Stories of Words: Flight

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Learning About Words

It's a bird! It's a plane! It's Superman!

We admire superheroes for many reasons. They lift cars. They climb up the sides of buildings. They save humans from raging floods. However, there's one special quality many superheroes have that humans, of course, do not. They fly!

Since the earliest times, people have looked up to the stars and wanted to travel there. They saw birds flying and tried to build machines that would help them fly, too. Legends tell of people who used wax wings or kites to attempt to fly. These attempts, of course, did not end well.

Over hundreds of years, people built kites and boomerangs that were inspired by how birds glide through the sky. Only in the last few hundred years, though, did people have the technical skills needed to build flying machines. Both airplanes and rockets were invented in just the last 100 years. These machines allowed people, finally, to fly.

At first, the machines only flew very short distances. But as their skills improved, people built airplanes that could fly across the country, then across the world. Then, they built spaceships that flew to the moon.

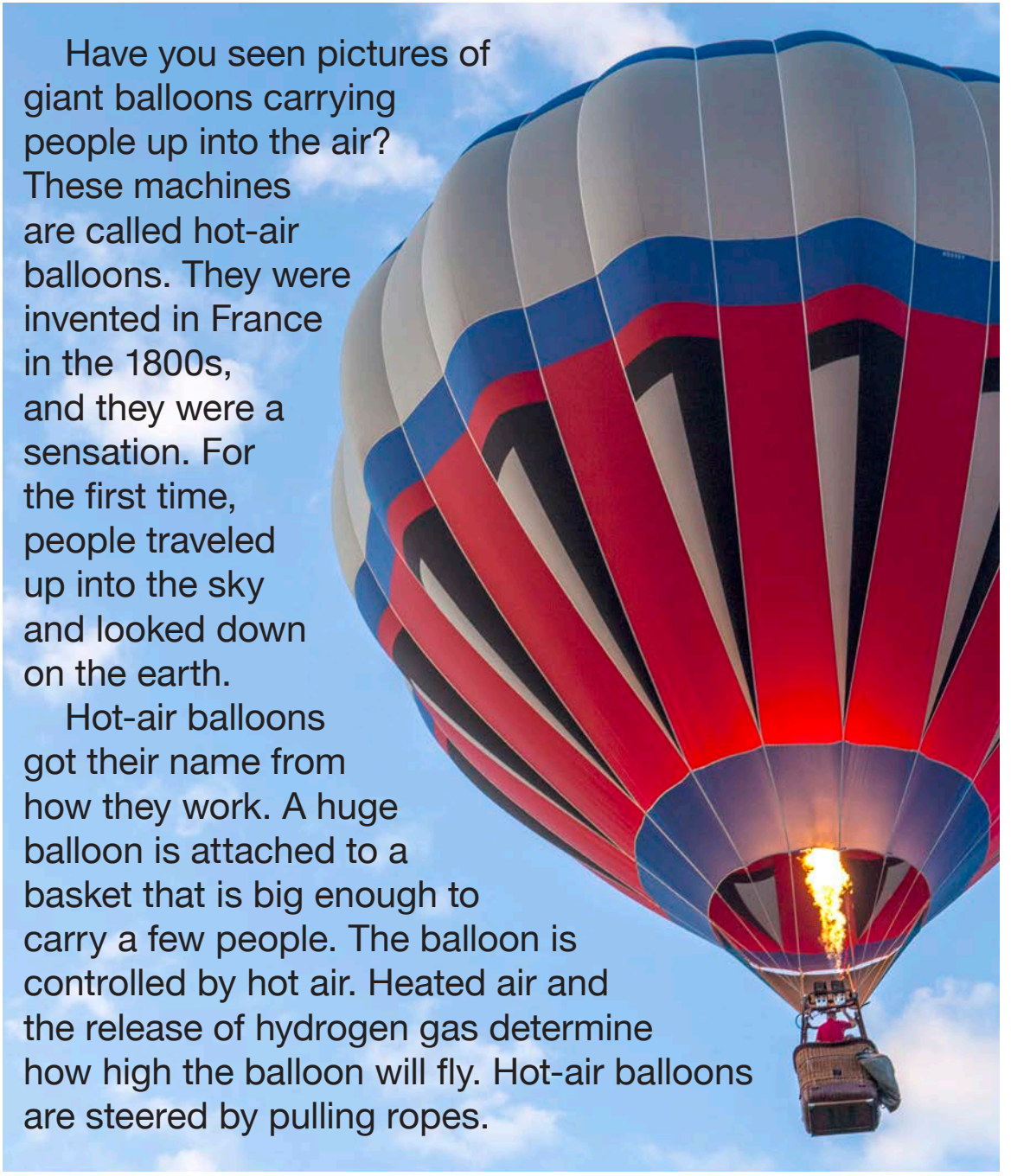
Once flying machines became real, new words were needed to describe them. The word *aircraft* was first used in the mid-1800s to describe airships and balloons, which were the only flying machines at that time. Today, *aircraft* is used as a general word to refer to machines and other devices that can fly.

