M111

May 2025

The newsletter of the Richland Astronomical Society and Warren Rupp Observatory

## New Lift Delivered

We were surprised by the unannounced delivery of our shiny new scissor lift purchased through the generosity of the Richland Foundation in early April. Fortunately, Mike Romine and Justin Hewlett were able to spring into action and be on hand to take possession. There are a few tasks that still need to be completed such as enhancing the entrance gate to be easier to get in from the steps, mounting the computer equipment, and a few other things. Training for the first operators was conducted on April 27.

*Mark Vanderaar, Justin Hewlett, Dan Everly, and Rich Krahling with the new lift.*

# Big Blue Targets for May

M104 - The Sombrero Galaxy

The Sombrero Galaxy, also known as M104, is a large, nearly edge-on, spiral galaxy located in the constellation Virgo, approximately 28 million light-years from Earth. It's a member of the Virgo II Group and is one of the most massive objects in the Virgo galaxy cluster, with a mass equivalent to 800 billion suns. The galaxy is nicknamed the Sombrero due to its distinctive edge-on appearance, which resembles a wide-brimmed hat.

NGC4631 - The Whale Galaxy

NGC 4631 (also known as the Whale Galaxy or Caldwell 32) is a barred spiral galaxy in the constellation Canes Venatici about 30 million light years away from Earth. It was discovered on 20 March 1787 by German-British astronomer William Herschel. This galaxy's slightly distorted wedge shape gives it the appearance of a herring or a whale, hence its nickname.  Because this nearby galaxy is seen edge-on from Earth, professional astronomers observe this galaxy to better understand the gas and stars located outside the plane of the galaxy.

M51 - Whirlpool Galaxy (after about 10:30PM)

Galaxy Messier 51 (M51, also designated NGC 5194) is nicknamed the Whirlpool because of its prominent swirling structure. Its two curving arms, a hallmark of so-called grand-design spiral galaxies, are home to young stars, while its yellow core is where older stars reside. Many spiral galaxies possess numerous, loosely shaped arms, which make their spiral structure less pronounced. These arms are star-formation factories, compressing hydrogen gas and creating clusters of new stars. Some astronomers believe that the Whirlpool's arms are so prominent because of the effects of a close encounter with NGC 5195, the small, yellowish galaxy at the outermost tip of one of the Whirlpool's arms. At first glance, the compact galaxy appears to be tugging on the arm. Hubble's clear view, however, shows that NGC 5195 is passing behind the Whirlpool. The small galaxy has been gliding past M51 for hundreds of millions of years.

