

Constellations

Background Information

Star watching has occupied humans from the earliest times. Our ancestors studied the night sky and saw shapes and patterns among the stars. They often made up stories to explain what they saw.

Many stars look as if they are in groups that stay together as they seem to move across the sky at night. We call these star groups *constellations*.

Over thousands of years, people in many parts of the world have made imaginary pictures around the constellations and made up stories about them. **Remember** – *stars are real, but constellations are not real.*

Facing south in the fall sky, you can see the constellations called Cygnus the Swan, Pegasus the Flying Horse, and Andromeda the Princess. You can find other constellations during other seasons.

Facing north, you can find the constellations called Ursa Major – the Big Bear, Ursa Minor – the Little Bear, and Cassiopeia the Queen. You can find the North Star at the end of the Little Bear’s tail.

Constellations by Season

Fall – Cygnus, Perseus, Pegasus, Andromeda

Stars – Deneb (the Swan Star)

Winter – Orion, Taurus, Gemini, Canis Major, Canis Minor, Auriga

Stars – Betelgeuse (red supergiant), Rigel, Sirius, Castor, Pollux

Spring – Bootes, Leo, Virgo, Corona Borealis

Stars – Arcturus, Spica, Regulus

Circumpolar – Ursa Major, Ursa Minor, Cassiopeia

Stars – Polaris (the North Star)

Objectives

By the end of this activity, students will be able to:

- listen to oral clues determine constellation.
- order dots to create constellation.
- will recognize northern hemisphere constellations.

Instruction Time

30 minutes

Constellations

Materials

- Astronomer Journal page 24
- Pencils

Procedure

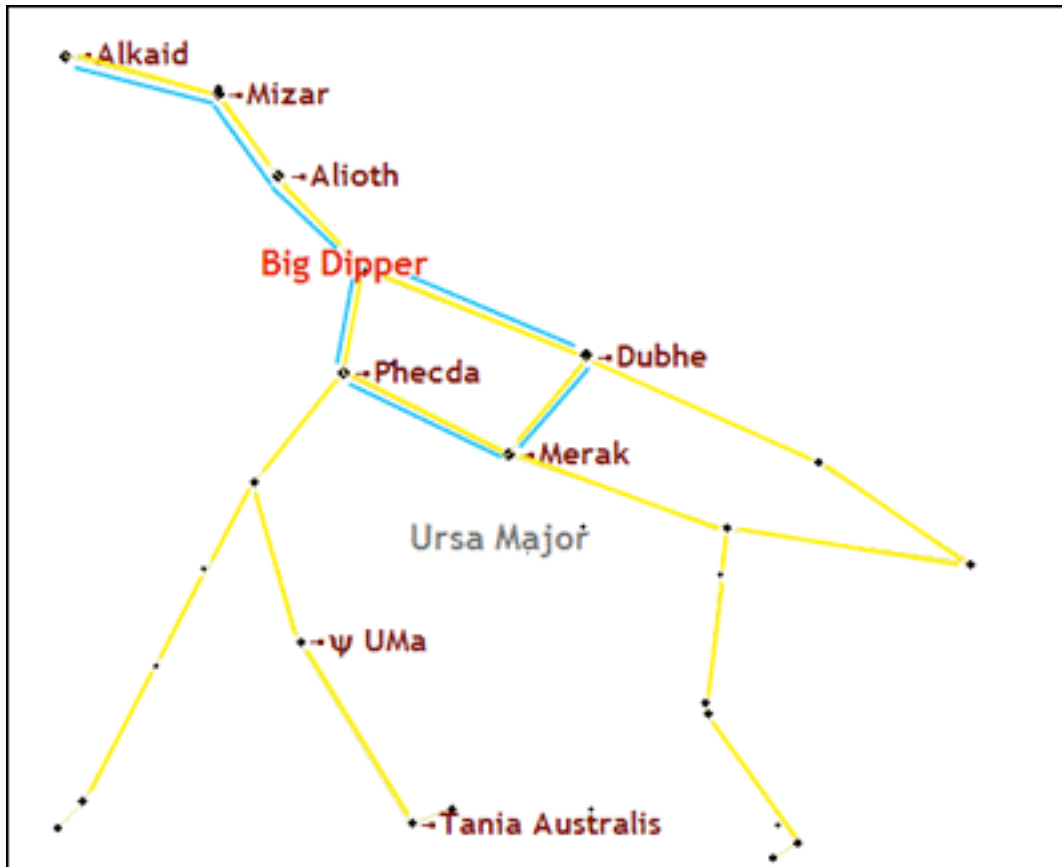
1. Before class, copy the constellation sheet onto a transparency.
2. Students should follow along on the constellation page – page 24 – of the Astronomer Journal.
3. Read the script about each constellation aloud to the students.
4. Students should use the information from the script to guess which constellation on their paper it is talking about.
5. Connect the dots for the appropriate constellation on the overhead.
6. Students should follow along, connect the dots, and label each constellation in their Astronomer Journals.