The word *aircraft* has two smaller words inside it: *air* and *craft.* As you know, *air* refers to the gases around us. *Craft* was used in the late 1600s to refer to boats. In this way, two existing words were put together to make a new word that described the new flying machines.

The word *airplane* was first used in the early 1900s, when these flying machines were invented. Like *aircraft, airplane* has two smaller words inside it: *air* and *plane. Air* you know, but *plane* is from a French word from the early 1400s that meant "to soar or glide on wings." Later, people used the word to describe the way birds glide, with flattened wings. Like *aircraft,* people combined two existing words to make a new word.

You can also see two words inside two other common words used to describe flying machines: *spacecraft* and *spaceship.* These words mean the same thing, *spaceship* was invented earlier than *spacecraft,* when it was used in science-fiction stories. *Space* was first used in the early 1300s to describe an area, or a room. In the 1700s, it was used to describe the area of the sky that is outside Earth's atmosphere. So, again, two older words were joined to form new words that described new things.

1 FLOATING ABOVE THE EARTH



Have you seen pictures of giant balloons carrying people up into the air? These machines are called hot-air balloons. They were invented in France in the 1800s, and they were a sensation. For the first time, people traveled up into the sky and looked down on the earth.

Hot-air balloons got their name from how they work. A huge balloon is attached to a basket that is big enough to carry a few people. The balloon is controlled by hot air. Heated air and the release of hydrogen gas determine how high the balloon will fly. Hot-air balloons are steered by pulling ropes.

Airships are similar to hot-air balloons, in that they have a large balloon-like structure that is filled with gas. The gas is lighter than air, which allows the machine to fly. Unlike hot-air balloons, airships have a gondola, or compartment, that can carry people, cargo, and landing gear. It is attached underneath the airship.

Airships also have engines that allow them to be steered more accurately. Another word for airships is *dirigibles.* This word comes from the French word *diriger,* which means "to steer." An airship's ability to steer is more advanced than a hot-air balloon's.

Blimps are another kind of airship. It's unclear how blimps got their name. Some people believe that the name came from the sound made when a finger flicked the outside of the blimp. Others believe the name may be connected to words like *limp, blob,* and *lump* because of the way blimps look when they fly.

You might have seen a blimp at a sporting event, where they often fly over stadiums. Sometimes they have cameras that film the game. Sometimes they have advertising on their sides.

Another type of airship is called a zeppelin. Zeppelins have stronger structures than blimps, and they are usually larger. Zeppelins were named after Count Ferdinand von Zeppelin, a German solider, who designed and built them. They are not used today because they can be dangerous. The gases used inside a zeppelin can explode, as they did in one air disaster that happened in New Jersey in 1937.

