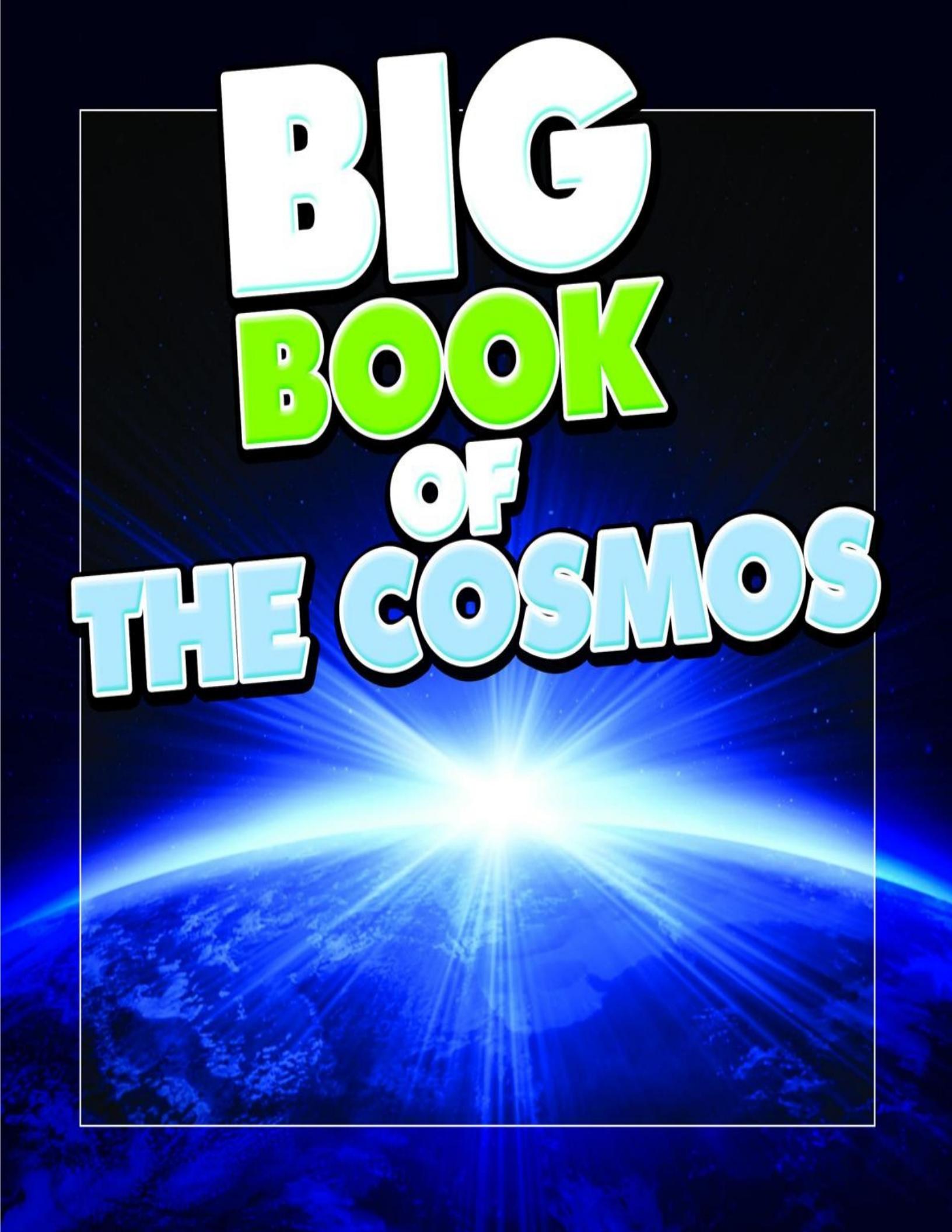


# **BIG BOOK OF THE COSMOS**



**Big I**

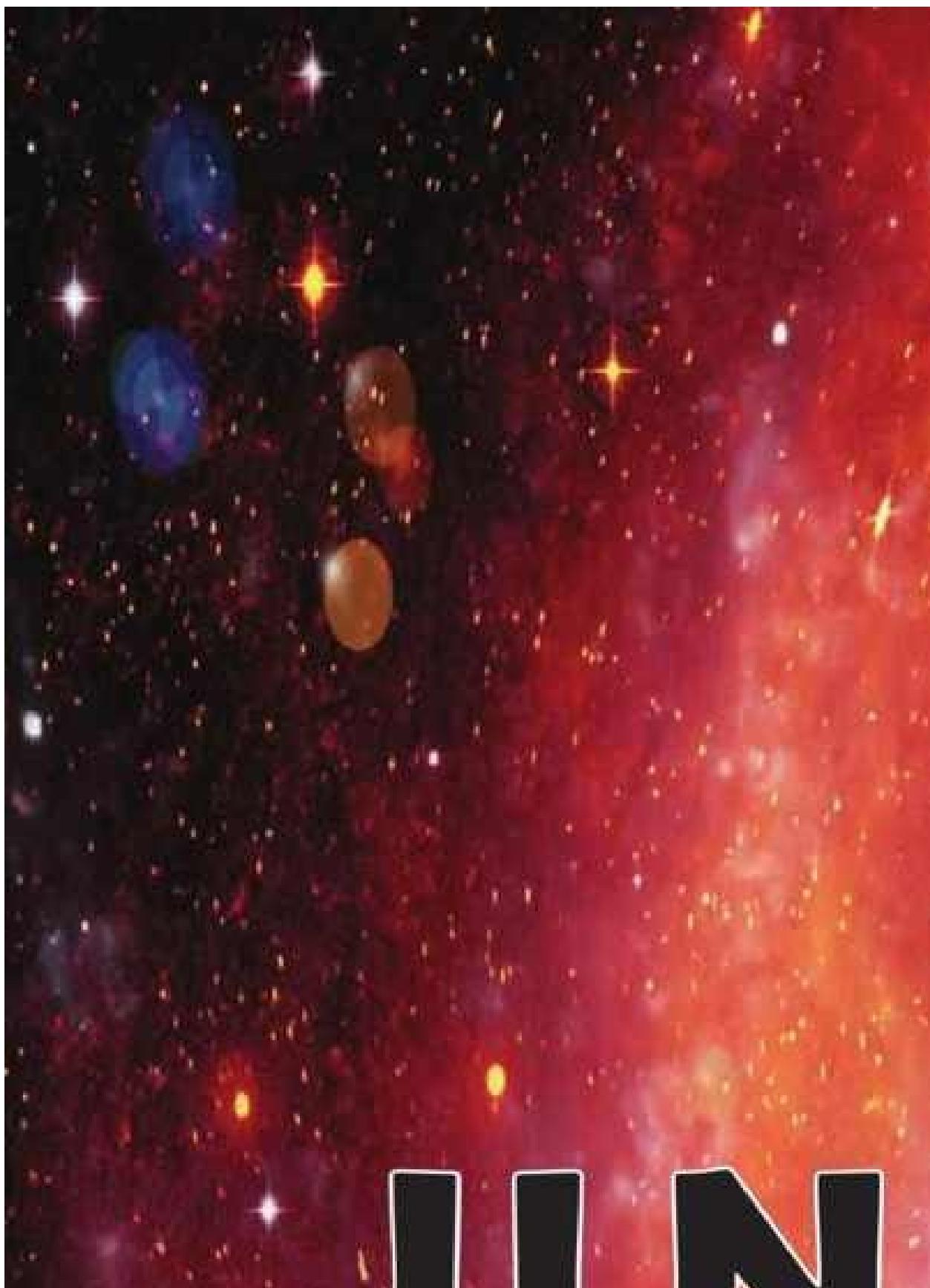
Cosm





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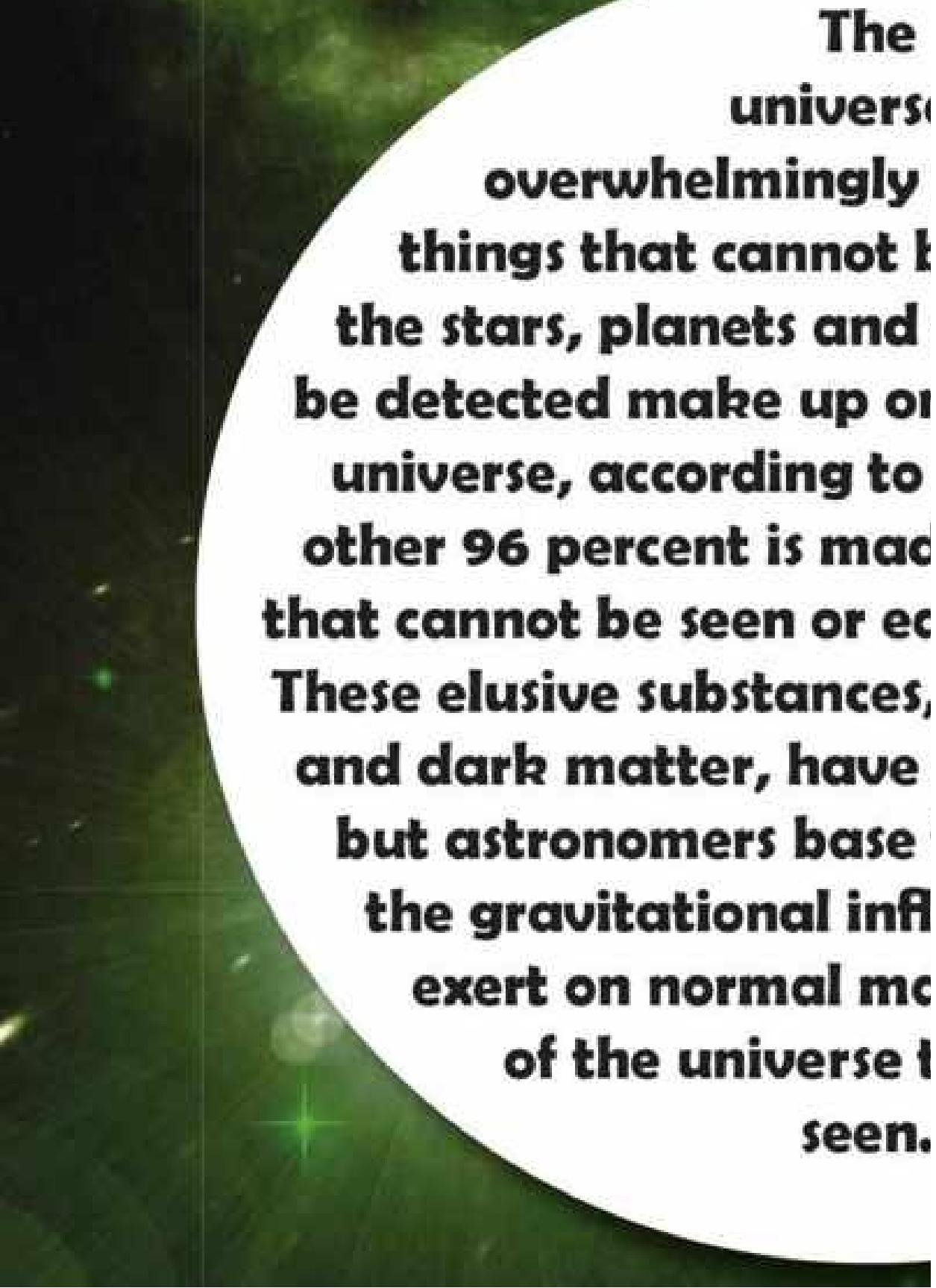


The  
universe  
**began with the Big  
Bang, and is estimated  
to be approximately 13  
billion years old (plus  
or minus 130 million  
years).**









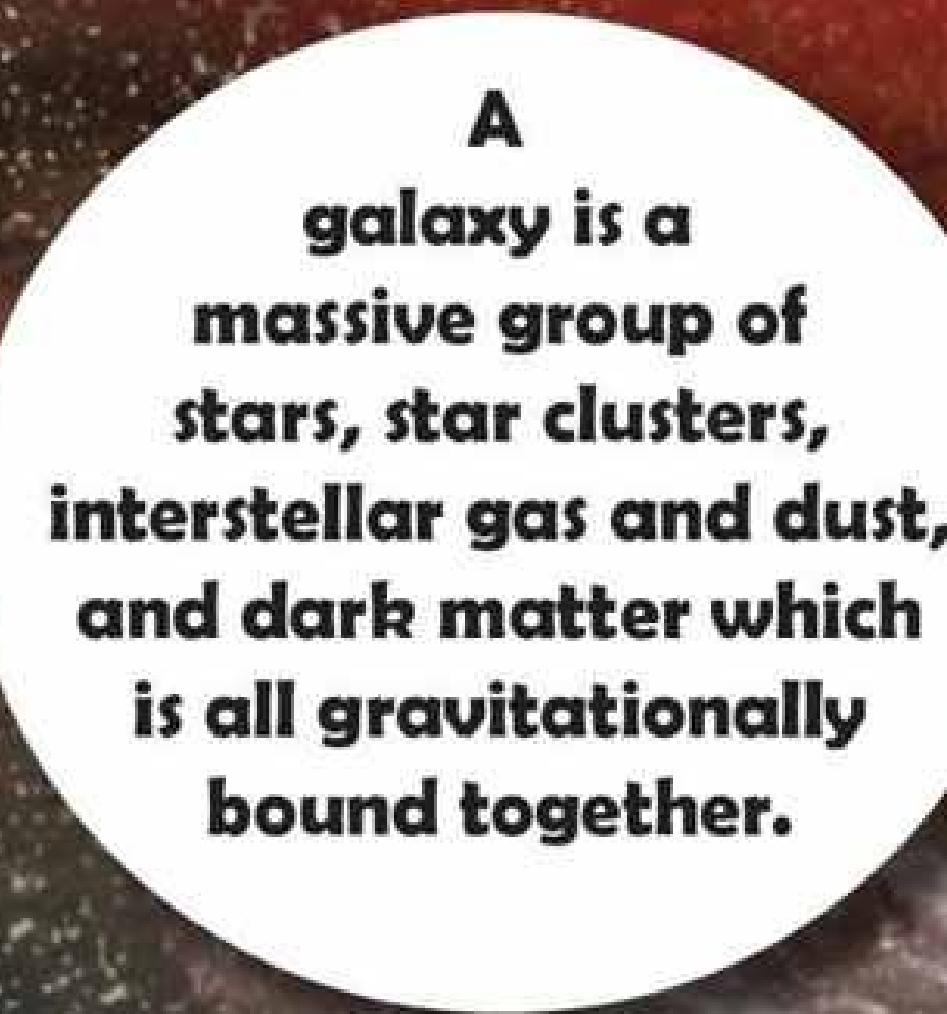
**The universe is  
overwhelmingly composed  
of things that cannot be  
seen or easily detected.  
The stars, planets and  
other matter that can be  
detected make up only  
a tiny fraction of the  
universe, according to  
astronomers. The remaining  
other 96 percent is made  
up of dark energy and  
dark matter, substances  
that cannot be seen or easily  
detected. These elusive substances,  
which make up most of the  
universe, have been  
predicted by theory but  
have not yet been  
directly observed. Dark matter,  
however, has been  
detected through its  
gravitational influence  
on normal matter. Dark  
energy is believed to  
exert a repulsive force  
on normal matter, causing  
the expansion of the  
universe to accelerate.  
Astronomers base their  
theories on observations  
of the gravitational influence  
of normal matter on light  
and other particles. They  
also study the motion  
of galaxies and clusters  
of galaxies to determine  
the distribution of matter  
in the universe. By  
studying the properties  
of dark matter and  
dark energy, scientists  
hope to gain a better  
understanding of the  
fundamental laws of  
physics and the evolution  
of the universe over  
time. The search for  
dark matter and dark  
energy continues, as  
new discoveries are  
made every day.**



