

**TAKE YOUR STUDENTS TO SPACE ABOARD APOLLO 13
AND EXPERIENCE HISTORY LIKE NEVER BEFORE!**

APOLLO 13

THE **IMAX** EXPERIENCE

A Message to Educators

Imagine immersing your students into history and transporting them from the Earth to the Moon aboard Apollo 13. Now, digitally remastered for IMAX® screens up to eight stories high and featuring the IMAX 12,000-watt surround system, *APOLLO 13 THE IMAX EXPERIENCE* will captivate your students and allow them to experience the exciting story of the mission like never before!

This resource guide has been designed to help you bring the story of Apollo 13 into your classroom and enhance your curriculum with the fascinating topics of space and technology. The activities and lessons in this guide were designed to educate students on the history of the Apollo 13

mission and the challenges of space travel and exploration. Using true-to-life experiences to engage students, the activities focus on problem-solving, critical thinking, communication, and teamwork — the key element that brought the crew of Apollo 13 safely back to Earth. Although these materials are copyrighted, you have permission to reproduce them for educational purposes.

We hope that you and your students enjoy *APOLLO 13 THE IMAX EXPERIENCE* and use this guide to discuss the film as a group. We look forward to seeing your class at your local IMAX Theatre for the next educational IMAX film.

Making Motion Picture History

Universal Pictures, Imagine Entertainment, and IMAX present the Academy Award® winning *Apollo 13*—the first 35mm live-action film ever to be digitally remastered into IMAX's 15/70 format using revolutionary, proprietary IMAX® DMR™ technology. Through IMAX DMR, *Apollo 13* has been transformed by the unparalleled image and sound quality of The IMAX Experience® and will redefine the overall movie-going experience. *APOLLO 13 THE IMAX EXPERIENCE*, directed by Oscar® winner Ron Howard and starring two-time Oscar® winner Tom Hanks, will be released exclusively in IMAX Theatres.

Target Audience

Grades 5 and older. The film has been rated PG.

Educational Standards

The activities in this resource guide comply with U.S. National Education Standards for Science Education and English Language Arts. For more information, see <http://books.nap.edu/books/0309053269.html/103.html> and www.ncte.org/standards/standards.shtml.

How to Use This Guide

Since the activities in this guide have been designed for use with students with a wide range of abilities, you may adapt them to meet the needs of your students. You may wish to provide your class with background information and implement some of the lessons prior to seeing *APOLLO 13 THE IMAX EXPERIENCE*.



The Film Synopsis

At first it seemed like a perfect mission – too perfect, even, to make headlines. After three days in space, three Apollo astronauts – Jim Lovell (Tom Hanks), Fred Haise (Bill Paxton), and Jack Swigert (Kevin Bacon) – were finally approaching a long-cherished destination: Apollo 13 was going to the Moon.

Back in Houston, astronaut Ken Mattingly (Gary Sinise) considered himself the unluckiest man on

Earth. Two days before the launch, he'd been grounded from Apollo 13 for medical reasons. So, Mattingly was in Mission Control when Lovell relayed a simple, heart-stopping message across the void of space: "Houston...we have a problem." Something had gone horribly wrong. Power and guidance systems were down, and the supply of oxygen was rapidly dwindling. Lovell, Haise, and

Swigert now faced a grim reality – that their crippled capsule, 205,000 miles from Earth, might never return.

With time running out, the crew and thousands of others braved near-impossible odds in a daring attempt to guide the capsule to Earth. For three days, the world watched in silence, not knowing until the last, anxious moment whether the men of Apollo 13 would come home alive.

Planning for a Mission to the Moon

A trip to the Moon, Earth's only natural satellite, is a challenging journey. Before lift-off, information must be gathered, life support systems must be designed and built, and mission plans and checklists must be developed. Astronauts, Mission Control, and ground crews must also be trained. The first three activities will help your students explore the effort that goes into preparing for a mission to the Moon.

Gathering Information

To help your students prepare for the activities in this guide, have them research facts about the Moon and space. You might ask students:

- How far away is the Moon? *About 240,000 miles*
- How fast will the vehicle have to go to escape Earth's gravity? *25,000 mph*
- How long will it take to get to the Moon? *2.5 days from Earth's orbit to the Moon's orbit*
- What is the relative gravity of the Moon? *0.17 that of Earth*
- How much does a person weigh on the Moon? *To calculate, multiply a weight by 0.17 or divide by 6.*
- What is the atmosphere on the Moon? *There is no atmosphere on the Moon, so there is no wind or weather.*

Encourage students to research additional facts about the Moon and the other Apollo Missions.

Training Day

What does it take to become an astronaut, or a member of the ground crew or Mission Control? Have students brainstorm areas of study that would help them prepare for a career as an astronaut, engineer, or NASA scientist. Before brainstorming, you might have students work in small groups to gather background information on the skills needed for these occupations, and then have them share their findings with the class. To add a creative twist

once they are done, have students write a resume or help wanted ad for these positions. For information about these jobs, check out the web sites of NASA (www.nasa.gov) and The Space Foundation (www.spacefoundation.org).

