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opening extract from

Insiders Atlas of the Universe

written by

Mark A. Garlick

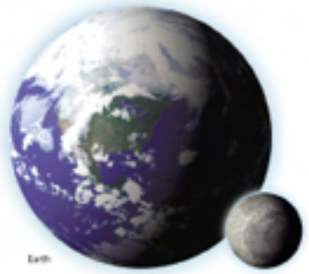
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Sumerian Earth goddess

Earth

ORIGIN OF NAME
EARTHE, THE ANGLO-SAXON WORD FOR "LAND"

DISTANCE FROM THE SUN
92.9 MILLION MILES (149.6 MILLION KM)

DIAMETER AT THE EQUATOR
7,926 MILES (12,756 KM)

MASS
6 x 10^{24} TONS (5.5 x 10^{24} TONNES)

MOONS
1

LENGTH OF YEAR
365.24 DAYS

Wind and rain have worn away most of Earth's impact craters. If Earth had no atmosphere, it would look more like the surface of the Moon.

An eye on Earth

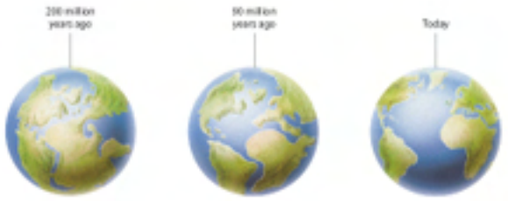
At least 5,000 artificial satellites have been put into orbit around Earth since the Soviets launched the first, Sputnik, in 1957. Most of these have long since burned up in Earth's atmosphere or have become space junk in orbit. The International Space Station (right) is the largest and most complex satellite ever built. Construction began in November 1998, with completion due in 2010.



The International Space Station (ISS) orbits the Earth every 92 minutes. The ISS is a joint project between agencies in the US, Canada, Japan, Russia, and Europe.



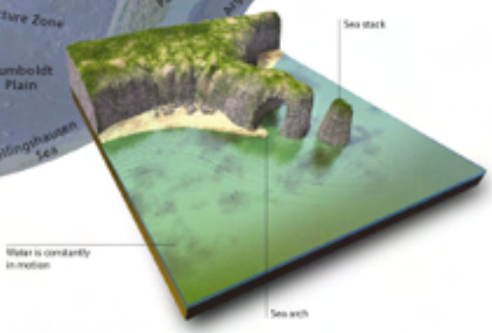
Curtain of light
The auroras—the Northern and Southern lights—are caused by charged particles streaming from the Sun. Upon reaching our planet, they get caught up in Earth's magnetic field and collide with molecules in the atmosphere, making them glow.



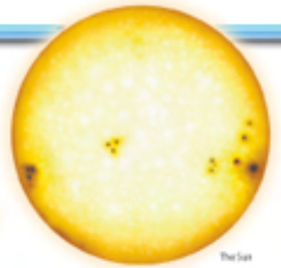
On the move
The continents are in continuous motion. Some 200 million years ago Earth had a single supercontinent. But it broke up and the fragments separated to make the pattern of continents so familiar today.



Volcanic planet
Earth, and the moons Io (orbiting Jupiter), Enceladus (Saturn), and Triton (Neptune), are the only places in the Solar System known to be volcanically active. This image shows Batur volcano in Indonesia erupting.



The power of the sea
The Moon is so large and so comparatively close to Earth that it exerts a gravitational pull on our ocean's waters. The constant movement of water causes erosion in our coastlines.



Jupiter

The Sun



Apollo,
Greek Sun god

The Sun

ORIGIN OF NAME
SOL, THE LATIN WORD FOR "SUN"

DISCOVERED
KNOWN SINCE ANTIQUITY

DIAMETER AT THE EQUATOR
865,000 MILES (1,392,000 KM)

MASS
333,000 X EARTH'S MASS

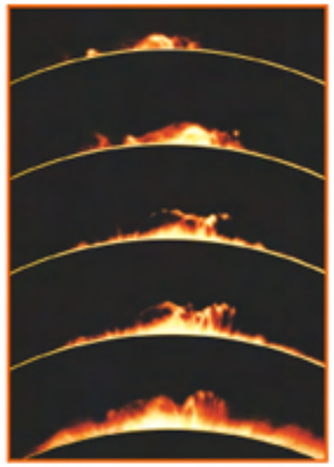
SURFACE TEMPERATURE
9,900°F (5,500°C)

CORE TEMPERATURE
28,000,000°F (15,500,000°C)



Sampling the Sun

Launched in 2001, NASA's Genesis mission had a bold objective—to capture particles from the solar wind blustering out from the Sun, and to return them safely to Earth for study. Despite its crash landing in the Utah desert in 2004, scientists were able to retrieve some of its precious cargo.



Flaring up!

This image is an eight-hour photographic sequence showing a solar flare eruption. Some solar flares can eject material out through the solar corona.

In one second, the Sun sends out more energy than humans have consumed in all of recorded history.

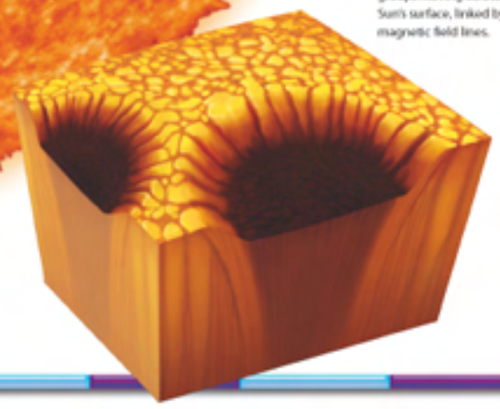
SOHO observatory

The Solar and Heliospheric Observatory (SOHO) was launched in December 1995 to study the Sun. Its twelve instruments continually monitor the solar surface, winds, and corona.



