Disaster in Space

By Arthur Goldwag

When an explosion rocked Apollo 13, three astronauts were stranded in space, 200,000 miles from home. Could they be saved?

On July 20, 1969, more than 500 million people around the world sat glued to their television sets as Neil Armstrong and Buzz Aldrin became the first human beings to walk on the moon.

Just nine months later, when Apollo 13 was streaking moonward, most people kept their televisions tuned to their favorite shows. Apollo 13 was already the third manned mission to the moon, and there were at least four more on the schedule. Space travel, which had once been daring and dramatic, now seemed safe and routine.

But Apollo 13 would be anything but routine. Superstitious types had already made much of its unpropitious numbers: not only was its name unlucky, it was scheduled to launch on April 11, 1970. Add up each digit in the date 4/11/70 and you get 13. Liftoff was at 1:13 p.m. Houston time (in military time, that's 1313 hours). And sure enough, 55 hours, 54 minutes, and 53 seconds after it blasted into space, at 9:07 p.m. on the 13th day of April, things went terribly wrong aboard Apollo 13. Astronauts Jim Lovell, Fred Haise, and Jack Swigert had been working their way down a checklist of chores when they were startled by a loud noise.

(See picture, "Apollo 13 Astronauts."

"Hey!" Jack Swigert shouted. "We've had a problem here."

"This is Houston, say again please," Mission Control crackled in reply.

You could hardly blame Swigert for raising his voice. When you're 200,000 miles away from home, traveling at speeds of up to 25,000 miles an hour, with only a thin metal skin separating you from the vacuum of space, a "pretty large bang," as Fred Haise would describe it later (Jim Lovell called it a "bang-whump-shudder"), was just about the last thing you wanted to hear. The ship trembled as the sound reverberated through its hull, then the gauges monitoring Apollo 13's power supply and oxygen began to plummet.

Lovell broke into the transmission. "Houston, we've had a problem," he said.
Fearing the Worst

The next morning, in the Houston suburb of Timber Cove, 10-year-old Bobby Winfield looked out of his bedroom window as an army of men with notebooks, microphones and cameras descended on the Lovells' house across the street. Bobby didn't know any of the Lovell children very well (they were either older or much younger than he was), but he knew Captain Lovell was the commander of Apollo 13, and that he wasn't scheduled to walk on the moon for a few more days. Immediately, Bobby feared the worst.

Lost in Space

Bobby had grown up with the space program; his father was an engineer at the Manned Spacecraft Center in Houston (later renamed the Lyndon B. Johnson Space Center), the complex of laboratories and communication facilities where space flights were managed from the ground. His heroes were astronauts like Alan Shepard, the first American in space, John Glenn, the first American to orbit the Earth, and, of course, Neil Armstrong. Bobby knew how dangerous it was to blast into space strapped atop the 363-foot-tall Saturn V rocket, an explosive behemoth that stood 60 feet higher than the Statue of Liberty.

(See picture, "Apollo 13 Saturn V Space Vehicle, April 11, 1970.")

Terrible things could happen even on the ground--Bobby still had nightmares about the launch-pad fire that had taken the lives of astronauts Gus Grissom, Ed White, and Roger Chaffee in 1967.

When Bobby came down to breakfast, his mother assured him that Captain Lovell and his crew were all alive. But one of their oxygen tanks had exploded, and their ship was seriously damaged. People on the news were saying that it was possible--some even said it was likely--that they would be lost in space. But Bobby refused to believe it. He knew about the men who worked at the Spacecraft Center--unsung heroes like his father, who understood spaceships inside and out, down to their last bolts. They would do everything they could to bring those astronauts home. But could the astronauts really be saved?

All around the world, people gathered in front of their televisions as the drama unfolded. In Houston, Bobby's father and the hundreds of people he worked with were in full crisis mode, hunched over consoles that monitored Apollo 13's condition, poring over blueprints, diagrams and equations, wracking their brains for solutions to problems no one had faced before.

(See picture, "Newspaper Headlines: Apollo 13.")

