Anne-Charlotte Legrand, Académie de Versailles – Lycée Alain

The Final Frontier ? *Innovation scientifique et citroyenneté :* “That’s one small step for man, one giant leap for mankind.” — Neil Armstrong, 1969 .	
	Should humanity continue investing in the conquest of space?
At the end of the Unit, I will	Give my opinion about space conquest and explain it
What vocabulary will I need ?	Space conquest the issue of modern space conquest opinion
What grammatical structure will I need ?	Modals expression opinion and arguments past simple and past perfect
What documents will be used ?	**1- Space conquest : a history** 1a- Space conquest in 15 milestones (exercice) 1b- Space conquest in 15 milestones illustrated 1c- Space conquest in 15 milestones (explanations) **2- Why go to the moon?** 2a- "Why go to the moon?" - John F. Kennedy at Rice University, Texas, Sept 12 1962 2b-- letter from 13 year-old- Mary Lou Reitler to the President (letter + script) 2c-Deputy Special Counsel to the President Myer Feldman letter to Mary-Lou Reitler, on the President’s behalf (letter + script) 2d- Other things to consider **3- Moon Landing Investigation** 3a- Neil Armstrong - First Moon Landing 1969 3b- Moon Landing Investigation : Evidence (exercice) 3c- Moon Landing Investigation - Evidence collection sheet 3d- The need of Debunking moon conspracy 3e- Debunking moon landing conspiracies in 59 seconds 3f- Moon Landing Fact checking by proflegrand78 on Genially **4- Space Representation** 4a- June 2001– and the Moon be Still as Bright Ray Bradubury, *Martian Chronicles,* 1950 4b- Martian Chronicles, Off Season, Les Edwards, 1999 4c- Elysium, movie poster by Neill Blomkamp 2013

	5- the Issues of Modern Space conquest 5a- Heng Kim Song - The International New York Times (published September 28, 2014) 5b- Holy Cow, answer by Satish Acharya, 2014 5c- Space datacenters proposed by Musk and Bezos 'catastrophic' for planet, experts warn, Tom Perkins, Thu 23 Jul 2026, *The Guardian* **6- What next?** 6a- Space tourism could be getting more affordable, CBS New York, April 13 2025 6b- The race for the moon continues Statista- 2023 6c- The Fermi paradox explained, video by LAB
What will I learn about ?	How space conquest is more than just exploring the univers the environmental and money issues linked to space conquest
Final Task	As .... you are asked to share your opinion about space conquest. The grading sheet and role will be given on D-day

Instructions for your Final Project :

1- You will embody someone specifically and will share your opinion about the future of Space conquest.

2- You may be: - yourself, a high-school teenager being part of a draw and questionned
- a skeptical space scientific who believes space conquest should come to a halt
- Elon Musk or Jeff Bezo, a millionaire who wishes to develop space tourism and space conquest for many different reason
- a famous flat-earther, a conspiracionist who doesn't belive in space conquest
- Narendra Modi, India's Prime Minister

3- You are meant to write a 200-words essay and share your opinion about space conquest, embodying your character as well as possible,

4- you will need to introduce yourself, explain the reason why you think the way you do and justify your answer to the question "Should humanity continue investing in the conquest of space? "

5- you will need to pick arguments from the lesson (1 opinion or less = A1, 2 = A2, 3 and more = B1 and above, according to how well you use them)

6- You will need to introduce us to at least one personal opinion

1- **space conquest : a history**

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1a- Space conquest in 15 milestones (exercice)
1b- Space conquest in 15 milestones illustrated (pour projection une fois l'exercice fait)
1c- Space conquest in 15 milestones (explanations) (pour projection un fois l'exercice fait)

1a- Space conquest les grandes dates - reprérage:
distrution des images (une par personne) et des grandes dates avec des éléments clés an amont – faire des recherches pour s'approprier les évènements importants
présenter à ces camarades avec une tonalité:
ironique – humoristique – incréduble – journalistique
présentation à deux (groupes work fait au hasard)
recap écrit sur l'ensemble des 15 étapes – travail en individuel dans les cahiers
choix d'au moins 6 éléments différents

2 Moonlanding Investigation

- exercice basé sur une activité de on line observatory
In this activity, students will be given a range of pieces of evidence including a short video of the Apollo 11 lunar landings. They will examine 21 different pieces of evidence arranged around the classroom. Approximately half of the evidence suggests that the Moon landings were faked, the other half indicate they were real. The students are given a worksheet to fill in as they tour the evidence, forming their own opinions.
In 1969 America sent astronauts to the moon and on the 16th of July the first ever human (Neil Armstrong) set foot there, famously saying 'one small step for man, one giant leap for mankind'. Between 1969 and 1972 America sent six manned missions to land on the moon. Watch a video of the historical event and discuss what the students see (https://www.youtube.com/watch?v=cwZb2mqId0A). Along with the astronauts NASA sent a lunar module, to land on the planet, and a lunar buggy that they could drive around. Despite this video evidence and popular belief, there are some people who do not believe the moon landings were real. Ask students to vote on whether they believe the moon landings were real or fake, make a note of the result. In this activity you will investigate the evidence for yourselves and come to your own conclusion. Activity 1: • Distribute the 21 pieces of evidence around the room and organise students into groups of 3-4, each starting at one of the pieces of evidence. Introduce the activity, tell students to go around the room and look at the different evidence slides, tell them it is ok for them to have a different opinion from others in their group.
1. Students decide whether the evidence is for or against the moon landings being real.
2. They then rate the strength of the evidence, deciding how reliable it is.
3. They should make a note of this on their collection sheets.
4. On the collection sheets students should make any notes they have about the evidence and also write a few questions that might be relevant to ask.
5. Students should move around the room and repeat the process until they have finished the collection sheet, with all pieces of evidence reviewed.
6. When all students have finished, ask them to write their names on two different coloured post-it notes. One colour for the 'strongest' evidence and one for the 'weakest'. Students should place their post-it notes on the piece of evidence they think is the strongest (most valid/important) and the weakest.

