Astronomy for Beginners Lesson Plan

1. Safety

In order to prepare for your upcoming astronomy event, it is important that you stay safe in order to have fun. Below are some things to remember and make sure you have before your next night sky adventure.

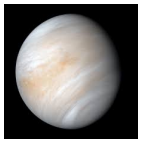
1.1 Safety Checklist

- ☐ Do you have a buddy?
- ☐ Are you carrying a first aid kit?
- ☐ Is All equipment working properly?
- ☐ Did you bring extra water?
- ☐ Are you wearing the proper clothing for the season/time?
- ☐ Do you have a proper red LED flashlight with extra batteries?
- ☐ Did you remember to wear bug spray and/or sunscreen (daytime observations)?
- ☐ Will you be considerate to others?
- ☐ Will you ensure to not look at the sun without proper equipment (Solar eclipse glasses, sun spotter)?

2. Planets in Our Solar System

2.1 Planets

Throughout the night sky there are many things that you are able to see that you would never expect. For instance you are able to see 6 out of 8 planets with the naked eye! Below is a list of the planets in order with some facts about each one. If you can not remember the order of the planets, use the mnemonic “My Very Educated Mother Just Served Us Noodles.

Name	Distance from sun/ order in solar system	Temperature	Make up of planet	Rotation/ orbit speed	Can it be seen from the Earth with the naked eye?	Moons/ Rings
Mercury 	First Planet from the Sun, 36 million miles from the Sun	Surface can reach up to 800 ℉ (430℃)	Similar size to our moon, surface is made out rock, has small atmosphere made up of mostly sodium hydrogen helium and potassium	1 orbit around the Sun = 88 Earth Days 1 rotation= 176 Earth Days	Yes!	No moons
Venus 	Second Planet from the Sun, 67 million miles from the Sun	Surface is can reach up to 900℉ (475 ℃)	Similar in size to Earth, surface is made out of rock, atmosphere is mostly made up of carbon dioxide	1 orbit around the Sun= 225 Earth Days 1 rotation= 243 Earth Days	Yes, one of the brightest objects in the night sky!	No moons
Earth 	Third Planet from the Sun, 93 million miles from the Sun	Surface temperatures average 60 ℉ (15.5 ℃)	Similar in size to Venus, 70 percent of the surface is covered in water, most surface material is made out of rock, atmosphere is made up of nitrogen, oxygen, argon, and other gases	1 orbit around the sun= 365.25 days 1 rotation= 23.93 hours	Yes, just look around you!	Has 1 moon
Mars 	Fourth Planet from the Sun, 142 million miles from the sun	Surface temperatures range between -243 ℉ and 68 ℉ (-153 ℃ and 20 ℃)	About half the size of Earth, surface is rock with a core made mostly of iron, atmosphere is made up of mostly carbon dioxide, with argon, nitrogen, oxygen, and water vapor	1 orbit around the sun= 687 Earth days 1 rotation= 24.6 hours	Yes!	2 moons; Phobos and Deimos

Name	Distance from sun/ order in solar system	Temperature	Make up of planet	Rotation/ orbit speed	Can it be seen from the Earth with the naked eye?	Moons/ Rings
Jupiter 	Fifth Planet from the Sun, 484 million miles from the Sun	Average surface temperature of -166 ℉ (-110 ℃)	About 11 times the size of Earth, gaseous planet made mostly out of hydrogen and helium, contains the largest in the solar system made out of liquid hydrogen	1 orbit around the sun= 11.86 earth years 1 rotation= 9.93 hours	Yes!	Has 95 different moons The four largest moons are Lo, Europa, Ganymede and Callisto Has very 4 part faint rings
Saturn 	Sixth Planet from the Sun, about 900 million miles from the Sun	Temperatures average about -220 ℉ (-140 ℃)	About 9 times the size of Earth, gaseous planet made out of mostly hydrogen and helium with a dense core of iron and nickel, does not have a true surface atmosphere has harsh winds Rings are made up of large amounts of ice and dust particles	1 orbit around the sun = 29.4 earth years 1 rotation = 10.7 hours	Yes, you can even see its distinctive rings!	Has over 200 moons Most famous moon is Titan Has very distinctive rings that can be seen from earth