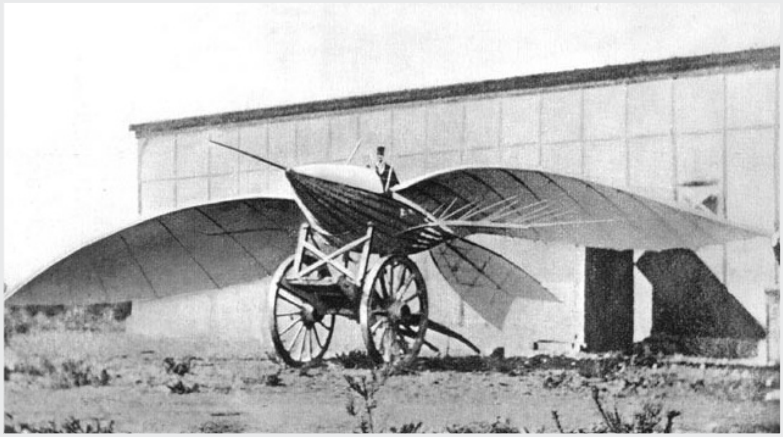
2 IT'S A BIRD!

You've just read about airships, which are shaped somewhat like balloons. They are powered by hot air and gas that is lighter than air. In contrast, airplanes have wings and a flat shape. They are powered by jet engines or propellers.

Planes are designed to be aerodynamic, which means they were built to move smoothly through the air. The parts of an airplane work together to make this happen. In many cases, planes were modeled after birds.

The body of an airplane is called the fuselage. The fuselage is where the crew, passengers, and cargo are held. This term comes from the French word *fuselé,* which refers to a rounded rod with tapered ends. The shape of the fuselage is similar to the shape of a bird's body.

A plane's wings and tail are modeled after a bird, too. These structures are attached to the fuselage, just as a bird's wings and tail are attached to its body. The wings of a plane function like the wings of a bird, helping to lift the plane into the air. The tail of a plane also works like a bird's tail. It helps to stabilize the plane, or keep it flying evenly.



The landing gear can be thought of as an airplane's legs, which support its body when it's on the ground. Different types of airplanes have different types of landing gear, depending on whether they land on land or on water. Land airplanes have wheels that extend underneath the fuselage. Planes that land on water, called sea planes, may have pontoons. The word *pontoon* means "flat-bottomed boat" in Latin. Pontoons are large flat-bottomed structures that help planes float.

Like birds, all parts of a plane are designed to be aerodynamic, providing a smooth, safe ride. Because planes can't flap their wings to take off, though, they need structures that birds do not. One of these is an engine.

Engines lift planes off the ground. Today, two types of engines are most commonly used: piston-driven engines, which are similar to those that power cars, and jet engines, which are most commonly used by commercial airlines and the military.

Some planes also use propellers. Airplane propellers are rotating blades that help move an airplane forward. The word *propel* actually means "to move forward or onward." Propellers push planes forward by driving air behind them.

3 FROM GLIDERS TO JETS

How many kinds of planes have you seen? You might have seen small ones flying overhead that look like they seat only a few people. You might also have seen jumbo jets, which are just what their name says: jumbo!

One well-known kind of plane is the biplane. The *bi-* in *biplane* means “two.” The name *biplane,* then, means “two wings.” One wing is attached to the top and one to the bottom of the fuselage. The first successful airplane was a biplane called the Wright Flyer. The Wright brothers used this plane to make the first flight, in Kitty Hawk, North Carolina, in 1903. You might have seen biplanes at an air show or in old movies.

The Wright brothers did not invent the biplane, but they did spend years perfecting the shape of the wings and the engine. Before the Wright Flyer was invented, planes were more like gliders. They did not use engines to fly. Early planes started from a high point and slowly drifted to the ground, like a paper airplane. By adding an engine, the Wright brothers made it possible to control the movement of planes in ways that aren’t possible with gliders. They also made it possible to keep the plane in the air longer.

Pilots flew biplanes for many years. Then newer technology made it possible for planes to have only one wing. When the wing was attached to the top of the fuselage, the plane was called a high-wing. When it was attached to the bottom of the fuselage, the plane was called a low-wing. In 1927, Charles Lindbergh made the first flight across the Atlantic Ocean in a high-wing plane called the Spirit of St. Louis.

Biplanes, high-wing planes, and low-wing planes are much smaller than today's airplanes. Both the Wright Flyer and the Spirit of St. Louis carried only one person: the pilot. These early planes used engines like the ones used in cars. To carry more people, planes had to be bigger. For planes to be bigger, engines had to be bigger, or new kinds of engines had to be invented.