## Eyes on the Solar System – NASA App

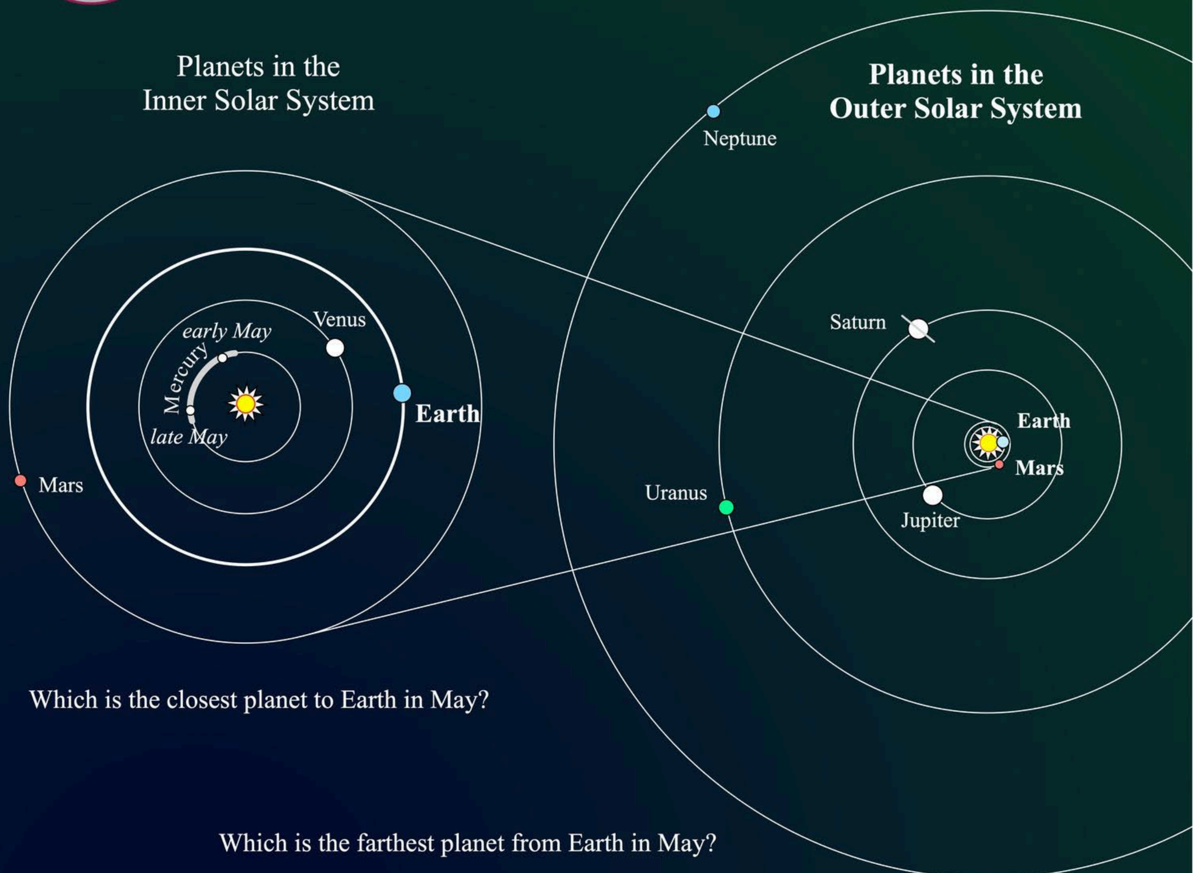
This simulated live view of the solar system allows you to explore the planets, their moons, asteroids, comets, and the spacecraft interacting with them in 3D. You can also fast-forward or rewind time and explore the solar system as it looked from 1950 to 2050, complete with past and future NASA missions.

You can follow over 150 NASA missions from start to finish with this browser-based 3D simulation that uses the most accurate data and imagery possible. Watch the Voyager spacecraft from launch in 1977 until today, see the Cassini mission fly through the ice plumes of Enceladus, ride along as OSIRIS-REx lands on an asteroid to scoop up material, see the New Horizons mission take the first close pictures of Pluto, witness the first Artemis mission circle the moon, or preview the Europa Clipper mission.

**https://eyes.nasa.gov/apps/solar-system/#/home**

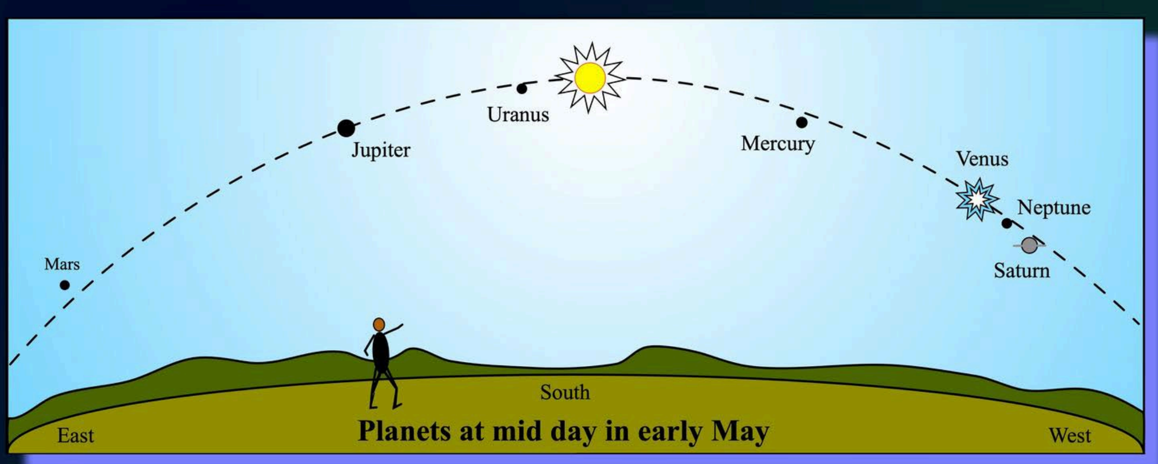
# Relative planet positions in May

*The planets are in constant motion*




Which is the closest planet to Earth in May?

