



SPACE Discovery

« to boldly go where no man has gone before »

Captain James T. KIRK (Star Trek)

Places and
Forms of
Power

Myths
and
Heroes

The idea
of
Progress

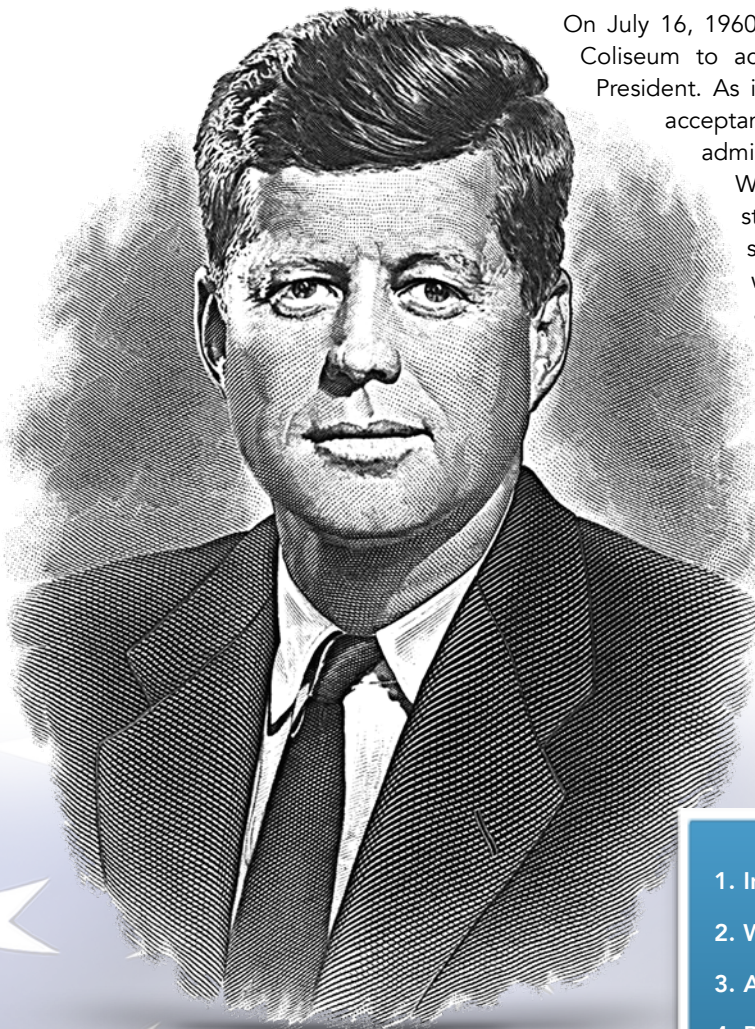
Space
and
Exchange

AN AMERICAN FRONTIER

On July 16, 1960, John F. Kennedy came to the podium of the Los Angeles Coliseum to accept the Democratic Party's nomination as candidate for President. As is customary in American political oratory, Kennedy used his acceptance speech to provide a slogan that would characterize his administration's style of thought and action. "I stand tonight facing 5
West on what was once the last frontier. From the lands that stretch 3000 miles behind me, the pioneers of old gave up their safety, their comfort and sometimes their lives to build a new world here in the West... (But) the problems are not all solved and the battles are not all won, and we stand today on the 10
edge of a new frontier - the frontier of the 1960s, a frontier of unknown opportunities and paths, a frontier of unfilled hopes and threats". By invoking the Frontier as a symbol to trademark his candidacy, Kennedy also tapped into one of the most resonant and persistent American myths. As 15
Richard Slotkin shows in this extraordinarily informed and wide-ranging new book, the myth of the Frontier has been perhaps the most pervasive influence behind American culture and politics in this century.

