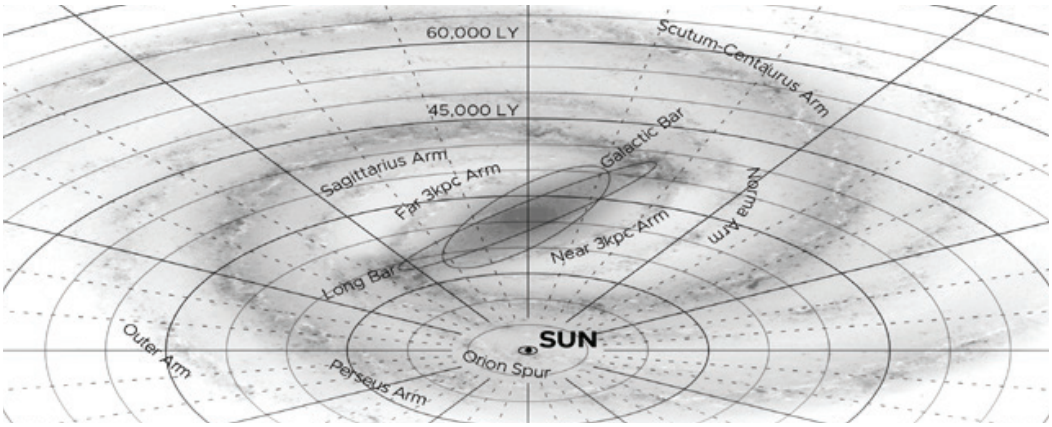
National Aeronautics and Space Administration

BEYOND OUR SOLAR SYSTEM

explore at **solarsystem.nasa.gov/beyond**

www.nasa.gov

On the front: An artist's concept illustrating the spiral structure of the Milky Way.



The Milky Way is a spiral galaxy about 100,000 light-years across. Our Sun lies far from its center.

Beyond Our Solar System

Our Sun is one of over 100 billion stars in the Milky Way, and our galaxy is just one of countless billions in the universe, each having millions – or billions – of stars of their own.

NASA EXPLORES

BEYOND OUR SOLAR SYSTEM

explore at **solarsystem.nasa.gov/beyond**

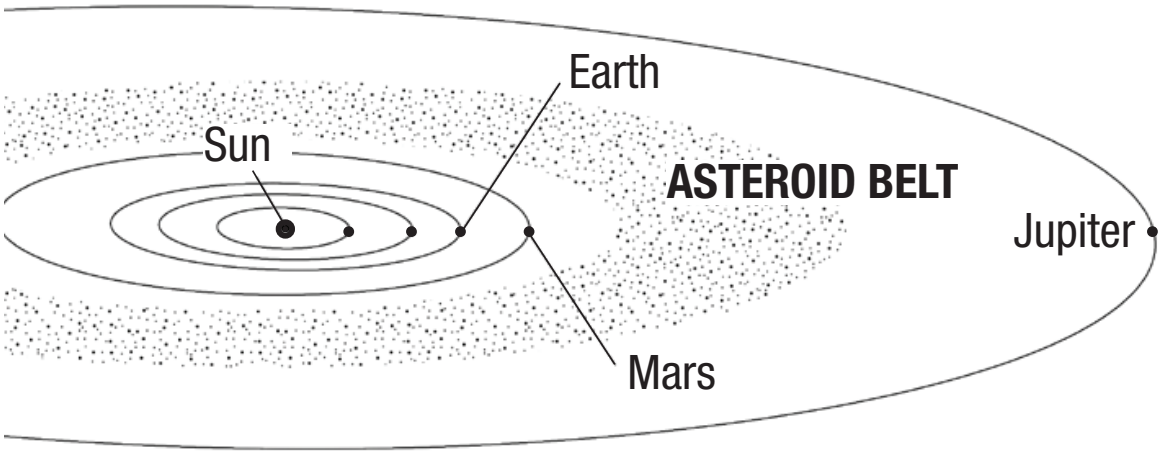
National Aeronautics and Space Administration

ASTEROIDS

explore at **solarsystem.nasa.gov/asteroids**

www.nasa.gov

On the front:
Asteroid 243 Ida from NASA's Galileo spacecraft.



Most asteroids are found in the main asteroid belt between Mars and Jupiter. There are also many asteroids with orbits that pass through the space near Earth.

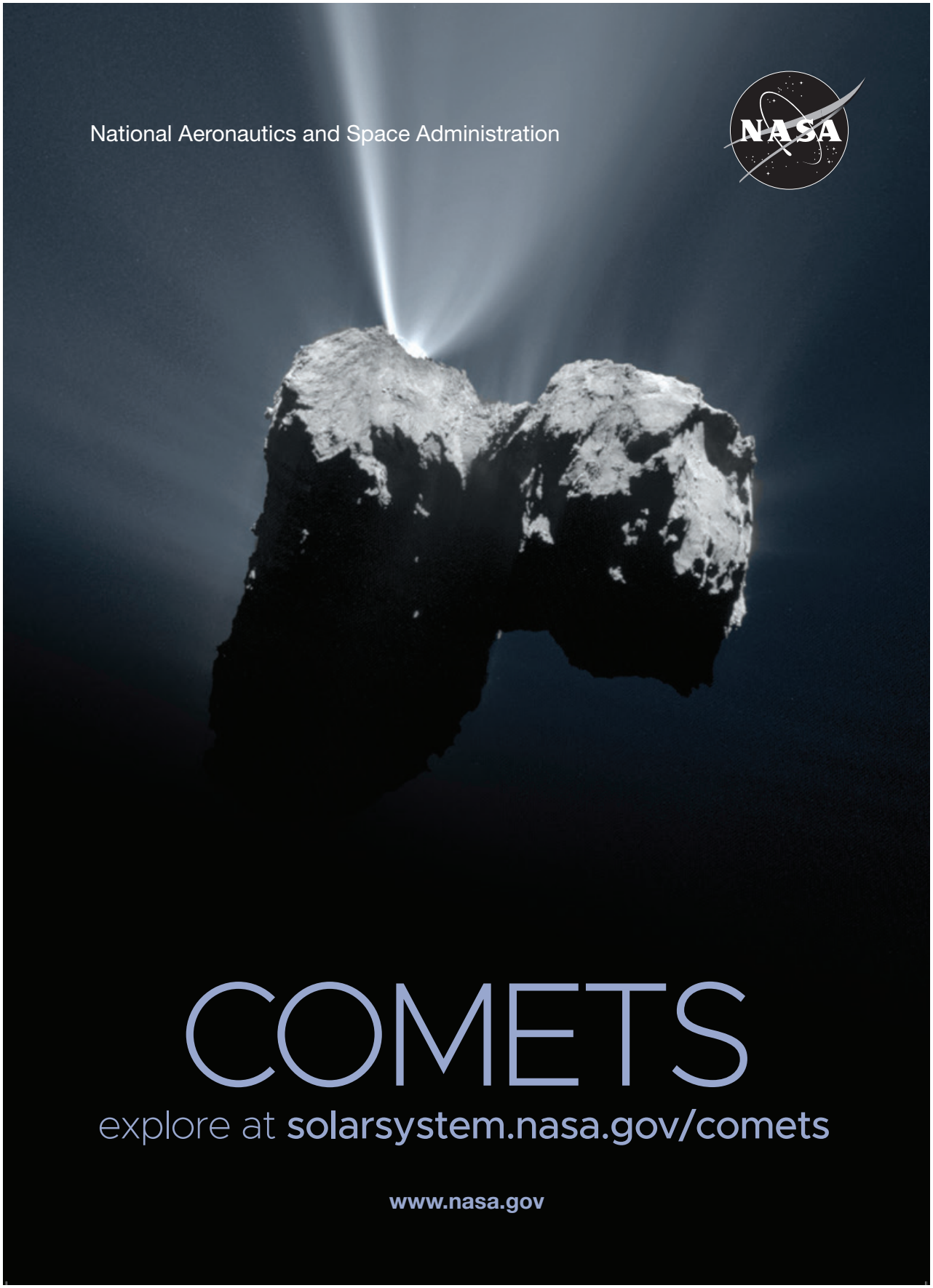
Asteroids are giant hunks of rock and metal that orbit the Sun. Like comets, they are remnants from the formation of our solar system more than 4 billion years ago.