Expected Results & Explanations

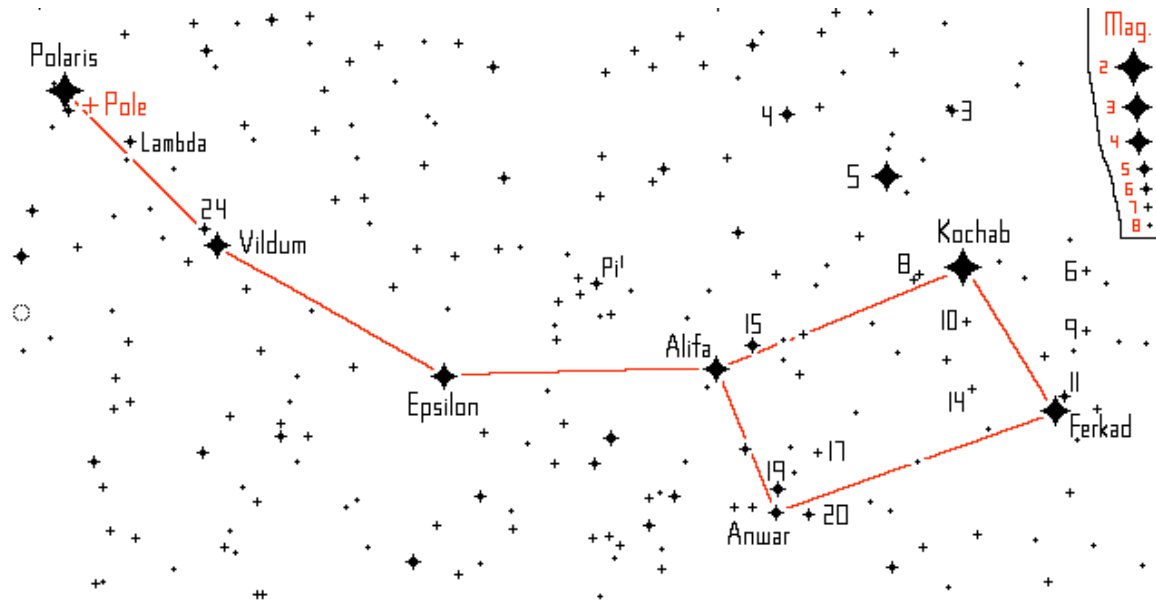
Upon completion of this activity, students would have heard one variation of the story of the constellations. Ethnic and religious backgrounds may lead to other explanations of the constellations different than what is suggested in this lesson. Allow students to state what they know and investigate further any explanations they do not know.

Constellations

URSA MAJOR AND URSA MINOR



Constellations



GREEK - Callisto was a beautiful river goddess. She had a son named Arcas. Juno was jealous of Callisto, so Juno changed Callisto into a bear. One day, when Arcas was a young man, he decided to go hunting. Callisto saw her son and, forgetting that she was a bear, rushed toward him to give him a hug. In fear of his life, Arcas lifted his bow and arrow to shoot at the charging bear. At the last moment, just before the arrow struck, Jupiter (Callisto's friend) tossed Callisto into the sky as the constellation as Ursa Major, the Great Bear. Then, Jupiter changed Arcas into a bear and tossed him into the heavens as the constellation Ursa Minor, the Little Bear. Arcas is always found standing next to his mother.