Richard Slotkin, 1992

Gunfighter Nation: The Myth of the Frontier in Twentieth-Century America



1. Introduce the document.
2. Who is John F. Kennedy?
3. At what moment does he deliver this famous speech?
4. Do you understand the reference made to the «last frontier» on the «West» ?
5. So, what is the «New Frontier»?
6. What kind of symbol is it? Can you link it with the notions?
7. In a few words, explain how you can link this document to the 3 notions proposed.



SPACE Discovery

KENNEDY'S NEW FRONTIER

Some would say that those struggles are all over. That all the horizons have been explored, that all the battles have been won, that there is no longer an American frontier. But I trust that no one in this vast assemblage will agree with those sentiments. For the problems are not all solved and the battles are not all won, and we stand today on the edge of a New Frontier: the frontier of the 1960's. The frontier of unknown opportunities and perils, the frontier of unfilled hopes and unfilled threats.

Woodrow Wilson's New Freedom promised our nation a new political and economic framework. Franklin Roosevelt's New Deal promised security and succor to those in need. But the New Frontier of which I speak is not a set of promises, it is a set of challenges. It sums up not what I intend to offer to the American people, but what I intend to ask of them. It appeals to their pride, it appeals to our pride, not our security. It holds out the promise of more sacrifice instead of more security.

The New Frontier is here, whether we seek it or not. Beyond that frontier are uncharted areas of science and space, unsolved problems of peace and war, unconquered province of ignorance and prejudice, unanswered questions of poverty and surplus. It would be easier to shrink from that New Frontier, to look to the safe mediocrity of the past, to be lulled by good intentions and high rhetoric, and those who prefer that course should not vote for me, or the democratic party.

But I believe that the times require imagination and courage and perseverance. I am asking each of you to be pioneers for that New Frontier. My call is to the young in heart, regardless of age, to all who respond to the Scriptural call: "Be strong and of a good courage; be not afraid, neither be dismayed."

John F. Kennedy, July 16 1960

Acceptance speech - Democratic National Convention

5
10
15



SPACE Discovery

KENNEDY'S NEW FRONTIER

Some would say that those struggles are all over. That all the horizons have been explored, that all the battles have been won, that there is no longer an American frontier. But I trust that no one in this vast assemblage will agree with those sentiments. For the problems are not all solved and the battles are not all won, and we stand today on the edge of a New Frontier: the frontier of the 1960's. The frontier of unknown opportunities and perils, the frontier of unfilled hopes and unfilled threats.

Woodrow Wilson's New Freedom promised our nation a new political and economic framework. Franklin Roosevelt's New Deal promised security and succor to those in need. But the New Frontier of which I speak is not a set of promises, it is a set of challenges. It sums up not what I intend to offer to the American people, but what I intend to ask of them. It appeals to their pride, it appeals to our pride, not our security. It holds out the promise of more sacrifice instead of more security.

The New Frontier is here, whether we seek it or not. Beyond that frontier are uncharted areas of science and space, unsolved problems of peace and war, unconquered province of ignorance and prejudice, unanswered questions of poverty and surplus. It would be easier to shrink from that New Frontier, to look to the safe mediocrity of the past, to be lulled by good intentions and high rhetoric, and those who prefer that course should not vote for me, or the democratic party.

But I believe that the times require imagination and courage and perseverance. I am asking each of you to be pioneers for that New Frontier. My call is to the young in heart, regardless of age, to all who respond to the Scriptural call: "Be strong and of a good courage; be not afraid, neither be dismayed."

John F. Kennedy, July 16 1960

Acceptance speech - Democratic National Convention

5
10
15



SPACE Discovery

THE UNCHARTED SPACE

THE EXPEDITION OF LEWIS & CLARK

On February 28, 1803, President Thomas Jefferson won approval from Congress for a visionary project, an endeavor that would become one of America's greatest stories of adventure. Twenty-five hundred dollars were appropriated to fund a small expeditionary group, whose mission was to explore the uncharted West. Jefferson called the group the Corps of Discovery. It would be led by Jefferson's secretary, Meriwether Lewis, and Lewis' friend, William Clark.