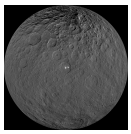
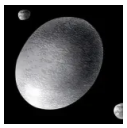
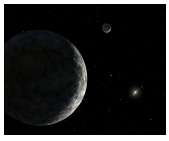
Uranus 	Seventh Planet from the Sun, around 1,785 million miles from the Sun	Temperatures average -320 ℉ (-195℃)	About 4 times wider than Earth, ice giant, doesn't have a true surface Atmosphere is made up of mostly hydrogen, helium and some methane Rings are made out of ice and dust particles	1 orbit around the sun= 84.1 earth years 1 rotation= 17 earth years *Uranus orbits sideways along with its moons	No, you need a high power telescope in order to see	Has 28 known moons Does have 2 sets of rings
Neptune 	Eight Planet form the Sun, about 28 million miles from the Sun	Average Surface temperature of -330 ℉ (-201 ℃)	About 17 times the size of Earth, ice giant, does not have a solid surface but it is made up of methane, ammonia, and water Atmosphere is made up of mostly hydrogen and helium Rings are made of ice and dust particles	1 orbit around the sun=164.8 years 1 rotation= 16 hours	No, you would need a high power telescope in order to see	Has 14 moons Does have 5 rings

2.2 Dwarf Planets

As many people are aware, there used to be 9 planets in our solar system. However, after the reclassification of dwarf planets, Pluto was removed as a planet. Now it sits alongside 4 other dwarf planets that call our solar system home. These dwarf planets excluding Pluto are called Ceres, Haumea, Makemake, and Eris.

Dwarf planets do not classify as regular planets because they are not able to clear away other objects from their path of orbit. Also, unlike the regular planets in our solar system, some are not mostly round (Haumea).

Below I have put some facts about each of the dwarf planets in our solar system. You are unable to see any of the dwarf planets with the naked eye, but it is still good to know where they are located within the solar system.

Name	Location in solar system	Size and distance from the sun	Fun Fact
Ceres 	Located in between Mars and Jupiter in the asteroid belt	Average distance of 257 millions miles from the sun About 1/13 the size of Earth	It is the only dwarf planet in the inner solar system and it was originally thought of as an asteroid before it was classified as a dwarf planet in 2006.
Pluto 	Located in the Kuiper belt (asteroid belt located just outside of Neptune's orbit)	Has an average distance of 3.7 billion miles from the Sun About 1 / 5 of the size of Earth	Has an odd, elliptical orbit in which it crosses over the orbit of Neptune
Haumea 	Located in the Kuiper belt (asteroid belt located just outside of Neptune's orbit)	Has an average distance of 4 billion miles from the Sun About 1/7 of the size of Earth	Has rings and moons similar to that of a regular planet, 1 rotation on its axis is only 4 hours long which gives it is egg shape
Makemake 	Located in the Kuiper belt (asteroid belt located just outside of Neptune's orbit)	Has an average distance of 4.3 billion miles from the Sun About 1/9 the size of Earth	Day length is similar to Earth's at 22.5 hours Has 1 provisional moon called MK2
Eris 	Located in the Kuiper belt (asteroid belt located just outside of Neptune's orbit)	Has an average distance of 6.3 billion miles from the Sun About the same size as Pluto	Has a single moon called Dysnomia Named after the Greek Goddess of discord

3. The Moon

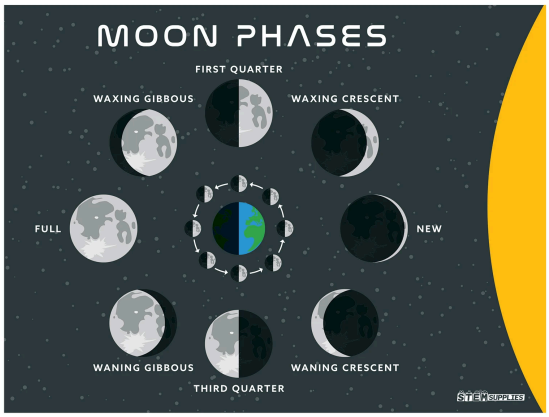
When you look up in the night sky one of the most prominent things you see on most nights is the moon. The moon is the largest object that we can see in our night sky and there is a lot more to it than people think. In this section we dive into what we can see on the moon at night as well as some neat phenomena that occur with the moon.