The Sun's face

In close-up, the surface of the Sun has a grainy appearance, known as solar granulation. Individual grains are typically about 600 miles (1,000 km) across. Solar granulation is the result of hot gas rising from the Sun's interior, which spreads out and disperses once it reaches the surface.

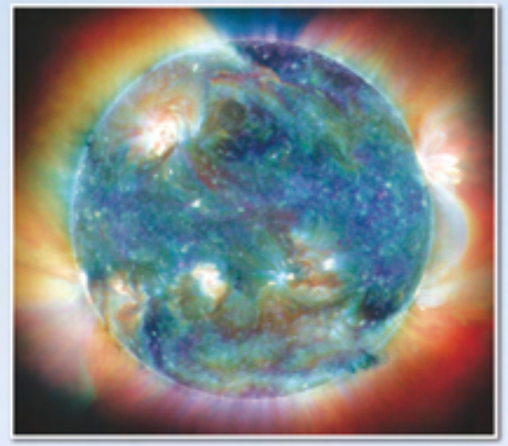


Inside a sunspot

Sunspots look like depressions, shaped a bit like saucers. These can be up to 50,000 miles (80,500 km) across.They usually appear in pairs or groups moving across the Sun's surface, linked by magnetic field lines.

Corona

The corona is the Sun's atmosphere, extending out several million miles from the Sun's visible face, the photosphere. Despite its extent, it is exceedingly faint, shining with only one-millionth as much light as the photosphere. For this reason the corona is most easily photographed during a solar eclipse, when the photosphere is blocked by the Moon. A cupful of gas from the photosphere contains a trillion times more gas particles than a cupful from the corona.



This photograph of the Sun reveals its turbulent atmosphere. The white regions are where the magnetic field is most highly concentrated.



ORIGIN OF NAME	VENUS, THE ROMAN GODDESS OF LOVE
DISCOVERED	KNOWN SINCE ANTIQUITY
DISTANCE FROM THE SUN	67 MILLION MILES (108 MILLION KM)
DIAMETER AT THE EQUATOR	7,521 MILES (12,104 KM)
MASS	81.5% OF EARTH'S MASS
MOONS	0
LENGTH OF YEAR	225 EARTH DAYS

Only one feature on Venus is named after a man: Maxwell Montes are named after James Clerke Maxwell. The rest are named for famous women.

Transit of Venus

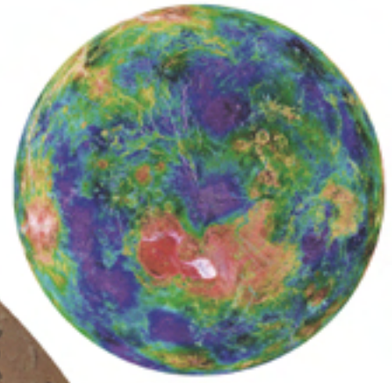
Occasionally, observers on Earth can watch Venus pass across the face of the Sun. These rare events are called transits of Venus. In the past, astronomers used these events to measure the distance between Earth and Venus. James Cook's first voyage of exploration in the Pacific included observing a transit of Venus before he went on to discover new lands.



This photograph, taken in 2004, shows Venus crossing the face of the Sun.



The portable observatory used by James Cook in Tahiti

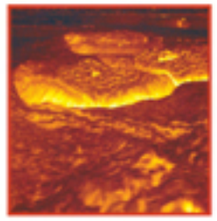


Venus unmasked

This image is a view of Venus looking straight down at the north pole. It was compiled by combining several years of radar data recorded by the Magellan probe. Colors indicate surface height, ranging from "blue" lowlands to "white" peaks.



+ = Spacecraft landing sites



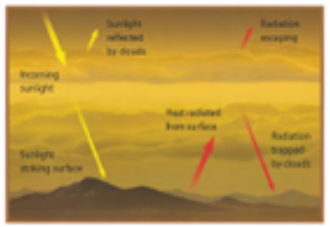
Pancakes on Venus

This image, created from data provided by the Magellan probe in 1989, shows three "pancake domes" on the Alpha Regio highland plateau. These volcanic features are about 2,400 feet (750 m) high.



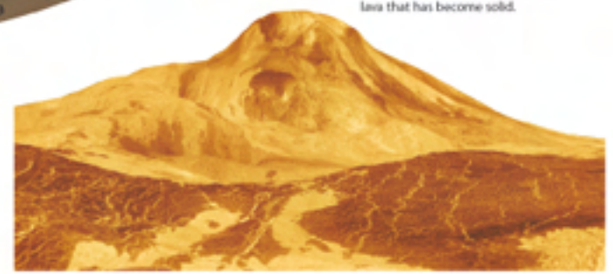
Venera lander

The Soviet Venera program launched sixteen probes to study Venus from 1967 to 1983. This illustration shows the odd shape of landers 9 to 14. They were designed to absorb the shock of landing, as well as the high temperature and pressure of Venus.



Heating up

Venus suffers from a greenhouse effect that is out of control. Strong sunlight filters through the clouds and heats the surface, but the clouds and carbon dioxide in the atmosphere stop the heat from escaping back into space. The planet cannot cool down.



Volcanic landscape

Using data from the Magellan probe, scientists have created this model of a volcano on Venus called Maat Mons, which reaches a height of 5 miles (8 km). The plains in the foreground are partly covered with lava that has become solid.



Magellan

From 1990 to 1994, NASA's Magellan probe used radar to map Venus.