



## Civil Aviation Authority – DofE Skill Activity Logbook

# A journey into Space

Participant name: \_\_\_\_\_

eDofE ID: \_\_\_\_\_

DofE Level (Bronze, Silver, Gold): \_\_\_\_\_

Start Date: \_\_\_\_\_



**DURATION**  
3 months



**MATERIALS REQUIRED**

Pen and paper optional, Task 7 and 10 require additional materials

Help and support for this program may also be provided through our STEM team at the CAA ([DofE@caa.co.uk](mailto:DofE@caa.co.uk)).

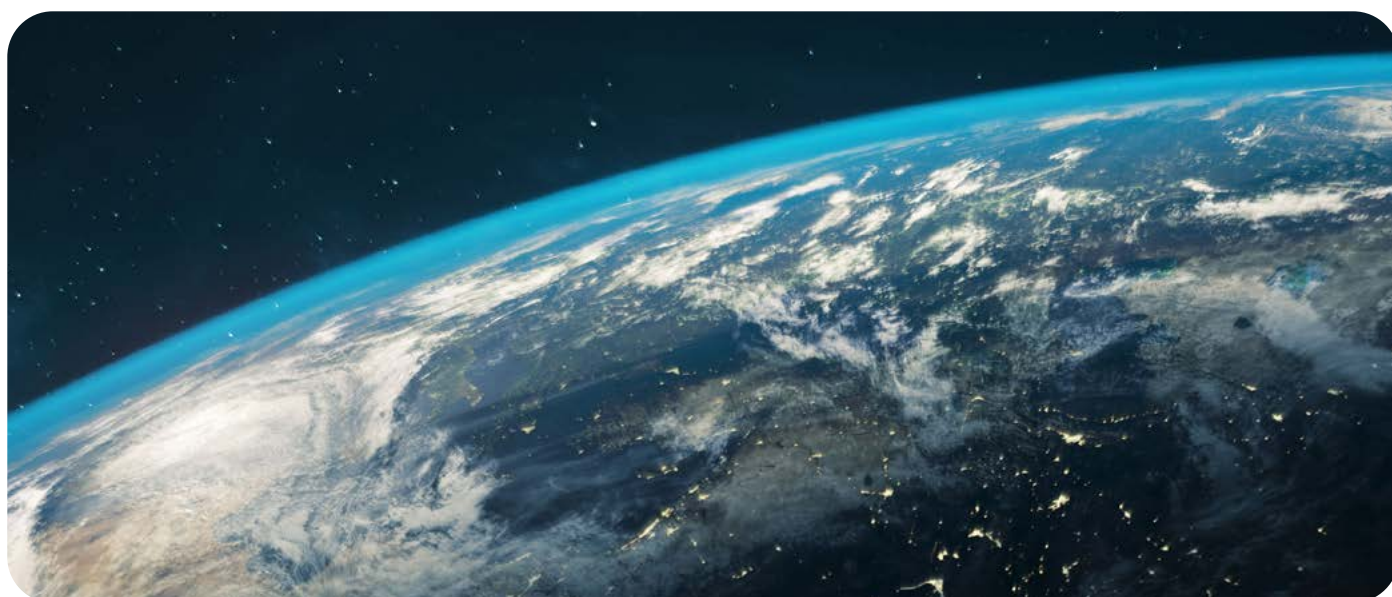
## The Duke of Edinburgh's a journey into Space, three month(s)

Thank you for choosing **a journey into Space** course through the UK Civil Aviation Authority. We are passionate about on sharing our knowledge with the next generation of talent to enter the aviation industry and giving you the opportunity to learn a new talent.

The below is a series of signposts of work that can be undertaken in any order. Each activity should last a **minimum of one hour per week** for the minimum time suggested. This course is designed for Bronze level award lasting 3 months (13 weeks), and can also be used to combine to achieve Silver and Gold awards.

After completion of the course please confirm you have done so by emailing [dofe@caa.co.uk](mailto:dofe@caa.co.uk) with your eDofE ID so we can process your skills award.

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# What is Space?

Before we even consider taking a journey into space let's think about what Space actually is.

Just in case you didn't know - Space is really, really big, and I mean really big. Although most of space is a vacuum it is actually filled with a lot of stuff. It holds our planet Earth, the sun, the moon, all the stars you see in the night sky, and galaxies even further away.

By the end of this task you should be familiar with the concept of space and what lies within it.

## ESA - Space for Kids - What is space?

## Earth and Space - BBC Bitesize

The Atmosphere | National Oceanic and Atmospheric Administration

## Universe Size Comparison | 3d Animation Comparison | Stars Real Scale Comparison

Earth | NASA Space Place – NASA Science for Kids

(There is lots on this website – don't worry you don't have to read it all! Just click on what you are interested in)

1. What is defined as Space?
2. What is the Universe?
3. What is the Milky Way?
4. Can we live in Space without any protection? If not, then why?

Read the information on the web pages and watch the size comparison on the YouTube video.

5. How big are we in comparison to some other galaxies and stars?

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# Astronaut Training

We begin our journey into space here on Earth and before any astronaut jumps onboard that rocket to take the great flight into space – they must go through extensive training.

Take a look at the following websites and conduct your own research to understand more about real-life astronaut training.

