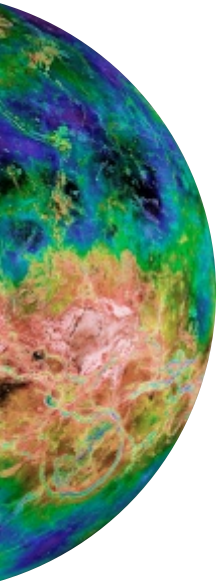


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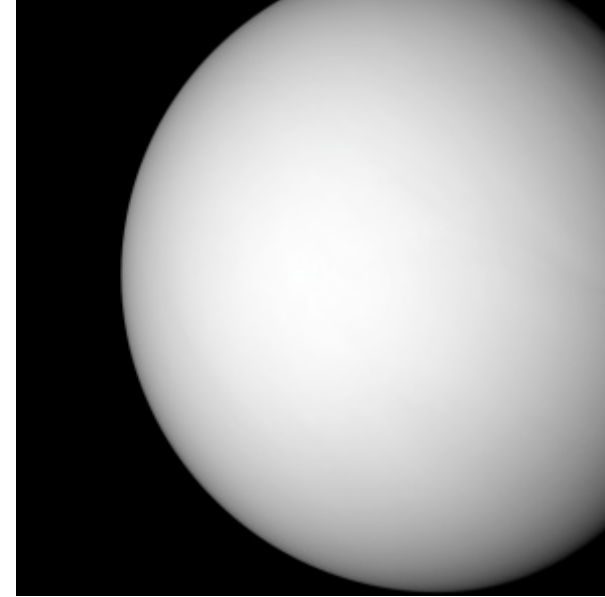
Venus – a fiery planet



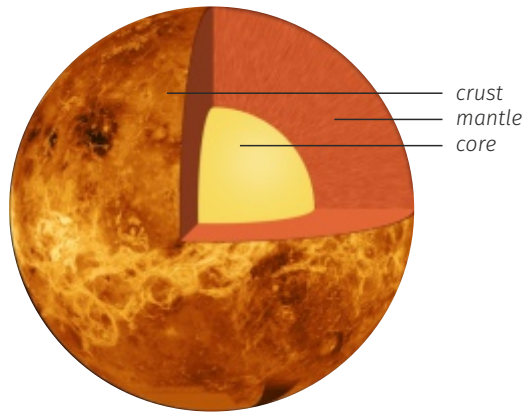
Venus is the second planet from the Sun, and closest to Earth. It is only slightly smaller than our planet. Venus is the third brightest object in the sky, after the Sun and the Moon. Its light is so bright that on a moonless night you can see the shadows it casts. Venus is so bright because it is close to our planet, and its clouds reflect much of the Sun's light.

Atmosphere on Venus

Venus's atmosphere consists mainly of carbon dioxide. The whole planet is covered in sulfuric acid clouds, which rain down acid on the surface. Sometimes lightning strikes the planet. The clouds in the upper atmosphere move so fast that they can circle around the planet in just four Earth days. Acid rains, intense heat, severe winds, and incredible pressure make Venus absolutely uninhabitable.



↑ We cannot see the planet's surface through a telescope – only the upper atmosphere is visible.



↑ Structure of Venus

Structure of the planet

The surface of Venus is solid and dry, as all water evaporates because of high temperatures. There are many volcanoes and craters on the surface. Venus has a core of molten iron, and a very weak magnetic field.

*Year on it as long as day,
And the weather stays the same!*

Time on the planet

Venus takes 243 Earth days to rotate on its axis. One year (one revolution around the Sun) on Venus is 225 Earth days. So, a day on Venus is longer than a year. This makes it the slowest planet in the Solar system.

← Venus is covered with thick clouds, but using special technology we can glance at Venus's surface even through the clouds.

