Comprehension

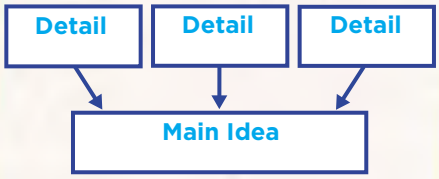
Genre

Nonfiction gives facts about real people, living things, places, or events.

Generate Questions

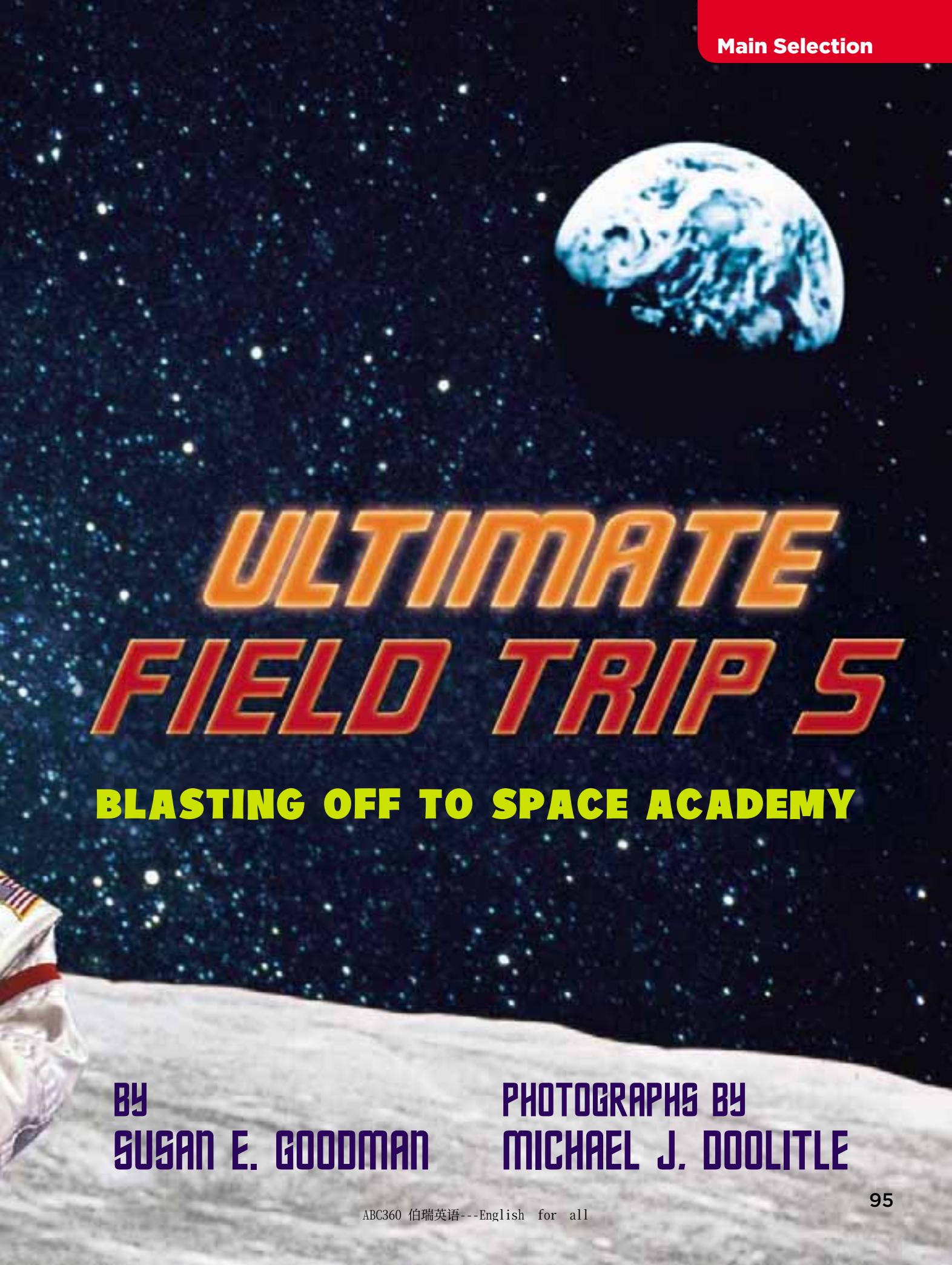
Summarize

As you read, use your Summary Chart.