3.1 Phases of the Moon

The Earth, Moon and Sun change positions constantly with them never being in the same spot two days in a row. As a result, we are able to see the changing moon phases each night. The entire moon phase cycle lasts a total of 29.5 days. Additionally, the moon itself is not emitting light, rather the moonlight is a reflection of light from the Sun; however, the side of the moon that we see never changes.

There are 8 phases of the moon and in order it goes New Moon, Waxing crescent, First Quarter, Waxing Gibbous, Full Moon, Waning Gibbous, Third Quarter, and Waning Crescent. From there the cycle repeats and goes back to a New Moon.

When stargazing, it is important to remember that the moonlight can actually affect how well you see the stars. So, the best time for star parties or other activities is during a new moon.



A New Moon occurs when the Sun and Moon are in the same position in the sky so, from Earth, we are not able to see the moon whereas a Full moon is the complete opposite in which the Moon and Sun are on opposite sides, so from the Earth we can see the entirety of the moon lit up.

New Moon **vs.** **Full Moon**

In between a full and new moon there are the First Quarter and Third Quarter moons. These phases appear as the moon is halfway lit. While they are named ‘quarters’it is to signify the cycle rather than how lit the moon is.

First Quarter **vs.** **Third Quarter**

A waxing and waning crescent occurs when there is only a sliver of the moon lit up (between New Moon and First quarter and between Third Quarter and New Moon); however, they are opposites where waxing is on the right side of the moon and waning is on the left. It is easier to remember that a waxing crescent is increasing the illuminated portion of the moon while a waning crescent is decreasing. The same goes for waning and waxing gibbous where one is illuminated on the right (waxing) and one is illuminated on the left (waning). It is important to know the difference between waxing and waning crescents because it is the easiest way to see which phase could come next or what part of the phase cycle you are in.

Waxing Crescent **vs.** **Waning Crescent**

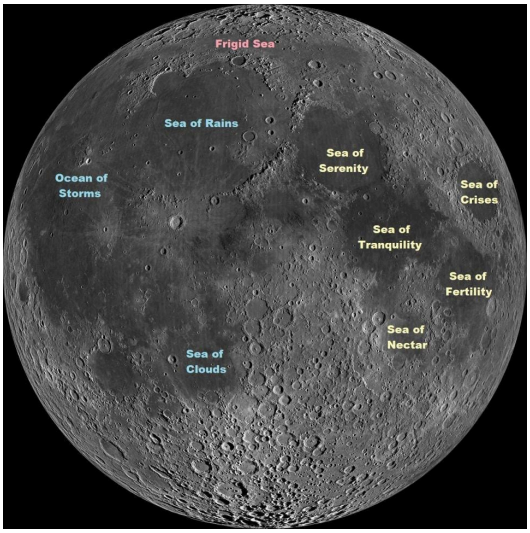
Waxing Gibbous **vs.** **Waning Gibbous**

3.2 Seas vs Craters of the Moon

When observing the moon it is quite obvious that the moon is not perfectly flat. In fact, the moon's indents are called seas and craters. There are some key differences between seas and craters on the moon which is what we are exploring in this section.

Seas

Seas are large expanses of the moon that appear slightly darker than the rest of the moon. They were created as impact basins from collisions with space debris that were then filled with lava and other lunar material. They are called seas because originally we thought they were filled with water which later was discovered to be false. In total, they cover about 15 percent of the moon with the most notable being The Sea of Tranquility, Ocean of Storms (the largest), Sea of Showers, Sea of Crises, and more.



Craters

Craters on the moon can be seen as the circular indentations that come in a wide range of sizes. These depressions were made after asteroids, meteoroids or comets came into contact with the moon. They can even be seen on Earth however not as common in comparison due to the atmosphere preventing them from entering. In contrast, the moon has a very thin atmosphere that cannot slow or reduce the impact from asteroids, meteoroids or comets.

Craters can come in many different sizes with the largest being over 1,500 miles in diameter. There are 3 main types of craters; simple, complex and basins. Simple craters are typically smooth and no larger than 6 to 9 miles in diameter. Complex craters are larger than simple craters (9+ miles in diameter), but they often have features such as terraces, peaks, and flatish floors. Lastly, basins are huge craters that are over 186 miles in diameter; there are more than 40 of these located on the surface of the moon.

3.3 Eclipses

At various points throughout the year, the Moon, the Sun, and the Earth line up perfectly. When they are aligned, phenomena called eclipses occur. There are 2 types of eclipses– lunar and solar eclipse. Lunar eclipses occur about 2 to 3 times per year whereas solar eclipses occur about 2 to 5 times a year.

