

Zeno the Outer Space Keeper and the Mission



Dr. Suciana Wijirahayu & Team

ZENO THE OUTER SPACE KEEPER AND THE MISSION



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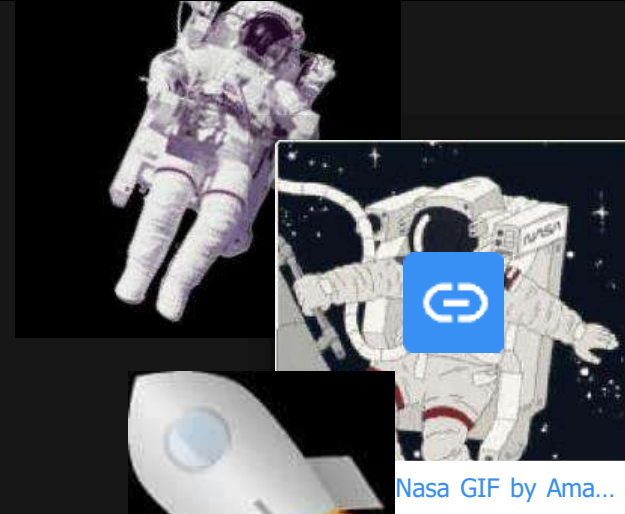


PREFACE

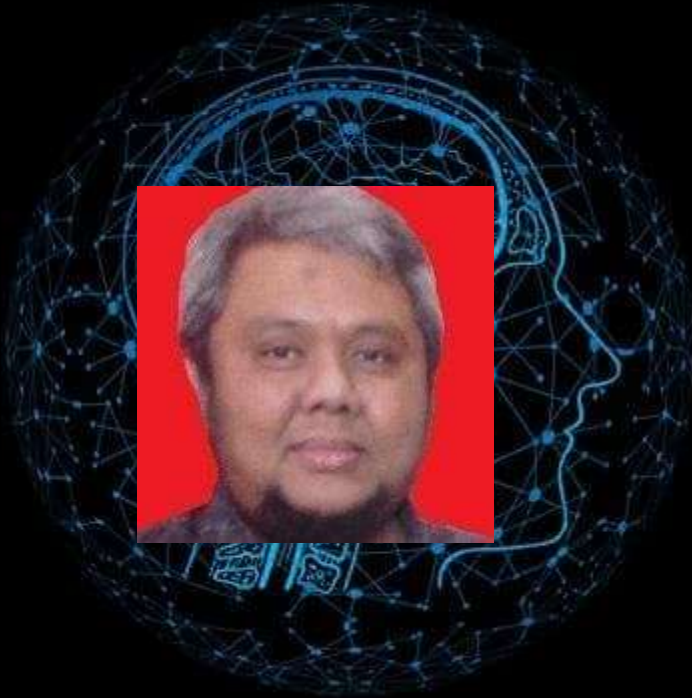
We express our gratitude to Allah SWT for the blessing given to us. Shalawat and greetings we convey to our beloved Prophet Muhammad SAW. Alhamdulillah, by His grace, we could complete the e-book entitled Zeno the Outer Space Keeper & the Mission. The authors' success in completing this e-book is from the support of various parties' encouragement, guidance, and participation. Therefore, the author would like to express their deepest gratitude to all parties. We cannot mention us one by one with all the deepest sincerity. Even though he has tried as optimally as possible, the authors know that many shortcomings and errors are still possible. Therefore, we expect input and suggestions from various parties for this e-book.

Jakarta, July 2026

Dr. Ir. Suciana Wijirahayu, M.Pd. and Team



Kata Sambutan



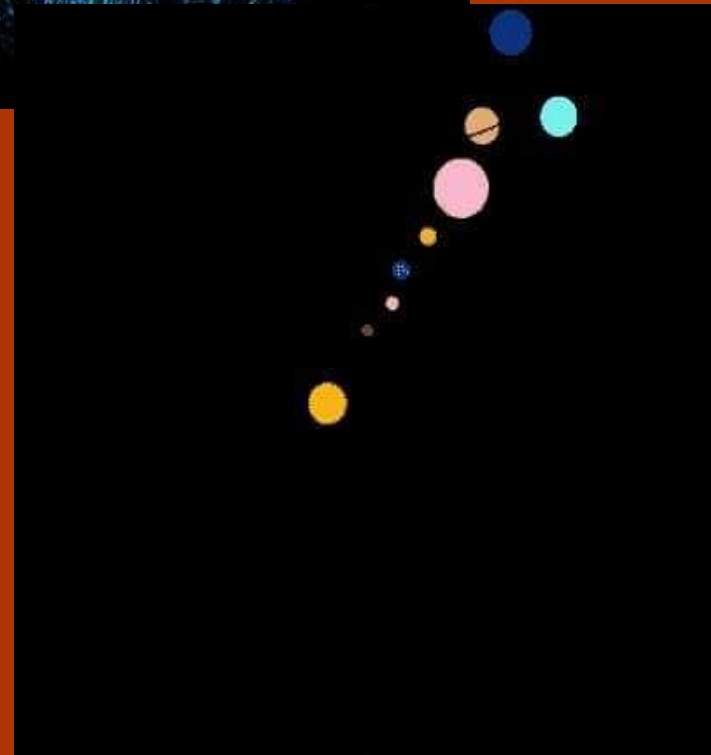
DR. DR. DAN MUNGISIDI, ST.,M.SI.

**DEKAN FAKULTAS TEKNOLOGI INDUSTRI
DAN INFORMATIKA
UNIVERSITAS MUHAMMADIYAH PROF.
DR. HAMKA**



Alam semesta merupakan pemandangan indah yang masih menyisakan banyak misteri. Masih sedikit sekali pengetahuan yang dimiliki manusia dan didominasi oleh perkiraan-perkiraan meskipun berdasarkan kalkulasi. Meskipun pemahaman manusia mengenai alam semesta terus berkembang seiring perkembangan ilmu pengetahuan, kita harus terus menggali karena alam adalah tanda kekuasaan Allah bagi orang yang berpikir.

Meskipun pemahaman manusia mengenai alam semesta terus berkembang seiring perkembangan ilmu pengetahuan, kita harus terus menggali karena alam adalah tanda kekuasaan Allah bagi orang yang berpikir. Buku ini mengantarkan untuk berkenalan dengan informasi faktual mengenai alam semesta dan menjadi pemantik bagi anak-anak untuk mempelajarinya. (Dr. Dan Mungisidi, ST.,M.Si.)



Fore Word

I am honored and pleased to write the foreword of this digital book written by Dr Suciana. She is a colleague of mine who has been dedicating her time and making her hard effort to develop technology-based media for helping students' learning English. In today's digital era, information can be easily disseminated and accessed.

Book as a source of information and medium for learning can be very powerful if the valuable knowledge they contain can be accessed easily with the existence of technology,



Silih Warni, Ph.D.

**The Head of English Education
Study Program**

**The Faculty of Teacher Training
and Education
Universitas Muhammadiyah
Prof. DR. HAMKA**

Accessing and reading books are supposed to be easier. As an English lecturer, Dr. Suciana is aware of this promising but at the same time challenging situation. With her hard work, she developed this digital English book which offers ease of access as well as provides exposure to English for its readers.

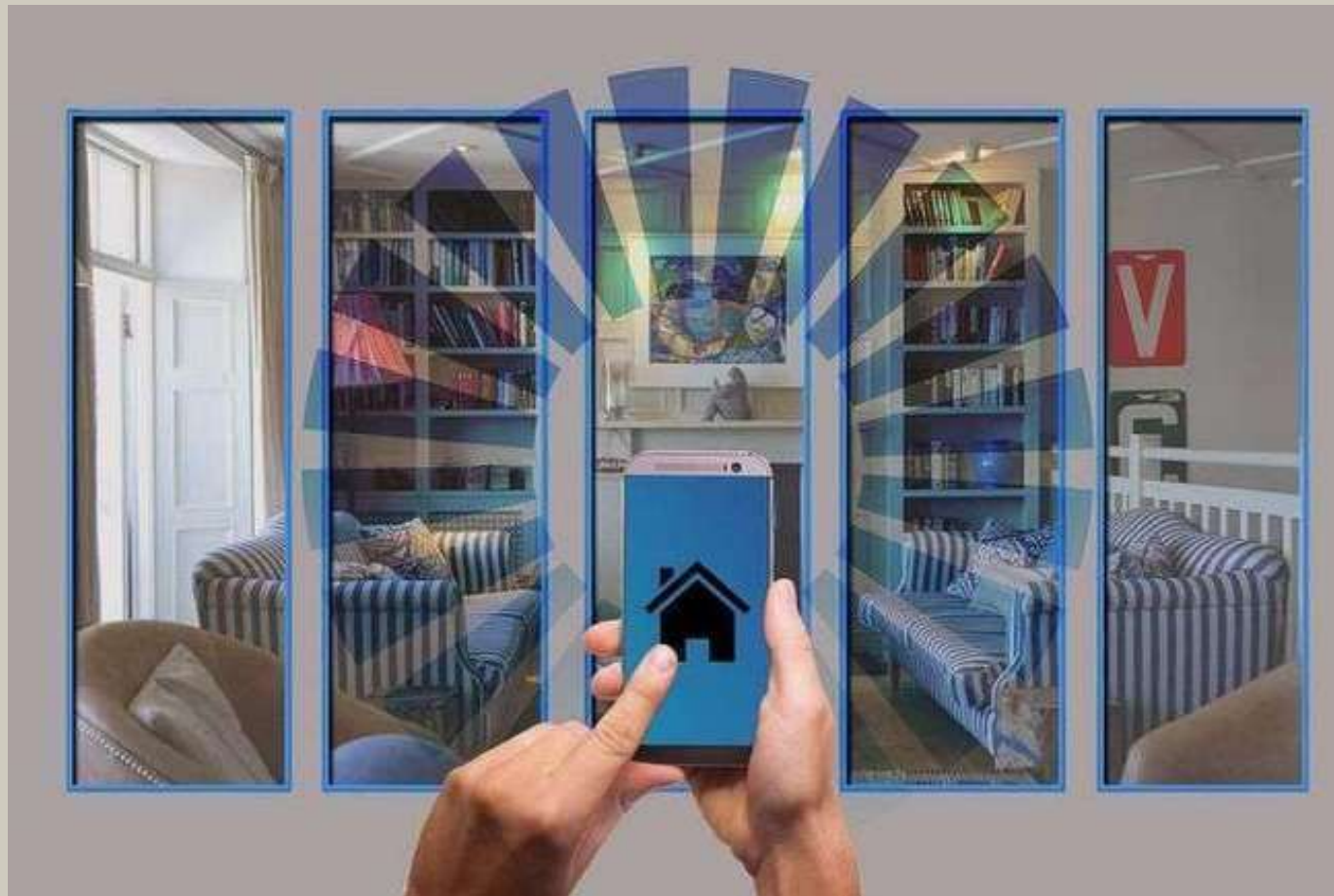
Moreover, the appealing appearance and integration of the various types of media in this book will certainly give a touch to the readers' motivational aspect and interest in exploring the contents.
(Silih Warni, Ph.D.)

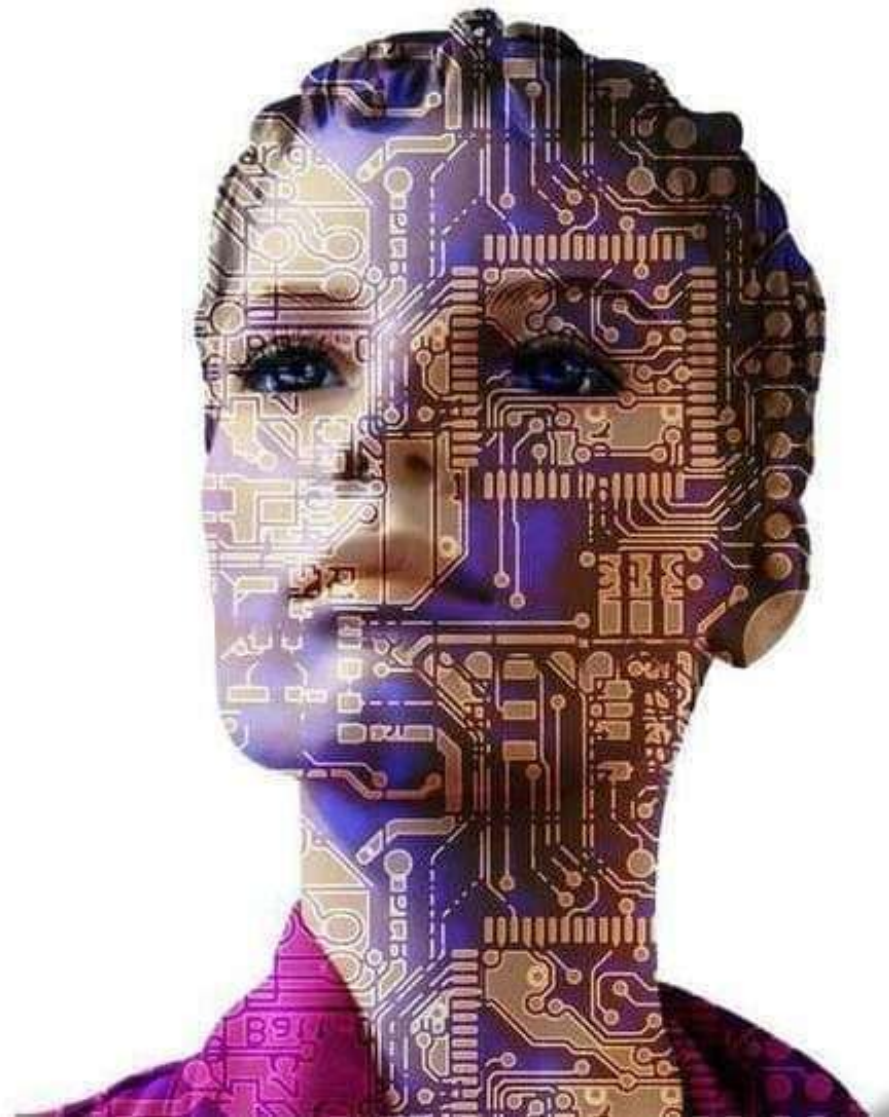




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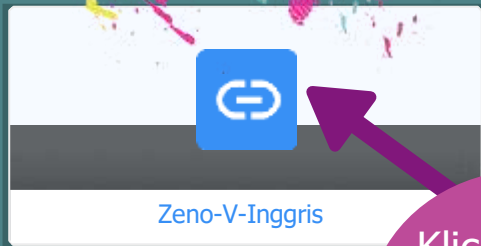
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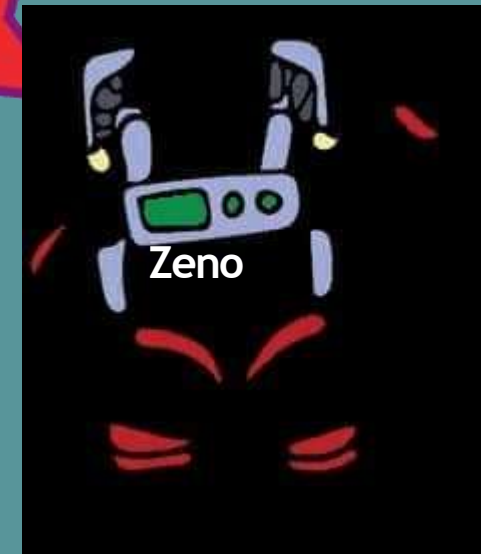
ZENO & THE SOLAR SYSTEM

In this time, I will help you learn about "Solar System"

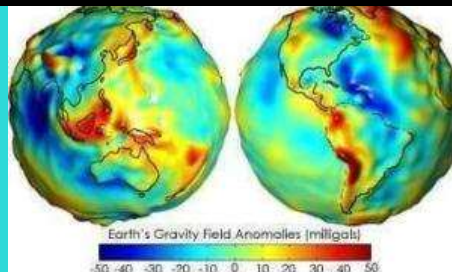


Klick here to access the Zeno Chatbot

Hello! My name is Zeno.
I am a solar system patrolman.



