



Kathie Kralik

Originally a city girl from Toledo, Ohio, I now live in Breckenridge. Drawn to the mountains on a University of Toledo Ski Team trip, I knew where I wanted to live for the rest of my life when I first stepped in Colorado in 1987. After receiving my BA in marketing from U of Toledo, I worked 10 years for a ski resort in Sales & Marketing and lived the life of planes, trains, taxis, & hotel rooms. Then I landed the position of Summit County 4-H Program Manager in 1997. I felt the need to make a difference in our community by connecting with local families. Summit County 4-H gave me that opportunity and I embraced the concept of meeting local community needs by using research-based resources from CSU. What a cool concept! Our biggest success to date has been the 4-H STEM programs in schools and for homeschooled. STEM has helped us partner with Summit School District working with local volunteers, teachers, principals, & parents to provide more STEM opportunities for our youth. Just a few years ago, people were saying, "We have 4-H in Summit County?" Now they are saying, "4-H, oh yes, STEM, you guys are getting STEM programs going in our county—how exciting!" Having the flexibility and support from State 4-H as well as Summit County Government has given me the ability to design programs that interest our local kids & community. It doesn't matter if kids are learning life skills through traditional 4-H programs by raising animals or through STEM programs. What matters is getting kids involved with positive adult role models in areas that are interesting to them to help build their future careers. CSU Extension/4-H and Summit County Government have given me the opportunity to make Summit County 4-H successful and, in turn, make my life rewarding and purposeful. Thank you!

STEM Connections



Connecting Science, Technology, Engineering, and Math concepts to our everyday lives.

Pumpkins and the Evening Sky!

http://i388.photobucket.com/albums/oo328/becky_is_a_star_94/night-sky.jpg

This month's activity is a fun introduction to astronomy, one of Kathie's hobbies, with a twist on traditional jack-o-lanterns that decorate our porches this time of year. The activity is based on a NASA lesson from the 1980s.

Constellations are like states on a map; there are no state lines but are imaginary boundaries that have been established. **Constellations** are similar in that they outline a specific area in the sky, and we are then able to find objects within their borders. Astronomers have determined that there are a total of 88 **constellations**. The **constellations** in the northern hemisphere are named after the heroes of Greek myths. Every culture of all peoples, however, have stories in the stars. It is really fun to spend time finding the stories of different cultures. For example, the Kalamath people saw *Hercules*, *Lyra*, and *Boötes* as a spider sitting on a giant web, and they told wonderful stories about them, like Coyote and Spider Woman. The Chinese saw the Big Dipper as a cart with a horse pulling it.

The first step in astronomy is to make friends with the patterns found in our sky. It is really fun to look up and see familiar shapes of *Leo*, *Pegasus*, *Scorpius* or *Orion*, point out that pattern, and share a story with your family and friends.

Our activity this month will not only help you to become familiar with those patterns in the night sky, but will also share the stars with your family and friends. You will be carving **constellation** pumpkins! This month's STEM Connection has a second page of the patterns of our more familiar northern **constellations** if you don't have internet or a close-by library. If you do, you can research the stories and patterns of your own zodiac sign (which are **constellations**), the circumpolar **constellations** (those patterns that we can see every night all year long), or one of the beautiful **constellations** or **asterisms** found in the fall night sky.

EXPLORE IT - DESIGN IT - DO IT

- Research in the library or on the internet about **asterisms** and **constellations**, and the stories that our ancestors would tell. Pick one that tickles your fancy. If you don't have internet or a close-by library, use the simple patterns found on the next page.
- Work on the newspaper, and ask for a parent's help with carving. Prepare the pumpkin as any regular jack-o-lantern: cut a lid and scrape out the pulp. Save the seeds for later.
- With a sharpie, enlarge a star pattern to cover about 1/3 of the pumpkin. *Hint:* Use newspaper to make an enlarged pattern; lay the newspaper over the pumpkin and poke nails through each of the stars.
- Some stars appear brighter and others dimmer from Earth. To indicate star brightness, we use larger dots for brighter stars and smaller dots for dimmer stars. Drill holes in your pumpkin, using larger bits for the brighter stars. If you do not have a drill, use a hammer and nail to get the holes started, and then use different size screwdrivers (larger for brighter), twisting them in to form the holes.
- To form the lines that depict the pattern of stars, use a small sharp knife (like an X-Acto craft knife) and gently slice/scrape into the pumpkin, but don't go all the way through—just pierce the skin. This is like playing connect the dots.
- Carve the name of the constellation on the lower back of the pumpkin (for example, Scorpius is pictured, so that word would be carved on the back side of your pumpkin).
- Put in the candles, light, and enjoy.