A new kind of engine, the jet engine, was patented in 1930 by a British engineer named Frank Whittle. *Jet* comes from the French word for "stream of water." Originally, *jet* was used to describe how a squirt of water or air pushed an object forward. This is the way a jet engine works: It heats air very quickly and to a very high temperature. It then pushes this hot air out the back of the plane, moving the plane forward and allowing it to fly. The new engines meant that jet planes could travel very fast and carry more people and cargo.

4 TO THE MOON– AND BEYOND

Today, it's common for people to get into a plane and fly across the country, and even around the world. It's less common for people to get into a spacecraft and fly to the moon. However, people do travel into space.

The words *spacecraft, spaceship,* and *starship* are used interchangeably by most people to refer to a vehicle that can travel through space. However, astronauts and scientists most often use the word *spacecraft* to refer to space vehicles. The terms *spaceship* and *starship* are most often used in science fiction.

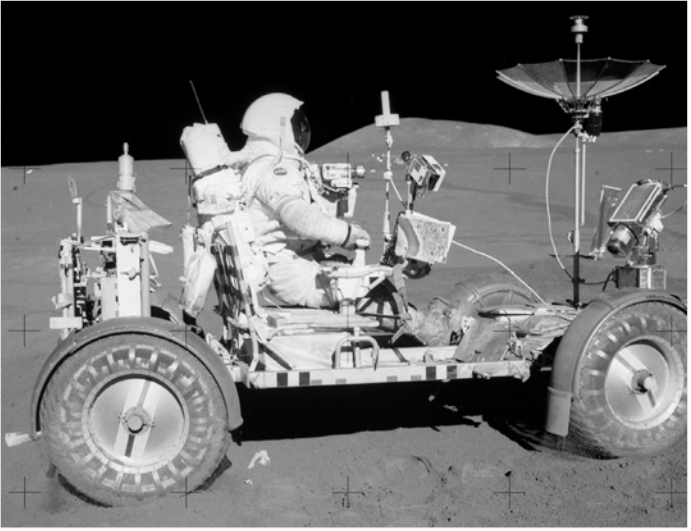
The word *rocket* is used to describe both a type of engine and a tall, thin vehicle. Today, rockets are space vehicles that are powered by engines. When they were first invented in China in the 1200s, though, rockets were weapons. A tube filled with gunpowder was strapped to an arrow, then launched into the air with a bow. These were also called "fire arrows." Rockets got their name from the Italian word *rocchetto,* meaning "a spindle," or a long rod that has a tapered end.

The first spacecraft were rockets that were designed to be used only once. They'd fly into space, then land in the ocean or on land. The rocket could not be used again.

Years later, space *shuttles* were invented. A shuttle is a machine that goes back and forth on a route. Like the shuttles that take people around town, a space shuttle can make many trips between Earth and locations in space. Between 1981 and 1985, the United States launched five space shuttles: Challenger, Columbia, Discovery, Endeavor, and Atlantis. In recent years, these vehicles are used most often to take people to a space station, then back to Earth.

