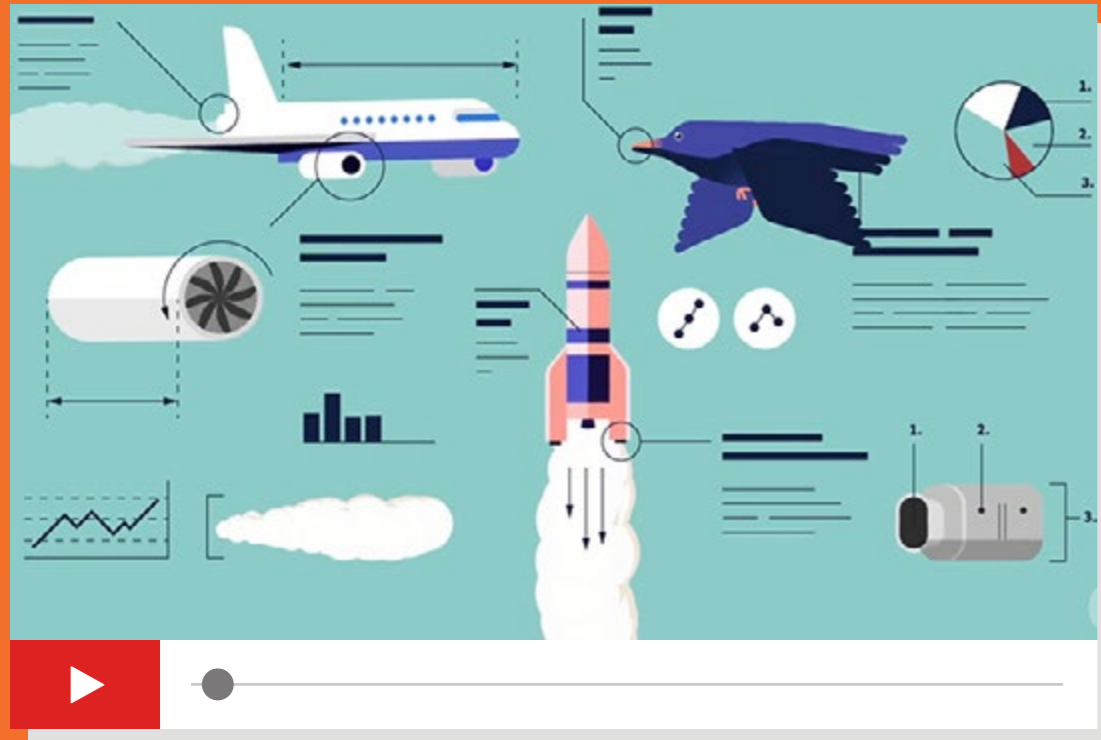


AIRBUS FOUNDATION

**DISCOVERY
SPACE
AMBASSADOR
TOOLKIT**

in partnership with  **AUTODESK**



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Welcome to Discovery Space!

At Airbus, we believe that education is one of the most powerful vehicles for progress. This is why, through the Airbus Foundation, we strive to use the fascinating power of aerospace to inspire the next generation into the fields of Science, Technology, Engineering, and Mathematics.

As a highly skilled, global company, we have the duty to promote equitable education and a lifelong learning opportunity, which means ensuring our future workforce has the relevant skills to face tomorrow's challenges.

With our platform, Discovery Space, our goal has been to create a fun place for kids to practice their critical thinking, problem solving, and collaboration skills and to empower them to drive and shape both their future and ours.

We believe that using the passion and knowledge of fellow Airbus employees is one of the most powerful ways to accelerate the path to realising this vision.

We realise that stepping into a classroom or a science club can feel like a daunting task. With that in mind, we created this toolkit to help make your presentation fun for kids AND easy for you.

GET STARTED!

Welcome to Discovery Space	2	How to Export Your Designs on Minecraft	27
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How to Use This Toolkit

The Airbus Foundation Discovery Space Toolkit was designed to give you the freedom and flexibility to create the presentation, activity, or demo that works best for you and your particular audience.

With our first theme, “Mission to the Moon,” you will help students think about solutions to overcome the challenges we will face on the Moon.

If you are more of an Aviation Geek, no worries! Our second theme on Flight Physics was made for you. With Flight Physics, you will be able to take students on a journey through the sky and dig deeper into how things fly!

You will also find different ways to engage with your audience. Whether you choose to complete the web games, watch the animations, answer the suggested questions, or 3D design a space rocket and export it to Minecraft, make sure you follow the pre-visit checklist before leaving!

Every year, starting in April and October, we will host a competition in partnership with Autodesk that will reward the best designs with many prizes to win!



Free Online Design Resources

Autodesk offers a wide range of free software and online resources for designers, thinkers, and makers of all ages to help build 3D design skills inside the classroom and beyond.



Instructables

An online tool built for the maker community that helps you explore, document, and share your creations.

[Instructables.com](https://www.instructables.com)



Tinkercad

A free, easy-to-use online 3D CAD design tool for anyone to use to create fun, simple designs from scratch.

[Tinkercad.com](https://www.tinkercad.com)



Fusion 360

The first 3D CAD, CAM, and CAE tool of its kind that connects your entire product development process in one cloud-based platform.

[Autodesk.com/Fusion360Edu](https://www.autodesk.com/Fusion360Edu)

Pre-Visit Checklist

Being prepared is one critical element to a successful presentation. Here is a pre-visit checklist you can use as a guide to get ready for your event.

- ☑ To use the web games, you need to have an Internet connection. Please note that the web games work best on the latest version of Google Chrome.
- ☑ If you are planning on watching the animations, make sure to download them ahead of time. [The videos are also available on YouTube.](#)
- ☑ If you are planning to use Tinkercad, you need to have an Internet connection. Please note that Tinkercad works best on the latest version of Google Chrome or Mozilla Firefox.

Presentation or Activity:

- ◆ How many students will attend? (For printouts, materials, etc.)
- ◆ Will you need a projector? Is one available in the room?
- ◆ Will you need Wi-Fi? Is it available?
- ◆ Will there be any participants with special needs to accommodate for?

Online Activities:

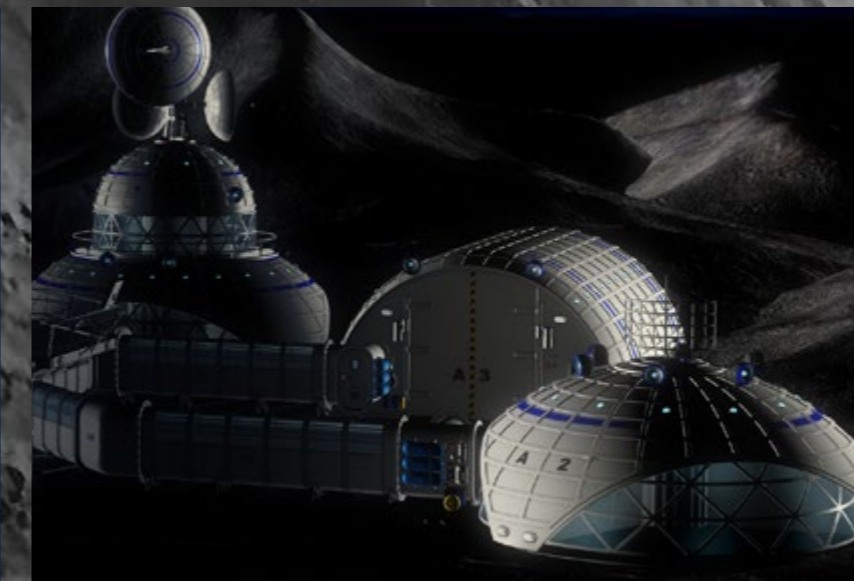
- ◆ How many students will attend? (For printouts, materials, etc.)
- ◆ What product will you be using?
- ◆ Are there sufficient desktop computers (each with a mouse) for all students to participate?
- ◆ Will you need a projector? Is one available in the room?
- ◆ Will you need Wi-Fi? Is it available?
- ◆ Will there be any participants with special needs to accommodate for?

MISSION TO THE MOON



LESSON #1

Fly Me to the Moon



LESSON #2

Architect to the Stars



LESSON #3

Moon Life 101



LESSON #4

Lunar Road Trip

Lesson Plans

Introduction to Discovery Space 15–20 minutes

- ◆ Introduce yourself and Airbus
(5 minutes)
- ◆ Watch the [“Discovery Space” introduction video](#)
(2 minutes)
- ◆ Read the [“Fly Me to the Moon” theme introduction](#)
(1 minute)
- ◆ Watch the [“Bye Earth, Hello Moon!” video](#)
(2 minutes)
- ◆ Play the [“Leaving Earth” web game](#)
(5 minutes)
- ◆ Show basic functions of Tinkercad and discuss exporting to Minecraft
(2 minutes)

Fly Me to the Moon 60–90 minutes

- ◆ Introduce yourself and Airbus
(5 minutes)
- ◆ Watch the [“Discovery Space” introduction video](#)
(2 minutes)
- ◆ Read the [“Fly Me to the Moon” theme introduction](#)
(1 minute)
- ◆ Watch the [“Fly Me to the Moon” videos](#)
(6 minutes)
- ◆ Play the [“Leaving Earth” web game](#)
(5 minutes)
- ◆ Complete the [“DIY Rockets” Instructables activity, the “Travelling to the Moon” Tinkercad design activity, or the “Design Your Rocket” activity on Fusion 360](#)
(30 minutes)

Architect to the Stars 60–90 minutes

- ◆ Introduce yourself and Airbus
(5 minutes)
- ◆ Watch the [“Discovery Space” introduction video](#)
(2 minutes)
- ◆ Read the [“Architect to the Stars” theme introduction](#)
(1 minute)
- ◆ Watch the [“Architect to the Stars” videos](#)
(12 minutes)
- ◆ Play the [“Making a Home” web game](#)
(5 minutes)
- ◆ Complete the [“Habitat on the Moon” Tinkercad design activity or the “Moon Habitat” activity on Fusion 360](#)
(30 minutes)

Lesson Plans

Moon Life 101

60–90 minutes

- ◆ Introduce yourself and Airbus
(5 minutes)
- ◆ Watch the [“Discovery Space” introduction video](#)
(2 minutes)
- ◆ Read the [“Moon Life 101” theme introduction](#)
(1 minute)
- ◆ Watch the [“Moon Life 101” videos](#)
(8 minutes)
- ◆ Play the [“Working 9 to 5” web game](#)
(5 minutes)
- ◆ Complete the [“Living on the Moon” Tinkercad design activity](#) or the [“Basics of Living” activity on Fusion 360](#)
(30 minutes)