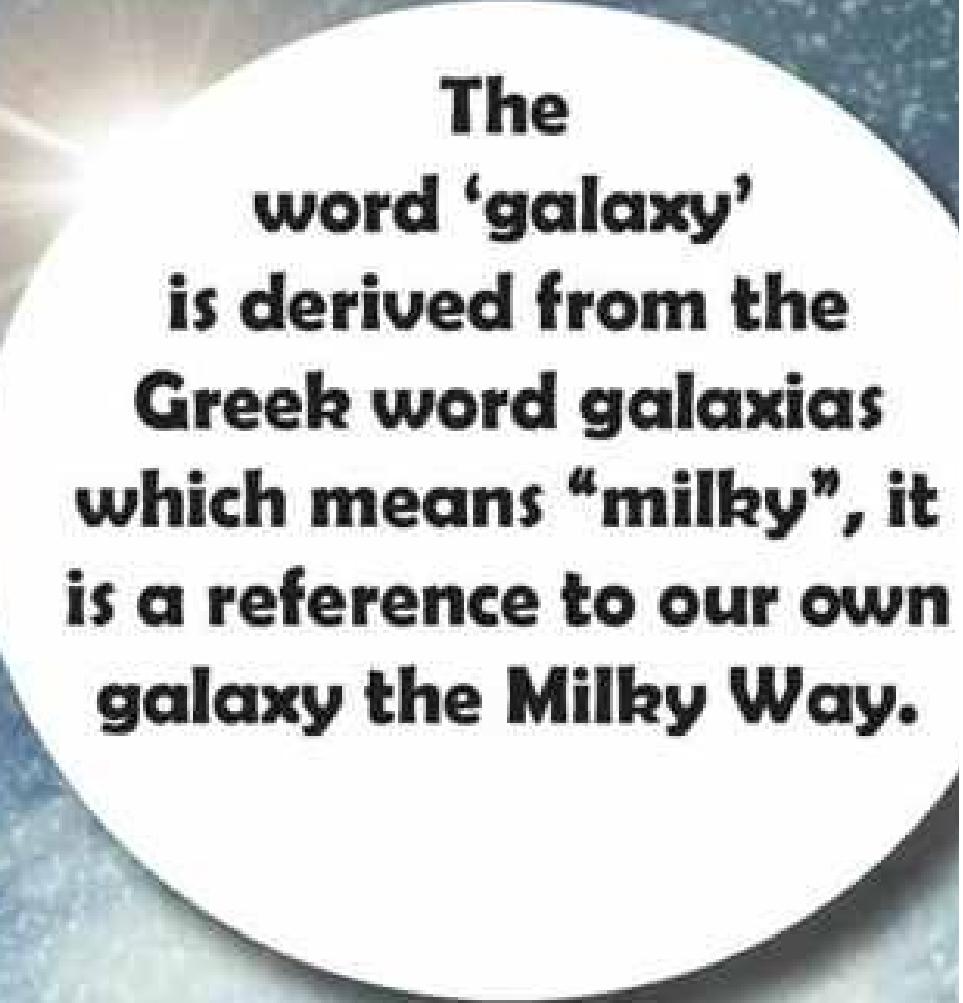




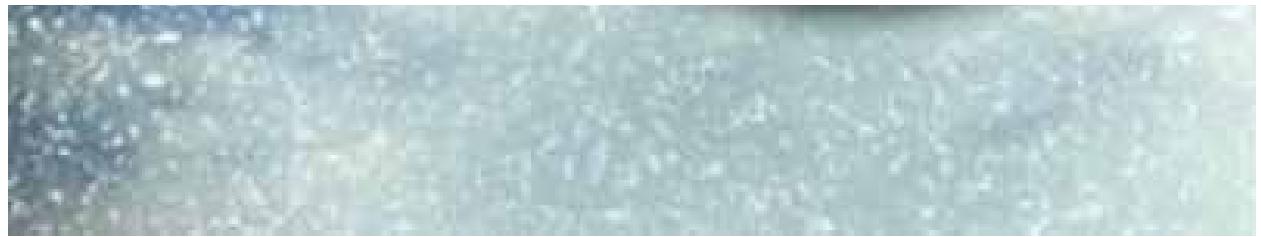


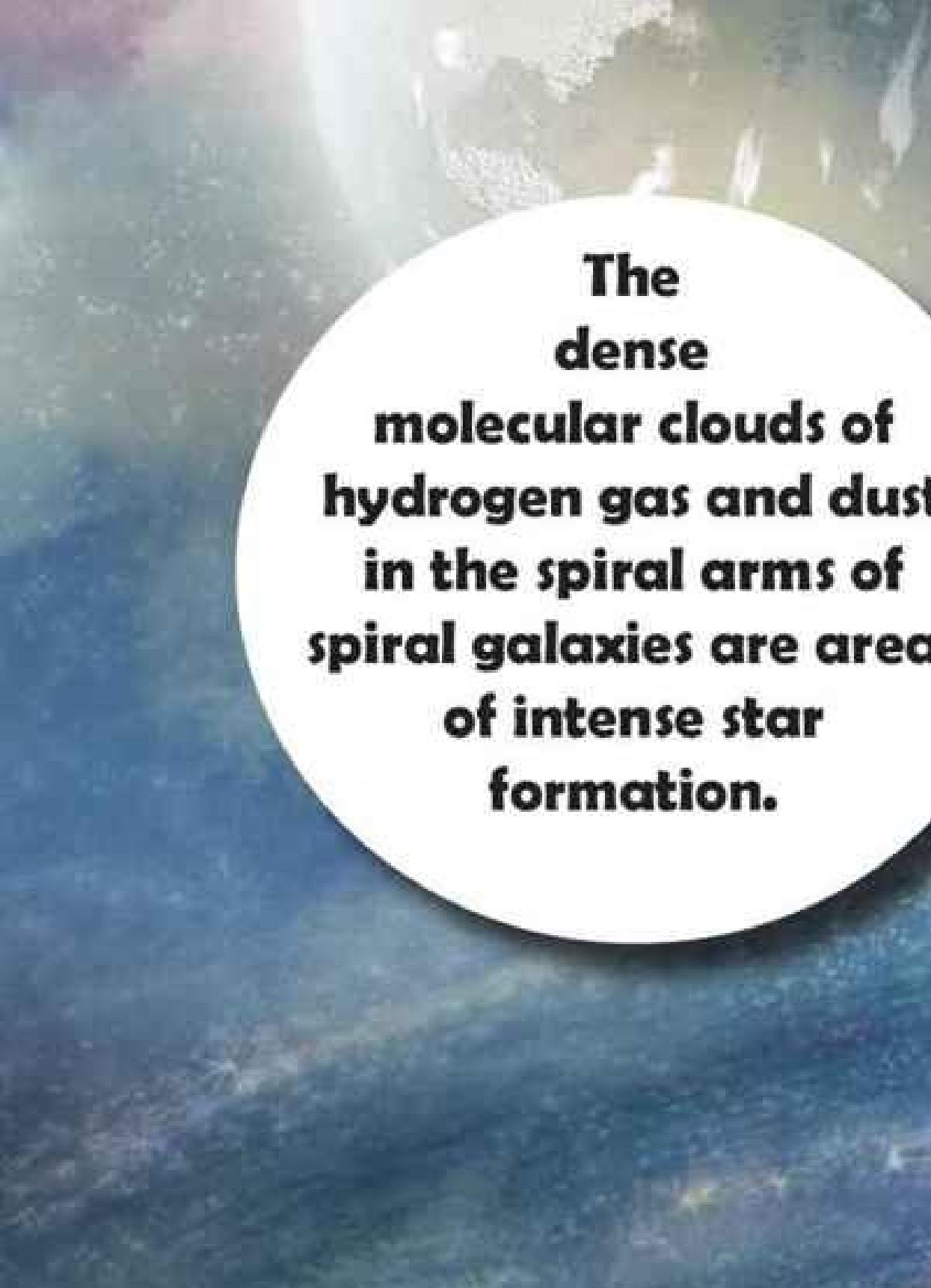


**A  
galaxy is a  
massive group of  
stars, star clusters,  
interstellar gas and dust,  
and dark matter which  
is all gravitationally  
bound together.**



**The  
word ‘galaxy’  
is derived from the  
Greek word galaxias  
which means “milky”, it  
is a reference to our own  
galaxy the Milky Way.**





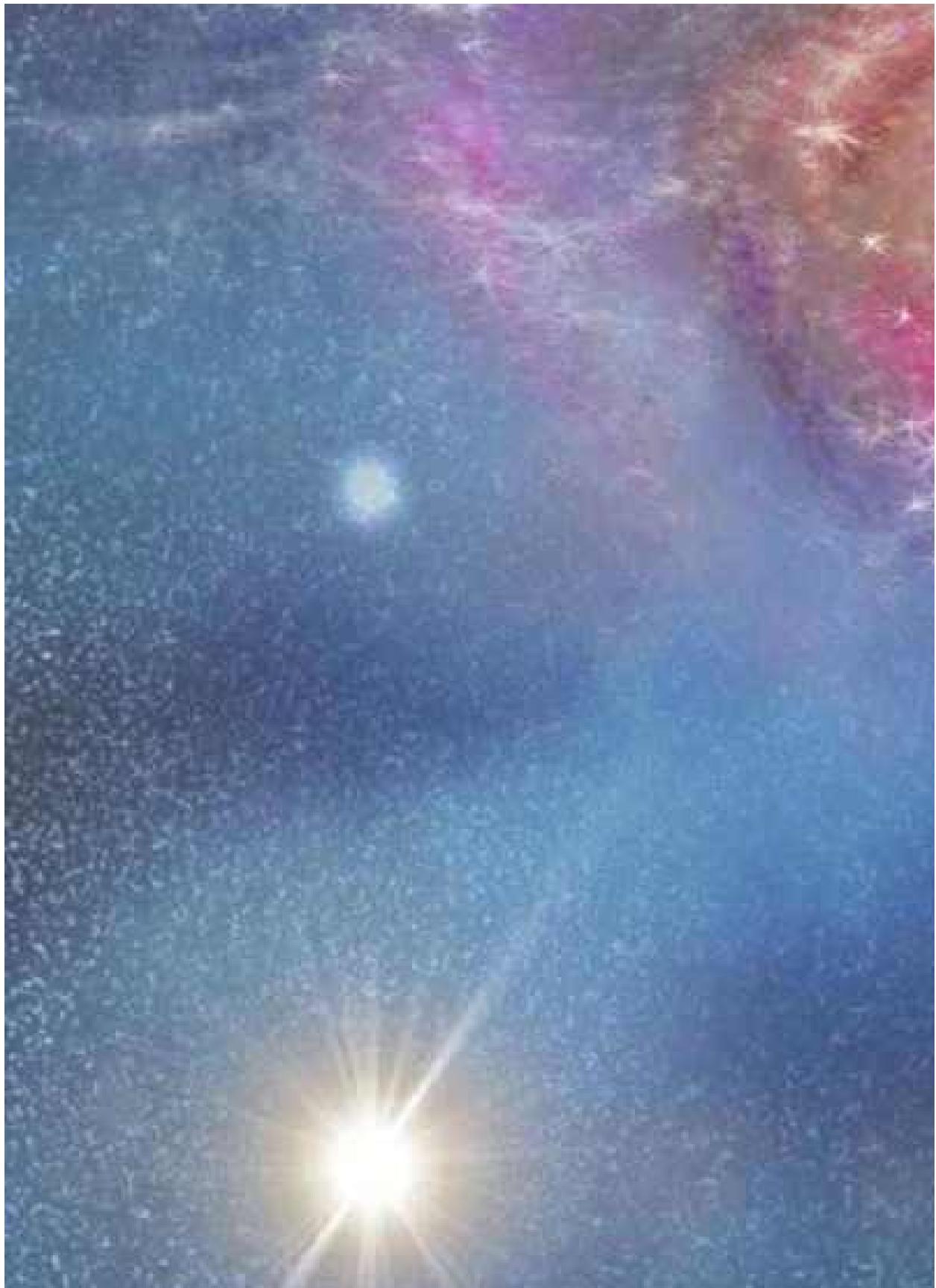
**The  
dense  
molecular clouds of  
hydrogen gas and dust  
in the spiral arms of  
spiral galaxies are areas  
of intense star  
formation.**







**Our  
Solar System is  
located within the  
disk of the Milky Way  
Galaxy, around 27,000  
light-years from the  
Galactic Center of  
the galaxy.**