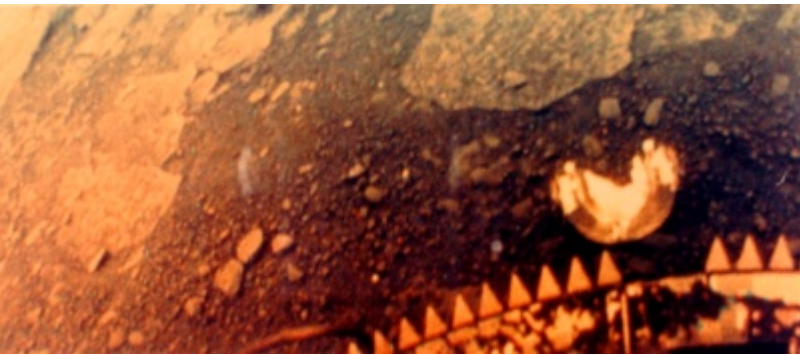


Hot and unapproachable

Even though Venus is farther from the Sun than Mercury, its temperature is higher, because it has an atmosphere, which keeps heat at the surface. Top temperatures can exceed 470 °C (878 °F). It's the hottest planet in the Solar system. It is so hot that objects made from tin and lead would simply melt. The high temperature remains even during the night, when the Sun is absent. Temperature doesn't change throughout the year, either. Because the planet's axis is not at an angle, there is no changing of seasons.

Venus has no shade to hide,
It is always hot and bright

Venus is the hottest planet in the Solar system



↑ The first color image of the surface of Venus, taken by the Venus 13 space probe.

Weather here isn't placid –
It is raining toxic acid

Journeys to Venus

More than 40 spacecraft have visited Venus. But because of the high surface temperature and acid rains, space probes cannot stay on the planet for very long. They are destroyed within hours, which makes it difficult to study the planet's surface. Venus 13 was the first spacecraft to take color pictures of Venus. It managed to last 127 minutes on Venus.

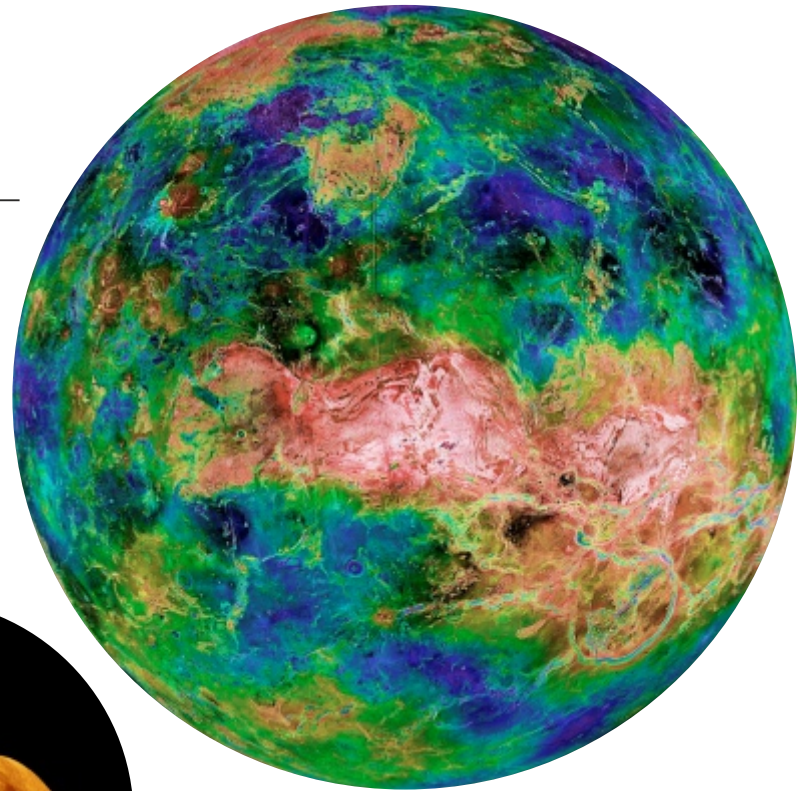
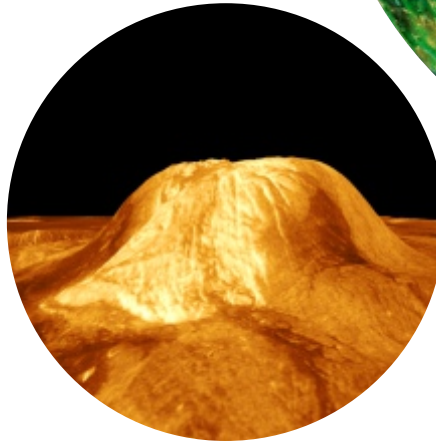
Curious fact

Unlike other planets of the terrestrial group, Venus rotates around its axis in the opposite direction. So, on Venus, the Sun rises in the west, and sets in the east.