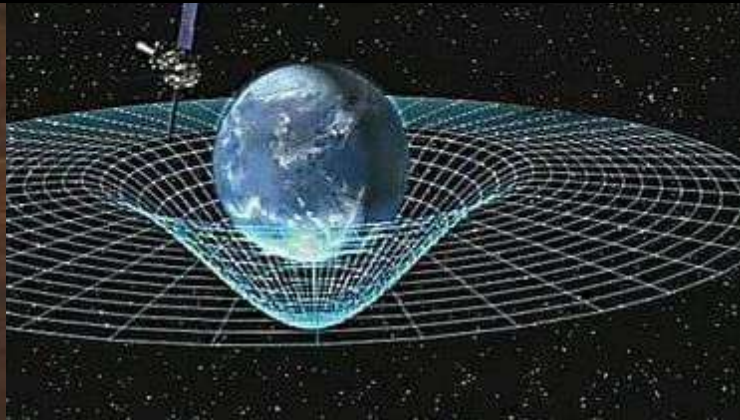
What is Solar System



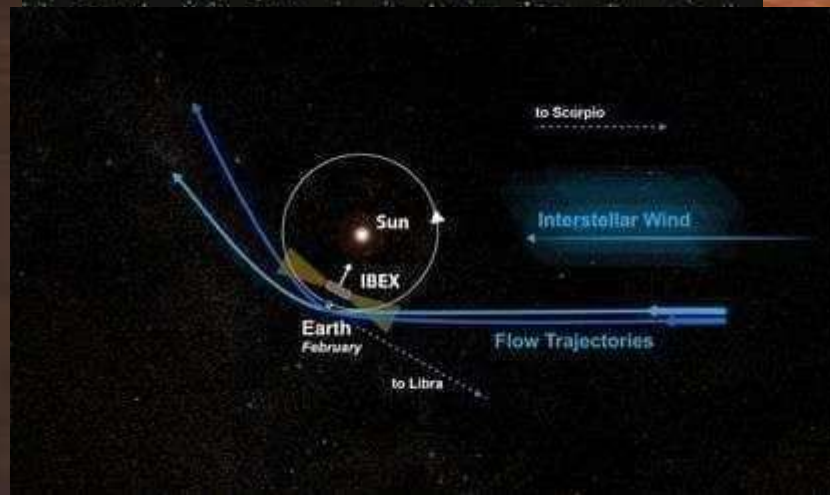
Floating Area 51 GIF - Find & Share on GIPHY



The solar system is a collection of celestial bodies consisting of a star called the Sun and all objects that are bound by the force of gravity.

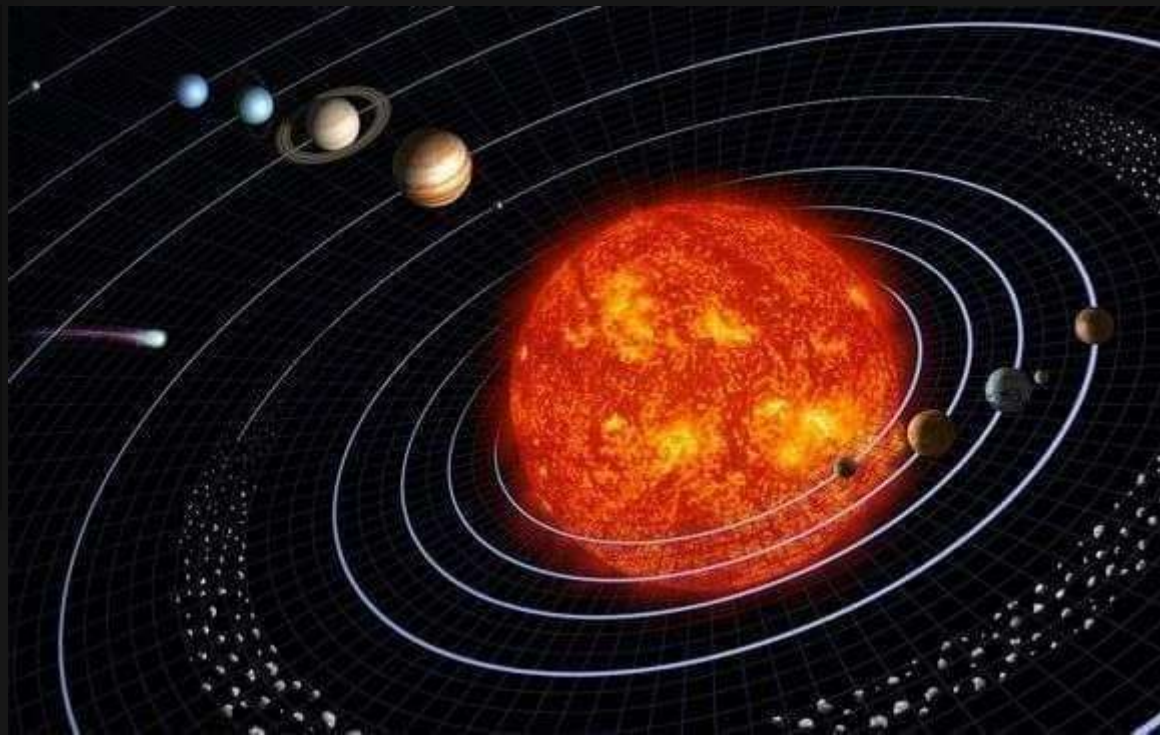


These objects include 8 planets with elliptical orbits, 5 small planets, 173 identified natural satellites, and millions of celestial bodies.



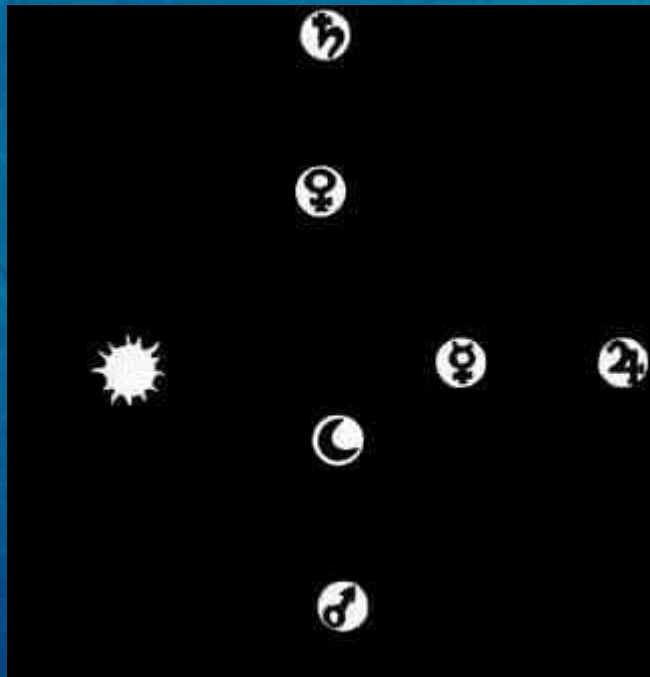
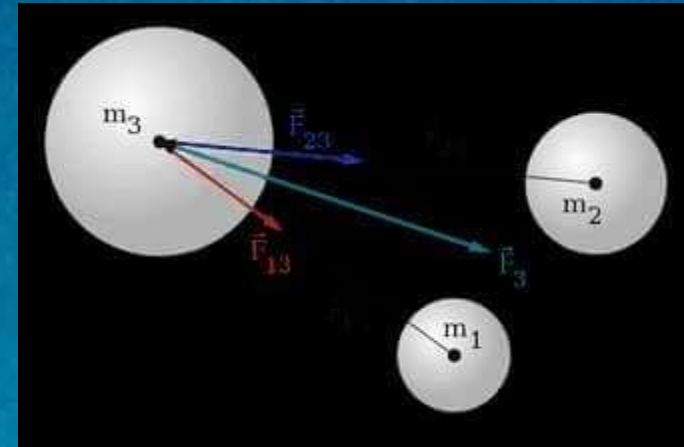


Solar System GIF - Find & Share on GIPHY



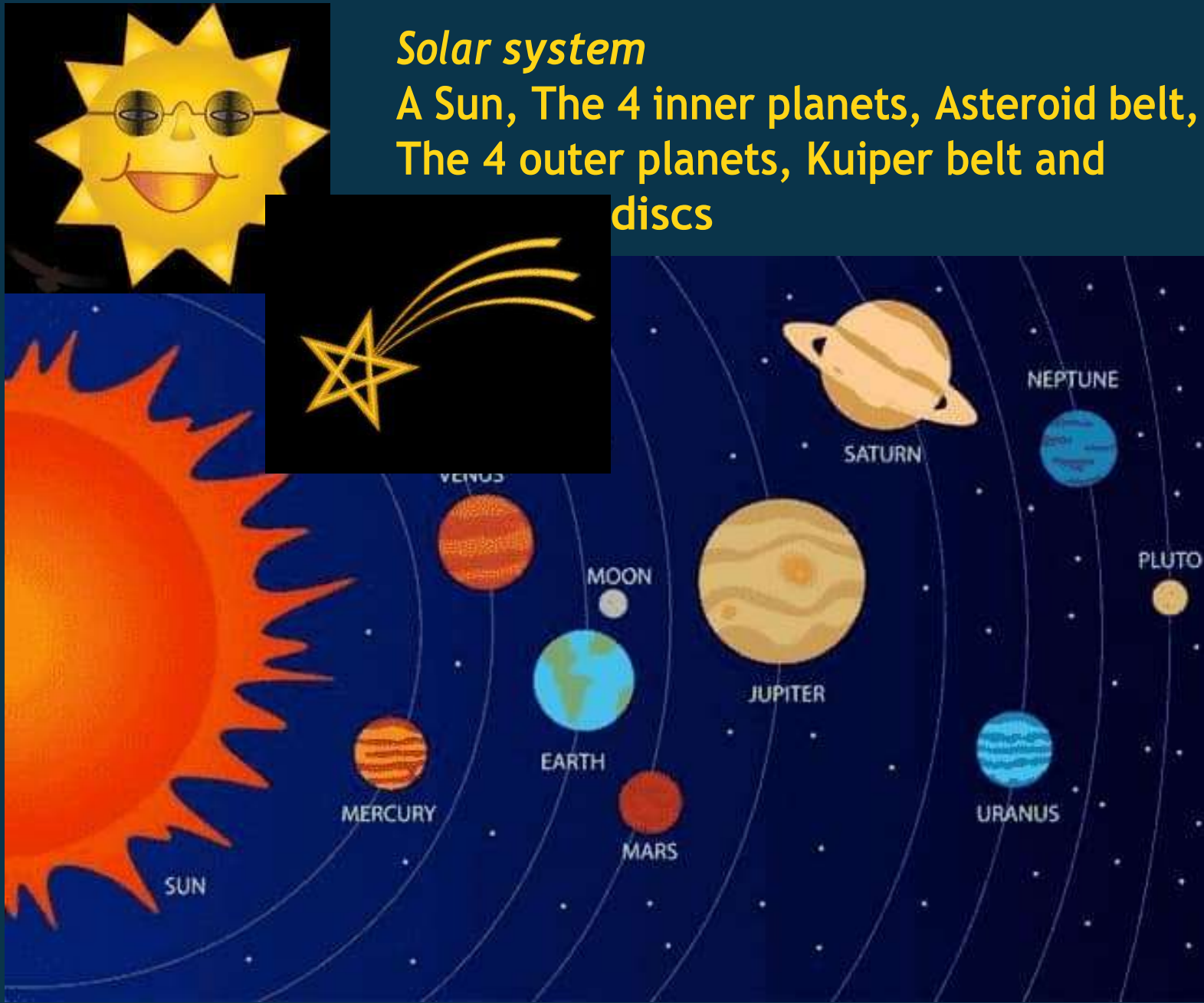
Solar system divided into:
A Sun
The 4 inner planets
Asteroid belt
The 4 outer planets
Kuiper belt and scattered discs





Solar system

A Sun, The 4 inner planets, Asteroid belt,
The 4 outer planets, Kuiper belt and
discs

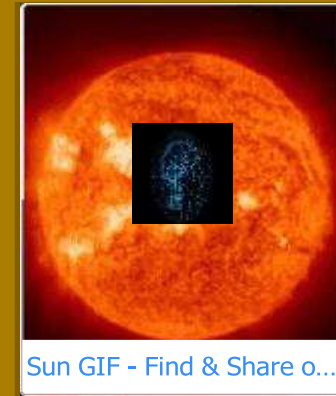




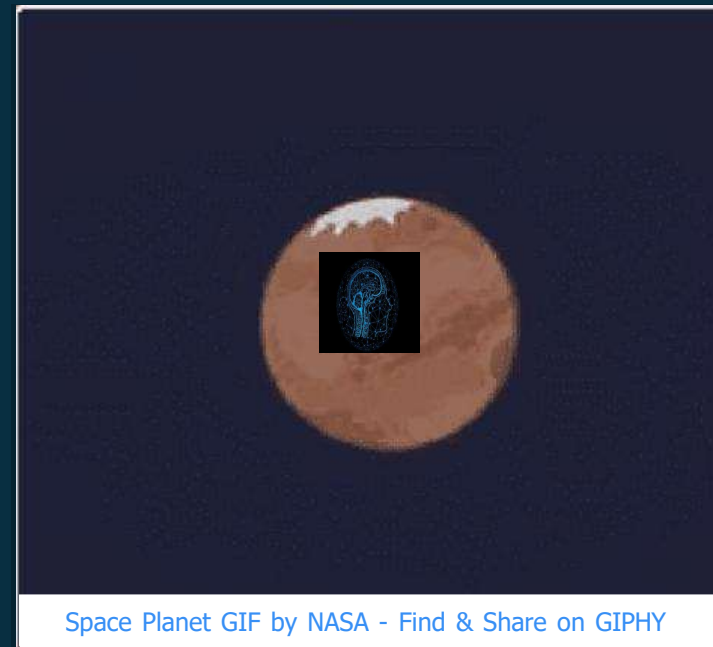
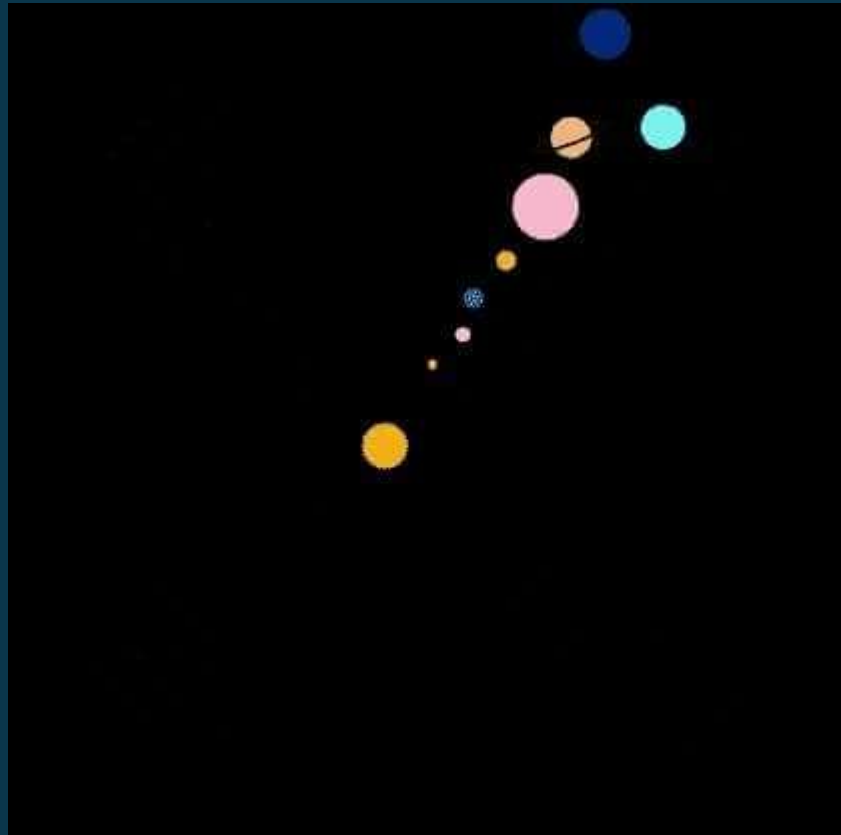
A sun as a center

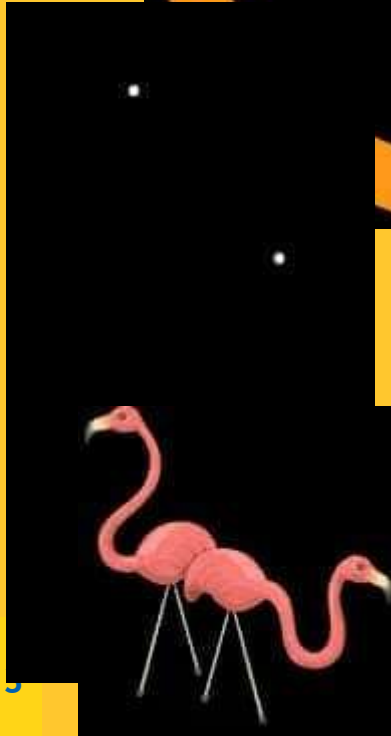
The sun is a center of celestial bodies circulation. The sun and other celestial bodies are in one system. That system is called as solar system.

