

ASTRONOMY

Calendar Connections Cards

Target Level: grades 3-6

The facts are created at a more advanced level but can easily be used for the entire homeschool family!
Young children will soak up the information their older siblings are taught while all together.

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Calendar Connections Cards

In this file you will find a one page set of mini cards. These can either be cut up for a mini pocket chart calendar, or leave the page whole and add to a [calendar notebook!](#)

You will also find the larger image cards and fact cards – these do NOT print front to back. Print the image cards for your calendar {laminare if possible} and keep the information cards separate on a metal ring or behind the image cards in the calendar. [See the calendar we use here.](#)



Calendar Connections Supplies





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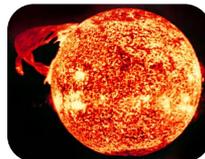
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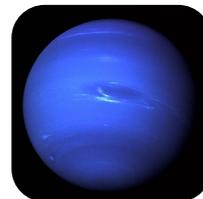
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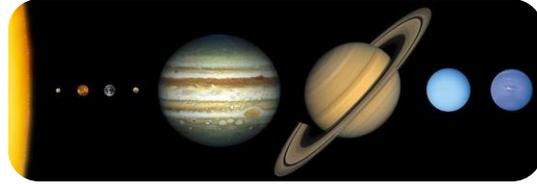
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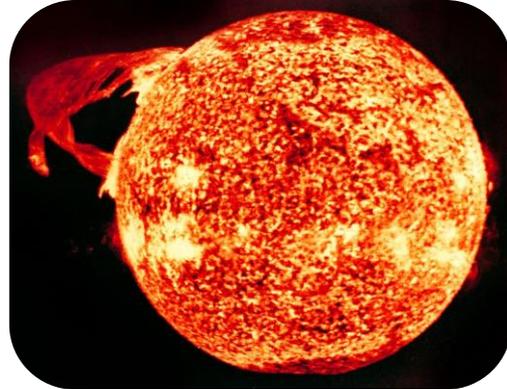
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1

Astronomy

Astronomy is the study of the universe. The word **aster** means **star**. The word **onomy** means **knowledge of**. Many years ago star was the only word used to describe what people saw in space. Today we still use the word "astronomy" to describe the study of stars, planets, and everything in space.

2

Solar System

The solar system is the term used to describe the sun and the nine planets that circle around the sun. The planets have been placed in a certain arrangement and are held in this arrangement by gravity. Gravity is an invisible force that pulls objects towards it. Similar to a magnet. All the planets and the moon have gravity. Larger planets have more gravity than smaller ones. The sun, the biggest thing in our solar system, has the most gravity forcing all the planets to keep their orbital paths around it. Gravitational pull is what keeps each planet in it's perfect position. The sun pulls on Mercury from one side while Jupiter pulls on Mercury from the other side and so on with all the other planets and the moon.

3

Rotation and Revolution

Before we begin discussing the different planets it's important to know two concepts. First, each planet rotates. Rotation is the spinning movement that makes the planet face the sun and turn away from the sun, causing night and day. Second, each planet revolves, or orbits, around the Sun. The closer a planet is to the Sun the faster it revolves around it. The farther it is from the Sun the longer it takes to get around the Sun. It is the revolution that causes a year.

To illustrate this point have one person stand – he is the Sun. A second person now stands and faces the Sun. He is a planet. Have the planet spin slowly. One spin is equal to one day. This is the rotation of the planet. Now while slowly spinning the planet walks around the Sun. This is the revolution a planet makes around the Sun. One revolution is equal to one year.

4

Sun

The Sun is what makes all life possible on Earth. The Sun is the closest star to Earth but is still 92,935,700 miles away! It takes eight minutes for the Sun's light to reach our planet! Even at that distance we can still feel it's heat. It is a large ball of fire and burning gas. It's temperature on the outside is about 5,500 degrees and millions of degrees on the inside! The sun is the perfect distance from the Earth. If it were any closer the ocean water would evaporate and trees and plants would all burn up. Any farther and the planet would become a frozen block of ice and we would freeze to death.

5

Solar Flares

Have you ever watch a fire in a fireplace or while you were camping? Sometimes the flames seem to jump or hop. Fire is active and it is no different on the sun. In our picture you can see a giant red flame coming off the sun. This is called a solar flare and they burst out millions of miles from the sun. These flares can throw so much energy and electricity toward the Earth that people in the far North and far South can see colorful lights in the night sky called aurora (Uh-Roar-Uh).

