SPACE EXPLORATION | LESSON 4

Return to the Moon

From Apollo to Artemis: how people first reached the Moon, why going back is hard, and what comes next.

Grades 4-9 | About 15 minutes of narrated flight, plus discussion stops | 9 stops | Start: learn.allseeing.space/return-to-the-moon

What students will see and do

Students review Apollo and Apollo 13, learn why the Moon is harder to reach than the space station, meet the Artemis rocket and capsule, follow the 2026 Artemis II crew around the Moon, and explore the Moon's south pole, its dangers, and future missions.

Learning objectives

- Describe the Apollo program and what it achieved
- Explain why a Moon mission is much harder than a trip to the space station
- Describe the Artemis II mission and its crew
- Explain why water ice at the lunar south pole matters for future exploration

NGSS connections

MS-ETS1-1	Moon missions are engineering problems with criteria and constraints (mass, safety, cost, radiation).
MS-ETS1-2	Comparing design solutions: Apollo, Orion and commercial landers.
MS-ESS1-2	Gravity and orbits shape the path to and around the Moon.
MS-ESS3-1 (extension)	Resources such as lunar water ice are unevenly distributed and shape where people explore.

40-minute class plan

1. 5 min: pre-lesson prompt. Before we fly: people walked on the Moon in 1969. Write down one reason you think it took more than fifty years to send people back.
2. 18-20 min: run the lesson. Keep discussion stops short (1-2 minutes each) or turn them off in the Lessons menu.
3. 8 min: whole-class discussion using two of the questions below.
4. 5 min: Exit ticket: Describe the Artemis II mission in one sentence, and give one reason the Moon's south pole is a good place for a base.

Full exploration (about 60 minutes)

1. 5 min: pre-lesson prompt, recorded so students can revisit it.
2. 25-30 min: run the lesson with every discussion stop at full length.
3. 15 min: follow-up activity. Design a Moon base: teams list what they need (air, water, power, shelter) and where they would get it.

4. 10 min: revisit the pre-lesson ideas, then the exit ticket.

Before the lesson

Before we fly: people walked on the Moon in 1969. Write down one reason you think it took more than fifty years to send people back.

Discussion stops: timing and key points

At Why the Moon is harder (4-6 min): Apollo reached the Moon more than fifty years ago. Why do you think it took so long for people to return? Think about cost, goals, and safety.

- Cost and changing national goals after the space race.
- The Moon is about a thousand times farther than the space station, with no quick way home.
- New rockets, spacecraft and safety systems had to be built and tested first.

At Artemis II: around the Moon (3-5 min): Artemis II included the first woman, the first person of color, and the first non-American to travel around the Moon. Why does it matter who gets to explore?

- Different backgrounds bring different ideas and skills to hard problems.
- Students can see themselves in future missions.
- International partners share the cost and the knowledge.

More questions for after the lesson

1. What went wrong on Apollo 13, and how did the crew survive?
2. Why do engineers test new spacecraft without a crew first?
3. What job would you want on a Moon mission, and what would you need to learn?

Vocabulary

Apollo, Artemis, Orion, Space Launch System, lunar module, splashdown, south pole, water ice

Exit ticket

Exit ticket: Describe the Artemis II mission in one sentence, and give one reason the Moon's south pole is a good place for a base.

Follow-up activities

- Design a Moon base: teams list what they need (air, water, power, shelter) and where they would get it.
- Egg drop lander: build a lander that protects an egg dropped from a set height.
- Mission timeline: place Apollo 11, Apollo 13, Artemis I, Artemis II and the planned missions on a class timeline.

Full transcript

Introduction

Welcome to Return to the Moon. Fifty years after the last Apollo astronauts left the Moon, people have flown back around it. In this lesson we will follow humanity's journey to the Moon, from Apollo to NASA's Artemis program, and find out why going back is so hard.

Here is our question. If people walked on the Moon in nineteen sixty nine, why has it taken so long to go back?

1. Apollo: the first time

We begin at Earth. In nineteen sixty one, the United States set a goal of landing people on the Moon before the end of the decade. It was part of a space race with the Soviet Union, and it took the work of about four hundred thousand people.

On July twentieth, nineteen sixty nine, Apollo eleven landed. Neil Armstrong and Buzz Aldrin walked on the Moon while Michael Collins circled overhead. Between nineteen sixty nine and nineteen seventy two, six Apollo missions landed, and twelve astronauts walked on the Moon.

They rode the Saturn five rocket, as tall as a thirty six story building. Two astronauts landed in a fragile lunar module, so lightweight that its walls were in some places only about as thick as a few sheets of paper.

The astronauts brought back about three hundred and eighty kilograms of Moon rock. Scientists are still studying those samples today, and they taught us how the Moon formed. After Apollo seventeen in December nineteen seventy two, no one went back for more than fifty years.

2. Why the Moon is harder

This is the International Space Station, about four hundred kilometers above Earth. For decades, this is where astronauts have lived and worked. So why is the Moon so much harder to reach?

The Moon is about a thousand times farther away. Getting there takes about three days, not a few hours. A Moon rocket must be far more powerful, the spacecraft must carry everything the crew needs for the whole trip, and if something goes wrong, there is no quick way home.

After Apollo, space agencies chose different goals: reusable spacecraft like the Space Shuttle, robotic explorers across the solar system, and long-term living in orbit on space stations. Returning to the Moon needed new rockets, new spacecraft, and a new reason to go.

Discussion stop: Apollo reached the Moon more than fifty years ago. Why do you think it took so long for people to return? Think about cost, goals, and safety.