Which is the farthest planet from Earth in May?

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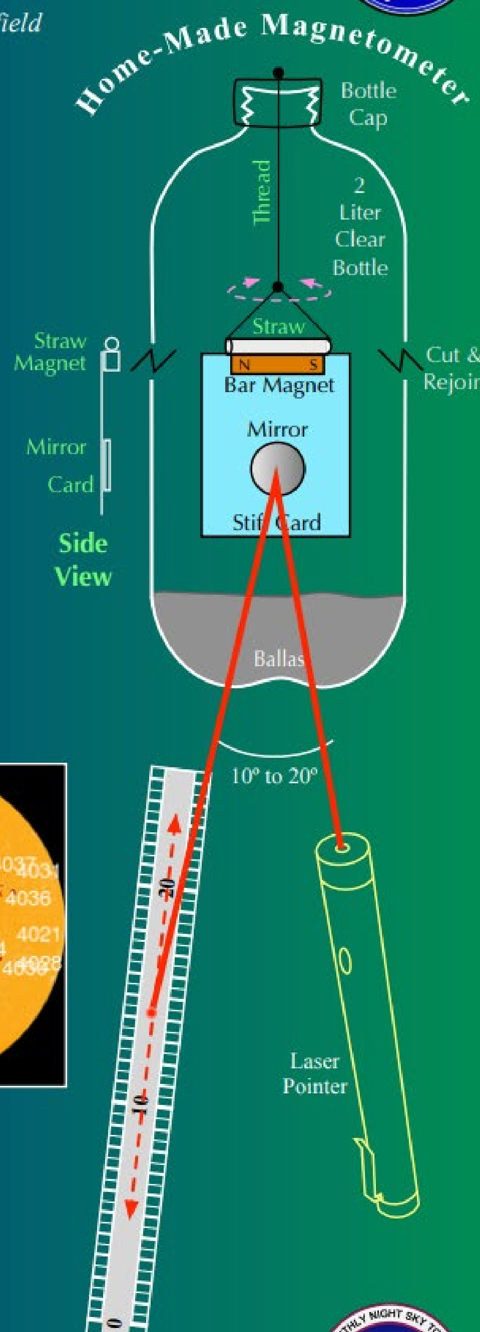
# Space Weather Observing Program

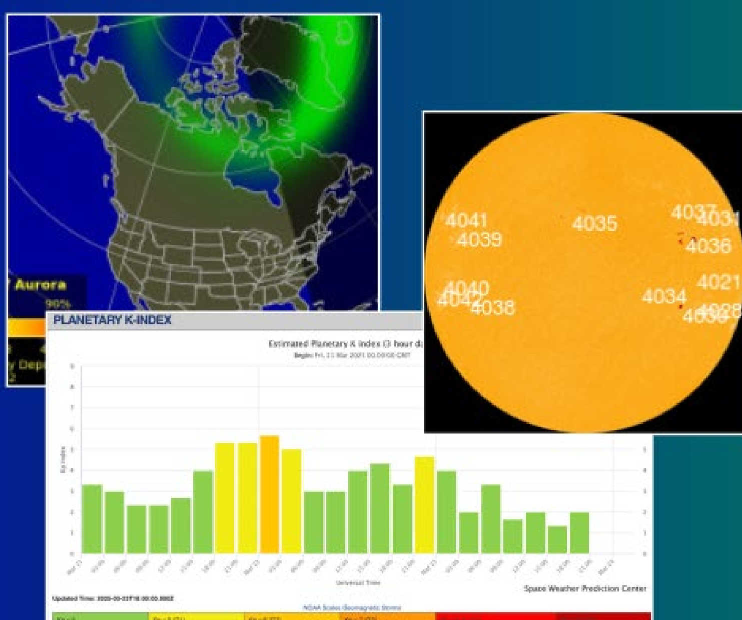
*The solar wind greatly affects Earth's magnetic field and those effects can be measured using an inexpensive home-made magnetometer.*