6

Solar Eclipse

A total solar eclipse is when the moon passes between the Sun and the Earth. The Sun's light does not bend around the moon so it casts the moon's shadow across the Earth. This causes the day to look like night. They usually last a few minutes, but some have lasted for up to seven minutes! At least two solar eclipses, but sometimes as many as five, happen every year but are not visible to everyone. Only certain parts of the world can see the eclipse when it happens. There are partial eclipses when the moon doesn't cover the Sun entirely. You must never look at an eclipse directly, but through special eclipse-viewing glasses or viewing box. Google to see when the next visible total eclipse in your area will be!



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Mercury

Mercury is one of the inner planets and is nearest to the Sun. During the day temperatures reach 806°F. During the night temperatures dip down to -292°F. Mercury has a very thin atmosphere and loses the warmth of the day quickly. The US Mariner 10 probe set off in 1973 to help make a map of Mercury's surface. It is the only spacecraft to have ever visited Mercury. During this visit it was discovered that Mercury has a number of impact craters caused by asteroids. You can often see Mercury without a telescope just before the sun rises in the morning or just after the sun sets in the evening. It looks like a very bright star because the sun shines upon it and makes it seem to light up.

8

Venus

Venus is often called Earth's "twin sister" as it is almost the same size and made up of the same kind of rocks and metals. Surface conditions on Venus, however, are far different than those on Earth. Venus is the hottest planet (896°F on average) in our solar system. It also has crushing pressure and unbreathable air. The thick yellow clouds that cover the surface are full of a harmful sulfuric acid. It would burn our skin. Most planets rotate in a counter-clockwise direction or towards the east. Venus, however, rotates in a clockwise direction or towards the west. It spins very slowly! It takes 243 Earth days for Venus to rotate on its axis once. Therefore, 243 Earth days = 1 Venus day. That's about 121 days of darkness and 121 days of daylight.

9

Earth

The third planet from the Sun, it is the only planet in the solar system that has the proper surface conditions that permit liquid water and oxygen to exist. Our planet is also covered with a thick layer of gases called the atmosphere. Our atmosphere goes pretty high up in the sky, about 800 miles. The atmosphere contains the air we breath and the clouds that give us rain. The atmosphere is important because it keeps out all the harmful things in the Sun's rays and allows in all the light and heat we need. The outer part of our atmosphere is where the Earth ends and space begins. Earth takes 24 hours to rotate once – making one day. It takes 365 days for the Earth to revolve around the Sun – making one year.

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Earth's Moon

The Moon is the largest, brightest object in our night sky, yet it's one quarter the size of Earth. The moon itself, however, has no light source of it's own. It is bright because it reflects the light of the Sun. The moon orbits around the Earth in just over 27 days. While it is moving it looks as if it is changing shape. It is not – we are actually seeing different amounts of its sunlit side. We call these changes phases. The first phase is the new moon where it cannot be seen at all. We then see the crescent, the first quarter, the gibbous, and finally the full moon.

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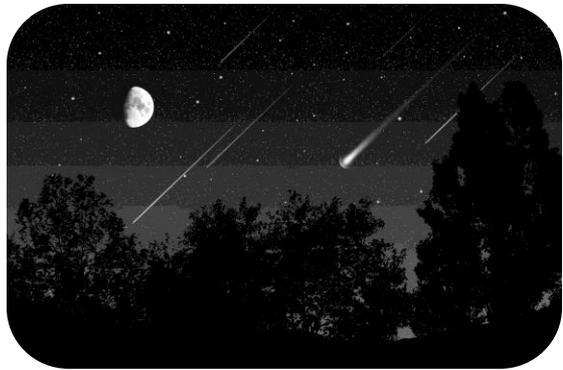
Mars

Mars is known as the "Red Planet" due to its rusty, red dust on its surface. The red color is caused by the presence of iron oxide. This hue makes the planet look as if it is a hot dusty desert, but it is actually freezing cold! The atmosphere on Mars is thin and extremely poisonous to humans. Mars does not orbit the sun in a circle, but in a long skinny oval shape. This orbit makes Mars look close to sun at some times and farther away at others. It takes 687 days for Mars to orbit the Sun just once. If people were born on Mars on their tenth birthday they would really be twenty Earth years old! Mars has two potato shaped moons. The smaller one is called Deimos and the larger one is called Phobos. They were likely asteroids that were captured by Mars' gravity.

12

Comets

Astronomers call comets "dirty snowballs." Can you guess what comets are made of? That's right! Comets are mostly big balls of ice. They are made of water and carbon dioxide ice. Their center, called the nucleus, is a hard rock. Comets orbit the sun and as they get closer to the sun the ice begins to melt and clouds of dust and gases, called comas, form around them. Some of the gas and dust streams out behind the comet to form what looks like a "tail." Sightings of comets have been recorded for thousands of years. The last clearly visible (without a telescope) comet was in 1997, Hale-Bopp. It could be many years before another is visible – but keep your eyes and ears open and they can appear at any time!