For Every Problem, a Solution

Before seeing the film, ask students to brainstorm potential problems that could occur on a mission to the Moon. Then encourage students to work in teams to derive potential solutions to these problems.

After seeing the film, create a list of problems the Apollo 13 crew faced. For example, they lost an engine; the temperature went down drastically; the lithium hydroxide chemical to take carbon dioxide out of the air was not sufficient enough for three people over an extended period of time; they needed to create a new reentry plan, etc.

Focusing on the splash down location, have students analyze the three options Mission Control had to bring the astronauts down. Students should work in teams to select an option and explain why they selected it. (Solution two was chosen.)

1. Present course would take them to the Indian Ocean, where recovery would be difficult.
2. Burning the engines to bring them home quicker would take them to the Pacific Ocean, near the recovery forces.
3. Bringing them home even faster would take them to the South Atlantic, away from recovery forces.

We Want Them on Our Team!

Review the main characters in the film and have students work in small groups to list the traits each person displayed. Students should then compare and contrast the characters, including their strengths and weaknesses. Have each student identify which of the characters he/she would select as a role model or hero and write an essay explaining why.



The astronauts used cardboard, plastic bags, and tape to create a device to make the air breathable.

Society's Perceptions

To get perspective on how the Apollo 13 mission and space exploration affected or influenced society, have your students interview older family members or seniors. Students should ask the interviewee to recount the Apollo 13 events, explain how people reacted to the concept of sending people to the Moon, and describe what impact space exploration had on society during the 1960s and early 1970s.

The Pros and Cons of Space Travel

After viewing the film, students will be aware of some of the risks involved in space travel. What are other risks? What are the rewards? Have students research the history of space exploration and then debate the pros and cons of space travel for society.

Activity Sheet

After seeing the film, copy and distribute the activity sheet. Review the facts with your class, and then discuss Jim Lovell's quote in Part One. Students might brainstorm ideal candidates for their crews together, or they might work independently. In Part Two, provide students with guidelines for the newspaper article. Students might work in pairs or small groups to complete this exercise.

Resources

www.nasa.gov – NASA's web site has information on various topics and a special section for kids.

www.spacefoundation.org – The Space Foundation is a non-profit organization advancing the exploration, development, and use of space and space education.



APOLLO 13

THE IMAX EXPERIENCE

"Houston, we have a problem."

Jim Lovell, Commander Apollo 13

The Apollo 13 mission to the Moon was expected to be a smooth trip, even dull according to some. The actual voyage was far from dull as the ship's three crew members and Mission Control in Houston worked desperately to save the astronauts after hearing Jim Lovell's heart-wrenching words, "Houston, we have a problem." Although the groups were 204,000 miles apart, their courage, quick thinking, and teamwork showed the world what could be accomplished in the face of potential tragedy.

Name: _____ Date: _____

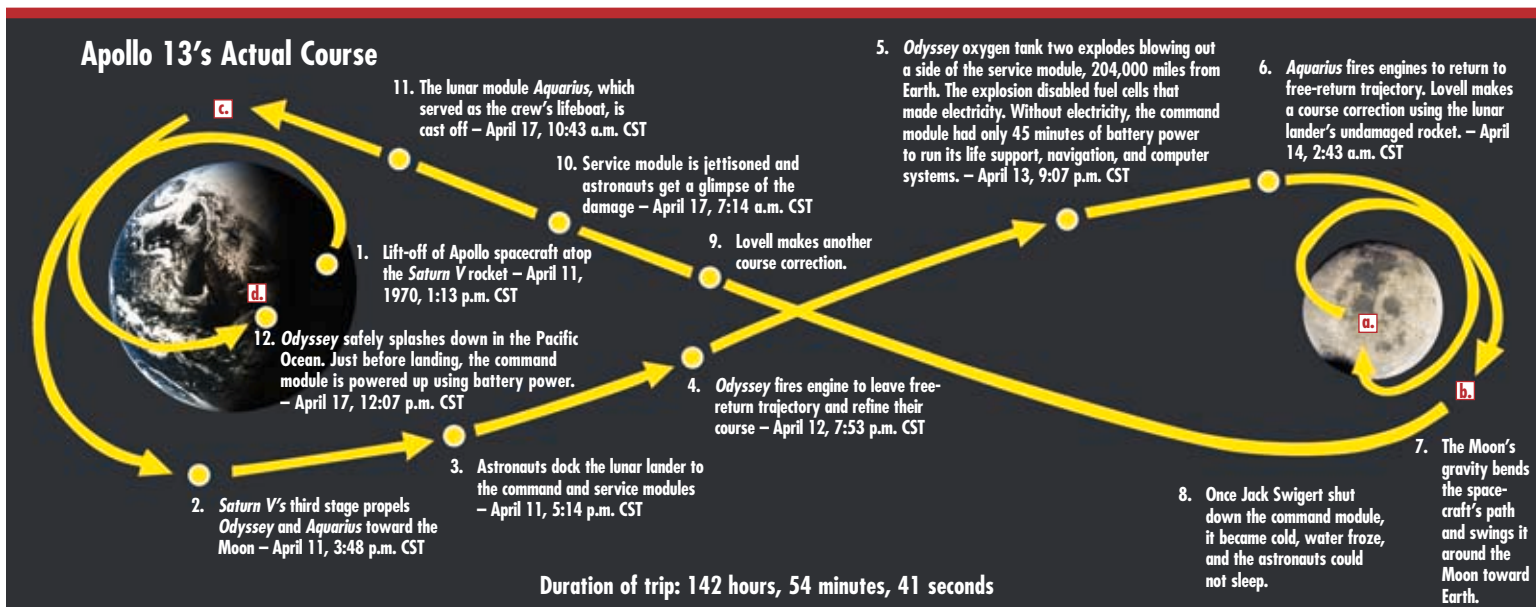
"Survival became initiative and ingenuity."