So, solar system is the arranged system which sun as a center and celestial bodies that surround it. Sun is a big star in solar system center. The shape is round and it consist of hot plasma mixed with a magnetic field. The diameter is around 1.392.648 km represents 99% of the total mass of the solar system.



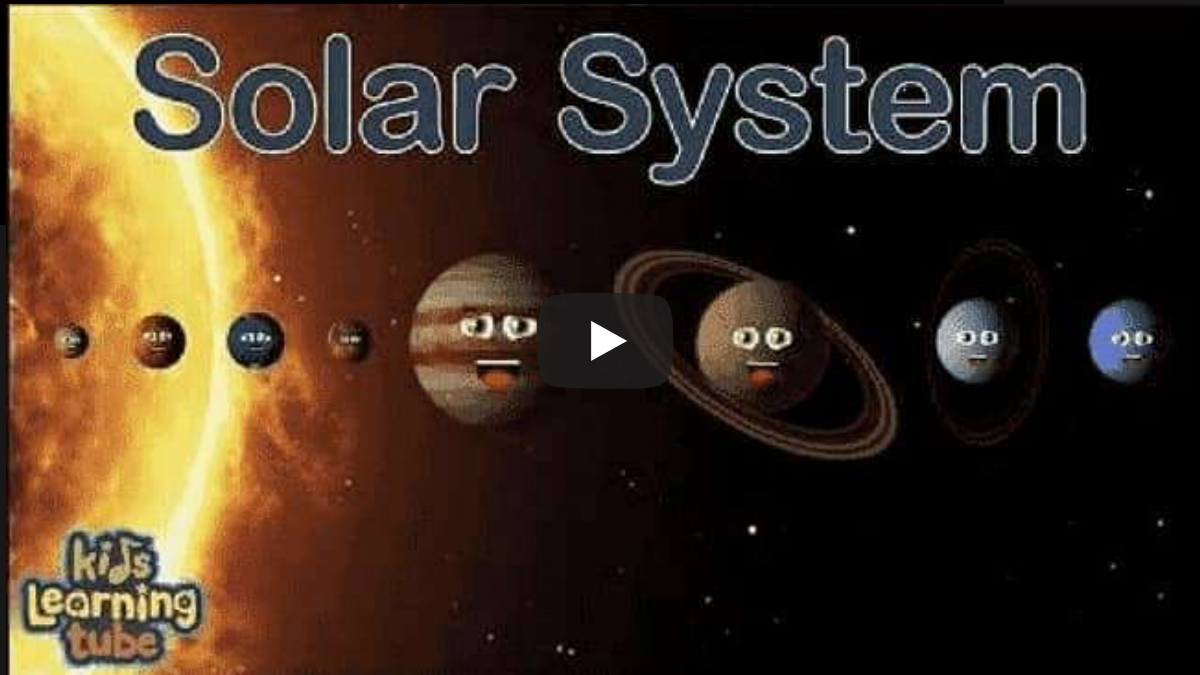
How many planets are
there in our solar system?





The Formation Of a







How the sun



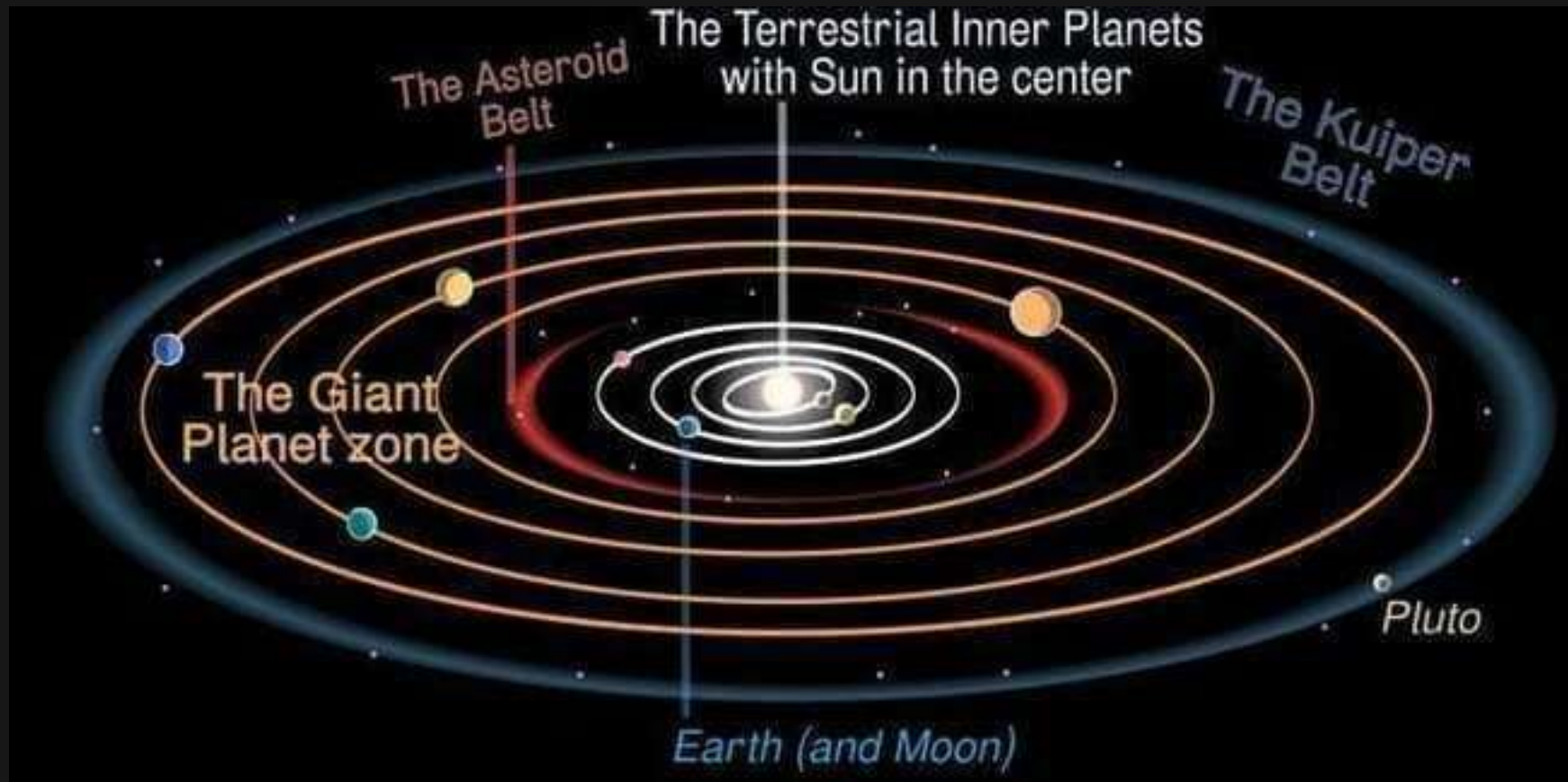
According to astronomers, this sun-forming material comes from the explosion of the first generation of stars.



Space Science Stars GIF by European Space Agency - ES...

The sun is shaped around 4,6 billion years ago as a glowing blob of gas, mainly hydrogen gas.

Solar system's planets

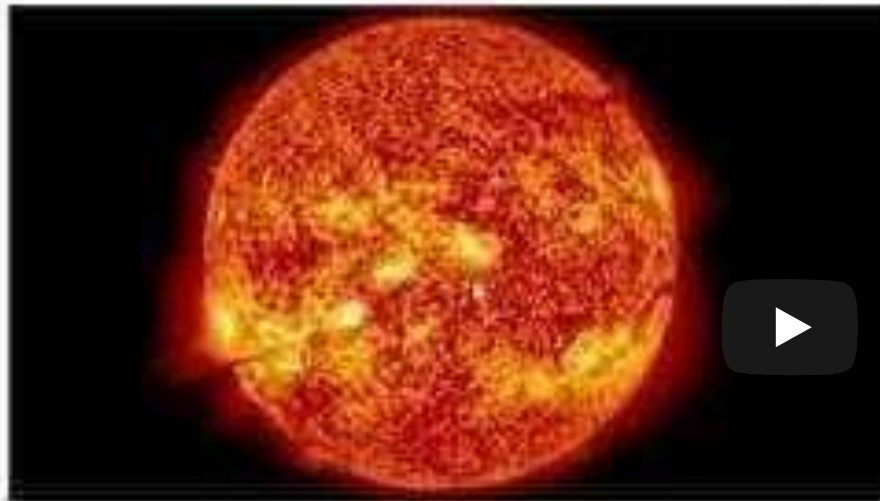


The planet is a celestial body that revolves around a star with a certain trajectory and speed. Other definition, solar system has 8 planets that divided into two zones: · Inner planet zone & outer planet zone



Is it true that the sun was formed about 4,6 billion years ago?

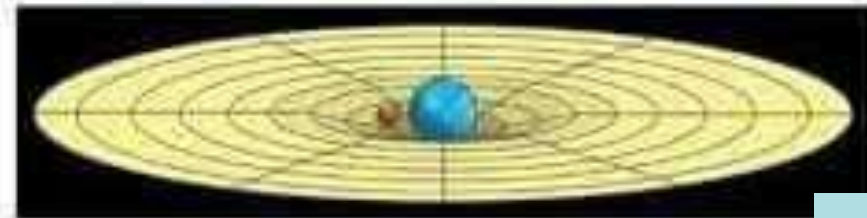
Sun Infographics



The sun is a center of celestial bodies circulation. The sun and other celestial bodies are in one system. That system is called as solar system. So, solar system is the arranged system which sun as a center and celestial bodies that surround it.

Sun is a big star in solar system center.

The shape is round and it consist of hot plasma mixed with a magnetic field. The diameter is around 1.392.648 km represents 99% of the total mass of the solar system



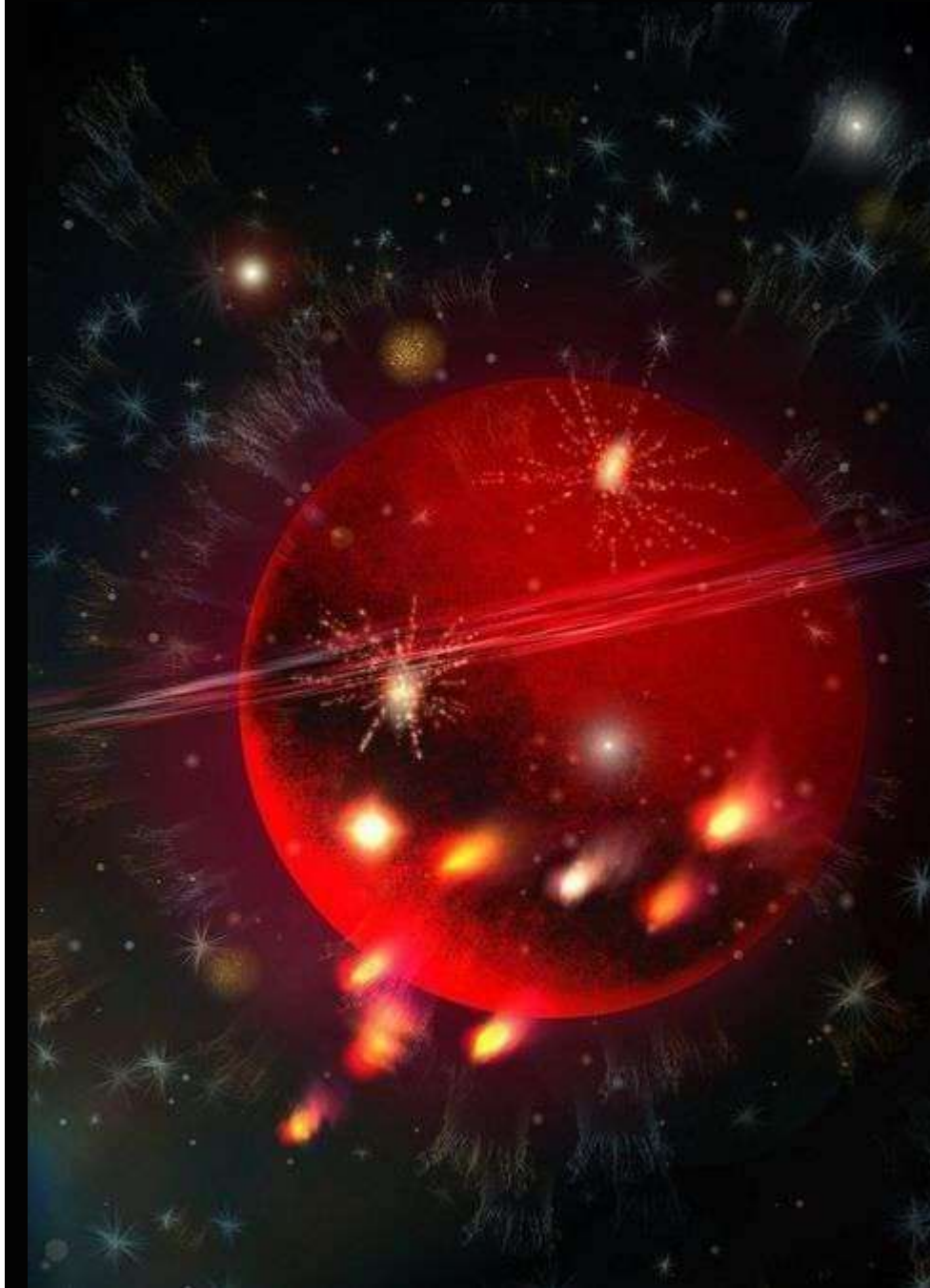




Science
TREK

WHAT EXACTLY IS A PLANET?

<https://www.youtube.com/watch?v=iLD01n0rFHE>



There is something called with small planet, it is celestial body not a satellite. It also orbits the sun and has enough mass to make a sphere but cannot clear the area around it, like Pluto.

