

LEVELED BOOK • Y

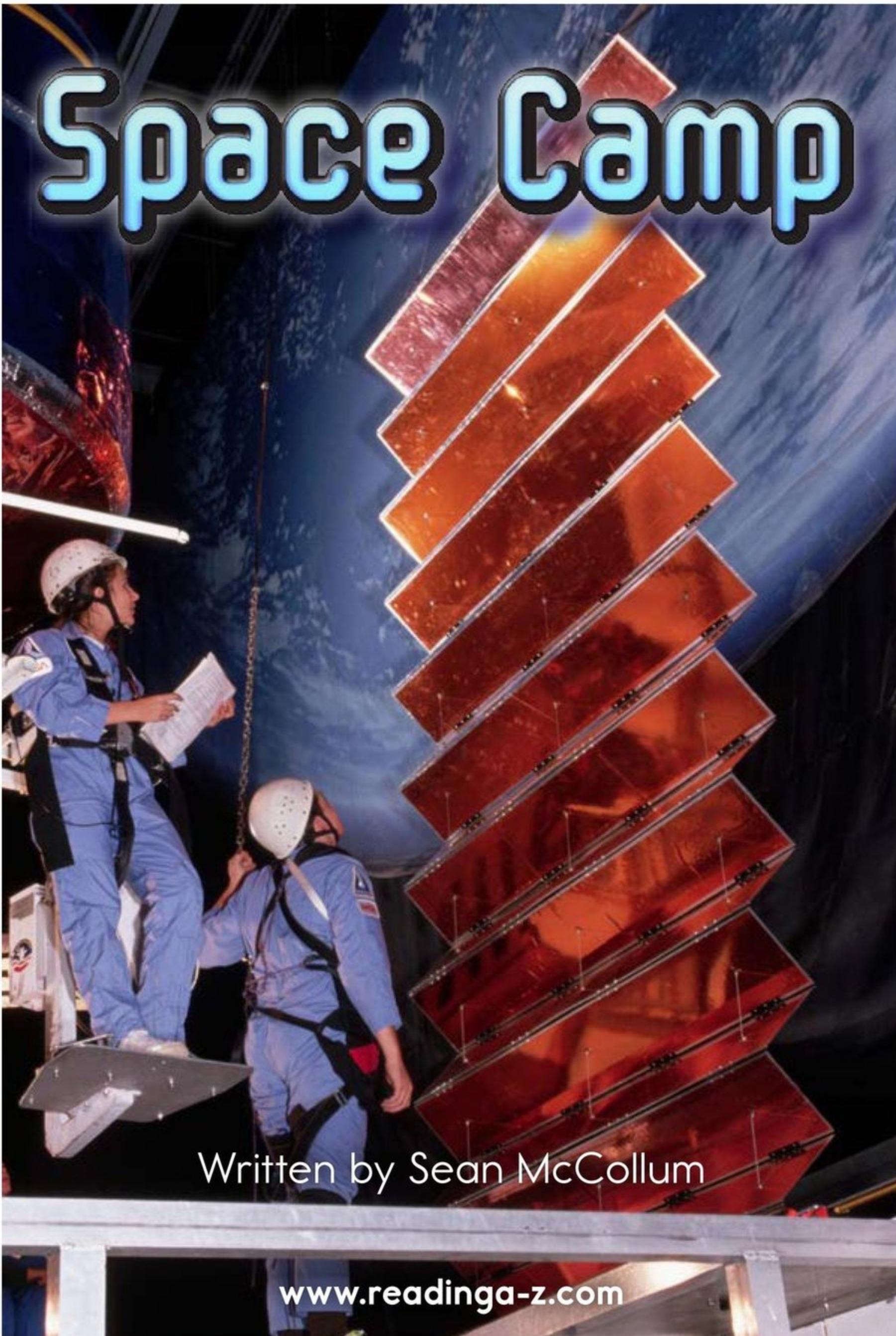
Space Camp

MULTI
level
S•V•Y

Written by Sean McCollum

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Focus Question

Why do people want to attend space camp?

Words to Know

aeronautics
aviation
counselors
exploration
g's
hone

mock
rovers
simulated
spacecraft
technology
trainees

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Introduction: From Space Camp to Space

In the summer of 1990, sixth grader Kate Rubins went off to camp in Huntsville, Alabama. It wasn't the kind of place where she sang around a campfire or paddled a canoe—this was space camp. It was an in-depth program that delved into the science and excitement of space **exploration**. She had told her parents that she dreamed of becoming “an astronaut, and biologist, and geologist—in that order.” She jumped with enthusiasm into the science and engineering activities offered at the camp. She was thrilled to participate in real astronaut training and engage in the teamwork of **simulated** space missions.