3. Artemis: rockets and spacecraft

That new program is called Artemis, named after Apollo's twin sister in Greek mythology. Its goal is not just to visit the Moon, but to learn how to stay there, and to prepare for future missions to Mars.

Artemis uses NASA's Space Launch System, or SLS, the most powerful rocket NASA has ever flown. On top sits Orion, a capsule built for four astronauts. Behind the capsule is the European Service Module, built by the European Space Agency, which provides power from solar wings, air, water, and the engine that steers Orion through space.

In November twenty twenty two, Artemis one flew Orion around the Moon with no crew aboard. Mannequins packed with sensors measured the radiation and forces that astronauts would feel. The capsule returned safely, but engineers found that parts of its heat shield had worn away in unexpected ways, and they studied that carefully before risking a crew.

Artemis one lasted about twenty five days. Orion traveled farther from Earth than any spacecraft built to carry people had ever gone, more than four hundred thousand kilometers away.

4. Apollo 13: the record and the rescue

Before we meet the Artemis crew, one story from Apollo. In April nineteen seventy, Apollo thirteen was on its way to the Moon when an oxygen tank exploded, crippling the spacecraft. The landing was canceled, and the crew had to survive.

The three astronauts moved into their small lunar module and used it as a lifeboat. With help from engineers on the ground, they swung around the far side of the Moon and headed home, cold, thirsty, and short on power. All three returned safely.

Because of the path they took around the Moon, the Apollo thirteen crew traveled farther from Earth than any humans before them. That distance record stood for fifty six years.

5. Living on the Moon

Imagine living here for weeks. Gravity is one sixth of Earth's, so a backpack that weighs thirty kilograms at home would feel like five. There is no air, and the sky is black even in daytime.

A full day, from one sunrise to the next, lasts about twenty nine and a half Earth days. The ground heats to over one hundred degrees Celsius in two weeks of sunlight, then freezes far below minus one hundred degrees during the long night. A Moon base would need strong insulation, steady power, and maybe a roof of Moon soil for protection.

6. Artemis II: around the Moon

In April twenty twenty six, Artemis two launched four astronauts toward the Moon: commander Reid Wiseman, pilot Victor Glover, and mission specialist Christina Koch of NASA, and Jeremy Hansen of the Canadian Space Agency.

They did not land. Their job was to test Orion with people aboard. They flew around the far side of the Moon, seeing it with their own eyes, and traveled farther from Earth than any humans had ever been, breaking the record set by Apollo thirteen.

The mission made history in other ways too. Christina Koch became the first woman to travel around the Moon, Victor Glover the first person of color, and Jeremy Hansen the first person from outside the United States.

After about ten days, Orion came home. It hit the atmosphere at roughly forty thousand kilometers per hour, glowing hotter than molten lava, and splashed down under parachutes in the Pacific Ocean off the coast of California.

Discussion stop: Artemis II included the first woman, the first person of color, and the first non-American to travel around the Moon. Why does it matter who gets to explore?

7. The south pole and its ice

Future Artemis astronauts plan to land near the Moon's south pole, a place no human has ever visited. Why there?

At the south pole, the Sun stays low on the horizon. Some deep craters are in permanent shadow and have not seen sunlight for billions of years. Spacecraft have found signs of water ice frozen in those dark craters.

Water is precious in space. Astronauts could drink it, split it into oxygen to breathe, and turn its hydrogen and oxygen into rocket fuel. Using what you find on the Moon, instead of carrying everything from Earth, is called using local resources, and it could make long stays possible.

Some mountain peaks near the pole stay in sunlight almost all the time, which would be good places for solar panels. Light and ice, close together, make the south pole the best place to build a base.

8. Dangers of deep space

Beyond Earth's protective magnetic field, astronauts face radiation from the Sun and from deep space. A big solar storm could be dangerous to a crew in a thin spacecraft. Orion has a sheltered area where the crew can gather behind stored supplies to block radiation.

Moon dust is another hazard. Without wind or water to round them, the grains are sharp like tiny pieces of glass. Apollo astronauts found that dust scratched visors, clogged suit joints, and even made them sneeze. Engineers are designing new suits and tools to handle it.

Living in low gravity is hard on the body, too. Without exercise, astronauts lose bone and muscle strength. Scientists use the space station to study these changes and design workouts, diets, and medicines to protect future Moon and Mars crews.

9. What comes next

We come home to Earth to look ahead. As of twenty twenty six, NASA plans for Artemis three to be a crewed test flight in Earth orbit, practicing how Orion meets up with the new commercial Moon landers being built by SpaceX and Blue Origin. The first Artemis landing on the Moon is planned for a later mission, Artemis four. Space schedules often change, so watch the news.

Other nations are going to the Moon too. India landed Chandrayaan three near the south pole in twenty twenty three, and China has brought back samples from both the near side and the far side of the Moon and plans to land its own astronauts there.

The people who walk on the Moon in the coming years are adults today, but the people who build the first long-term bases, or travel on to Mars, might be students right now.

A Moon mission needs far more than astronauts. It needs engineers, geologists, doctors, programmers, welders, mathematicians, cooks who plan space food, and writers who explain it all to the world. Every one of those skills starts with curiosity and practice.

Wrap-up

So why did it take so long to go back? Because the Moon is far, dangerous, and expensive, and because for decades the world chose other goals. Now new rockets, new spacecraft, international partners, and the promise of water ice are drawing people back.

If you could join a Moon mission, what job would you want to do? Press L to choose another lesson.

Positions are computed live from real orbits. Narration is checked against public scientific sources; full credits at learn.allseeing.space/credits.html. Standards are listed as connections to NGSS, not formal alignments. Report an issue: info@allseeing.space