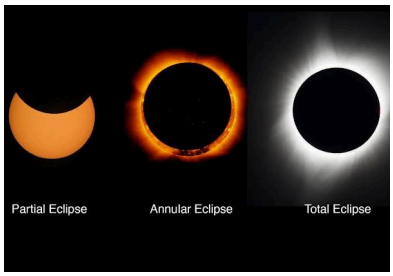
Lunar Eclipse

A lunar eclipse only occurs at the full moon phase in which the Earth is positioned right in between the Moon and the Sun. During a lunar eclipse, the Moon turns into a striking red color due to the blue and purple light wavelengths being absorbed in the Earth's atmosphere and the red wavelengths are refracted (bent) towards the moon.

Solar Eclipse

A solar eclipse can only occur during the new moon phase, when the moon is positioned right in between the Earth and the Sun. During a solar eclipse, the shadow from the moon blocks Earth's vision of the Sun. Depending on where you are in the world, the sun may be blocked partially or totally. The shadow of the moon consists of 2 parts called the umbra (fully blocked) and the penumbra (partially blocked).

There are 2 types of solar eclipses, an annual solar eclipse and a total solar eclipse. A total solar eclipse completely blocks the view of the Sun and the Earth will darken like the sun is rising or setting. An annular solar eclipse also occurs when the moon passes in front of the sun, but it is at the furthest point away from the Earth, so it does not cover the sun entirely.

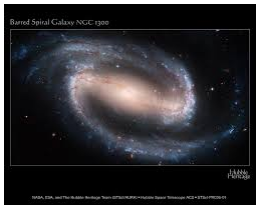


4. Types of Galaxies

Galaxies are large clusters or gas, dust, stars, planets, that are all held together by gravity. Our solar system is located within the Milky Way galaxy, but there are trillions of galaxies located throughout the universe. In this section we dive into the classifications of galaxies and our galaxy that we call home.

4.1 Most Common Types of Galaxies

When classifying galaxies, they are often categorized by their shape and other key features. The most common types of galaxies are listed below with ways to identify each.

Type of galaxy	Key Features	Image
Spiral	Spirals have arms in the shape of pinwheels they can be either tight or loosely wound.	
Elliptical	Elliptical galaxies are round to oval in shape and are less common in comparison to spiral galaxies. Additionally, the stars located in these galaxies are typically much older than those located in spiral galaxies	
Irregular	Irregular galaxies have unusual shapes, can come in many different sizes of dwarf irregular galaxies to extremely large ones Hypothesize they are created through galaxies interacting with each other	
Lenticular	A cross between elliptical Galaxies and spiral galaxies, has a center bulge but no arms - scientists hypothesize that they are older spiral galaxies whose arms are faded Similar to elliptical galaxies, they have older stars	

4.2 Our Galaxy: The Milky Way

Our solar system is located within the Milky Way Galaxy. The Milky Way is dubbed “milky” due to the translucent white streak we are able to see in the night sky (see below). It is a spiral

galaxy that is about 100,000 light years across and 1,000 light years thick. Our location is about half way to the center of the galaxy, which means we are roughly 25,000 light years from the edge and roughly 25,000 light years to the center. The Milky Way is thought to be about 13.9 billion years old with 200 billion stars located throughout.

As mentioned previously, we are able to see the milky way in our night sky. There is a band that stretches across the night sky, but without knowing where it is, it can be hard to find. There are several ways to remember where the milky way is simply by using the constellations of Cygnus the Swan and Saggitarius. It is important to know however, that it can be hard to see when in a place with lots of light pollution, so dark locations prove best for viewing.

5. Constellations

Throughout the year, the stars that you can view change due to the rotation of the Earth and the seasons. For example, during the summer you would see completely different constellations than you would during the winter. In the following sections, there are some easy to locate constellations that you can see during each season with images. However, the best way to know where they are is to attend a star party so you can understand where they are in the night sky.

Some constellations you are able to see year round, such as Ursa Major and Ursa Minor (also known as the Big Dipper and Little Dipper). However, these constellations are only visible in the Northern Hemisphere, so some of the constellations you see in the Southern Hemisphere are different. In this section, it will apply to how we in the Northern Hemisphere view the night sky.