- 5
- 10

pbs.org



Places and Forms of Power

Myths and Heroes

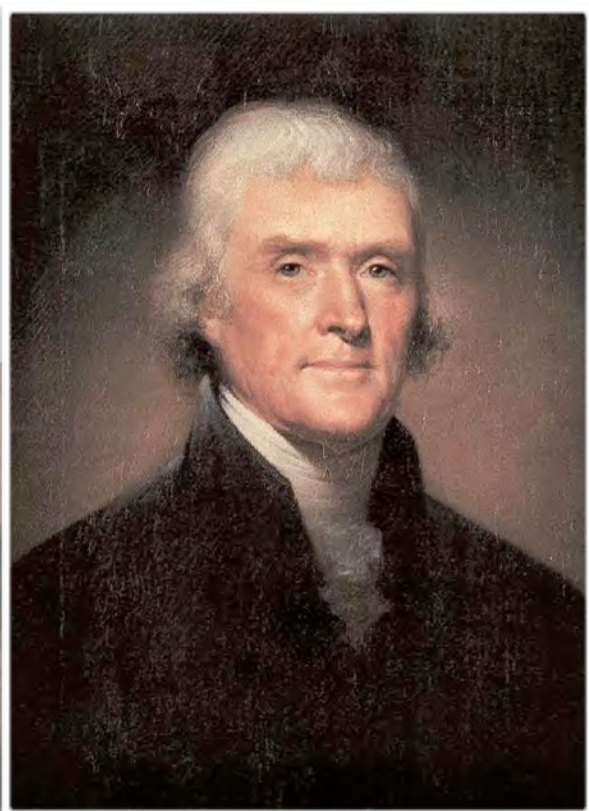
The idea of Progress

Space and Exchange

THE AMERICAN EXPERIENCE

"This is an incredible story of the American experience," says Truitt, executive producer at National Geographic. "What Lewis and Clark accomplished was an extraordinary feat of fortitude and luck. They had no solid knowledge about the land they were going to traverse and what little information they had was strikingly wrong. They faced 5 unbelievable danger with tremendous courage. Historians say that their journey was our equivalent of a trip to the moon."

www.californiasciencecenter.org



1. Introduce the documents.
2. What was the Expedition of Lewis & Clark?
3. Who decided to send this mission?
4. What is it compared to? Explain why it is relevant.
5. What do you understand about the American relationship with the «Frontier»?



relevant = pertinent



SPACE Discovery

WE CHOOSE TO GO TO THE MOON

DO IT RIGHT, DO IT FIRST

Places and
Forms of
Power

Myths
and
Heroes

The idea
of
Progress

Space
and
Exchange

But why, some say, the moon? Why choose this as our goal? And they may well ask why climb the highest mountain? Why, 35 years ago, fly the Atlantic? Why does Rice play Texas?

We choose to go to the moon. We choose to go to the moon in this decade and do the other things, not because they are easy, but because they are hard, because that goal will serve to organize and measure the best of our energies and skills, because that challenge is one that we are willing to accept, one we are unwilling to postpone, and one we intend to win, and the others, too.

We shall send to the moon, 240,000 miles away from the control station in Houston, a giant rocket more than 300 feet tall, the length of this football field, made of new metal alloys, some of which have not yet been invented, capable of standing heat and stresses several times more than have ever been experienced, fitted together with a precision better than the finest watch, carrying all the equipment needed for propulsion, guidance, control, communications, food and survival, on an untried mission, to an unknown celestial body, and then return it safely to earth, re-entering the atmosphere at speeds of over 25,000 miles per hour, causing heat about half that of the temperature of the sun--almost as hot as it is here today--and do all this, and do it right, and do it first before this decade is out--then we must be bold.

John Fitzgerald Kennedy, September 12th, 1962.