## Space Weather Observing Program

- Construct and use your own magnetometer.
- Do a minimum of 100 observations on at least 100 different days.
- Note the location on the meter (or yard) stick where the reflected laser spot is located.
- The 2 liter magnetometer, the laser, and the measuring stick must be located where they will not be disturbed during the program.

- Compare your data with NASA's Planetary K-Index.
- Note sunspot activity as found on Spaceweather.com.
- Note auroral activity as found on Spaceweather.com.




**For complete details on this fascinating program:**
https://www.astroleague.org/space-weather-observing-program/

2503

# Mare Orientale

***... this most astounding impact basin is only partially seen***

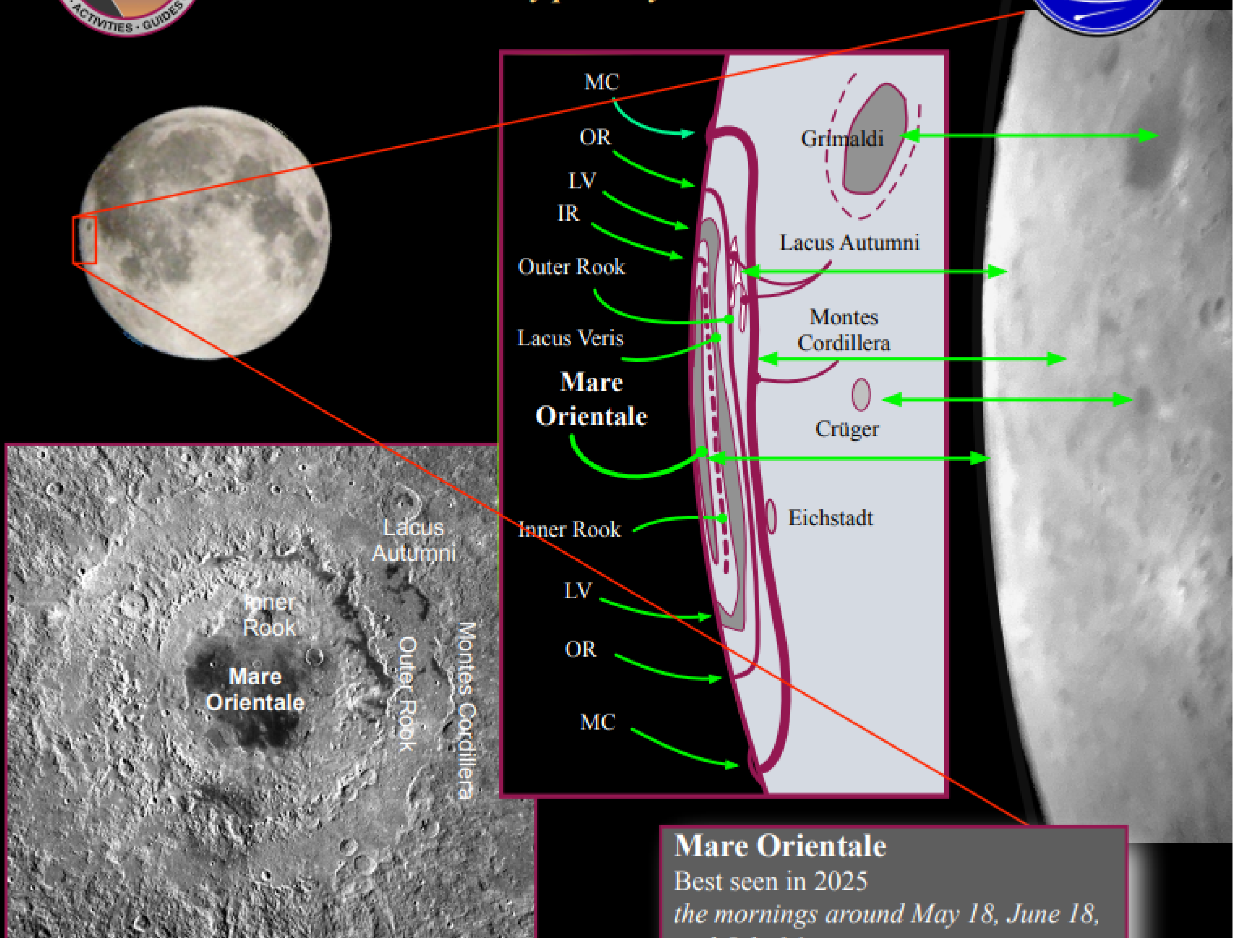



*image: NASA/GSFC/ Arizona State University*

**Mare Orientale**
Best seen in 2025
*the mornings around May 18, June 18, and July 16*