Surface of the planet

There are mountains, volcanoes, and craters on the surface of Venus. The Maxwell Mountains are the highest, at 11 kilometers (6.85 miles). Unlike Mercury and the Moon, Venus has way fewer craters. Large craters bear names of famous women, and the small ones have common women's names. For example, on Venus you can find craters named Julie, Emilia, Amanda, Marie, and Rose.

Venus and Earth
are the only
planets with
female names

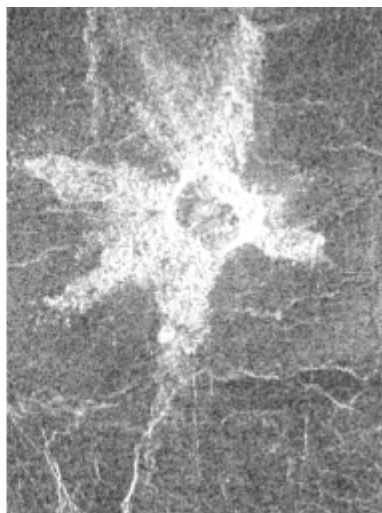


↑ Map of montes (mountains) on Venus. The most elevated areas are in brown; the lower ones are in green; and the lowest areas are in blue and dark blue.

← Gula Mons has a peculiar shape, but it is the highest mountain on Venus.



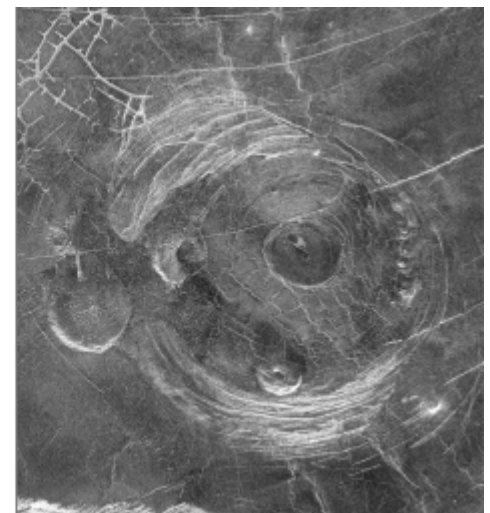
↑ Is there really a spider on Venus? This is just an odd volcano!



↑ There is a crater on Venus that looks like a sea star.



↑ What do you and your friends think this crater looks like?



↑ Try to find a bear's muzzle in these craters!



Looking through a telescope

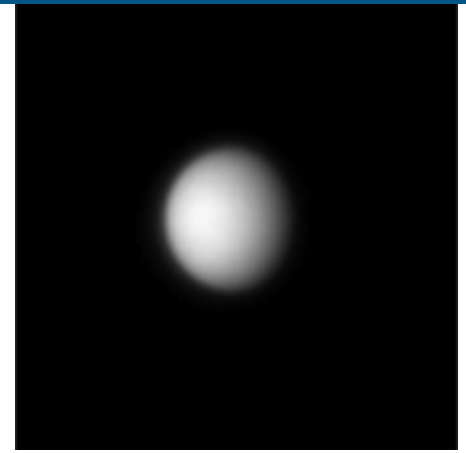
Venus looks like a white-gray planet through a telescope. The dense atmosphere of Venus prevents you from seeing its surface, only the clouds. But the atmosphere, too, has its peculiarities. You can see dark areas of different shapes through a telescope, and lighter areas at the poles. It is best to watch Venus in the evening or early morning.