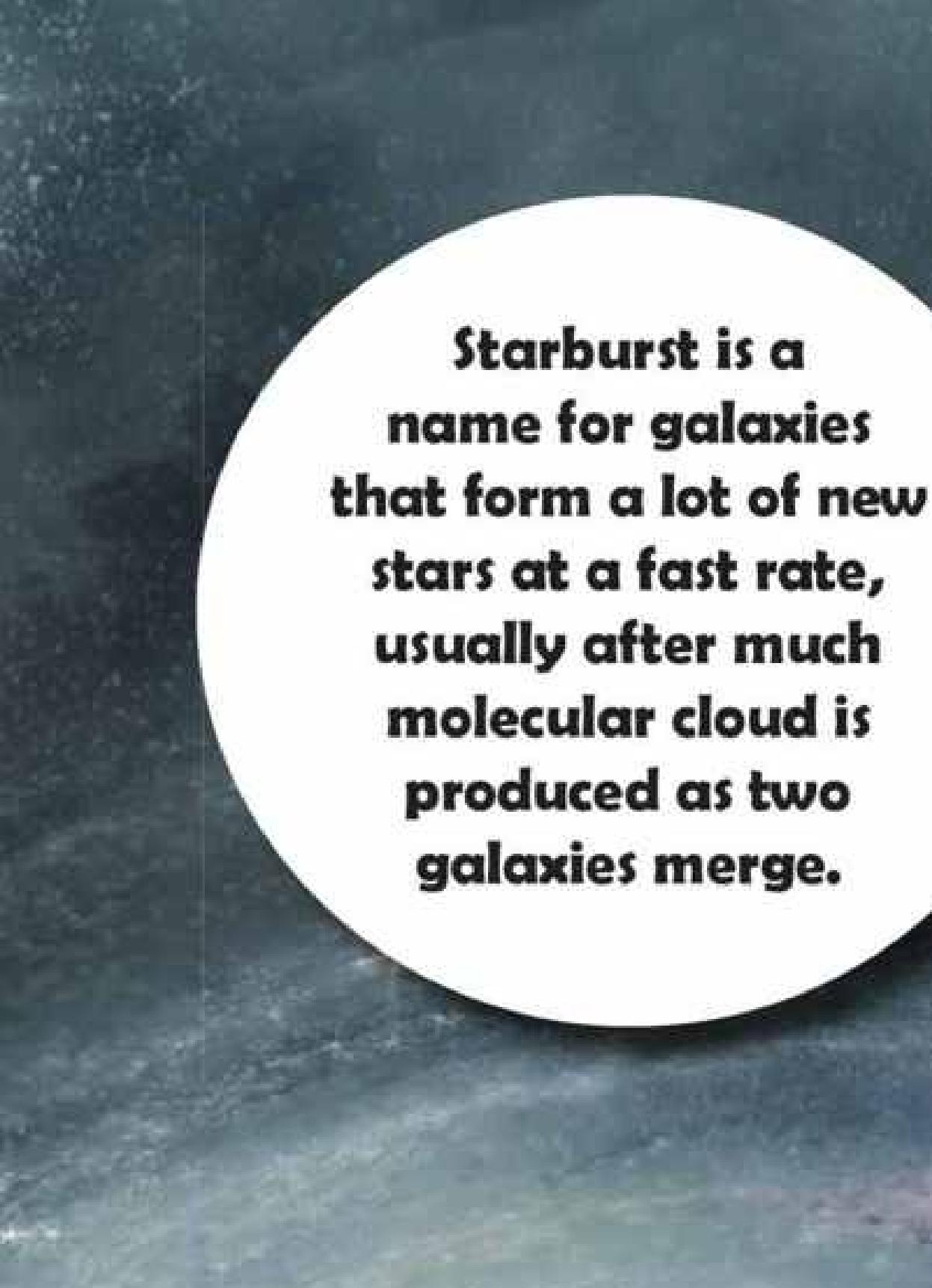










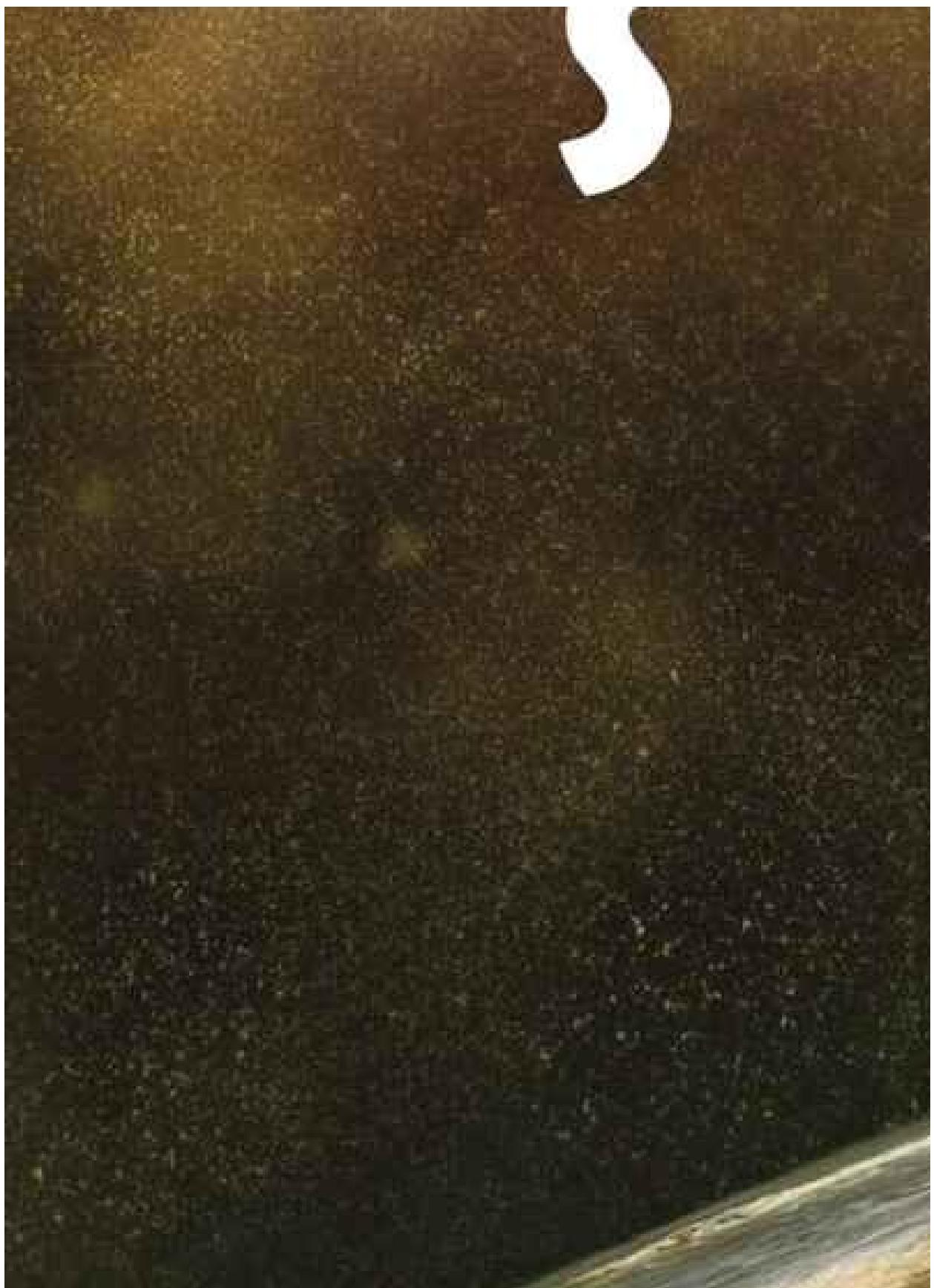


**Starburst is a  
name for galaxies  
that form a lot of new  
stars at a fast rate,  
usually after much  
molecular cloud is  
produced as two  
galaxies merge.**



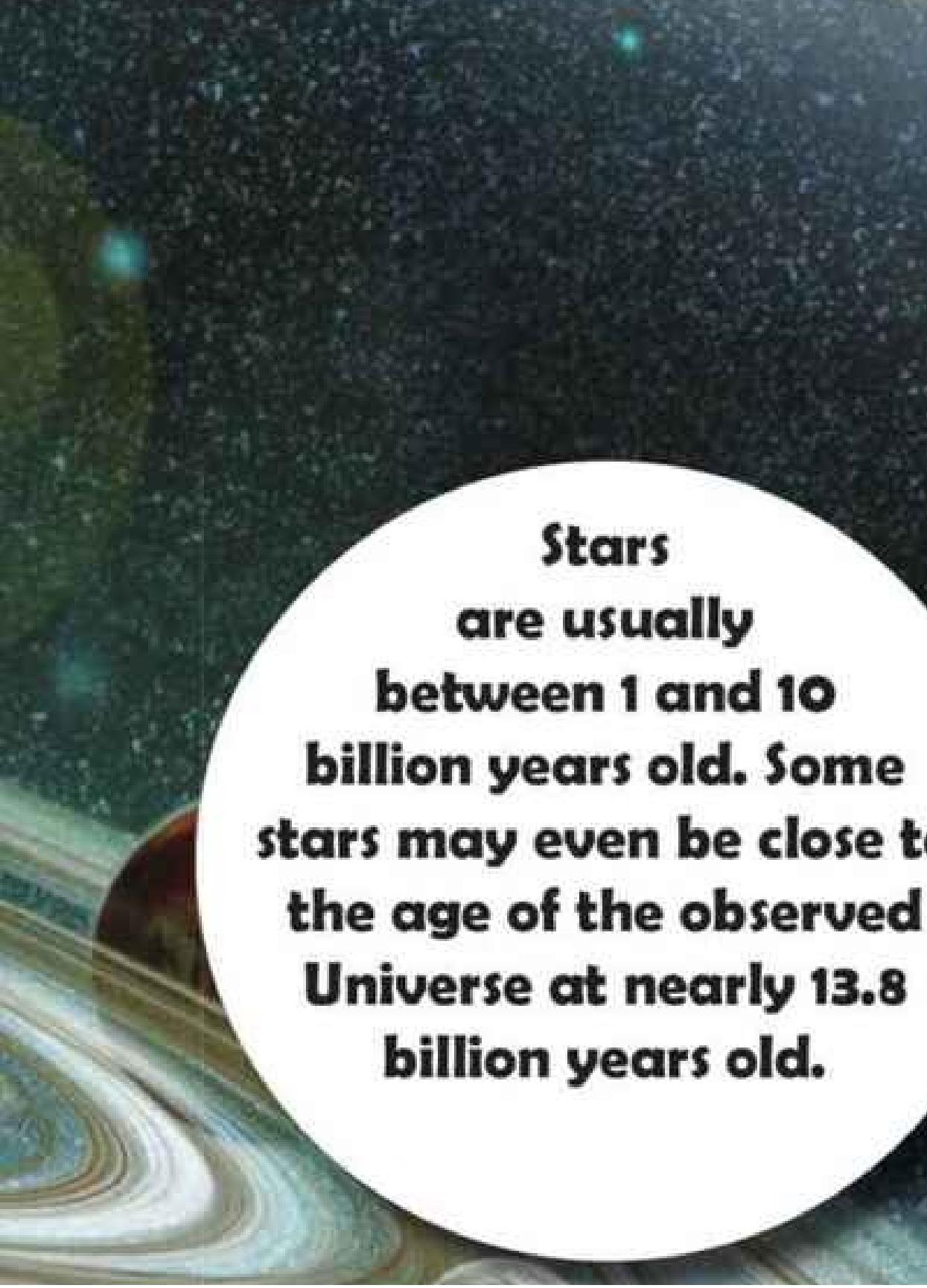








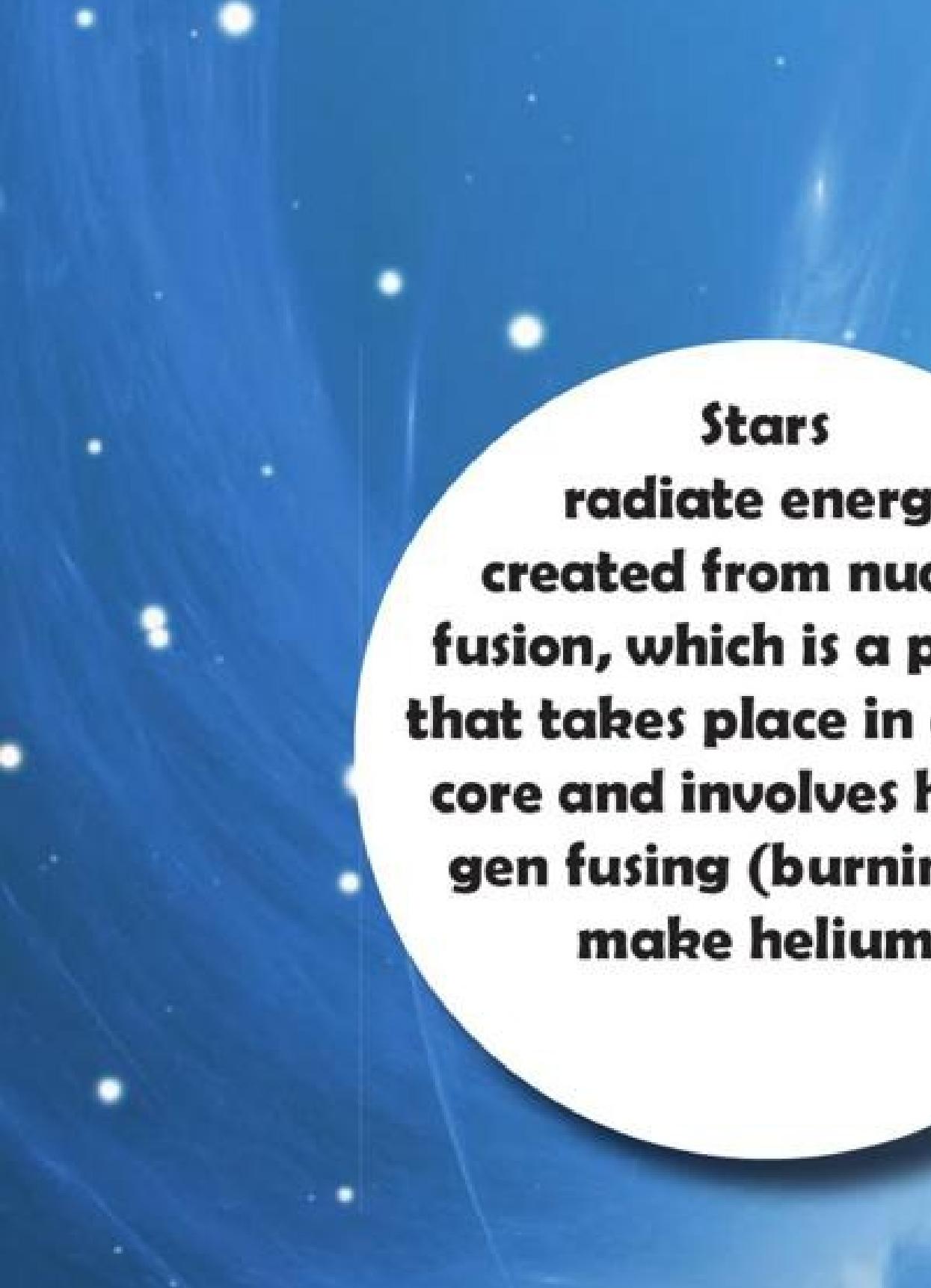




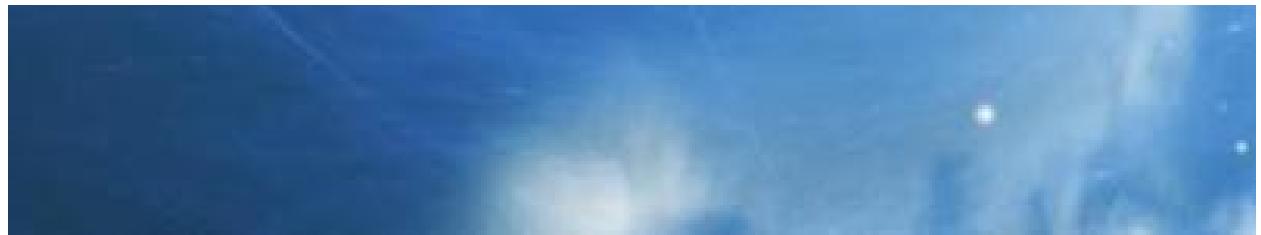
**Stars  
are usually  
between 1 and 10  
billion years old. Some  
stars may even be close to  
the age of the observed  
Universe at nearly 13.8  
billion years old.**

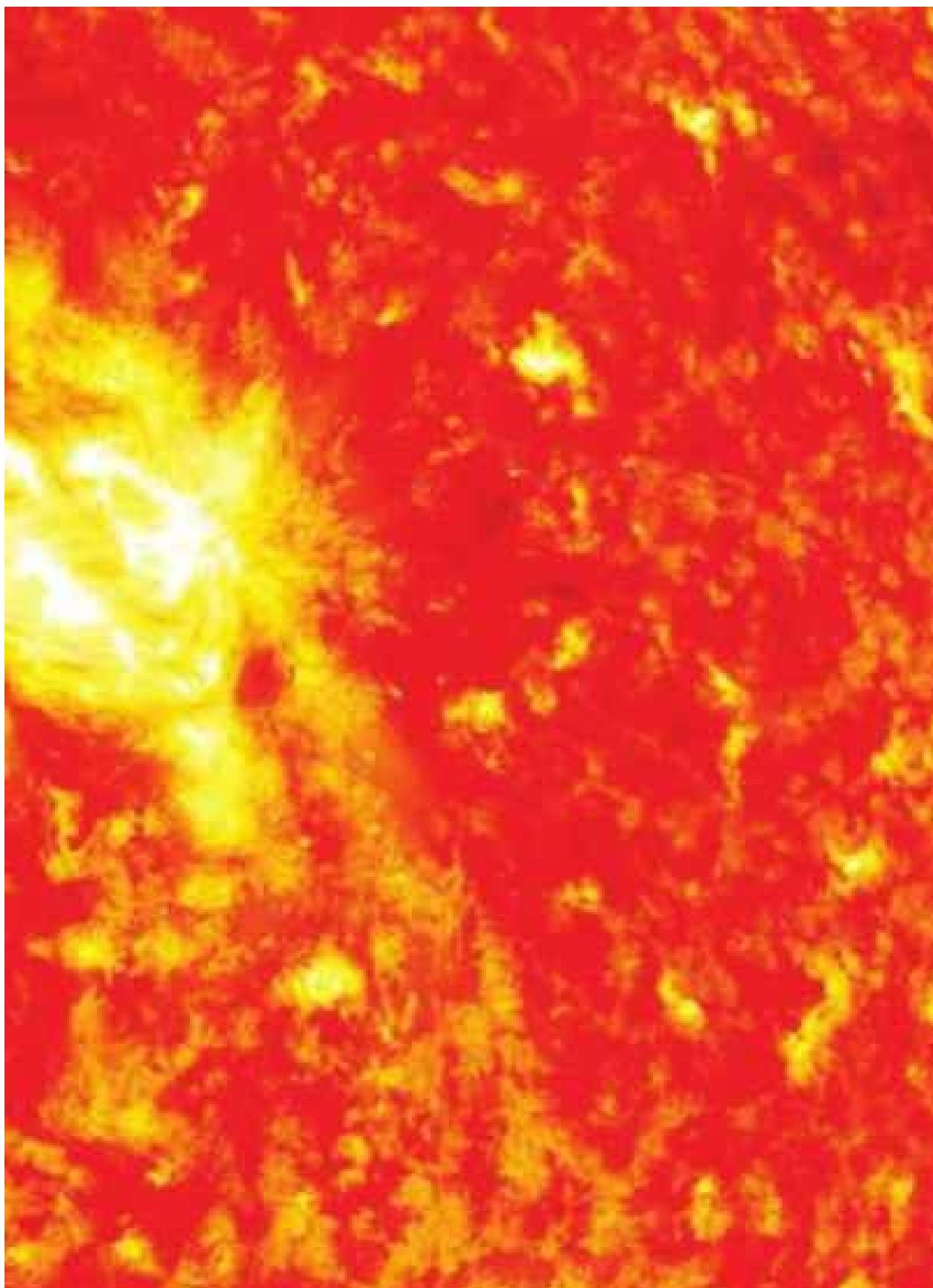




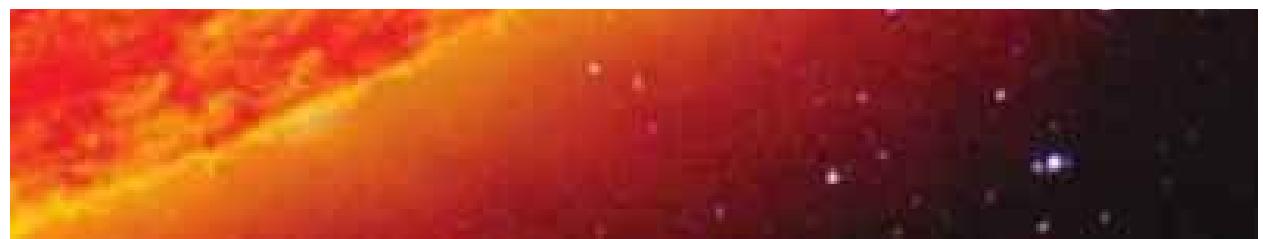


**Stars  
radiate energy  
created from nuclear  
fusion, which is a process  
that takes place in the  
core and involves hydrogen  
fusing (burning) to make helium**