NATIVE AMERICAN - Late in the spring, a bear awakened from its long winter sleep and wandered out of its hillside den in search of food. Soon three hunters spotted the bear and began to chase it. Just like the bear, the hunters were hungry after the long, cold winter. The first hunter carried a bow and arrow with which he hoped to kill the bear. The second hunter carried a big pot in which he hoped to cook the bear. The third hunter came behind the others. He was collecting wood for the huge fire which would be needed to cook such a large meal. All summer the hunters chased the bear through the sky. In the fall, the bear started to get weak and the first hunter was able to shoot it with an arrow. The arrow killed the bear and it fell over on its back. The hunters ate the bear and left its skeleton behind. As fall turned to winter, the weather became colder and colder. The bear's skeleton was still visible in the sky, but the life spirit of the bear had entered a new body -- the body of another sleeping bear. All through the long, cold winter the bear slept. When spring came again, the bear awakened and went out in search of food. Once again it

Constellations

was hunted and killed. Its life spirit entered the body of yet another sleeping bear in the den. And so it happens every year.

Since the Big Dipper is part of the constellation Ursa Major (The Great Bear), it is technically not a constellation. It's what is called an asterism, which is the name given to interesting star patterns that are easily recognizable, but not one of the "official" constellations.

Be that as it may, the Big Dipper is probably one of the first objects in the sky that we learn to find and identify. It's distinctive position at the top of the summer night sky and the graceful curve of its handle make it easy for almost anyone to find.

The Big Dipper is very impressive all by itself, but it also is very close to a number of other very interesting sights. Included in these sights, and noted on the map at right, are the Pinwheel galaxy and the Whirlpool galaxy. If you have a good pair of binoculars or a small telescope, you should be able to find these galaxies using the map we have provided. When you find them, they will usually look like a small smudge of light instead of the sharp well-defined light that you are used to seeing when you look at a star. There are also several double stars in the Big Dipper, which you should be able to see using a small telescope. All in all, the Big Dipper is a very interesting place indeed.

As you spend more time watching the sky, you will learn that the stars in one constellation can help lead you to other sky landmarks. The Big Dipper is no exception as you can use two of the stars in its "cup" to find the North Star and you can use the arc of its handle to find the giant red star Arcturus.

As the Big Dipper rotates around our north sky "pole", in what is called a "circumpolar" orbit, two of the stars in its bowl can always point the way to Polaris, the North Star. Although Polaris is not often at exactly North on a compass, it's fairly close and can help you get your directions when you are outside at night.

In the United States, during the nineteenth century, African-Americans that were being held as slaves in the south made very practical use of the Big Dipper's consistent northern sky location. The Big Dipper was also known as the Drinking Gourd and slaves trying to make their way to freedom used it as a guidepost to find their way North and escape the bonds of slavery.

The lyrics of folk song "Follow the Drinking Gourd" served as guide to help them find their way north and its chorus reminded them to always follow the Drinking Gourd, or Big Dipper.

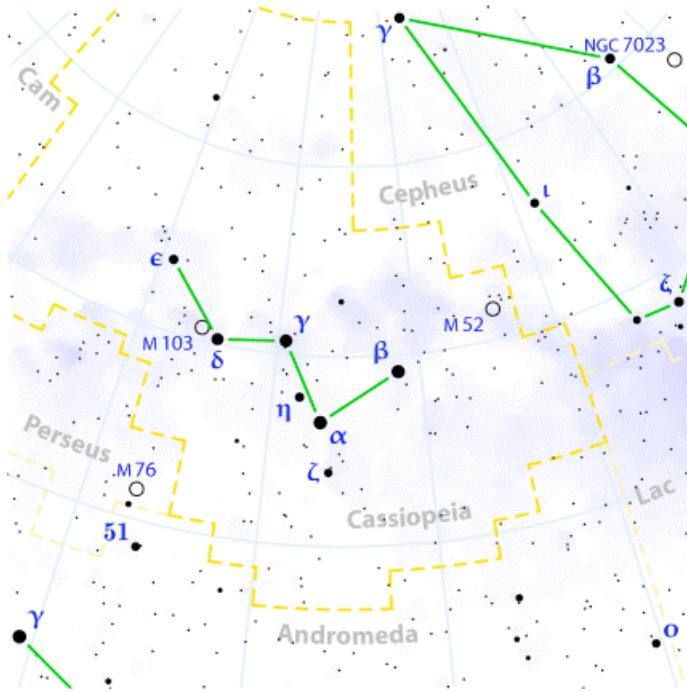
When Can I See the Big Dipper?

