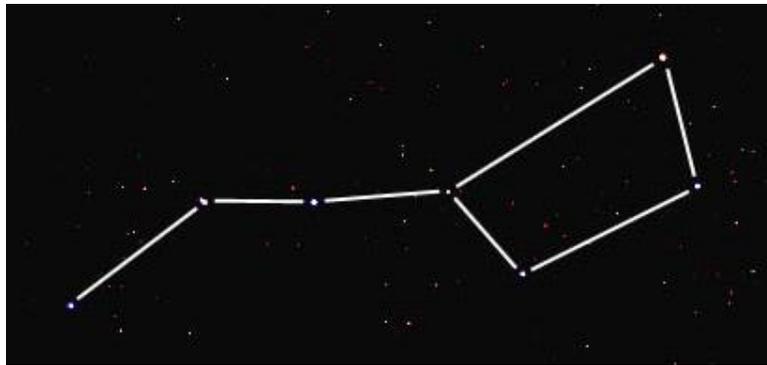


Springtime Constellation Worksheet

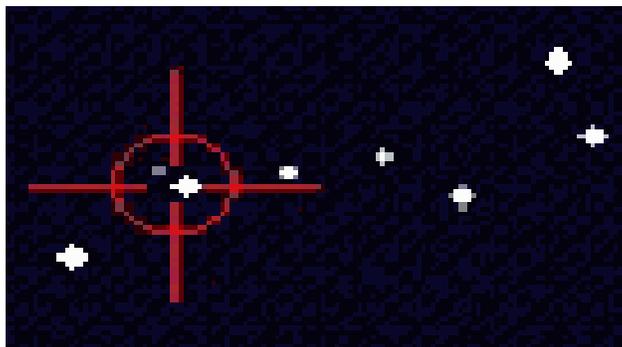
Activity 1. Big Dipper

Most individuals have heard of the Big Dipper, but they might be surprised to learn that it is not a true constellation. The Big Dipper is composed of the brightest stars that make up the constellation Ursa Major – the Big Bear. The Big Dipper is composed of seven stars that resembles a sauce pot. During the spring, it should be located almost straight over your head near the zenith in the sky. The zenith means the center point of the evening sky. Go outside on a clear dark night with a good view of the sky and try to find and observe the Big Dipper. (Suggestion: You may want to read through this entire project before going to view the sky)



Activity 2: Star Magnitude

There is variability in the brightness and size of the stars in the evening sky. A star brightness is determined by the combination of its size and distance from the planet. Scan the entire sky and you might find five stars that are brighter than all the others. Stars are ranked on a brightness scale called magnitude. These five stars are all classified as first magnitude stars. The Big Dipper is composed of stars that exist amongst the second order of magnitude. Focus on the middle star of the handle, this star is called Mizar. Just next to Mizar, you may notice another dimmer star. This is Alcor, a fifth magnitude star. Fifth magnitude stars are the dimmest stars one can see without magnification. Note: If you found Alcor, you just past the World War 1 eye exam.



Activity 3: Ursa Major

As mentioned, the Big Dipper is part of the constellation Ursa Major, the Big Bear. This is one of the largest constellations in the northern hemisphere. It spreads out over the rest of the center of the springtime sky. Extend the dipper's pan out, away from the handle, and you will see another dimmer four sided shape and then a triangle. These shapes depict the body and head. There are two arcs of stars that extend from the body, one from the back of the dipper's pot and the other from where the triangle connects to the body. These arcs depict the legs.



Myth: Many myths revolve around Zeus, king of the gods, and his human love interests. He once confessed his love to a mortal woman named Callisto. Hera, wife of Zeus, became jealous after learning Zeus and Callisto had a child named Arcas. Hera turned Callisto into a bear as punishment. When Arcas grew up and went hunting, Hera made sure that Arcas found Callisto in her bear form. Zeus interfered in time to save Callisto from being killed. Zeus was unable to turn Callisto back into her human form, so he turned Arcas into the little bear to join his mother. He then placed them both in the sky as Ursa Major and Ursa Minor so he could watch over them.

Activity 4: Big Dipper as a Compass

The Big Dipper is one of the main reference points for finding many of our other constellations. The classic example is finding the North Star and the Little Dipper (aka: Ursa Minor). The two end stars of the Big Dipper's pot are referred to as the "pointer stars." Imagine a line and the distance between these two stars. Now extend that line upwards for five times. Center the line a little in the direction of the bear's head, you will find the North Star. The North Star's proper name is Polaris. This is the point on which the whole evening sky appears to rotate on since this star is almost directly above the North Pole.



Extending back towards the handle of the Big Dipper, there are six stars that make up the constellation of the Ursa Minor or the Little Dipper. To me, the shape appears to be a ladle which is pouring into the Big Dipper. The four stars in the middle of this constellation are dim fifth magnitude stars and you may have trouble seeing them if there is a lot of surface lighting in your area.