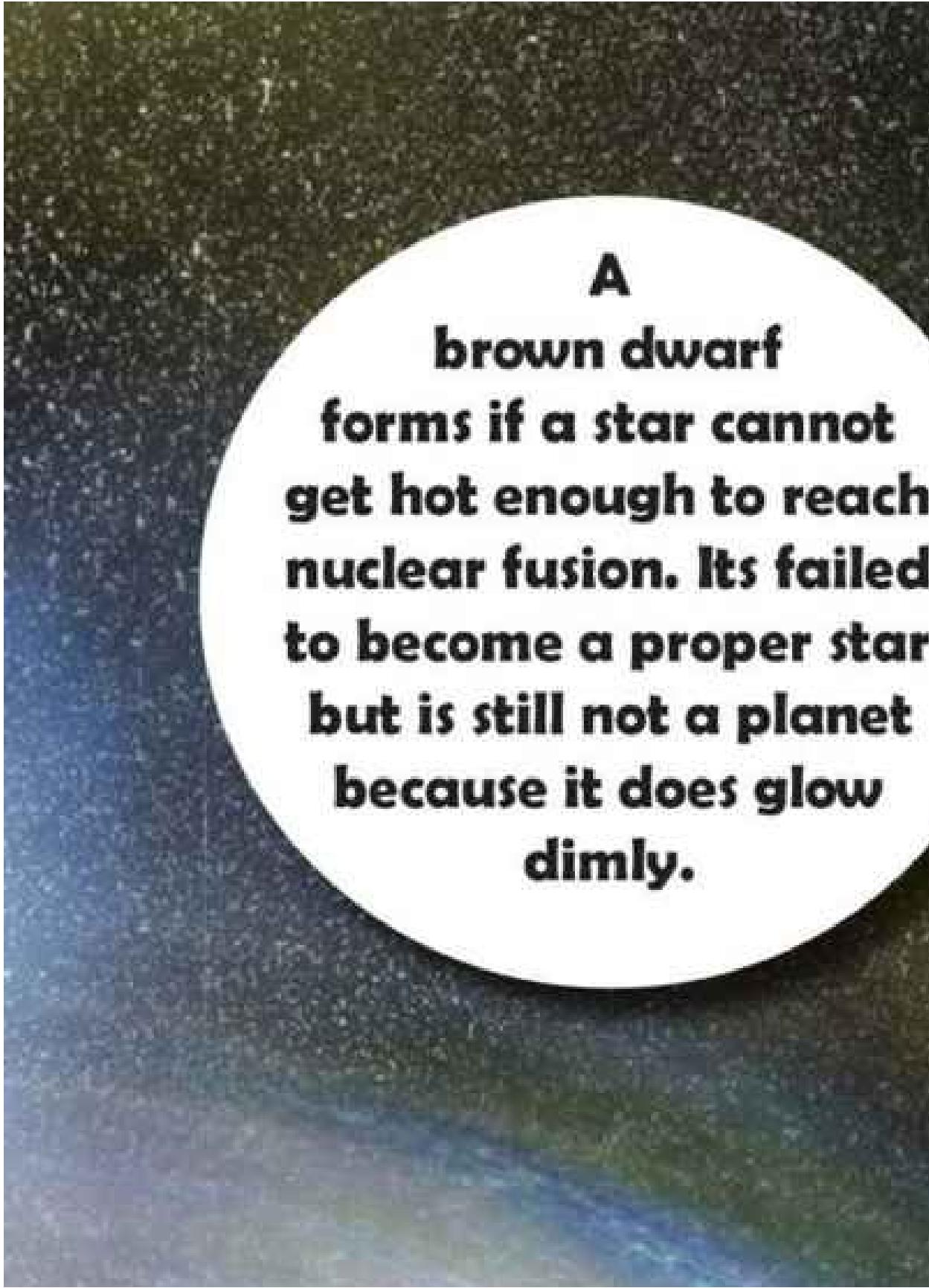












**A  
brown dwarf  
forms if a star cannot  
get hot enough to reach  
nuclear fusion. Its failed  
to become a proper star  
but is still not a planet  
because it does glow  
dimly.**



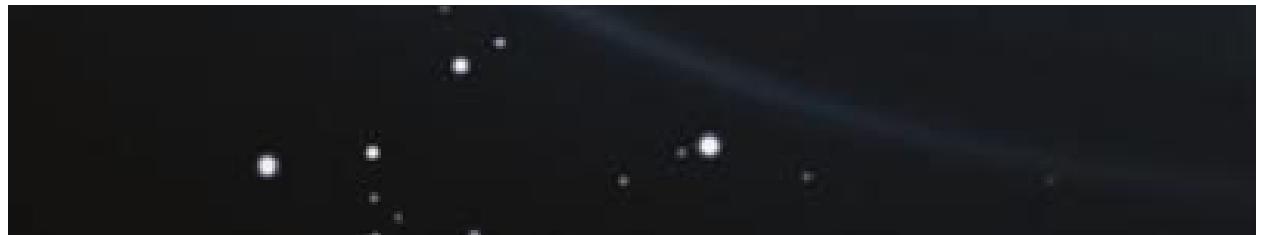
**Big stars like supergiants and hypergiants have short lives as they consume their fuel at a faster rate than smaller stars. As these massive stars die they explode in massive bright supernova.**