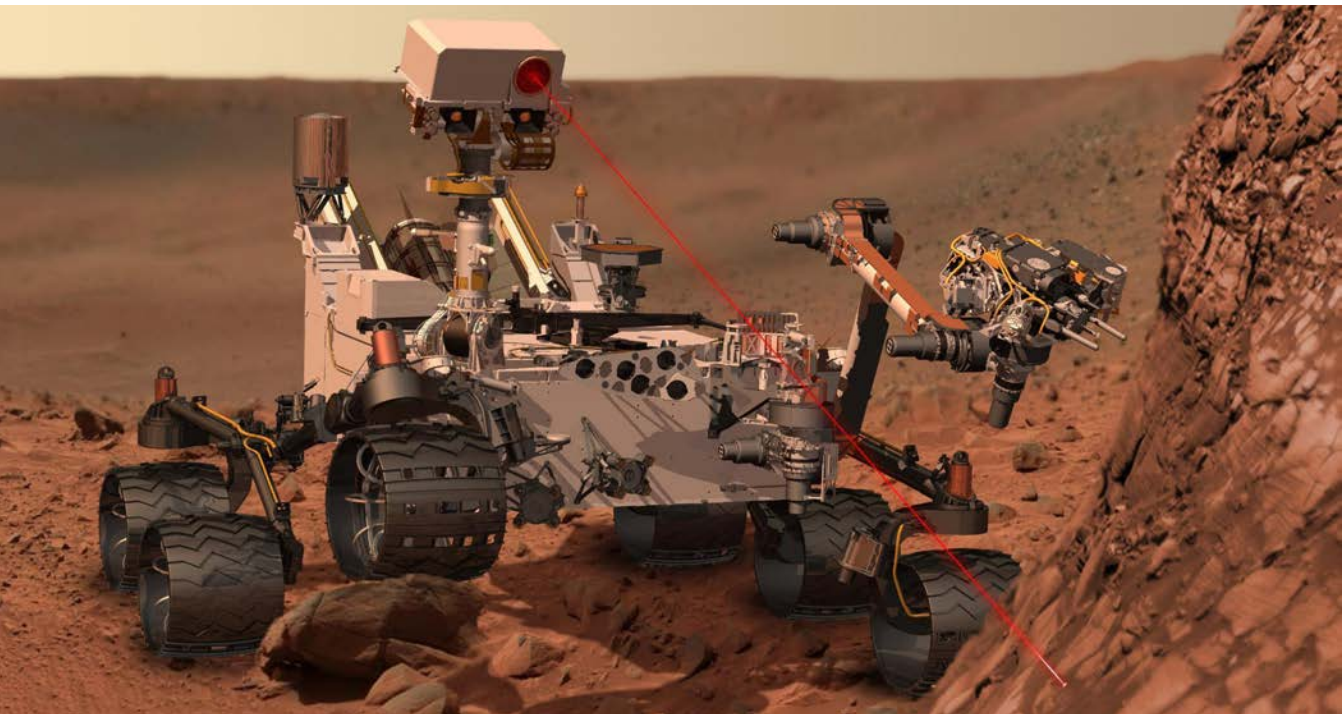
A space station is a type of spacecraft that is designed to move around the Earth on a fixed path, or orbit. They last for many years. Today, two space stations are in orbit around Earth: the International Space Station, which is operated by the United States, and Tiangong 1, which is operated by China. (*Tiangong* means "heavenly palace" in Chinese.)

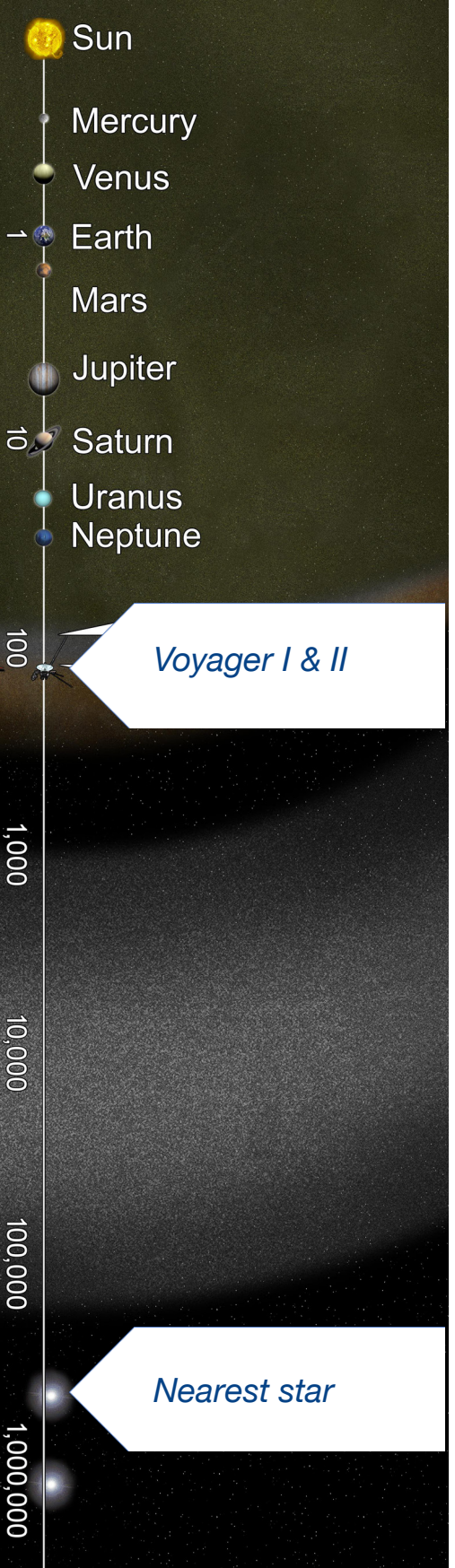
Astronauts conduct research on space stations, testing such things as how plants and even humans act in space. This research may be useful in the future, when people take longer flights.