1. Introduce the document.
2. Who is speaking? Say what you know about him.
3. What is the topic of his speech?
4. Why does he keep asking questions at the beginning of the extract? Explain the stylistic device used here.
5. «not because they are easy, but because they are hard»
 - Can you explain why it is more important to do have difficult goals?
6. What can you say about the technical descriptions he gives about the equipment and the rocket?
7. «Untried mission» «Unknown celestial body»
 - How can you explain this need for something unknown?
 - What can you compare it to?
8. «Do it right and do it first»
 - Why is it important to «do it first»?
 - Who else could do it then? Explain the historical background.



ORAL COMPREHENSION

video available at: www.myenglishclass.net



SPACE Discovery

SPUTNIK SETS UP A NEW DEAL THE USA IS SCARED AND CHALLENGED

Satellite

Gas Jet

Pneumatic
Ejection
System

Places and
Forms of
Power

The idea
of
Progress

The standard Sputnik story goes like this: It was the launch of this metal ball that forced the United States to elevate the pursuit of science. But that's not quite true.

5 Technically speaking, Sputnik was no more sophisticated than a cheap transmitter from Radio Shack attached to 120 pounds of batteries. It was the R-7 launch vehicle that scared the pants off the U.S. military. The Soviets proved they not only had a rocket with precise guidance systems, but one that could launch a heavier payload than anything the Americans had.

10 The launch system on Oct. 4, 1957, was a one-shot deal. It was preset before takeoff and its trajectory could not be changed during flight. The Russians had to fire and pray.

15 Despite its apparent simplicity, the impact of the R-7 rocket cannot be overstated. Sputnik was the first satellite humans launched into orbit, and it stunned the world.

By the time the United States had launched 20 pounds into orbit, the Russians had already launched Sputnik 2, at 1,118 pounds, more than 50 times as much.

20 Even a month before the Sputnik launch, many of the military, political and academic leaders in the Soviet Union saw no merit in putting such a rudimentary artificial moon above the Earth.

25 But the maverick bunch of engineers who built Sputnik predicted its political impact. In the Cold War mentality that took hold following World War II, Sputnik had a purpose: to show Washington that Moscow had a lead in the arms race and the technical wherewithal to face up to the United States.

30 "The Soviet Union must be first," Sergei Pavlovich Korolëv, chief designer of the Soviet missile program and the chief proponent of sending Sputnik into orbit, told dissenters the month before the satellite's launch, according to Matthew Brzezinski's book *Red Moon Rising*.



1. Introduce the document.
2. What is Sputnik?
 - Give the «technical» definition of the author.
3. What was the reaction of the U.S. military?
 - Explain what was the threat for the Americans.
4. What were the technical limits of this first launch for the Soviets?
5. Finally, what was the reaction of the world?
6. Can you compare the achievements of the 2 nations?
7. What was the purpose of the Russians engineers in this Cold War context ?
8. Who was Korolëv and what was his intention?

Robert Lemos, WIRED.com, October 3rd 2007



SPACE Discovery

THE MERCURY PROJECT

ALAN SHEPARD'S MISSION

Myths and Heroes

Places and Forms of Power

The Idea of Progress

In 1959, 110 test pilots were invited to volunteer for the space flight program headed by the new National Aeronautics and Space Administration (NASA). Although Shepard was on the list, a snafu kept him from receiving his invitation. Regardless, he was selected as one of the first seven astronauts for the organization. Known as the Mercury 7, the group included John Glenn, Virgil "Gus" Grissom, Donald "Deke" Slayton, Malcolm "Scott" Carpenter, Walter "Wally" Schirra, and Gordon Cooper. From this prestigious group of highly trained fliers, Shepard was selected to man the first space flight, with Glenn acting as his backup.

The stakes were raised in the space race on April 15, 1961, when the Soviet Union launched cosmonaut Yuri Gagarin into space and he became the first person to orbit the Earth. Gagarin beat the Americans by less than a month. Shepard's launch was initially scheduled for May 2, but was rescheduled twice because of weather conditions. On May 5, Freedom 7 lifted off, carrying Shepard to an altitude of 116 miles for a 15-minute flight. Because of the placement of the porthole windows, the first American in space was unable to catch a glimpse of the stars, and he was strapped in too tight to experience weightlessness. Also, a filter left on the periscope window rendered the Earth below in black and white.