The entrance and “habitat” where campers stay at United States Space Camp in Huntsville, Alabama



Takuya Onishi, Anatoly Ivanishin, and Kate Rubins fly to the ISS in July 2016.

Fast-forward twenty-six years to 2016. A group of young **trainees** filed into an IMAX theater at that same space camp. They sat in their seats and watched in awe as the theater showed the live video feed of a real liftoff of a giant Russian rocket. On board were fresh supplies and crew for the International Space Station (ISS), which orbits more than 322 kilometers (200 mi.) above Earth.

Watching the launch was particularly special for these space camp trainees. One of the three astronauts on board was space camp graduate Dr. Kate Rubins. For years she had worked as a biologist before starting to train with the National **Aeronautics** and Space Administration (NASA). Now, she was blasting off to serve on a four-month mission on the ISS. She would act as the mission's flight engineer and conduct biology experiments. As the former space camp trainee rocketed into orbit, she finally fulfilled her childhood dream of becoming an astronaut.



The Pathfinder is a model of a space shuttle that is on permanent display near the space camp in Alabama.

Space Camps Around the World

Space camps allow participants to dive into space-related science through various activities. Multimedia programs teach about the exciting history of space exploration. Hands-on projects focus on the robotics and **technology** involved in the field. Campers also test out the equipment real astronauts use to prepare for space missions. Sometimes trainees are required to practice teamwork in simulators—machines built to imitate the operation of a real **spacecraft**.

Today, space camps are taking off in many places. The camp in Huntsville, Alabama, is located near the United States Space and Rocket Center. There, space camp trainees can see the giant rockets and space capsules that helped NASA astronauts reach the Moon in 1969. More than 750,000 trainees have attended the space camp in Alabama since it opened in 1982. Campers have come from all fifty states in the United States and more than sixty other countries.

Some universities and museums around the United States host space camps during summer breaks. Children can attend space camp at the Frontiers of Flight Museum in Texas and Florida's Camp Kennedy Space Center. In Washington, D.C., the Smithsonian Association features several summer day camps with space-related activities for children as young as kindergarten age. These programs feed children's fascination with the science, technology, engineering, and even science fiction stories related to space exploration.

Space camps are popular around the globe as well. In Quebec, Canada, the Cosmodome hosts three-day camps and a variety of other space-related programs. Space Camp Turkey is located in Izmir, one of Turkey's biggest cities. Russian Space Camp at Gagarin Cosmonaut Training Center includes lectures about the country's amazing history of space exploration. The center's name honors Yuri Gagarin, who became the first human to fly into space in 1961.



Going to Space Camp

Space camp programs cater to a wide range of interests. At some camps, younger children can participate with their family, while camps for older children are grouped by age. Some space camps hold sessions for trainees with special needs, such as visual and hearing impairments. Many programs offer scholarships that make it possible for all space enthusiasts to have a chance to attend.



The rockets built at space camps can be powered by water.