Lunar Road Trip

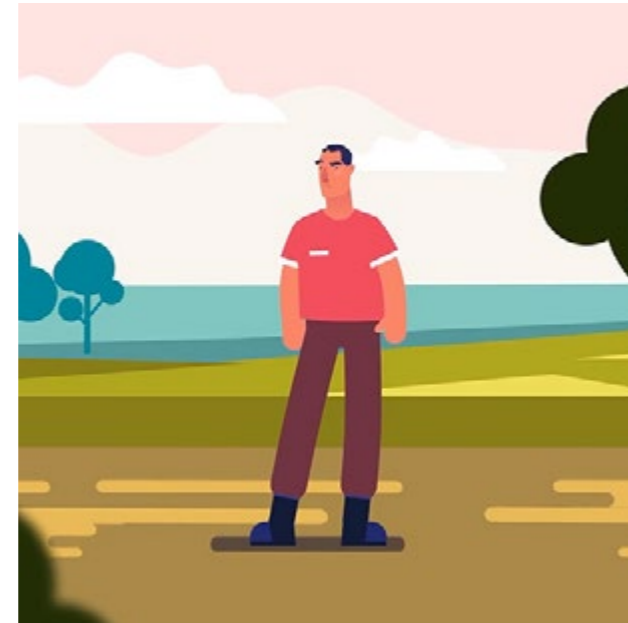
60–90 minutes

- ◆ Introduce yourself and Airbus
(5 minutes)
- ◆ Watch the [“Discovery Space” introduction video](#)
(2 minutes)
- ◆ Read the [“Lunar Road Trip” theme introduction](#)
(1 minute)
- ◆ Watch the [“Lunar Road Trip” videos](#)
(10 minutes)
- ◆ Play the [“Basics of Living” web game](#)
(5 minutes)
- ◆ Complete the [“Driving on the Moon” Tinkercad design activity](#) or the [“Moon Habitat” activity on Fusion 360](#)
(30 minutes)

Web Games

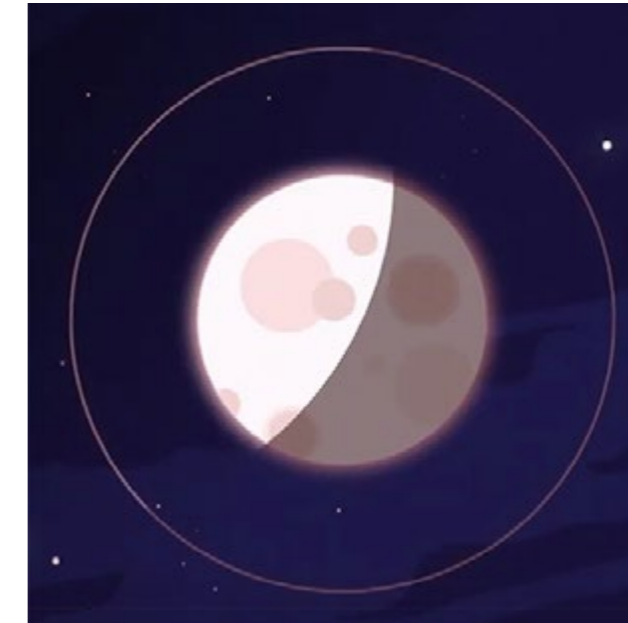
No time to go over all the animations? Don't feel like 3D designing? The web games are the perfect middle ground for your audience to learn more about the Moon!

Go through all the levels, listen to Airbus engineers answer the questions, and try to get the highest score!



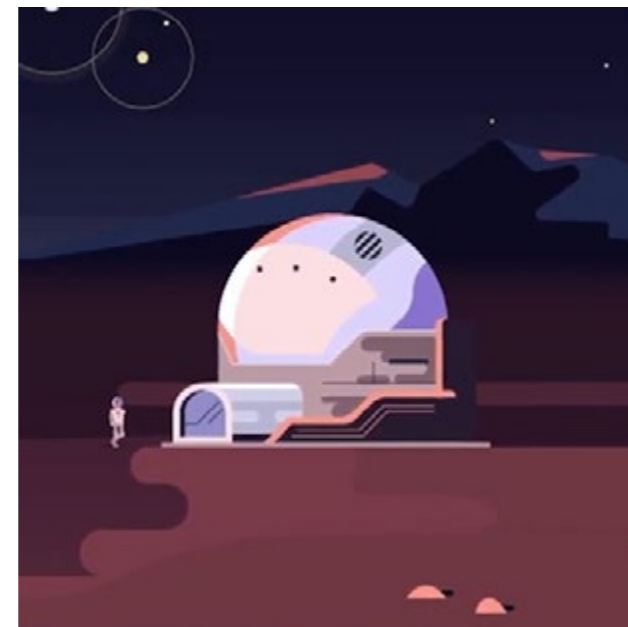
GAME #1

Leaving Earth

[PLAY >](#)

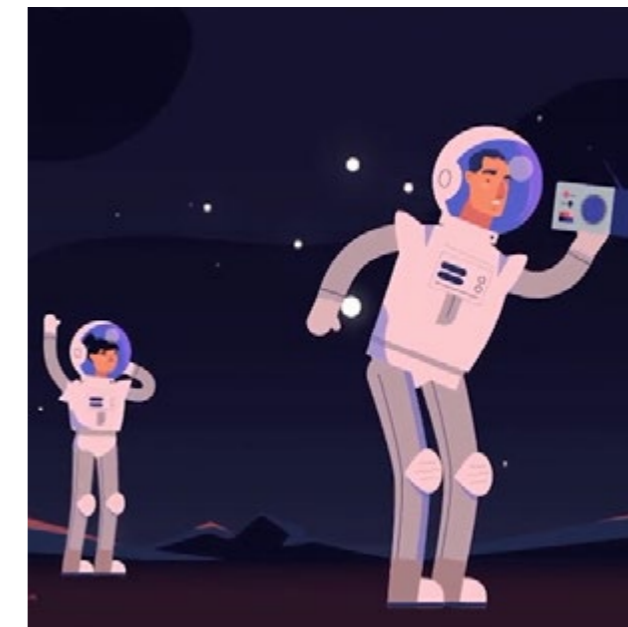
GAME #2

Making a Home

[PLAY >](#)

GAME #3

Working 9 to 5

[PLAY >](#)

GAME #4

Basics of Living

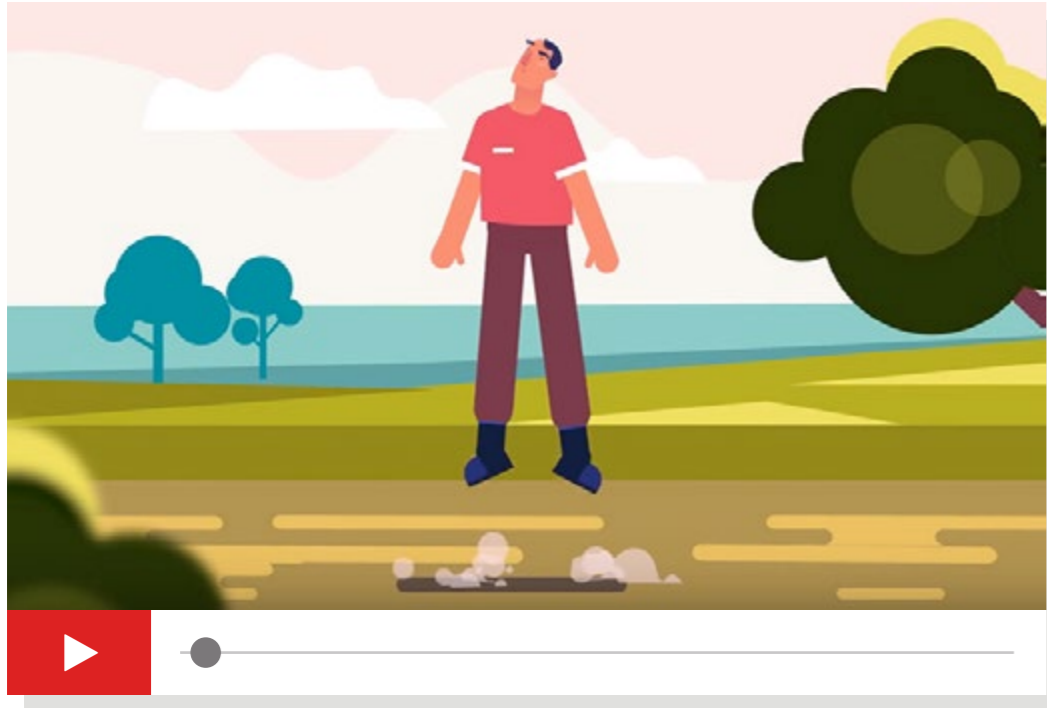
[PLAY >](#)



AIRBUS FOUNDATION

FLY ME TO THE MOON

How do you get to the Moon? By rocket, of course. But how do you construct it so it can break through the Earth's atmosphere? How can you wrangle it into a trajectory to your destination? Build each of your rocket's components and customise your work. Then think about how far you need to go – and how you'll land when you get there!



Bye Earth; Hello Moon!

How exactly does a rocket engine work? Learn about different factors that affect your space launch and how to design an aerodynamic rocket to the Moon.

QUESTIONS FOR YOUR AUDIENCE:

Beginner:

Q: How can you go to the Moon?

A: With a rocket.

Intermediate:

Q: How fast do you have to jump to leave Earth?