Images from: <http://www.17apart.com/2012/10/were-seeing-stars-our-constellation.html>



Age Appropriate:
4th—HS grades

Time Required:
At least 1 hour

Materials:

- Pumpkin(s)
- 3 candles or other lights
- Carving & small sharp knives
- Drill with several size bits
OR hammer, nail, and several size screwdrivers
- Newspaper
- Large metal spoon
- Sharpie
- Computer w/internet, library

The Set-up:

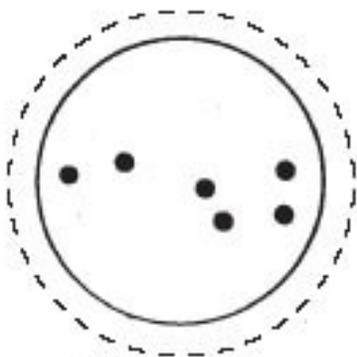
- Research stars, **asterisms**, and **constellations** on the internet or in a library. Below: a free night sky chart—pick Northern Hemisphere—and NASA):
 - <http://www.skymaps.com/downloads.html>
 - <http://starchild.gsfc.nasa.gov/docs/StarChild/questions/question9.html>
 - <http://starchild.gsfc.nasa.gov/docs/StarChild/StarChild.html>
- Ask parent to help.
- Lay out newspaper and gather all materials.

The Clean-up:

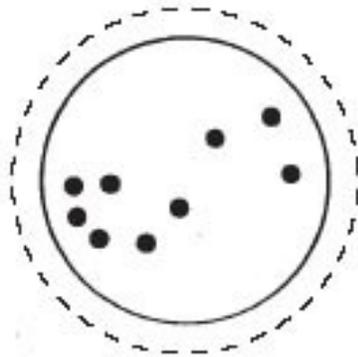
- Wash pumpkin seeds with water to remove the pulp. Pat dry with a towel. Lightly oil a cookie sheet, and place seeds in a single layer. Season with salt. Heat oven to 250° and bake for 60 minutes, turning the seeds after 30 minutes. Enjoy. YUM!
- Compost/dispose pumpkin pulp, skin, and newspaper.
- Wash all utensils and return them where they belong.

Power Words

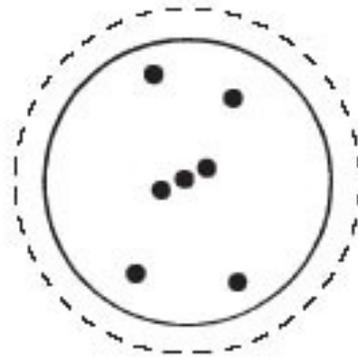
- asterism:** familiar group of stars with a common name, either part of a constellation or part of several constellations (*i.e.* the Big Dipper)
- constellation:** a group of stars forming a recognizable pattern with defined boundaries as determined by astronomers (*i.e.* *Ursus Major*, that contains the Big Dipper)