A Day at Space Camp

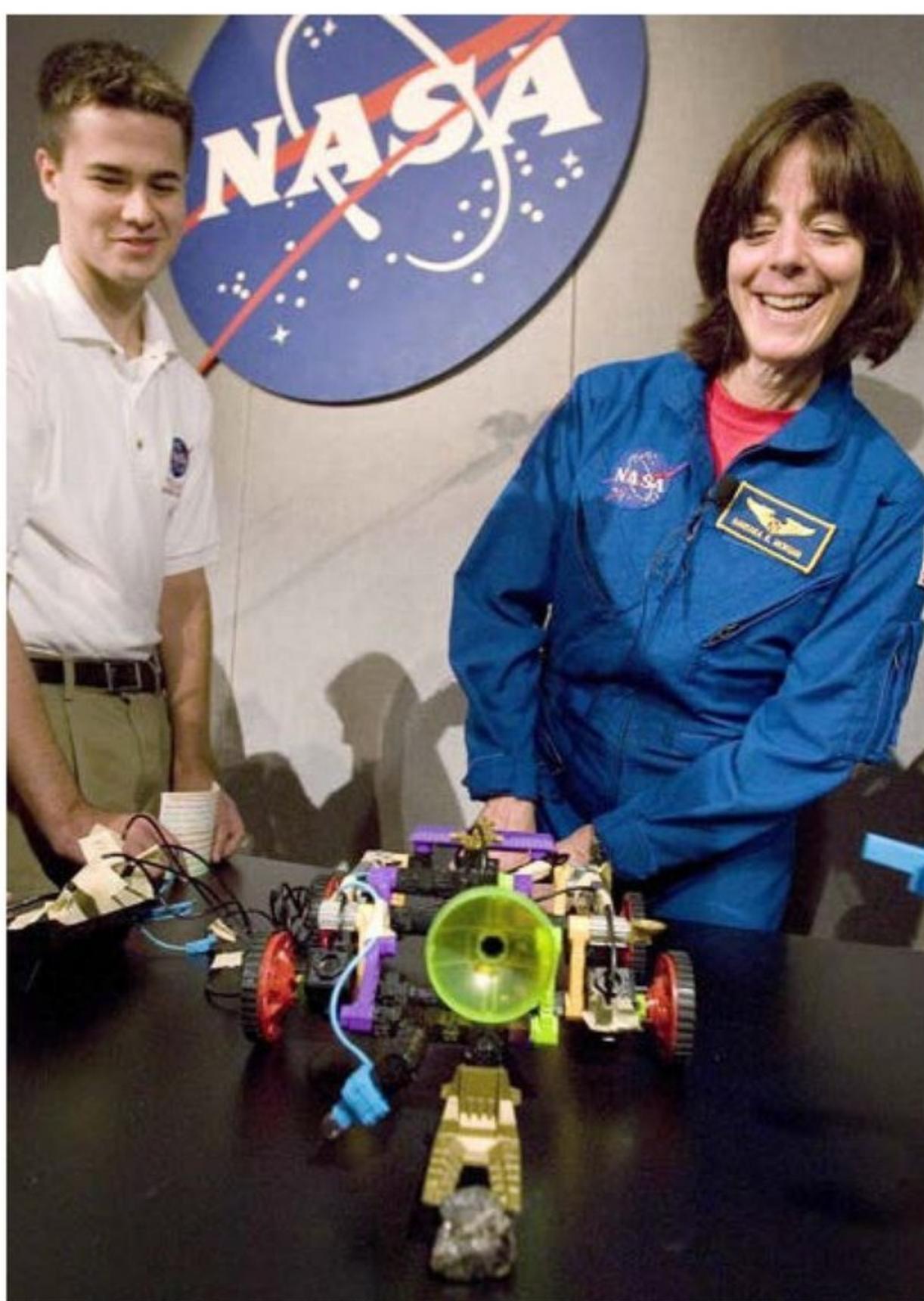
Below is an example of a day in the life of a space camper.

TIME	ACTIVITIES
8:00–9:00 AM	Get ready and eat breakfast
9:00–10:00 AM	Ride simulators
10:00–11:30 AM	Leadership and team-building activities
11:30–12:00 noon	Lunch in the crew galley
12:30–1:30 PM	Astronaut training simulator
1:30–3:00 PM	Rocket construction
3:00–4:00 PM	Movie showing
4:00–5:00 PM	Simulated mission training
5:30–6:00 PM	Dinner
6:30–7:30 PM	Learn about spaceflight history
7:30–8:30 PM	Engineering workshop
9:00–10:00 PM	Call home and prep for bed

Space camps generally concentrate on the history, science, and technology of space travel. At many space camps, trainees study rocketry, building and launching their own model rockets. At others, they study spacecraft design and then design their own ship for a space mission.

Space camp programs that emphasize robotics are common as well. As technology advances, robotics has become an important part of space exploration. For example, the Opportunity and Spirit robotic **rovers** have explored the surface of Mars. Robotics trainees engineer and program

robots to solve real-world problems. At the end of camp, teams may face off in an exciting robotics competition.



A NASA astronaut and educator test-drives a robotic rover built in a space camp program.



The food astronauts eat is dehydrated for decreased volume and ease of packing. This process also helps the food stay fresh longer.

Alabama's space camp has a weeklong **aviation** program where attendees can learn about flight and military aircraft. All of the earliest NASA astronauts started out as military test pilots.

Even while eating and sleeping, space campers may have some unique experiences in store. At the Cosmodome in Quebec, trainees strap themselves into sleeping bags that simulate how astronauts sleep on the ISS. Other camps let trainees try the specially packed meals astronauts eat in space.

