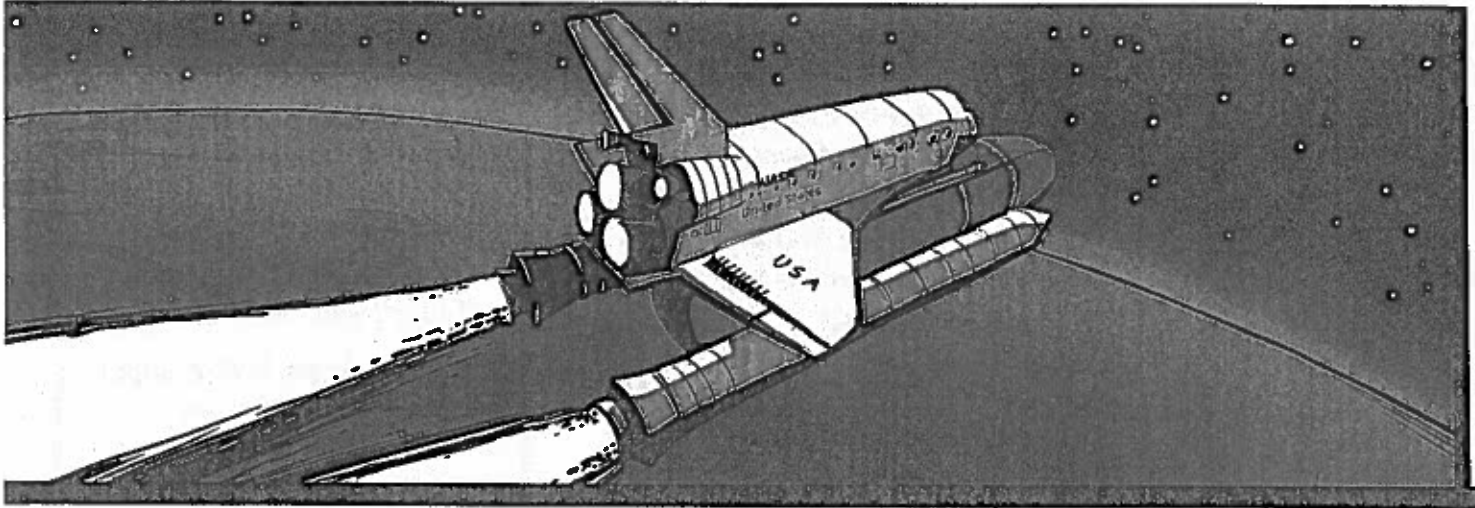




# THE END OF THE SHUTTLE ERA



An adventure in space travel is about to end. Before the summer is over, the National Aeronautics and Space Administration (NASA) will launch its last Space Shuttle flight into orbit.

The three Space Shuttles – Discovery, Atlantis and Endeavour – will each make one more trip. They’ll head for the International Space Station (ISS) to deliver tools and spare parts, and to attach a new storeroom. Then, they will be retired.

“It’s the end of an era,” says Roger Launis, a space historian.

## THE SHUTTLE PROGRAM

The Space Shuttle is the world’s first reusable spacecraft. It’s also the first spacecraft in history to carry large loads – up to 30,000 kilograms.

The shuttle launches like a rocket. It takes about 8.5 minutes to accelerate to a speed of 27,000 kilometres per hour. Once in Earth’s orbit, it moves about like a spacecraft. Returning to Earth, it lands like an airplane.

The Space Shuttle program is 30 years old. The first Space Shuttle, Columbia, blasted off from the Kennedy Space Centre in Florida on April 12, 1981. During a two-day test flight, it orbited the Earth 36 times, then landed at Edwards Air Force Base in California.

Challenger joined the fleet in 1982. Discovery was added in 1983. Next was Atlantis in 1985, and finally Endeavour in 1991.

## SUCCESSSES

All together, the craft have gone on more than 130 missions – and

## THE INTERNATIONAL SPACE STATION

The ISS is an orbiting science lab about 350 kilometres above the Earth. Travelling at over 28,000 kilometres per hour, it circles our planet every 90 minutes.

Five space agencies representing 15 countries, including Canada, began building the \$100-billion Space Station in 1998. The lab is being put together piece by piece, like a massive Lego toy. Construction will be completed this year. When it is finished, it will be slightly larger than a football field.

The ISS has space for six labs. Scientists hope that experiments in these labs will lead to breakthroughs in medicine and other fields. They also expect the Space Station to be a stepping stone for future space exploration.

## DEFINITIONS

**ERA:** a historical period with a particular character or feature

**NASA:** an independent U.S. agency, responsible for space-flight, created in 1958



accomplished a great deal. They have lifted satellites into orbit. They have launched and repaired the **Hubble Space Telescope**. And they have played a key role in building and supplying the ISS.

Technology developed for the shuttles has later been used elsewhere. One example is the ultrasound scanner, widely used in medicine. It uses sound waves to create pictures of the inside of the human body. Another medical invention is a tiny, pill-sized monitor that can 'see' what is going on inside someone. Voice-controlled wheelchairs and scratch-resistant lenses – even helmets that protect us from concussions – are other examples.

**DID YOU KNOW...?**

In all, the Space Shuttle program has cost about \$174 billion (U.S.).

Shuttle missions have also carried out important research. In the **microgravity** environment, scientists have studied the behaviour of crystals, microbes, plants and animals. They have analyzed the effects of space travel on people.

Some missions have probed the secrets of far-off galaxies. Others have zeroed in on the mysteries of the Earth. One used a type of radar to look below the surface of the planet. It discovered ancient riverbeds beneath the Sahara Desert.