5.1 Asterisms

Asterisms, while similar to constellations, are not quite the same and are an important distinction when stargazing. An Asterism is a pattern of stars that make up a distinctive shape. Many asterisms can be entire constellations, while others are parts of them or individual stars that form a pattern with other stars in different constellations. Below is a list of well known asterisms that are easy to spot with the naked eye

- Big Dipper (Ursa Major)
- Summer Triangle (Vega –Lyra, Deneb – Cygnus, and Altair –Aquila)
- Keystone (Hercules)

- Orion's belt (Orion)
- Great Square of Pegasus (Pegasus)
- Winter Triangle (Sirius, Procyon, Beetlegeus)
- Teapot (Sagitarrius)
- Northern Cross (Cygnus)
- “W” (Cassiopea)
- “V” (Head of Taurus)
- The Seven Sisters (Pleiades)
- Fishhook (Tail of Scorpius)
- Winter Hexagon- largest asterism in the night sky (Sirius – Canis Major, Castor/Pollux – Gemini, Capella – Auriga, Aldebaren– Taurus, Rigil– Orion)

It is important to note that similar to constellations, asterisms rotate with the Earth and change positions in the night sky throughout the year and seasons.

5.2 Ursa Major and Ursa Minor

The most well known constellations in the night sky are Ursa Major and Ursa Minor. As mentioned previously, they are able to be seen year round in the Northern Hemisphere. However, their orientation in the night sky rotates around the North star or polaris. Below, you are able to see their position in the night sky.

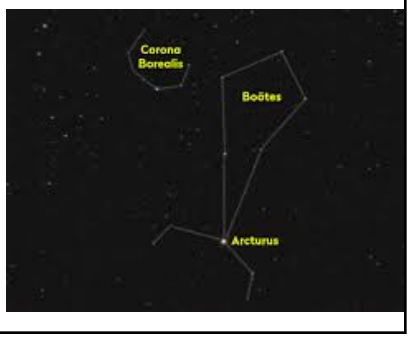
5.3 Winter Constellations

Name	Description/Shape/ Key Feature	Image

Orion	Orion in Greek Mythology is a hunter with. Most notable for its “belt” made out of 3 stars and the bright stars of Beetlegeuse and Rigel	
Taurus	Taurus is a bull in Greek Mythology Most notable for its “v” shaped head and its bright star of Aldebaran that resembles an eye	
Gemini	Represents mythical twins Castor and Pollux Two brightest stars make up the heads of the twins, also named Castor and Pollux	

Canis Major	Known as the “Greater Dog” constellation Key feature of Sirius which is brightest star in the sky	

5.4 Spring Constellations

Name	Description/Shape/ Key Feature	Image
Leo	Representative of a lion Has prominent backwards question mark shape with the brightest star of Regulus	
Bootes	Constellation of a Herdsman With the brightest star of Arcturus	

Virgo	Constellation of a young maiden Brightest star of Spica	
Hydra	Represents a water snake Is considered the longest and largest constellation in the night sky	

5.5 Summer Constellations

Name	Description/Shape/ Key Feature	Image
Scorpius	Depicts a giant scorpion Brightest star is Antares (heart), with a distinctive “J” hook tail	

Sagittarius	Depicting an archer that is a centaur Brightest stars in the constellation make up the asterism of a teapot, able to use Sagittarius to find the Milky Way Galaxy, (just remember that teapots make steam)	
Corona Borealis	Called the Northern Crown Has distinctive arc shape, much like a crown, Alphecca is the brightest star (also known as Gemma which can be remembered by crowns have gems in it)	
Summer Triangle (Cygnus the Swan, Lyra the Lyre, Aquila the Eagle)	Consists of the asterism of the summer triangle which is made up of Cygnus (swan), Lyra (lyre– handheld harp), and Aquila (Eagle) The triangle is made up of the stars of Deneb (tail of Cygnus), Vega (tip of Lyra) and Altair (head of Aquila)	

5.6 Autumn Constellations

Name	Description/Shape/ Key Feature	Image

Cassiopea	Depicts a Queen in her Throne Demonstrates a distinctive “M” or “W” or backwards 3 depending on the time of the night and season. Can be used to help find the North Star	
Aquarius	Depicts a Water Bearer pouring water Brightest stars are Sadalsuud and Sadalmelik	
Pegasus	Depiction of a winged horse or Pegasus Features the asterism of the Great Square of Pegasus and the brightest stars of Markab	
The Pleiades	Depicts the “Seven Sisters”, with seven main stars. However, it actually contains over 1,000 stars. Is located in the constellation of Taurus	