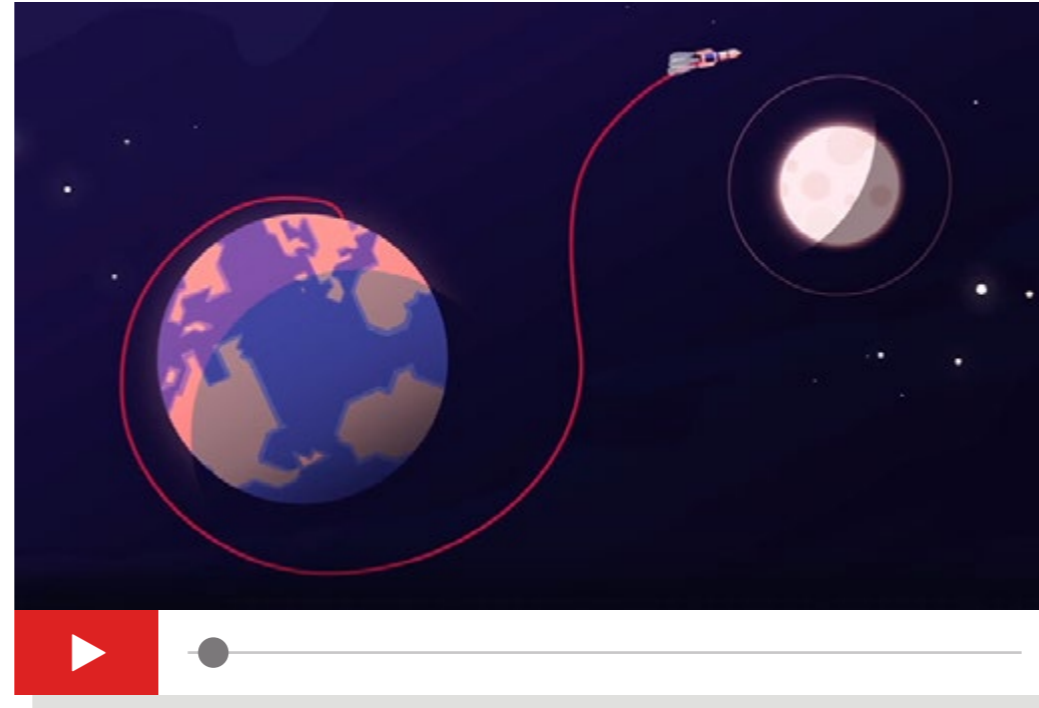
A: 40 000 km/h

Advanced:

Q: How much of the rocket is fuel?

A: 90%

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Slingshot to the Moon

Flying to the Moon is tricky business, especially since you can't just head in a direct line. How can you plan your trajectory to the Moon?

QUESTIONS FOR YOUR AUDIENCE:

Beginner:

Q: Is it possible to fly straight in space?

A: No, because of gravity!

Intermediate:

Q: How fast is Earth rotating?

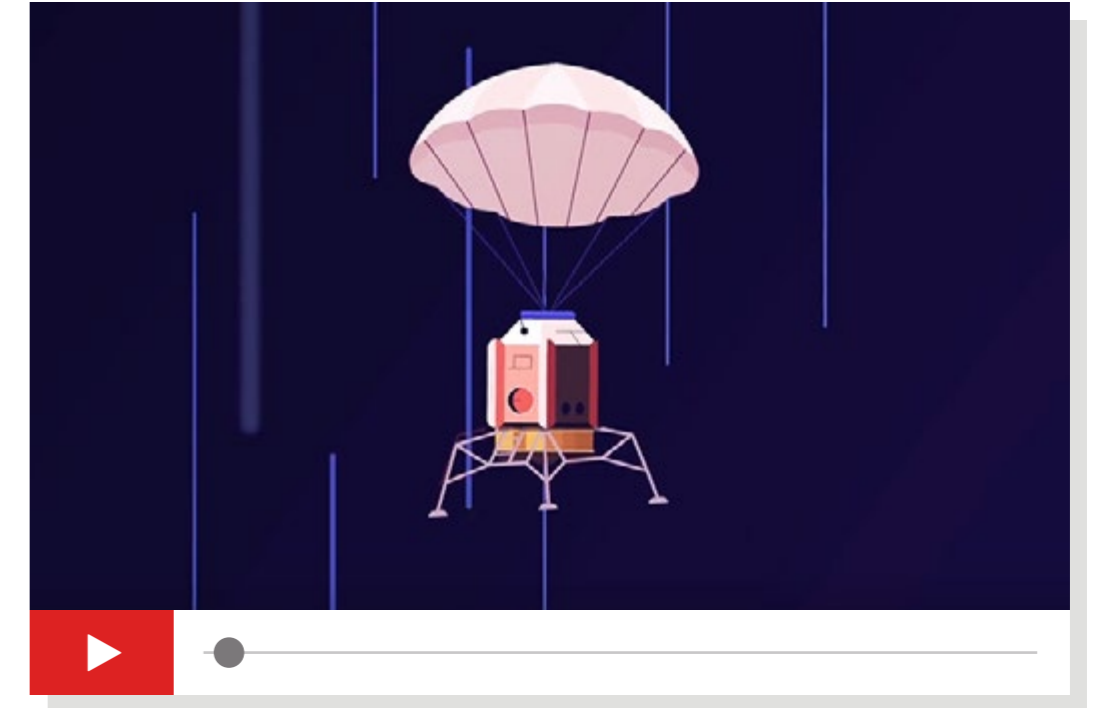
A: 1 600 km/h

Advanced:

Q: How fast is Earth orbiting the Sun?

A: >100 000 km/h

[WATCH >](#) | [DOWNLOAD >](#)



Setting Foot on the Moon

A manned spacecraft needs a soft landing, but it's all in the timing. Fire up your thrusters and hope you've picked the right spot to touch down.

QUESTIONS FOR YOUR AUDIENCE:

Beginner:

Q: Can you land anywhere on the Moon?

A: No, there are lots of craters!

Intermediate:

Q: Can you use a parachute to land on the Moon?

A: No, there's no air.

Advanced:

Q: When was the first time we landed on the Moon?

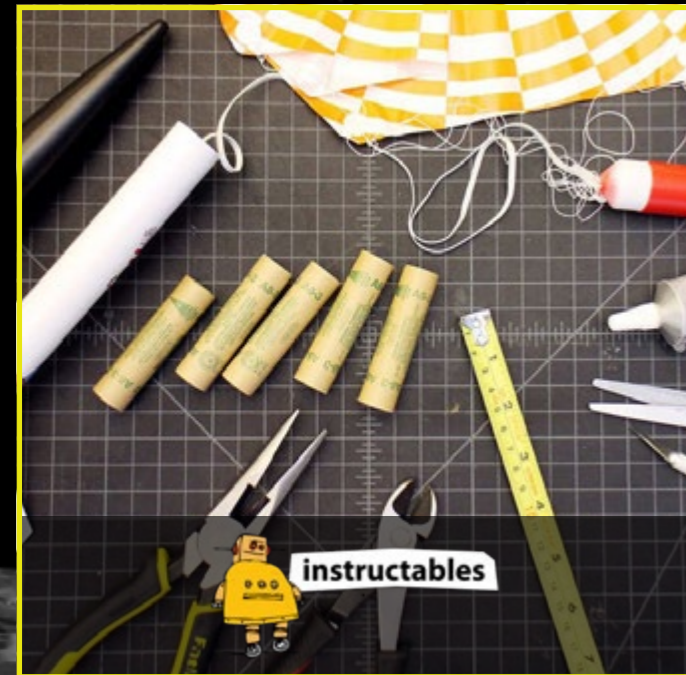
A: 1969

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Build Your Own Moon Rocket



**NEW RECRUITS
SPACE ROOKIES**
AGES 0-7

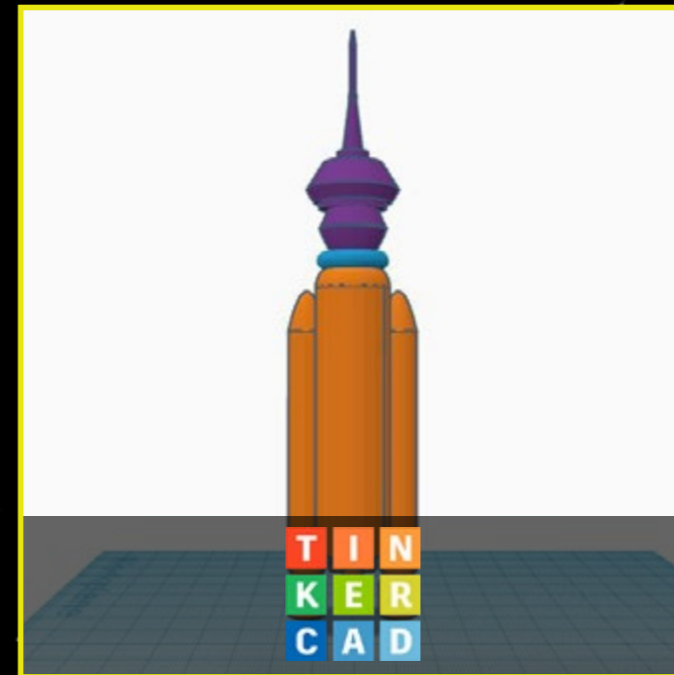


DIY Rockets – Tools + Supplies

[VIEW INSTRUCTIONS >](#)



**ASTRONAUTS
IN THE MAKING**
AGES 8-15

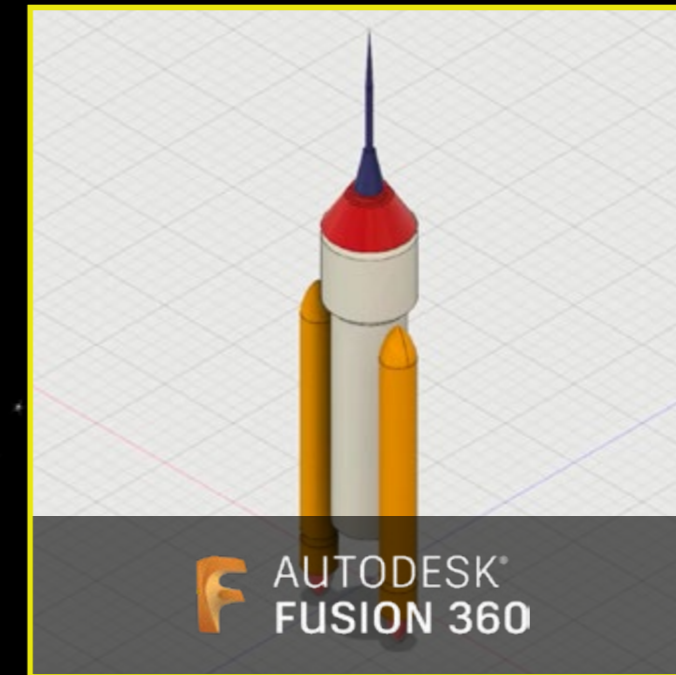


Airbus – Travelling to the Moon

[VIEW INSTRUCTIONS >](#)