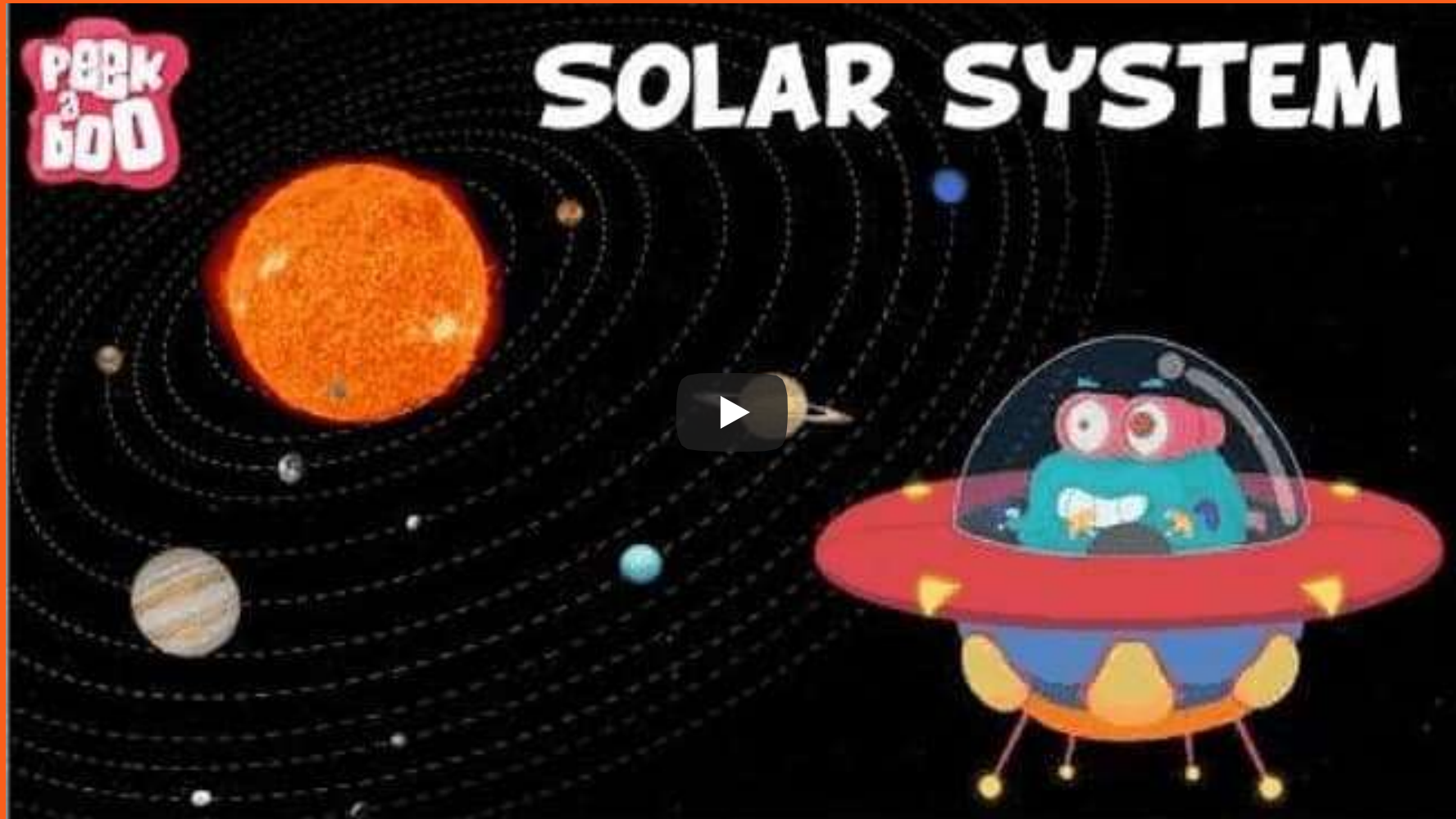




Between Mars and Jupiter, there is an area that called as asteroid belt which is collection of metals and minerals. Most of these asteroids are only a few kilometers in diameter.



Earth Planet GIF by Rob Diaz - Find & Share o...



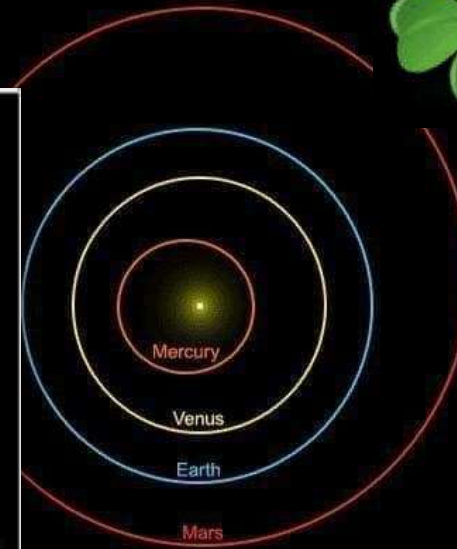
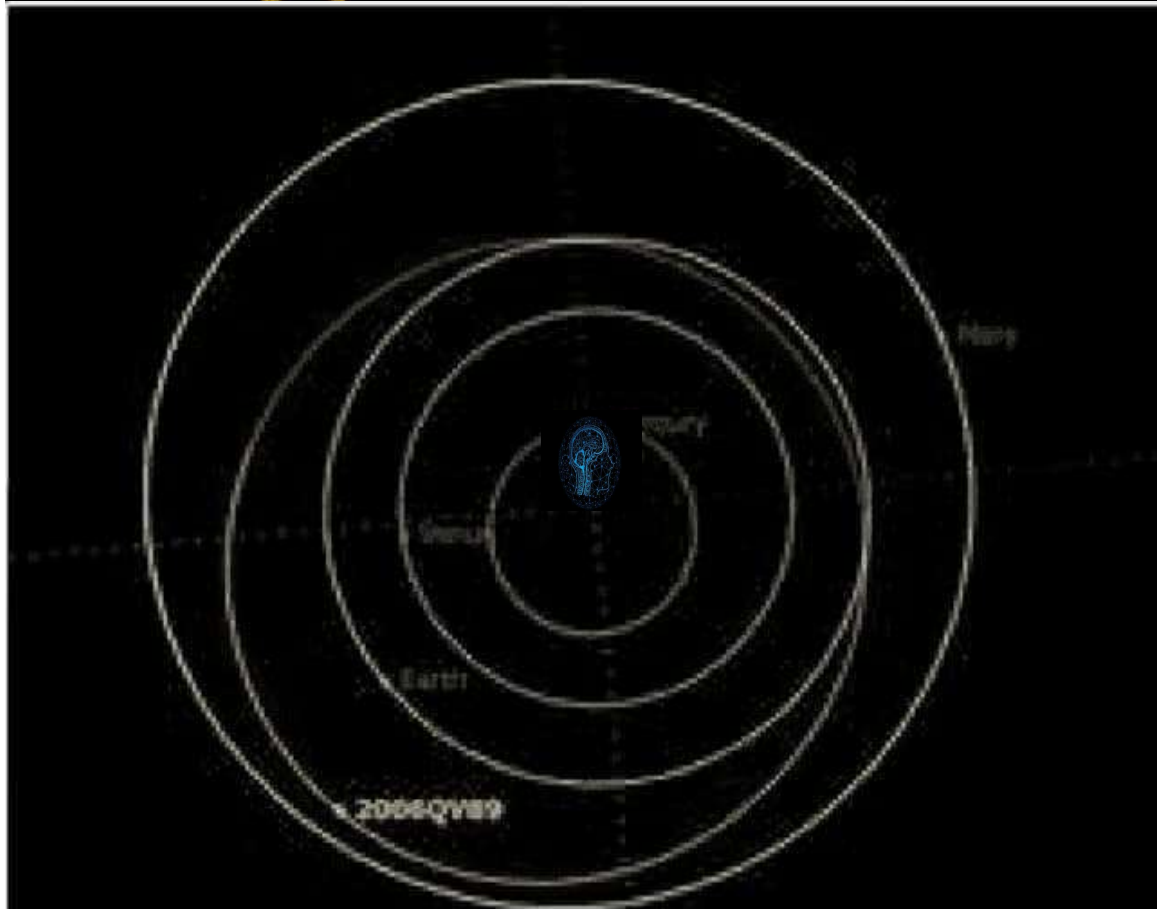
[SOLAR SYSTEM – The Dr. Binocs Show](#) | [Best Learning Videos For Kids](#) | [Peekaboo Kidz – YouTube](#)

Is the forming of a star the same as the process of the formation of the sun? Why is that so?





Inner Planets

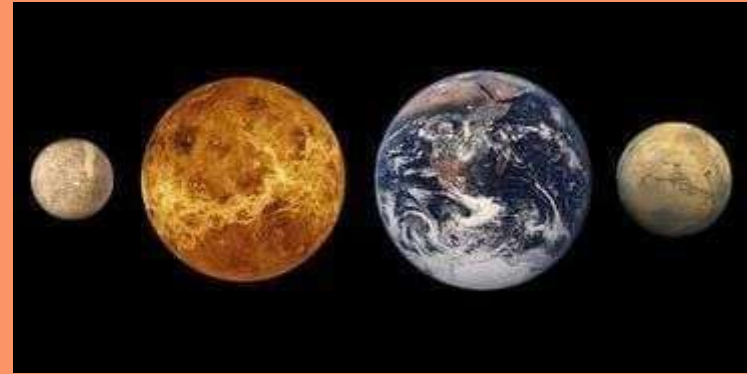


Terrestrial Planets

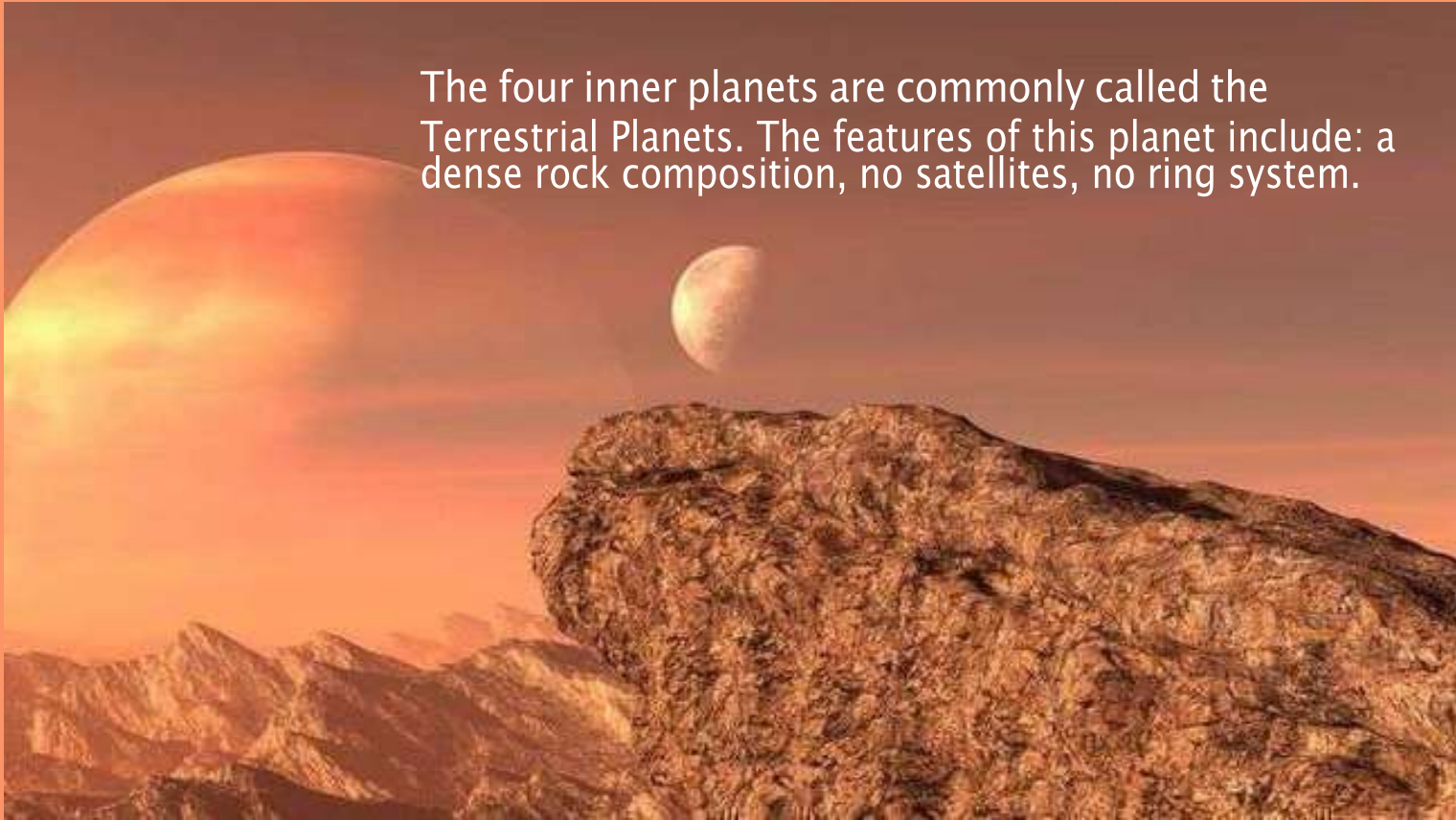
[Animation Sun GIF by European Space Agency - ESA - Find & Share on GIPHY](#)



Inner planets



The four inner planets are commonly called the Terrestrial Planets. The features of this planet include: a dense rock composition, no satellites, no ring system.





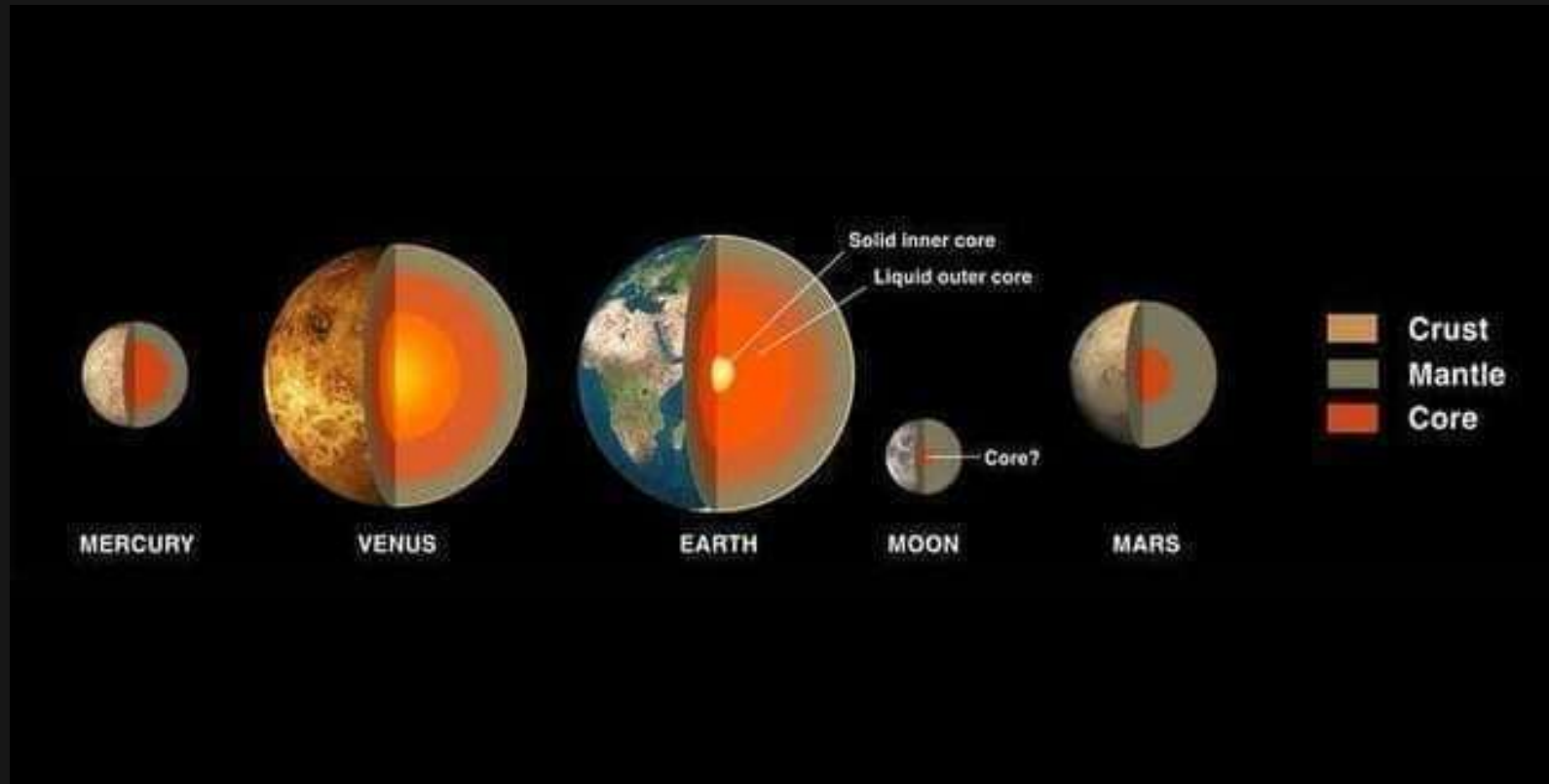
The main component of these planets are high melting point minerals. Examples include silicates which form the crust and mantle, and metals (iron and nickel) which form the core. Three of the four planets have atmospheres and the planet's surface is tectonic.