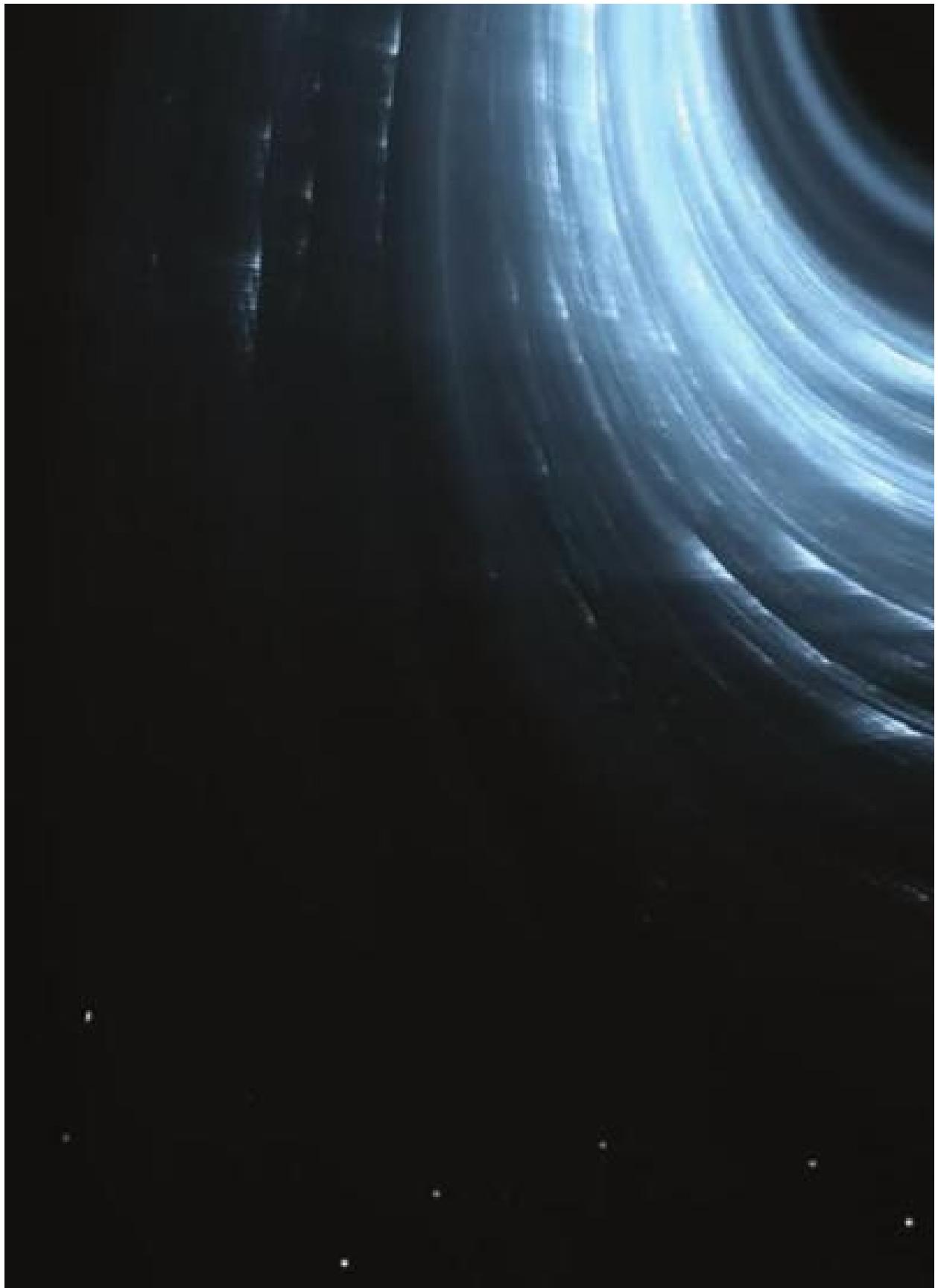
B

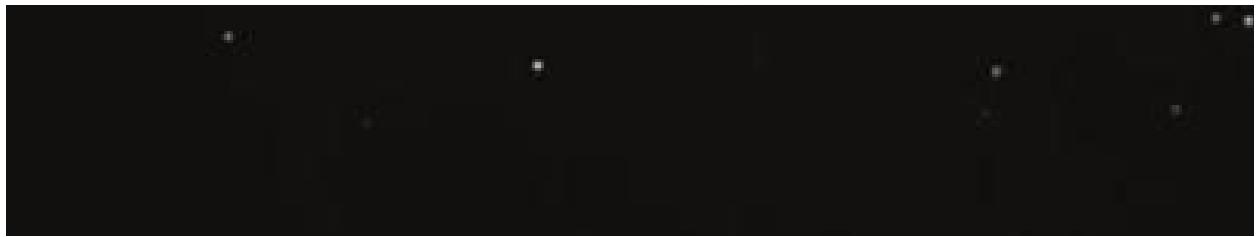


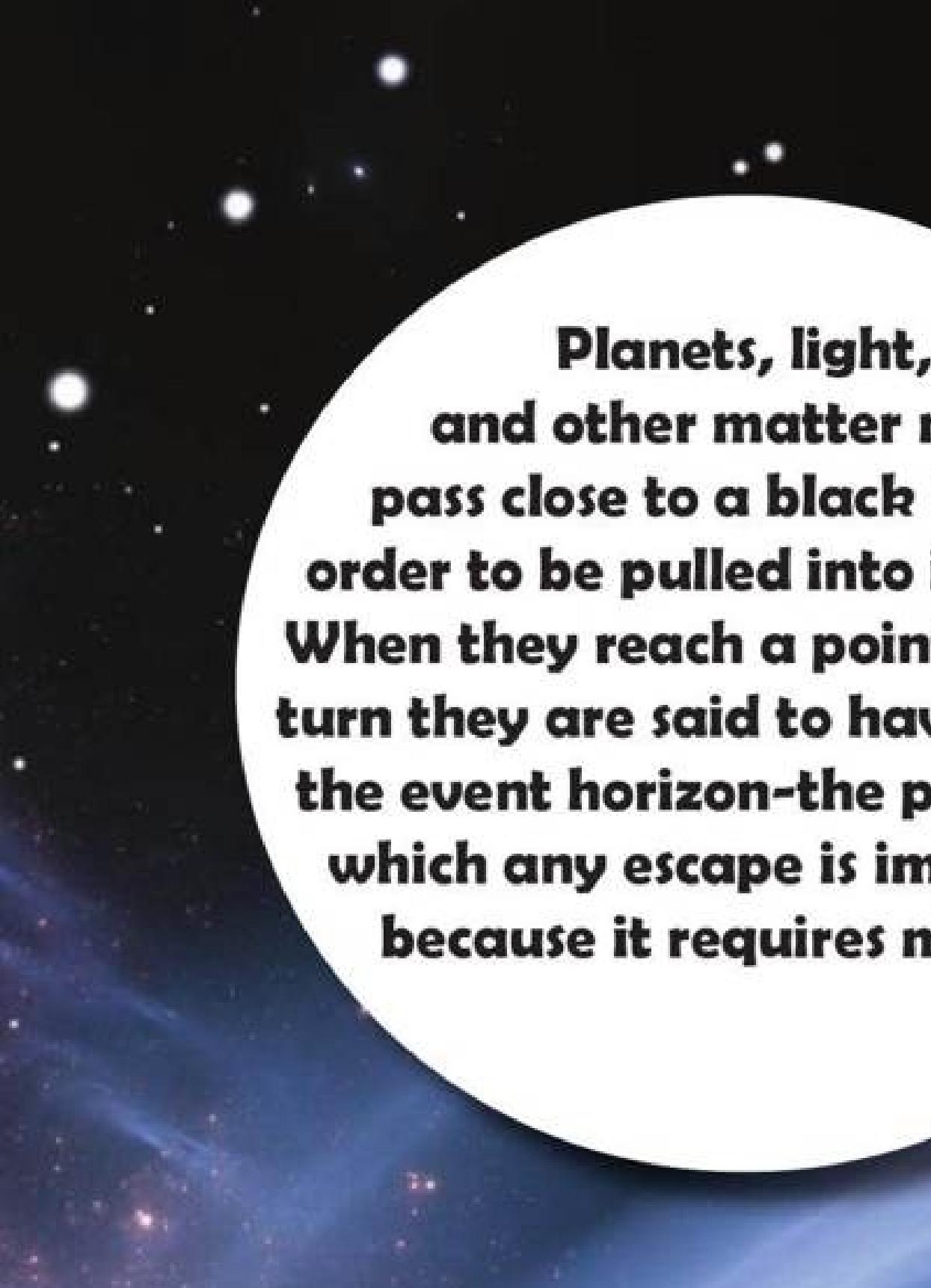




**Very  
heavy stars  
that have gone  
supernova can  
actually turn into  
black holes**



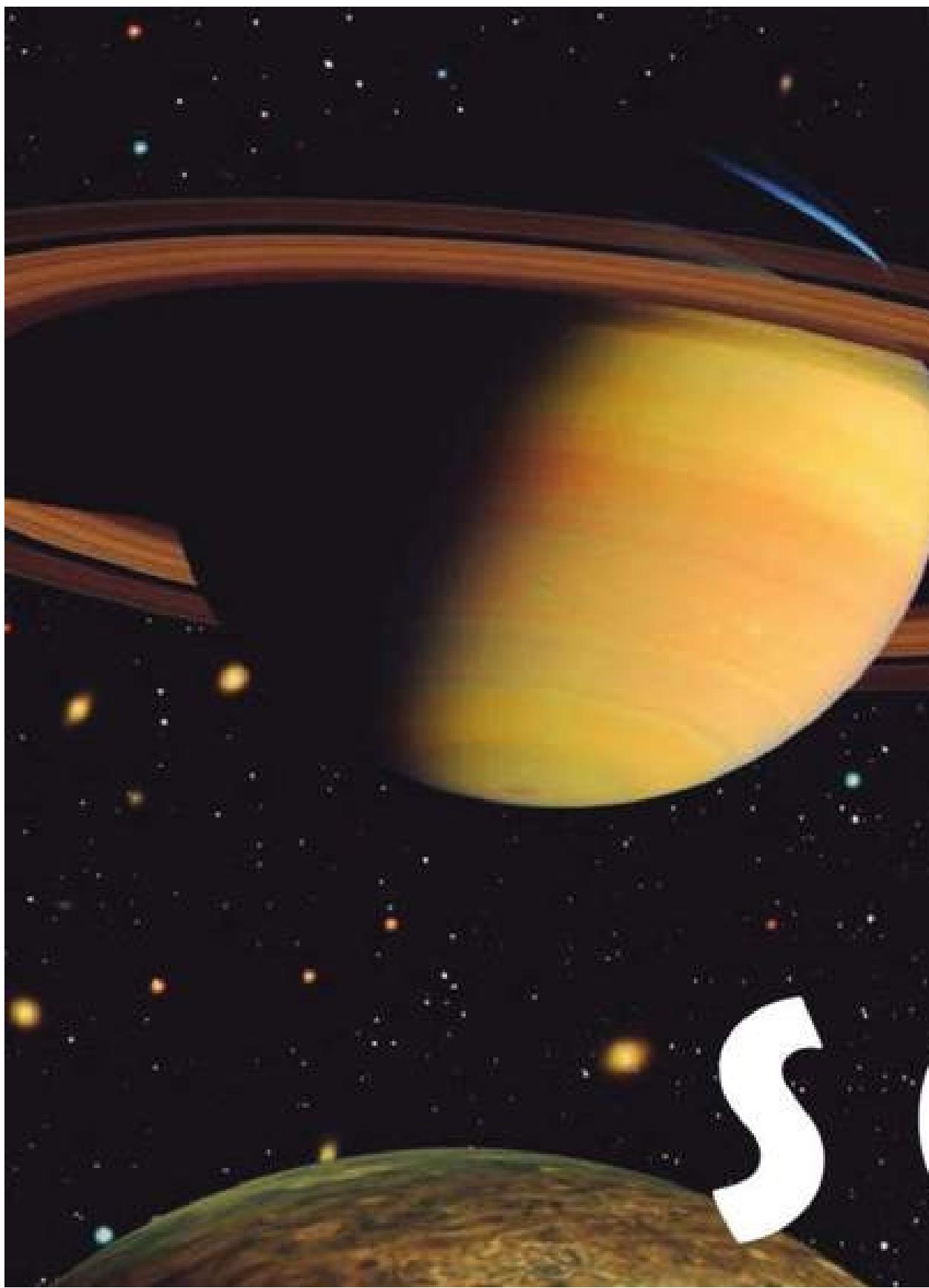




**Planets, light,  
and other matter i  
pass close to a black  
order to be pulled into  
When they reach a poi  
turn they are said to hav  
the event horizon-the p  
which any escape is im  
because it requires n**





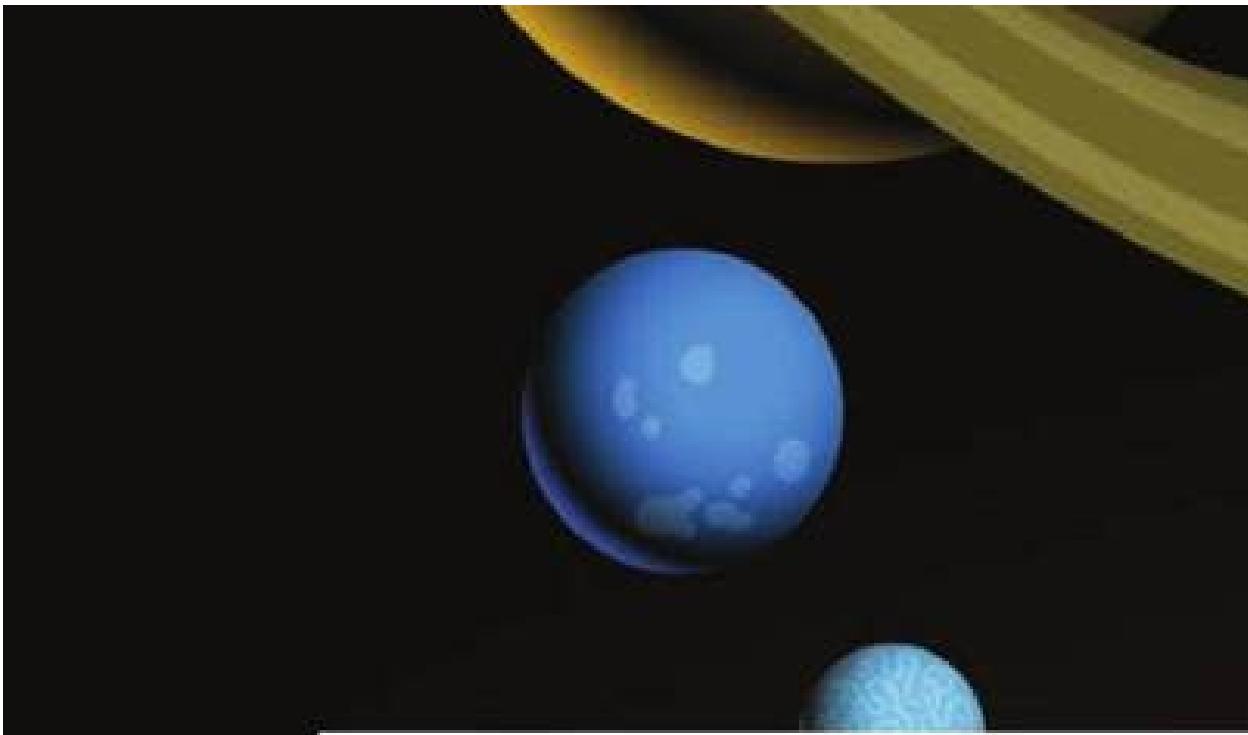




SKY



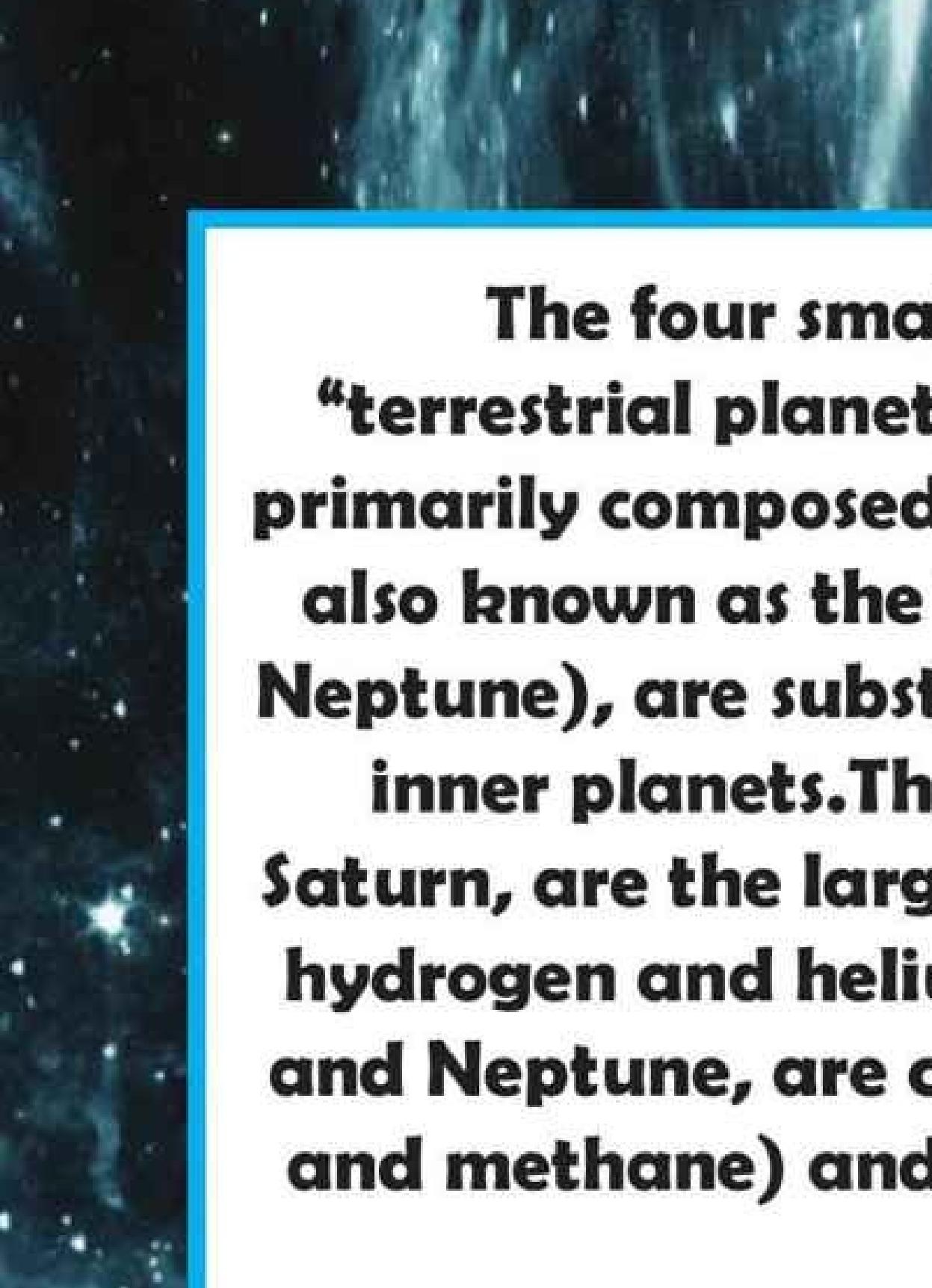




**The Solar System is 4.6 billion years old and consists of the Sun and eight planets, plus many other astronomical objects such as comets, asteroids, and meteoroids. The Sun's gravity was the cause by the collapse of a large cloud of gas and dust at the centre collecting matter and pushing it outwards, creating a disk around it which then began to form the planets.**







**The four smallest planets, Earth, Mars, Venus, and Mercury, are the “terrestrial planets” because they are primarily composed of rock and metal. They are also known as the “inner planets.” The other four planets, Jupiter, Saturn, Uranus, and Neptune, are substantially larger and are composed mostly of hydrogen and helium. They are also called the “gas giants.” Uranus and Neptune, are called “ice giants” because they contain large amounts of water (in the form of ice and methane) and methane.)**

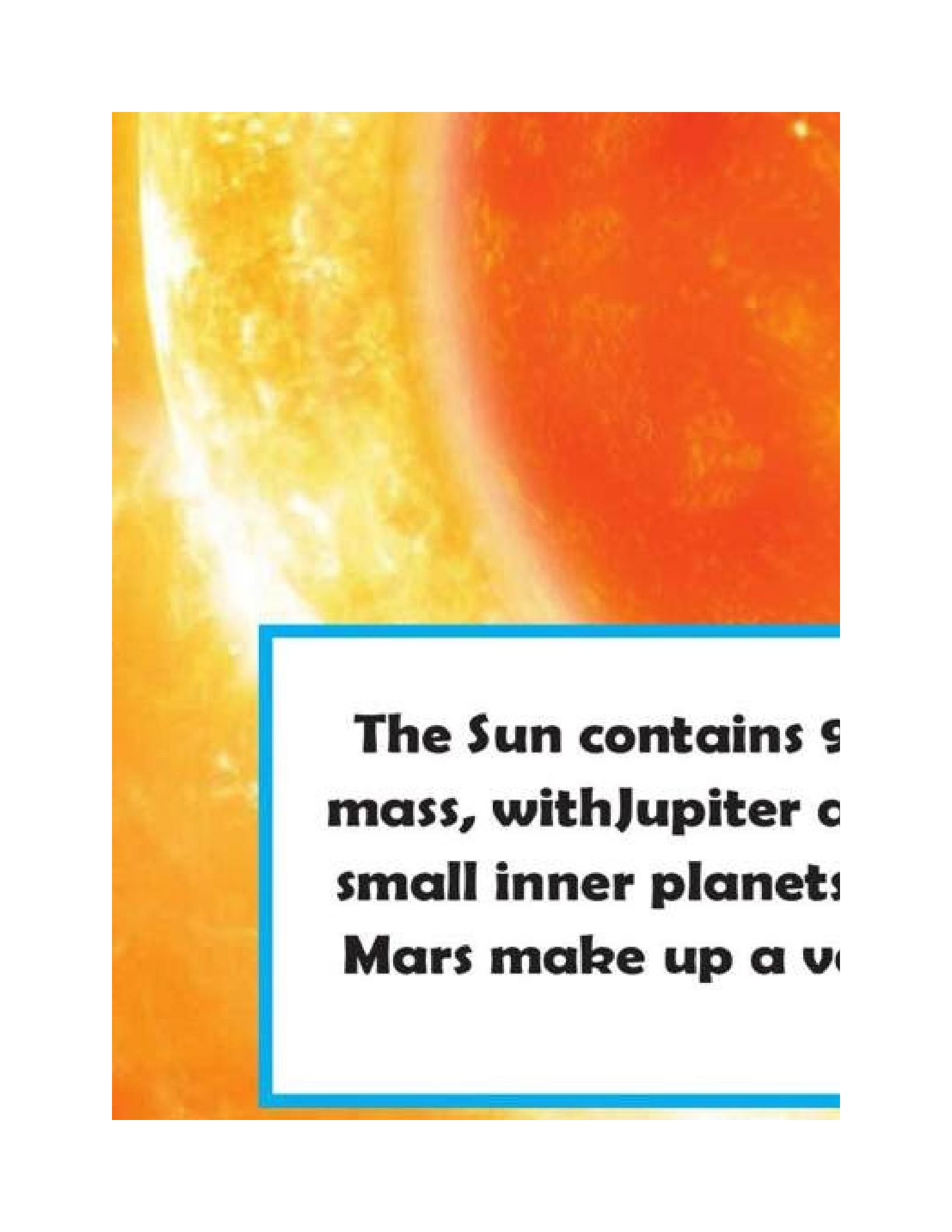












**The Sun contains 99% of the solar system's mass, with Jupiter and the small inner planets of Venus, Earth, and Mars make up a very small percentage.**

















**Mercury is the closest planet to the Sun. Due to its proximity it is not visible to the naked eye.**

**Mercury has a very eccentric orbit, it completes two orbits of the Sun for every three rotations of its axis and up until now it has never been visited by a probe.**

**Mercury constantly reflects light from the Sun, so Mercury can be clearly seen in the sky during the day. It is often visible as a bright point of light near the horizon or in the upper left quadrant of the sky.**

**Mercury can be seen in the upper left quadrant of the sky during the day, but it is often obscured by clouds or buildings.**