In charge of this small army of technicians was Flight Director Eugene Kranz. With his flat-top crewcut and his brusque, no-nonsense manner, Kranz looked every inch the Air Force pilot he had once been. Declaring that “failure is not an option,” he marshaled his troops to do the impossible.

(See picture, "Manned Spacecraft Center in Houston, Texas.")

A Lifeboat

Kranz understood that it wasn't just one problem they had to solve, but a whole series. The first and most serious: the astronauts' ship was rapidly losing power, and its air supply was streaming out into space.

Fortunately, they were carrying a lifeboat of sorts. Attached to the top of the main part of the ship, known as the command module, was
in Houston, who devised solution after solution to the problems faced by the astronauts on their crippled ship. In the midst of the crisis, their leader, Eugene Kranz, told them, "Failure is not an option." (Credit: (c) Jacques Tiziou/Corbis Sygma)

The explosion had damaged the ship's main rockets. The astronauts were instructed to continue their journey to the moon and then whip around it to steer themselves with the lunar module's small rockets into a slingshot path back to Earth. One by one, throughout that long sleepless night, the engineers and scientists in Houston, and the astronauts in space, wrestled the problems to the ground. By the time Bobby woke up, they had already completed their first course correction. But their problems were far from over.

(See picture, "Damage to Apollo 13 Service Module.")

The lunar module carried only enough air to sustain two men for two days--how would it keep three astronauts alive for twice as long? Eugene Kranz's engineers instructed the astronauts to turn off everything that they didn't absolutely need; with duct tape and plastic bags and tubes ripped from their space suits, they created filters to scrub the deadly carbon dioxide out of their dwindling air.

Hoping Against Hope

On Friday morning, as Apollo 13 reentered Earth's orbit, the exhausted and freezing astronauts crawled back into the command module and, tapping its one remaining battery, turned on the systems they would need for their reentry. This would be the riskiest maneuver. The command module was fitted with heat shields to protect the ship from the 5,000-degree temperatures (twice the melting point of steel) that their 25,000 mile-per-hour descent through the Earth's atmosphere would generate. Had the heat shield been damaged in the explosion? There was no way of knowing.

(See picture, "View of Earth from Apollo 13.")

Millions of people crowded around their televisions and radios as the astronauts careened through the Earth's atmosphere. Bobby's teacher had brought a transistor radio to school, and the children crowded around.

For a long time, nothing but static poured out of its tiny speaker, as the class listened for any sign of life. The controller on the ground tried to raise the ship. "Houston standing by. Over," he said. He waited 15 seconds, then tried again. "Houston standing by. Over." He tried two more times, as another slow minute ticked by. The world held its collective breath. Had the astronauts endured so much, only to perish when they were so close to home?

At long last, Jack Swigert's faint voice emerged from the static.

"OK, Joe," he said.

The ship--and the three astronauts--had survived. Just minutes later, they splashed down in the Pacific Ocean, where the waiting U.S. Navy ship, Iwo Jima, was standing by to pick them up. They were greeted as heroes.

(See picture, "Apollo 13 Spacecraft in the Pacific Ocean.")

Because of the catastrophic equipment failure, Apollo 13's astronauts never walked on the moon. But as a test of heroic ingenuity and a
determination to beat the odds, the *Apollo 13* mission was nothing short of a triumph.

**Sentence Chef Presents: How to Write a Paragraph**

**Directions:**
1. Read "Disaster in Space" above.
2. Read the prompt below.
3. Use the color-coded boxes and lines as guides to help you write each part of the paragraph.
4. When you're finished copy the entire paragraph onto a separate sheet of paper.

**The Prompt:** *Apollo 13* is remembered as a "successful failure." Explain what this means, using details from the story.

**Summary**

Thirteen turned out to be an unlucky number for *Apollo 13*. Two days into its voyage to the moon, an explosion onboard rendered the fate of its three astronauts very dubious. In this gripping article, students will learn how the heroic efforts of the space flight crew in Houston brought them safely home.