Although the Soviets had reached the historic milestone first, Shepard's suborbital flight made a significant worldwide impact because its launch, travel and splashdown were watched on live television by millions of people. By contrast, the details of Gagarin's landing were kept confidential for more than a decade. For his daring achievement, President John F. Kennedy awarded Shepard the NASA Distinguished Service Medal.



Alan Shepard - painting by Mark Wheatley, 2010

Nola Taylor Redd, SPACE.com

1. Introduce the document.
2. Who is Alan Shepard?
3. What was his role?
4. Did he succeed? Explain what happened.
5. Explain his flight conditions.
6. What was the impact of Shepard's flight on the world?
 - Why? What was different to Gagarin's flight?





SPACE Discovery

Myths
and
Heroes

JOHN GLENN AN AMERICAN HERO

«(A) hero...is somebody who is so preeminent in his or her field that it benefits other people and our country. These heroes have dedicated themselves to something that is very important to everybody and their own affairs have become secondary.» - John Glenn

At the height of the Cold War between the United States and the Soviet Union, John Glenn launched into space and landed as the first American to orbit the Earth. The year was 1962. The Berlin Wall had just been erected and the prior year saw two Russian cosmonauts successfully orbit the Earth, propelling the Russians to the head of the Space Race. Americans needed a patriotic boost, and NASA's success did just that, with Glenn as the icon of a renewed American pride.

Perhaps John Glenn will always be remembered as the hero in a space suit, but his historic orbit wasn't the first time he served his country well, and it certainly wasn't the last. Long before his fame as an astronaut, John had a strong sense of pride for his country and his duty to serve it, and this attitude and sense of honor and integrity has remained with Glenn throughout his life, from his love of flying, to a decorated military career, and then on to NASA and the US Senate.

Kathy Crockett, www.myhero.com, 31st January 2013



1. Introduce the documents.
2. Who is John Glenn
3. What did he do?
4. Is he a hero? Explain using all the documents.



Hawaii California Indian Ocean ship Woomera



SPACE Discovery

GEMINI SPACECRAFT
CABIN EQUIPMENT
from Gemini Familiarization Manual
revision 31 December 1964



The idea of Progress

GEMINI A BRIDGE TO THE MOON

Just weeks after Mercury astronaut Alan Shepard became the first American in space in May 1961, President John F. Kennedy announced the goal of sending astronauts to the moon before the end of the decade. Building on the Mercury successes, NASA soon expanded its manned space flight program to include the development of a two-man spacecraft dubbed Gemini. It would serve as the essential bridge between the first tentative steps of Mercury and the history-making lunar landings of Apollo.

During ten flights from March 1965 to November 1966, astronauts and ground controllers tested out the rendezvous and docking techniques that would be crucial for a successful lunar mission. They also learned more about weightlessness and its effects during longer-duration flights. When Gemini 12 splashed down on Nov. 15, 1966, NASA's bridge to the moon was complete.

www.nasa.gov

1. Introduce the document.
2. What is Project Gemini?
3. What is its goal?



Norman Rockwell, "Grissom and Young" (1965)



Myths
and
Heroes

ARTS

BECOMING ICONS

1. Introduce the document.
2. Who is Norman Rockwell?
3. Who is represented here?
4. What situation is it?
Describe the painting.
5. Can you explain what these men have become for the public opinion?



SPACE Discovery

APOLLO TIME TO GO TO THE MOON



Project Apollo's goals went beyond landing Americans on the Moon and returning them safely to Earth. They included:

- Establishing the technology to meet other national interests in space.
- Achieving preeminence in space for the United States.
- Carrying out a program of scientific exploration of the Moon.
- Developing man's capability to work in the lunar environment.