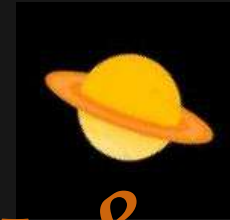




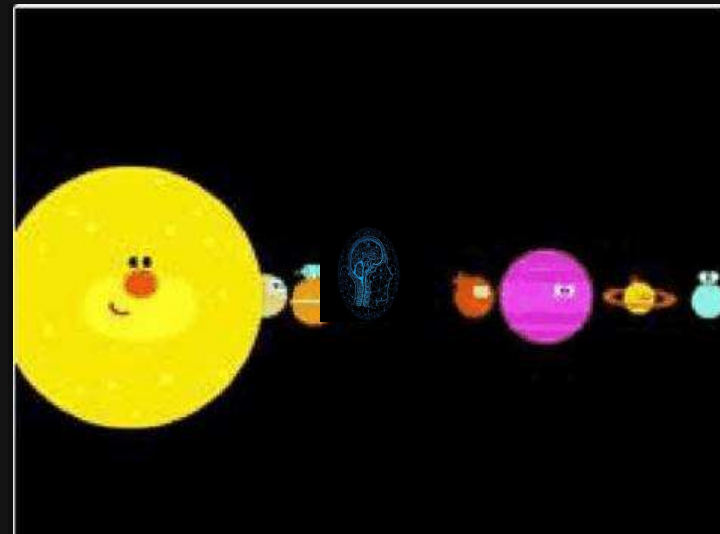
EXERCISE

Read carefully and explain the differences of the material in the planets exposed in the chart below!





Mercury & Venus



Space Sun GIF by Hey Duggee - Find & Share on GIPHY



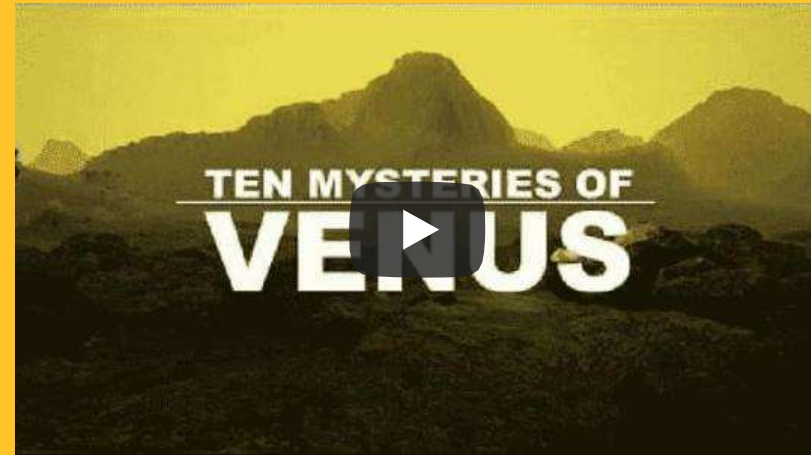
Mercury is the smallest planet in the solar system and the closest planet to the sun. The planet Mercury has no natural satellites with the planet's surface consisting of craters.





Mercury's surface temperature during the day is around 340 C, while at night it drops to minus 200 C.





source: https://www.youtube.com/watch?v=MAwtM_aq-1U

Venus is the second closest planet to the sun and is also the hottest planet in the solar system with temperatures reaching 400 C. This is caused by the greenhouse effect in the atmosphere. This planet is often called the morning star by Indonesian people.



Venus is similar in size to Earth but its atmosphere is nine times denser and its surface is drier than Earth's. Venus is so close to Earth that sometimes we can see it.

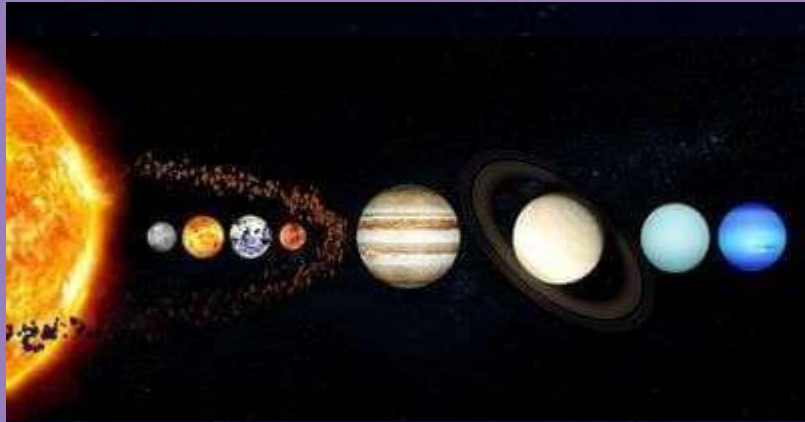


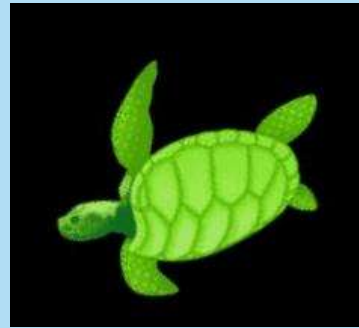


source: [How The Sun Was Formed?](#) | [Solar System](#) | [The Dr Binocs Show](#) | [Peekaboo Kidz - YouTube](#)

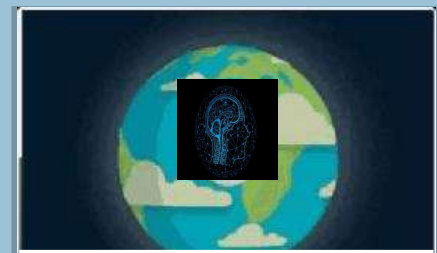


Which planet rotates 90 degrees?

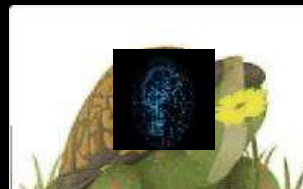
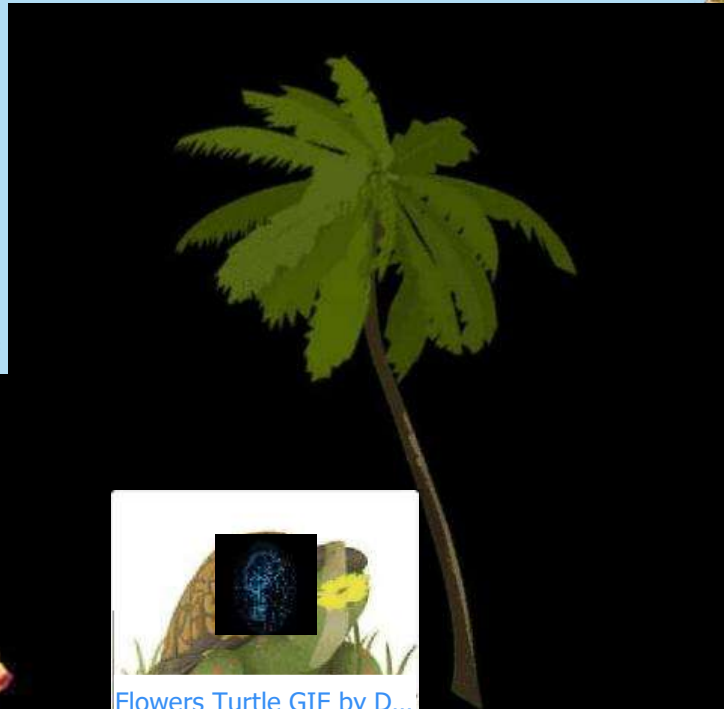
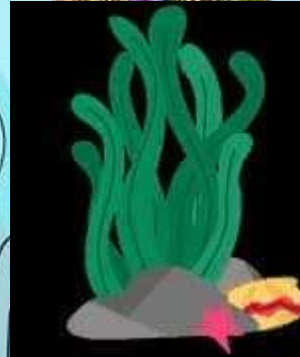
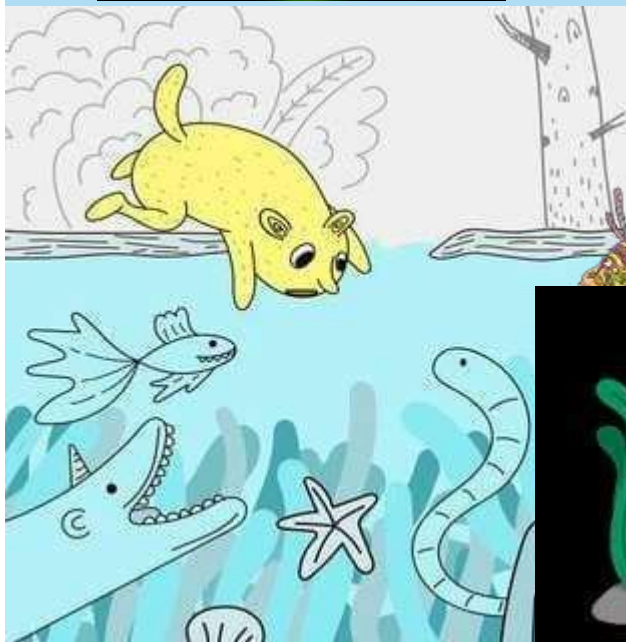
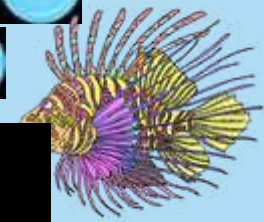




EARTH

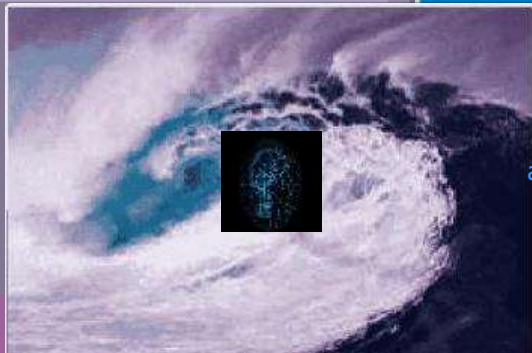


Outer Space Animation GIF by C...



Flowers Turtle GIF by D...



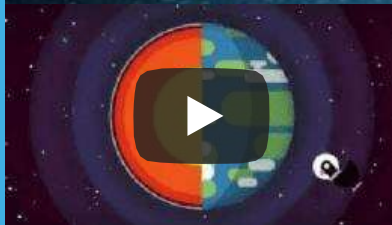
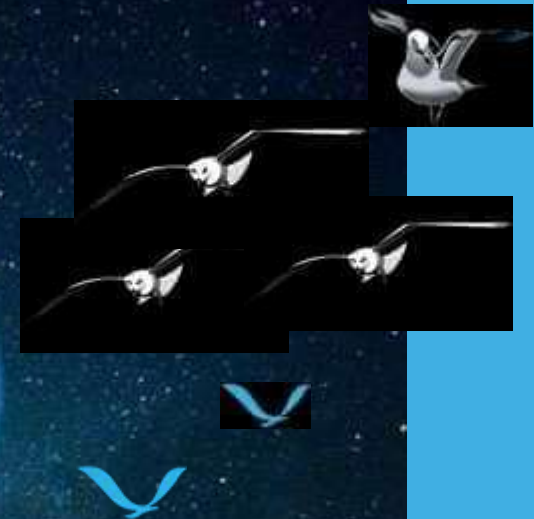


Loop Water GIF by Nova Sound - Find & S...

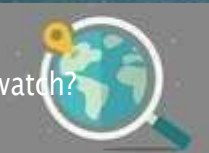


ale Swimming GIF - Fi...





https://www.youtube.com/watch?v=JGXl_9A_Vc



Earth is the largest inner planet and the only planet identified as having life. Several factors cause this.

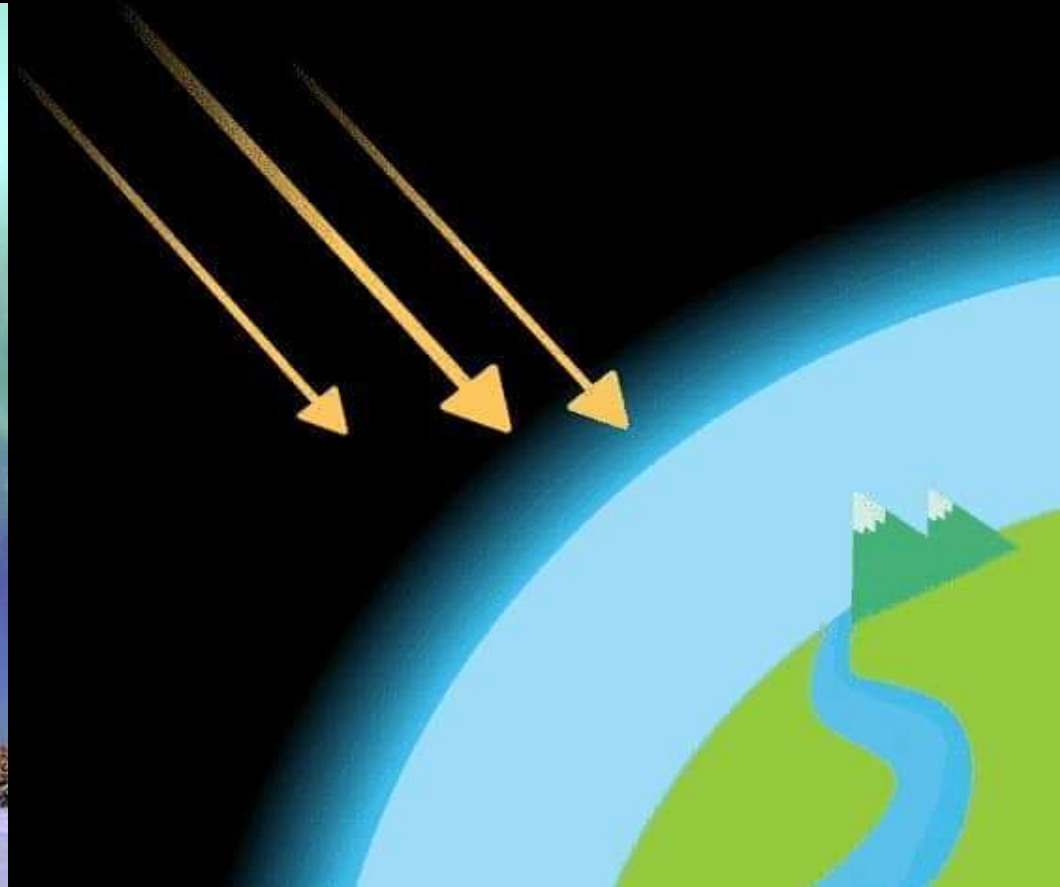


The earth receives enough sunlight so that the temperature of the earth's surface is around 22 C. This temperature allows living things to carry out their life processes



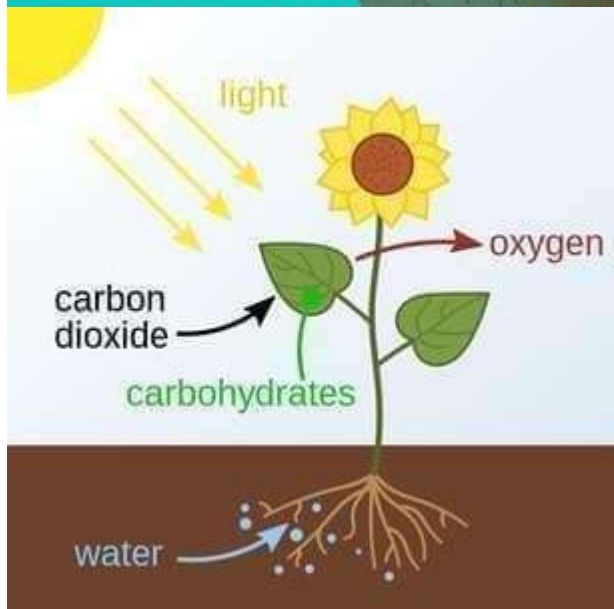


Earth has an atmosphere containing oxygen. This atmosphere protects the Earth from the fall of other celestial bodies. In addition, the atmosphere that surrounds the Earth plays a role in blocking excessive and dangerous heat and sunlight, such as ultraviolet rays





The surface of the earth consists of land and water. The waters on Earth are wider than the land. Thus it can provide water as a source of life.



source:
<https://www.youtube.com/watch?v=CL9A8YhwUps>





The earth has one satellite, namely the Moon, the largest single satellite of the terrestrial planets in the solar system.