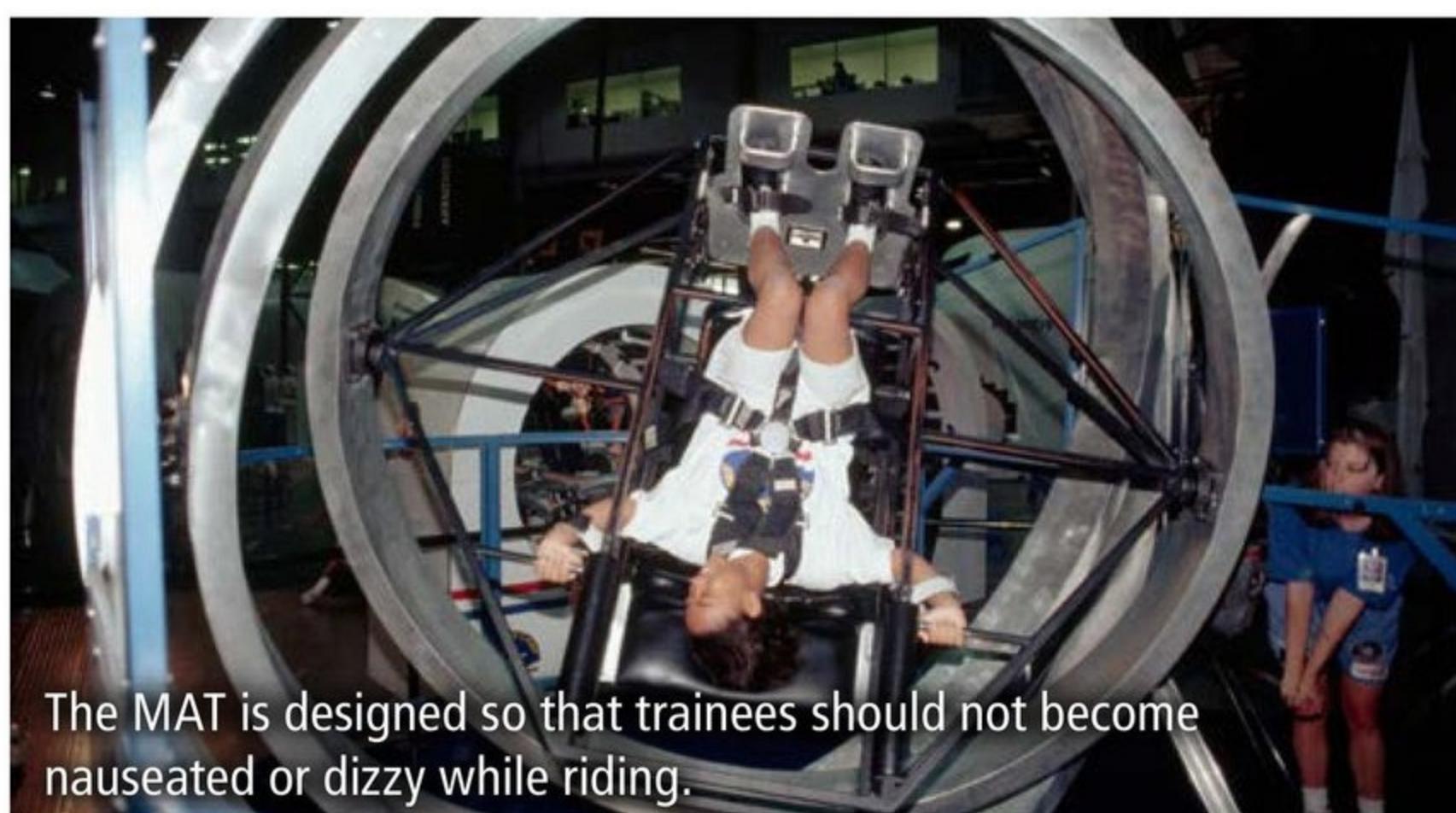
Children aren't having all the fun, though. Many space camps host adults from all around the world. Some science teachers attend so they can leave with new ideas and creative lessons to energize the next generation of space explorers.

Astronaut Training

Among the most popular activities at some space camps are simulators. Before ever stepping into a spacecraft, astronauts must practice for every situation they might encounter. The simulators allow trainees to experience some of the challenges astronauts face. While on the equipment, trainees are always under the watchful care of camp **counselors**.