**CONFIRMED
SPACE TRAVELLERS**
AGES 16+



Design Your Rocket on Fusion 360

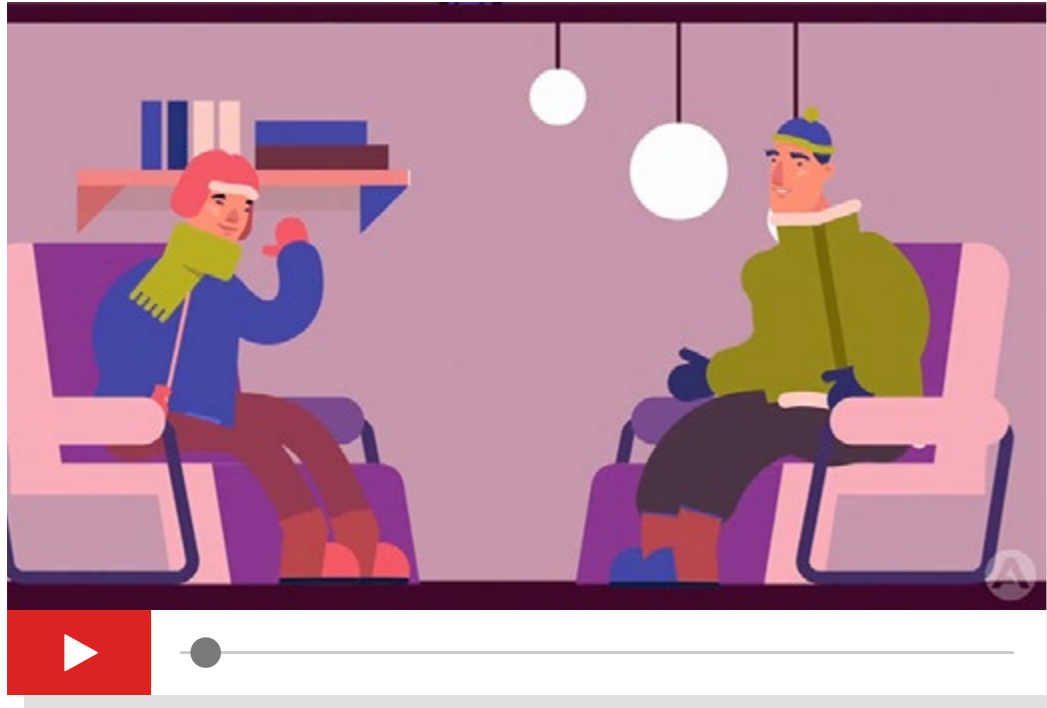
[VIEW INSTRUCTIONS - PART 1 >](#)

[VIEW INSTRUCTIONS - PART 2 >](#)

[VIEW INSTRUCTIONS - PART 3 >](#)

ARCHITECT TO THE STARS

Your home away from Earth has to have a lot more than a place to eat and sleep – it's the only structure on the Moon! How and where do you even build it? Customise, name, and expand your pioneering settlement, and ask yourself: how will these housing pods answer the needs of your Moon community?



What Is the Best Place to Live on the Moon?

An entirely new landscape awaits when you land on the Moon. Where will your Moon village be?

QUESTIONS FOR YOUR AUDIENCE:

Beginner:

Q: Is the Moon colder or hotter than Earth?

A: Both! Temperatures on the Moon range from 123°C to -233°C.

Intermediate:

Q: Where is the warmest place on the Moon?

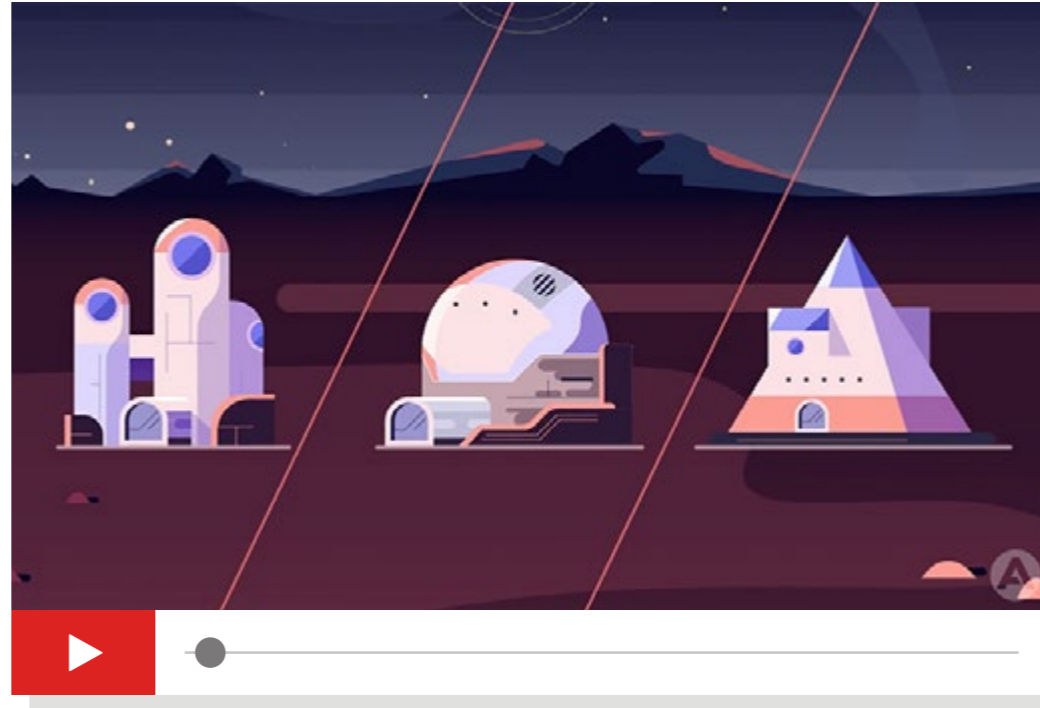
A: The poles.

Advanced:

Q: How cold does it get on the Moon?

A: -233°C

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Designing Your Home on the Moon

The first Moon structure has a lot of roles to fill: a home base not only for sleeping and eating but for research and experiments, too.

QUESTIONS FOR YOUR AUDIENCE:

Beginner:

Q: What rooms do you think you need in your Moon house?

A: *(Open-ended question)*

Intermediate:

Q: Would you build your house on, in, or under the Moon surface?

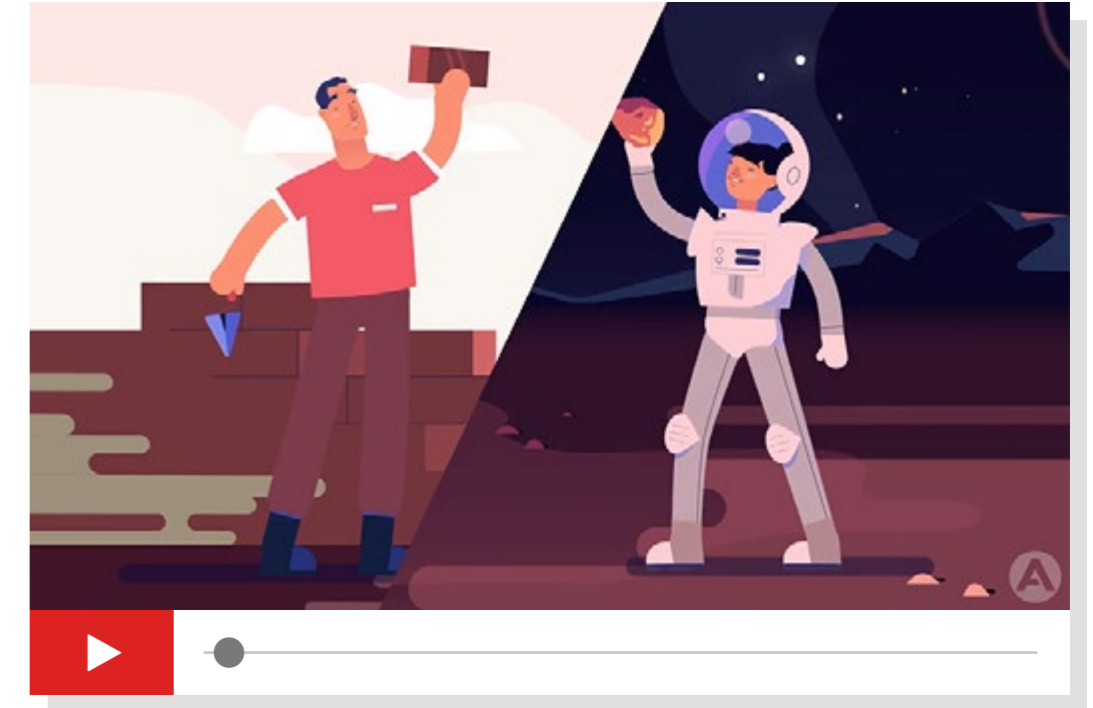
A: *(Open-ended question)*

Advanced:

Q: How high can you jump on the Moon?

A: 6 times higher than on Earth.

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Building Your Own Moon Home

When you think of building a home, you probably think of bricks – but Moon rock is an entirely different material. So, what's the best way to build on the Moon?

QUESTIONS FOR YOUR AUDIENCE:

Beginner:

Q: Can we build our Moon house like we do on Earth?

A: No.

Intermediate:

Q: What could we use to build our Moon house?

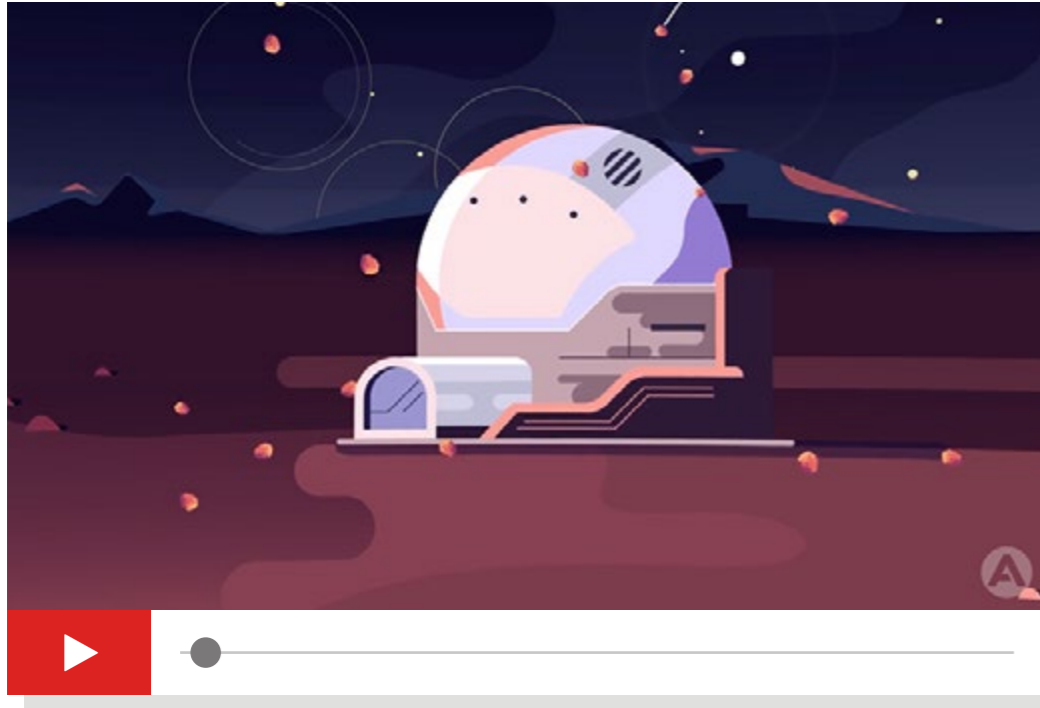
A: Lunar soil!