Loop Space GIF by xponen...





Earth

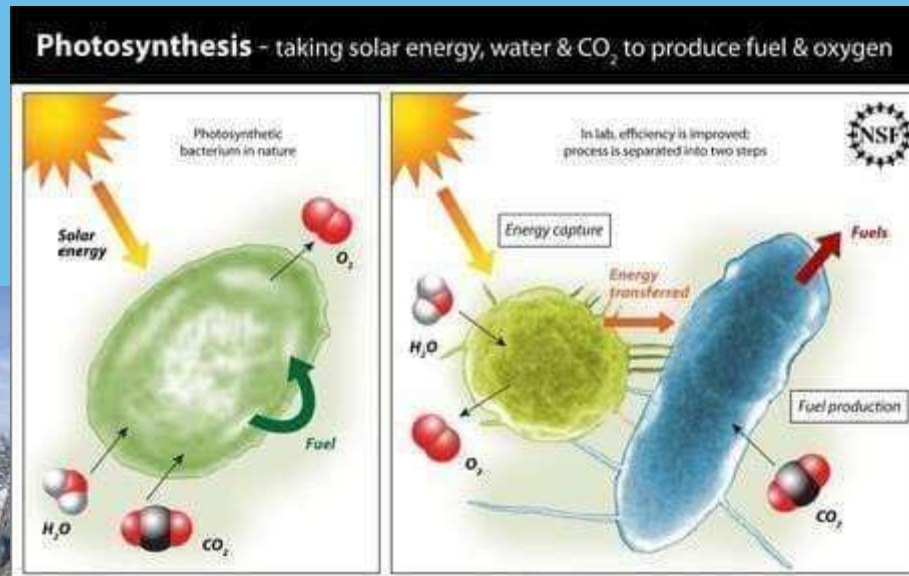


source:
<https://www.youtube.com/watch?v=KpJS9yoXP84>





Explain the element that specify or differentiate the earth from other planets by using the pictures below!





Mars



MARS

By Lula Aula Dzukhriyah (2101055010)
4A - Public Speaking



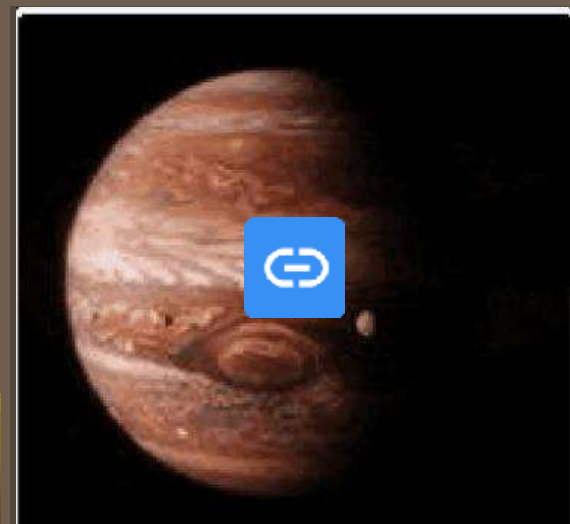
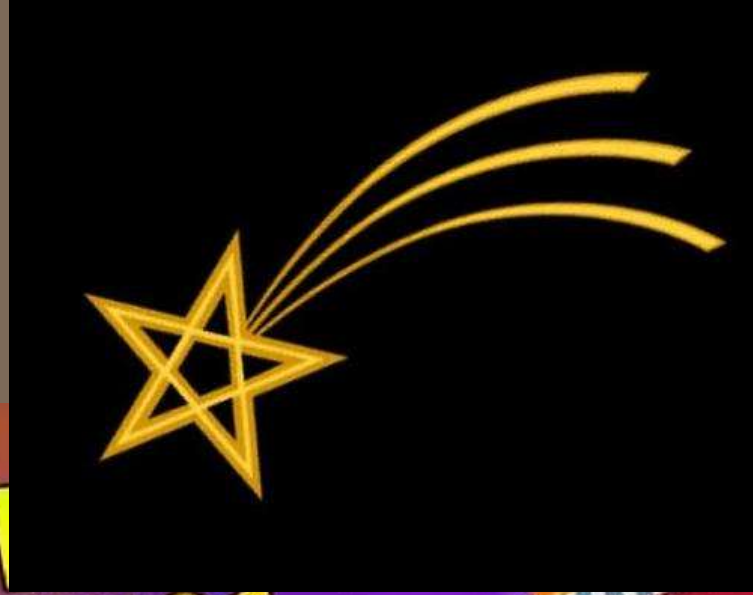


Mars is a smaller planet than Earth and Venus. Mars has a thin atmosphere mainly composed of carbon dioxide. The surface of Mars is filled with large volcanoes and its red color comes from the color of the soil which contains a lot of iron.



Mars has two small satellites, namely Deimos and Phobos. The name Mars itself is taken from the name of the Greek God of war.





Mars GIF - Find & Share on GIPHY



source:
<https://www.youtube.com/watch?v=DYwLsvyYLoU>

★ What is Jovian planet?





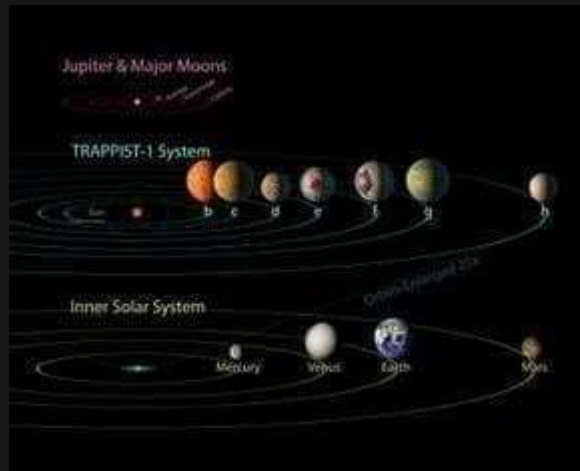
Surfing outer space

A child song from
Indonesia



source:

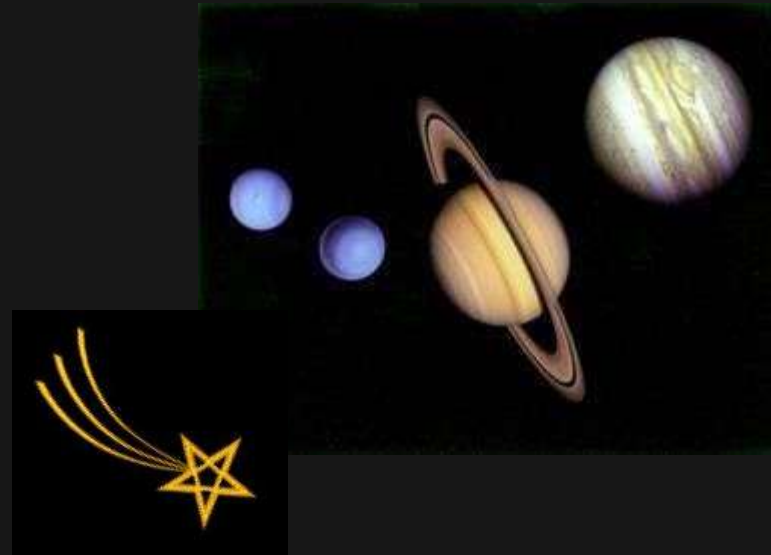
<https://www.youtube.com/watch?v=BcyX7l-NJ9M>



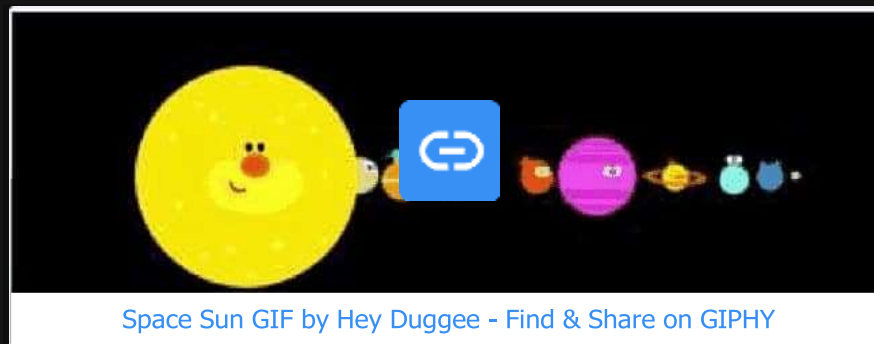
Outer planet zone



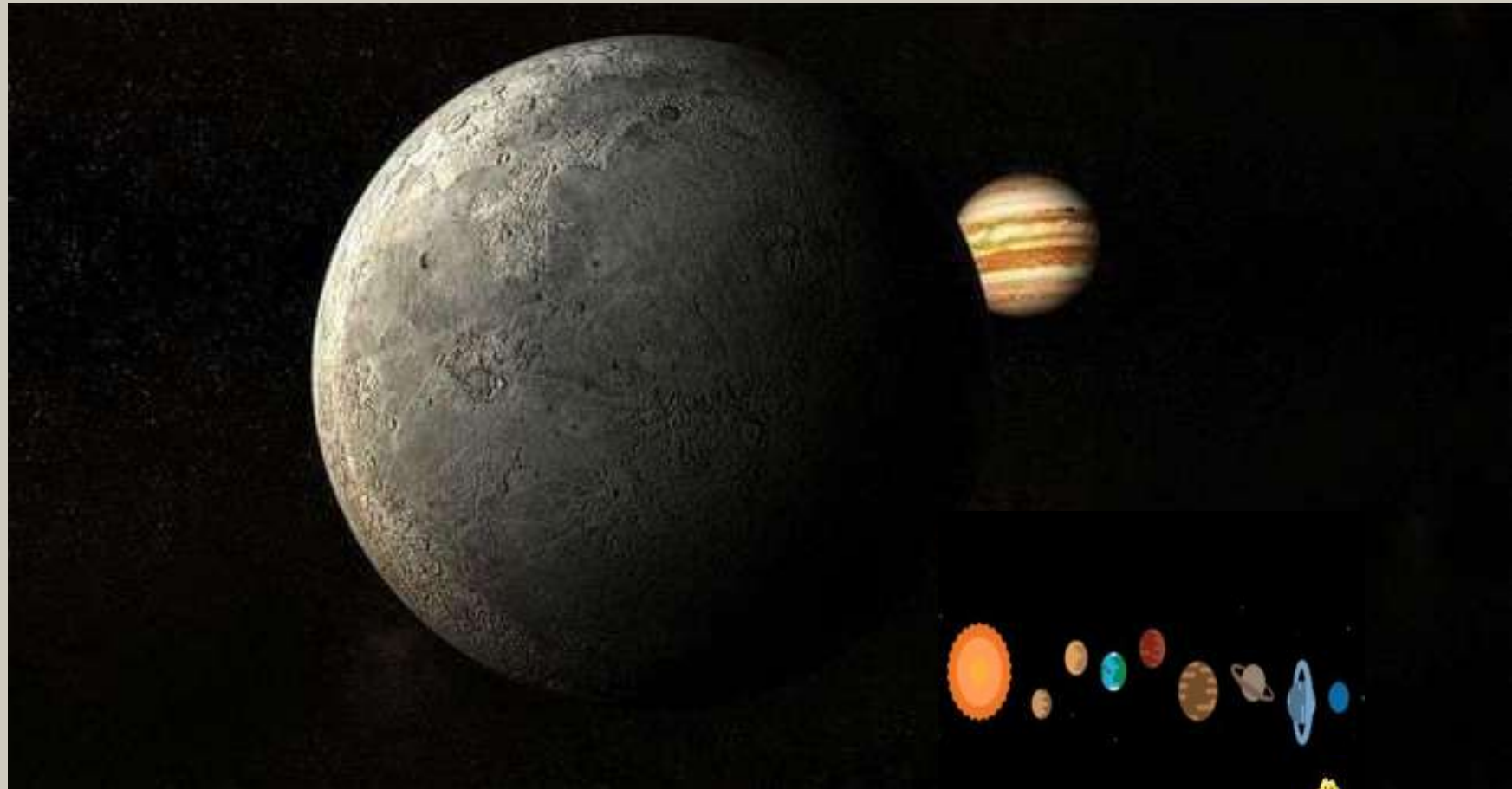
In the outer planet zone there are 4 planets which are called the four gas giant planets or the Jovian planets. All four of the giant planets have rings, although only Saturn's ring system is visible from Earth.



These four gas giant planets are divided into two more, Jupiter and Saturn both of which most of the planets contain hydrogen and helium. Whereas Uranus and Neptune have a greater proportion of ice.

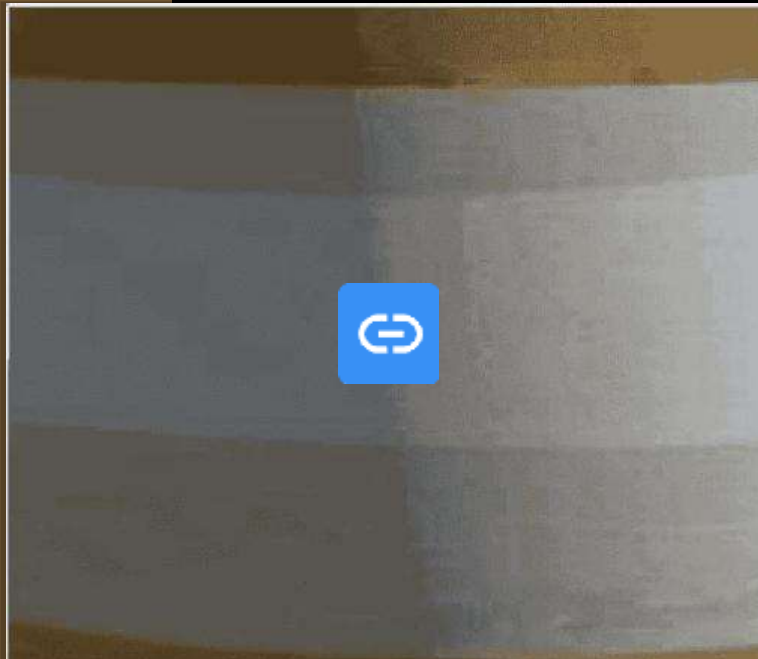
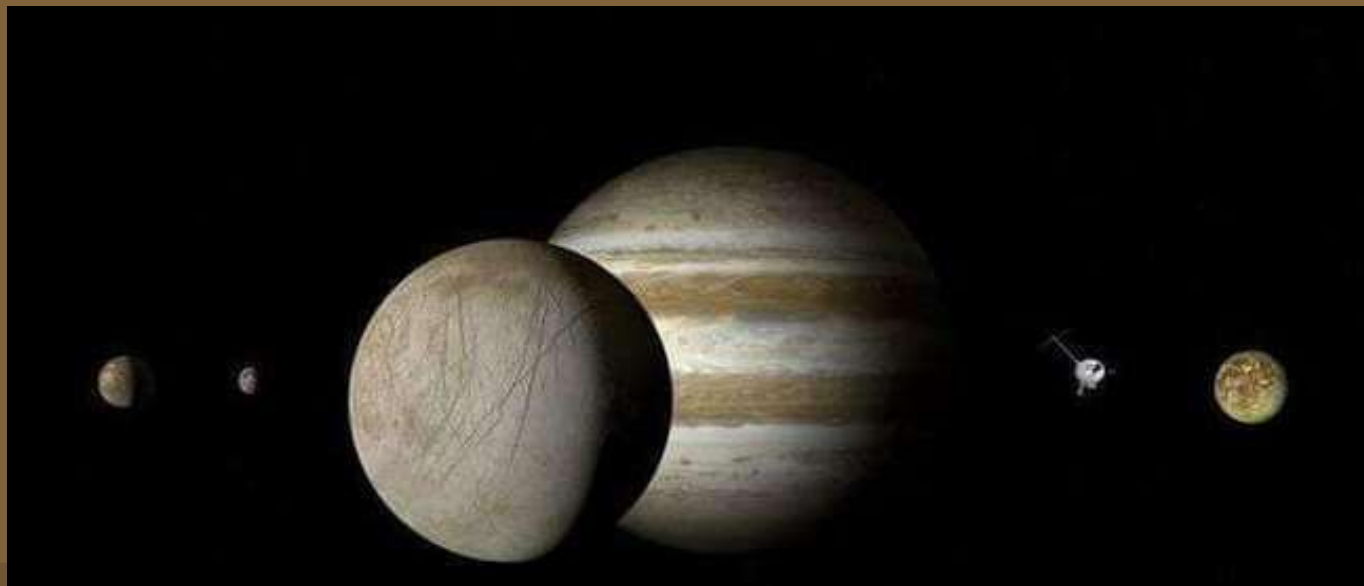


Space Sun GIF by Hey Duggee - Find & Share on GIPHY



Jupiter is 318 times the mass of Earth. Its main ingredients are helium and hydrogen.