The Multi-Axis Trainer

The Multi-Axis Trainer (MAT) was used in the early 1960s to test the first astronauts. It helped them practice regaining command of a space capsule that was tumbling out of control. The MAT is a big metal ring positioned within a larger ring. The trainee is strapped in the center ring, and then the two rings spin wildly in different directions.



The MAT is designed so that trainees should not become nauseated or dizzy while riding.

The 1/6 Gravity Chair

The 1/6 Gravity Chair simulator lets trainees feel the sensation of bounding around on the Moon. There, gravity is one-sixth that of Earth. The simulator helps trainees get used to moving around when their bodies feel much lighter than normal.

Math Minute

If a person weighs 27 kilograms (59.5 lb.) on Earth, how much would that person weigh on the Moon?

Answer: 4.5 kilograms (10 lb.)

The Space Shot and G-Force Accelerator

Anyone who has ridden a roller coaster will recognize the sensation these simulators create. The Space Shot shoots riders upward at a rate of four g's—four times the force of Earth's gravity. It feels as if you're moving upward so fast that your stomach has been left behind. If you weigh 23 kilograms (50.7 lb.), you will feel as though you weigh 92 kilograms (202.8 lb.) while riding the Space Shot.

The G-Force Accelerator is a spinning ride that produces a high-pressure force due to the fast speed at which it spins. The G-Force Accelerator reaches three times the force of Earth's gravity, or three g's. That is the same force astronauts experience during a rocket launch.



Some trainees work inside the simulators and operate controls as if they are flying a shuttle.