Advanced:

Q: Why can't you build your Moon house like on Earth?

A: Materials are too heavy to transport.

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Sunny with a Chance of Meteor Showers

About 180 craters appear on the Moon every year, not to mention being hit by golf-ball-sized meteors all year long. How do we stay protected?

QUESTIONS FOR YOUR AUDIENCE:

Beginner:

Q: Why are there craters on the Moon?

A: Because of meteorites.

Intermediate:

Q: What protects Earth from meteorites?

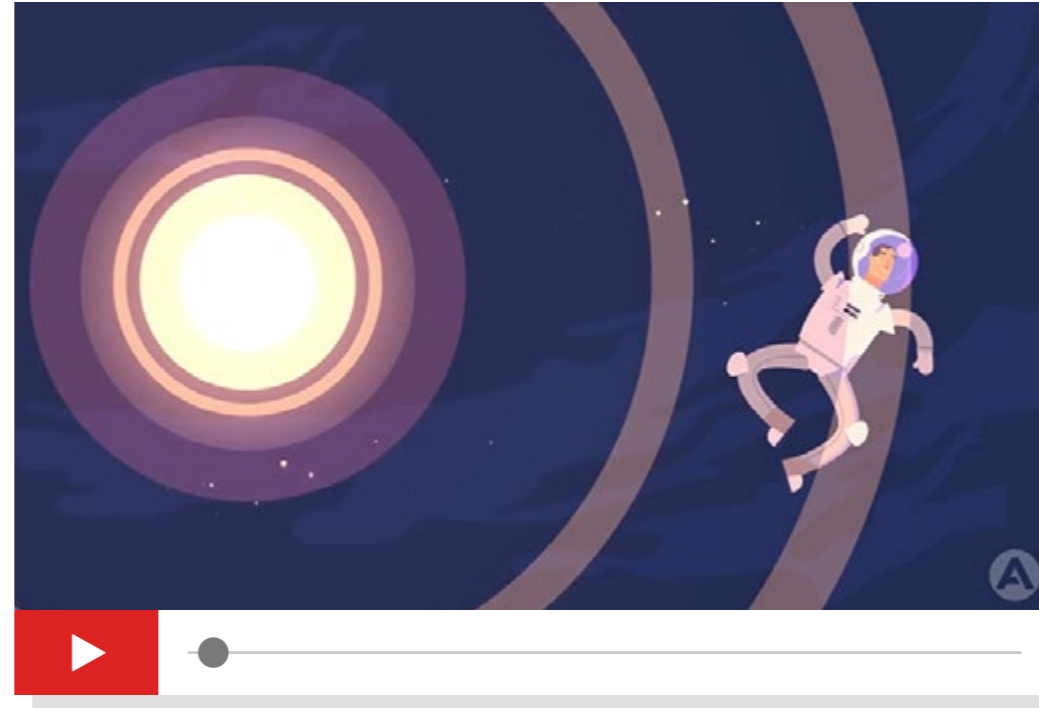
A: The atmosphere.

Advanced:

Q: How many meteorites hit the Moon per year?

A: 100 000

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How Much Sunscreen Do You Need on the Moon?

Just one year on the Moon maxes out the amount of solar radiation we can handle over a lifetime.

QUESTIONS FOR YOUR AUDIENCE:

Beginner:

Q: Can you tan on the Moon?

A: No, the Sun is too dangerous!

Intermediate:

Q: How hot does it get on the Moon?

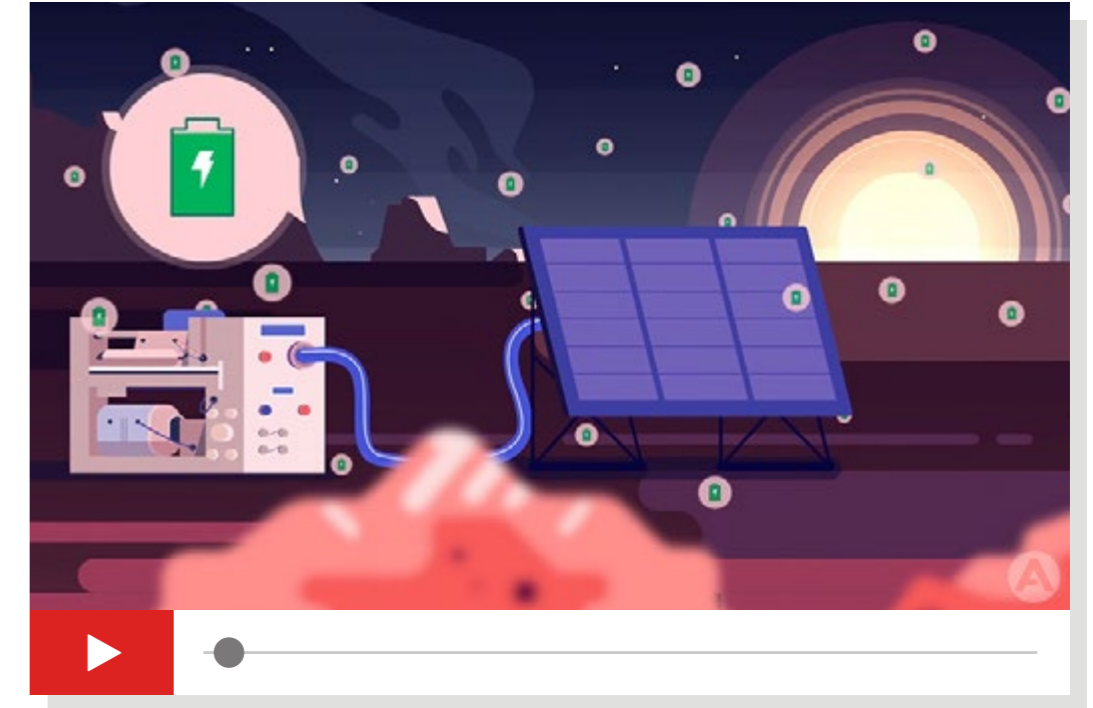
A: Up to 123°C

Advanced:

Q: How can you protect yourself from radiation on the Moon?

A: Plastic or water.

[WATCH >](#) | [DOWNLOAD >](#)



Powering the Moon

A lunar day lasts for 14 Earth days, but nights can be just as long. Is solar energy our best bet for powering the Moon base? And how do we make it last?

QUESTIONS FOR YOUR AUDIENCE:

Beginner:

Q: Can you use a wind turbine on the Moon?

A: No, there is no air!

Intermediate:

Q: How can you produce power on the Moon?

A: Solar.

Advanced:

Q: Where would you place your solar panels on the Moon?

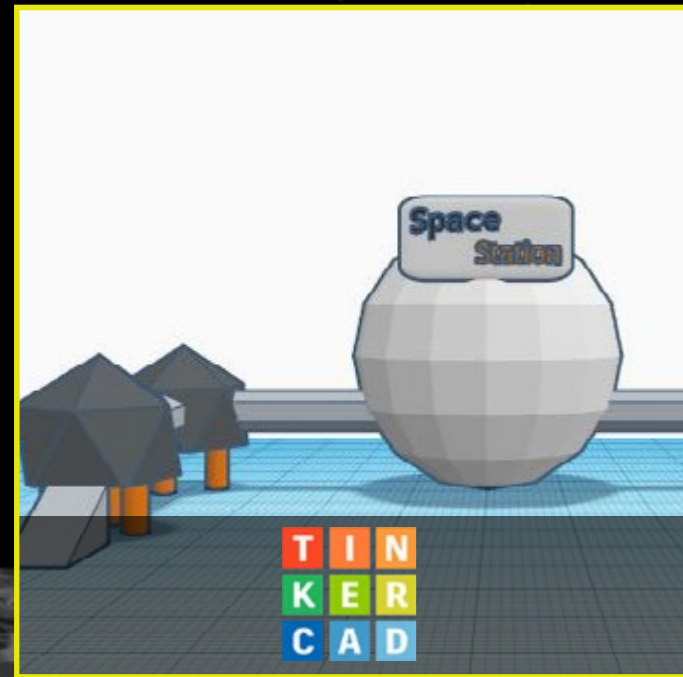
A: On the poles.

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Build Your Own Moon Camp



**ASTRONAUTS
IN THE MAKING**
AGES 8-15



**Airbus – Habitat
on the Moon**

[VIEW INSTRUCTIONS >](#)



**CONFIRMED
SPACE TRAVELLERS**
AGES 16+

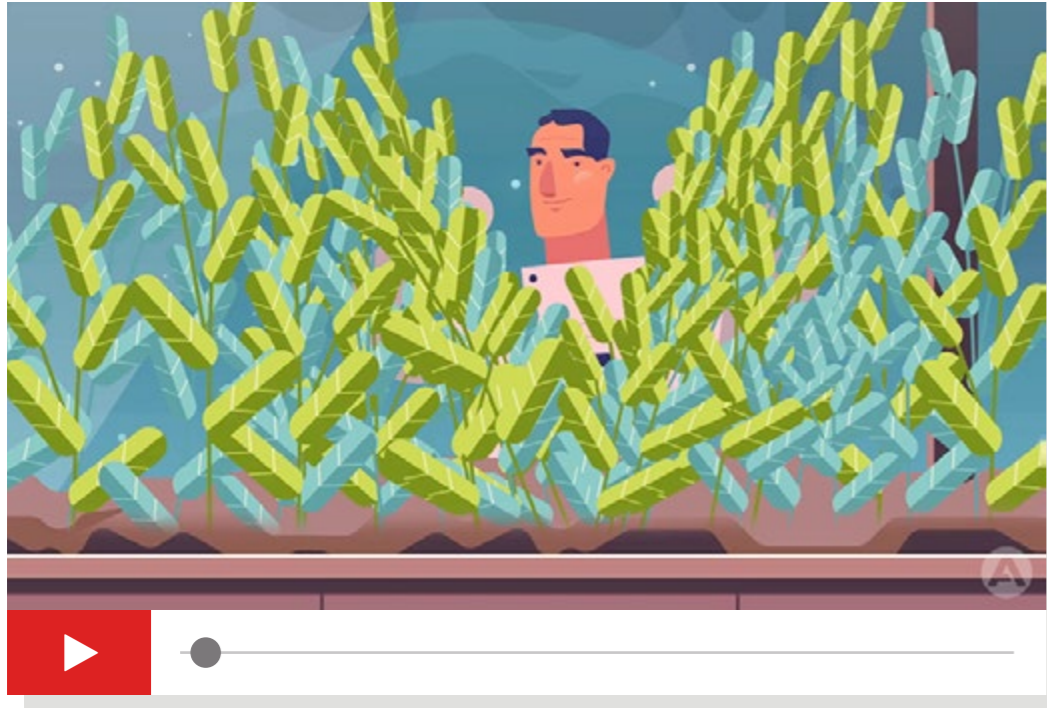


**Moon Habitat on
Fusion 360**

[VIEW INSTRUCTIONS >](#)

MOON LIFE 101

With no atmosphere and no air on the Moon, you'll need a breathing apparatus to get around. Though house plants and algae could generate enough oxygen inside your Moon pod, outside, you're still on your own. Complete the technical construction and get creative: how will you carry this important piece of equipment with you?