6. Types of Stars

6.1 Most Common Types of Stars

Most of the twinkling white dots in the night sky are stars. There are billions of stars throughout the galaxy and can be billions of years old. Stars consist of clumps of dust and gas that are held together by a balance of gravity pulling inward and the forces of a nuclear fusion reaction (where hydrogen is converted into helium) which creates high amounts of pressure outward, thus keeping a star stable. Every star ranges in terms of luminosity (how bright it is), color, and size. The most common types of stars are red giants, white dwarves, and blue stars. These various colors of stars are created due to their chemical make ups of different gases. For example, Red giants often appear more orange than red and are made up of mostly hydrogen and helium. Red stars are also the coldest type of stars for example, Antares is about 3,000 ℃ whereas blue stars such as Spica can be up to 28,000 ℃. Red stars can be 100 to 1,000 times larger than our sun today. Scientists theorize that in about 5 billion years, it is thought that our sun will become a red giant. The next common type of stars is white dwarf stars. They occur in the stage after red giant stars when they release most of their atmosphere leaving only the core of the star. White dwarf stars are very dense and can be quite hard to see with the naked eye. Lastly, blue stars are the largest as well as the brightest stars. They are also the hottest stars because there is more energy emitted from the blue in comparison to red stars (see above). However, due to their extreme temperatures, blue stars have a very short life span and thus are more common near star-forming regions.

6.2 Easily Identifiable Stars.

As previously mentioned, there are many stars that exhibit various colors throughout the night sky, but it is much more fun to be able to go outside and identify which stars have these colors. Listed below are some easily identifiable stars and their colors.

Color of Star	Names of Stars and Constellations
Red Giants	Arcturus (Bootes), Antares (Scorpius), Aldebaran (Taurus), Betelgeus (Orion)
Blue	Rigel (Orion), Maia, Taygeta, Electra, Celaeno (Pleiades)
White dwarf	Sirius B (Canis Major), Procyon B (Canis Minor)

7. Stories Throughout Various Cultures

In western cultures, the most well known stories about the stars come from ancient Greek and Roman cultures. Many of the constellation names as well as planet names were given through mythological stories of Gods and their interactions with humans. However, this was in only one region of the world, so naturally, other cultures developed their own stories. In this section, we look at how different cultures have viewed constellations and their significance in comparison to Greek mythology; however, this is a condensed version of the tales between cultures so I have linked the sources below if you are interested in looking further.

7.1 The Pleiades

In Japanese culture they have named the pleiades "Subaru" which means coming together or cluster. The popular car company *Subaru* was given this name which represents the joining of five companies into one large manufacturer. In fact, *Subaru* even features the pleiades in their logo of the seven stars.

In Greek Mythology the pleiades were the seven daughters of the titan Atlas who was forced to carry the heavens. Orion, the great hunter, began to pursue all of the daughters, but the Greek king of gods, Zeus, turned them into stars in order to save them. However, it is still said that the constellation of Orion pursues them across the night sky.

7.2 Ursa Major

In the Native American Cree tribes, they viewed Ursa Major as Mista Muskwa, who similarly was a large bear that roamed over all of the lands. However, many of the other animals were afraid of him because he was large, mean, and powerful. He was a large bully which really upset all of the animals who wanted to get revenge. So, they used their best hunters and trackers to take him down; however their hunt was so fast they flew into the northern night sky and remained there with Mista Muskwa (Ursa major) along with the seven birds (Corona Borealis).

In Greek Mythology, the constellation Ursa Major was originally Callista who belonged to Artemis's (goddess of the hunt) team of powerful hunters. One day, Zeus (the Greek king of gods) caught sight of Callista and they ended up having an affair together. Callista was then banished from Artemis's team. Hera, the wife of Zeus, found out about the affair and was irate and became determined to get her revenge on Callista. So, Hera turned her into a bear and made her wander through the woods for 15 years. Then, Callista's son Arcas who became a skilled hunter as well, came into contact with Callista in her bear form in the woods and was close to killing his own mother, so to prevent this Zeus turned him into a bear and placed Arcas and Callista into the sky as Ursa Major and Ursa Minor.