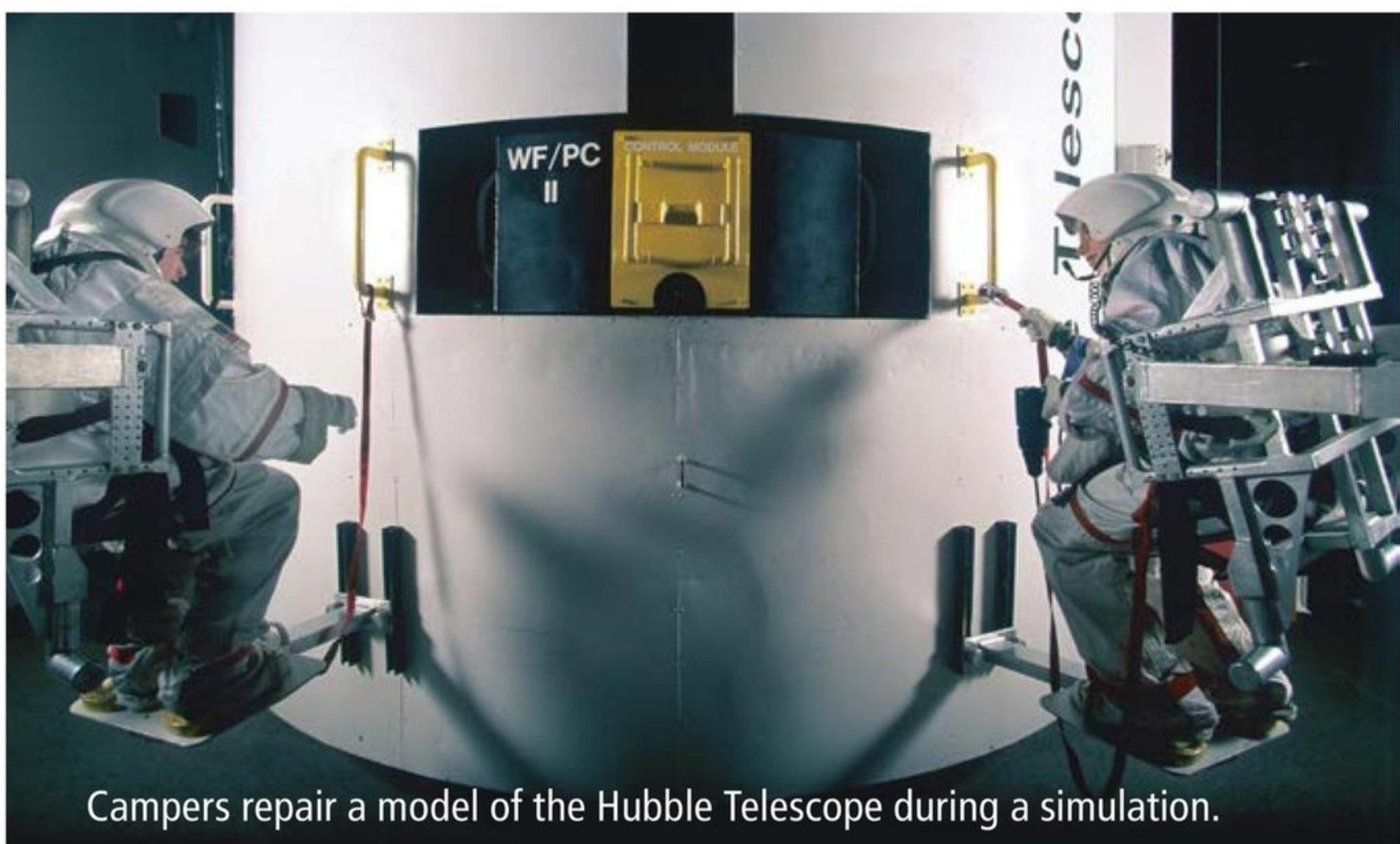
Simulated Missions

Another highlight at many camps is simulated space missions, with some simulations working much like video games. Teamwork and leadership are important qualities in real astronauts. Mission simulators allow trainees to **hone** these skills.

One mission has participants launch the space shuttle, fly it to the International Space Station, and dock the craft. Team members perform a variety of duties, but they must communicate on their headsets. Just like a real crew, they run through checklists to ensure that they remember their tasks exactly and stick to the schedule. Some trainees serve as astronauts, and others work in Mission Control, the command center back “on Earth.”

Some simulated missions include **mock** voyages to the Moon, while others take place on models of a space station or other spacecraft. The crew must be ready to think fast if the simulator creates an emergency for them to deal with, such as a simulated engine problem or sudden meteor shower.

For older trainees, a few space camps have made simulations for the future: a mission to Mars. Crews work together aboard life-size models of the *Orion* capsule and Mars lander at the space camp in Alabama. Real astronauts will live on *Orion* during the planned voyage to and from Mars. They will use the landing module to fly to the Martian surface and return to the *Orion*, which will remain in orbit around Mars.



Campers repair a model of the Hubble Telescope during a simulation.

Space Camp Heroes

Here are a few astronauts and scientists who have either graduated from space camps or supported programs that help young people learn about space.

- Dr. Leroy Chiao: This veteran NASA astronaut is now head of the Houston Association for Space and Science Education. Chiao does live-streaming visits with students and trainees around the world.
- Bobak Ferdowsi: An aeronautical and astronautical engineer, Ferdowsi is planning a future mission to send a robotic probe to Europa, one of Jupiter's moons.
- Samantha Cristoforetti: This space camp trainee became a fighter pilot for Italy's air force. In 2014–2015, Cristoforetti served on the ISS for 199 days.
- Robert "Hoot" Gibson: Robert Gibson, a big supporter of space camps, is a veteran of five space shuttle missions in the 1980s and 1990s.
- Michael E. Lopez-Alegria: Michael Lopez-Alegria served on four space shuttle missions. He has also been a speaker at Space Camp Turkey.

Astronauts of the Future?

Much like Dr. Kate Rubins, today's trainees from space camps around the world may be the astronauts of tomorrow. NASA is working with other space programs to plan a mission to Mars. They hope the mission will take place as soon as the 2030s. If everything goes as expected, current space camp trainees could be some of the astronauts on board the *Orion*. They could be among the first people to leave footprints in the soil of the Red Planet, continuing humanity's reach for the stars.

Glossary

aeronautics (<i>n.</i>)	the science and practice of flight (p. 5)
aviation (<i>n.</i>)	the flying of aircraft (p. 10)
counselors (<i>n.</i>)	people who supervise at a camp (p. 11)
exploration (<i>n.</i>)	a journey through unfamiliar territory to learn more about it (p. 4)
g's (<i>n.</i>)	units of force that equal gravity's pull on an object at Earth's surface (p. 12)
hone (<i>v.</i>)	to sharpen or improve (p. 13)
mock (<i>adj.</i>)	not real; done for practice or as a simulation (p. 14)
rovers (<i>n.</i>)	vehicles used to explore the surface of objects in space, such as planets or moons (p. 9)
simulated <i>(adj.)</i>	modeling or imitating the appearance or condition of something (p. 4)
spacecraft (<i>n.</i>)	a vehicle used for traveling in space (p. 6)
technology (<i>n.</i>)	scientific knowledge or tools to make or do something (p. 6)
trainees (<i>n.</i>)	people who are being taught a particular job (p. 5)