Instruction for pupils:
Go around the room looking at the 21 different pieces of evidence for the moon landings. For each one decide whether it is evidence for the moon landings being real, fake or

neither and fill this in in the table on the collection sheet. You will also need to decide how important the pieces of evidence are, giving them a rating out of ten (where 10 is the strongest). At the end of the activity mark the strongest and weakest evidence with post-it notes. You can have different answers from your group.

Mettre au tableau les evidences et les posts its correspondand
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https://onlineobservatory.eu/category/resources/moon

vidéo:
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evidence à mettre dans la salle / à s'approprier:
https://onlineobservatory.eu/wp-content/uploads/2020/12/MoonLandingInvestigation_evidence.pdf

conclusion:
https://view.genially.com/5ef1ca4f4a737d0d34d2ead0

suite de l'exercice:
interview of Neil Armstrong
diary of Neil Armstrong : remembrance

2- Moon landing: a choice: (activitée basée sur https://www.jfklibrary.org/sites/default/files/2018-06/Why_Choose_the_Moon.pdf)

Historical Background and Context:
On May 25, 1961, President John F. Kennedy made a special address to Congress on Urgent National Needs and asked Congress to dedicate $7 to $9 billion dollars to the space program. The United States, he declared, needed “to take a clearly leading role in space achievement” and “commit itself to achieving the goal, before this decade is out, of landing a man on the moon and returning him safely to the earth.”

The mission was clear: the United States must go to the moon. President Kennedy made this request one month after the Soviet Union had sent the first man into space. The Soviet success suggested that the United States was falling behind in the arms race and fueled new tensions between the two nations entwined in a bitter Cold War. Space was the latest theater for battling the Cold War and provided an opportunity for the United States to promote leadership and demonstrate the technological advances of a free and democratic society.

In order to do that, the United States needed to reach the moon before the Soviet Union. To achieve this end, Congress appropriated the funding for NASA’s Apollo lunar landing program. It took eight years of work and sacrifice, including the loss of three astronauts in a fire aboard Apollo 1, but President Kennedy’s goal was finally achieved on July 20, 1969 when Neil Armstrong and Buzz Aldrin became the first men to walk on the moon as part of the Apollo 11 mission.

From the very moment President Kennedy made his intentions clear, people began to debate the necessity of space exploration. The wonders of exploring the unknown and

promise of potentially life-altering technological advances were tempered by thoughts that life would be most improved by focusing on immediate concerns on earth such as the struggle for civil rights, domestic anti-poverty programs, and, as time went on, increasing U.S. involvement in Vietnam

2a- JKF speech :
appropriation du speech en pair work (s'arranger pour avoir un multiple de 4): deux personnes reçoivent le meme texte, et travaille à deux. Trouver un titre, justifier en donnant les idées principales.
Être en mesure de résumer le texte en 3 idées principales
échange en group work de 4: s'arranger pour avoir 4 personnes avec les 4 textes et faire un recap en commun des raisons pour lesquelles JFK propose cette conquête spatiale.
Les classer du meilleur argument au moins bon selon soi

Part 1 — Space as a New Frontier: Knowledge, Responsibility & Peace
From:
"We set sail on this new sea…"
To:
"…its opportunity for peaceful cooperation may never come again."
Main ideas

- Space offers new knowledge and opportunities.
- Technology can be used for good or evil.
- Humans are responsible for its consequences.
- Space could become a place of peace or conflict.
- International cooperation is a unique opportunity.

Core message:
The exploration of space brings great power and great responsibility.

Part 2 — Why the Moon? The Value of Difficult Challenges
From:
"But why, some say, the moon?"
To:
"…we shall make up and move ahead."
Main ideas

- Humanity has always pursued difficult challenges.
- The Moon is chosen because it is difficult.
- Difficult goals mobilize human abilities.
- The United States accepts the challenge.
- The space program becomes a symbol of national determination.

Core message:
We choose difficult goals because they push us to achieve what seems impossible.

Part 3 — The Benefits of Space Exploration
From:
"The growth of our science and education will be enriched…"
To:
"…for we have given this program a high national priority…"
Main ideas

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- Space exploration advances science and education.
- It creates new technologies.
- It benefits medicine, industry, schools, and everyday life.
- It creates jobs and economic growth.
- It requires major financial investment.