Space Science Animation GIF by European Space Agency - ES...

So far, Jupiter has 63 satellites. The biggest four are Ganymede, Callisto, Io and Europa.



As previously explained, Jupiter is mostly composed of hydrogen and helium. The planet may have a rocky core made up of heavy elements, but it doesn't have a solid surface like the other gas giants

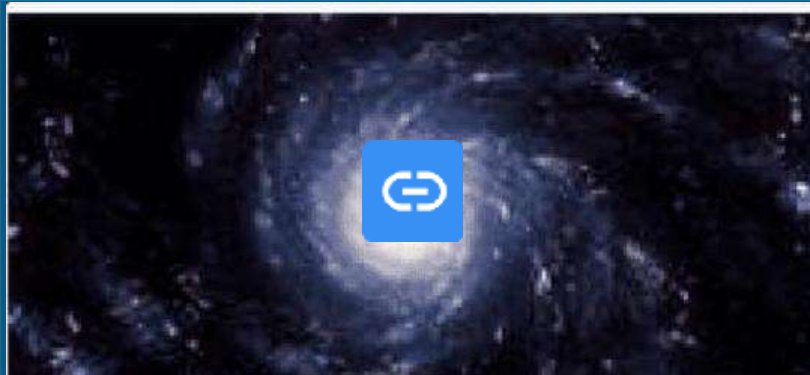
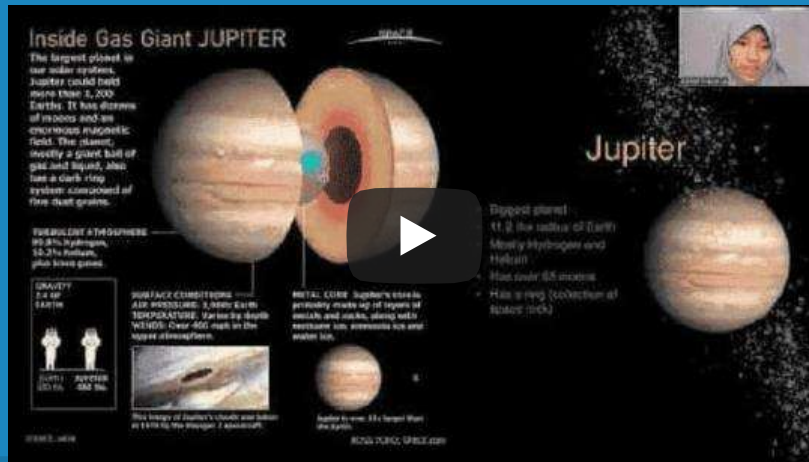


Due to the content that exists in its essence, it causes several semi-permanent characteristics in the atmosphere, for example: **Cloud Streamers , The Great Red Spot**



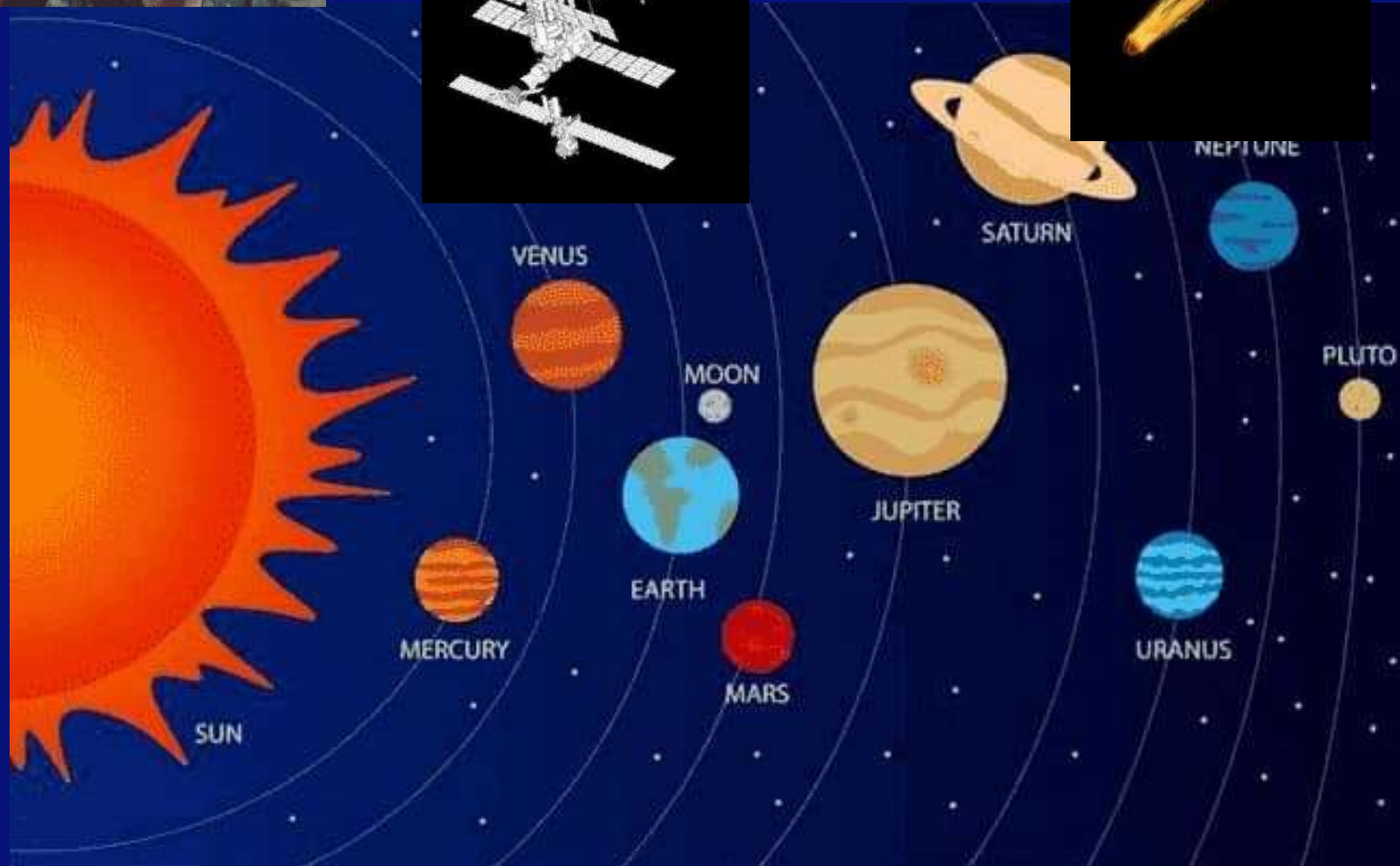
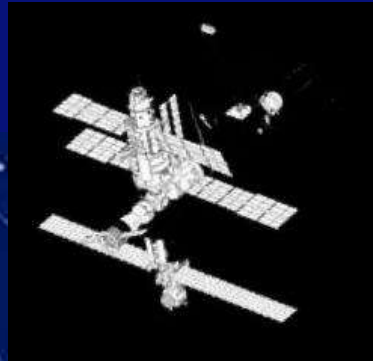


Which ones of the planet are called Giant Gas Planets?



Star Wars Space GIF by Feliks Tomasz Konczakowski - Find & Sha...







Saturn . Uranus .
Neptune



Saturn is a planet known for its ring system. Saturn has some comforts with Jupiter, such as its atmosphere. But Saturn is smaller than Jupiter, equivalent to 95 times the mass of Earth. Thus making Saturn the least dense planet in the solar system. even so Saturn is the 2nd largest planet in the solar system.

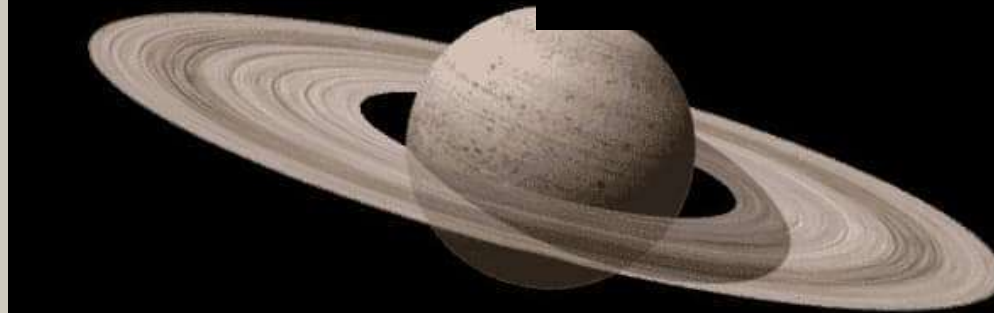


source:

https://www.youtube.com/watch?v=7F_A4gMxsfE



So far, Saturn has 63 satellites, two of which are Titan and Enceladus.



Saturn evolves in 29.46 years. Besides evolving, Saturn also rotates in a very short time, which is 10 hours 40 minutes 24 seconds



Uranus has a characteristic abnormality of the orbit, it revolves around the sun with an axis of 90 degrees. This planet has the coldest core compared to other planets. Uranus has 27 known satellites, the largest of which is Titania, Oberon, Umbriel, Ariel, Miranda.

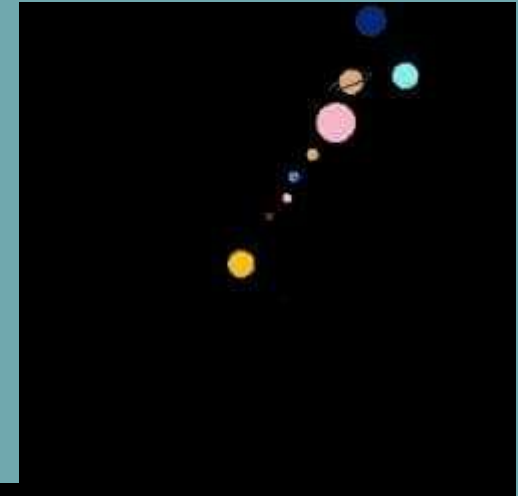


Uranus has a mass 14 times that of Earth, with this Uranus is the lightest planet of the outer planets.



Unraveling Uranus: A Brief Exploration of the Mysterious Ice Giant



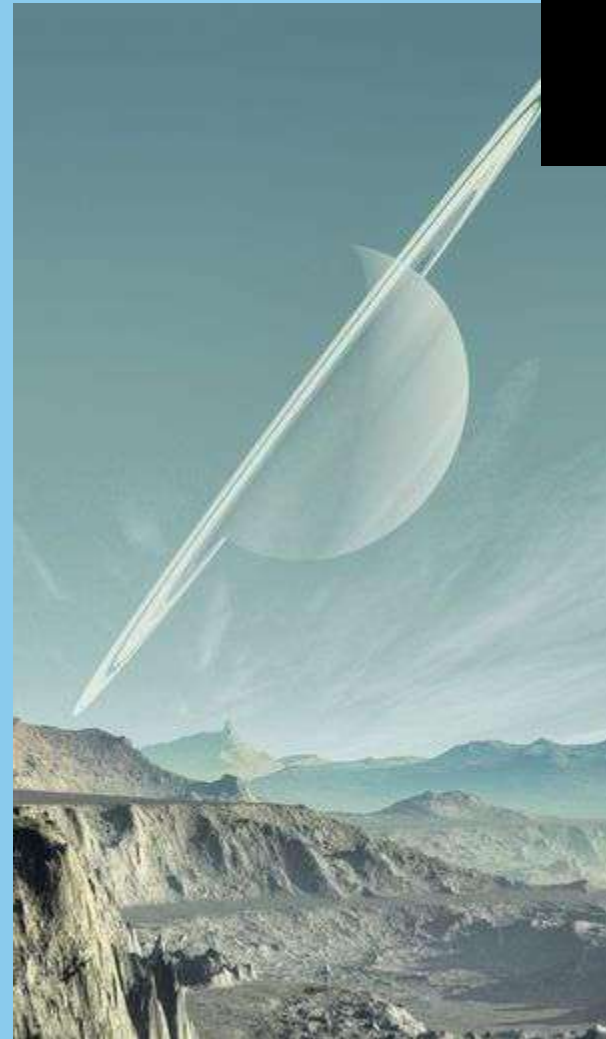


Neptune is slightly smaller than Uranus, making it denser. Neptune radiates heat from the inside, but not as much as Jupiter and Saturn. Neptune has 13 known satellites. Neptune's largest satellite is Triton. What is unique about Triton is that Triton is the only large satellite whose orbit is reversed.

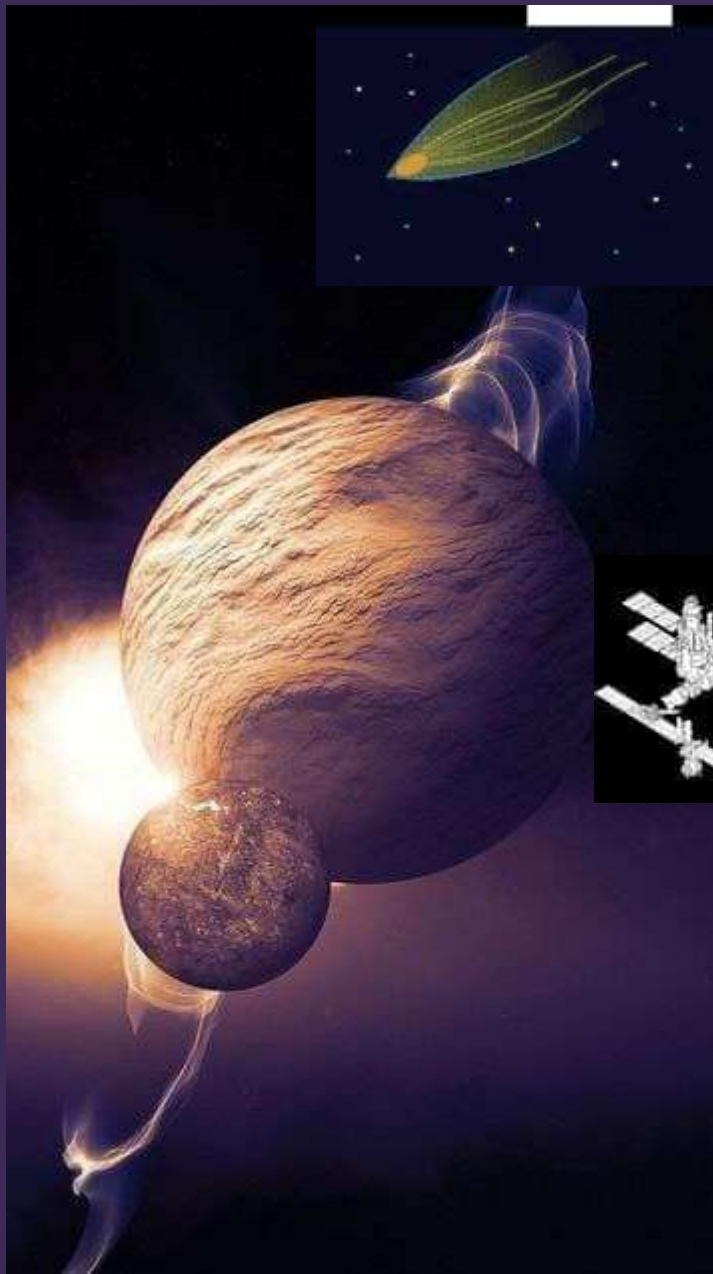


EXERCISE

**How many satellites
are there of Neptune?**



Celestial Body



Outer Space Art GIF by xponentialdesign - Find & Sha...