Read to Find Out

How do astronauts prepare for space travel?



ULTIMATE FIELD TRIP 5

BLASTING OFF TO SPACE ACADEMY

BY
SUSAN E. GOODMAN

PHOTOGRAPHS BY
MICHAEL J. DOOLITLE

Countdown to Adventure

What's the best part of being an astronaut? Is it the thrill of rocketing out of Earth's atmosphere at 25,000 miles per hour? Is it the chance to make new scientific discoveries? Or is it the adventure of leaving the familiar behind and going, as someone once put it, "where no man has gone before?"

Few people actually get to answer these questions by traveling into space. But some kids took the first step by going to U.S. Space Academy at the United States Space and Rocket Center in Huntsville, Alabama.

"I can't tell whether this fits or not," said Shane. "Do I look like an astronaut?" Another kid's comment: "If you have to go to the bathroom quick, these flight suits are a bummer."

AMAZING SPACE FACTS

At least half the astronauts experience space sickness at the beginning of their voyage. That's why John Young didn't do Gus Grissom any favor when he smuggled him a corned beef sandwich on the Gemini 3 mission. The story is Grissom threw up; in weightless conditions, that's a difficult cleanup job.

For almost a week they used the same simulators that real astronauts use and learned how to walk on the Moon and work without **gravity**. They built their own rockets and visited the ones scientists used to launch the Apollo astronauts to the Moon. They tried tasting space food and wearing space suits. They learned how to eat in space, sleep in space, even how to go to the bathroom without any gravity.

During their training they became a team, Team Europa, named after one of Jupiter's seven moons. Then, Europa blasted off on a mission of its own . . . .

The Habitat, where kids sleep at Space Academy, was designed as an earthbound space station with stairs and handrails to get from floor to floor. In space, you'd float where you need to go.

On the Training Floor

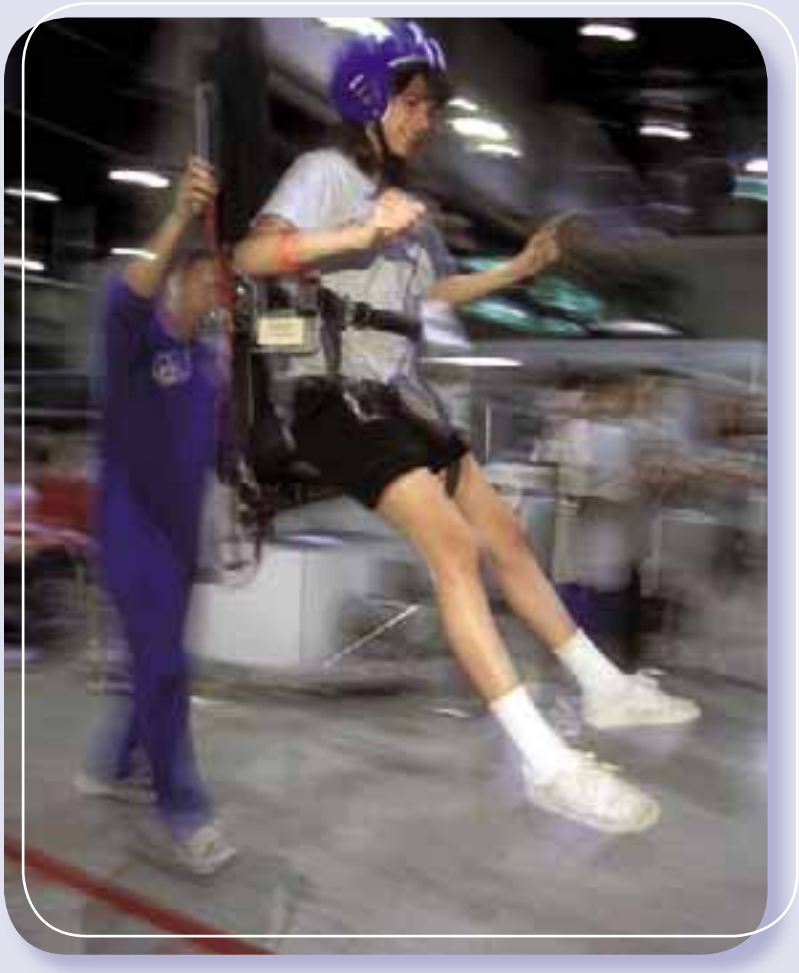
"Europa, the training center is a dirt-free **zone**," said Paul. "Gum and drinks can create **disasters** here."