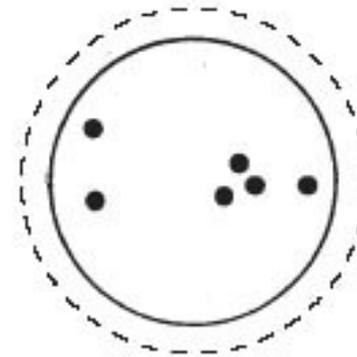
URSA MAJOR,
the Great Bear



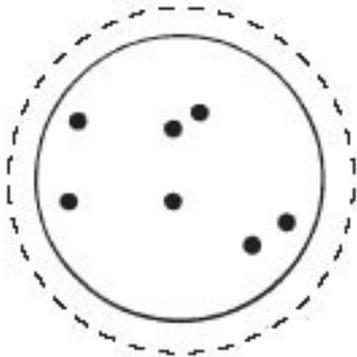
SCORPIUS,
the Scorpion



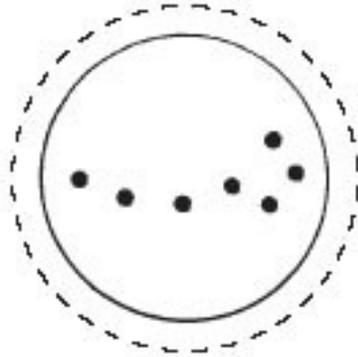
ORION,
the Hunter



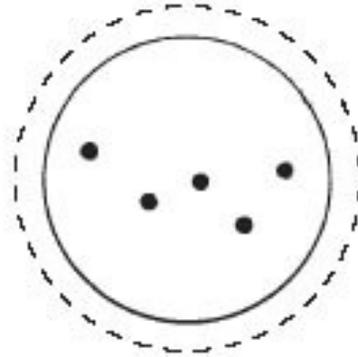
TAURUS,
the Bull



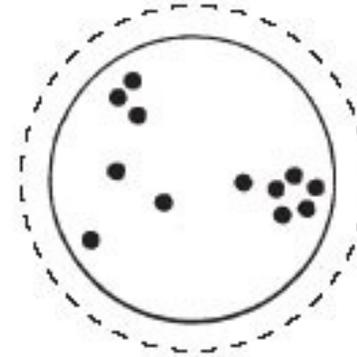
PEGASUS,
the Flying Horse



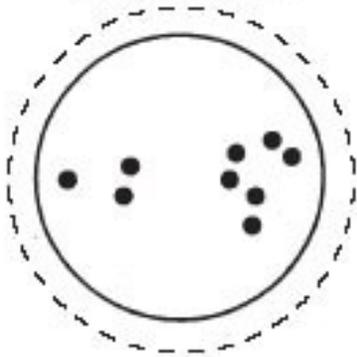
URSA MINOR,
the Little Bear



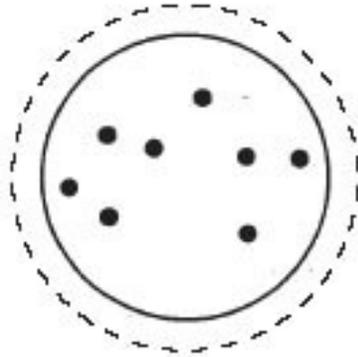
CASSIOPEIA,
the Queen



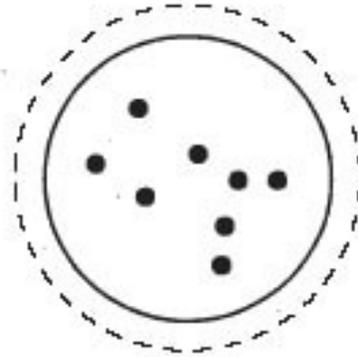
PISCES,
the Fishes



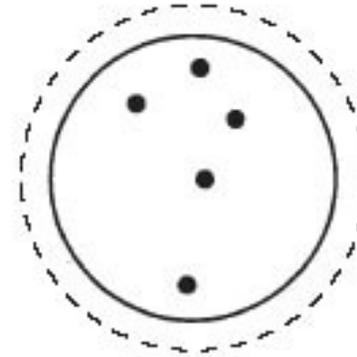
LEO,
the Lion



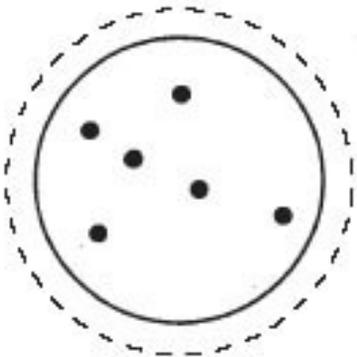
SAGITTARIUS,
the Archer



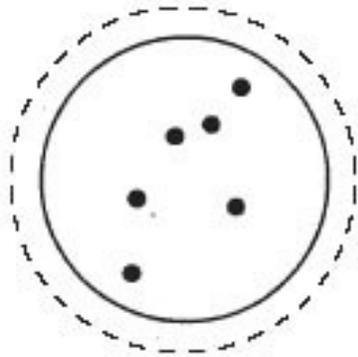
GEMINI,
the Twins



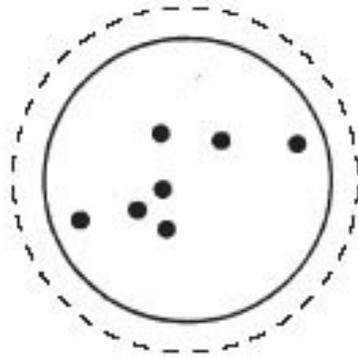
BOÖTES,
the Herdsman



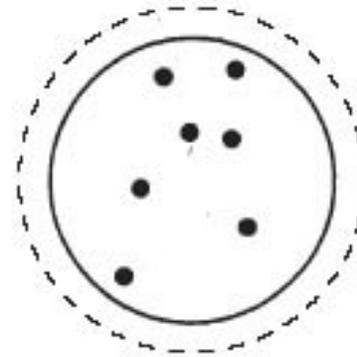
CYGNUS,
the Swan



PERSEUS



CANIS MAJOR,
the Big Dog



HERCULES

The above patterns are for those of you who do not have access to the internet. If possible, visit your community library for the book, *The Stars: A New Way to See Them*, 2nd edition by H. A. Rey (Curious George author). That book, even though it is over 50 years old, is the best book to learn the night sky. It has all 88 constellations, how to see the patterns, where and when they are located in the sky, and other fascinating information. It also has the associated Greek myth with each constellation.

The above constellation patterns are from: http://space.about.com/library/graphics/constellation_patterns.jpg