Backyard Astronomy

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Photo Credit: NASA, *A Mess of Stars,*08-10-2015

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What will you need?

The most important things you will need are your curiosity, your naked eyes, and the ability to observe.

You do not need fancy telescopes to begin enjoying the wonders of our amazing night skies. Here in Northern New Mexico, we are blessed with the ability to step out of our homes, look up, and see the Milky Way displayed above us without too much obstruction.

Photo Credit: NASA, A Glimpse of the Milky Way, 12-13-2005

While the following Items can help you to begin exploring the wonders of the Universe, they are not required. These items include:

1. Binoculars
2. Telescope (a small inexpensive one is fine)
3. Star Chart Planisphere
4. Free Astronomy Apps for both iPhones and Androids

   There are several really good free apps that help you identify, locate, and track celestial objects. One that I use is *Star Walk 2* but there are other good apps available.

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What am I looking at?

When you look up at night, what do you see? Probably more than you think! Below is a list of the Celestial Items you can see.

* Photo Credits Images.NASA.gov

- **The Moon** - The Moon is the Earth's only Natural Satellite and is arguably the most recognized and familiar Night time Celestial Body. Did you know that while the Moon is bright it does not make its own light, but rather reflects the light of the Sun; like a Mirror? The Moon has always fascinated humans and is the most studied and documented object in our night skies. You can make your own observations of the Moon with nothing more than your own eyes. The moon waxes (growing brighter) and wanes (growing darker) through a 29.5 day cycle. You can check online at Moon Phases 2020 – Lunar Calendar to find out where in the cycle the moon is . Before going out to look at the Moon you can become familiar with the Moon's features and their names on the Google Moon Map .

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* Photo Credits Images.NASA.gov

- **International Space Station** - The International Space Station is the largest artificial Satellite orbiting the Earth. It has been in a low Earth Orbit since the first component was launched in 1998 and has been continuously occupied since November 2, 2000. Did you know that if you have clear night skies you can see the International Space Station with your naked eyes?! It will look like a bright very fast moving spot traveling on a straight path from horizon to horizon. To find out when the Station is visible where you live click this link Spot The Station . To find out what the station looks like on the inside you can click here to Explore the Station !

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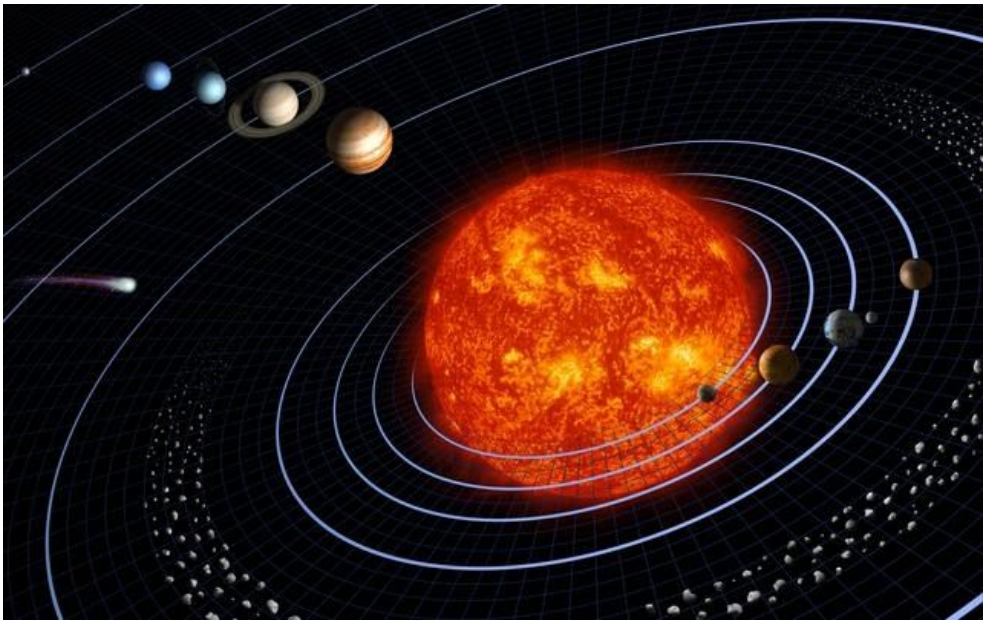

* Photo Credits Images.NASA.gov

- **Planets** - There are 8 Planets in our Solar System, including our own Home Planet of Earth. At various times of the year you can see 5 of the other Planets with your naked eyes, and for more details with the aid of Binoculars or Telescope. The Planets you can easily see are *Mercury*, *Venus*, *Mars*, *Jupiter*, and *Saturn*. The Planets *Uranus*, *and Neptune* can also be seen but are harder and need a telescope. Like the Moon, the Planets reflect the light of the Sun and will appear brighter than the stars around them.