NASA EXPLORES

ASTEROIDS

explore at **solarsystem.nasa.gov/asteroids**

National Aeronautics and Space Administration

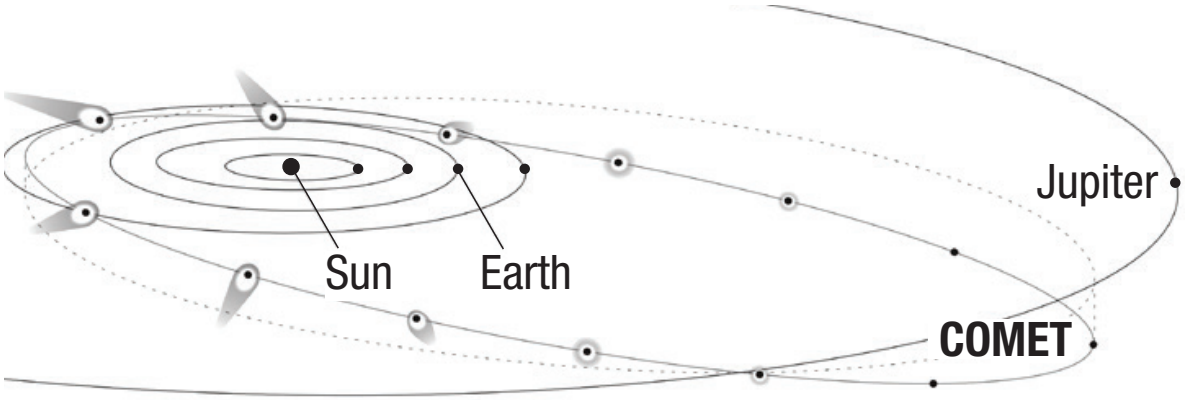


COMETS

explore at **solarsystem.nasa.gov/comets**

www.nasa.gov

On the front: Comet 67P/ Churyumov-Gerasimenko based on two images by ESA's Rosetta mission.



This example of a comet's orbit (for Comet 67P) shows how its activity increases as it nears the Sun.

Comets are icy balls of dust and frozen gases that orbit the Sun. When a comet's orbit brings it close to the Sun, it heats up and spews dust and gases, creating a giant, fuzzy head, called a coma, and a long tail.

NASA EXPLORES

COMETS

explore at **solarsystem.nasa.gov/comets**

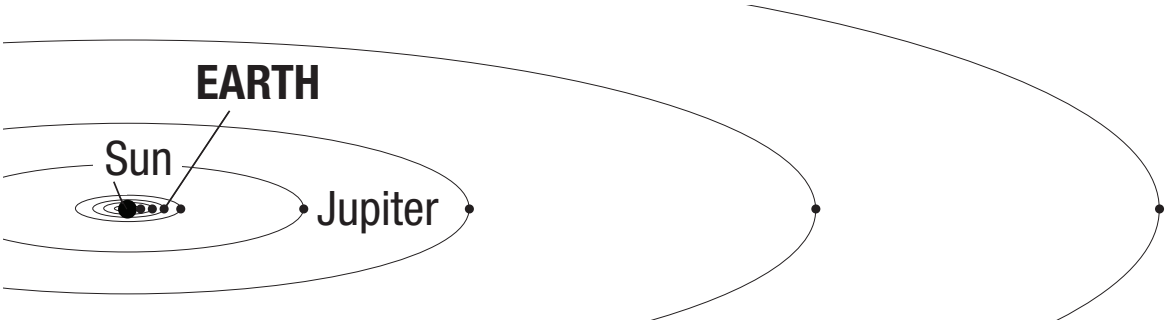
National Aeronautics and Space Administration

EARTH

explore at **solarsystem.nasa.gov/earth**

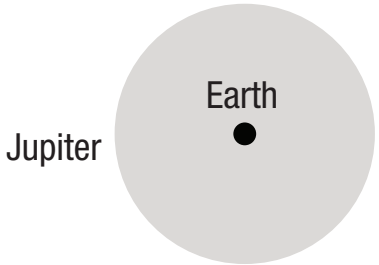
www.nasa.gov

On the front: A view of Earth made using data collected by NASA's Terra satellite.



Earth is one of the four inner, rocky planets of our solar system. It is close enough to the Sun that, with some help from our atmosphere, the planet is warm enough to have liquid water on its surface.

Earth — our home planet — is the third planet from the Sun, and the only place we know of so far that's inhabited by living things. It is the only world in our solar system with liquid water on the surface.



Earth is 0.09x (or 9%) the size of Jupiter and 0.009x (or ~1%) the size of the Sun

NASA EXPLORES

EARTH

explore at **solarsystem.nasa.gov/earth**

National Aeronautics and Space Administration

EARTH'S MOON

explore at **solarsystem.nasa.gov/moon**

www.nasa.gov

On the front: Photo from the Apollo 12 mission, showing an astronaut with the Surveyor 3 spacecraft.

The Moon is farther away than people often think, at a distance of 239,000 miles (385,000 kilometers).

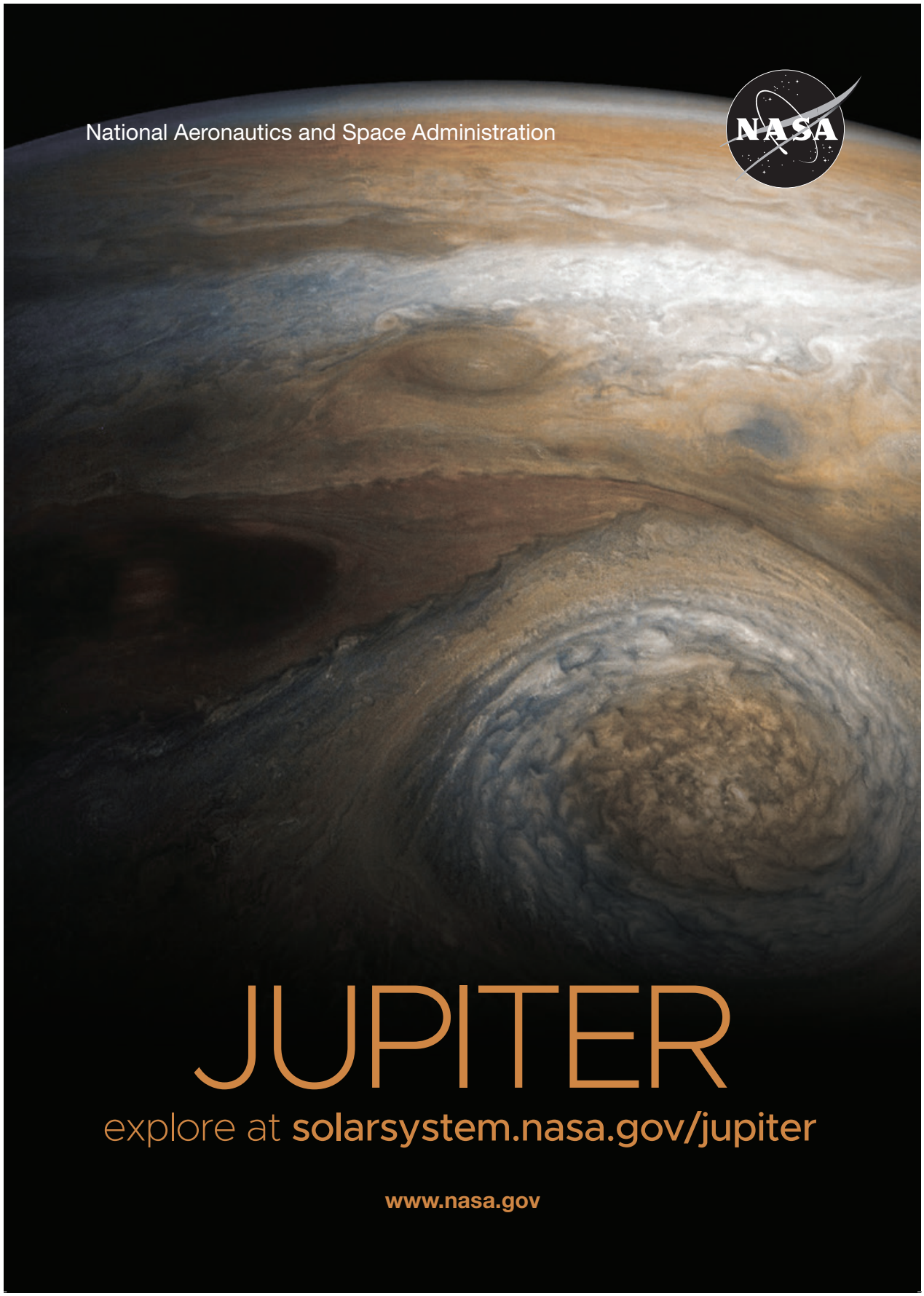
Earth's Moon was likely formed after a Mars-sized body collided with Earth several billion years ago. Earth's only natural satellite is simply called "the Moon" because people didn't know other moons existed until Galileo Galilei discovered four moons orbiting Jupiter in 1610.