Optional: If you can set up a camera on a tripod, center the camera on Polaris and leave the shutter open for about 4 hours. Remember to close the shutter before moving the camera. When you look at the picture, you should see an image called "Star Trails." This captures the effects of the earth's rotational spin.



Activity 5: The Circumpolars

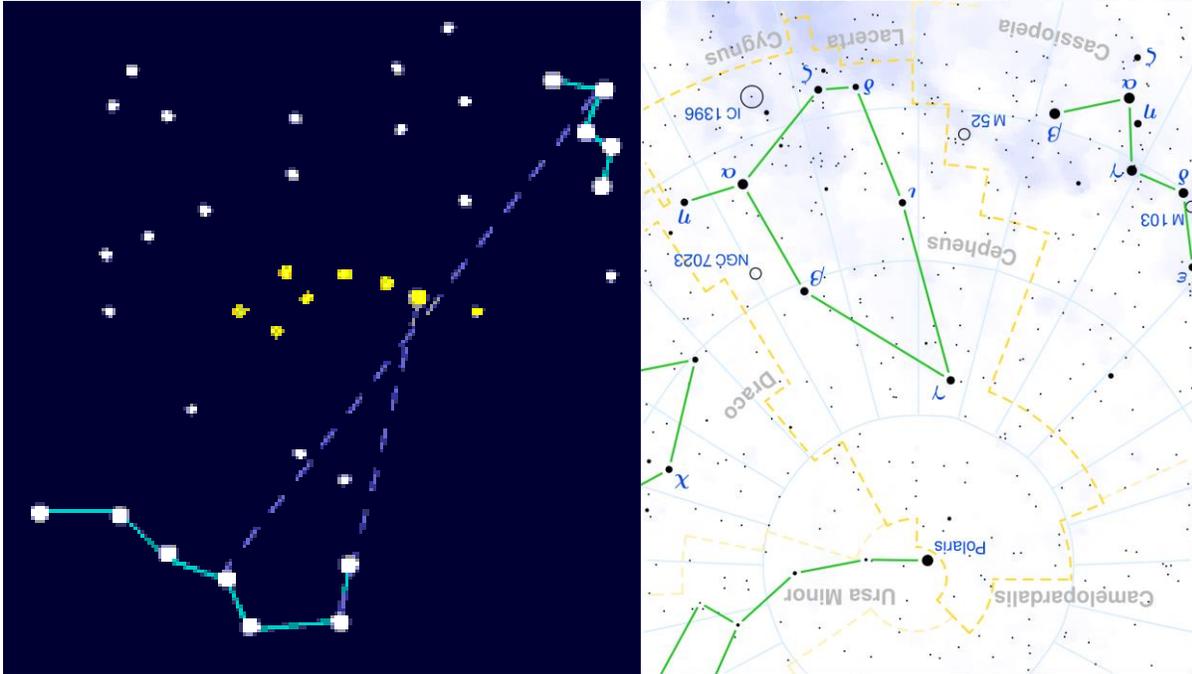
Along with the Big and Little Dippers, there are three other constellations: Draco, Cassiopeia and Cepheus that are collectively known as the circumpolar constellations. This means that they can be seen all year long in New Jersey and areas further north. These three remaining constellations are found by using the Big Dipper as the starting reference point.

Draco is found by looking for an arc of stars which start between the Big and Little Dippers. This arc curves around the cup of the Little Dipper. Once on the other side of the cup, it drops down to a small square which forms the head of the Draco, the Dragon.



Myth: Draco was the guardian of the golden apples and a servant of Hera. Hercules, for his 11th task, had to retrieve the Golden Apples. Atlas, who was an imprison Titan and who was forced to hold up the world, was the only one besides Hera, who knew the location of the apples. Hercules asked Atlas for the location. Atlas would not reveal the location, but agreed to retrieve the apples if Hercules would hold up the world while he retrieved them. Atlas was known to Draco and could safely pass by the dragon. When Atlas returned from getting the apples, he refused to take back the world. Hercules, realizing he had been tricked, asked if Atlas would lift the world for him so that he could at least place a pillow on his shoulders. Atlas agreed to this. Hercules, having tricked Atlas, grabbed the apples and escaped. To this day Draco still protects the remaining Golden Apples.

Cassiopeia is found by starting on the star that is the point where the handle and pot meet on the Big Dipper. From this star draw a line through the North Star. Continue past the North Star on this line for an equal distance. You will find a sideways shaped "W." This is Cassiopeia or what is often referred to as her throne.