Core message:
Investing in space exploration can produce benefits far beyond space itself.

Part 4 — The Moon Mission: Risk, Courage & Human Ambition
From:
"But if I were to say, my fellow citizens…"
To:
"…the greatest adventure on which man has ever embarked."
Main ideas

- The Moon mission is an extraordinary technological challenge.
- It requires precision, innovation, and courage.
- The mission is expensive and dangerous.
- Humanity explores because new frontiers exist.
- Space represents knowledge, hope, peace, and adventure.

Core message:
Humanity explores the unknown because the challenge itself expands what is possible.
1. RESPONSIBILITY → 2. CHALLENGE → 3. PROGRESS → 4. ADVENTURE

What does space mean?
Why should we attempt the impossible?
What can we gain from the effort?
Why should we continue exploring?

2b-- letter from 13 year-old- Mary Lou Reitler to the President
What is Mary Lou's reaction to the decision to send a man to the moon?
What are the reasons that Mary Lou gives to defend her position?

2c-Deputy Special Counsel to the President Myer Feldman letter to Mary-Lou Reitler, on the President's behalf
How does Myer Feldman respond to Mary Lou's letter?
What are the reasons that Myer Feldman uses to defend his position

brainstorm additional reasons in support of or opposition to spending federal money on the space program. 4. Have students look at the handout "Other Things to Consider" for additional ideas. This handout provides a chronology of other events that were going on at the same time as the Apollo program, statistics about the cost of the Apollo program, and a list of technological advances attributed to the Apollo program

(imprimer les éléments de https://www.jfklibrary.org/sites/default/files/2018-06/Why_Choose_the_Moon.pdf)

question: what problems does moon landing brings today?

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3- Moonlanding Investigation
3a- Neil Armstrong - First Moon Landing 1969
3b- Moon Landing Investigation : Evidence (exercice)
3c- Moon Landing Investigation - Evidence collection sheet
3d - Moon Landing Fact checking by proflegrand78 on Genially

Moonlanding Investigation - exercice basé sur une activité de on line observatory
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evidence à mettre dans la salle / à s'approprier:
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conclusion:
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suite de l'exercice:
interview of Neil Armstrong
diary of Neil Armstrong : remembrance

4- Space Representation

4a- June 2001– and the Moon be Still as Bright Ray Bradubury, *Martian Chronicles,* 1950
travail sur la nouvelle: focus sur 4 groupes de personnes: the men from the rew, Hathaway, captain Wilder et Jeff Spender
-the place : description, sound...
-the Martians
conclusion: what has happened ? // avec les Natives from South America : what message is conveyed?
4b- Martian Chronicles, Off Season, Les Edwards, 1999 : travail de description de la photo (possibilité de faire dessinet en étant dos au tableau ou écrire la description de l'image:
// avec la nouvelle d'avant: disparition de la ville derrière, pollution, Américanisation de la planète
4c- Elysium, movie poster by Neill Blomkamp 2013 : différence entre les have et les have nots => ceux qui ont le droit et ceux qui n'ont pas le droit

5- the Issues of Modern Space conquest

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5b- Holy Cow, answer by Satish Acharya, 2014
// entre les deux images: qu'est ce que cela veut dire? Quels sont les messages derrières les deux illustrations?

5c- Space datacenters proposed by Musk and Bezos 'catastrophic' for planet, experts warn, Tom Perkins, Thu 23 Jul 2026, *The Guardian*
https://www.theguardian.com/science/2026/jul/23/space-datacenters-bezos-blue-origin
étude du texte: proposition hierarchisation des éléments
qu'en déduire?

6- What next?
6a- Space tourism could be getting more affordable, CBS New York, April 13 2025
travail sur la vidéo : reparage, tonalité, noms, compagnie
les pro les contre: se faire une opinion

https://www.youtube.com/watch?v=boi2Q9kPQqU
6b- The race for the moon continues Statista- 2023
6c- The Fermi paradox explained, video by LAB

https://www.theguardian.com/science/2026/jul/23/space-datacenters-bezos-blue-origin

les dangers de la space conquest:
pollution elon musk
have et les have notes

// pays blanc et inde

suprématie des pays blancs: image de l'inde vs nouvelle image de l'inde
ferge complexe : is it a good idea?

Part 2 — Five Important Elements for Each Milestone

1. Sputnik 1 — 1957

- First artificial satellite.
- Launched by the Soviet Union.
- Proved that objects could be placed into orbit.
- Started the Space Race.
- Marked the beginning of the Space Age.

2. Yuri Gagarin — 1961

- First human in space.
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- Flew aboard Vostok 1.
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- Returned lunar samples to Earth.
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4. Voyager 1 — 1977

- Explored Jupiter and Saturn.
- Revealed new information about the outer planets and their moons.
- Continues operating far from Earth.
- Entered interstellar space.
- Demonstrates the extraordinary longevity of scientific missions.

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- Introduced reusable orbital spacecraft.
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- Major NASA–ESA collaboration.
- Observed distant galaxies and nebulae.
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7. International Space Station — 1998

- Permanent laboratory in low Earth orbit.
- Built through international cooperation.
- Enables long-duration human research.
- Studies biology, physics, and human health in microgravity.
- Serves as a testbed for future deep-space missions.