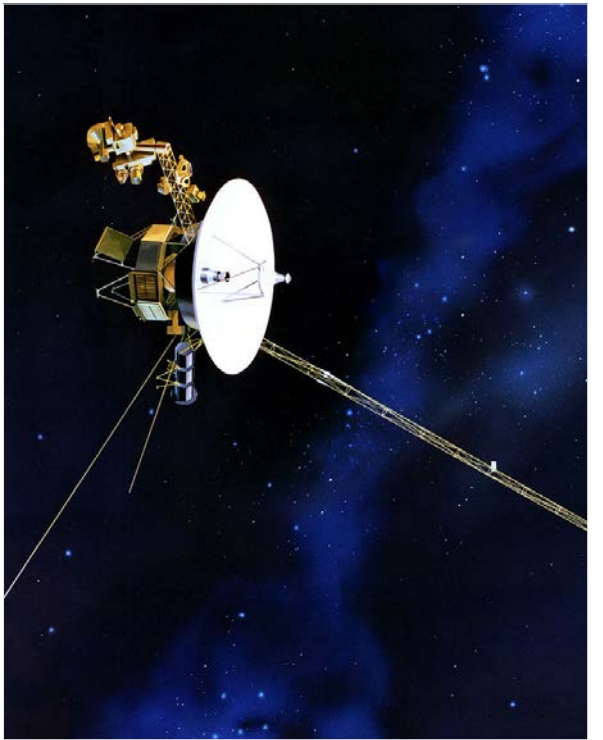
Rovers are another kind of space vehicle. The first rover was used on the moon during the Apollo 15 mission in 1971. The word *rover* means “someone or something that wanders about.” In space science, a rover is a vehicle that carries astronauts or science equipment and explores a planet or satellite.

In 2003, NASA sent two rovers to study the surface of Mars. They were named Spirit and Opportunity. Before the launch, NASA held a contest in which children were invited to name the rovers. The winning names were suggested by a third-grade girl named Sofi Collis, who was born in Russia, but now lives in Arizona.





Not all spacecraft land on moons or planets. Voyagers 1 and 2 were launched in 1977 to fly near Jupiter, Saturn, Uranus, and Neptune and send pictures home to scientists who study them. The name *Voyager* was chosen because these spacecraft are on a long journey, or voyage, to explore the universe. Their voyages are similar to explorations that were made on Earth centuries ago. The Voyagers are still flying today, way beyond the solar system. In fact, they are the most distant human-made objects in space.



5 PEOPLE WHO FLY

What would it be like to climb into a plane and take off into the sky? You could fly above the clouds and look down on Earth. Cities and even mountains would look tiny. You could even fly into space and watch the Earth turn.

It takes special training to fly. The people who fly aircraft are usually called pilots or captains. Since the 1500s, the word *pilot* has been used to describe a person who steers a ship. It comes from a Greek word that meant "an oar that steers a ship." Today, that ship is often an aircraft.

