

Exploring Space

by John Perritano

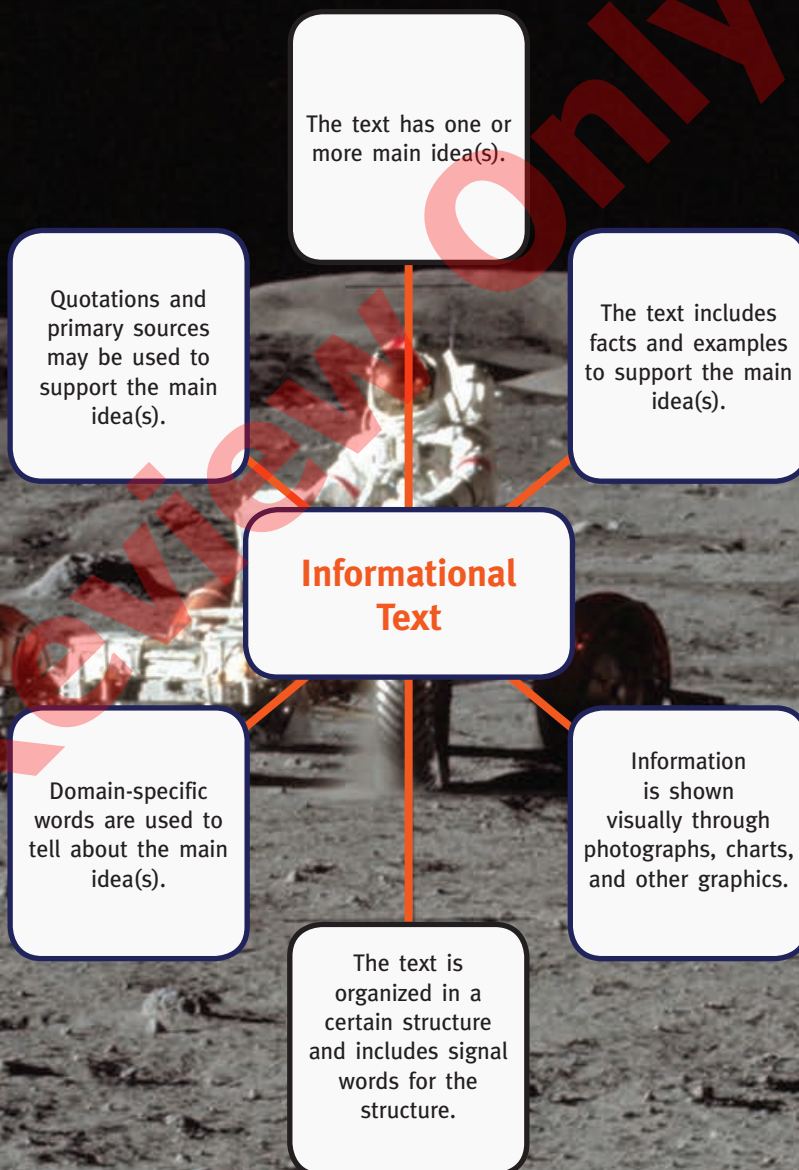


How does NASA change people's understanding of Earth and the universe?

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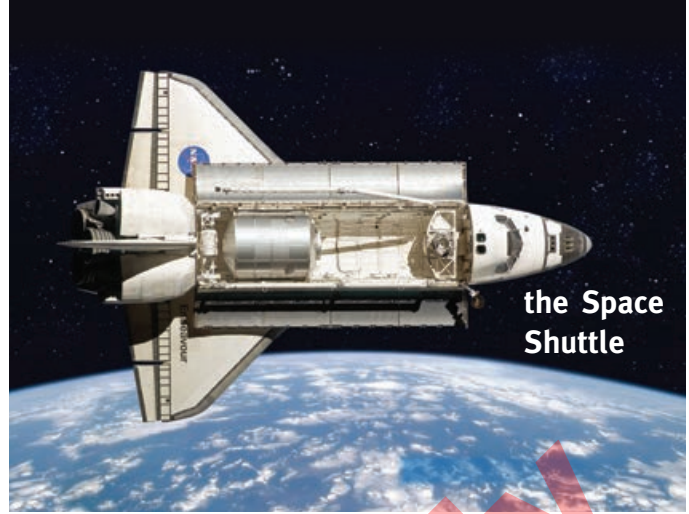
Going the Distance

Throughout human history, people have been in awe of the stars and the planets. Yet for the longest time, traveling to space was something that existed only in the human imagination.