Earth's Moon is 0.27x (or 27%) the size of Earth

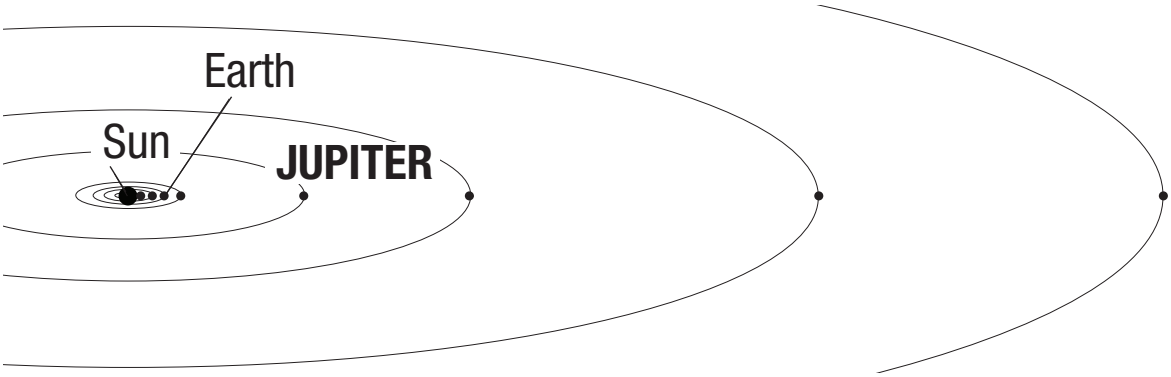
NASA EXPLORES

EARTH'S MOON

explore at **solarsystem.nasa.gov/moon**

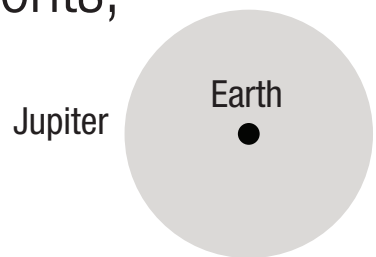

National Aeronautics and Space Administration
NASA
JUPITER
explore at solarsystem.nasa.gov/jupiter
www.nasa.gov

On the front: Image from NASA's Juno spacecraft showing a Jovian cloudscape. Image processing by Gerald Eichstädt and Seán Doran.



Jupiter orbits the Sun at a distance five times farther than Earth does. It's one of four giant planets in the outer solar system.

Jupiter is the largest planet in the solar system – more than twice as massive as all the other planets combined. Despite its huge size, the planet is made almost entirely of the lightest elements, hydrogen and helium.

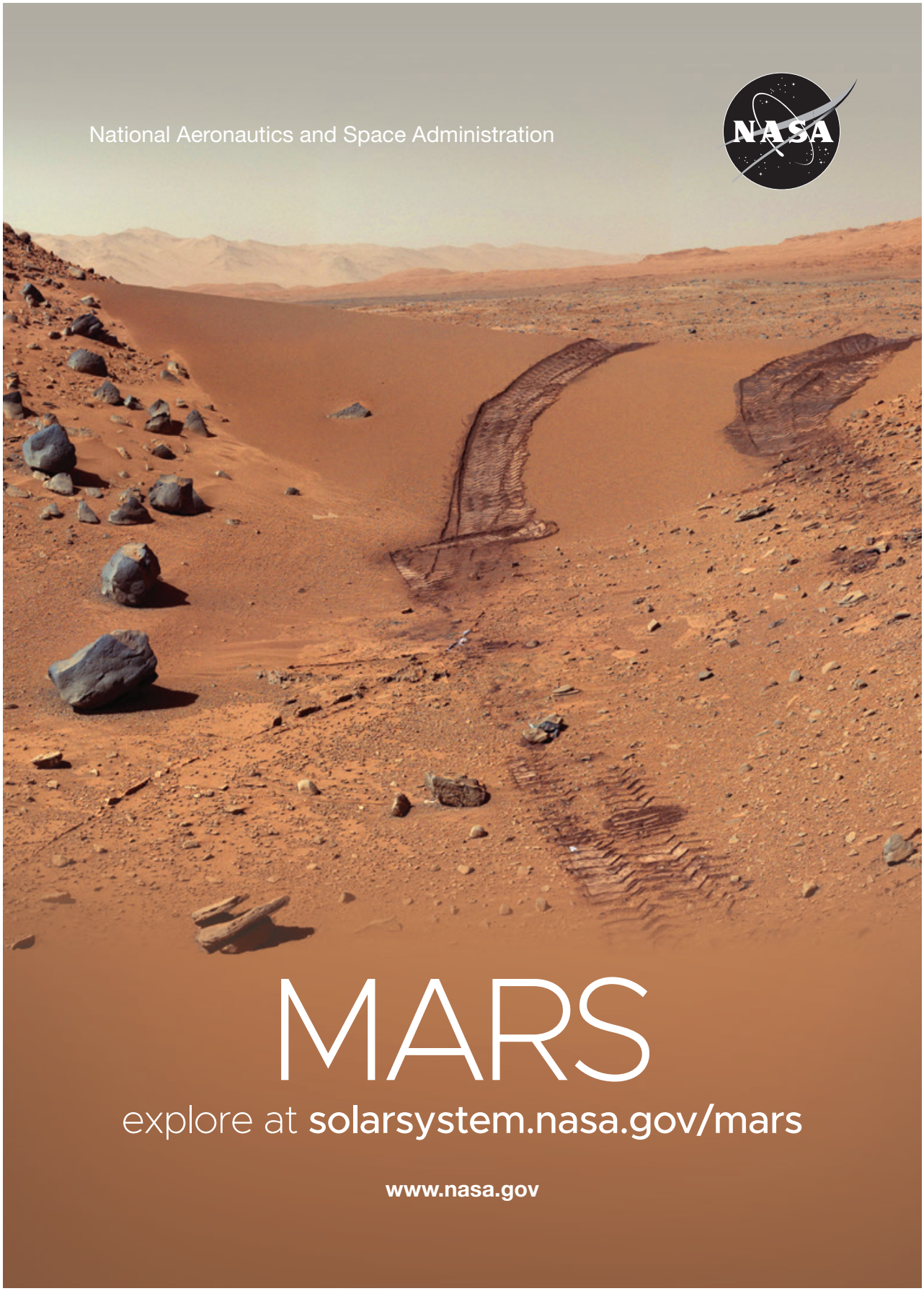


Jupiter is 11.1x larger than Earth

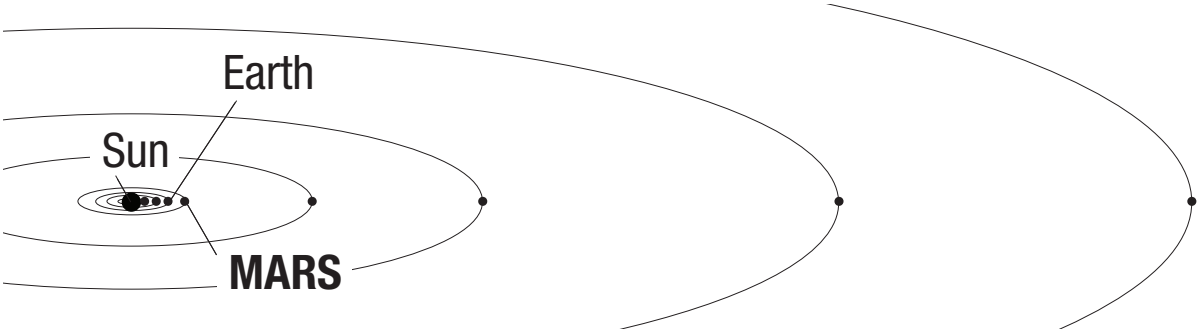
NASA EXPLORES

JUPITER

explore at **solarsystem.nasa.gov/jupiter**

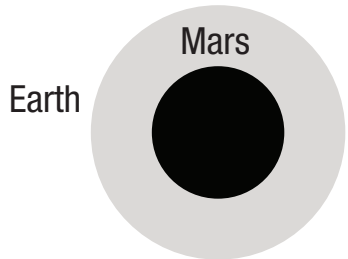

National Aeronautics and Space Administration
NASA
MARS
explore at solarsystem.nasa.gov/mars
www.nasa.gov

On the front: A view from NASA's Curiosity Mars rover showing the rover's tracks on the Martian surface.



Mars orbits a bit farther away from the Sun than Earth does — on average its distance is about 1.5 times Earth's distance from the Sun.

Mars is a cold desert world with a thin atmosphere. NASA missions have found lots of evidence that Mars was much wetter and warmer, with a thicker atmosphere, billions of years ago.



