http://www.spacejr.com/tag/zodiac-constellation-maps/>

Weather Underground

Enter the ZIP code where you'll be star gazing and see a map of the night sky.

<http://www.wunderground.com/sky/index.asp>

Google Sky

<http://www.google.com/sky/>