In 1926, Robert Goddard changed all that. Considered the “father of modern rockets,” Goddard built the first liquid-fuel rocket. After that invention, space travel seemed a little more within reach.

One of NASA's goals is to send astronauts to Mars by the 2030s.



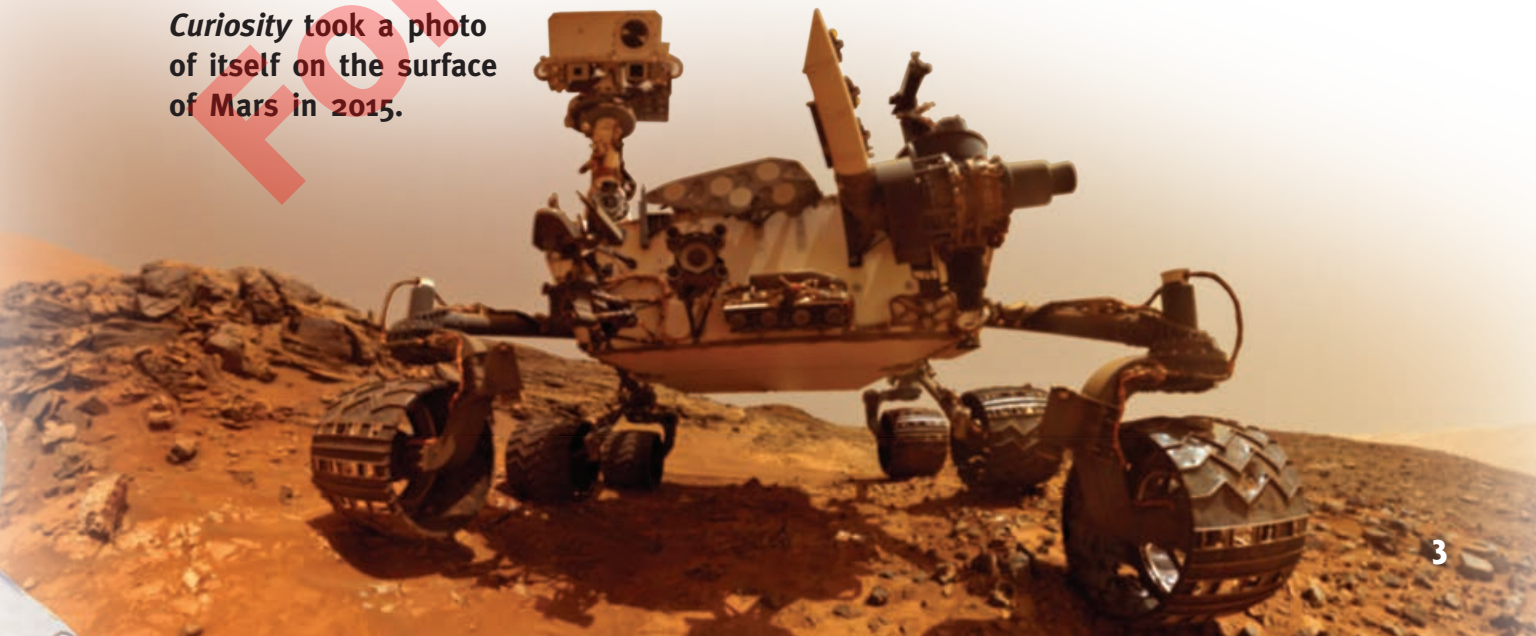


- ▲ Robert Goddard's first rocket briefly reached a height of about 12 meters (41 feet) on March 16, 1926.

Just a few decades later, humans were traveling to space and walking on the moon. This was due in large part to the National Aeronautics and Space Administration (NASA). This agency was started by the United States government in 1958 with the mission of studying and understanding outer space with the hopes of making life on Earth better.

NASA also aimed to develop space technology and created tens of thousands of jobs in various industries, including **aerospace**, climate studies, and medicine. The work done by NASA has led to advancements in robotics and solar technology. In addition, NASA has given people a better understanding of how the universe works.