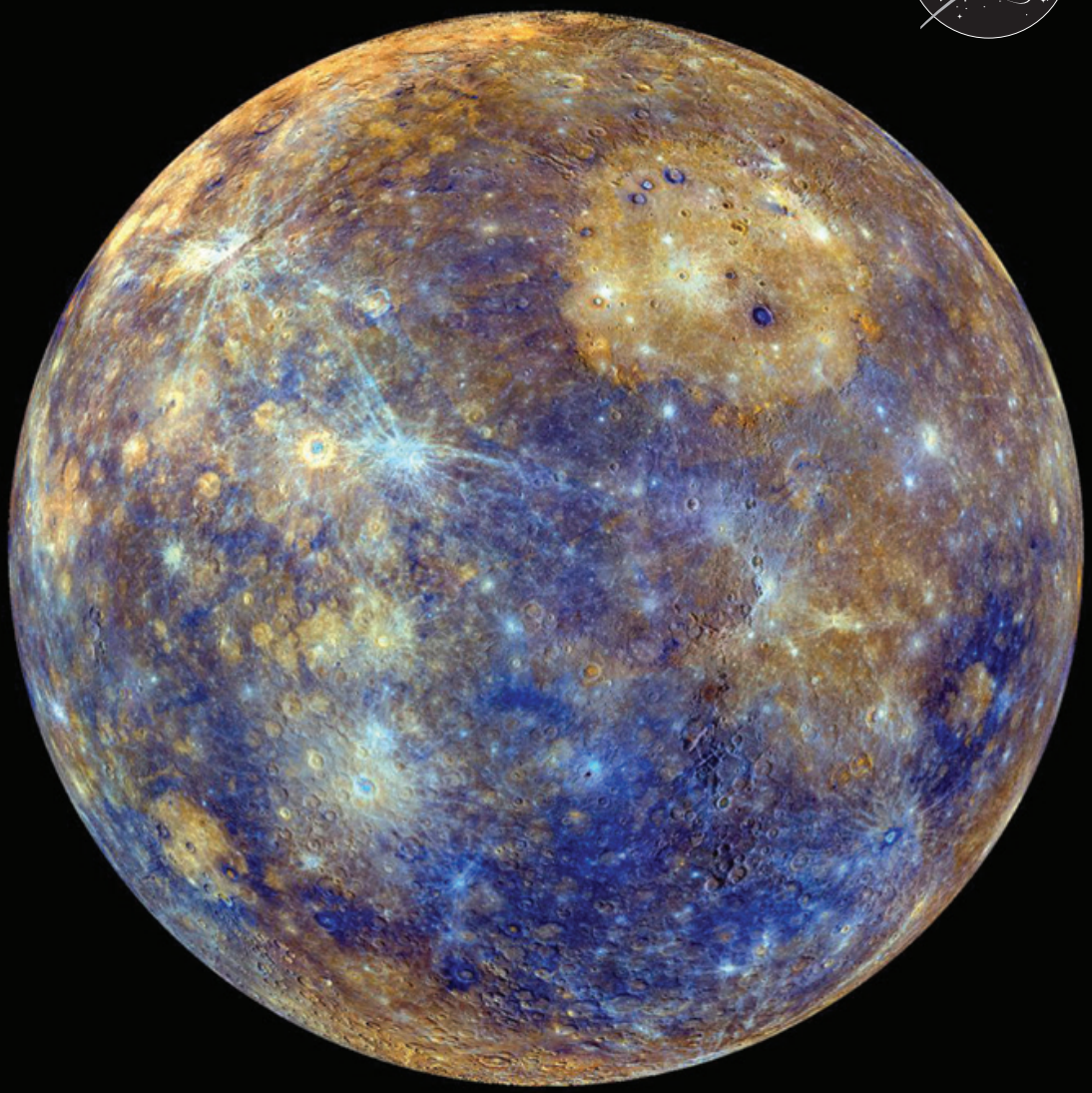
Mars is 0.53x (or 53%) the size of Earth

NASA EXPLORES

MARS

explore at **solarsystem.nasa.gov/mars**

National Aeronautics and Space Administration

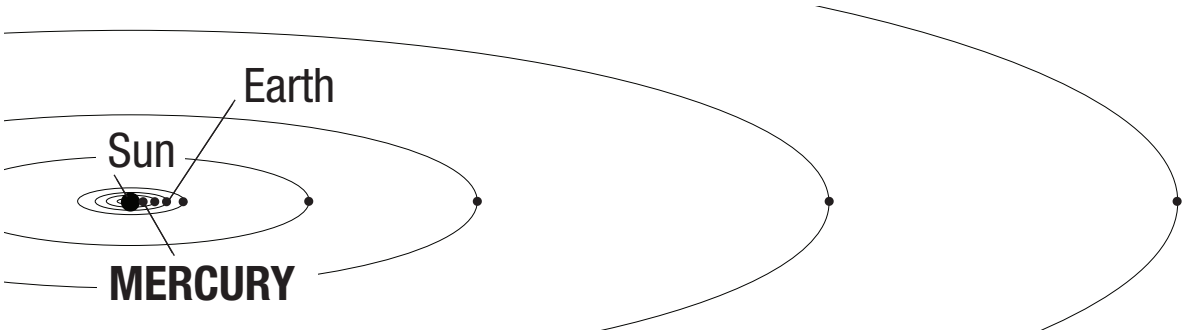


MERCURY

explore at **solarsystem.nasa.gov/mercury**

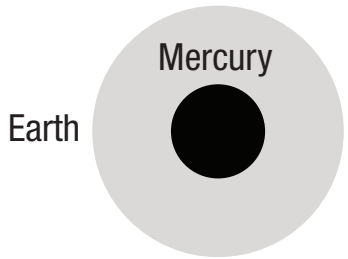
www.nasa.gov

On the front: An enhanced-color map of Mercury's surface from NASA's MESSENGER spacecraft.



Although Mercury is extremely close to our Sun, there are other solar systems with multiple planets orbiting even closer to their stars.

Mercury is the smallest of our solar system's major planets (only slightly larger than Earth's Moon), and the closest to the Sun. Mercury is also the fastest planet, zipping around the Sun every 88 Earth days.



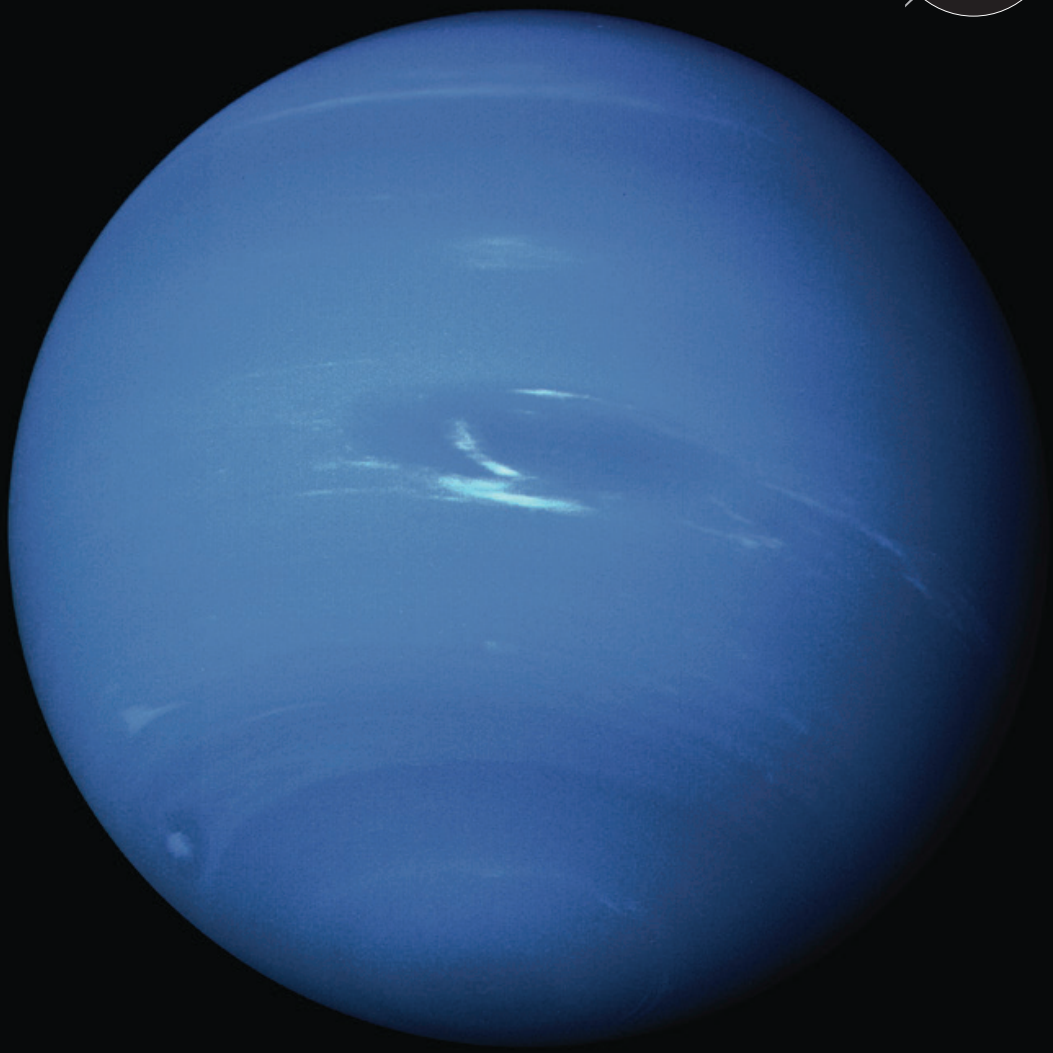
Mercury is 0.38x (or 38%) the size of Earth