8. Spirit & Opportunity — 2004

- Explored the Martian surface.
- Found evidence of ancient liquid water.
- Operated far longer than originally expected.
- Demonstrated the value of robotic exploration.
- Changed our understanding of Mars' geological history.

9. SpaceX — 2002–Today

- Founded with the goal of reducing launch costs.
- Made orbital rocket booster reuse practical.
- Developed commercial crew transportation.
- Expanded the scale of commercial space activity.
- Is developing Starship for future deep-space missions.

10. Curiosity — 2012

- Successfully landed a large rover on Mars.
- Used the innovative Sky Crane landing system.
- Found evidence of an ancient habitable environment.
- Studies Martian rocks, soil, atmosphere, and climate.
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11. Rosetta & Philae — 2014

- First mission to orbit a comet.
- Philae became the first probe to land on a comet.
- Studied the composition of comet 67P.
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12. Perseverance — 2021

- Searches for signs of ancient microbial life.
- Explores Jezero Crater.
- Collects and stores rock samples.
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- Carried Ingenuity, the first powered aircraft to fly on another planet.

13. James Webb Space Telescope — 2021

- Collaboration between NASA, ESA, and CSA.
- Observes some of the earliest galaxies.
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14. Chandrayaan-3 — 2023

- India's successful lunar landing mission.
- Landed near the Moon's south polar region.
- Demonstrated India's growing space capabilities.
- Studied the lunar surface and environment.
- Expanded international interest in lunar exploration.

15. Artemis & the New Lunar Era — 2022–Today

- Designed to return humans to the Moon.
- Develops new spacecraft and lunar exploration systems.
- Encourages international and commercial partnerships.
- Aims toward a more sustained human presence beyond Earth.
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Five Important Elements for Each Milestone (pour impression)

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- Landed near the Moon's south polar region.
- Demonstrated India's growing space capabilities.
- Studied the lunar surface and environment.
- Expanded international interest in lunar exploration.

11

Rosetta & Philae — 2014

- First mission to orbit a comet.
- Philae became the first probe to land on a comet.
- Studied the composition of comet 67P.
- Investigated material left over from the Solar System's formation.
- Demonstrated precision navigation and international scientific cooperation.

Apollo 11 — 1969

- First crewed Moon landing.
- Neil Armstrong became the first person on the Moon.
- Demonstrated extraordinary engineering and navigation.
- Returned lunar samples to Earth.
- Proved that humans could explore another world.

SpaceX — 2002–Today

- Founded with the goal of reducing launch costs.
- Made orbital rocket booster reuse practical.
- Developed commercial crew transportation.
- Expanded the scale of commercial space activity.
- Is developing Starship for future deep-space missions.

12

Yuri Gagarin — 1961

- First human in space.
- First human to orbit Earth.
- Flew aboard Vostok 1.
- Demonstrated that humans could survive spaceflight.
- Made human space exploration possible on a new scale.

Spirit & Opportunity — 2004

- Explored the Martian surface.
- Found evidence of ancient liquid water.
- Operated far longer than originally expected.
- Demonstrated the value of robotic exploration.
- Changed our understanding of Mars' geological history.

James Webb Space Telescope — 2021

- Collaboration between NASA, ESA, and CSA.
- Observes some of the earliest galaxies.
- Studies how stars and planetary systems form.
- Analyzes atmospheres of distant exoplanets.
- Extends humanity's ability to observe the deep universe.

13

Perseverance — 2021

- Searches for signs of ancient microbial life.
- Explores Jezero Crater.
- Collects and stores rock samples.
- Supports the future Mars Sample Return concept.
- Carried Ingenuity, the first powered aircraft to fly on another planet.

Space Shuttle — 1981

- Introduced reusable orbital spacecraft.
- Carried astronauts and satellites.
- Enabled the Hubble servicing missions.
- Contributed to the construction of the ISS.
- Advanced the idea of reusable space transportation.

Artemis & the New Lunar Era — 2022–Today

- Designed to return humans to the Moon.
- Develops new spacecraft and lunar exploration systems.
- Encourages international and commercial partnerships.
- Aims toward a more sustained human presence beyond Earth.
- Helps prepare for future human missions to Mars.

14

Sputnik 1 — 1957

- First artificial satellite.
- Launched by the Soviet Union.
- Proved that objects could be placed into orbit.
- Started the Space Race.
- Marked the beginning of the Space Age.

Curiosity — 2012

- Successfully landed a large rover on Mars.
- Used the innovative Sky Crane landing system.
- Found evidence of an ancient habitable environment.
- Studies Martian rocks, soil, atmosphere, and climate.
- Helps prepare the scientific groundwork for future human missions.

Rosetta & Philae — 2014

- First mission to orbit a comet.
- Philae became the first probe to land on a comet.
- Studied the composition of comet 67P.
- Investigated material left over from the Solar System's formation.
- Demonstrated precision navigation and international scientific cooperation.

15

International Space Station — 1998

- Permanent laboratory in low Earth orbit.
- Built through international cooperation.
- Enables long-duration human research.
- Studies biology, physics, and human health in microgravity.
- Serves as a testbed for future deep-space missions.