5

10 Rocket and Spacecraft

The flight mode, lunar orbit rendezvous, was selected in 1962. The boosters for the program were the Saturn IB for Earth orbit flights and the Saturn V for lunar flights.

Apollo was a three-part spacecraft: the command module (CM), the crew's quarters and flight control section; the service module (SM) for the propulsion and spacecraft support systems (when together, the two modules are called CSM); and the lunar module (LM), to take two of the crew to the lunar surface, support them on the Moon, and return them to the CSM in lunar orbit.

15



www.nasa.gov

1. Introduce the document.
2. What is Project Apollo?
3. What were its goals?
 - Describe them precisely
4. What rockets were used for these missions?
 - Say which one was used for what type of mission.
5. What type of spacecraft was Apollo?
 - Give the technical description
6. Explain the symbols used on the Apollo mission badge.





SPACE Discovery

FIRST TRAGEDY APOLLO ASTRONAUTS DIE



Cape Kennedy, Florida, January 27 1967. The three-man crew of astronauts for the Apollo 1 mission were killed tonight in a flash fire aboard the huge spacecraft designed to take man to the moon.

Those killed in the blaze on a launching pad were: 5

- VIRGIL I. GRISSOM, 40 years old, Air Force lieutenant colonel, one of the seven original Mercury astronauts.
- EDWARD H. WHITE 2d, 36, a lieutenant colonel in the Air Force, the first American to "walk" in space. 10
- ROGER B. CHAFFEE, 31, a Navy lieutenant commander, who had been awaiting his first space flight.

The astronauts were the first American spacemen to be killed on the job and ironically, died while on the ground. The bodies were removed hours later and a space agency spokesman said death was "instantaneous." 15

Three other astronauts died in airplane crashes, in the line of duty, but today's tragedy involved the first "on premises" deaths in the American space program- the first time anyone was killed while in space hardware. 20

The New York Times, January 28, 1967



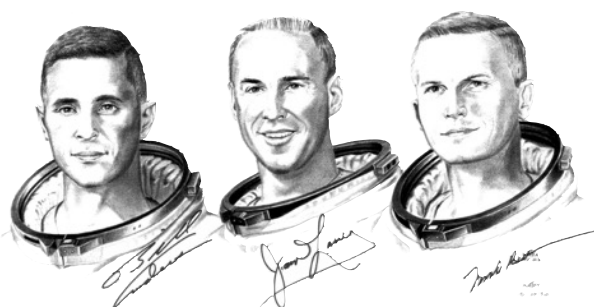
1. Introduce the document.
2. What happened.
 - Explain and give as much details as possible.
3. Who was killed?
4. Why is this tragedy so important for the NASA and the US?
5. What is ironic about their death?



SPACE Discovery

APOLLO 8

THE FIRST MANNED FLIGHT TO ANOTHER WORLD



The 3 astronauts of the Apollo 8 mission
Frank Borman - Jim Lovell - William Anders



Apollo 8 mission badge

In April 1968, U.S. intelligence sources reported that the Soviet Union had a rocket capable of sending men to the moon. The crew members of Apollo 8 (commander Frank Borman, service module pilot James Lovell and lunar module pilot William Anders) were supposed to test the lunar module in high Earth orbit in December. However, engineers would not have the lunar module ready in time for that launch window. Apollo's program manager, George Low, contemplated what to do with the mission. Should Apollo 8 repeat the test of the Apollo capsule that was assigned to Apollo 7, but only in high Earth orbit? Should they do something to outshine the Soviets, like having the crew of Apollo 8 orbit the moon by the year's end?

The plan to orbit the moon was risky; no one had ever left Earth's orbit. If the service module engine failed, the astronauts would die in lunar orbit. Low considered these issues, but decided that beating the Soviets at sending men to the moon was worth the risks. It would be like a "Hail, Mary" pass during the closing seconds of a football game for the win. Chief rocket engineer Wernher von Braun assured him that the powerful Saturn V moon rocket would work despite previous setbacks; the rocket had never been tested with a manned crew. So, in August 1968, the decision to send Apollo 8 to the moon was approved. NASA had four months to get ready, and that included developing navigation software to fly a space ship to the moon.