CELESTIAL BODY

In our solar system, there is one main star and eight planets that around it. Each planet has its own satellites. In addition, there are other celestial bodies. Some of these celestial bodies include asteroids, meteors, comets, and satellites. Each celestial body has its own characteristics. So, for more details, let's describe other celestial bodies in the solar system.

Satellites

Satellites are celestial bodies that move around a planet. There are 2 types of satellites. A natural satellite is a satellite that already exists in the solar system. An artificial satellite is a satellite made by humans and launched using rockets.





Meteors, meteorites, and meteoroids

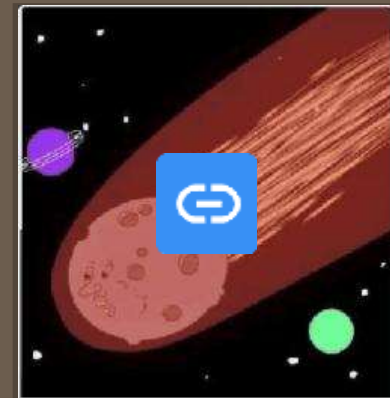


Meteors are small celestial bodies that do not have a specific trajectory. These objects move freely through space at great speed. These objects are called meteoroids.



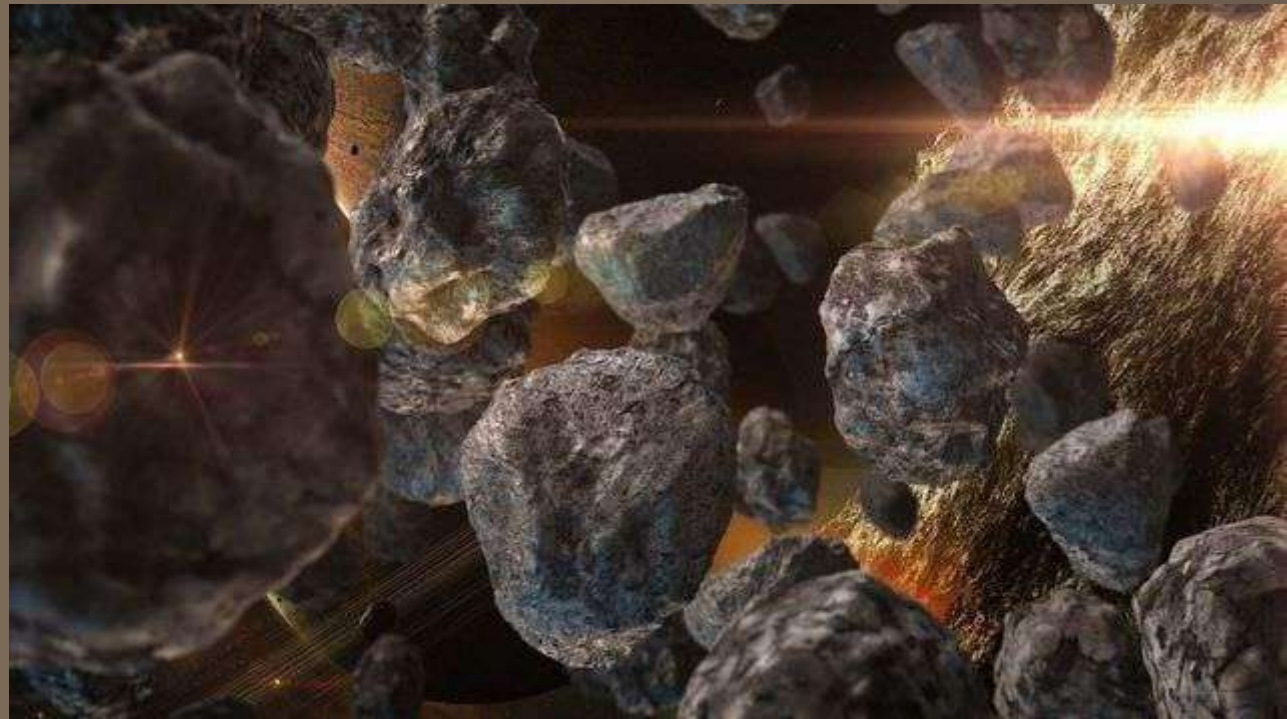


If this object is attracted by a planet that has an atmosphere like Earth's, for example, then the object will glow because it rubs against the atmosphere. These glowing objects are called meteors.



On My Way - GIPHY Clips

If the meteor does not completely burn up in the atmosphere, it will reach the Earth. Meteors that reach the earth's surface are called meteorites.





What is Dwarf planet?

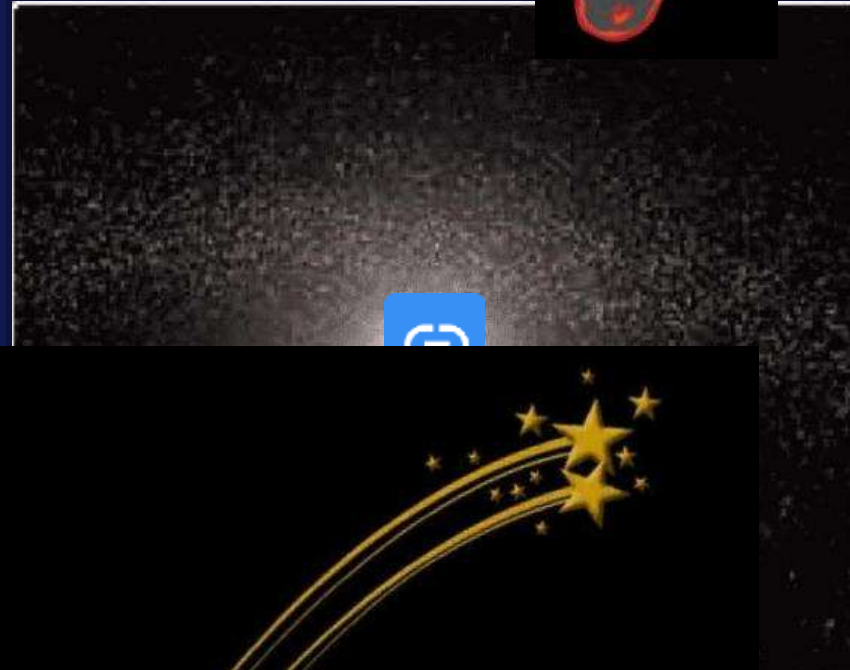


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[Cartoon Looking GIF by Daniel Spacek - Find & Share on GIPHY](#)

Comet & Asteroid





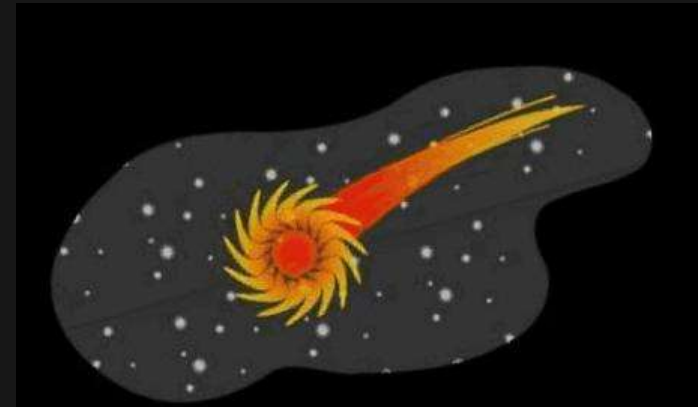
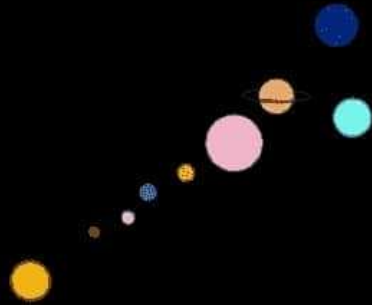
Comets are celestial bodies that revolve around the sun in very elliptical orbits. Comets are composed of gas, ice, and dust. As the comet moves closer to the sun, the ice on the comet evaporates.

Halley comet appears on earth every 75–76 years. The latest moment was in 1986.



source

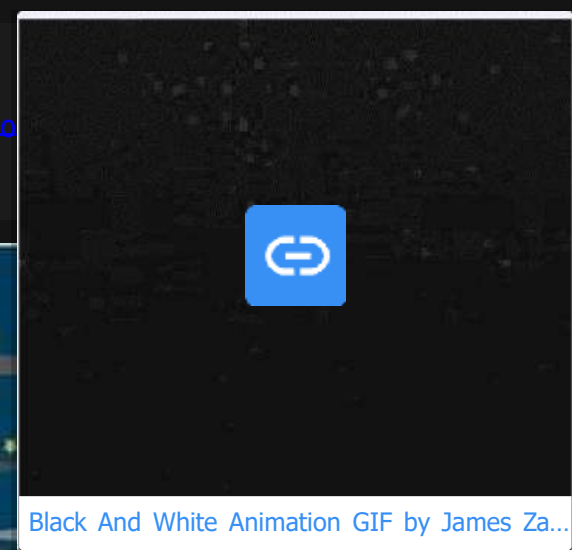
<https://www.youtube.com/watch?v=geUYm3f6ZA4>



The collection of st
and dust is pushed by the
solar wind so that it
moves away from the sun.
That's why when a comet
approaches the sun, its
tail is behind, whereas
when a comet is moving
away from the sun, its tail
is in front.



source:
https://www.youtube.com/watch?v=oPxS3U40_gQ



Asteroids

Asteroids are small, rocky bodies that have been left over from the formation of the planets 4.5 billion years ago. We often know them as 'minor planets'. There are thought to be billions of these chunks of rock. Most of them lie in a doughnut-shaped 'main belt' between the orbits of Mars and Jupiter



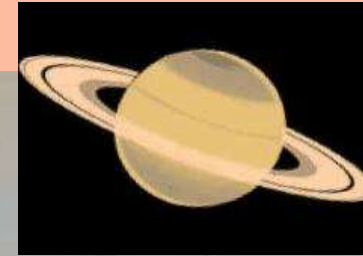


EXERCISE

When a comet approaches the sun, its tail is behind, whereas when a comet is moving away from the sun, its tail is in front.

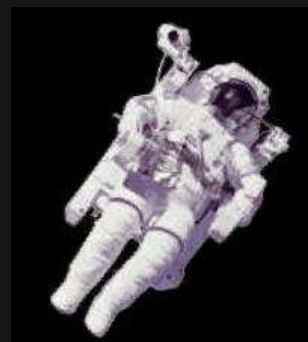
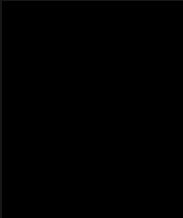
Explain the pictures below!





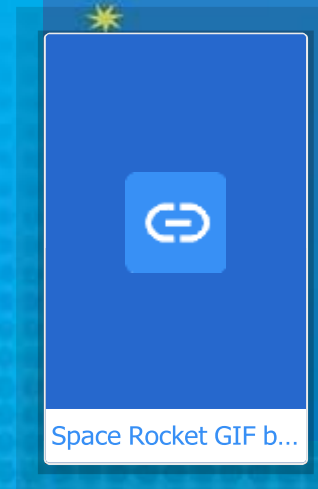
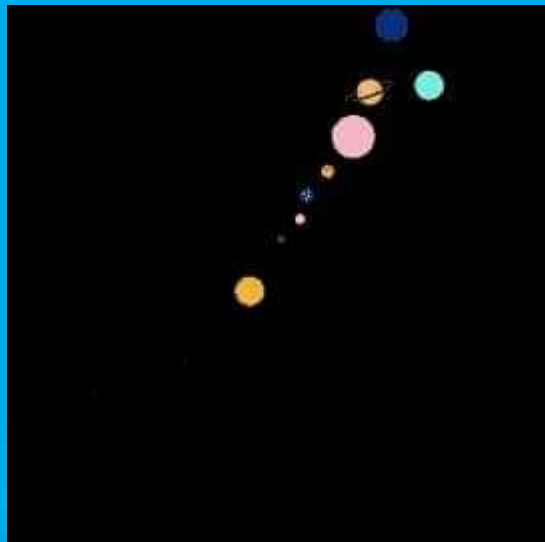
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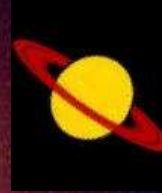




AknoWledgement

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which support the funding of this
research





MEET OUR TEAM



Dr. Ir. Suciana Wijirahayu, M.Pd
Dosen Pendamping



Indra Nurul Alam
Ketua Team



Dhafa Alifandra
Anggota 1



Mentari Yuliani
Anggota 2

A SYNOPSIS



ZENO THE OUTER SPACE KEEPER AND THE MISSION

A media of instruction has a crucial function to motivate the young learners who learn English as a foreign language. Chatbot is one of it to increase the students' interest.

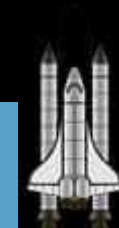
Zeno is a character introduced in this e-book provided and completed with the chatbot to engage the learner with a topic about Outer Space especially the Solar System. The design is to support the students to be more autonomous by having fun in learning English through news about A Solar System.

Strategy training is one way to equip the university students to deal with problems they face in learning English. The shared effects of students' attitudes and affective strategy should be considered of contributing the students' speaking and writing performances.

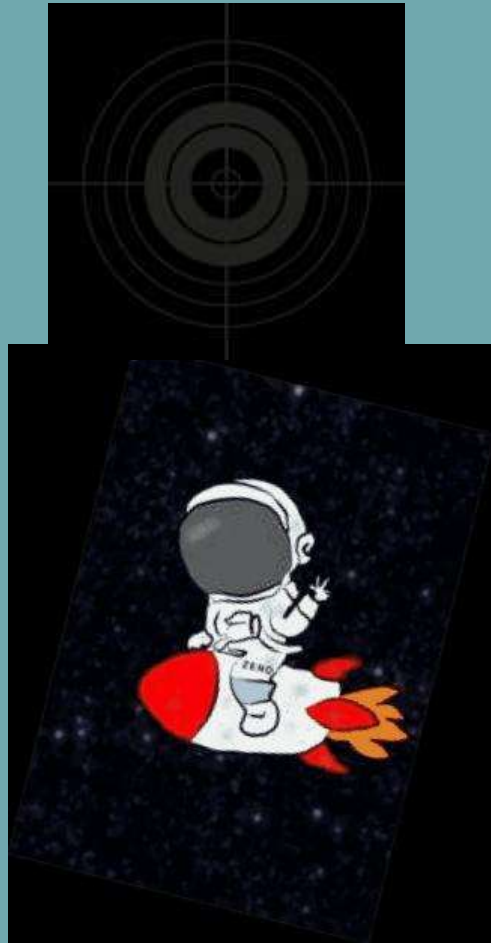
Therefore, a model of affective strategies training, in a form of the combination of both variables is in need to overcome the challenges and create autonomous learning that contributes greater effects on the students' speaking and writing performance to an increase of the students' awareness and responsibilities to learn.



Adjusting the supported learning environment set systematically to build creative thinking and cultural awareness in any other challenging EFL contexts are suggested for further application.



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In the VEA 2 and VEA 3 Programs, she is the Coordinator of Higher Education Mentors..

We hope you enjoy reading this book!

Zeno the Outer Space Keeper and the Mission



Dr. Suciana Wijirahayu & Team