Jim Lovell

The Apollo moon ship consisted of three pieces:

- ▲ **Odyssey**, which included the command and service modules.
 - The command module housed three crew members, flight controls, and life-support systems.
 - The service module contained the main rocket engine, electrical power, and breathing oxygen.

- ▲ **Aquarius**, the lunar module, which shuttled two astronauts to the Moon's surface and back. The boxy part was left behind when the astronauts returned to the command module. Only the command module made it back to Earth.



Planned Course

Up until Odyssey fired its engines (#4) everything went as planned. Here's what should have happened after that:

- a. Aquarius lands on the Moon – April 15, 8:55 p.m. CST, and Aquarius leaves the Moon on April 17, 6:22 a.m. CST
- b. Lunar lander jettisoned – April 17, 12:17 p.m. CST
- c. Service module jettisoned – April 21, 1:47 p.m. CST
- d. Odyssey splashes down – April 21, 2:17 p.m. CST

Part One

"My concern...went from 'I wonder what this is going to do to the landing, to I wonder if we can get back home again.'" Jim Lovell

Think about what Jim Lovell must have felt to have such a shift in priorities. Relate them to how we all must shift priorities in our lives, either positively or negatively, at any given moment.

Now, imagine that you are going to travel to the Moon in a space capsule. If you had to spend a week with two crew members traveling to the Moon, what sort of people would you want them to be? If you were the Commander, how would you lead your crew and instill courage? In an emergency, how would you manage your crew? If you had doubts about whether you would make it home safely, how would you remain positive and inspire your crew? On a separate piece of paper, describe the two people with whom you would travel to the Moon and explain why. Be sure to address the above questions to demonstrate what type of leader you would be for these two people in the wake of potential disaster.

Part Two

Research additional events and details about the Apollo 13 mission. You might review newspaper articles from April 11–17, 1970 for information. Then create a news article with facts and quotes about the plight of the mission.

"Let's everybody think of the kinds of things that could be venting...failure is not an option."

Eugene Kranz, Lead Flight Director, Apollo 13

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A RON HOWARD FILM

APOLLO 13

THE IMAX EXPERIENCE

Education That Entertains

IMAX® films are designed to educate and enlighten as much as they are to entertain. They offer educators a powerful teaching tool that is easily integrated into existing curriculum. And, they provide students with unique and exciting opportunities to explore new worlds and new ideas.

The Technology Behind The IMAX Experience

IMAX Film

IMAX uses 15-perforation, 70mm film to shoot and project images of incredible sharpness. The 15/70 frame is 10 times larger than the 35mm used in regular theatres and three times larger than standard 70mm film used in classic Hollywood epics. This makes it the largest commercial film ever invented.

IMAX Cameras

IMAX cameras are specifically designed to shoot 15/70mm film. Weighing between 42 and 100 pounds, these cameras are extremely versatile and can be used in any environment, even space.

IMAX Projectors

IMAX projectors are the most powerful in the world. The key lies in the Rolling Loop technology, which advances the 15/70 film in a wavelength motion at 24 frames per second. During projection, each frame is positioned on fixed registration pins and a vacuum holds the film flat against the rear lens element.

IMAX DMR™

IMAX DMR™ is a new technology that scans each frame of a 35mm film and converts it into a digital image, optimizing the image for printing on 70mm film. The techniques used to enhance the digital images include sharpening, color correction, grain removal, and eliminating unsteadiness. The enhanced digital signal is then recorded onto 15/70 film resulting in a visual presentation which, when projected on IMAX's state-of-the-art rolling loop projection system, is bright, crisp, steady and absolutely stunning!

Visit the IMAX Web site for more information about The IMAX Experience, IMAX technology, films, and theatres at www.IMAX.com.



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