NASA EXPLORES

MERCURY

explore at **solarsystem.nasa.gov/mercury**

National Aeronautics and Space Administration

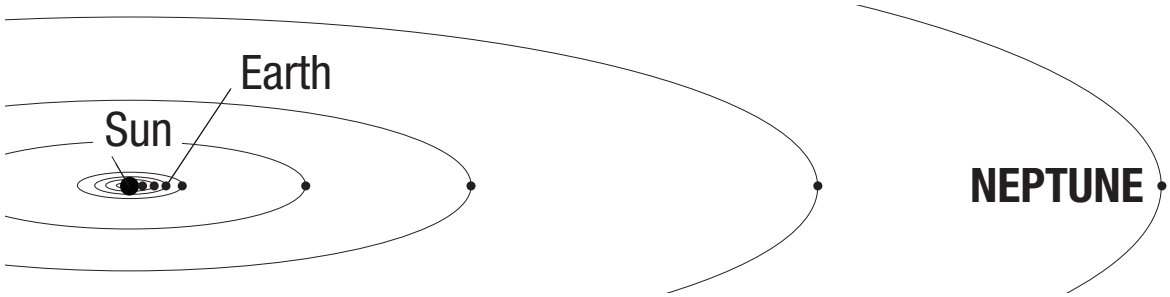


NEPTUNE

explore at **solarsystem.nasa.gov/neptune**

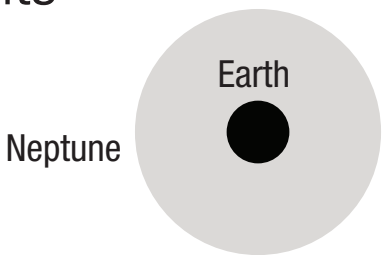
www.nasa.gov

On the front: A view of Neptune from NASA's Voyager 2 spacecraft in 1989.



Neptune orbits the Sun about 30 times farther out than Earth. In 2011, Neptune completed its first 165-year orbit since its discovery in 1846.

Neptune is the most distant of the eight major planets orbiting our Sun. It is dark, cold and whipped by supersonic winds. Like Uranus, Neptune gets its bluish color from methane gas in its atmosphere.



Neptune is 3.9x larger than Earth

NASA EXPLORES

NEPTUNE

explore at **solarsystem.nasa.gov/neptune**

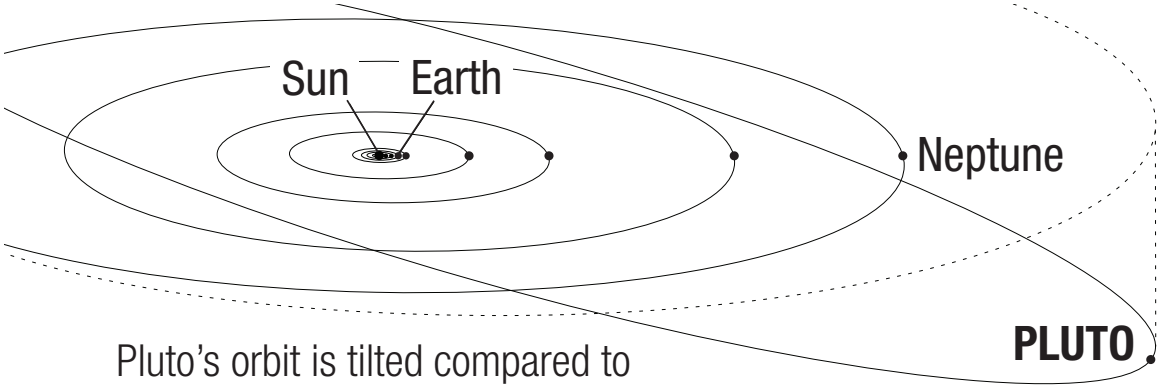
National Aeronautics and Space Administration

PLUTO

explore at **solarsystem.nasa.gov/pluto**

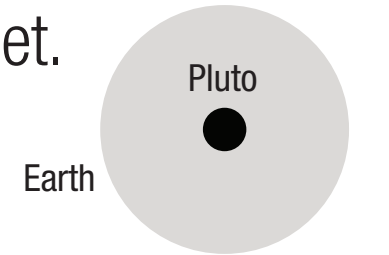
www.nasa.gov

On the front: An enhanced-color view of Pluto from NASA's New Horizons spacecraft.



Pluto's orbit is tilted compared to the other planets. Decades after its discovery, astronomers came to understand it's not a lone oddball, but one of many icy worlds that orbit beyond Neptune.

Pluto is a complex world with mountains, valleys, plains and glaciers. Long considered our solar system's ninth major planet, after the discovery of similar worlds in the space beyond Neptune, Pluto was reclassified as a dwarf planet.



Pluto is 0.19x (or 19%) the size of Earth

NASA EXPLORES

PLUTO

explore at **solarsystem.nasa.gov/pluto**

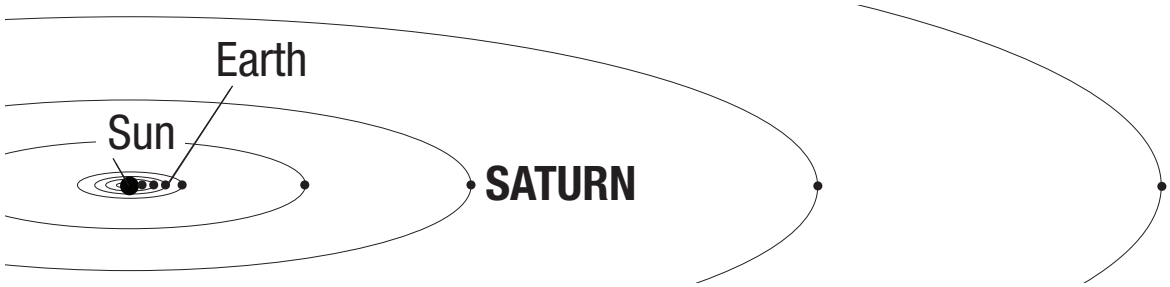
National Aeronautics and Space Administration

SATURN

explore at **solarsystem.nasa.gov/saturn**

www.nasa.gov

On the front: The final full-planet mosaic of Saturn captured by NASA's Cassini spacecraft in 2017.



Saturn orbits about twice as far from the Sun as Jupiter, and about 10 times farther out than Earth. It takes about 30 Earth years to make each orbit around the Sun.

Saturn is the second largest planet in our solar system. Adorned with a dazzling system of icy rings, Saturn is the farthest planet from Earth that was discovered by the unaided human eye, and has been known since ancient times.