Voyager 1 — 1977

- Explored Jupiter and Saturn.
- Revealed new information about the outer planets and their moons.
- Continues operating far from Earth.
- Entered interstellar space.
- Demonstrates the extraordinary longevity of scientific missions.

Chandrayaan-3 — 2023

- India's successful lunar landing mission.
- Landed near the Moon's south polar region.
- Demonstrated India's growing space capabilities.
- Studied the lunar surface and environment.
- Expanded international interest in lunar exploration.

Anne-Charlotte Legrand, Académie de Versailles – Lycée Alain

January 19, 1962

Dear President Kennedy,

I am thirteen years old and I'm in the eighth grade. Please don't throw my letter away until you've read what I have to say. Would you please answer me this one question? When God created the world, He sent man out to make a living with the tools he provided them with. They had to make their living on their own with what little they had. If he had wanted us to orbit the earth, reach the moon, or live on any of the planets, I believe he would have put us up there himself or he would have given us missiles etc… to get there. While our country is spending billions of dollars on things we can get along without, many refugees and other people are starving or trying to make a decent living to support their families. I think it is all just a waste of time and money when talents could be put to better use in many ways, such as making our world a better place to live in. We don't really need space vehicles. I think our country should try to look out more for the welfare of its people so that we can be proud of the world be live in. At school they tell us that we study Science so that we can make our world a better place to live in. But I don't think we need outerspace travel to prove or further the development of this idea. Now that you have heard what I have to say, will you please write an answer to my question?

Sincerely,

Mary Lou Reitler

Dear Mary Lou Reitler:

The President has asked me to reply to your letter asking why the United States expends so much time and energy in exploring space, and suggesting that God would have provided man with the necessary space implements had he wanted man to explore space.

A significant feature of our society is the right of each individual to determine the nature of God's intent in accordance with his own conscience. I would not, therefore, presume to suggest how you should resolve the issue you pose in your letter. Yet it would appear that among the most common characteristics of man is a desire to impose change on nature in order to mollify the hardships of life. This, combined with an endowed natural intelligence and curiosity, has allowed man to progress through increased knowledge from the most primitive past when the only tools utilized were those rocks and sticks found lying on the ground, to the present day, when disease-controlling drugs, efficient food production, and labor-saving machinery have combined to permit man, if he wishes, to pursue a far richer and more humane life.

It is impossible to determine in advance, moreover, those benefits which will eventually result from a given advance in human knowledge. History is replete with examples of man pursuing

> knowledge with no expectation of any practical use, which later serve as the basis for developments making significant contributions to mankind. Janssen's work on lenses, without his realising it, provided the breakthrough required to understand and control disease-causing microbes; also, Horts predicted that his academic experimentation with electromagnetic waves would have no practical or useful results, but he had in fact helped to lay the groundwork for the modern electronic industry.
>
> Astronaut John H. Glenn briefly summed this up recently when he explained his views on the importance of space research before a joint session of Congress. He in part said, "But exploration and the pursuit of knowledge have always paid dividends in the long run—usually far greater than anything expected at the outset… Any major effort such as this results in research by so many different specialities that it is hard to even envision the benefits that will accrue in many fields. Knowledge begets knowledge. The more I see, the more impressed I am —not with how much we know—but with how tremendous the areas are that are as yet unexplored."
>
> Thank you very much for advising the President of your views on this important matter. It is encouraging to find someone of your age showing such interest and concern in public affairs.
>
> Sincerely,
>
> Myer Fieldman
>
> Deputy Special Counsel to the President

speech: we to to the moon;

« We choose to go to the moon » speech by President John F. Kennedy to further inform the public about his plan to land a man on the Moon before 1970, September 12, 1962, Rice University, Texas

We set sail on this new sea because there is new knowledge to be gained, and new rights to be won, and they must be won and used for the progress of all people. For space science, like nuclear science and all technology, has no conscience of its own. Whether it will become a force for good or ill depends on man, and only if the United States occupies a position of pre-eminence can we help decide whether this new ocean will be a sea of peace or a new terrifying theater of war. I do not say the we should or will go unprotected against the hostile misuse of space any more than we go unprotected against the hostile use of land or sea, but I do say that space can be explored and mastered without feeding the fires of war, without repeating the mistakes that man has made in extending his writ around this globe of ours.

There is no strife, no prejudice, no national conflict in outer space as yet. Its hazards are hostile to us all. Its conquest deserves the best of all mankind, and its opportunity for peaceful cooperation may never come again. 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?

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 which we intend to win, and the others, too.

It is for these reasons that I regard the decision last year to shift our efforts in space from low to high gear as among the most important decisions that will be made during my incumbency in the office of the presidency.

Anne-Charlotte Legrand, Académie de Versailles – Lycée Alain

In the last 24 hours, we have seen facilities now being created for the greatest and most complex exploration in man's history. We have felt the ground shake and the air shattered by the testing of a Saturn C-1 booster rocket, many times as powerful as the Atlas which launched John Glenn, generating power equivalent to 10,000 automobiles with their accelerators on the floor. We have seen the site where five F-1 rocket engines, each one as powerful as all eight engines of the Saturn combined, will be clustered together to make the advanced Saturn missile, assembled in a new building to be built at Cape Canaveral as tall as a 48-story structure, as wide as a city block, and as long as two lengths of this field.