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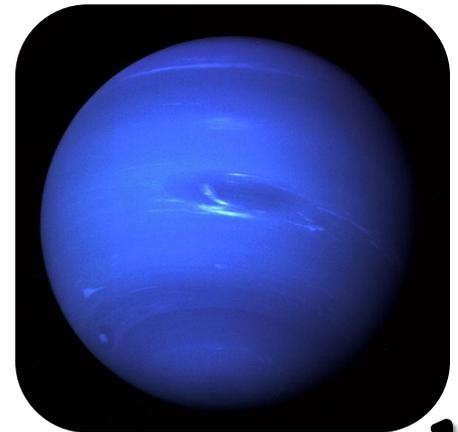
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13**Meteorites**

Remember the dust and dirt left behind by the comets tail? That dirt and debris floating out in space are called meteoroids. When meteoroids fall through the Earth's atmosphere they burn up and are then called meteors or more often shooting stars. When the Earth passes through the path of comet debris many meteoroids pass through the Earth's atmosphere giving us a meteor shower!

There are a few meteor showers that occur each year. The next visible one in the 48 states is the Lyrids on the evening of April 21, 2012.

Most meteors are small and burn up in the atmosphere. Those that are larger and land on the Earth are called meteorites.

14**Asteroids**

Asteroids are large pieces of rock and metal. Most asteroids orbit the Sun between Mars and Jupiter, in an area known as the Asteroid Belt.

It is hypothesized that these large pieces of rock and metal were once a planet that exploded. Each of the planets in our solar system are evenly spaced apart at graduating distances. Because of this order, math can tell you exactly where each planet is going to be because of where the first three planets are. According to mathematical calculations there should be a planet after Mars and before Jupiter. Scientists call this the Exploded Planet Hypothesis.

15**Jupiter**

Jupiter is the largest of all the planets. It is so big that all the other planets in our solar system could fit inside it! Jupiter is Earth's protector. Without Jupiter's gravity, the Sun's gravity would pull us right into it. With Jupiter pulling us from the other side, we are kept on our perfect path. Up to this point all the planets studied have been terrestrial, meaning earth-like. Jupiter is part of a group called the "gas giants." Jupiter has a rocky core but the top layers are made of gas. Gases are invisible, but we see the colors that they absorb from the light of the Sun. Jupiter is one of the most colorful objects in space.

Jupiter has a special feature that makes it recognizable – a Great Red Spot. This Great Red Spot is actually a giant storm, like a hurricane. It has been raging for more than 300 years!

16**Saturn**

Saturn is the most famous of all the planets in our solar system due to its beautiful, colorful rings. It is the second biggest planet and also part of the "gas giants." But don't be fooled by its beauty! It is a horribly cold and stormy planet. The winds on Saturn blow fiercely at about one thousand miles per hour! Saturn is the only planet in our solar system that is less dense than water. What does that mean? Things that are denser than water sink. Saturn is the only planet that would float in water! Saturn has thousands of rings spinning around it. They are made of icy rocks of different shapes and sizes. The ice chunks and grains reflect the light from the Sun, giving them their dazzling beauty!

17**Uranus**

Uranus is the third largest planet and also a member of the "gas giants" club. It, too, is made up of helium and hydrogen, like Jupiter and Saturn, but methane is also present and dominates the planet. It is this gas that gives Uranus its blue-green color as methane reflect blue light. Uranus is different from the other planets in that its North and South poles aren't up and down, they stick out the sides. Because of this it looks as if it is lying down and rolling around the Sun rather than like a spinning top like the other planets. Uranus is an extremely cold planet, averaging about 320 degrees below zero! It takes 84 Earth years to make one complete revolution around the Sun. A day on Uranus, however, is only 17-hours.

18**Neptune**

Neptune, the fourth largest planet and the final member of the "gas giants" club, is the brightest blue planet we know of. After the discovery of Uranus, scientists believed there must be another planet beyond. Astronomers noticed Uranus moving as if being pulled by another large object – remember gravitational pull? It took fifty years before they finally discovered Neptune! Neptune is the windiest planet in our solar system and has a Great Dark Spot, just like Jupiter's great Red Spot! It takes 163 Earth years to orbit around the Sun. A day on Neptune is about 16-hours. No person will ever visit Neptune as the temperature is just too cold, -330 degrees!