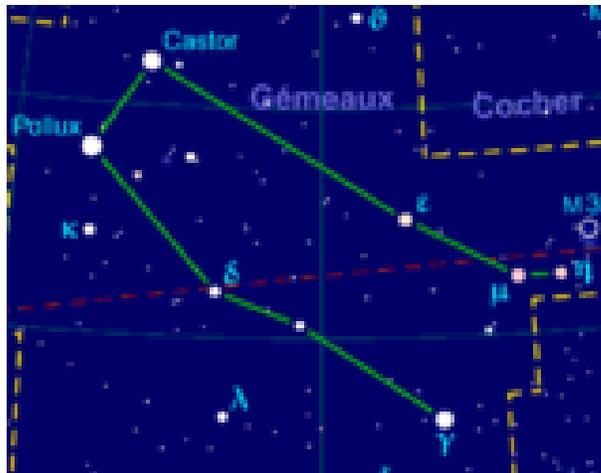
Cepheus is made up of the five stars between Cassiopeia and Draco. It looks like a young child's drawing of a house: a square with a triangle on top of it. You can find Cepheus by extending the line from the pointer stars of the Big Dipper through the North Star and continuing to the top of Cepheus.

Myth: Cassiopeia and Cepheus are Queen and King of Ethiopian City of Joppa. Cassiopeia boasted of her and her daughter's beauty and compared their beauty to Poseidon's Sea Nymphs. Poseidon took offense and sent a sea monster, Cetus, to punish them. Cepheus was told by an oracle to sacrifice his daughter, Andromeda, to appease the gods. (The movie Clash of the Titans is loosely based on this myth if you want to learn the rest of the story.)

Activity 6: The Zodiacs

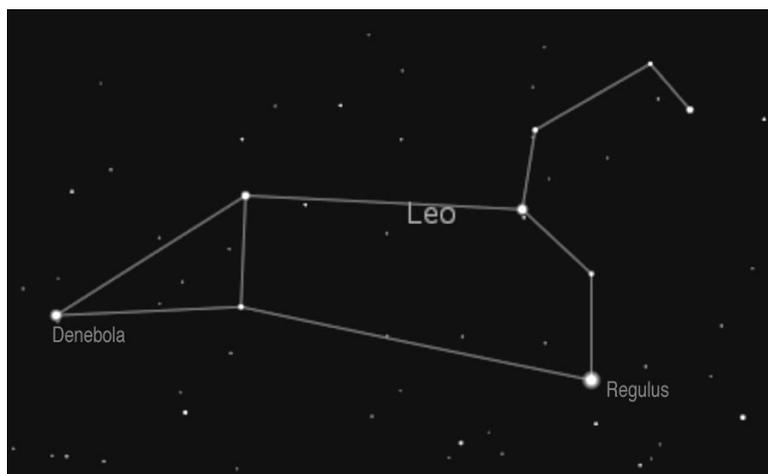
There are five other prominent constellations that can be seen during the spring season. Two of them are Zodiac Constellations: Leo and Gemini.

Gemini, which represents the twins, is found in the sky by creating a line from the base of the handle of the Big Dipper through the bottom pointer star. Extend this line almost twice the length for the Big Dipper and you should come to two very bright stars. These stars are Castor and Pollux, the twins, and both are first magnitude stars. The constellation is basically a rectangle with Castor and Pollux making up the one side and representing the heads of the twins.



Myth: Castor & Pollux were both sons of Zeus and a mortal woman named Leda. Pollux inherited immortality, but only Castor was mortal. The two brothers were devoted to each other. They sailed with the Argonauts and Castor eventually fell in a battle and was sent to the underworld. Pollux pleaded with Zeus to let him stay with Castor in the underworld. Zeus was impressed by Pollux's plea and Pollux was granted permission to spend alternate days between Hades and Olympus. Eventually, Zeus placed them in the heavens so that they would never be apart again.

Leo is found by extending a line through the two non-pointer stars of the pan and continuing the line out the bottom of the pan about 7-8 times the distance between the two non-pointer stars until you find the shape of a backwards question mark. Regulus, which would be the dot for the question mark, is a first magnitude star and will be the brightest star in this region of the sky. This shape represents the head of Leo, the Lion. Behind the head of Leo is a noticeable triangle that represent the rump of the lion.