On Dec. 21, 1968, Apollo 8 lifted off into Earth orbit. Hours later, the astronauts fired the third-stage engine to send them to the moon. For the next three days, they coasted to the moon. On Christmas Eve morning, they fired the service

module engine to place them in lunar orbit. The astronauts became the first humans to see the lunar surface up close -- from about 60 miles (100 kilometers) above. They spent the time photographing the lunar surface and studying future Apollo landing sites. They also were the first people to see the Earth rise above the lunar horizon. Early Christmas morning, the moment of truth came; they fired the engine to leave lunar orbit. The atmosphere in Houston was tense until Lovell announced, "Please be informed, there IS a Santa Claus." Apollo 8 was on its way home. The space ship splashed down in the Pacific Ocean on Dec. 27, thereby completing the first voyage to the moon. Of the crew, only Lovell would return to the moon -- on the Apollo 13 flight.

Craig C. Freudenrich, curiosity.discovery.com

1. Introduce the document.
2. What was the goal of Apollo 8?
3. Why were the US extremely motivated?
4. Why was this mission very dangerous?
5. When was the mission finally launched?
6. When did they get into lunar orbit?
7. What type of pioneers were the astronauts?
8. What did they do?
9. Why was the atmosphere «tense» at Houston?
10. What were Jim Lovell's plans after Apollo 8?





SPACE Discovery

«EARTHRISE»

THE FIRST PHOTO OF THE EARTH TAKEN FROM A DISTANT POINT OF VIEW



This photo of "Earthrise" over the lunar horizon was taken by the Apollo 8 crew in December 1968, showing Earth for the first time as it appears from deep space.

Astronauts Frank Borman, Jim Lovell and William Anders had become the first humans to leave Earth orbit, 5 entering lunar orbit on Christmas Eve. In a historic live broadcast that night, the crew took turns reading from the Book of Genesis, closing with a holiday wish from Commander Borman: "We close with good night, good luck, a Merry Christmas, and God bless all of you -- all of 10 you on the good Earth."

www.nasa.gov

1. Introduce the document.
2. What can you see on this picture?
3. Can you explain why this photo stunned the entire world?





SPACE Discovery

Places and
Forms of
Power

Space
and
Exchange

The idea
of
Progress

Myths
and
Heroes

APOLLO 11

THE EAGLE HAS LANDED

July 1969. It's a little over eight years since the flights of Gagarin and Shepard, followed quickly by President Kennedy's challenge to put a man on the moon before the decade is out.

5 It is only seven months since NASA's made a bold decision to send Apollo 8 all the way to the moon on the first manned flight of the massive Saturn V rocket.

Now, on the morning of July 16, Apollo 11 astronauts Neil Armstrong, Buzz Aldrin and

10 Michael Collins sit atop another Saturn V at Launch Complex 39A at the Kennedy Space Center. The three-stage 363-foot rocket will use its 7.5 million pounds of thrust to propel them into space and
15 into history.

At 9:32 a.m. EDT, the engines fire and Apollo 11 clears the tower. About 12 minutes later, the crew is in Earth orbit.

After one and a half orbits, Apollo 11 gets
20 a "go" for what mission controllers call "Translunar Injection" - in other words, it's time to head for the moon. Three days later the crew is in lunar orbit. A day after that, Armstrong and Aldrin climb into the lunar module Eagle and begin the
25 descent, while Collins orbits in the command module Columbia.

Collins later writes that Eagle is "the weirdest looking contraption I have ever seen in the sky," but it will prove its worth.

30 When the lunar module lands at 4:18 p.m EDT, only 30 seconds of fuel remain. Armstrong radios "Houston, Tranquility Base here. The Eagle has landed." Mission control erupts in celebration as the tension breaks, and a controller tells the crew "You got a bunch of guys about to turn blue,
35 we're breathing again."