Gasping for Air

Holding our breath isn't an option on the Moon. We need sources of oxygen to sustain life. Let's start by importing some plants to help us breathe easy.

QUESTIONS FOR YOUR AUDIENCE:

Beginner:

Q: Can you breathe on the Moon?

A: No.

Intermediate:

Q: What is the key ingredient in air that we need to breathe?

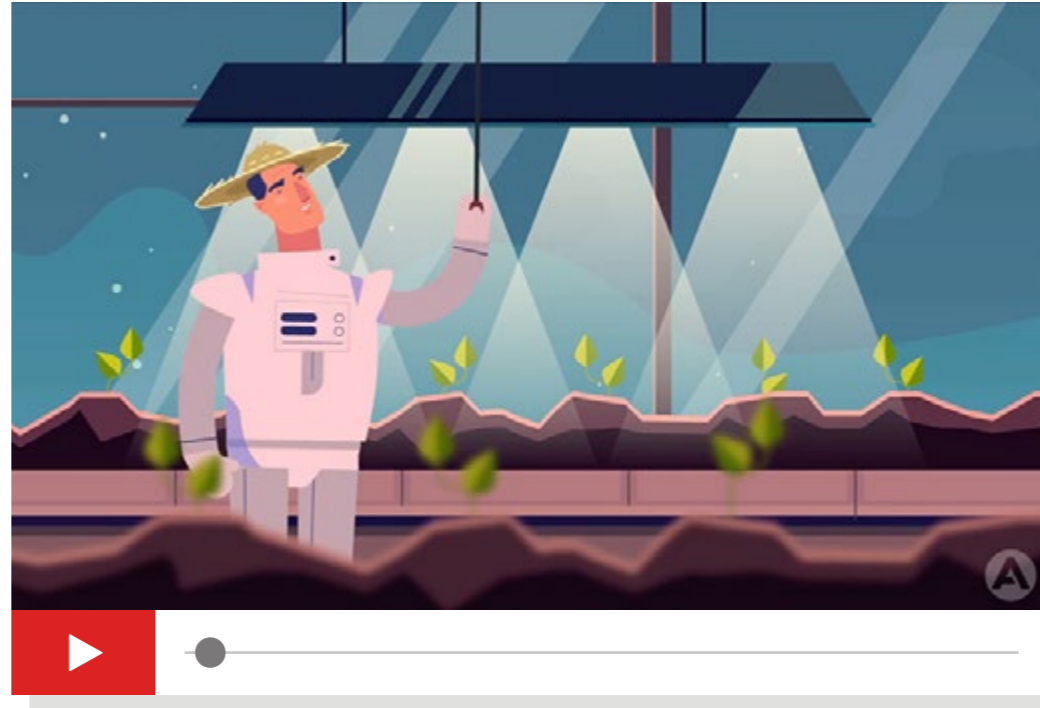
A: Oxygen.

Advanced:

Q: How could we produce air on the Moon?

A: With plants or the lunar soil.

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Moon Dining Between the Stars

There are only so many groceries you can bring to the Moon, so how do you produce food in a place with no air? Here's how to cultivate lunar food sources.

QUESTIONS FOR YOUR AUDIENCE:

Beginner:

Q: Can you grow your vegetables outside on the Moon?

A: No.

Intermediate:

Q: Can you grow any plant on the Moon?

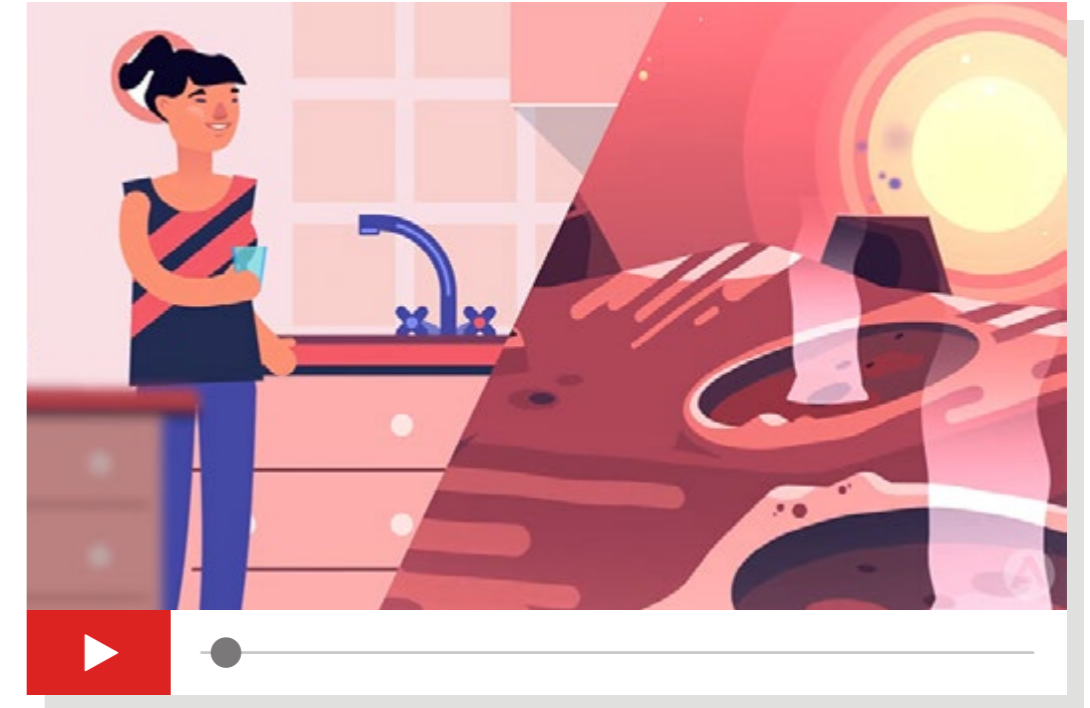
A: No, some of them can't handle the day and night cycle, so you need to help them!

Advanced:

Q: How long does the Sun shine on the Moon?

A: 14 Earth days.

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Quenching Your Lunar Thirst

Since the Moon is as dry as Earth's driest desert, we'll have to bring water with us. The water recycling system used on the ISS can help our supply last.

QUESTIONS FOR YOUR AUDIENCE:

Beginner:

Q: Are there lakes on the Moon?

A: No.

Intermediate:

Q: Can you survive without water on the Moon?

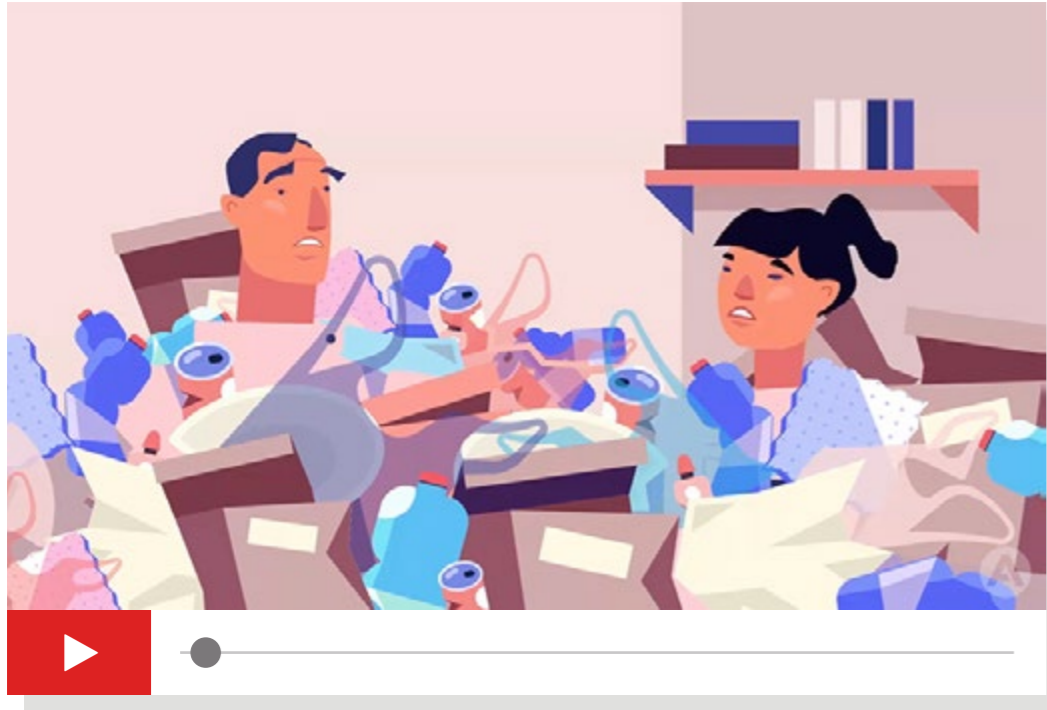
A: No, since you can't recycle 100% of the water you use, you have to produce some.

Advanced:

Q: Where can you find water on the Moon?

A: In the ground!

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Making Tools from Your Trash

One Earthling's trash is another astronaut's treasure. We can turn waste products into valuable sources of heat, fuel, and recycled materials.