Paul, one of Europa's team leaders, led the kids through a **maze** of strange-looking machines. As they walked, the kids peeked at other teams jumping high enough to dunk a basketball and spinning in what looked like a giant gyroscope. Paul explained that astronauts trained for years before going into space. It takes a lot of practice to learn how to **function** in such a different **environment**. On space walks, for example, they must make delicate repairs while floating upside down. In their ships they must learn how to drift rather than walk through the air.

How do they learn these things while anchored by Earth's gravity? To find out, Europa tried some of the simulators that astronauts have used.

The training center is equipped with many simulators.

The 1/6 Gravity Chair



"The Moon has only one-sixth of our gravity," explained Paul. "If you weigh one hundred twenty pounds here, you'd only weigh twenty pounds on the Moon. And you'd have to learn to walk differently because there isn't as much traction."

To practice this movement, the kids used a 1/6 Gravity Chair similar to the Apollo astronauts'. In fact, Europa learned from the astronauts' experiences. The best ways to get around were a slow jog and the bunny hop.

John waited impatiently while Paul **adjusted** the chair to offset five-sixths of his weight.

"Bunny hop for me," said Paul.

"You've got to be kidding," answered John. "I can barely reach the ground."

Soon, however, he was leaping across the training floor.

"This looks like good practice for the high jump," said Stephanie.

"It shouldn't be; you want to jump for distance, not height," said Paul. "Astronaut Charlie Duke of *Apollo 16* tried to set a height record. But his life-support pack changed his center of gravity. He landed on his back and couldn't get up, just like a beetle. If John Young hadn't been around to help him, he could have been stuck there until *Apollo 17!*"

"I felt like I was on a trampoline," said Lindsay, "but I didn't go down—just up!"

Summarize

What did the kids of Team Europa do to help them prepare for a possible trip into space?

The Multi-Axis Trainer (MAT)

"Remove everything from your pockets," said Bethany, Europa's other team leader. "Take off your necklaces, too, so you don't get whacked in the face."

To get ready for the MAT, some kids took off jewelry; others just took a few deep breaths. The MAT looks like an atom gone wild, with each of its three outer circles spinning separately and you as its whirling nucleus. The Mercury astronauts used it to learn how to regain control of a tumbling spacecraft.

The MAT never turns more than twice in the same direction, which is supposed to keep you from feeling sick. That didn't keep a lot of kids from getting nervous. But once they tried it, the glint of silver braces flashed through their smiles.

"It was terrific," said Stacy, "but next time, I'll tie my hair back so it doesn't keep hitting my face."

"It's awesome," Stephanie agreed.

When asked how she'd feel doing it for a ten-minute stretch in a spaceship, Stephanie added, "Your head spins like crazy, but it doesn't feel bad."

"I couldn't help smiling all the time because it was so much fun," said Lindsay.

The Five Degrees of Freedom (5DF) Chair

On Earth, when you jump up, gravity pulls you back down. In space, you just keep going up. If you push away from a wall, you keep going backward. Bending quickly to grab something could make you do somersaults. To get used to the weightless tumble of space, the Gemini and Apollo astronauts—and the kids at Space Academy—used the 5DF Chair. This chair glided over the floor on a cushion of air like the puck in an air hockey game.

"This is what an EVA, an extravehicular activity, or space walk, feels like," Bethany said, tipping and rolling the chair in all direction to give the kids a taste of the different movements.

Bethany held on to the 5DF Chair to keep it safe. In space, astronauts are tethered to their ship. It's a good thing, too. When astronaut Pete Conrad went on his space walk, he lost hold of *Skylab*. That tether was the only thing that kept him from floating away.

In the 5DF Chair, kids practiced inching their way along a wall. Once Lindsay pushed herself away by accident, she had a hard time getting back.

"Swim, Lindsay, swim!" Courtney called out.

Lindsay tried to breaststroke her way back to the wall—it was hopeless.