**Main Teaching Objectives**

After reading this article, students should be able to

• explain the disaster that happened aboard *Apollo 13*

• identify the main idea that heroic efforts were made to save the crew

• describe the problems that arose and how they were solved

• identify how the author uses suspense to tell the story

**Before Reading**

**Prior Knowledge/Predicting:** Have students look at the first two photos and read the caption for the "Apollo 13 Astronauts" photo. What do they see? Ask if anyone already knows about *Apollo 13*'s flight. Then ask what they can predict about the article. What do they think it will describe? What do they think the outcome will be? Why?

**During Reading**

**Identifying suspense:** Guide students in focusing on how the author uses suspense to make the story more interesting. First, ask them what suspense means. Explain that it is the excitement of not knowing what will happen next. Can they give an example of a suspenseful movie or book? Then, as they read, ask them to pause at the last sentence of each section. What does each of these sentences make them wonder? How does it make them feel? To help them further, download our reproducible at [www.scholastic.com/storyworks](http://www.scholastic.com/storyworks).

**Discussion Questions/Writing Prompts**
• How was the public’s attention to the scheduled flight of Apollo 13 different from that of Apollo 11, the first flight to the moon? Why? (compare/contrast) People barely paid attention because space travel seemed safe and routine.

• What details of the story made the explosion seem especially scary? (understanding details) The astronauts were 200,000 miles up in space; they were traveling at 25,000 mph; their spaceship was the only thing protecting them; and they were losing power and oxygen.

• How do you think Bobby Winfield felt when he looked out his window? (making inferences) He probably felt shocked, scared, and worried. He most likely feared for the lives of the astronauts.

• How did Bobby know that space flight could be dangerous? (reading comprehension) He was familiar with the space program because his father was a space engineer, and he knew of other disasters.

• How did the public react once the explosion occurred? Why do you think their reaction changed? (cause/effect) Everyone was glued to the news to find out what would happen; the world was concerned for the lives of the three astronauts.

• What was Eugene Kranz’s attitude toward the situation? The people working on the ground at the Manned Spacecraft Center? How do you think this affected the outcome? (cause/effect) The entire crew and their leader felt they had to do everything possible to save the astronauts. It prompted people to reach beyond their limits to find solutions.

• What was one of the main problems the astronauts faced in coming back to Earth? (identifying problems and solutions) Answers may vary, but students might suggest that they had a limited amount of oxygen.

• What was the riskiest part of their return? (understanding details) They didn’t know if the command module could still withstand the 5,000-degree temperatures they would generate while returning.

• How do you think the astronauts felt upon their return? (making inferences) Students might say grateful, relieved, etc.

• What is the main idea of this story? (identifying main idea) Many people pooled their concern, brainpower, and efforts to save the Apollo 13’s astronauts.

After Reading

Identifying Cause and Effect: The Apollo 13 disaster presented many problems. Against all odds, the crew of the Manned Spacecraft Center came up with solutions. Have students identify the cause of the problems that occurred by writing them in the left-hand column of a two-column chart and their corresponding effects on the right. Or, download our reproducible at www.scholastic.com/storyworks.

Writing a skit: The photos that accompany this article capture the drama of Apollo 13’s episode. Divide students into groups; have each group choose one of the photos and write a skit based on it, using the information they learned from the article and captions. Have them present their skits to the class.

Writing Prompts

Letter: Ask students to imagine they were living in 1969. Have them write a letter to a friend who has no access to a TV or a radio, telling him or her about what happened on Apollo 13.

Expository: Today, astronauts from the International Space Station study life on Earth and in space, while the Phoenix Mars Lander is heading for Mars, to explore whether there could be life there. Ask students to write an essay about why they think the space program is or is not important today.

Answer Key

Answers will vary. Apollo 13 was called a "successful failure," because even though it didn’t reach the moon, the astronauts survived. One of the oxygen tanks exploded and the ship’s main rockets were damaged. The ship was losing power and its air supply. But, thankfully, engineers and technicians at the Manned Spacecraft Center in Houston came up with solutions to the ship’s various problems. They told the
astronauts to turn off everything they didn't need in order to conserve power. Just before reentry, the astronauts turned everything back on. Although the ship didn't land on the moon, its astronauts and engineers successfully navigated the disaster.

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