- A vehicle named *Curiosity* took a photo of itself on the surface of Mars in 2015.



The Race to Space

Sputnik was the first human-made satellite to orbit Earth.



On October 4, 1957, *Sputnik*, the world's first artificial satellite, was launched into space by the former **Soviet Union**. A satellite is an object that **orbits** a moon or a planet. *Sputnik* was the size of a beach ball, weighed only 83.6 kilograms (184 pounds), and beeped as it orbited Earth. Its name came from a Russian word, meaning “fellow traveler.”

The people of Russia and the other Soviet republics celebrated the accomplishment. But the launch of *Sputnik* worried many people in the United States. At that time, the United States and the former Soviet Union were rivals in the **Cold War**. People feared that if the Soviets could launch a satellite into outer space, they could also launch a missile against the United States.

The Race Begins

The launch of *Sputnik* started a race to space between the United States and the Soviet Union. Each country set out to achieve more than the other country. On January 31, 1958, the United States launched its own satellite—*Explorer 1*. The machine carried scientific instruments into Earth's orbit. Yet more needed to be done if the United States was going to achieve dominance in the field of space travel and space exploration.

So, in 1958, President Dwight D. Eisenhower started NASA. Six days later, NASA announced Project Mercury, a mission to send the first team of humans into space.

The first seven astronauts were chosen for the program. Thousands of people worked in research laboratories to make the mission possible.



▲ Known as the Mercury 7, the United States' first astronauts became well known.

Meanwhile, the Soviets continued to make significant achievements in the space race. They launched several other *Sputniks* (including *Korabl-Sputnik 2* in 1957, which safely launched and returned two dogs from space). And in 1959, the Soviets crash-landed *Luna 2*, an unpiloted spacecraft, onto the moon's surface. It was the first human-made object to reach the moon.

On April 12, 1961, the news was even more startling. The Soviets announced that they had placed the first human being in orbit around Earth. His name was Yuri Gagarin.

Gagarin blasted off at 6:07 a.m. from a space base in central Asia. Traveling at 27,400 kilometers per hour (17,025 miles per hour), Gagarin made one complete orbit around Earth.

Yuri Gagarin's flight lasted 108 minutes.



Biography

Wernher von Braun

Wernher von Braun was one of the top U.S. scientists at NASA. Von Braun was always interested in space travel. As a boy, he read science fiction books written by H. G. Wells, Jules Verne, and others. During World War II (1939–1945), von Braun developed rockets for the German military. When the war ended, von Braun and many other scientists came to the United States. Von Braun then went to work building some of the most powerful rockets the world had ever seen.

Wernher von Braun became the director of NASA's Marshall Space Flight Center in Huntsville, Alabama. ▶



NASA's Reaction

Officials at NASA listened to the news with great concern. The agency responded by shifting the Mercury program into high gear. Scientists, including Wernher von Braun, doubled their efforts to build a spaceship that could carry U.S. astronauts into orbit.

NASA researchers worked alongside scientists, engineers, mathematicians, and other experts from dozens of private companies and colleges. They used computers and cutting-edge technology to build things that most people had never imagined before.

Major Space Missions

The Mercury 7 astronauts were all military pilots or veterans. But their expertise would not prepare them for the challenges of space travel. As a result, they all underwent hundreds of hours of testing and training.

One important test involved sitting in a **centrifuge** as it spun, twisted, and flipped at high speeds. The machine pushed astronauts' bodies and minds to their limits. The test was designed to see how high **gravity** affected the astronauts. NASA needed to know if the astronauts could stay alert and handle controls while speeding through space.