QUESTIONS FOR YOUR AUDIENCE:

Beginner:

Q: Where would you throw away your trash on the Moon?

A: (Open-ended question)

Intermediate:

Q: How much equipment and trash did we leave on the Moon when we first went there?

A: 180 000 kg

Advanced:

Q: How can we recycle our organic trash on the Moon, like food?

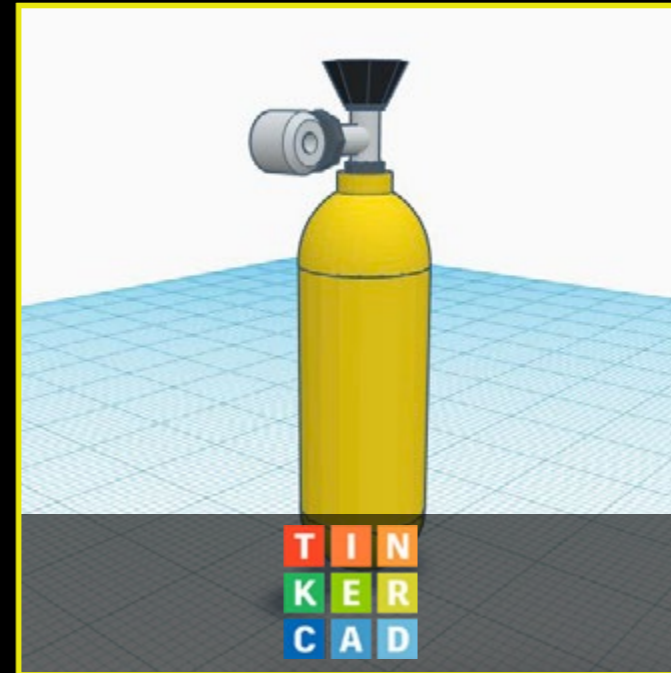
A: Composting.

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Build Your Own Oxygen Tank



**ASTRONAUTS
IN THE MAKING**
AGES 8-15



Airbus – Living on the Moon

[VIEW INSTRUCTIONS - PART 1 >](#)



**CONFIRMED
SPACE TRAVELLERS**
AGES 16+



Airbus – Basics of Living

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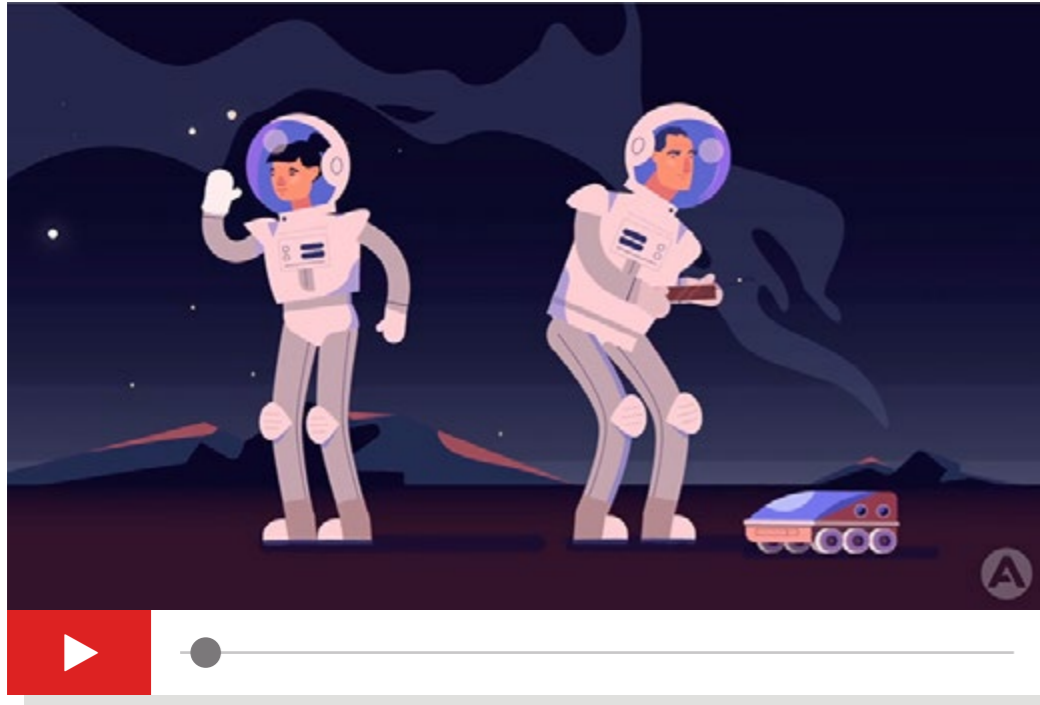
[VIEW INSTRUCTIONS - PART 2 >](#)

[VIEW INSTRUCTIONS - PART 3 >](#)

LUNAR ROAD TRIP

The bumpy and unpredictable terrain of the Moon's surface necessitates rugged vehicles for commuting, cargo transport, and exploration – and helper robots will need sturdy construction, too! Design your own Moon Ranger and purpose – build it for any mission you can imagine!





Test, Test, One, Two

The aim of the Moon mission is to research how to live on other planets. That means not only experimenting on the environment – but also on ourselves!

QUESTIONS FOR YOUR AUDIENCE:

Beginner:

Q: After going to the Moon, what planet will we explore?

A: Mars.

Intermediate:

Q: What do you call the side of the Moon you cannot see?

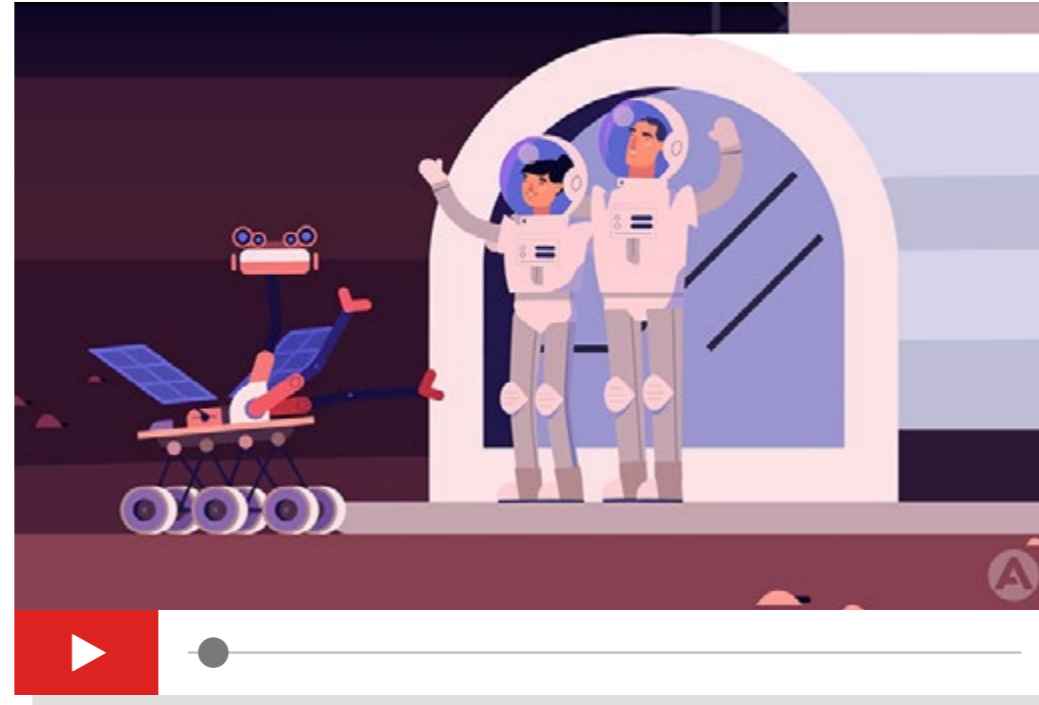
A: The far side.

Advanced:

Q: What would be our biggest experiment on the Moon?

A: Us!

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Our Biggest Friends on the Moon

Getting stuff done on the Moon requires more effort than what the first settlers can manage by themselves. Robots to the rescue!

QUESTIONS FOR YOUR AUDIENCE:

Beginner:

Q: What do you think robots can help us do on the Moon?

A: *(Open-ended question)*

Intermediate:

Q: Who can help us work on the Moon?

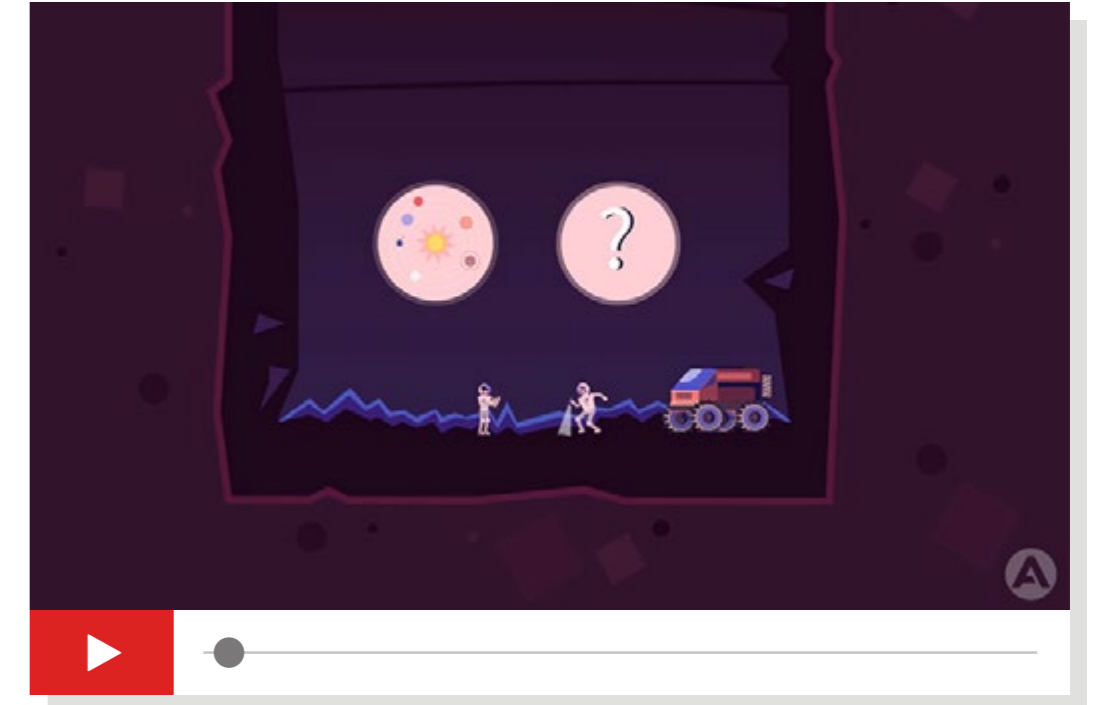
A: Robots.