Within these last 19 months at least 45 satellites have circled the earth. Some 40 of them were "made in the United States of America," and they were far more sophisticated and supplied far more knowledge to the people of the world than those of the Soviet Union.

The Mariner spacecraft now on its way to Venus is the most intricate instrument in the history of space science. The accuracy of that shot is comparable to firing a missile from Cape Canaveral and dropping it in this stadium between the 40-yard lines.

Transit satellites are helping our ships at sea to steer a safer course. Tiros satellites have given us unprecedented warnings of hurricanes and storms, and will do the same for forest fires and icebergs.

We have had our failures, but so have others, even if they do not admit them. And they may be less public.

To be sure, we are behind, and will be behind for some time in manned flight. But we do not intend to stay behind, and in this decade, we shall make up and move ahead.

The growth of our science and education will be enriched by new knowledge of our universe and environment, by new techniques of learning and mapping and observation, by new tools and computers for industry, medicine, the home as well as the school. Technical institutions, such as Rice, will reap the harvest of these gains.

And finally, the space effort itself, while still in its infancy, has already created a great number of new companies, and tens of thousands of new jobs. Space and related industries are generating new demands in investment and skilled personnel, and this city and this state, and this region, will share greatly in this growth. What was once the furthest outpost on the old frontier of the West will be the furthest outpost on the new frontier of science and space. Houston, your city of Houston, with its Manned Spacecraft Center, will become the heart of a large scientific and engineering community. During the next five years the National Aeronautics and Space Administration expects to double the number of scientists and engineers in this area, to increase its outlays for salaries and expenses to $60 million a year; to invest some $200 million in plant and laboratory facilities; and to direct or contract for new space efforts over $1 billion from this center in this city.

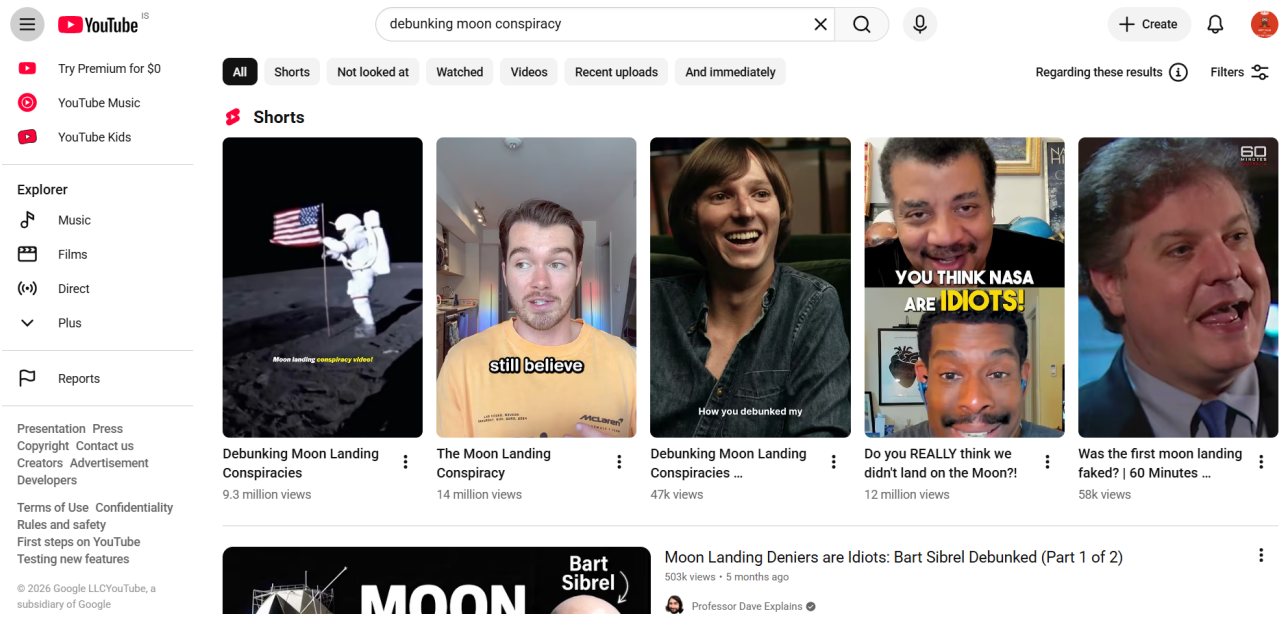
To be sure, all of this costs us all a good deal of money. This year's space budget is three times what it was in January 1961, and it is greater than the space budget of the previous eight years combined. That budget now stands at $5,400,000,000 a year — a staggering sum, though somewhat less than we pay for cigarettes and cigars every year. Space expenditures will soon rise some more, from 40 cents per person per week to more than 50 cents a week for every man, woman and child in the United States, for we have given this program a high national priority — even though I realize that this is in some measure an act of faith and vision, for we do not now know what benefits await us.