A good viewing of Mare Orientale requires that the Moon be at or near maximum western libration. This happens on three, four, or five days in some, but not all months. Of course, it should not hide in the lunar night, which immediately eliminates fifteen days each month. The three mornings leading up to new Moon are also poor times because the waning thin crescent lies too close to the horizon to give a sharp enough image for a clear, meaningful view.

As a result, opportunities for studying Mare Orientale are infrequent, occurring on fewer than twenty days each year. Generally, four months running present three, four, or five good opportunities each, followed by a string of nine or ten months that present no suitable occasions for viewing it. And then there is the weather!

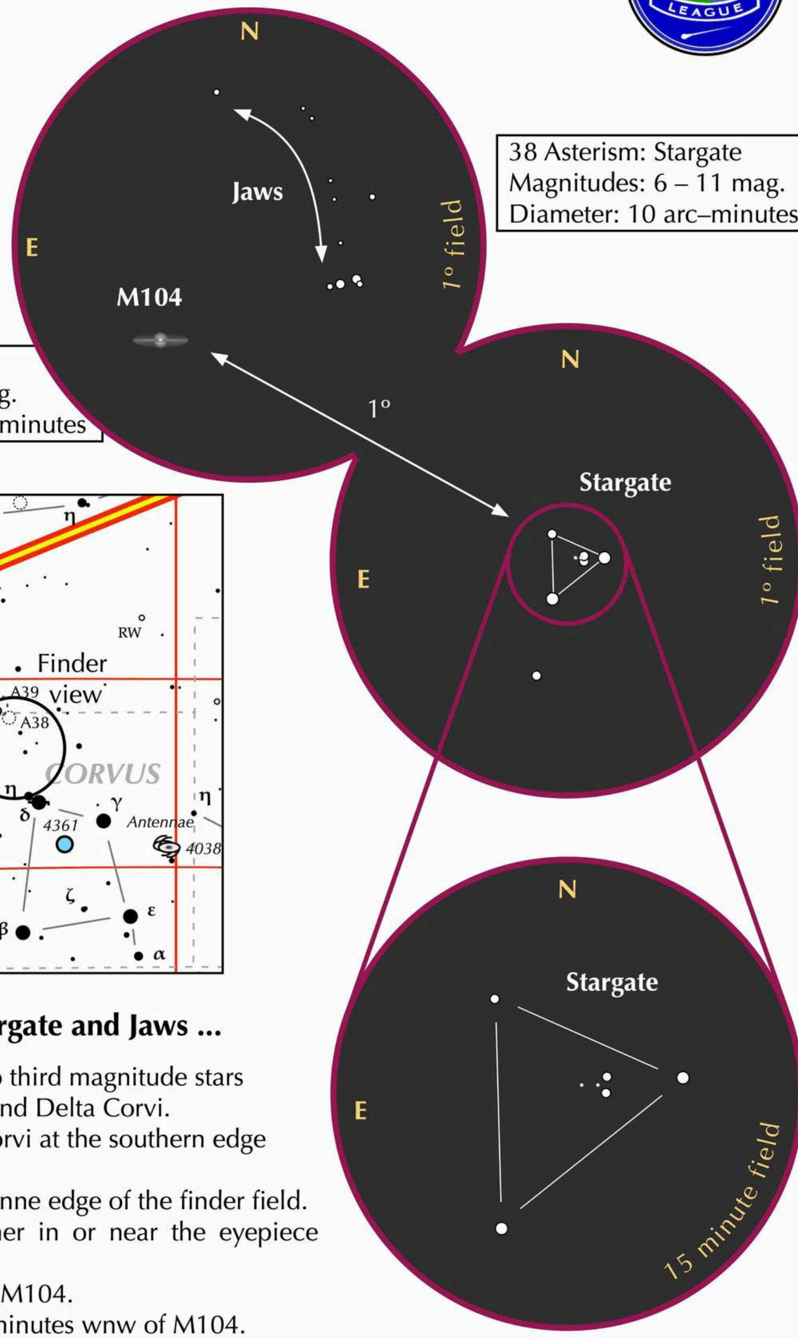
Identifying Orientale's fascinating features demands steady seeing and moderate magnification.

