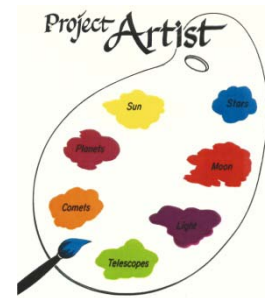




CONSTELLATION VIEWERS*



It can be very difficult for young observers to identify constellations in the night sky. If they are fortunate enough to live in an area with dark skies, there will be so many stars that finding a constellation can be very confusing. More likely, students live in an urban area with some degree of light pollution which makes it impossible to see the dimmer stars in even the most prominent constellations, let alone the stars of less familiar constellations.

The potato chip can viewers (we have found Pringles[®] cans to be ideal) can help students to recognize the shapes of constellations by using patterns for familiar constellations and by using only the brightest stars which give these constellations their basic shapes. In some cases we do not include an entire constellation because many of the stars that give the constellation its shape are difficult, if not impossible, to see in urban areas. For example, instead of the constellation Ursa Major (the Great Bear), we use the *asterism* of the Big Dipper.

An asterism is a prominent group of stars that form a recognizable shape, but it is not one of the 88 designated constellations. The viewer patterns also use the “teapot” asterism in Sagittarius, an easily identifiable portion of a much larger constellation. Another common asterism is the Summer Triangle, which is formed by the brightest star in the constellation Cygnus, the brightest star in the constellation Lyra, and the brightest star in the constellation Aquila.

When astronomers refer to a constellation, they are referring to a specific *area* of the sky. The sky is divided into 88 sections, each associated with a constellation pattern. Think of the sky as a giant two-dimensional map, with the constellation areas equivalent to states on a map of the U.S. When astronomers need to communicate the location of an object in the sky, they use the constellations as points of reference. For example, a nova discovered “in Cygnus” is located in the area of the sky that includes the constellation Cygnus, the swan. The constellations serve as a road map for locating other celestial objects in the three-dimensional sphere of the sky.

Another problem for new observers is the size (proportion) difference between a constellation pattern on a piece of paper and the actual star patterns in the night sky. By using the shorter Pringles cans, the star pattern seen in the viewer will be close to the size of the star pattern in the sky. If the longer Pringles cans are used, the perception will be that the paper star patterns are smaller than the actual star patterns in the sky.

NOTE: When a constellation is near the horizon, it will appear larger than when it is overhead. Think about the rising Moon versus the Moon when it is high in the sky. The rising Moon APPEARS to be much larger, an optical illusion whose explanation is still being debated!

*Original activity in many publications. Designed specifically for Pringles[®] cans to conform with view on the sky by Larry and Nancy Lebofsky.

Objective: Students will become familiar with constellation and asterism patterns. If an observing night or planetarium session is planned, students will demonstrate their knowledge by identifying star patterns in the sky. If no observing night or planetarium session is planned, students can demonstrate their knowledge by trading patterns and viewers with other students and identifying the star patterns.

Materials:

Enlarged copies or transparencies of star patterns

Pringles© cans (regular or single serving size)

Pattern sheets

Hammer(s) and nail(s)

Black butcher or construction paper circles the size of the can lid

Black butcher paper for wrapping the can

Gummed stars, crayons or markers

Push pins

Scraps of styrofoam or plywood

Tape or glue; scissors

Optional: white pencils, crayons or chalk

Optional: clear or patterned Contact paper

Optional: Big Dipper variations pattern sheets

Procedure:

1. Ask the students to brainstorm about what a constellation is and the names of constellations they may have heard of or observed. Using the background information provided and/or your own resource materials, discuss with the students what a constellation is, using enlarged copies of the patterns provided or overhead transparencies as examples.
2. Introduce the concept of asterisms using the Big Dipper as an example. Use the Big Dipper variations pattern sheets provided, if desired. Show the stars of the Big Dipper within the constellation Ursa Major. A sample showing the constellation Sagittarius and the teapot within Sagittarius is also provided.
3. Optional: The Big Dipper variations package provides a worksheet of just the stars of Ursa Major. Students can use this page to create their own constellation using the stars of Ursa Major.
4. Provide a sample Pringles can constellation viewer for the students to see. Describe how the viewer works; allow the students to identify the constellation pattern used in the sample.