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* Photo Credits Images.NASA.gov

- **Meteors** - A Meteor, often known as a Shooting Star, happens when a Meteoroid enters our Atmosphere and it sheds particles, creating a glowing trail of light behind it. Any remaining debris that hits the ground then becomes a Meteorite. While you can see Meteors throughout the year, there are predictable times when a cluster of Meteors occur, called Meteor Showers. To find the dates of predicted Meteor Showers, and to increase your odds of seeing a Meteor, you can check the Calendar at the American Meteor Society site.

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* Photo Credits Images.NASA.gov

- **Comets** - Comets are Big Dirty Space Snowballs! They are made of Dirt, Rocks, and Ices. As they approach the Sun they start to shed debris and gases which makes them glow bright at the head and form a long glowing tail that can stretch millions of miles! They are spectacular and a rare treat to observe! To learn more about Comets you can go to the NASA Site.

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* Photo Credits Images.NASA.gov

- **Stars** - Did you know our Sun is a Star? It is! All the Stars you see (and can't see) when you look up at night are Suns. It is impossible to know how many Stars there are in the Universe, but you can see that the number is vast. Humans have long found a connection with the Stars, creating Mythologies, Stories, and Superstitions about them. Some of the Stars have names that entwine with Science and History. Ancient Mariners used the Stars to guide them and Seers looked to the Stars for Omens. To learn more about the Stars you can go to the NASA site.

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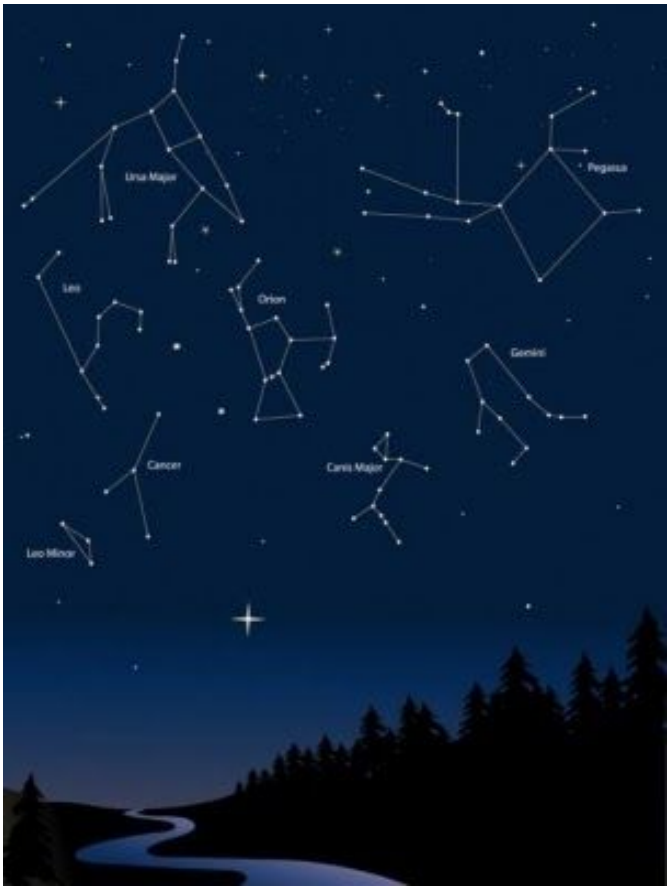

- **Constellations** - Constellations are groups of stars that form a shape or pattern in the sky. Throughout Human History, different Cultures have seen shapes in the stars and created stories about them. The 48 Constellations that we are most familiar with in the Northern Hemisphere were originally established by The ancient Sumerians and the Greeks, however the Native People of North America have their own Constellations and folklore about them as well. In 1928 The International Astronomical Union recognized a total of 88 Constellations in both hemispheres. Click the link for an Interactive Chart of the Constellations. You can also use an interactive app on your phone or tablet to help identify the Constellations.