But if I were to say, my fellow citizens, that 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.

Anne-Charlotte Legrand, Académie de Versailles – Lycée Alain

I'm the one who is doing all the work, so we just want you to stay cool for a minute. [laughter] However, I think we're going to do it, and I think that we must pay what needs to be paid. I don't think we ought to waste any money, but I think we ought to do the job. And this will be done in the decade of the sixties. It may be done while some of you are still here at school at this college and university. It will be done during the term of office of some of the people who sit here on this platform. But it will be done. And it will be done before the end of this decade.
I am delighted that this university is playing a part in putting a man on the moon as part of a great national effort of the United States of America.
Many years ago, the great British explorer George Mallory, who was to die on Mount Everest, was asked why did he want to climb it? He said, "Because it is there."
Well, space is there, and we're going to climb it, and the moon and the planets are there, and new hopes for knowledge and peace are there. And, therefore, as we set sail we ask God's blessing on the most hazardous and dangerous and greatest adventure on which man has ever embarked.
Thank you.

Illustration of the need of debunking the moon conspiracy



JUNE 2001– and the Moon be Still as Bright

It was so cold when they first came from the rocket into the night that Spender began to gather the dry Martian wood and build a small fire. He didn't say anything about a celebration; he merely gathered the wood, set fire to it, and watched it burn.
In the flare that lighted the thin air of this dried-up sea of Mars he looked over his shoulder and saw the rocket that had brought them all, Captain Wilder and Cheroke and Hathaway and Sam Parkhill and himself, across a silent black space of stars to land upon a dead, dreaming world.

Jeff Spender waited for the noise. He watched the other men and waited for them to jump around and shout. It would happen as soon as the numbness of being the "first" men to Mars wore off. None of them said anything, but many of them were hoping, perhaps, that the other expeditions had failed and that this, the Fourth, would be *the* one. They meant nothing evil by it. But they stood thinking it, nevertheless, thinking of the honor and fame, while their lungs became accustomed to the thinness of the atmosphere, which almost made you drunk if you moved too quiddy.

Anne-Charlotte Legrand, Académie de Versailles – Lycée Alain

Gibbs walked over to the freshly ignited fire and said, "Why don't we use the ship chemical fire instead of that wood?"
"Never mind," said Spender, not looking up.
It wouldn't be right, the first night on Mars, to make a loud noise, to introduce a strange, silly bright thing like a stove. It would be a kind of imported blasphemy. There'd be time for that later; time to throw condensed-milk cans in the proud Martian canals; time for copies of the *New York Times* to blow and caper and rustle across the lone gray Martian sea bottoms; time for banana peels and picnic papers in the fluted, delicate ruins of the old Martian valley towns. Plenty of time for that. And he gave a small inward shiver at the thought.

They had landed on an immense tomb. Here a civilization had died. It was only simple courtesy that the first night be spent quietly.The men shifted around. There were twenty of them, holding to each other's shoulders or adjusting their belts. Spender watched them. They were not satisfied. They had risked their lives to do a big thing. Now they wanted to be shouting drunk, firing off guns to show how wonderful they were to have kicked a hole in space and ridden a rocket all the way to Mars.

But nobody was yelling.

The captain gave a quiet order. One of the men ran into the ship and brought forth food tins which were opened and dished out without much noise. The men were beginning to talk now. The captain sat down and recounted the trip to them. They already knew it all, but it was good to hear about it, as something over and done and safely put away. They would not talk about the return trip. Someone brought that up, but they told him to keep quiet

There was a touch of fire across the sky, and an instant later the auxiliary rocket landed beyond the camp. Spender watched as the small port opened and Hathaway, the physician-geologist--they were all men of twofold ability, to conserve space on the trip--stepped out. He walked slowly over to the captain.

"Well?" said Captain Wilder.

Hathaway gazed out at the distant cities twinkling in the starlight. After swallowing and focusing his eyes he said, "That city there, Captain, is dead and has been dead a good many thousand years. That applies to those three cities in the hills also. But that fifth city, two hundred miles over, sir--"

"What about it?"

"People were living in it last week, sir." Spender got to his feet.

"Martians," said Hathaway.

"Where are they now?"

"Dead," said Hathaway. "I went into a house on one street. I thought that it, like the other towns and houses, had been dead for centuries. My God, there were bodies there. It was like walking in a pile of autumn leaves. Like sticks and pieces of burnt newspaper, that's all. And *fresh*. They'd been dead ten days at the outside."

"Did you check other towns? Did you see _anything_ alive?"

Anne-Charlotte Legrand, Académie de Versailles – Lycée Alain

"Nothing whatever. So I went out to check the other towns. Four out of five have been empty for thousands of years. What happened to the original inhabitants I haven't the faintest idea. But the fifth city always contained the same thing. Bodies. Thousands of bodies."

"What did they die of?" Spender moved forward.

"You won't believe it."

"What killed them?"

Hathaway said simply, "Chicken pox. I made tests. Chicken pox. It did things to the Martians it never did to Earth Men. Their metabolism reacted differently, I suppose. Burnt them black and dried them out to brittle flakes. But it's chicken pox, nevertheless. So York and Captain Williams and Captain Black must have got through to Mars, all three expeditions. God knows what happened to them. But we at least know what *they* unintentionally did to the Martians.