Constellations

The very best time to look at the Big Dipper is in the middle of the summer, when it is easily found on any clear night in the northernmost part of the night sky. Once you are outside, look in the northern sky and try to find its handle. The arc of the handle will stand out and once you have found the handle, finding the bowl is easy. You will be surprised at how easy it is.

Constellations

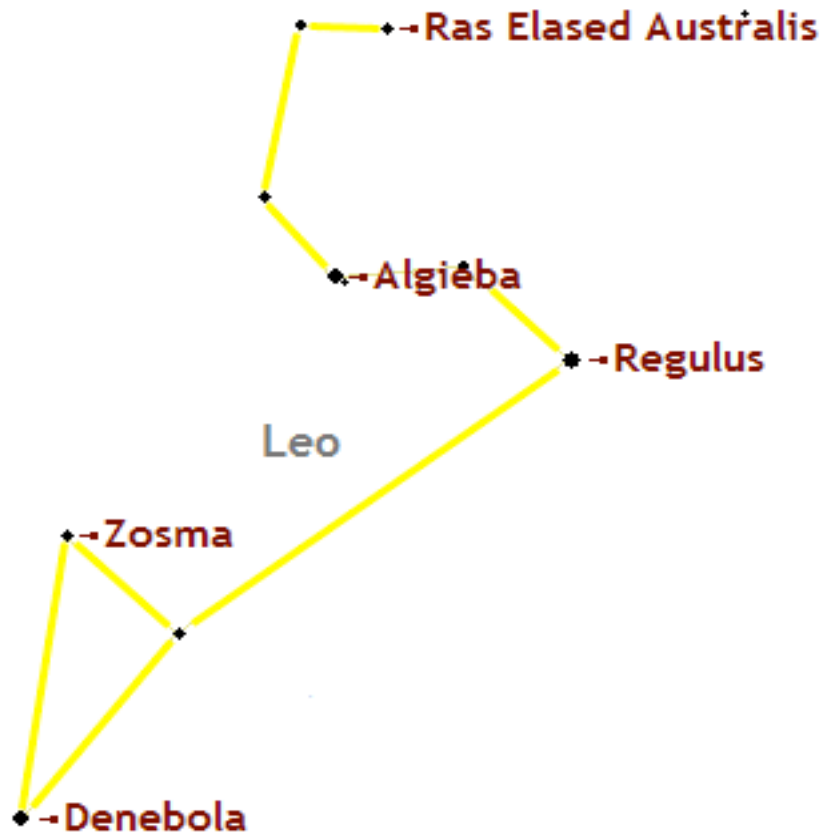
CASSIOPEIA



Cassiopeia, a queen of ancient Ethiopia, was a very beautiful woman. Unfortunately, she was also very vain and spent much of her time bragging about her beauty. She even boasted that she was far more beautiful than the maidens who attended Poseidon, the god of the sea, in his underwater kingdom. When Poseidon's maidens learned of this, they were very angry indeed. The maidens demanded that Poseidon punish Cassiopeia for daring to compare herself to them. Poseidon agreed that Cassiopeia should be punished. He placed her in the heavens to be scorned, not honored. Cassiopeia swings every half night around the North Star. She is seated in a chair, but the chair is placed upside down. Cassiopeia must hang on with both hands to keep from falling out. Her sky position is most humiliating for one who was so proud of her beauty.