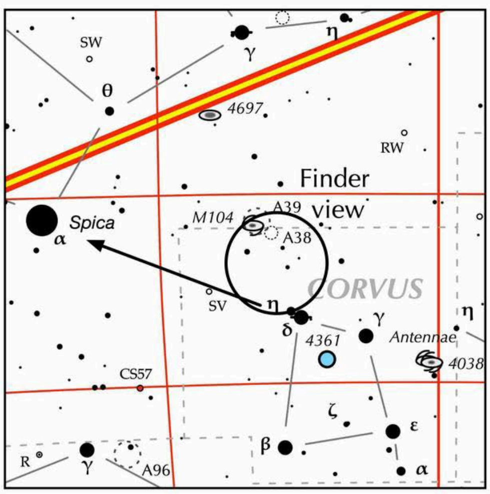
# Stargate & Jaws Asterisms

*On the Astronomical League's Asterism list as nos. 38 & 39*

38 Asterism: Stargate
Magnitudes: 6 – 11 mag.
Diameter: 10 arc–minutes

39 Asterism: Jaws
Magnitudes: 9 – 11 mag.
Diameter: 10 x 30 arc–minutes




## How to find Stargate and Jaws ...

1. Find Spica and the two third magnitude stars that point to it, Gamma and Delta Corvi.
2. Place Delta and Eta Corvi at the southern edge of the finder field.
3. Aim your scope to the nne edge of the finder field.
4. M104 should lie either in or near the eyepiece field.
5. "Stargate" is 1° wsw of M104.
6. "Jaws" is about 30 arcminutes wnw of M104.

**This article is distributed by NASA's Night Sky Network (NSN).**

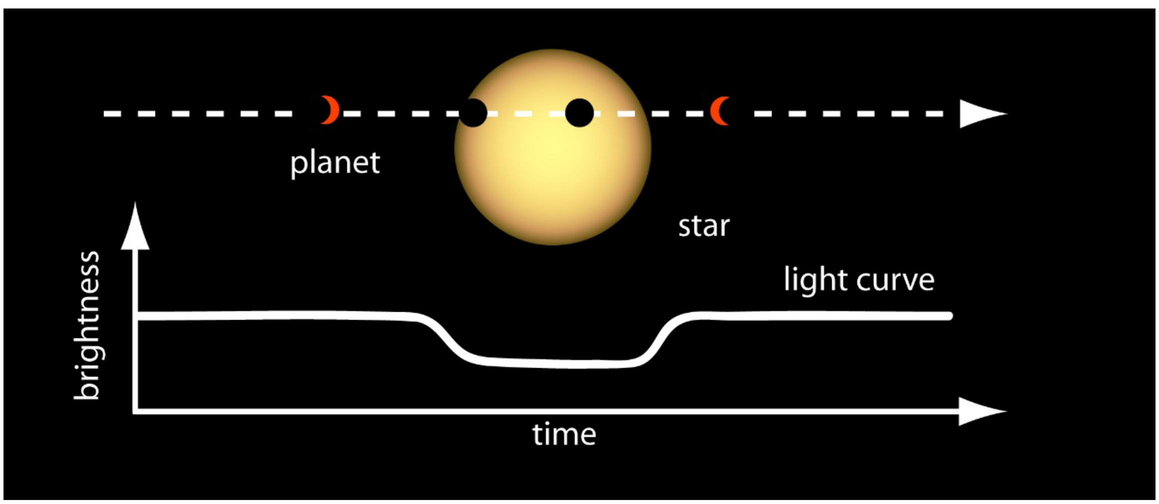
The NSN program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit go.nasa.gov/nightskynetwork to find local clubs, events, and more!