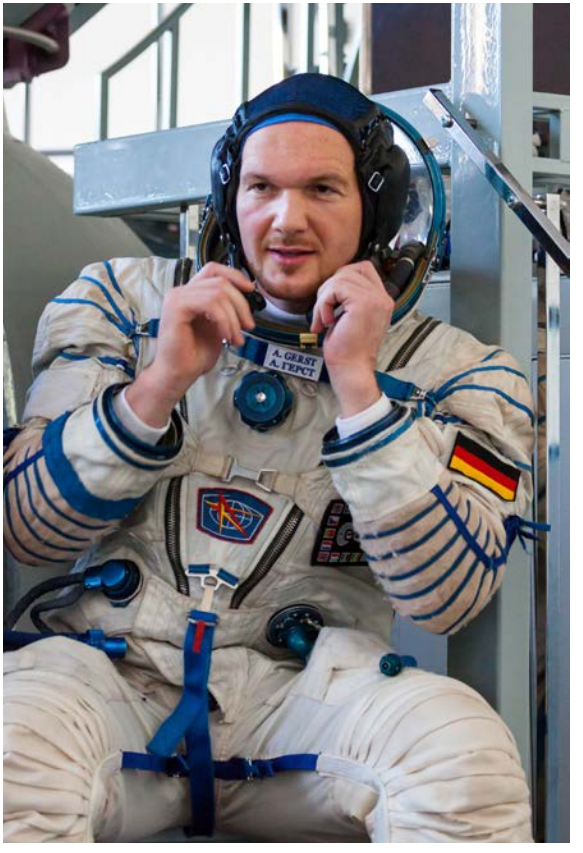
Captain comes from the Latin root *caput,* meaning "head" or "chief." In the late 1300s, anyone who was a leader was considered to be a captain. In the 1500s, the word was used to describe someone who commanded a warship. Later, the term *captain* was also used to describe someone who commands an airplane.

People who fly spacecraft are called astronauts by people speaking English. The word *astronaut* is composed of two words: *astro,* which means "star," and *naut,* which means "sailor." So, an astronaut is someone who "sails in the stars." *Astronaut* was first used in 1930 by science-fiction writer Neil R. Jones. It was probably inspired by the word *aeronaut,* which means "a person who flies hot-air balloons."

In 1961, a Russian named Yuri Gagarin became the first person to travel into space. Gagarin rode the Russian rocket Vostok 1 into orbit around the earth. In Russian, *Vostok* means "east." Scientists chose to use the word for *east* because it symbolizes the dawn, or the beginning of space exploration.

The Russians use the word *cosmonaut* instead of *astronaut* to describe their space travelers. The word *cosmonaut* comes from two Greek words: *cosmos,* which means "world" or "universe," and *naut,* which means "sailor."