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* Photo Credits Images.NASA.gov

- **Galaxies** - a Galaxy is a collection of Billions of Stars, their planets, Dust, and Gases and is held together by Gravity. We have identified three shapes of Galaxies: Elliptical, Spiral, and Irregular. It is estimated that there are about 200 Billion Galaxies in the Observable Universe! Our own Milky Way is a Spiral Galaxy. When you look up on a dark night you can clearly see the Milky Way stretching across the sky. With the aid of Binoculars or a telescope, you can see other Galaxies like the Andromeda Galaxy. To learn more click this link from NASA Galaxies.

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* Photo Credits Images.NASA.gov

- **Lunar Eclipse** - A Total Lunar Eclipse occurs when the Moon is completely covered by the Earth's Shadow. This happens when the Moon, Earth, and Sun are in alignment with each other. This phenomenon can be safely viewed with the naked eye. During a Total Eclipse the Moon takes on a deep Red Color, which is sometimes called a Blood Moon. Throughout History, Humans have seen Lunar Eclipses as both Good and Bad Omens and have interwoven them into Folklore. The next observable Lunar Eclipse will be on May 26, 2021 and another a year later on May 16, 2022.

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What You Can See: August 2020

You can check HERE to see what is in the Sky on any night!

- **August 1 - 29** - the Planets you can clearly see this Month are Venus, Mars, Jupiter, and Saturn. You might also be able to see Uranus with a telescope.

- **August 3** - Full Moon

- **August 11 - 13** - The Perseid Meteor Shower is always a spectacular show of shooting stars with the Peak occurring in the predawn hours of August 12th, and it often produces a meteor a minute. This annual Meteor show is called the Perseid because they appear to come from the constellation Perseus.

- **August 13** - This is the best time to view Venus since it will be at its highest point above the horizon in the morning sky. Look for the bright planet in the eastern sky before sunrise.

- **August 19** - The New Moon. This is when the Moon is at its darkest and you can see the Stars at their brightest.

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What You Can See: September 2020

- **September 1 - 30** - the Planets you can clearly see this Month are Venus, Mars, Jupiter, Saturn, Uranus, and Neptune. You might also be able to see Uranus with a telescope.

- **September 2** - Full Moon

- **September 6** - The Moon and Mars will be in conjunction, meaning that they will appear very close together!

- **September 11** - Neptune is the closest to the Earth and its visible face will be completely illuminated by the Sun, so it is the brightest it will be in the year. You can see it with the naked eye as a bright spot of light throughout the night, but is best viewed with binoculars or a telescope.

- **September 17** - New Moon. This is when the Moon is at its darkest and you can see the Stars at their brightest.

- **September 22** - Fall Equinox. This is the day when the day and night are about equal throughout the World. In the Northern Hemisphere it signals the beginning of Fall and shorter days as we head toward Winter.

- **September 25** - The Moon will be in conjunction with both Jupiter and Saturn, meaning they will appear very close together!

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What You Can See: October 2020

- **October 1- 31** - the Planets you can clearly see this Month are Mercury, Venus, Mars, Jupiter, Saturn, Uranus, and Neptune. You might also be able to see Uranus with a telescope.

- **October 1** - Full Moon

- **October 1** - Mercury will be at its most visible, although it can still be tricky to find. Look for Mercury low in the Western Sky just above the Horizon right after Sunset.

- **October 6-10** - Draconids Meteor Shower is best viewed in the early evenings, with the peak occurring on the night of October 7th. This Meteor Shower usually produces about 10 meteors per hour, but this year with a quarter Moon producing darker skies, this should be a good show this year!

- **October 13** - Mars will be the closest to Earth and its face will be fully illuminated by the Sun. This means that it will be the brightest and most visible than any other time of the year. Mars will be visible all night long!

- **October 16** - New Moon. This is when the Moon is at its darkest and you can see the Stars at their brightest.

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- **October 2 to November 7** - Orionids Meteor Shower. This Meteor Shower is produced by dust grains left behind by Comet Halley and can produce up to 20 Meteors per hour. The peak of this shower will be the Night of **October 21** and the early Morning of **October 22**. The best viewing will be after Midnight when the Crescent Moon sets leaving a dark sky. Although the Meteors can appear anywhere in the Sky, look to the Constellation of Orion for the best chances of seeing this show!