"Oh, well," said Charles, "she's *Lost in Space!*"

Space Shot

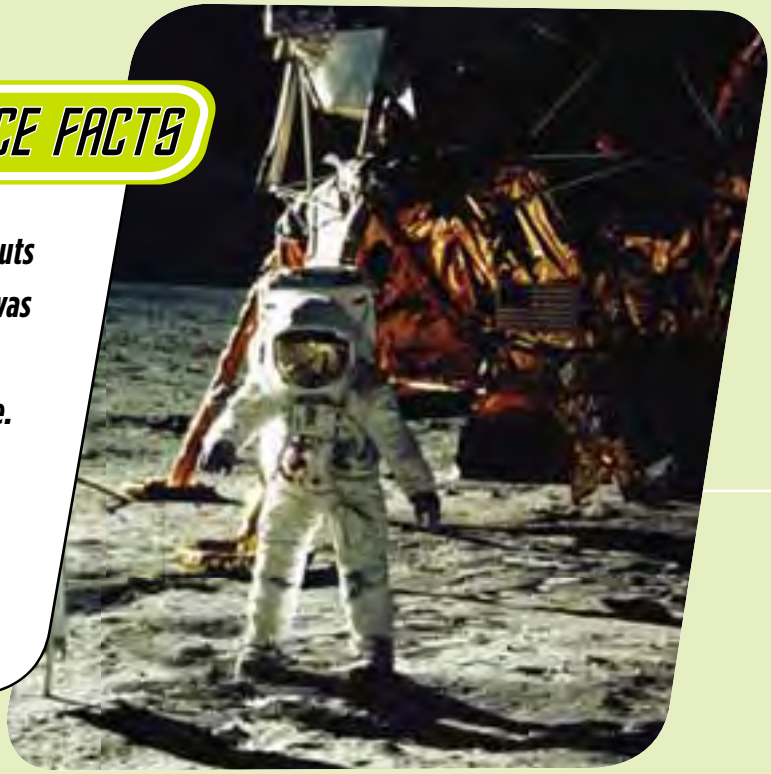
"This is your last chance to change your mind," said the operator. "Once the generator has been charged, we cannot stop."

In just seconds, the kids were blasting off on the Space Shot. They would rocket skyward with a force of 4 Gs, one more than astronauts experience during their launches. All that force meant that, for a few seconds at the top, before gravity pulled them back, the kids could feel what it was like to be weightless.

Some people call the Space Shot "an elevator with an attitude."

AMAZING SPACE FACTS

The last time astronauts walked on the Moon was in 1972, but all of their footprints are still there. Since the Moon does not have an atmosphere, there is no wind to blow the prints away.



NASA doesn't use the Space Shot to simulate weightlessness; it trains astronauts aboard its KC-135 airplane. The plane climbs sharply and then free-falls straight toward the ground, up again, then down again, and again. For twenty-five seconds, at the top of each roller-coaster ride, the plane's passengers are weightless. But many astronauts have paid a price for this amazing experience. The KC-135 is nicknamed the "Vomit Comet" for good reason.

"I wish I hadn't eaten so much breakfast," said Erin as she waited for her turn on the Space Shot. "I'm going to scream. It helps you not throw up."

Before her second ride, Erin was too excited to feel sick. "I love that feeling of just shooting up there," she said.

"Then you rise up out of your chair and float there for a second," said Stacy. "Weightlessness, I wish it lasted a lot longer."

Summarize

How did each machine Team Europa used help them to experience what it's like to travel in space?

This is the way Frank and most kids feel going up on the Space Shot . . .

. . . and they feel this way coming down. Devin was amazed that one kid in line thought the experience would cure his fear of heights.

The Pool

Another way the earthbound astronauts simulate working in weightlessness is by going underwater. At Houston's Lyndon B. Johnson Space Center, astronauts practice in a huge water tank holding a full-scale model of the Shuttle's payload bay. At Space Academy, the kids went to a swimming pool.

"Your job is to build a cube underwater as fast as possible," said Bethany. "It takes teamwork, an ability to work in weightlessness, and—something astronauts don't need, I hope—an ability to hold your breath."

Each strut, or tube, belonged in a specific place.

Once the kids started working together, the cube was built quickly.

The water started boiling as kids grabbed struts and dove underwater. It kept boiling as they came up for air again and again, slowly realizing they needed a better plan. . . .