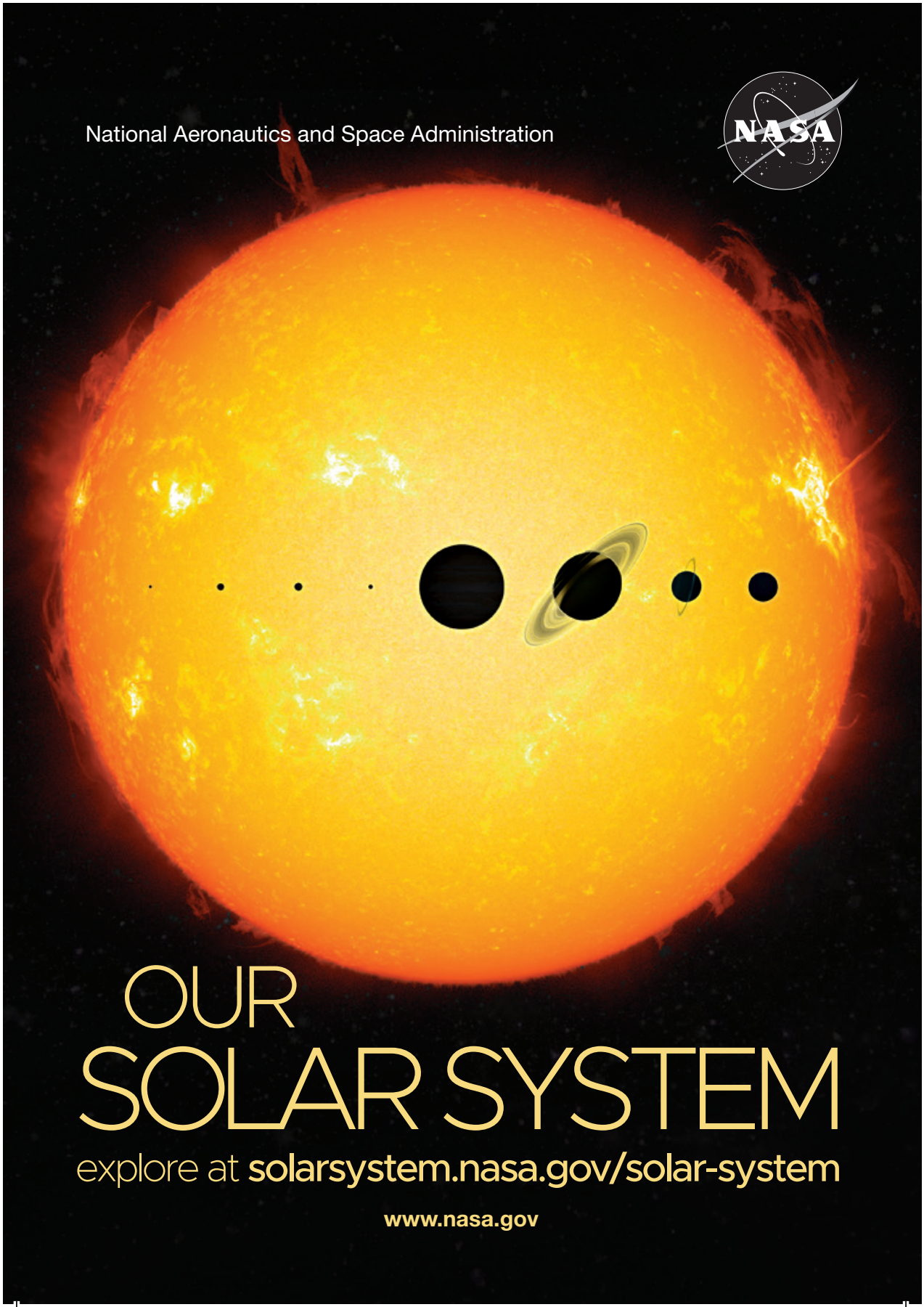
Saturn is 9.4x larger than Earth

NASA EXPLORES

SATURN

explore at **solarsystem.nasa.gov/saturn**

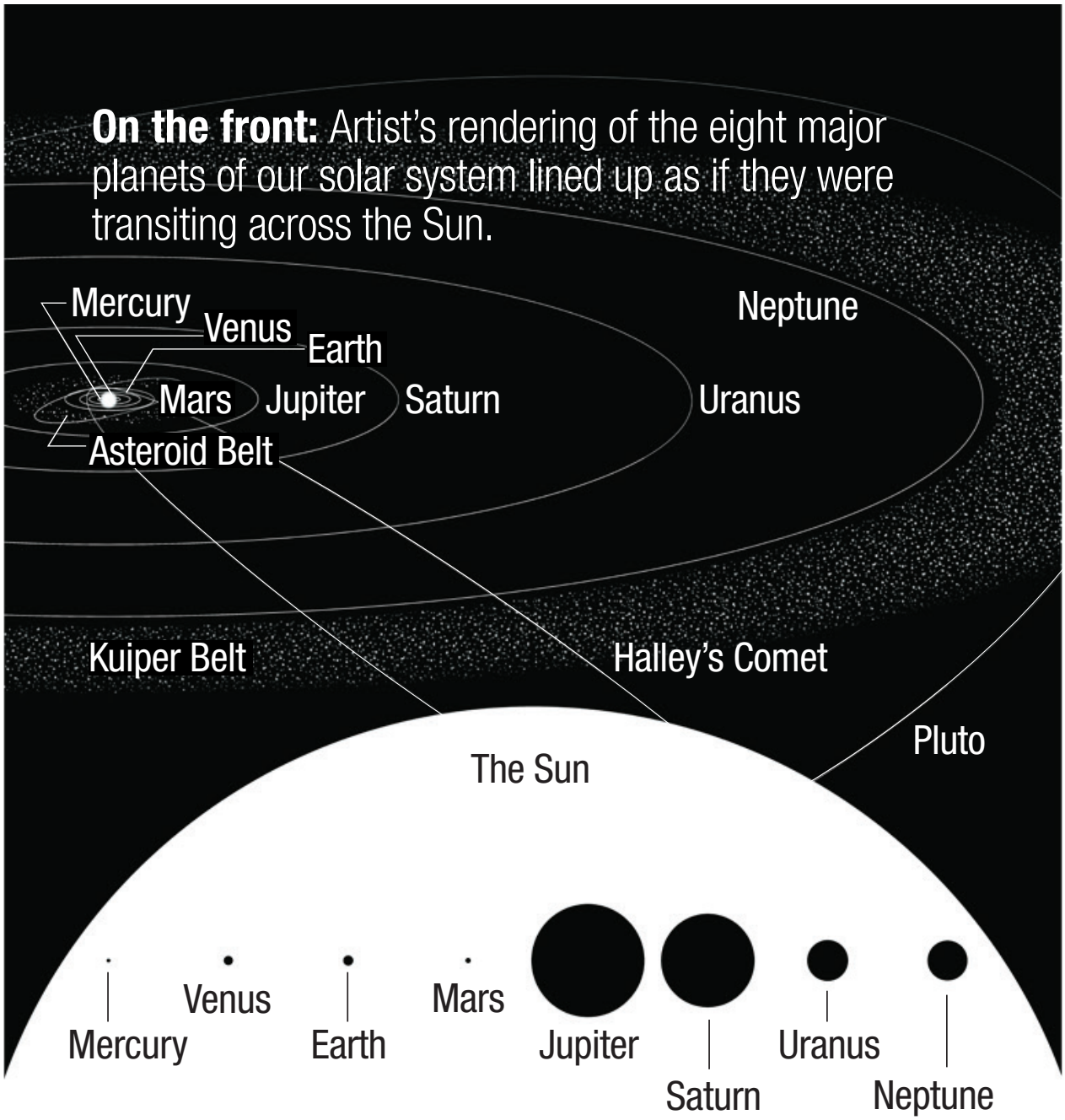
National Aeronautics and Space Administration



OUR SOLAR SYSTEM

explore at **solarsystem.nasa.gov/solar-system**

www.nasa.gov



NASA EXPLORES

OUR

SOLAR SYSTEM

explore at **solarsystem.nasa.gov/solar-system**

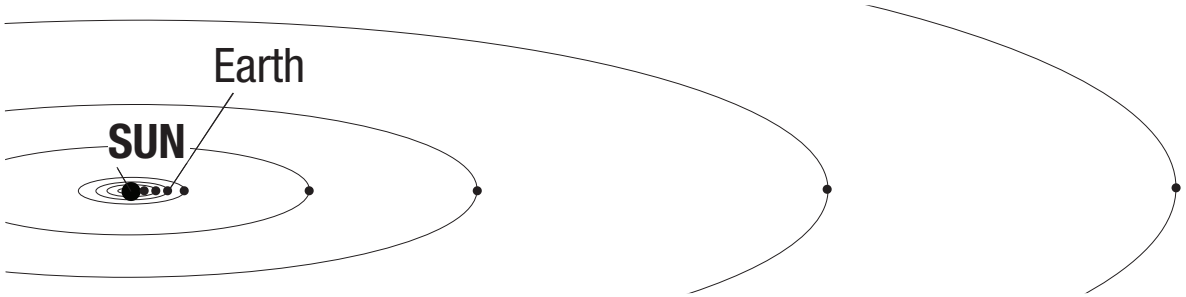
National Aeronautics and Space Administration

THE SUN

explore at **solarsystem.nasa.gov/sun**

www.nasa.gov

On the front: The Sun emits a solar flare, as seen by NASA's Solar Dynamics Observatory in 2015.



The Sun formed from a swirling disk of gas and dust, billions of years ago. The planets and their orbits are remnants of that disk, formed from the leftover material that went into making the Sun.

The **Sun** is the star at the heart of our solar system. Its gravity holds the solar system together, keeping everything in its orbit. Almost all (99.8%) of the mass in the solar system is contained within the Sun.