- **October 29-30** - Southern Taurids Meteor Shower. This Meteor Shower actually runs from September 10 to November 20, but the Peak viewing will be the night of October 29 and the Morning of October 30. Although Meteors can appear anywhere in the sky, look to the Constellation of Taurus for the best chances of spotting one!

- **October 31** - Full Moon. This is a second Full Moon in a Month and is traditionally referred to as a Blue Moon. The term “Once In a Blue Moon” comes from this more rare occurrence.

- **October 31** - Uranus will be the closest to Earth and its face will be fully illuminated by the Sun. This means that it will be the brightest and most visible than any other time of the year. Uranus will be visible all night long! Because Uranus is so far away from us, it will appear as a tiny blue-green dot through a telescope.

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Star Stories

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Activities: Tracking the Sunset/Sunrise

1. Find a clear(ish) view of the Horizon at a place that is easy and safe to get to, preferably from your home. To track the Sunrise, you will need a due East Horizon view. To track the Sunset, you will need a due West Horizon view. You can choose one or both. It is up to you!
2. Take a landscape photo of the horizon and print it out. You can also do a landscape sketch on a piece of paper. It doesn't have to be perfect, just the idea of the shape of the horizon.
3. Once or Twice a week stand in the same spot looking at the horizon at Sunrise or Sunset and mark on your photo / drawing the place that the Sun is rising / setting with the date and time.
4. Continue to do this over several months. The longer you do it the more data you will have to make observations!
5. What have you observed?
6. Does the Sun rise / set at the same time every day?
7. Does the Sun rise / set in the same place every day?
8. What do you think will happen 3 months from now? 6 months from now?
9. Why do you think it was important for our ancestors to observe the Sunrises and Sunsets throughout the year?

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Activities: Moon Watching

The Moon is probably the most observed and documented celestial object in Human History. There are several ways you can observe and document the Moon from your Backyard.

1. **Keep a Moon Journal** - You can Download and Print a Moon Journal from NASA. Record your Observations of the Moon for a Month or longer. What have you noticed? Why do you think our Ancestors kept a close Watch on the Moon? How did it help them?

2. **Chart the Moon** - While the Moon is a sphere, we can only see one face of it due to a phenomenon called synchronous rotation. Until the NASA Moon Missions in the 20th Century when we could travel to the far side, we had no idea what the other side of the Moon looked like. Looking up from your BackYard, you see the same Moon Features that your Ancestors saw thousands of years ago. To Chart the Moon, take a large blank piece of paper and draw a circle (You can use a bowl or cup as a template). Take your time looking at the Moon and when you are ready begin to draw in the circle the features of the Moon that you see. You can see more detail if you use Binoculars or a telescope, but you should be able to see many features with your naked eyes, especially on a clear night of a full Moon!
   If you are curious what the far side of the Moon looks like, click here to go to NASAs Moon page!

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Activities: Tracking the International Space Station

The International Space Station is the third brightest object in the sky and if you know when to look you can see it with your naked eye as it moves quickly across the sky.

You can keep track of when the Station will be visible over your BackYard using NASA's Spot The Station tracking site. You can also signup for alerts for when you can see it.

Use a log to keep track of how often you spot it. Record the Date, Time, Location and any other observations you want to keep track of like direction, weather conditions, etc…

As you look at the data, what does it tell you? Are there patterns? Can the sightings be predicted? Does it follow the same path every time? Does the direction change?

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Activities: Constellation Discovery

On a clear night take some time and go out, get comfortable, and look up. Find a patch of sky and study the Stars and how they are situated with each other. Take your time and think about any patterns you start to see in them.

Take a clean piece of paper and carefully draw the Stars in the pattern you see. What does the Pattern look like to you? An animal? An Object? A Plant? A Person or Group of People? A Fantastical Beast? A group of things? Whatever your mind sees, connect the stars and draw it out as a basic form and Name it whatever you want! From now on that is YOUR Constellation!

Now take out another piece of paper and write out the Myth or Story about your Constellation. It can be as long or short as you want it to be.

There are Billions of Stars above us and you can create as many Constellations as you want to!

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What to Read

The Library has many great books and DVD's on Astronomy in the 500 section of Non-Fiction for all ages.

You can search our Catalog online at https://santafelibrary.org/ or call and speak with a Reference Librarian at 505-955-6781, 505-955-4862, and 505-955-2820 to find and put Materials on Hold for Pick-up.