**Facts:**

**Mass:**

**330,104,000,000,  
billion kg (0.055  
Earth)**

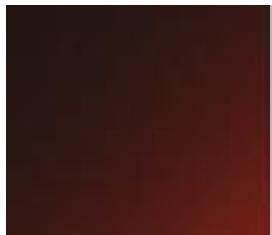
**Moon:  
None**

**Surface Temperature:  
-173 to 127°C**

**First Record:  
14th century BC**

**Recorded By:  
Assyrian astronom**

**A year in Mercury is  
88 days long. Mer-  
is the smallest planet  
in the Solar System**







**Venus is the second  
brightest object in the sky,  
the Roman goddess of  
largest terrestrial planet.  
Earth's sister planet.  
surface of the planet.**





**Facts:**

**Mass:**

**4,867,320,000,000,  
billion kg (0.815 x Earth)**

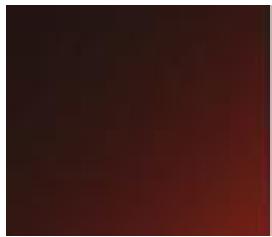
**Moon:**  
**None**

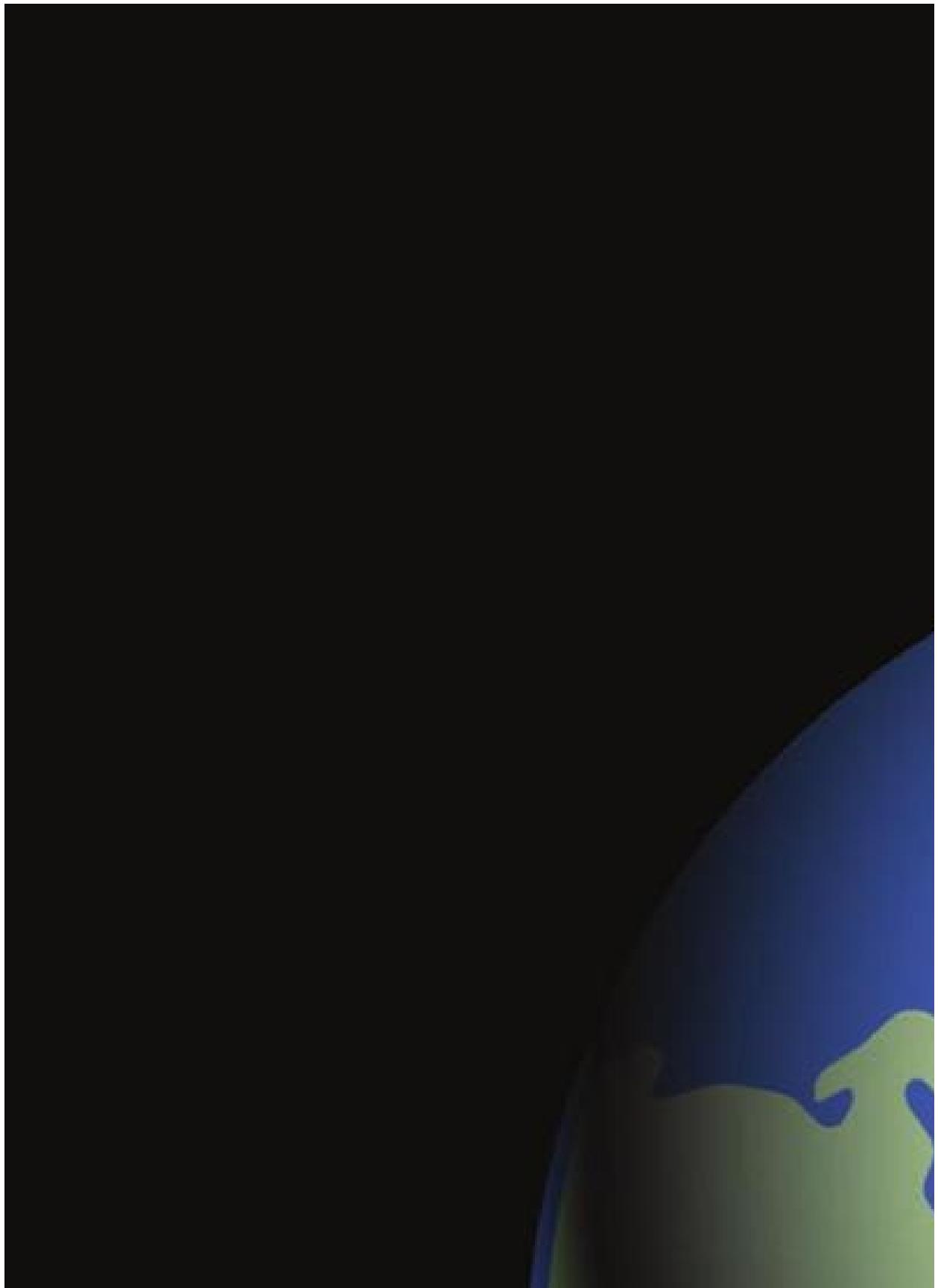
**Surface Temperature  
462 °C**

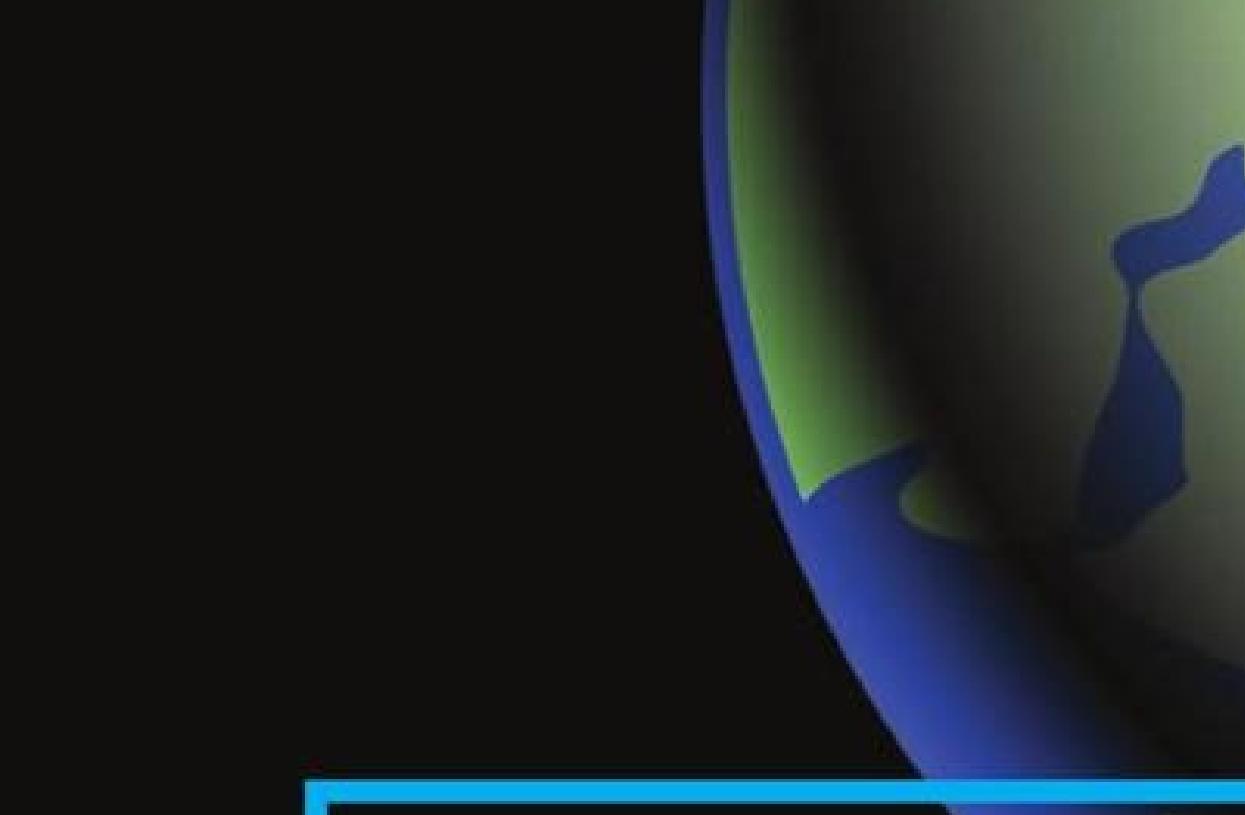
**First Record:  
17th century BC**

**Recorded By:  
Babylonian astronomer**

**The Earth and Venus  
very similar in size with  
only a 638 km  
difference in diameter.  
Venus having 81.5% of  
Earth's mass.**







**Earth is the third planet from the Sun and is the only known planet that currently supports life.**

**It is the fifth largest planet, and it is a terrestrial planet.**

**The name "Earth" is derived from Old English words, and it is the only planet named after a deity.**

**The Earth was formed about 4.5 billion years ago, and it is the only planet known to have liquid water on its surface.**





**Facts:**

**Mass:**

**5,972,190,000,000,  
billion kg**

**Moon:**

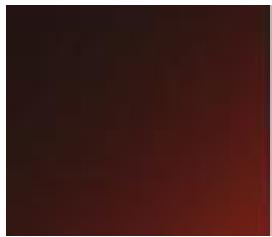
**1**

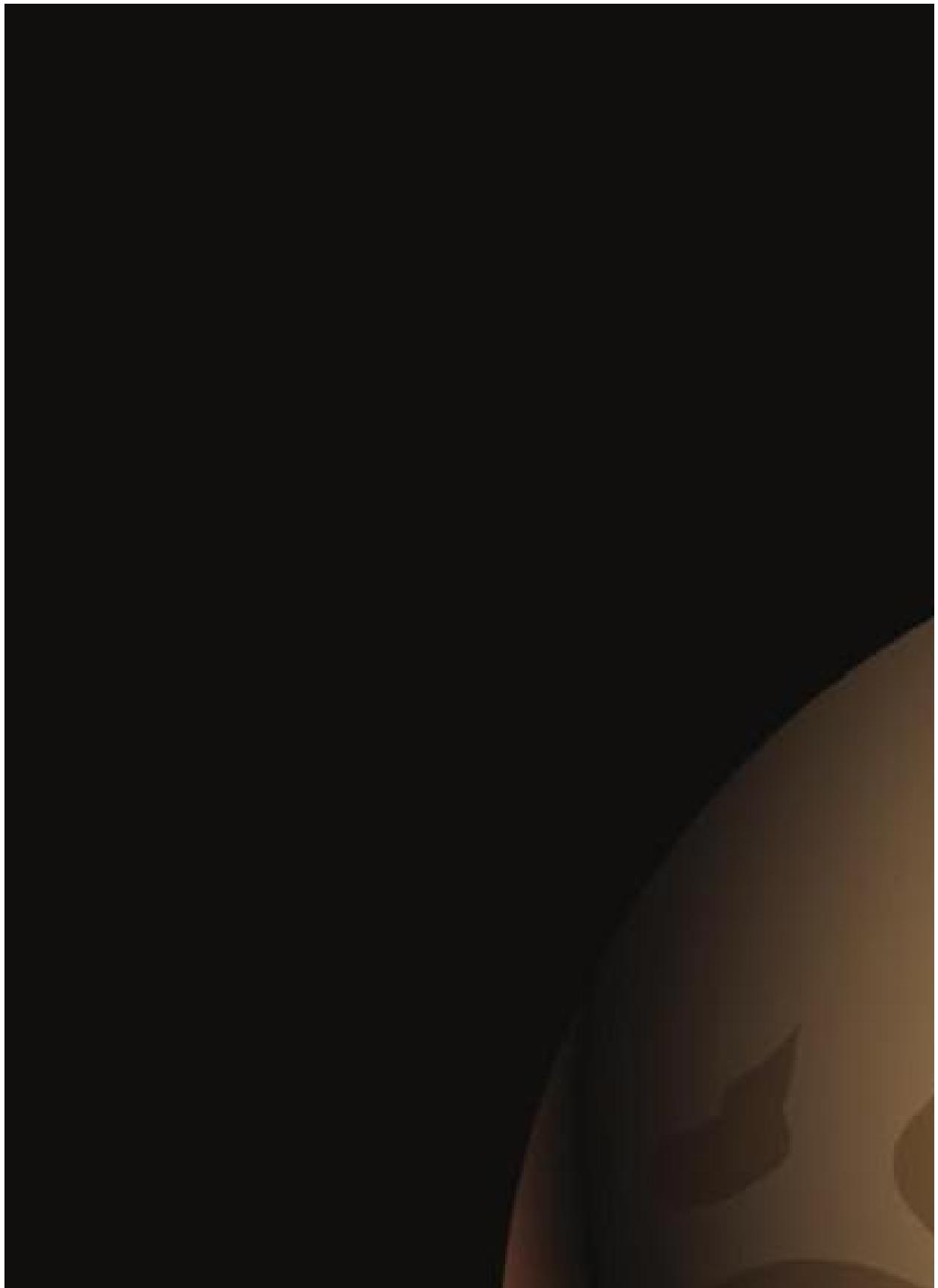
**Surface Temperature  
-88 to 58°C**

**First Recorded:  
NA**

**Recorded By:  
NA**

**Earth has a power  
magnetic field. This  
phenomenon is caused  
by the nickel-iron core  
of the planet, coupled  
with its rapid rotation.**







**Mars is the fourth planet from the Sun and the Roman god of war. It is reddish due to its thin atmosphere.**





**Facts:**

**Mass:**

**641,693,000,000,  
billion kg (0.107 x E<sup>15</sup>)**

**Moon:**

**2**

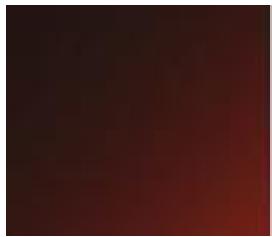
**Surface Temperature:**

**-87 to -5 °C**

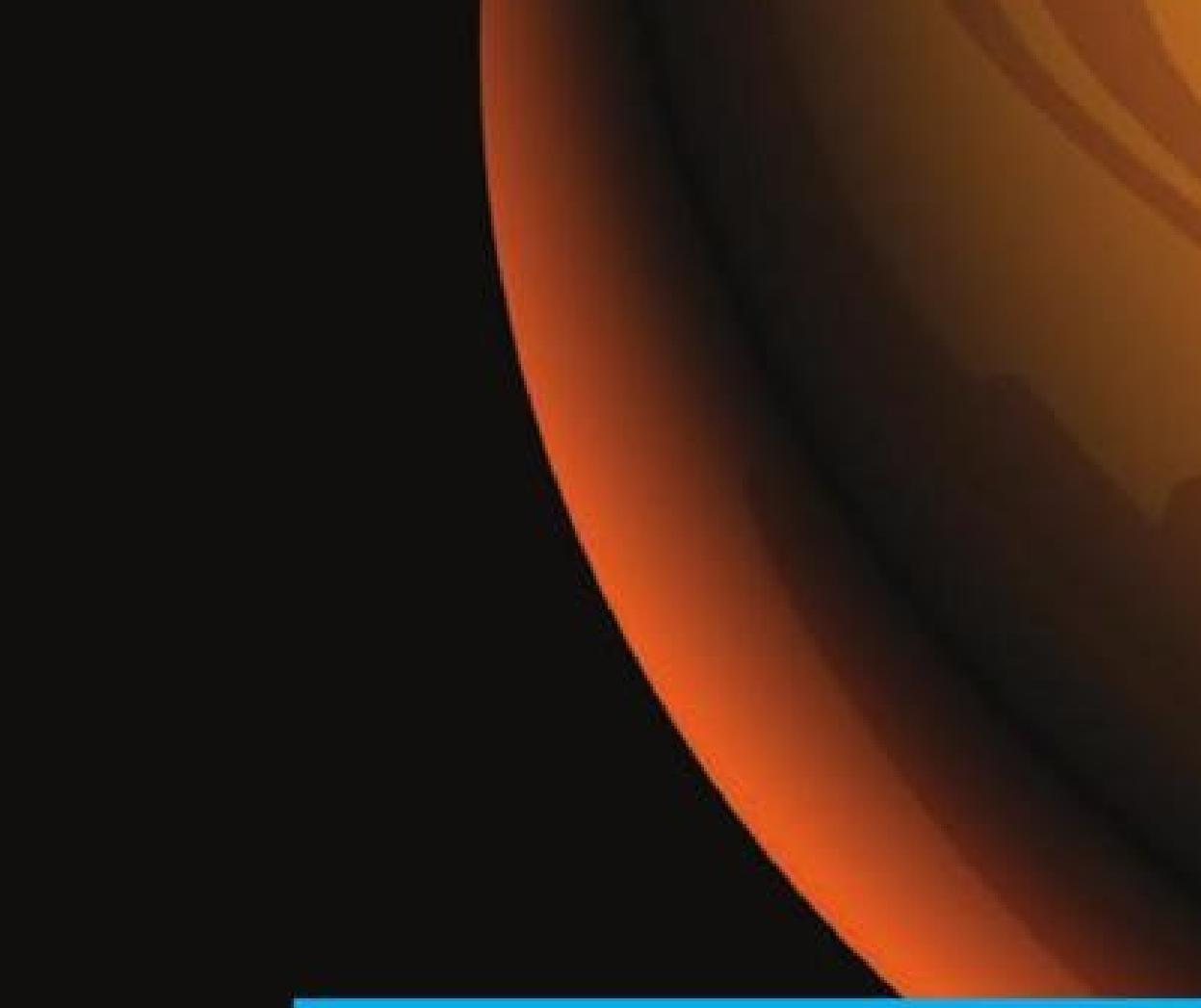
**First Record:  
2nd millennium BC**

**Recorded By:  
Egyptian astronomer**

**Mars is home to the tallest mountain in the solar system. Olympus Mons, a shield volcano 21km high and 600km diameter.**