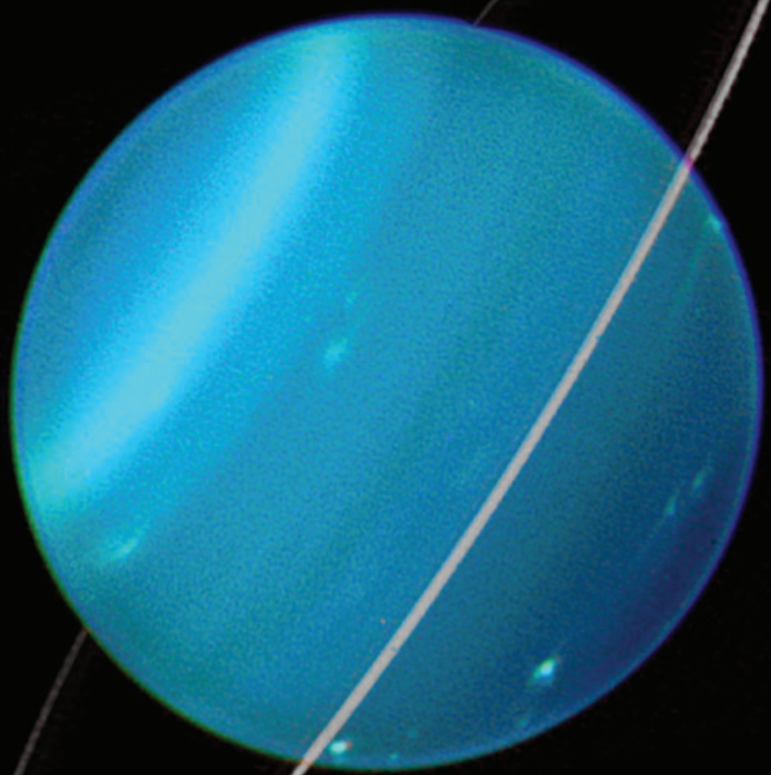
The Sun is 109x larger than Earth

NASA EXPLORES

THE SUN

explore at **solarsystem.nasa.gov/sun**

National Aeronautics and Space Administration

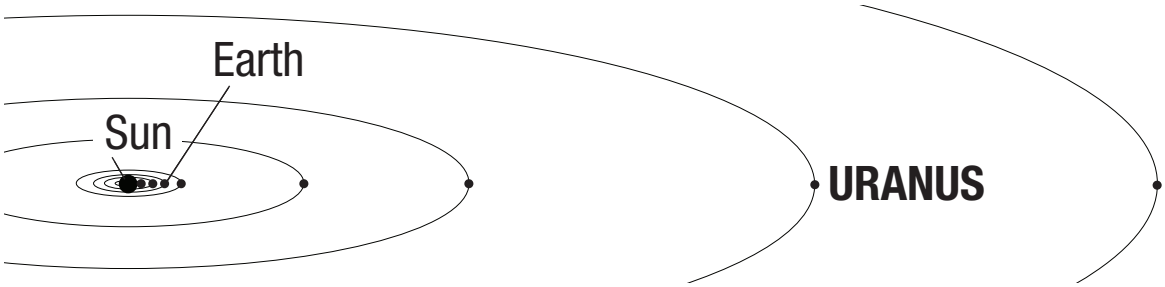


URANUS

explore at **solarsystem.nasa.gov/uranus**

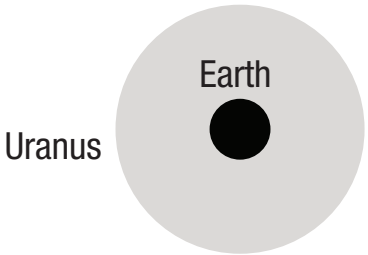
www.nasa.gov

On the front: An infrared view of Uranus and its rings from the Keck Telescope (with support from NASA).



Uranus orbits about twice as far from the Sun as Saturn, and about 20 times farther out than Earth. It takes 84 Earth years to complete a single orbit.

Uranus is a giant planet surrounded by faint rings and more than two dozen small moons. Rotating at a nearly 90-degree angle from the plane of its orbit, its unique tilt makes Uranus appear to spin on its side.



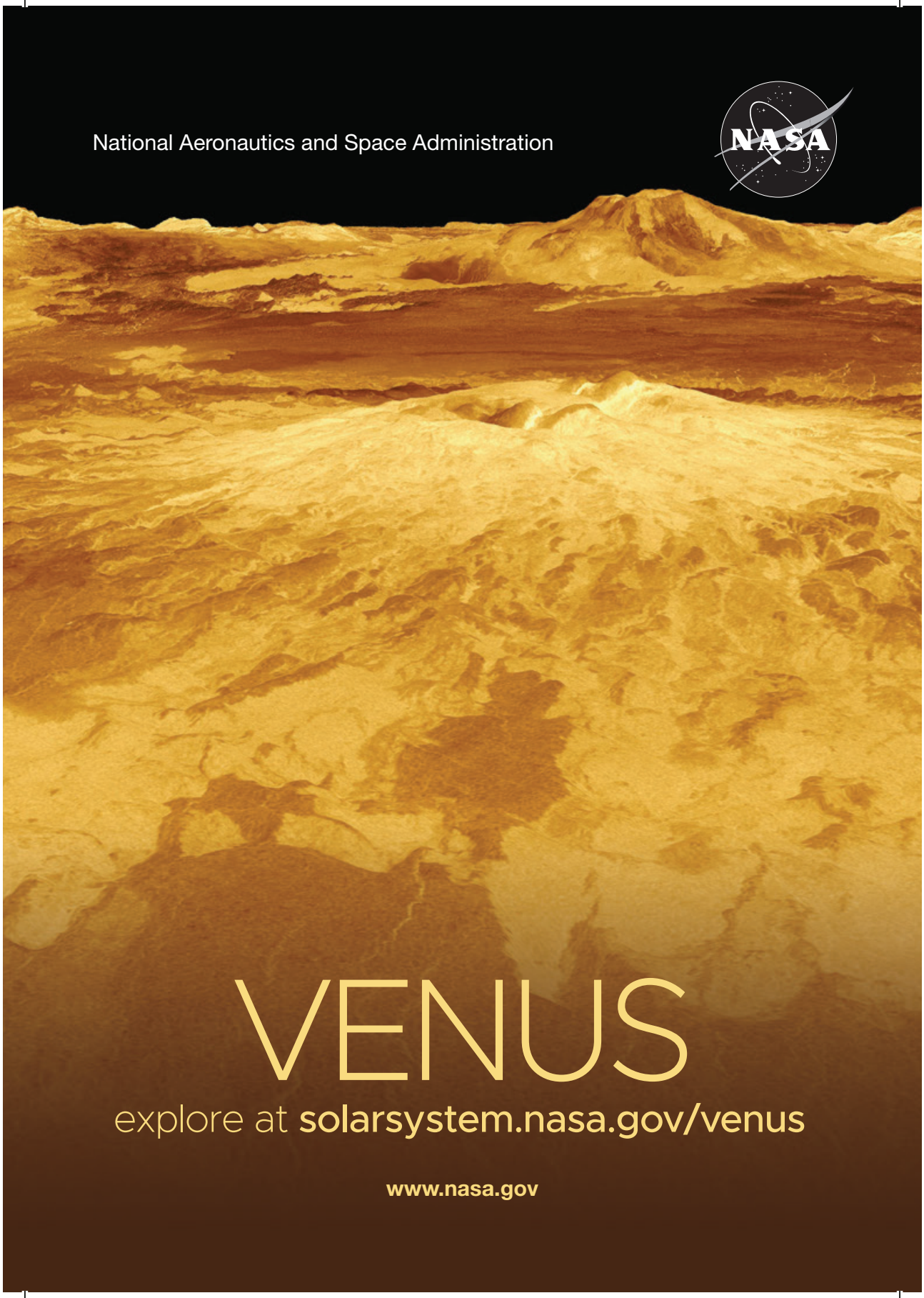
Uranus is 4x larger than Earth

NASA EXPLORES

URANUS

explore at **solarsystem.nasa.gov/uranus**

National Aeronautics and Space Administration

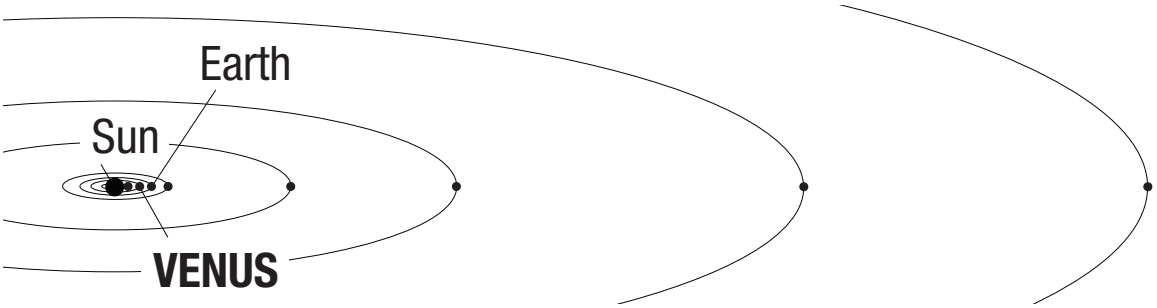


VENUS

explore at **solarsystem.nasa.gov/venus**

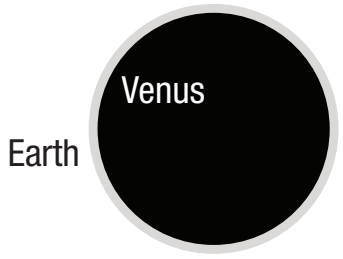
www.nasa.gov

On the front: A computer-generated, 3D view of Venus, using radar data from NASA's Magellan mission.



Venus orbits closer to the Sun than Earth, which would tend to make it warmer there anyway, but the planet's dense carbon dioxide atmosphere is the main factor in creating its extreme heat.