Advanced:

Q: What do you think we will need assistance for on the Moon?

A: *(Open-ended question)*

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Local Lunar Sights

Top tips for an unforgettable Moon adventure include impact craters housing ancient organisms from the days of the universe's creation.

QUESTIONS FOR YOUR AUDIENCE:

Beginner:

Q: What would you want to explore on the Moon?

A: *(Open-ended question)*

Intermediate:

Q: How deep is the biggest Moon crater?

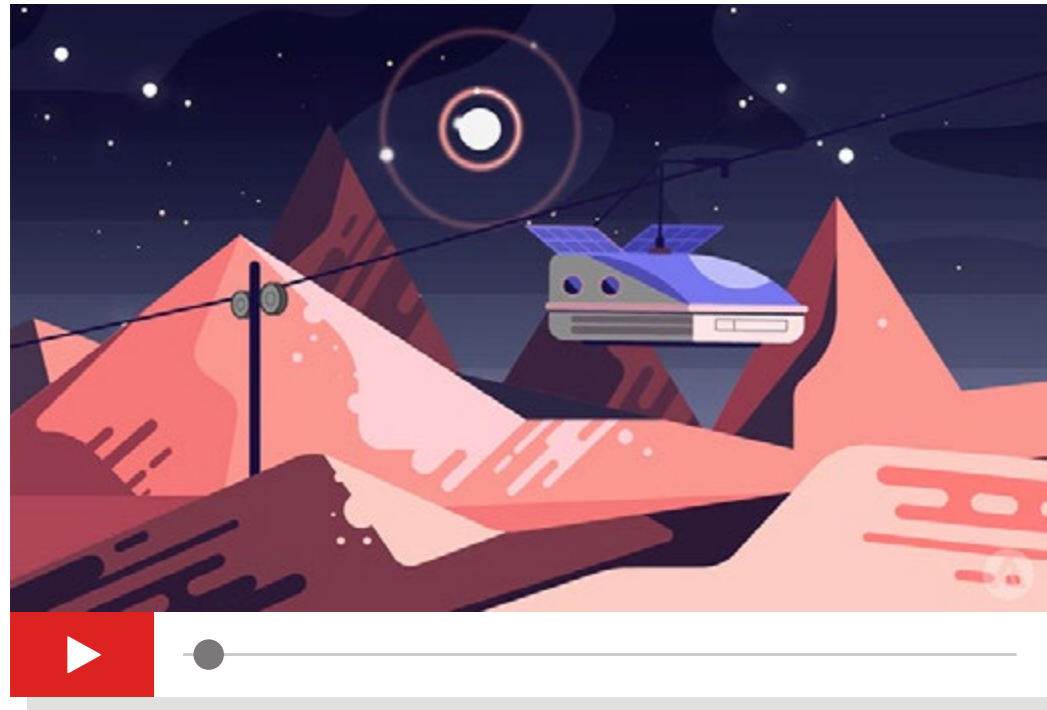
A: 13km

Advanced:

Q: Why are the bottoms of some Moon craters special?

A: Sunlight has never reached there.

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Your Daily Commute on the Moon

What's the best way to travel on the Moon with rocks, boulders, and craters in our way? And when settlements expand, what will our lunar infrastructure look like?

QUESTIONS FOR YOUR AUDIENCE:

Beginner:

Q: Can you ride your bike on the Moon?

A: No, there are no roads!

Intermediate:

Q: Can you drive a convertible on the Moon?

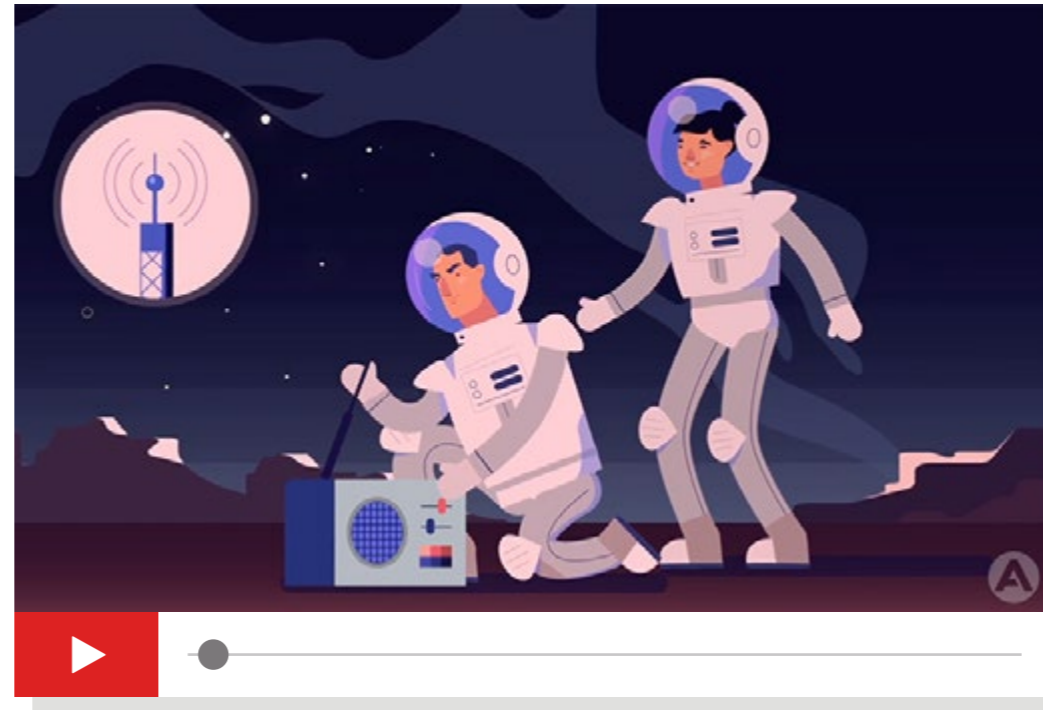
A: Not without a spacesuit.

Advanced:

Q: What do you think would be the best vehicle to go around on the Moon?

A: *(Open-ended question)*

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Moon Base to Rover, Do You Copy?

Even daily communication changes when living on the Moon. Without air to carry our voices, we might rely on lasers to beam our message home.

QUESTIONS FOR YOUR AUDIENCE:

Beginner:

Q: Would your friend hear you talk on the Moon?

A: No, there is no air.

Intermediate:

Q: How can you communicate on the Moon?

A: Laser or radio.

Advanced:

Q: Why can't you hear anything on the Moon?

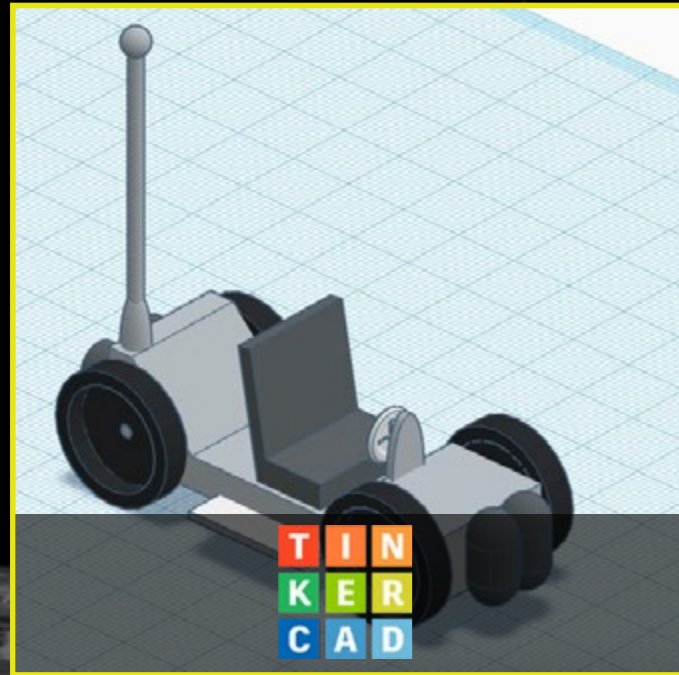
A: Because there is no air.

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Build Your Own Moon Rover



**ASTRONAUTS
IN THE MAKING**
AGES 8-15

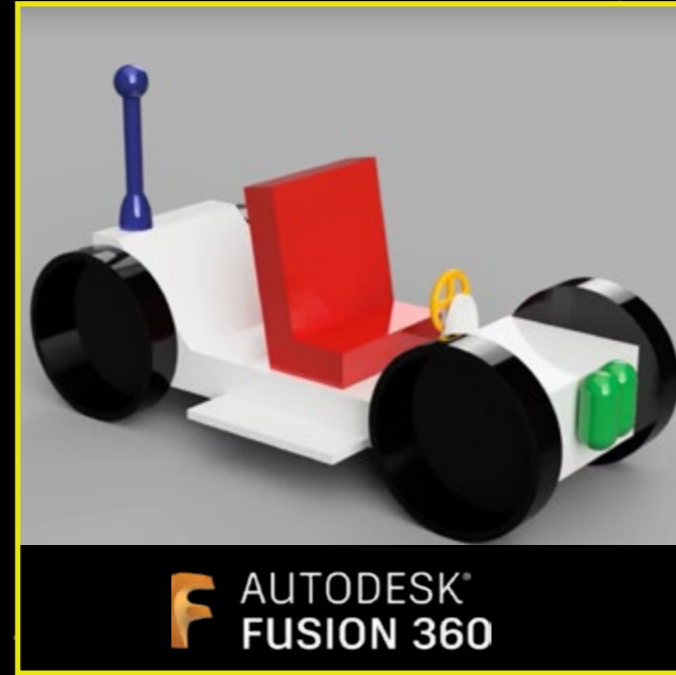


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Moon Secrets LED Jacket

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Additional Instructables Projects



Eclipse Lamp

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3D Printed
Canadarm Model

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3D Printed Modular
Mars Habitat Model

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How to Export Your Designs on Minecraft

Planning to meet with Minecraft addicts? Follow the tutorials and show them how to go from 3D design to their favourite online world!

[FROM TINKERCAD >](#)

[FROM FUSION 360 >](#)



MINECRAFT

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As with anything new, this toolkit is a starting point. We encourage you to take a look, try it out, and email any feedback you have that will help us further improve this resource at corporate.foundation@airbus.com.