# May's Night Sky Notes: How Do We Find Exoplanets?

By: Dave Prosper
Updated by: Kat Troche

Astronomers have been trying to discover evidence that worlds exist around stars other than our Sun since the 19th century. By the mid-1990s, technology finally caught up with the desire for discovery and led to the first discovery of a planet orbiting another sun-like star, Pegasi 51b. Why did it take so long to discover these distant worlds, and what techniques do astronomers use to find them?

## The Transit Method

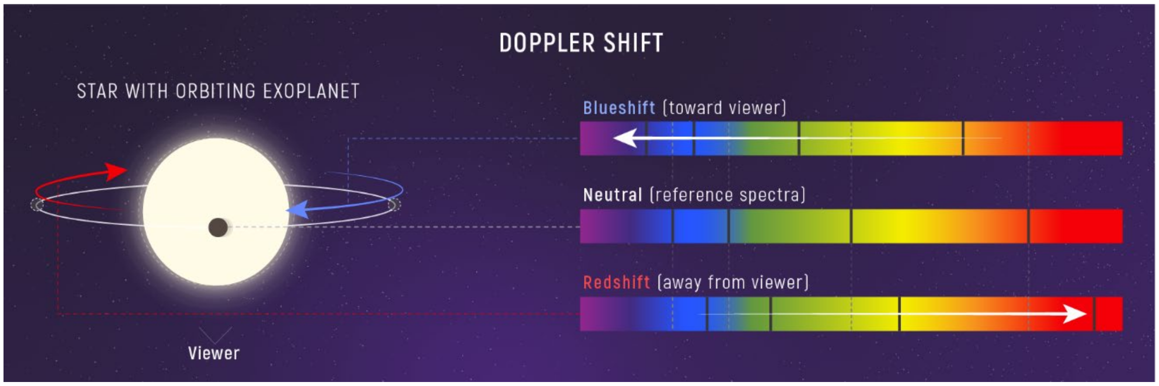



*A planet passing in front of its parent star creates a drop in the star's apparent brightness, called a transit. Exoplanet Watch participants can look for transits in data from ground-based telescopes, helping scientists refine measurements of the length of a planet's orbit around its star. Credit: NASA's Ames Research Center*

One of the most famous exoplanet detection methods is the **transit method**, used by Kepler and other observatories. When a planet crosses in front of its host star, the light from the star dips slightly in brightness. Scientists can confirm a planet orbits its host star by repeatedly detecting these incredibly tiny dips in brightness using sensitive instruments. If you can imagine trying to detect the dip in light from a massive searchlight when an ant crosses in front of it, at a distance of tens of miles away, you can begin to see how difficult it can be to spot a planet from light-years away! Another drawback to the transit method is that the distant solar system must be at a favorable angle to our point of view here on Earth – if the distant system's angle is just slightly askew, there will be no transits. Even in our solar system, a transit is very rare. For example, there were two transits of Venus visible across our Sun from Earth in this century. But the next time

Venus transits the Sun as seen from Earth will be in the year 2117 – more than a century from now, even though Venus will have completed nearly 150 orbits around the Sun by then!