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A Reading A-Z Level Y Leveled Book

Word Count: 1,418

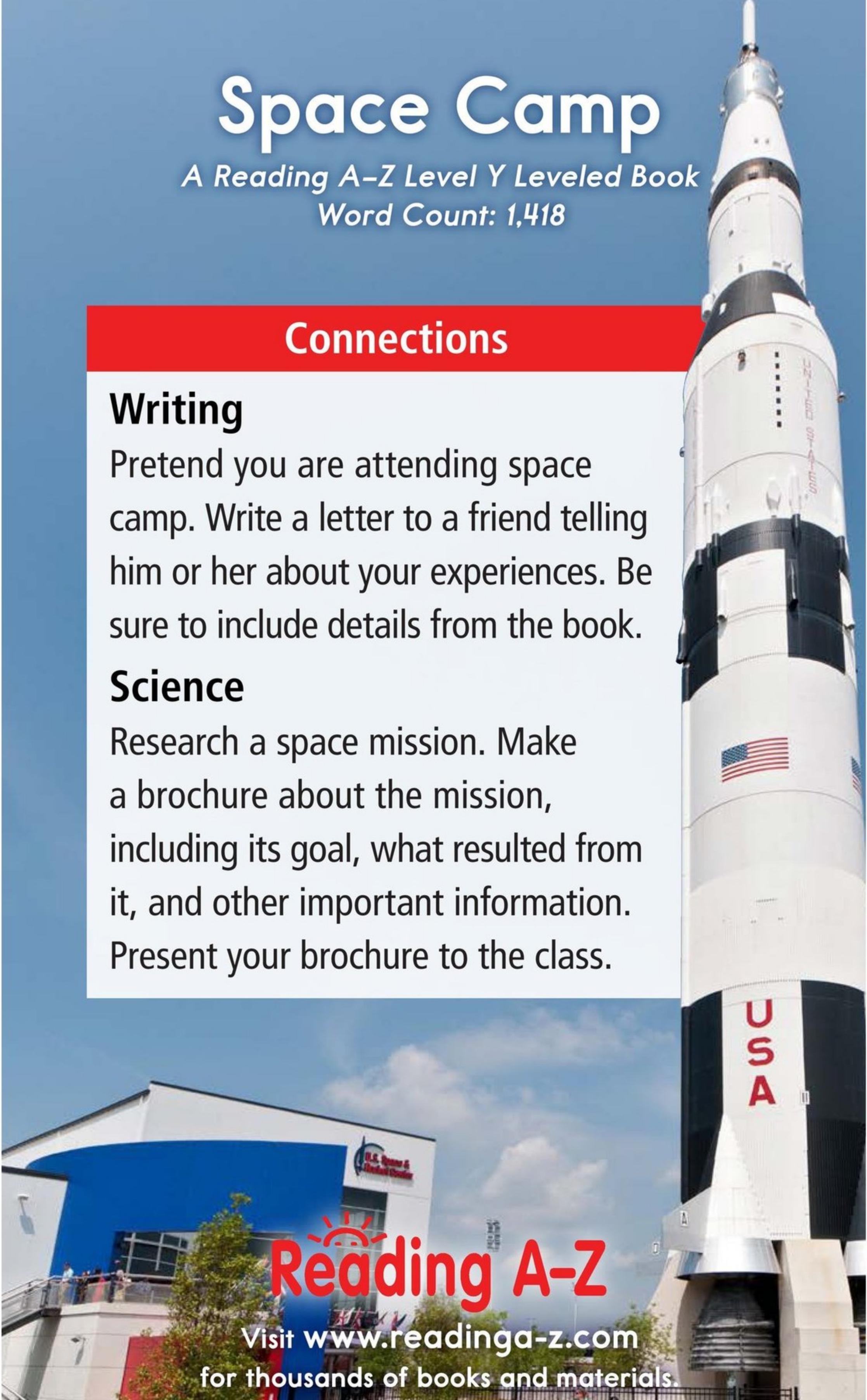
Connections

Writing

Pretend you are attending space camp. Write a letter to a friend telling him or her about your experiences. Be sure to include details from the book.

Science

Research a space mission. Make a brochure about the mission, including its goal, what resulted from it, and other important information. Present your brochure to the class.



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