The planet Jupiter  
two and a half ti  
ets in the solar syst  
and is t





**Facts:**

**Mass:**

**1,898,130,000,000,000  
billion kg (317.83 x Earth's mass)**

**Moon:**

**67**

**Rings:**

**4**

**Surface Temperature:**

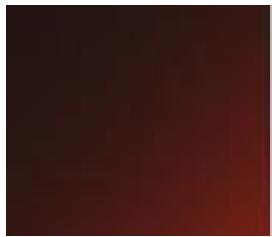
**-180°C**

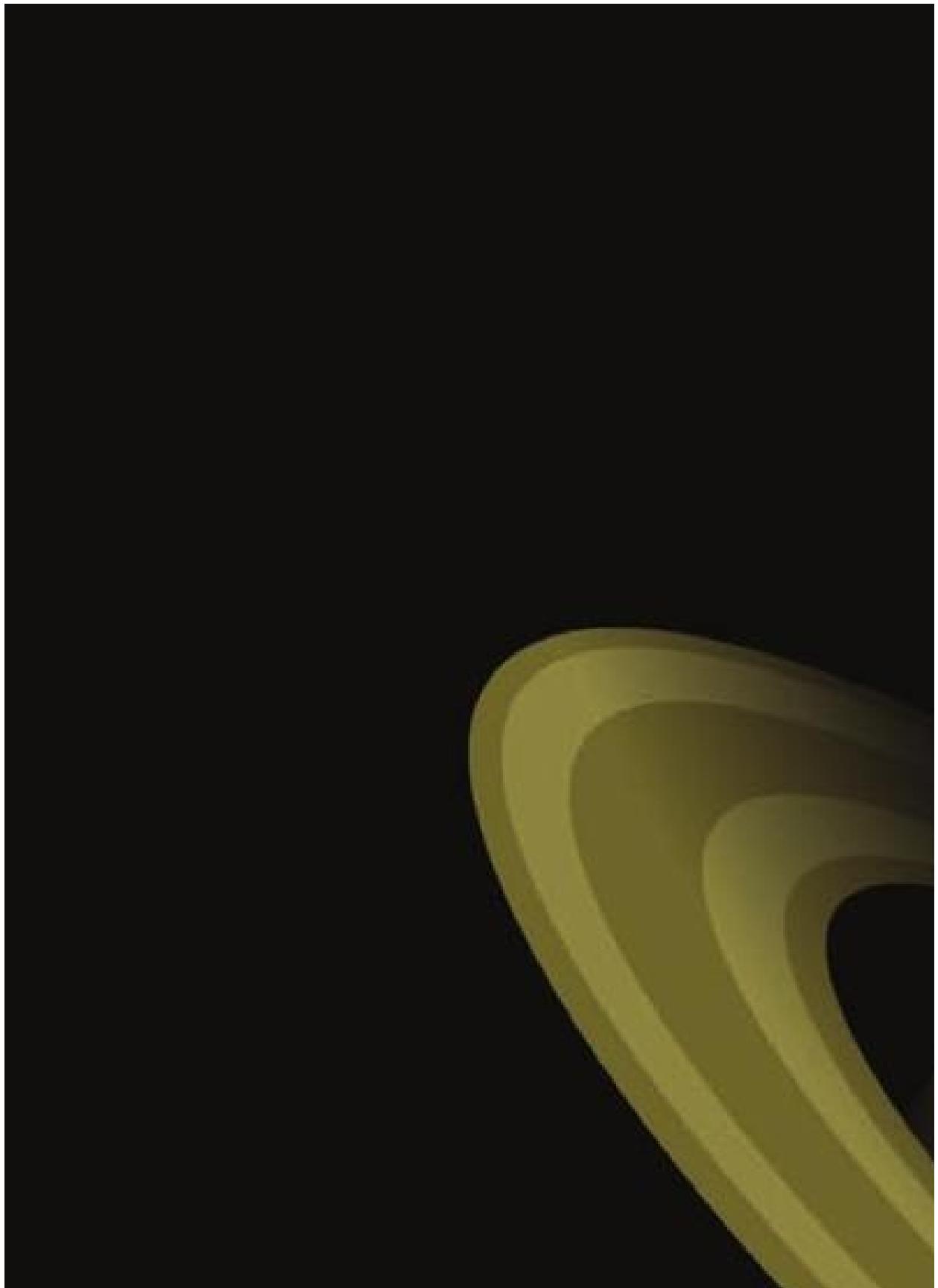
**-108°C**

**First Record:  
7th or 8th century B**

**Recorded By:  
Babylonian astronom**

**Jupiter is the fourth  
brightest object in the  
system. Only the Sun, M  
and Venus are brighter.  
one of five planets visib  
the naked eye from Ea**







**Saturn is the sixth  
planet from the Sun and  
the second largest in our  
solar system. It is a gas giant  
and is known for its prominent  
ring system, which consists  
of numerous small ice and rock  
particles orbiting the planet.  
The rings are composed of  
millions of small particles of  
ice and rock, ranging in size  
from tiny dust specks to  
large boulders. The particles  
are held together by the  
gravitational pull of the planet,  
which creates a ring system  
that is approximately 28,000 km  
wide and 20 km thick. The  
rings are tilted at an angle  
of about 27 degrees relative  
to the planet's equator. The  
outermost ring is the most  
extensive, while the inner  
rings are more concentrated  
near the planet's equator.  
The rings are composed of  
millions of small particles of  
ice and rock, ranging in size  
from tiny dust specks to  
large boulders. The particles  
are held together by the  
gravitational pull of the planet,  
which creates a ring system  
that is approximately 28,000 km  
wide and 20 km thick. The  
outermost ring is the most  
extensive, while the inner  
rings are more concentrated  
near the planet's equator.**





**Facts:**

**Mass:**

**568,319,000,000,000,  
billion kg (95.16 x Earth)**

**Moon:**

**62**

**Rings:**

**30+ (7 Groups)**

**Surface Temperature...**

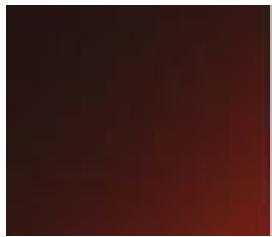
**Surface Temperature:**

**-139 °C**

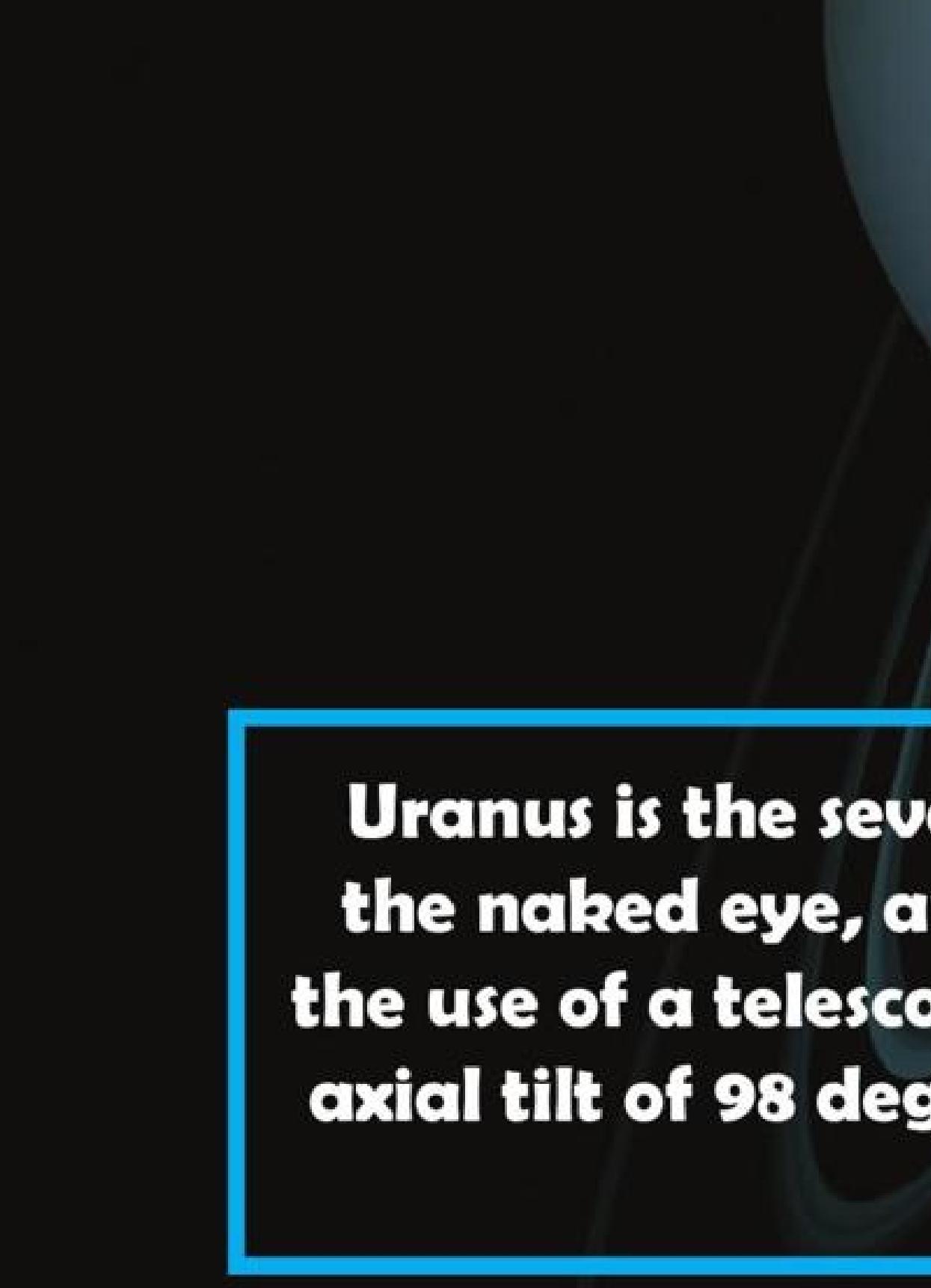
**First Record:  
8th century BC**

**Recorded By:  
Assyrians**

**Saturn can be seen with naked eye. It is the brightest object in the solar system and is easily studied through small telescope.**







**Uranus is the seventh planet from the Sun. It is visible to the naked eye, and can be seen with the use of a telescope. Its axial tilt of 98 degrees causes it to rotate almost on its side.**