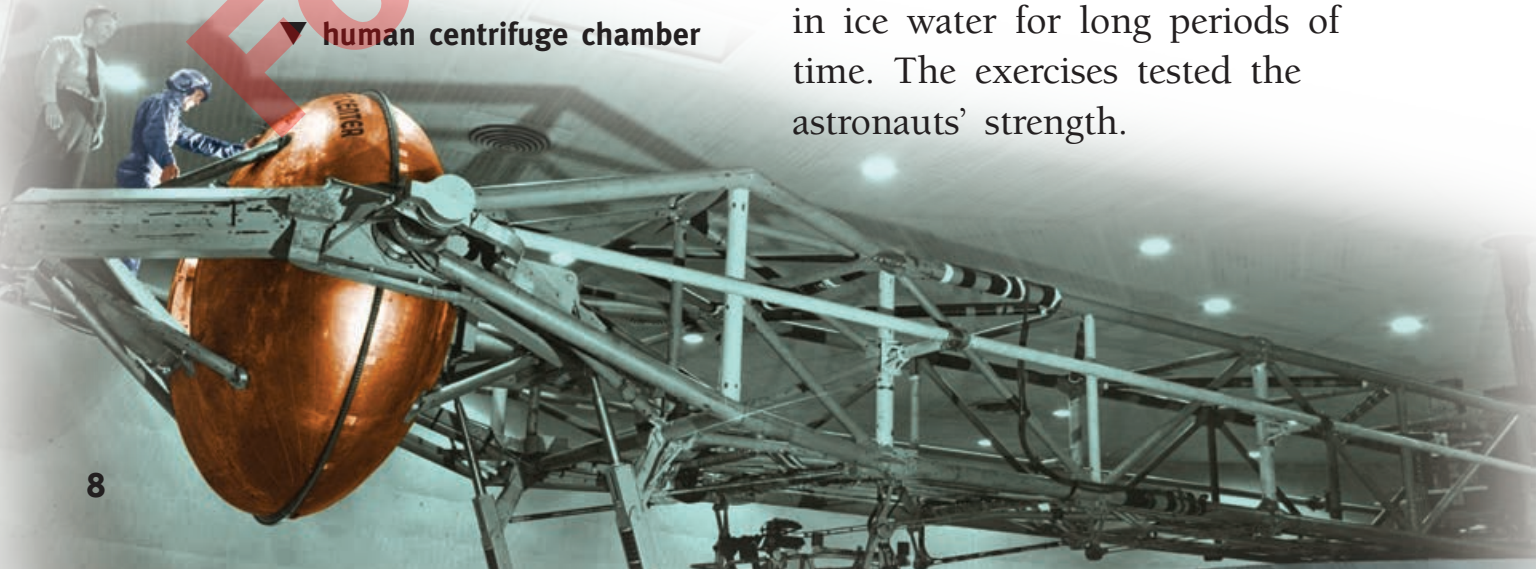


▲ All the Mercury astronauts trained in a centrifuge to see how gravity affected them.

The astronauts were also subjected to zero-gravity training. They were flown on a plane with a flight path similar to a roller coaster. The up-down motion created seconds of weightlessness, which gave them the chance to practice performing tasks in conditions similar to those in space.

In other tests, astronauts were asked to blow up balloons until exhausted and sit with their feet in ice water for long periods of time. The exercises tested the astronauts' strength.

▼ human centrifuge chamber

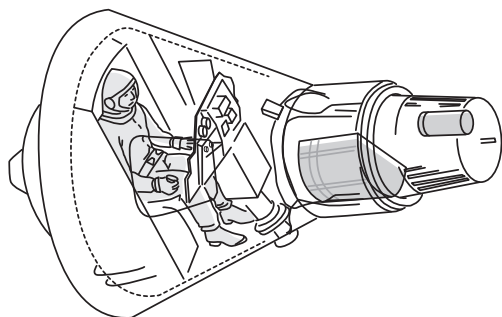


Project Mercury

Building a rocket was not an easy job. Some early rockets failed, but luckily no astronauts were on board. Finally, NASA settled on two rockets. One was the Redstone. It would be used for short flights. The second rocket was the Atlas. NASA used this one to take an astronaut into orbit.

NASA designed a cone-shaped capsule to sit atop these rockets to carry the astronauts. The heat shield was an important part of the Mercury capsule. Bolted to the bottom of the capsule, it was the heat shield's job to protect the capsule from the nearly 1,649 degrees Celsius (3,000 degrees Fahrenheit) temperature while reentering Earth's atmosphere.

- ▼ **The Mercury capsule had room for one astronaut, and it had an escape system.**



THE MERCURY SPACE CAPSULE



Escape System —
Could blast the capsule away from the main rocket in an emergency

Recovery Compartment —
Contained parachutes that slowed the capsule as it splashed down

Crew Compartment —
Where the astronaut sat

Heat Shield —
Protected against the heat of reentry

Retropack —
Slowed the spacecraft when it reentered Earth's atmosphere