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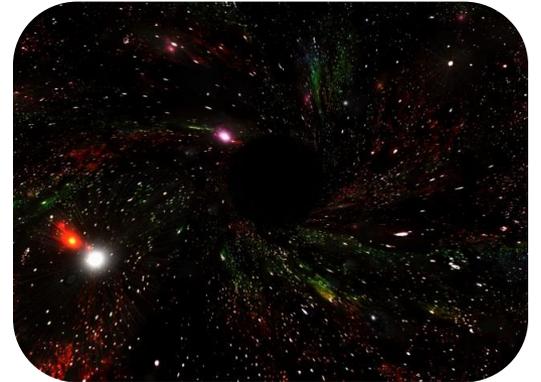
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19**Kuiper Belt**

The Kuiper Belt is a lot like the asteroid belt, but the objects in the Kuiper belt are much larger and much colder. These objects are short period comets (meaning they take less than 200 years to make a complete revolution) orbiting around Neptune. There are approximately 35,000 comets in the Kuiper belt. All these comets orbit close to Pluto and in an orbital pattern similar to that of Pluto's. These comets look so similar to Pluto that they have been labeled Plutinos or little Plutos. Many astronomers believe that the Kuiper belt is responsible for Neptune's swaying orbit and not another large undiscovered planet.

20**Pluto**

Pluto used to be considered the ninth planet in our solar system until April 24, 2006 when the International Astronomical Union (IAU) came up with a new definition for classifying planets. A full-fledged planet is an object that orbits the sun and is large enough to have become round due to the force of its own gravity. In addition, a planet has to dominate the neighborhood around its orbit. Pluto does not dominate its own neighborhood as it does not have enough gravity to clear the space around it from comets, asteroids and other debris causing the space around Pluto to look very untidy! NASA, however, launched a satellite called New Horizons on January 19, 2006 to flyby Pluto and take pictures and map it out. It is expected to reach Pluto sometime in 2015.

21**Stars**

Stars are the most common object in the night sky. Stars are present at all times, its just that our bright sun prevents us from seeing them during the day. On a cloudless night, when the moon is new (meaning it's completely dark, you can see about 3,000 stars. With a telescope you would be able to see about 100,000 stars! When looking at the stars they seem to twinkle. Stars don't actually twinkle. Our atmosphere has chemicals that busily move around. Every few seconds these tiny particles pass between our eyes and the star causing the star to dim for a quick second – making the star look like it's twinkling! Different stars are visible in the night sky each season as we rotate around the Sun. Isn't it amazing! We can see different stars every few months!

22**The North Star**

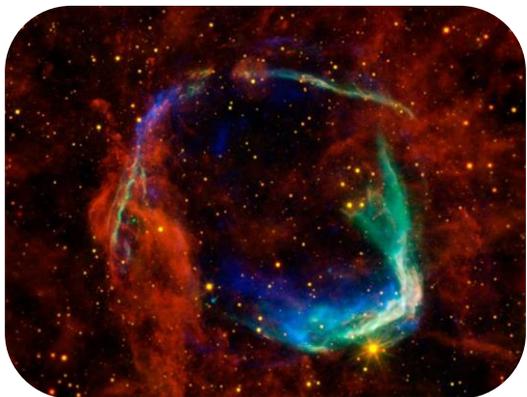
The North Star, also named Polaris, is one of the most important stars, besides our Sun. It is the last star in the handle of the constellation Little Dipper. The North Pole is always pointing toward Polaris, the North Star. So even though we see different stars in our latitudinal view every few months, those of us in the Northern Hemisphere can always see the North Star and the Little Dipper because that is where the Northern Hemisphere of the Earth is always pointed. Since it has always been a constant, sailors used it for finding north and determining latitude to help navigate the seas.

23**The Milky Way**

The Milky Way is the name of our galaxy and it contains all the stars that we see in our evening sky. Galaxies are different shapes and patterns, but they can be grouped into four categories – spiral, barred spiral, elliptical, and irregular. The Milky Way is a spiral galaxy meaning the center of our galaxy is disk shaped and has spiral arms that fan out. It is named the Milky Way because it appears as a dim milky glowing band arching across the night sky which are really stars that the naked eye cannot distinguish as individual stars.

24**Black Holes**

When a star begins to run out of fuel, it starts to collapse in towards itself. The star then begins to shrink as its own gravity presses it inward. It shrinks down to the size of Jupiter, then to the size of the Earth, then a comet, an asteroid, a soccer ball. It eventually shrinks down to the size of a period at the end of a sentence! But even though it has shrunk so small, it still has all the gravitational pull it used to have! Anything that comes close to the period sized star's gravitational pull will get sucked into it. Scientists have never really seen or identified a black hole before, but this is what they believe it is.