**Facts:**

**Mass:**

**86,810,300,000,000  
billion kg (14.536 x Ea)**

**Moon:**

**27**

**Rings:**

**13**

**Cause Tomorrow...**

**Surface Temperature:**

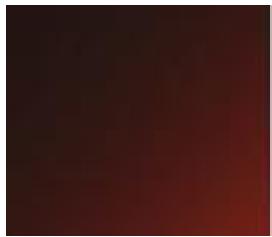
**-197 °C**

**Discover Date:  
March 13th 1781**

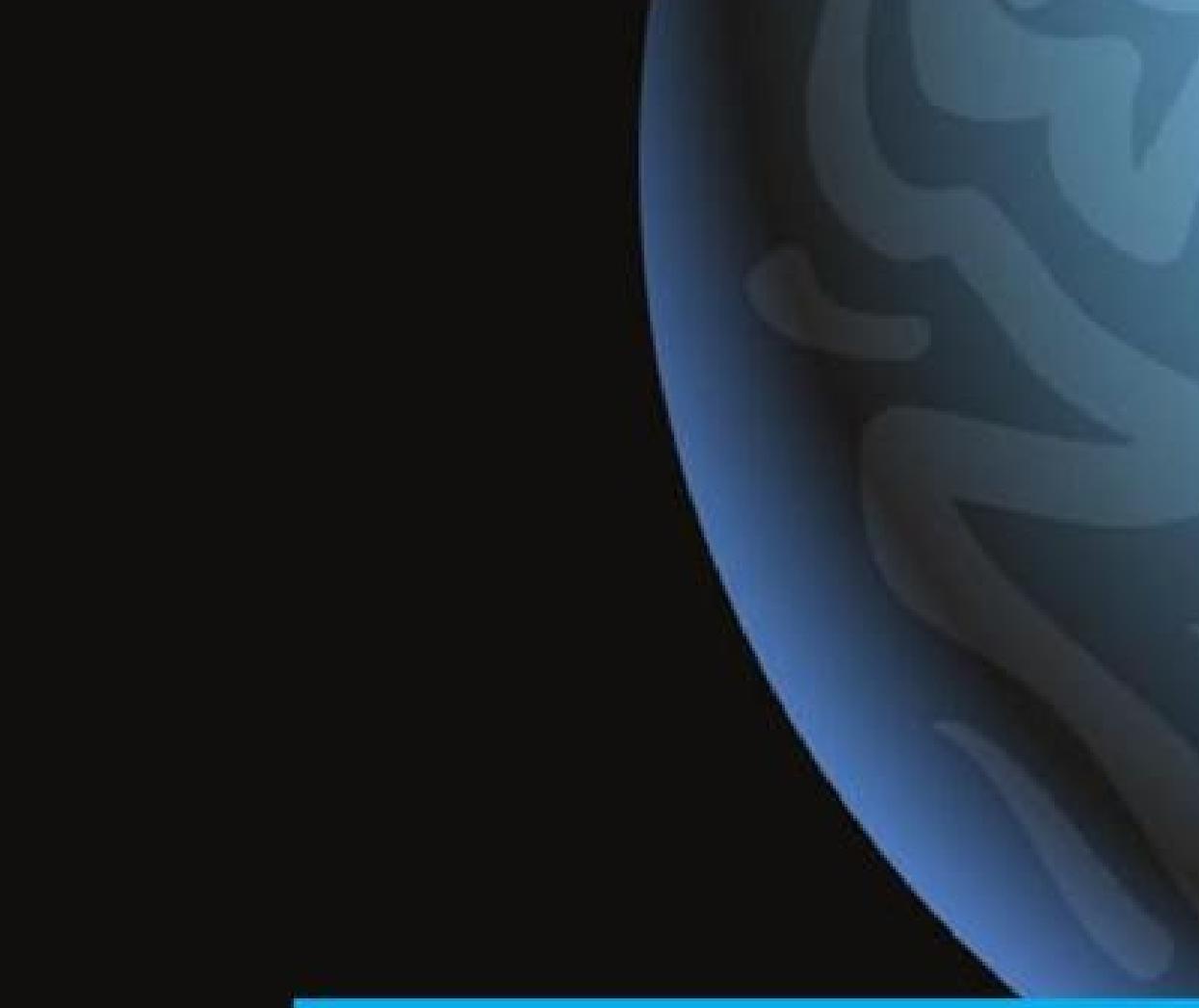
**Discovered By:  
William Herschel**

**Uranus makes one  
around the Sun every  
Earth years.**

**Uranus is often referred  
as an “ice giant” planet**







**Neptune is the e  
distant planet fro  
formed much clo  
before**





**Facts:**

**Mass:**

**102,410,000,000,000,  
billion kg (17.15x Earth)**

**Moon:**

**14**

**Rings:**

**5**

**Surface Temperature:**

**-180 to 80°**

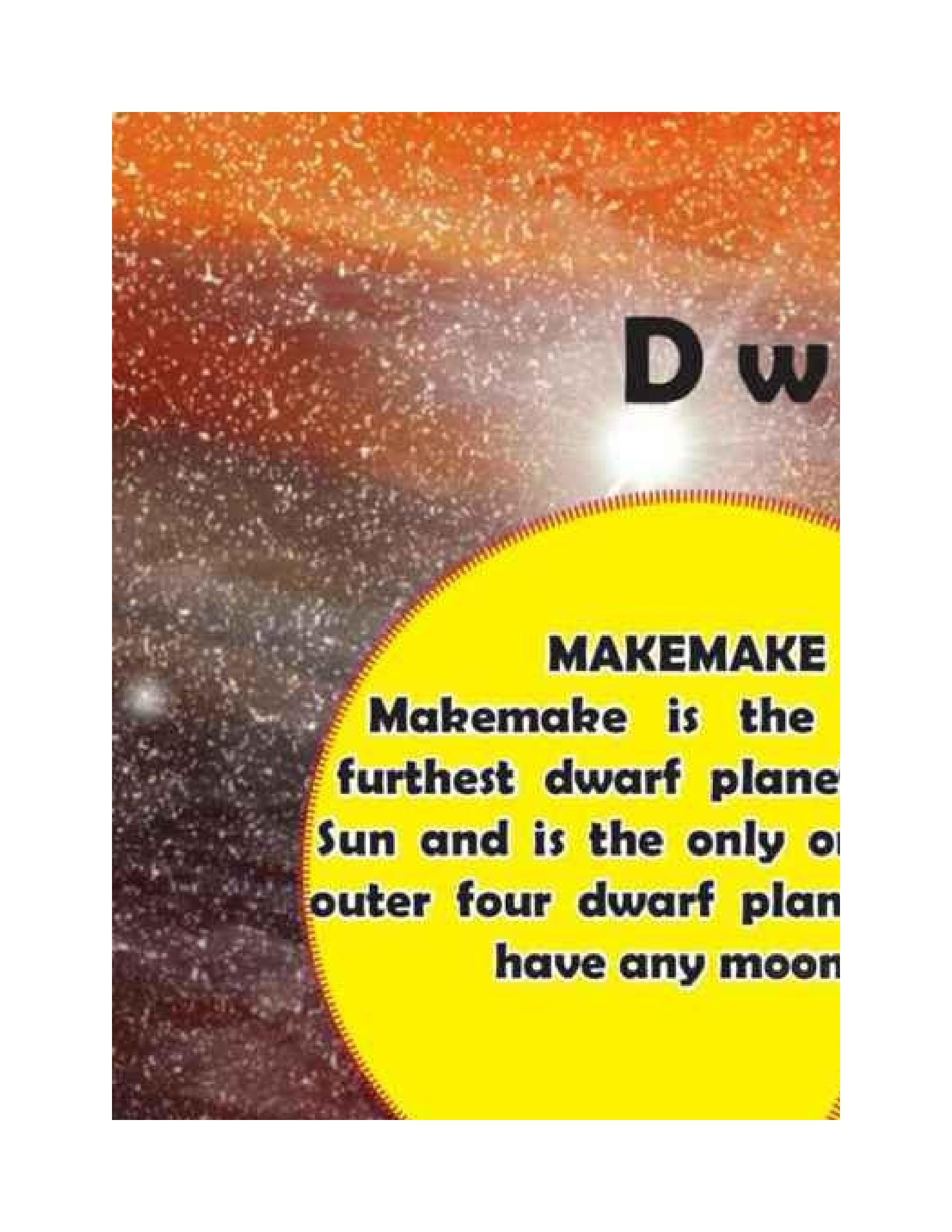
-201 -C

**Discover Date:  
September 23rd 1846**

**Discovered By:  
Urbain Le Verrier & John  
Galle**

**Neptune is not visible to the naked eye and was first observed in 1846. Its position was determined using mathematical prediction. It was named after the Roman god of the sea.**





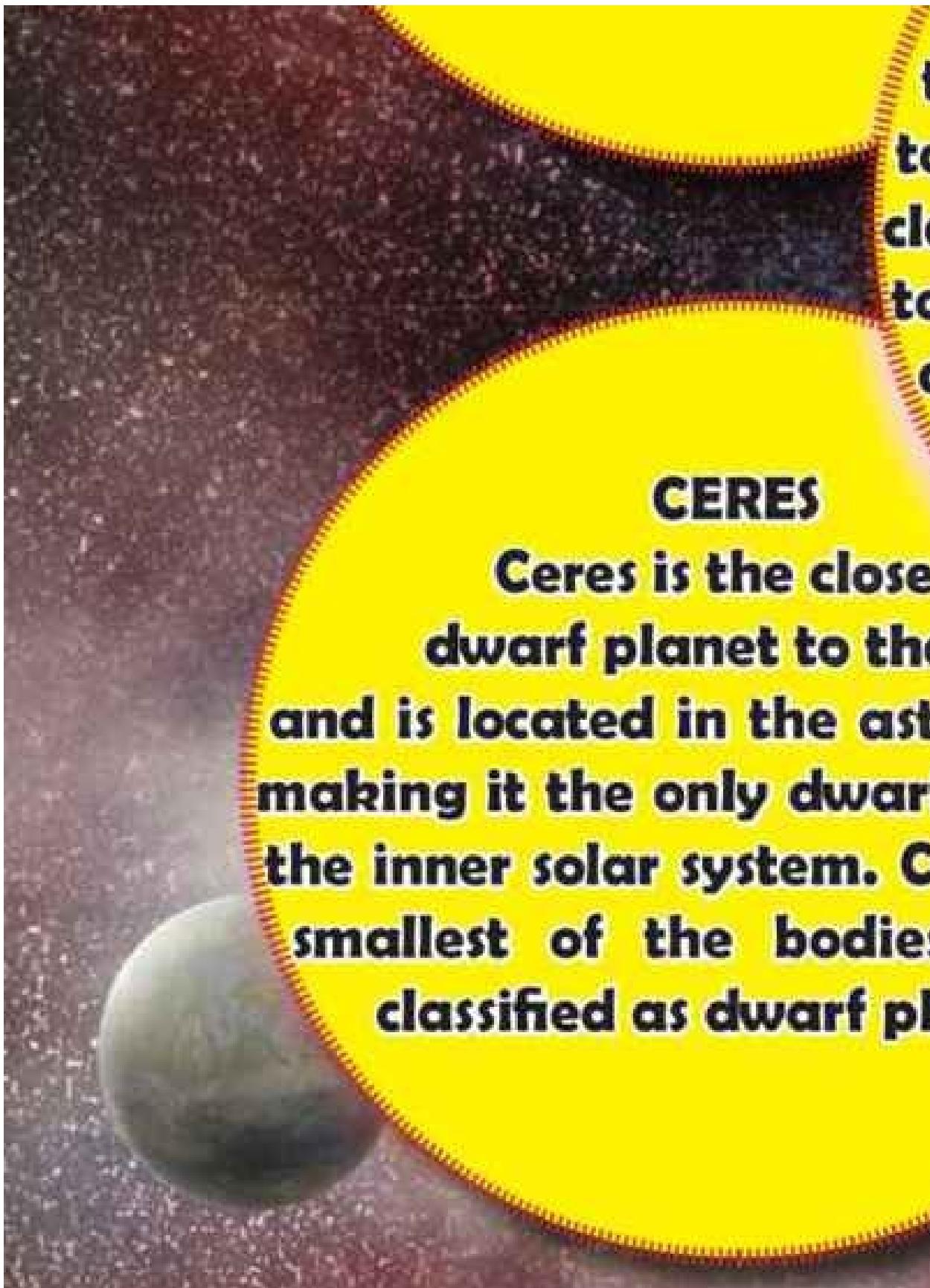
D W

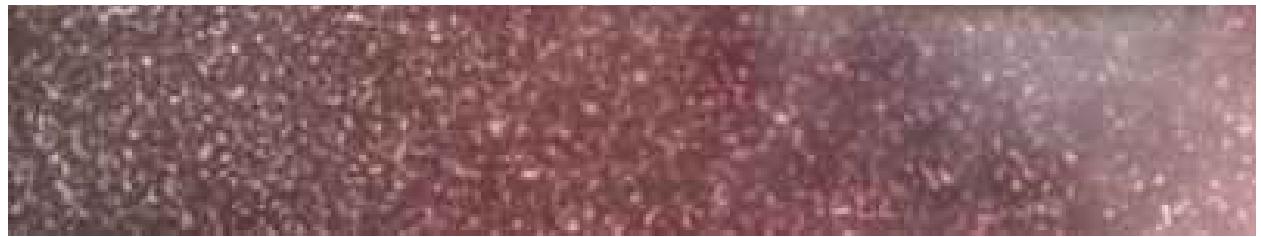
## **MAKEMAKE**

**Makemake is the  
furthest dwarf planet  
Sun and is the only one  
of the outer four dwarf planets  
to have any moons.**

## **CERES**

**Ceres is the closest dwarf planet to the Sun and is located in the asteroid belt, making it the only dwarf planet in the inner solar system. Ceres is the smallest of the bodies classified as dwarf planets.**





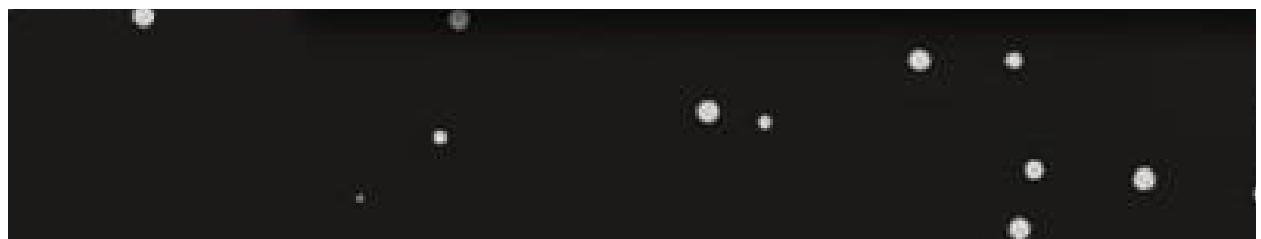


AST

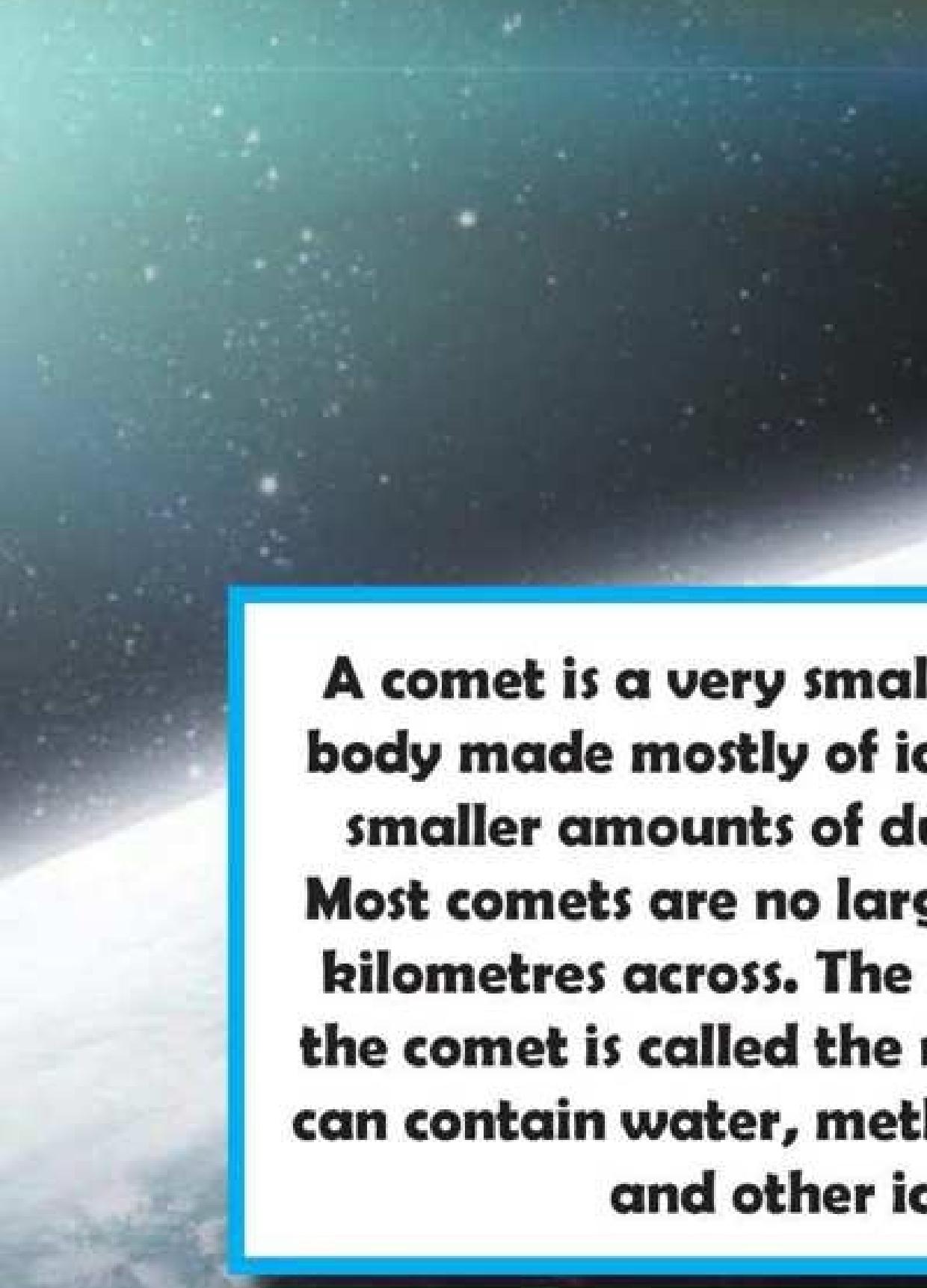


**Asteroids are small, rock bodies that populate interplanetary space out to the orbit of**

**are millions of them, and grouped by their common**







**A comet is a very small body made mostly of ice and dust. Most comets are no larger than a few kilometres across. The central part of the comet is called the nucleus. It can contain water, methane, ammonia, and other ices.**







**The Moon (or Luna) is a natural satellite and has been around for billion years ago around million years after the formation of the solar system. The Moon is in synchronism with Earth meaning the two bodies face each other all the time.**







**The Sun or Sol, is the centre of our solar system. It is responsible for the sun's heat and weather. The Sun is a perfect sphere with a diameter of just 10km in diameter. It has a bright surface with dark spots called sunspots. The Sun's atmosphere is divided into three layers: the photosphere, the chromosphere, and the corona. The Sun's magnetic field is generated by the movement of plasma in the Sun's interior. The Sun's energy is produced by nuclear fusion reactions in its core, where hydrogen atoms are converted into helium. The Sun's energy is transmitted through space as electromagnetic waves, which are absorbed by the Earth's atmosphere and used for various purposes, such as heating and lighting.**