Constellations

LEO



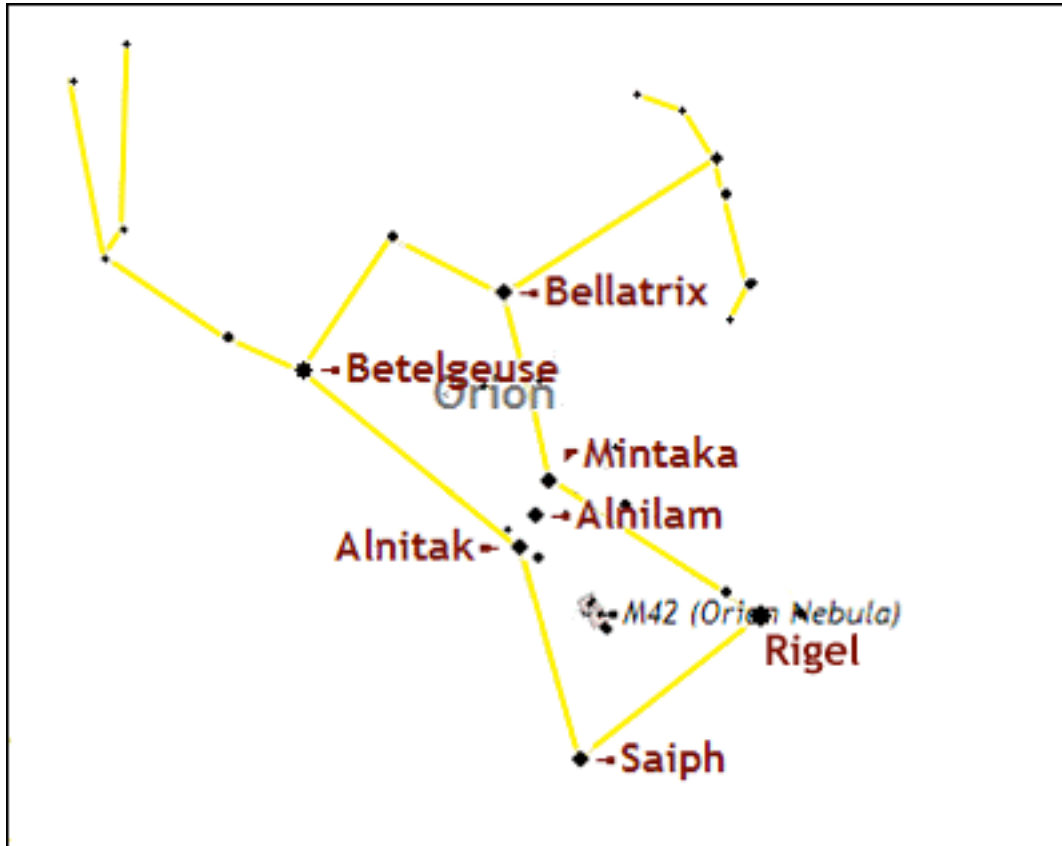
The first on the list of Hercules' labors was the task of killing the Nemean Lion. A giant beast that roamed the hills of the Peloponnesian villages causing havoc. Hercules' arrows bounced harmlessly off of the lion's body, his sword bent in two and his wooden club smashed to pieces. Hercules had to wrestle the beast finally choking it to death. Hercules then wrapped the pelt of the lion around his body to protect himself from his second labor, killing the poisonous sea serpent Hydra. The lion found its way to the heavens to commemorate the great battle with Hercules.

The largest and brightest star in Leo is Regulus. This large blue star shines brightly as the heart of the lion. Although not a giant star, Regulus is still over five times as large as our Sun. A small telescope will show you that Regulus is part of what is called a "binary

Constellations

system". Binary stars are stars that have one or more companions that orbit around the largest star in the group, much like the planets orbit around our Sun.

ORION



Orion is the great hunter in the sky. He has two hunting dogs that follow right behind him as he hunts Taurus the bull.

Orion is easy to find using a couple of methods. The easiest way to find Orion is to look for the three stars that make up his "belt". These three stars are Alnitak, Alnilam and Minatka. They form one of the most recognizable patterns in the sky. Another way to find Orion is to look for the four stars that make up his shoulders. Starting from the right shoulder and going clockwise, these stars are Betelgeuse, Bellatrix, Rigel and Saiph. Betelgeuse and Rigel are some of the brightest stars in the heavens, so they are easy to spot any time the constellation is visible. Whichever method you choose, Orion is very easy to find and will soon become a familiar landmark in the sky.

Constellations

Like any successful hunter, Orion is accompanied in the sky by faithful dogs. In Orion's case, they are Canis Major and Canis Minor. Canis Major is the home of Sirius, the brightest star in the sky, and is easily visible during the winter months waiting at the right "foot" of the great hunter.