May Skies over the Pinnacles May 2023 by Jeff Hutton May's Four Principal Phases of the Moon

May 5	Full Moon	
May 12	Last Quarter	
May 19	New Moon	
May 27	First Quarter	

Stump the "Expert"

On April 27 I gave my presentation on the Analemma and was asked a question that I couldn't answer. This is something that happens a lot. During the talk, I showed how the analemma, the hourglass pattern the sun makes in the sky when you take its picture every day at the same time, usually at noon. I showed these two images of the



One image was taken from the northern hemisphere.

The other was taken from the southern hemisphere.



The question was, "How would the analemma look if you were on the equator?" I was stumped. I was planning to do a Google search (my last resort) when the answer came to me, and here it is. The shape of the analemma would be the same wherever you are on earth. If you find yourself on the equator for two years, point your feet south during the first year, as you would do in North America, and look toward the sun for a year you would see the figure at upper left. During your second year, point your feet north, as you would do in Australia, now you would witness the analemma as it appears on the upper right.

Important Note: NEVER look toward the Sun, except during one very special time. When is that? Read on.

The Biggest Show (Above) Earth

On Monday, Apr 8, 2024 we have a second chance since 2017 to see a sky show that is unforgettable. A total eclipse of the Sun!

I took this picture on August 21 of 2017 just as the brilliant glare of the sun was just popping out from behind the Moon.



These pictures are nice, but they are a bit like the thousands of cute kitten pictures you can find online. I agree, they mostly look the same even though that's the shot everyone wants to capture. Compare a video recording of your favorite musical act to actually being at the concert, and with really good seats. No contest.

First, let me clue you in on why and when solar and lunar eclipses happen.



Here's an illustration of what happens when we are treated to a lunar eclipse. During a lunar eclipse, the Moon, traveling along its orbit around the Earth, wanders into the shadow of the Earth as it trails off into space. Anyone with clear skies on Earth's night side can view this kind of eclipse. The Earth's shadow is always there but we normally can't see any sign of it because there normally isn't anything besides the Moon to show us where it is. If you have an app like the one called "Heavens Above" you can learn when certain bright human-made satellites will be visible at night. When they reflect sunlight you can see them. But when their orbit around the earth take them into the Earth's shadow, they dim and then wink out.



Go out some crisp, clear evening, just after sunset, and look to the east. That dark band hugging the earth is the shadow of the solid Earth on our own atmosphere. The name for it is the Belt of Venus.



This is what happens during a solar eclipse. The Moon's orbit will sometimes carry it between the Earth and the Sun and it makes a small, traveling shadow along a narrow path somewhere over the Earth's surface. This happens many more times each year than when the Moon passes through the earth's shadow. It's just that you usually have to travel to place yourself somewhere that will be under the Moons traveling shadow. Because the orbit of the moon is tilted about 5 degrees to the orbit of the Earth around the Sun, they seem to move across the sky, over the and year, along

paths.

months different





If you took two hoops (think of barrel stays of hoolah hoops) and placed one inside the other, then tilted the one on the inside to the one on the outside you get the idea of the slightly different paths of the Sun and Moon across the sky. See where the girl's hands are holding the hoops together? Where the hoops meet are called **nodes**.

Here's the cool rule to remember about eclipses. When the Sun and Moon are at opposite **nodes** at the same time, we get a lunar eclipse. When the Sun and Moon are at same **node**, we get a solar eclipse, somewhere on earth.



Map courtesy of In-The-Sky.org

The map above shows the paths taken by the Moon's shadow during some future eclipses of the sun. The track of next year's eclipse across the United States is shown as a dashed line.

Finally I'll finish with something I always tell people whenever we talk about observing the sun. NEVER look directly at the sun without adequate, approved, eye protection. That even includes the last few seconds before the Moon covers the sun completely and the first few seconds as direct sunlight peeps out when the Moon uncovers the disc of the Sun.



NO! Means that you must <u>not</u> look toward the sun (at any time) without your approved solar observing glasses.

YES! Means that now, <u>and only now</u>, may you remove your approved solar observing glasses.

For more information about how to enjoy eclipses, including next April's total solar eclipse, mark your calendar for May 27 at 7:30 PM at the Berea College Forestry Outreach Center. If skies are clear, we'll follow my presentation with viewing of celestial wonders with large telescopes!

Attractions in May

Astronomers use a measuring scale of **angular distance** to show the apparent distance that separates two objects in the sky. A trip all the way around the sky would take 360 degrees. Here's a handy guide to estimate **angular distance** that you can use when you're out under the stars.



For instance, when you hold your hand all the way out and hold three fingers out, like the scout's salute in panel 2, your fingers create an **angular distance** of 5 degrees, about the width of the bowl of the Big Dipper. When I talk about the distance between, say, the Moon and a star or planet, I'll say that they are separated by a certain number of degrees. Sky and Telescope magazine is my source of most of the following information.

May 3 After darkness falls, go out and look for the waxing gibbous Moon just 2 degrees from the blue star Spica, brightest of the constellation, Virgo. Now's a good time to try out the astronomer's trick to use the handle of the Big Dipper as a pointer. Here it is: follow the arc of the handle to Arcturus, bright orange star of the constellation Bootes. Next spike on to Spica.



May 6 If the Moon weren't so bright and nearly full, I's say, "get up super early to view the Eta Aquariid Meteor Shower". As it is, the Moon's light will make seeing any "shooting stars" unlikely. Better luck next year!



May 9 Tonight, head out and find the constellation Gemini, the twins. The planet Mars will look like a third star, temporarily making the Twins a Triplet.



May 17 Here's one that may make getting up early worth the effort. Just as it's getting light, look low in the east to spot the planet Jupiter following the 'fingernail' Moon into the eastern sky. With binoculars you might even see the Moon swallow Jupiter before it gets too light to see them both.



May 21 This evening, check out the neat triangle formed by the stars, Castor and Pollux and the brilliant planet, Venus. The scene is completed by the beautiful crescent Moon.



May 22 In case it was cloudy last night, take another look at this grouping. It's cool to see how much territory the Moon covers in the sky in 24 hours. If it's clear tomorrow, check out this quad again!



May 31 Finish out the month by returning to the same celestial real estate. Using your binoculars or small telescope, find the red planet Mars with the pretty little open star cluster, called the Beehive, just to the upper left. You're in the constellation, Cancer.