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25**Supernovas**

Our Sun is a very special star because it always puts out the same amount of heat, light and energy everyday. We never have to worry about whether its going to be so hot all the water will evaporate or whether it will be so cold the world would freeze into an ice cube! This, however, is not how other stars perform. Sometimes they burn very bright and hot and other time they shrink down and put out less heat and energy. Stars are unstable. Once in awhile these unstable stars have a huge explosion called supernovas. Supernovas send particles of fire millions of miles out into the star's solar system. The star lights up so brightly that it looks like a cluster of stars and can be seen for months. As the supernovas begin to dim it leaves a cloud of dust and debris that spreads out. This dust and debris is called a nebula. A nebula looks like a donut shaped cloud around the place where the supernova was, as in our picture.

26**Constellations**

Astronomers many years ago, made patterns out of the stars, like dot-to-dot pictures, to help them tell the stars apart. The skies around the Earth have been divided into 88 different constellations. Each one represents a mythological person, creature or object. Even though the stars appear to be close together or in a line, most of them are very far apart. Why are constellations important? Because they help people, astronomers and stargazers, know where they are looking in the night sky. Before people had compasses they would use the night sky to help them to travel. Slaves searching for freedom would search for the Little Dipper and walk towards the North Star to head to the northern free states.

27**Space Travel**

Since the beginning of time, man has been fascinated with the starry skies and his desire to go and see it up close. People who study ancient history have discovered that a Chinese astronomer learned how to build a rocket back in the 1200's! Up until the 1800's people thought they could use dynamite or gunpowder to launch a rocket into space. In the late 1800's a Russian astronomer, Konstantin Tsiolkovsky, figured out man would need to mix liquid hydrogen and liquid oxygen to make a big enough explosion to break through the atmosphere. We use that same mixture to blast rockets into space today.

28**Sputnik**

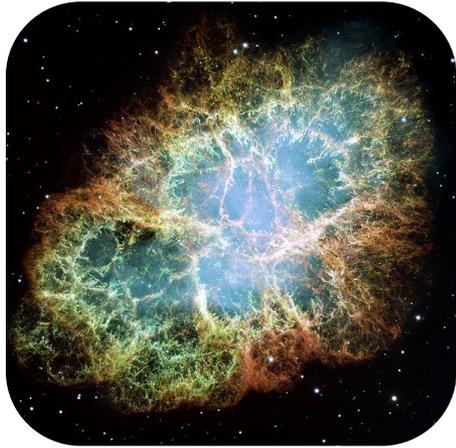
In the early 1900's Germany was at war. During this time it figured out how to make airplanes fly 3000 miles per hour and 8 miles up into the air. In the mid-1900's Russia used the German airplane ideas to make a rocket called Sputnik. This was the first rocket to go into space. This success made other countries nervous. Russia was not a free country and people were worried they might become too powerful. While America busied itself with trying to build a rocket, Russia put Sputnik 2 into space. This one was even more amazing because it carried a little dog, named Laika, into space. It was thought that living creatures could not survive without gravity and the protection of our atmosphere. But Laika proved that in a pressurized cabin, living things could survive. The "Space Race" was on!

29**1960's**

This time in history is known for the great discoveries in Aeronautics, the science of space flight. Russia put an actual human being in space in April of 1961. A month later, America sent Alan Shepard into space. When Shepard returned, President John F. Kennedy decided that America should try to put a man on the moon. Eight years after that speech, July 20, 1969, an Apollo spacecraft set Neil Armstrong and Edwin "Buzz" Aldrin on the moon. Between 1969 and 1972 there were six successful missions to put people on the Moon. A total of 12 astronauts have explored the surface.

30 International Space Station

Shortly after putting a man on the Moon, man set their sights to living in space. Space stations, a giant satellite that people can live in, was first sent up by Russia and then America. The living area of the first space stations was smaller than a closet! They are pressurized with oxygen, heat, air conditioning, electricity and many other comforts needed to live. In 1998 the best space station ever built was sent into orbit. It is called The International Space Station. It is called "international" because Russia helped to build the station. Scientists from both countries are trained astronauts who perform experiments with plants, chemicals and many other things in an attempt to make better medicines, equipment, and products.



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“The heavens are telling of the glory of God; and their expanse is declaring the work of his hands.”

Psalm 19:1

After looking at space for the past 30 days, the heavens definitely do declare the work of God! The more we learn about all that is in outer space, the more amazed we become with how perfectly God created the universe.