""My God, no!"

"You saw no other life?"

"Chances are a few of the Martians, if they were smart, escaped to the mountains. But there aren't enough, I'll lay you money, to be a native problem. This planet is through."

Spender turned and went to sit at the fire, looking into it. Chicken pox, God, chicken pox, think of it! A race builds itself for a million years, refines itself, erects cities like those out there, does everything it can to give itself respect and beauty, and then it dies. Part of it dies slowly, in its own time, before our age, with dignity. But the rest! Does the rest of Mars die of a disease with a fine name or a terrifying name or a majestic name? No, in the name of all that's holy, it has to be chicken pox, a child's disease, a disease that doesn't even kill *children* on Earth! It's not right and it's not fair. It's like saying the Greeks died of mumps, or the proud Romans died on their beautiful hills of athlete's foot! If only we'd given the Martians time to arrange their death robes, lie down, look fit, and think up some *other* excuse for dying. It can't be a dirty, silly thing like chicken pox. It doesn't fit the architecture; it doesn't fit this entire world!

"All right, Hathaway, get yourself some food."

"Thank you, Captain."

And as quickly as that it was forgotten. The men talked among themselves.

Ray Bradubury, *Martian Chronicles,* 1950

Space datacenters proposed by Musk and Bezos 'catastrophic' for planet, experts warn

petition demands review of plans from tech companies amid fears of environmental destruction

Space datacenters proposed by SpaceX, Jeff Bezos's Blue Origin and others would release staggering levels of pollution that would probably **alter** the Earth's atmosphere and be "catastrophic" for the planet, space industry experts and environmental groups warn in a new petition demanding a review of their impacts.

Anne-Charlotte Legrand, Académie de Versailles – Lycée Alain

Among other issues, pollution from satellites and rockets burning up upon re-entry appears to be accumulating in the stratosphere at alarming levels. The spacecraft release black soot, rare metals, aluminum oxides and other pollutants with unknown effects. Some scientists fear the pollution could destroy the ozone layer, potentially expose some people to higher levels of ultraviolet radiation, or help further destabilize the planet during the climate crisis. The pollution could also end up back on Earth, and millions of satellites would create a major source of light pollution.
The petition submitted to the FCC calls for a pause on new licenses for space data center projects, arguing that the plans "violate federal law"." these same proponents have refused to embrace any inquiry into the impacts of their self-claimed epochal technology on the environment, science, economy, or other values." (...)

Putting millions of additional satellites into orbit would create a significant environmental risk, said Steve Volz, the former head of the National Oceanic and Atmospheric Administration (Noaa) satellite office.
"There is a lot of complex material in these things, and even if they do burn up, you do not want to be filling up the atmosphere **with refuse** from these any more than you would want it coming from a smoke stack," Volz said. Volz was with the agency until he was put on leave and eventually fired under the Trump administration.

The number of active satellites in orbit has grown exponentially from about 1,400 in 2015 to about 15,000 currently. As many as 100,000 are expected to be in orbit within the decade, not including the datacenter networks. Spacecraft can cause problems on their way up and down. Launches emit a range of emissions like black carbon, nitrogen oxides, carbon monoxide, aluminum oxide, chlorine gases and, once in orbit, mercury. When satellites are decommissioned five to 15 years later, they release metals as they vaporize. That's injecting pollutants into previously **pristine** parts of the stratosphere, a highly sensitive system, and there's very little understanding of the consequences.
Scientists only began to discover some of the impact in late 2023, when a Noaa-sponsored stratospheric measurement flight found metals in sulfuric acid aerosols that make up much of the stratosphere. These aerosols are thought to play an outsize role in regulating the Earth's temperature, and may partly function as a planetary "sunscreen" by creating high-level clouds that reflect solar radiation, and they simultaneously keep greenhouse gases and pollution from entering the ozone layer from below.
But how the spacecraft metals, naturally occurring metals and sulfuric acid aerosols interact is "largely unknown", scientists behind the study said. Further research has not been conducted under Trump.

Meanwhile, advocates say plants and animals rely on the darkness, and light pollution is contributing to firefly and other insect die-offs. "These projects could permanently alter the night sky as we know it," said Ruskin Hartley, executive director of DarkSky International. "The FCC needs to take seriously its obligation to ensure these projects do not cause unnecessary harm to naturally dark skies."
Cole Donovan, a former Noaa space policy expert now with the Stand Up for Science non-profit, noted that the space datacenters would demand a huge amount of rare metals and other resources that are already in short supply, creating another environmental challenge on the ground.
The petition notes that SpaceX claims in its FCC application that its orbital datacenters will "ensur[e] humanity's multi-planetary future amongst the stars", but its only reference to environmental risk is a claim that it would "develop industry-leading brightness mitigations", though it offers no other detail.

Anne-Charlotte Legrand, Académie de Versailles – Lycée Alain

Ultimately, the tech companies' FCC applications provide no meaningful consideration of environmental consequences, the petition states.

Tom Perkins, Thu 23 Jul 2026, *The Guardian*