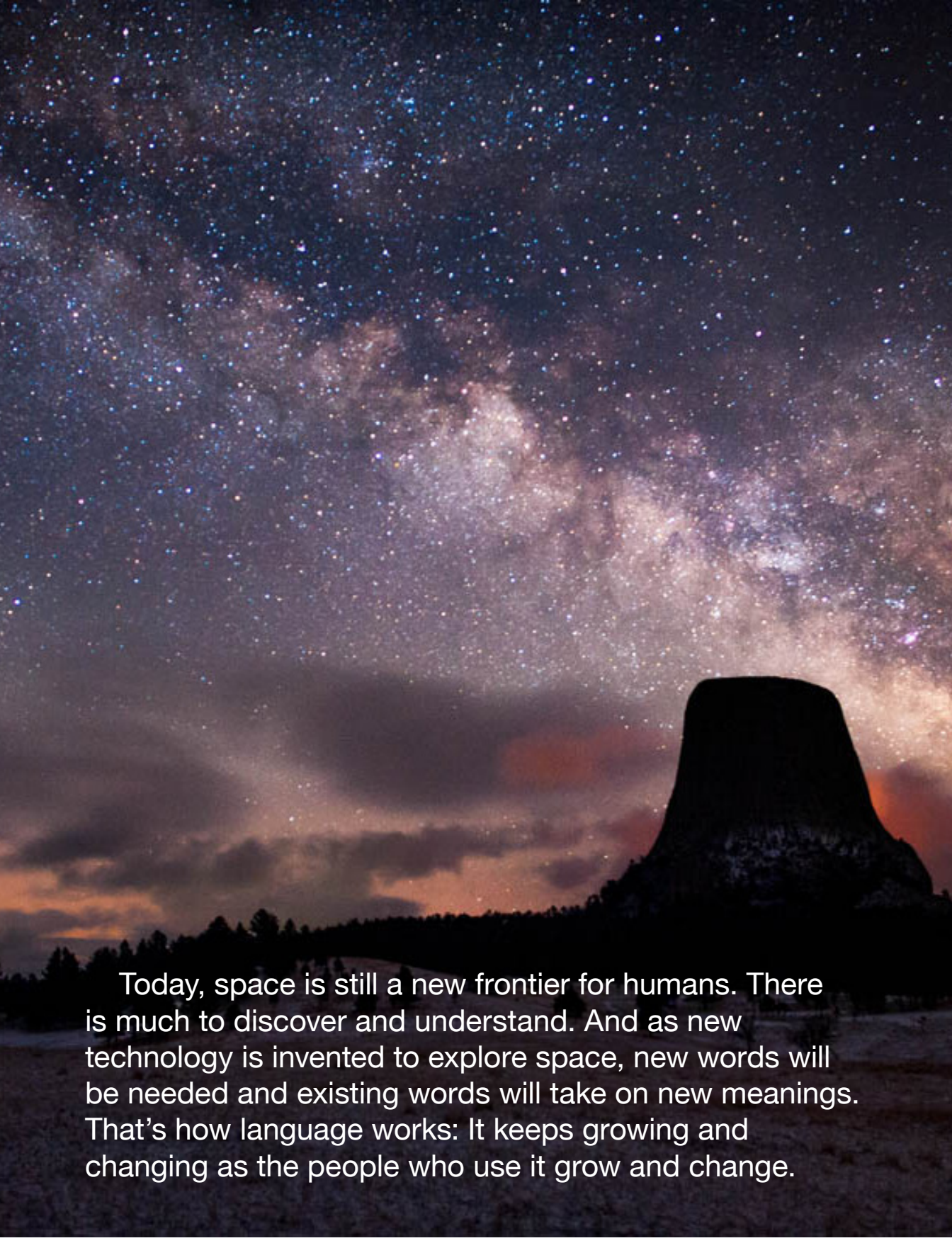
Today, people can fly across the world easily. Maybe someday, it will be as easy to fly to the stars!



Our Changing Language

To cavemen looking at the heavens or to people imagining life among the stars, a machine that could explore nearby planets was the stuff of dreams. When people first tried to fly, they studied birds. Then they invented kites. Later came aircraft and spacecraft.

Along the way, words like *captain* and *pilot* added meanings to fit the new technology. Some words also had to be created because existing words didn't fit the new technology. Words like *aerodynamic,* for example, weren't needed before it was possible to fly.



Today, space is still a new frontier for humans. There is much to discover and understand. And as new technology is invented to explore space, new words will be needed and existing words will take on new meanings. That's how language works: It keeps growing and changing as the people who use it grow and change.

Glossary

aerodynamic flying smoothly through the air

aircraft a machine that can fly

astronaut a person who is trained to travel into space (used in English)

cosmonaut a person who is trained to travel into space (used in Russian)

engine a machine that uses energy to make something move

exploration traveling through an unknown area

fuselage the body of an airplane

glider an aircraft without an engine that moves by gliding through the air

NASA an abbreviation of the National Aeronautics and Space Administration, the government agency that runs the U.S. space program

pilot someone who is in charge of ships, aircraft, or spacecraft

propeller a device with blades that spin, pushing air behind a machine and moving it forward

rover in space science, a machine that carries astronauts or science equipment and explores a planet or satellite

space in space science, the area of the sky that is outside Earth's atmosphere

spacecraft a machine that can travel into space

vehicle a machine that is used to carry people or things from one place to another

Think About It

• Have you ever flown in an airplane? Draw a picture that shows what you saw as you looked out the window. Describe the picture to a friend.

• Scientists are always working on new machines that can make it easier and safer to fly. Work with a friend to design an airplane or spacecraft. Describe where it would go and how it would be better than the machines that are used today.

• Use some of the words you learned in this book to tell a friend something exciting you learned about how people learned to fly.

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