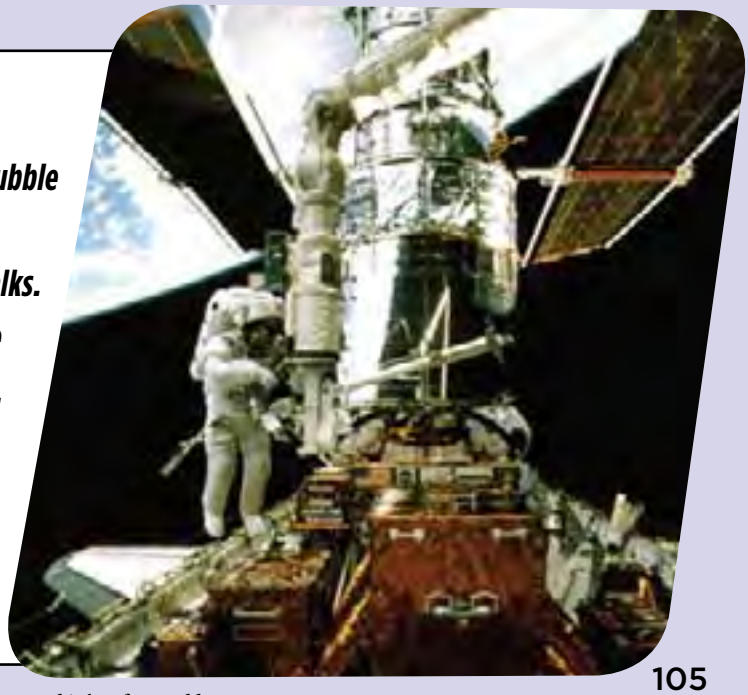
"Ten minutes and fifty-six seconds," Bethany said when they finally finished. "Well, every astronaut has to start somewhere. How could you have gone faster?"

"Talk more to each other?" said Isabelle.

"That's right," Bethany agreed. "Communication, letting your leaders lead, and teamwork. It's true in the pool, and it will be even more important when you work to make your own space mission a real success."

AMAZING SPACE FACTS

Flawed when it went into orbit in 1990, the Hubble Space Telescope was repaired in 1993 during a spectacular mission that required five space walks. Located above our hazy atmosphere, the Hubble sees deep into the universe to reveal black holes, new galaxies, the birth of some stars and the death of others. Its "eagle-eyed vision" is so acute that if the Hubble were on Earth, it could spot a firefly ten thousand miles away!



BLAST OFF WITH SUSAN E. GOODMAN

Susan E. Goodman writes her stories by trying them out first. For this story she actually went to Space Camp at the U.S. Space Academy. There she learned how to do everyday things at zero gravity, like brushing her teeth and "walking." Experiencing different ways of living helps Susan find the right words when it comes to writing about them. For other stories Susan has stayed in an underwater hotel and even balanced on a girder fifty stories above the ground.

Another book by Susan E. Goodman:
On This Spot: An Expedition Back Through Time

LOG ON Find out more about Susan E. Goodman at **www.macmillanmh.com**

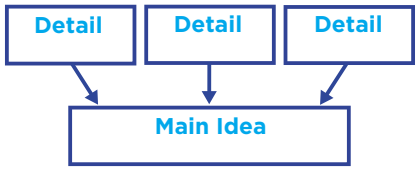
Author's Purpose

Authors of nonfiction often write to inform readers about something. Do you think that is why Susan E. Goodman wrote *Ultimate Field Trip 5*? Explain what clues in the text and captions make you think so.

Comprehension Check

Summarize

Use your Summary Chart to summarize Ultimate Field Trip 5: Blasting Off to Space Academy. Your summary should include the main ideas from the selection. These will usually appear at the beginning of each paragraph.



Think and Compare

1. *Summarize one section of Ultimate Field Trip 5: Blasting Off to Space Academy. Be sure to only include important events and information.* **Generate Questions: Summarize**

2. *Reread page 99. Why do Team Europa and actual astronauts use a gravity chair? Give reasons for your answer.* **Analyze**

3. *Which activity from space camp would you enjoy most? Explain your answer.* **Evaluate**

4. *Do you think a future* ***mission*** *into space will improve our lives on Earth?* **Analyze**

5. *Reread "Jobs in Space" on pages 92–93. What aspects of the jobs described aboard a space shuttle would Team Europa be prepared to do? Use details from both stories to explain your answer.* **Reading/Writing Across Texts**