7.3 Scorpius

In Hawaiian folklore, Scorpius's tail is known as Nui o Maui which translates to "the big fish hook of Maui." Maui, a demigod, was said to have created the Hawaiian islands when he caught his large fish hook on the Ocean floor and raised the islands to the surface. For navigation, Polynesian sailors would use this constellation to find their direction and orientation in the vast seas.

In Greek Mythology, Scorpius is depicted as a giant scorpion who was set to defeat Orion, the skilled hunter. Orion grew very cocky and threatened to hunt every creature on Earth which upset Gaia (mother earth). So, Scorpius was sent after him to stop him, but at the end of their ferocious battle Orion stabbed Scorpius, while Scorpius bit Orion's foot thus killing one another at the same time. In order to memorialize them, the gods put them in the opposite ends of the sky so they would never fight again.

8. Links to Sources

Safety Links

1. https://www.explorescientific.com/blogs/explorescientific/preparing-for-an-astronomy-expedition?srsltid=AfmBOooUHUmfXoYpY_1ua0HXIj1LnyOvDKrmjIpHGty7pXzqaPKqJ907
2. https://www.mnastro.org/wp-content/uploads/2022/02/star-party-guidelines.pdf
3. https://www.astronomy.com/astronomy-for-beginners/what-to-bring-for-a-night-of-stargazing-the-ultimate-guide/

Planet Links

1. https://www.planetary.org/worlds/mercury
2. https://airandspace.si.edu/explore/stories/mercury
3. https://www.nhm.ac.uk/discover/planet-mercury.html
4. https://science.nasa.gov/venus/venus-facts/
5. https://www.astronomy.com/science/earth/
6. https://science.nasa.gov/earth/facts/
7. https://www.nhm.ac.uk/discover/planet-mars.html
8. https://www.esa.int/Science_Exploration/Space_Science/Juice/Facts_about_Jupiter
9. https://science.nasa.gov/jupiter/jupiter-facts/
10. https://www.space.com/48-saturn-the-solar-systems-major-ring-bearer.html
11. https://science.nasa.gov/saturn/facts/
12. https://www.planetary.org/worlds/uranus
13. https://science.nasa.gov/uranus/facts/
14. https://space-facts.com/neptune/#google_vignette
15. https://science.nasa.gov/neptune/neptune-facts/
16. https://science.nasa.gov/dwarf-planets/
17. https://www.planetary.org/articles/meet-the-dwarf-planets

The Moon Links

1. https://science.nasa.gov/moon/moon-phases/
2. https://www.planetary.org/articles/the-phases-of-the-moon-explained?gad_source=1&gad_campaignid=18220423822&gbraid=0AAAADozrycQQg9KPN4aTMWrX32nBbAN9&gclid=Cj0KCQjw-4XFBhCBARIsAAdNOktX4vz1j7OG8u6g1V9GTJk5BUFrrgAYiUJMFulNODgAuf2Xz48tqA4aAqseEALw_wcB
3. https://www.skyatnightmagazine.com/space-science/lunar-maria-guide-list-seas-moon
4. https://science.nasa.gov/moon/lunar-craters/
5. http://science.nasa.gov/moon/eclipses/

Galaxies Links

1. https://science.nasa.gov/universe/galaxies/types/
2. https://www.space.com/19915-milky-way-galaxy.html

Constellations Links

1. https://www.rmg.co.uk/stories/space-astronomy/what-are-pleiades
2. https://starwalk.medium.com/best-constellations-season-by-season-northern-hemisphere-7892257aa133

Types of Stars Links

1. https://astrobackyard.com/types-of-stars/
2. https://science.nasa.gov/universe/stars/types/
3. https://www.space.com/blue-stars
4. https://earthsky.org/favorite-star-patterns/pleiades-star-cluster-enjoys-worldwide-renown/

Stories Throughout Cultures Links

1. http://judy-volker.com/StarLore/Myths/Cree.html#HUNT
2. http://judy-volker.com/StarLore/Myths/UrsaMajor1.html#GREECE
3. http://judy-volker.com/StarLore/Myths/Scorpius2.html#HI
4. http://judy-volker.com/StarLore/Myths/Pleiades3.html#CH
5. http://judy-volker.com/StarLore/Myths/Pleiades1.html#G