Armstrong will later confirm that landing was his biggest concern, saying "the unknowns were rampant," and "there were just a thousand things to worry about."

40 At 10:56 p.m. EDT Armstrong is ready to plant the first human foot on another world. With more than half a billion people watching on television, he climbs down the ladder and proclaims: "That's one small step for a man, one giant leap for mankind."

45 Aldrin joins him shortly, and offers a simple but powerful description of the lunar surface: "magnificent desolation." They explore the surface for two and a half hours, collecting samples and taking photographs.



They leave behind an American flag, a patch honoring the fallen Apollo 1 crew, and a plaque on one of Eagle's legs. It reads, "Here men from the planet Earth first set foot upon the moon. July 1969 A.D. We came in peace for all mankind." 50

Armstrong and Aldrin blast off and dock with Collins in Columbia. Collins later says that "for the first time," he "really felt that we were going to carry this thing off." 55

The crew splashes down off Hawaii on July 24. Kennedy's challenge has been met. Men from Earth have walked on the moon and returned safely home.

In an interview years later, Armstrong 60 praises the "hundreds of thousands" of people behind the project. "Every guy that's setting up the tests, cranking the torque wrench, and so on, is saying, man or woman, 'If anything goes wrong
65 here, it's not going to be my fault.'"

In a post-flight press conference, Armstrong calls the flight "a beginning of a new age," while Collins talks about future
70 journeys to Mars.

Over the next three and a half years, 10 astronauts will follow in their footsteps. Gene Cernan, commander of the last Apollo mission leaves the lunar surface with these words: "We leave as we came and, god willing, as we shall return, with peace, and hope for all mankind." 75

www.nasa.gov

1. Introduce the document
2. What is Apollo 11? What was the mission?
3. Was it successful?
4. Who were the astronauts of Apollo 11?
5. When was the mission launched?
6. What rocket did they use?
7. What is the name of the Space Center? Why?
8. When did Apollo 11 arrive on the Moon?
9. What is the code for the successful landing? Why? Can you compare it to the badge of the mission?
10. Who is the first man to step on the Moon?
11. What did he say when he stepped on the surface of the Moon? Can you understand why he said that?
12. Who is the second man to walk on the Moon?
13. What did they leave on the Moon?
14. Armstrong said this was the «beginning of a new age» (l 68 / 69). Why? Do you agree?



The New York Times

MEN WALK ON MOON

ASTRONAUTS LAND ON PLAIN; COLLECT ROCKS, PLANT FLAG

Voice From Moon: 'Eagle Has Landed'



A Powdery Surface Is Closely Explored

...the lunar surface is a fine, powdery soil, called regolith, that has been broken up by billions of years of meteorite bombardment. The surface is so fine that it clings to the lunar module's legs and the astronauts' suits. It is also so soft that it can be walked on without leaving deep footprints. The astronauts found that the surface was covered with small rocks and pebbles of various sizes. Some of these rocks were collected by the astronauts for scientific study. The lunar surface is also covered with a thin layer of water ice in the permanently shadowed regions of the poles.

VOYAGE TO THE MOON

By Lawrence Sanders
...the lunar surface is a fine, powdery soil, called regolith, that has been broken up by billions of years of meteorite bombardment. The surface is so fine that it clings to the lunar module's legs and the astronauts' suits. It is also so soft that it can be walked on without leaving deep footprints. The astronauts found that the surface was covered with small rocks and pebbles of various sizes. Some of these rocks were collected by the astronauts for scientific study. The lunar surface is also covered with a thin layer of water ice in the permanently shadowed regions of the poles.

Disc

1967 - Man on the Moon - Norman Rockwell



1969 - From the Earth to the Moon - Norman Rockwell



1969 - Two Men on the Moon - Norman Rockwell



1969 - Paul Calle, Apollo 11 Suiting Up

Paul Calle July 14, 1969