Venus is our closest planetary neighbor. Its thick atmosphere traps heat in a runaway greenhouse effect, making it the hottest planet in our solar system. Glimpses below the clouds reveal volcanoes and deformed mountains.

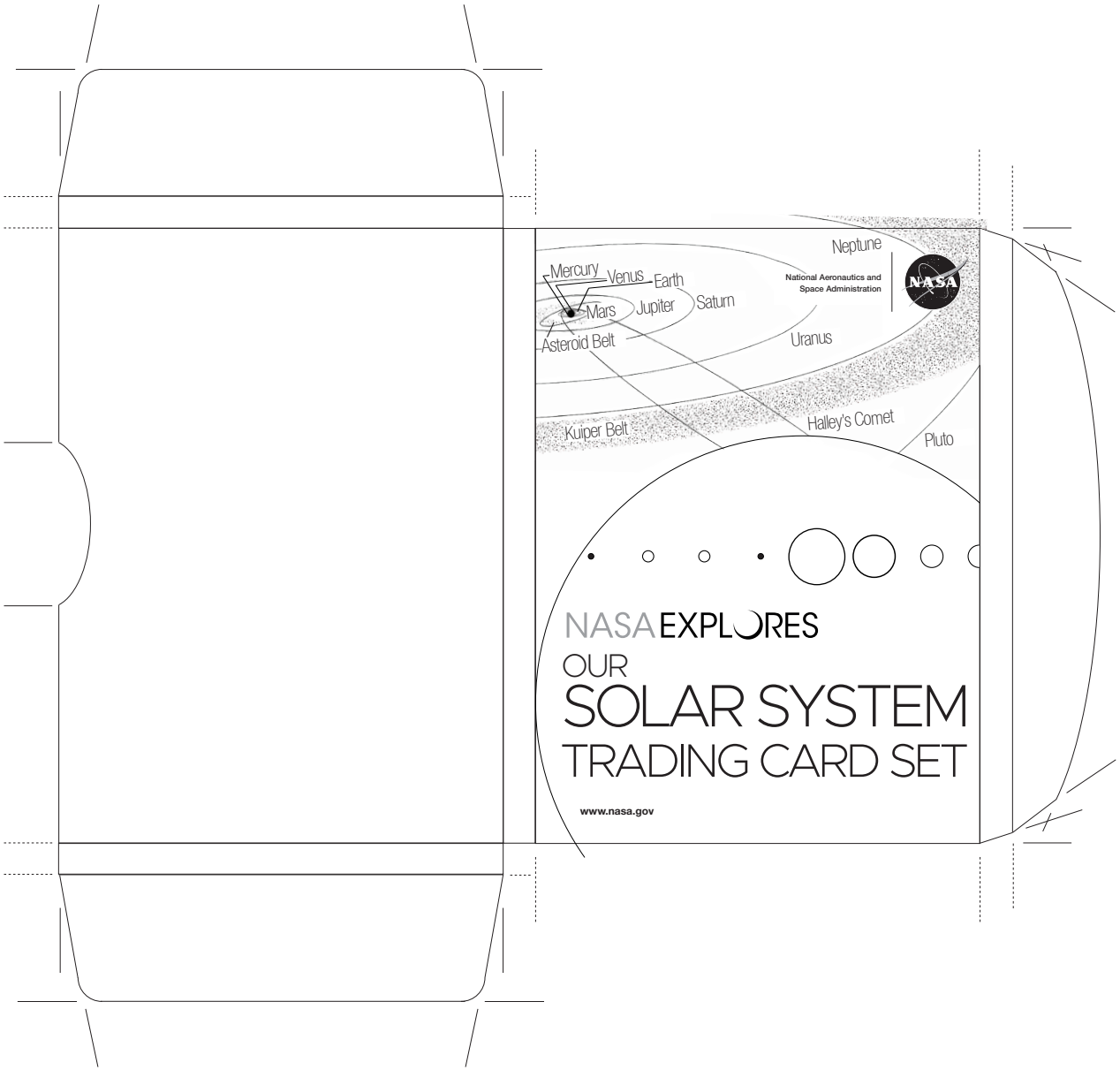


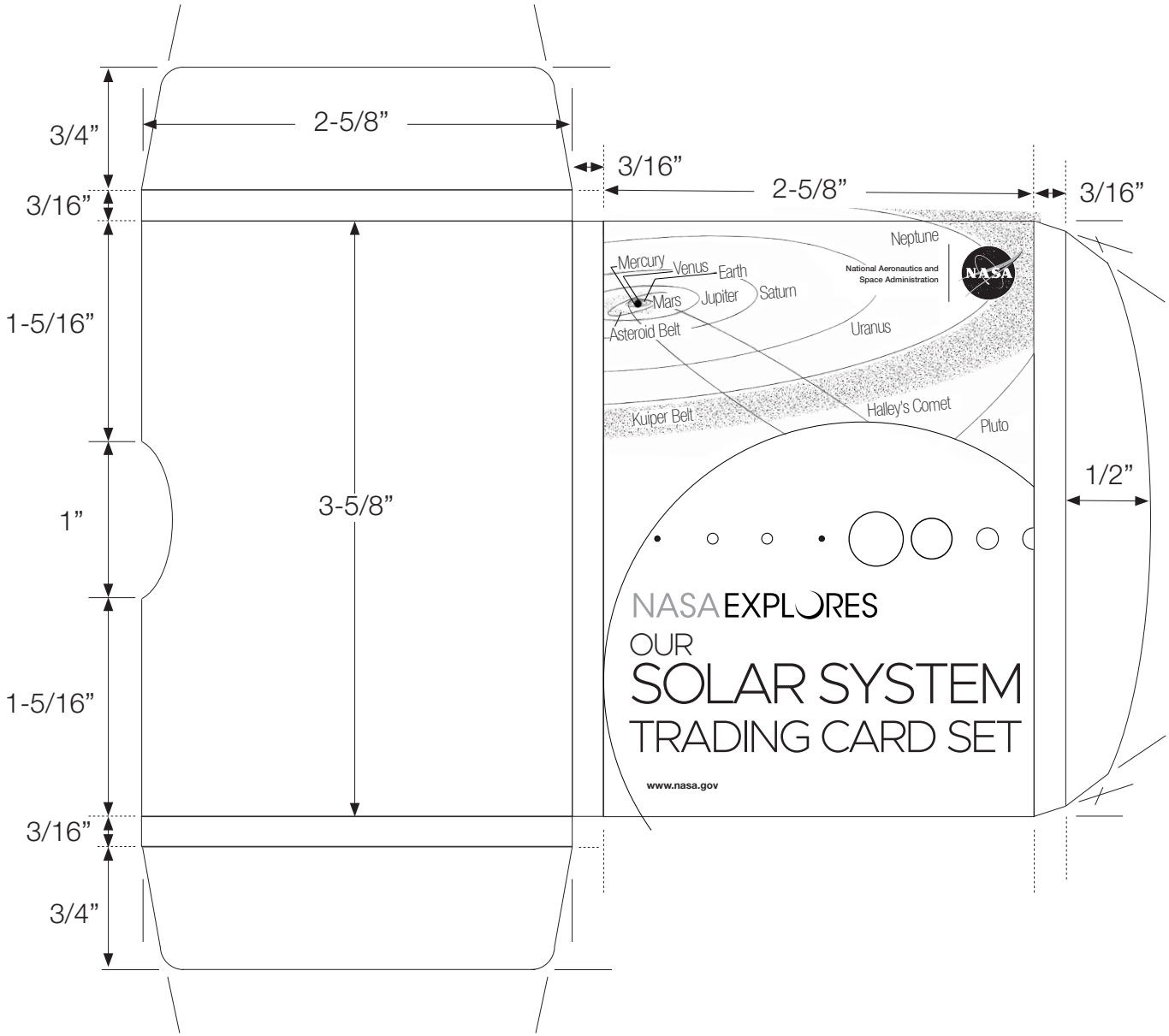
Venus is 0.95x (or 95%) the size of Earth

NASA EXPLORES

VENUS

explore at **solarsystem.nasa.gov/venus**


Neptune
Mercury
Venus
Earth
Mars
Jupiter
Saturn
Asteroid Belt
Uranus
Kuiper Belt
Halley's Comet
Pluto
National Aeronautics and Space Administration
NASA
NASA EXPLORES
OUR
SOLAR SYSTEM
TRADING CARD SET
www.nasa.gov


3/4”
2-5/8”
3/16”
3/16”
2-5/8”
3/16”
1-5/16”
3-5/8”
1”
1-5/16”
3/16”
3/4”
Neptune
Mercury
Venus
Earth
Mars
Jupiter
Saturn
Asteroid Belt
Uranus
Kuiper Belt
Halley's Comet
Pluto
National Aeronautics and Space Administration
NASA
1/2”
NASA EXPLORES
OUR
SOLAR SYSTEM
TRADING CARD SET
www.nasa.gov