Venus is the brightest celestial body, after the Sun and the Moon

Phases of Venus

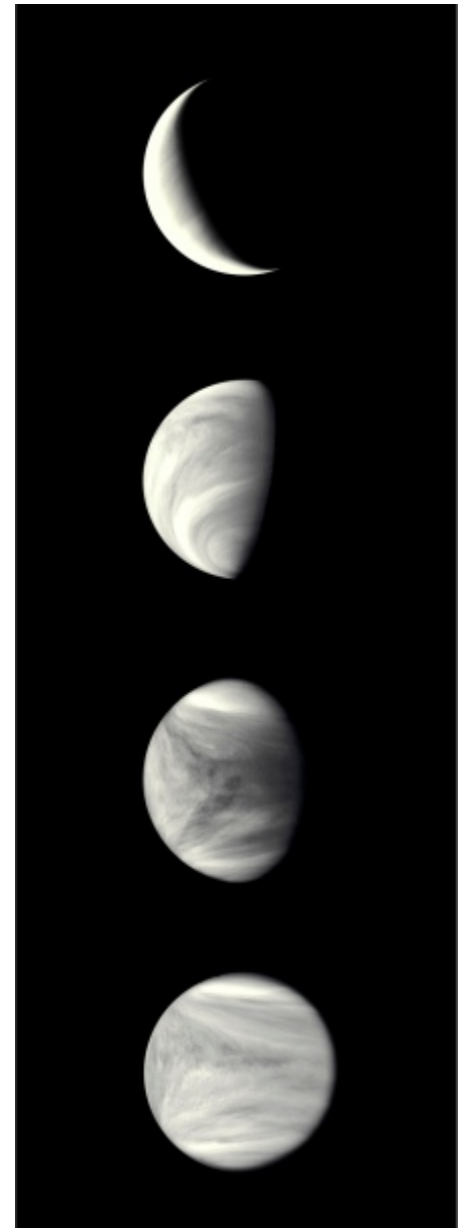
Don't be surprised if you see Venus not as a full planet, but only its illuminated part. This happens because Venus, like the Moon, appears in our sky in phases, and is only illuminated by the Sun from a side. That's why the planet's brightness varies when you watch it from Earth with the naked eye. It is impossible to see Venus fully illuminated, because at any given moment it is either directly in front of the Sun or directly behind it.


Look at the Venus sickle. You may notice that its ends are more elongated than those of the Moon. This happens because of sunlight refraction in a dense atmosphere. These arc continuations are called the Horns of Venus. The inside of the sickle may appear to be notched, and not a smooth line. For better contrast, use blue and orange light filters.



↑ This is what Venus looks like through a telescope.

↓ Phases of Venus.



A night sky with a bright star and a meteor streak. The star is Venus, and the meteor is a shooting star. The sky is dark blue with many small stars. The foreground shows a rocky, hilly landscape under a clear sky.

↓ *Venus is brighter than all the stars in the night sky.*

Observing Venus during the day

You can watch Venus in daytime, too. It is not as bright by daylight, and you can see more of its details. Be very careful during daytime observations, and don't point your telescope at the Sun.

Remember: you shouldn't look at the Sun without a special sun filter, or you can seriously harm your vision. This is not a joking matter.

Venus is such a bright planet that with enough experience you will be able to find it in the sky with the naked eye. You will need some practice. Choose a spot in the shade, so that the Sun doesn't interfere. Then, look at some distant object, to let your eyes get used to looking afar. After a few minutes, shift your gaze to the area in the sky where Venus is supposed to be, and you will surely see it.



Endeavour spacecraft in front of the Earth. The orange strip above the planet is the densest layer of the atmosphere, called the troposphere. This is where clouds form.

Earth – cozy for everybody



Earth is the third planet from the Sun. Our planet is an amazing place, because this is where life was born and where it exists. Millions of living organisms – bacteria, mushrooms, plants, animals – and even you – managed to come to life on this very planet. Our planet looks blue from the sky, because most of its surface is covered by oceans.

Earth's atmosphere

Earth's atmosphere is rich with oxygen – the gas we breathe. But this wasn't always so. Billions of years ago, when the Earth was first formed from space dust, you couldn't take a breath of oxygen on it. Plants helped produce this much oxygen, by giving it off after consuming carbon dioxide.

It also helps that the atmosphere protects living organisms from harmful UV light and small meteorites. When a meteorite enters the atmosphere, friction with air heats it up, and it simply burns, never even reaching the surface. But if a meteorite is too big, it doesn't burn, and crashes into Earth. Scientists believe that one such crash landing wiped out the dinosaurs.

Only huge meteorites
Won't burn out in our skies



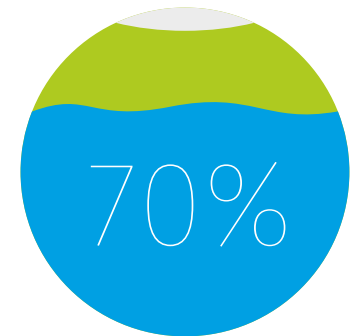
↑ This is how a meteorite burns in the atmosphere.

← This is how Earth looks from space. Image taken by the Apollo 17 spacecraft.

↓ Eruption of volcano Tungurahua.