## The Wobble Method




*As a planet orbits a star, the star wobbles. This causes a change in the appearance of the star's spectrum called Doppler shift. Because the change in wavelength is directly related to relative speed, astronomers can use Doppler shift to calculate exactly how fast an object is moving toward or away from us. Astronomers can also track the Doppler shift of a star over time to estimate the mass of the planet orbiting it. Credit: NASA, ESA, CSA, Leah Hustak (STScI)*

Spotting the Doppler shift of a star's spectra was used to find Pegasi 51b, the first planet detected around a Sun-like star. This technique is called the **radial velocity or "wobble" method.** Astronomers split up the visible light emitted by a star into a rainbow. These spectra, and gaps between the normally smooth bands of light, help determine the elements that make up the star. However, if there is a planet orbiting the star, it causes the star to wobble ever so slightly back and forth. This will, in turn, cause the lines within the spectra to shift ever so slightly towards the blue and red ends of the spectrum as the star wobbles slightly away and towards us. This is caused by the blue and red shifts of the planet's light. By carefully measuring the amount of shift in the star's spectra, astronomers can determine the size of the object pulling on the host star and if the companion is indeed a planet. By tracking the variation in this periodic shift of the spectra, they can also determine the time it takes the planet to orbit its parent star.

## Direct Imaging

Finally, exoplanets can be revealed by **directly imaging** them, such as this image of four planets found orbiting the star HR 8799! Space telescopes use instruments called **coronagraphs** to block the bright light from the host star and capture the dim light from planets. The Hubble Space Telescope has captured images of giant planets orbiting a few nearby systems, and the James Webb Space Telescope has only improved on these observations by uncovering more details, such as the colors and spectra of exoplanet atmospheres, temperatures, detecting potential exomoons, and even scanning atmospheres for potential biosignatures!

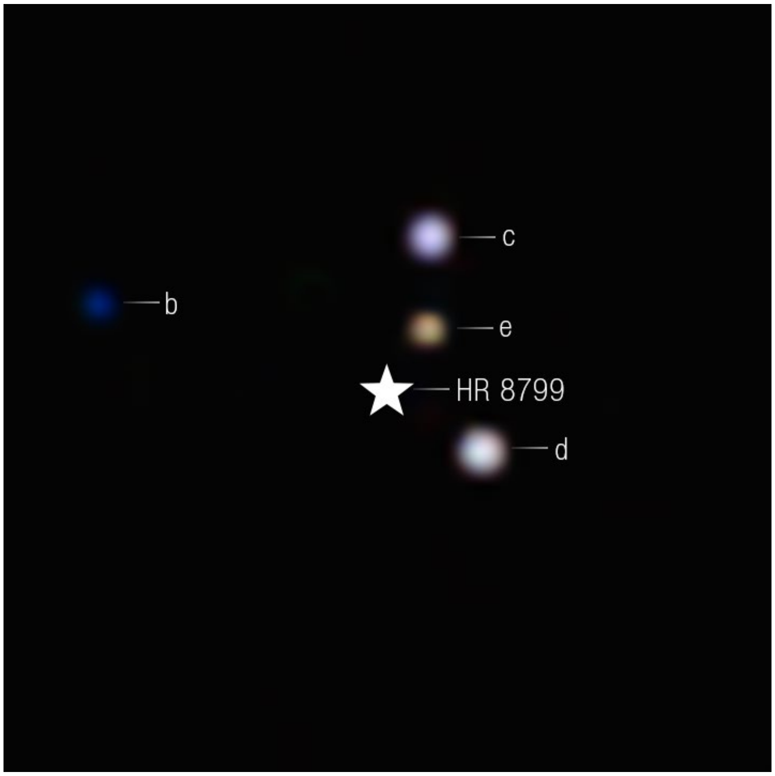


*Image taken by the James Webb Space Telescope of four exoplanets orbiting HR 8799. Credit: NASA, ESA, CSA, STScI, Laurent Pueyo (STScI), William Balmer (JHU), Marshall Perrin (STScI)*

You can find more information and activities on NASA's Exoplanets page, such as the Eyes on Exoplanets browser-based program, The Exoplaneteers, and some of the latest exoplanet news. Lastly, you can find more resources in our News & Resources section, including a clever demo on how astronomers use the wobble method to detect planets!

The future of exoplanet discovery is only just beginning, promising rich rewards in humanity's understanding of our place in the Universe, where we are from, and if there is life elsewhere in our cosmos.

## How to submit content and suggestions

Please send any content submissions, questions, or suggestions to the RAS secretary at secretary@wro.org.