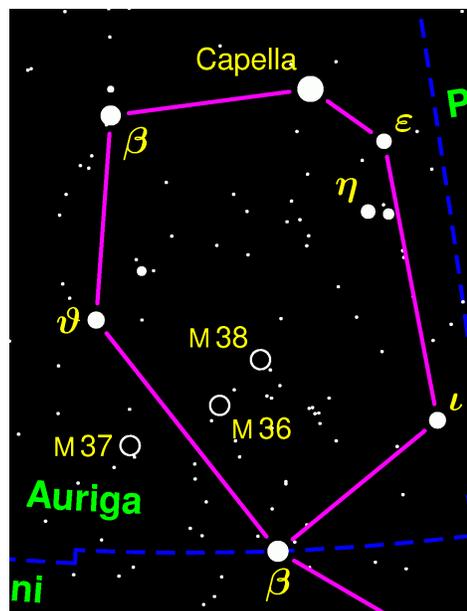
Myth: Leo was the great lion that roamed and attacked the villages in Nemea – a Greek valley. Its skin was impervious to arrows and swords. The first challenge of Hercules was to find and slay this lion. He wrestled with the lion for 30 days before he able to choke the lion to death. Some other myths say he then wore the skin as protection on his other adventures, while others said he nailed it to the sky with the stars.

Optional: May 25 to June 4

If you draw an arc from horizon to horizon through both zodiac constellations, that line is referred to as the Ecliptic. As the seasons change all twelve Zodiac constellations are all found along this line. Unfortunately about half our to dim to see completely in New Jersey. The Ecliptic is also the same line that the Sun, the Moon and all the planets follow through the sky as they rise and set. Another way of looking at this is if the solar system was a room the ecliptic is the floor that the planets move around on as they orbit around the Sun. The Zodiac Constellations would be the patterns on all four walls since they are outside the solar system. As the planets move around the sun, the constellation behind each planet changes. This creates the only part of Astrology that is scientifically correct. When astrologers state that a planet is in a particular sign it means that zodiac constellation is behind the planet when viewing it from the Earth. If you were to look at the constellation in the evening sky, you would see an extra star. That extra star is the planet with the Zodiac constellation behind it. During the dates above, track the Moon each day at 9:00 pm against surrounding constellations. Through these observations you will see the line of the ecliptic.

Activity 7: Auriga

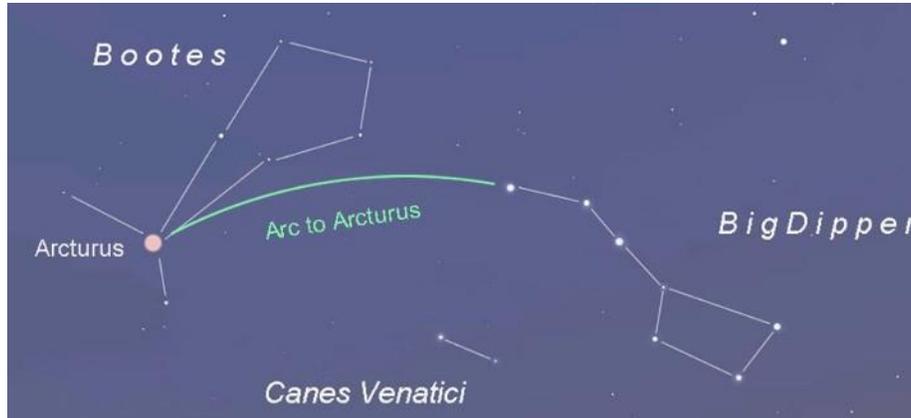
Auriga is found by extending a line across the top of the pot of the Big Dipper. By following this line almost to the horizon, you will discover Capella, another first magnitude star. Auriga is said to represent the front shield of a chariot, but to me is just a six sided shape in the sky.



Myth: Auriga depicts the chariot and honors a King of Athens, Erichthonius. He invented the chariot as a means of getting due to the fact that he was lame. This impressed Zeus so much that he placed the invention in the heavens.

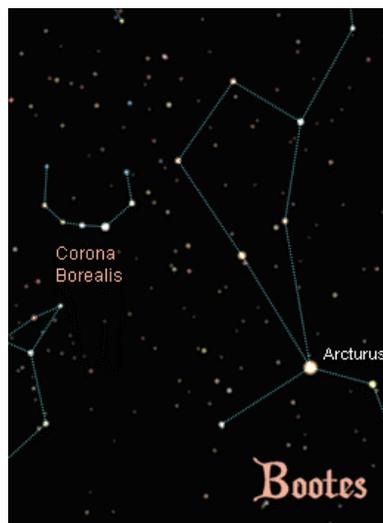
Activity 7: Bootes and Corona Borealis

Return your gaze back to the Big Dipper. Follow the arc of the handle about twice its length and you should find Arcturus, our fifth and last first magnitude star of this springtime sky. Bootes is shaped like the silhouette of a kite with two short tails off the back.



Myth: Bootes plays a multiple of roles in mythology. This constellation symbolizes hardworking men such as the plowman, wagoner or herdsman.

Between Bootes and the horizon, you will notice a bright arc of stars. This is the Northern Crown or what is formally called Corona Borealis.



Myth: Corona Borealis represents jewelry, primarily the crown fashioned by Bacchus that was given to Ariadne, daughter of King Minos, as a wedding gift.