5. Make several copies of the pattern sheets and cut the patterns apart into individual star patterns. Distribute or let each student choose several patterns. If the students will be trading viewers to try to identify each other's constellations/asterisms, be sure a variety of patterns are being used. If everyone chooses the Big Dipper and Orion, there will not be much challenge!
6. Trace circles the size of the inside of the can lid onto black butcher or construction paper. Note: Tracing around the outside of the lid will make a circle slightly too large to fit inside the lid. One option is to cut the traced circle inside the tracing line. Another option is to provide pre-cut circles or tagboard templates (approximately 7.5cm in diameter) for younger students.
7. Choose a constellation pattern. Lay it on a black paper circle. Lay the pattern and black paper circle on the styrofoam or plywood to protect the desk or table. Use a pushpin to transfer the star pattern onto the black paper circle.
8. Optional: Use a white pencil, crayon or chalk to connect the stars into the constellation "picture" illustrated on the pattern sheet.
9. **CONSTRUCTING THE VIEWER:** Using the hammer and nail, punch a hole in the metal end of the Pringles can. This is the end you will view through.
10. Cut a piece of black butcher paper to fit around the Pringles can. A regular size Pringles can requires paper about 23.3cm tall by 24.5cm around (or 9-3/8 x 9-5/8 inches). A single serving size can requires paper about 9.5cm tall by 24.5cm around (or 3-3/4 x 9-5/8 inches). This should allow the paper to fit between the metal can rims with a small amount of overlap for securing the vertical edge around the can.
11. Tape or glue the black paper to the can.
12. Use gummed stars, drawings, or patterned Contact paper to decorate the can.
13. Optional: If using gummed stars or drawings, cover the decorated can with a piece of clear Contact paper to protect the artwork.
14. Place one of the constellation circles into the plastic can lid with the wrong side against the lid. Put the lid on the can. Hold the can up to the light and view the constellation through the nail hole in the metal end.
15. Store the constellation circles inside the can lid.
16. Optional: Students can trade viewers and try to identify each other's constellations.
17. Optional: Use the smaller patterns provided with the cardboard tubes from toilet paper or paper towels. Punch out the patterns onto 11-12cm (4-5 inch) squares of black paper. Fold

the paper over the tube, right side of the constellation to the inside. Rubber band the paper around the tube.

Extension: Share skylore from around the world that relates to the constellations or asterisms you are studying.

Resources:

Observing Guides

H. A. Rey. 2008. *Stars: A New Way to See Them*. Houghton Mifflin.

H. A. Rey. 2008. *Find the Constellations*. Houghton Mifflin.

I. Ridpath and W. Tirion. 2012. *The Monthly Sky Guide*, 6th ed. Cambridge University Press.

Tours of the Night Sky. (CDs available from the Astronomical Society of the Pacific;
<http://www.astrosociety.org>)

G. Consolmagno and D. Davis. 2015. *Turn Left at Orion*. Cambridge University Press.

Astronomical Society of the Pacific. *The Total Skywatcher's Manual*

Myths and Legends (stars, constellations)
Some of these books may be out of print

T. Birdseye. 1990. *A Song of Stars*. Holiday House. (Vega and Altair, two stars of the Summer Triangle). Available used.

T. Cohlene. 1990. *Quillworker, A Cheyenne Legend*. Watermill Press. (Big Dipper, Polaris). Available used.

P. Goble. 1993. *Her Seven Brothers*. Macmillan. (Big Dipper)

G. Mayo. 1990. *North American Indian Stories, Star Tales and North American Indian Stories, More Star Tales*, Walker Publishing. (Big Dipper, Orion, and many others). Available used

J. Staal. 1996. *The New Patterns in the Sky*. Adult-level resource book. McDonald and Woodward Publishing Co.