**CRITICISM AND TRAGEDY**

Yet the Space Shuttle fleet has also fallen short. At first, NASA thought it could be used for scheduled flights to and from space, almost like a regular airline.

"It was supposed to be routine, safe and affordable, in addition to being highly capable. But it was never routine, [and] it was very expensive," said John Logsdon, a space policy expert.

The shuttles were also meant to take astronauts to the moon and beyond. They didn't.

But the program's biggest setback was the loss of two shuttles. On January 28, 1986, Challenger exploded just 73 seconds after launch, killing all seven astronauts. And on February 1, 2003, Columbia and its seven-member crew died in another explosion during the shuttle's descent to Earth.

**WHAT'S NEXT?**

What happens after the shuttles are grounded? For the first few years, Russian Soyuz spacecraft and international unmanned cargo vessels will deliver crew and supplies to the ISS.

By 2017 or sooner, NASA hopes to have built replacement craft for the shuttle. If not, the agency will hire commercially built spacecraft to transport astronauts and supplies to and from the Space Station.

Already, SpaceX – an American space transport company – has a contract with NASA to transport cargo to the International Space Station.

**PLENTY TO BE PROUD OF**

Despite these shortfalls, however, supporters say that the program has been worthwhile. In fact, some argue that the Space Shuttle is one of mankind's greatest successes.

"The assembly of the Space Station could not have been done without the Space Shuttle," said shuttle program manager John Shannon. "And the assembly of the Space Station is one of the great engineering achievements of mankind." ★

**DEFINITIONS**

**HUBBLE SPACE TELESCOPE:** a NASA-built telescope launched into orbit around the Earth in 1990 to provide

information about the universe

**MICROGRAVITY:** very weak gravity



**ON THE LINES**

Answer the following in complete sentences:

1. What does NASA stand for?

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2. How many Space Shuttles did NASA build?

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3. How is a Space Shuttle different from a conventional rocket?

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4. When was the first Space Shuttle launched?

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5. Describe what happened to the Columbia and Challenger Space Shuttles.

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6. How many more Space Shuttle missions are scheduled?

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7. What is the ISS?

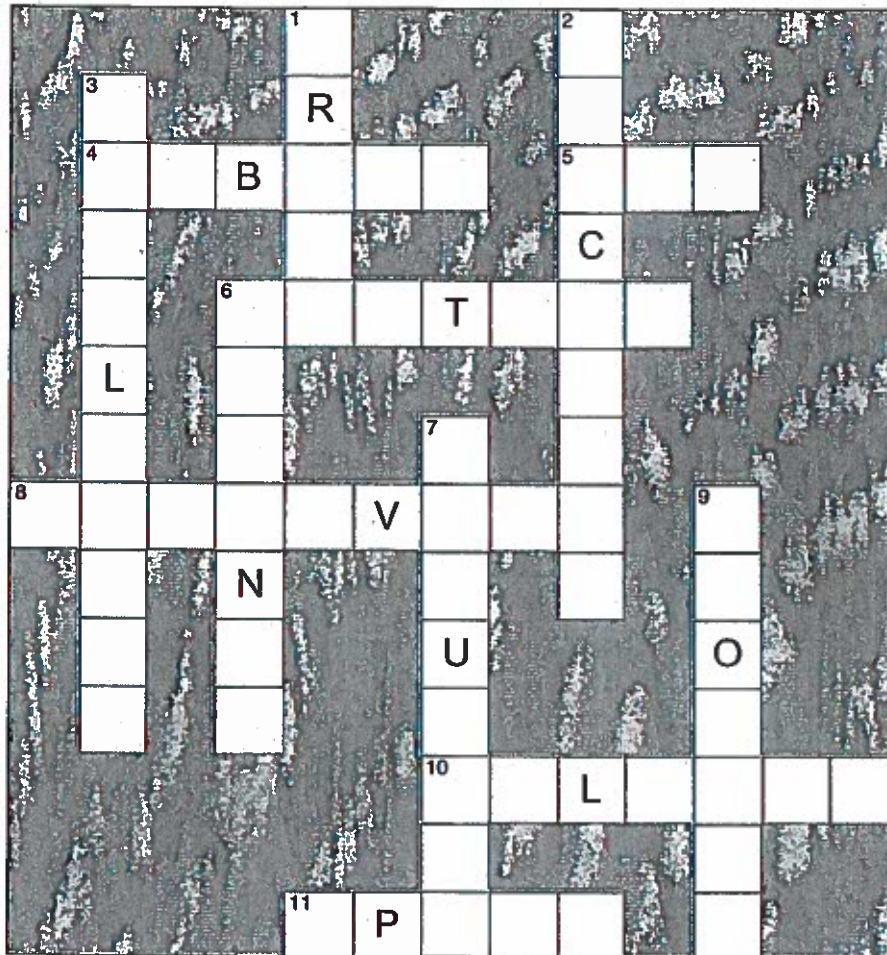
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8. How did the Space Shuttles help in creating the ISS?

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### ACROSS

- 4. space telescope
- 5. number of labs on the ISS
- 6. ISS = International Space \_\_\_\_\_
- 8. the last Space Shuttle that was added in 1991
- 10. the Space Shuttle program has cost \$174 \_\_\_\_\_
- 11. NASA = National Aeronautics and \_\_\_\_\_ Administration

### DOWN

- 1. the path of an object moving around a larger object in space
- 2. Space Shuttle that was added in 1983
- 3. Space Shuttle that exploded after take off
- 6. the ISS is an orbiting \_\_\_\_\_ lab
- 7. first space shuttle
- 9. Kennedy Space Center is located in this state