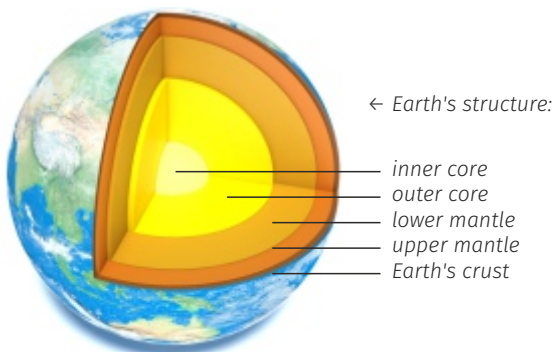


70%
of the Earth's surface
is covered by oceans



Structure of the planet

Earth is like a living organism that constantly changes due to processes both outside and deep inside. The surface is covered by the crust. Underneath it there is magma – molten rock. At the center of the planet is its core, fiery like the Sun. Sometimes molten lava from the depths of the planets rushes up and escapes through cracks in the crust, solidifying as peculiar mountains – volcanoes.



Moving continents

Movement of the Earth's crust causes earthquakes. Continents gradually move and change their shape, but this happens very slowly. The way Earth looked was different several billion years ago, and it keeps changing.



Earth is the largest planet of the terrestrial group

← Mount Everest – the highest mountain on Earth, located in the Himalayas.

Curious fact

The highest mountain on Earth is Mount Everest. Its height is 8,848 meters (5.5 miles). The deepest point is the Mariana Trench in the Pacific Ocean. It is 10,994 meters (6.8 miles) deep. And to think that even at such depth, where light never reaches, scientists have found fish!



225 million years ago – single continent Pangaea



150 million years ago – Laurasia and Gondwana



Earth today

Time on the planet

Earth is constantly rotating around its axis, and the Sun illuminates it from different sides. That's why day and night in different countries can occur at different times. So, when it's daytime in Europe, it's night in America, and vice versa. A full revolution around itself takes Earth 24 hours, which makes up a day on our planet.

Life on Earth began 3.5 billion years ago

Seasons

Because our planet's axis is tilted, summer days are a little longer than winter days. The longest and shortest days occur at the poles. Polar days last six months, and then – six months of the polar night. Change of seasons happens because the Earth's axis is tilted. As Earth makes its way around the Sun, it faces the Sun with its northern and southern hemispheres alternately. If the southern hemisphere gets more sunlight, then it's summer there, and vice versa. The Equator gets an equal amount of sunshine throughout the year, so it's eternal summer there. And the poles are always cold.



Happy third place

The Earth's location in the Solar system is so fortunate that it has water in liquid form. All living things on our planet exist thanks to this simple liquid. It is believed this took place 3.5 billion years ago. The simplest organisms were the first to appear on Earth – bacteria that lived in water. But more and more complex creatures developed as a result of evolution.

← You can find amazing animals on Earth,
like this dragon seahorse that looks like seaweed.
This is how it camouflages itself.

Had to add an extra day –
All to keep the years straight

Curious fact

Why doesn't February 29 come every year? You already know there are 365 days in a year, while the time it takes Earth to make a lap around the Sun is 365 days and 6 hours. So, every year is 6 hours longer. And so, four years add an extra 24 hours – a whole day! To keep the calendar precise, another day was added – February 29. A year that has this extra day is called a leap year, and it comes once every four years.

Cozy for everybody

Most living creatures on Earth dwell in areas that have temperatures between 0 °C and 45 °C (32 °F and 113 °F). But there are also inhabitants of our planet that feel perfectly fine in very cold or very hot corners of the Earth. For example, polar bears, walruses, and seals have no problem diving in the freezing water of the Arctic Ocean. And even in hot springs, where the water is so hot that it boils, scientists have found bacteria that survive in 120 °C (248 °F) temperatures.

In winter, Japanese macaques enjoy getting warm in hot springs. ↓



View from space

People have been studying their home planet for a long time, yet there are many unexplained mysteries on Earth. Many facts, like the Earth's rotation around the Sun, were determined even before space exploration. Nowadays, we're able to look at Earth from far above and make new discoveries. Many artificial satellites launched from Earth are busy studying our planet and its weather, and taking care of our communications.

↑ Earth and the Moon as seen from Mars.

You can also watch Earth from space when you stay at home. All this takes is a computer with access to the Internet. The NASA website allows you to watch live video feed from the International Space Station.



The Katrina Tropical Storm, 2011.
Image taken from the ISS. →

← Link to the space web cam page:
eol.jsc.nasa.gov/ESRS/HDEV



Earth as seen from the Moon.