## ESA - The challenges of astronaut training and have a look at the three-phases to astronaut training

## ESA - Spacewalk training

## Crew & Operations Training - NASA

## Blue Abyss

**Extra:** Not part of this module, however the best way to understand what astronaut training looks like is to watch a TV competition by the BBC called “Astronauts: Do you have what it takes?” This is a great 6 episode watch if you are interested in this topic **BBC Two - Astronauts: Do You Have What It Takes? - Episode guide**

Describe what activities astronauts must do during their training:

1. What facilities do they use?
2. Are there any astronaut training facilities in the UK?
3. Why do astronauts learn Russian?
4. Would you like to give astronaut training a go?



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## Know your Astronauts

Whilst we were looking before at the training that Astronaut's conducted – why don't we now research some of the famous past Astronauts, missions and great accomplishments made, including some which have entered the record books.

### Did You Know These Facts About Astronauts? - Orbital Today

Let's Explore Astronauts (Don't worry you don't have to do all of these activities)

### HISTORY OF SPACE

(Have a read through this site. You don't have to do the exercises, but try to understand the history of space)



Do some research on historic space missions where Astronauts have gone to space. Choose two of your favourites and dive deeper into the missions. Have a think about:

- > When was the mission?
- > What was the purpose of the mission?
- > Who was onboard?
- > Did anything happen during the mission that was unexpected or dangerous and had to be fixed?

Finally, are there any British Astronauts – who are they and what did they do?

**Extra:** not part of this module however if you are interested then have a look at some space Guinness World Records:

- > Who was the first Astronaut in space?
- > Who was the 2nd man on the Moon?
- > Has there been any sports played on the Moon?
- > How much does a space suit cost?



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## Getting into space (rockets)

Astronauts get into space using a rocket. You can think of a rocket like a taxi, but this taxi is really big, filled with fuel and goes from Earth into space!

By the end of this task, you will know much more about rockets, what they look like and how they work.

Check out some of the following links:

[All About Rockets | National Air and Space Museum](#)

[ESA - Ariane 6: what's it made of?](#)

[General Saturn V Diagrams](#)

[5 Most Important Parts Of A Rocket \[Explained\] | 2025 Edition - RankRed](#)

**Small tip:** When researching this topic it may help to use the term "launch vehicle" which means the same as rocket.

1. Are rockets just used for launching astronauts into space? What else might they launch?
2. Name the main parts (or subsystems) of a rocket.
3. Have a think about the different sizes of rocket. What was the biggest one ever launched?
4. Where do astronauts normally sit in the rocket? Do they have a lot of space to move around?
5. What forces do the astronauts experience during a rocket launch?



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## Rocket propellant

One of the parts of a rocket that you might have identified in the last task when doing some rocketry research is the propulsion system, which is a fancy way of saying the rocket's engine.

Unlike cars that typically run on petrol or diesel, rocket engines can use a variety of different fuels which are typically categorised into solid fuels, liquid fuels, or hybrid fuels.

By the end of this task, you will have a deeper understanding of the materials used in rocket propulsion and why you might use one fuel over another!

Check out some of the following links:

**Rocket - Chemical, Propulsion, Vehicle | Britannica**

**Solid and Liquid Propellant Rocket Systems | Intro to Aerospace Engineering Class Notes | Fiveable | Fiveable**

## A Quick Guide to Rocket Propellant (Liquid Fuel, Solid, and Others)

Perform some research into the three main types of rocket fuel – solid, liquid and hybrid.

1. What would be the advantages and disadvantages of using solid propellant over liquid propellant?
2. Liquid propellant engines require a fuel and an oxidiser to mix to create the thrust. Research the types of fuel and oxidiser that are mixed and show your findings.
3. What types of liquid propellant and oxidiser are commonly used? Which fuels give the most thrust to the rocket?
4. How much of the rocket is filled up with the fuel tank(s) and engines?
5. Do you think it might be dangerous for Astronauts sitting in a rocket with so much hazardous propellant in it?



## Activity 1 – Build your own Rocket

Congratulations you have made it to your first physical activity. You have two choices. The easy build or the more challenging build!

You are going to build your own paper rocket, but the aim is to make it look like a real rocket! If you can, label the parts of your rocket and select what materials and propellants that your rocket should have.

Easy Build – this is a small paper rocket build that can be fired with a straw and a strong blow. How far can you blow it? Follow the instructions on the following video:

### Paper Rockets - STEM Activity

For a more challenging build (warning this is likely to take a few hours) you will need a printer, pens, scissors, ruler, glue, tape and double-sided tape may help. This build is a beautiful display piece and not really mean to be launched! Follow the instructions below carefully and you may need a partner or grown up to give you a hand:

### Ariane 6 Paper Model

Take photos of the final outcome of your rocket build.

Send the photos with your submission of this task.



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## International Space Station (ISS)

When humans began exploring space, they thought of living there. Through the collaborative work by countries and their space agencies the International Space Station became what we have today.

By the end of this module, you will know more about what it is like to live in space, what challenges humans face and how much can be achieved by working with others when we put our minds to it.

## Living in Space – NASA

## Life Inside The International Space Station - YouTube

## How did they build the ISS? (International Space Station) - YouTube

1. Who build the first part of the International Space Station (ISS)?
2. How many years did it take to build?
3. How many countries contributed to the ISS?
4. How big is the ISS?
5. How do the astronauts get water, food and wash their clothes?



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# Our Moon

Our Moon, the Earth's only Moon have always played a big part in human existence. From the ancient Greek times to this day, we have been looking to the Moon for answers.

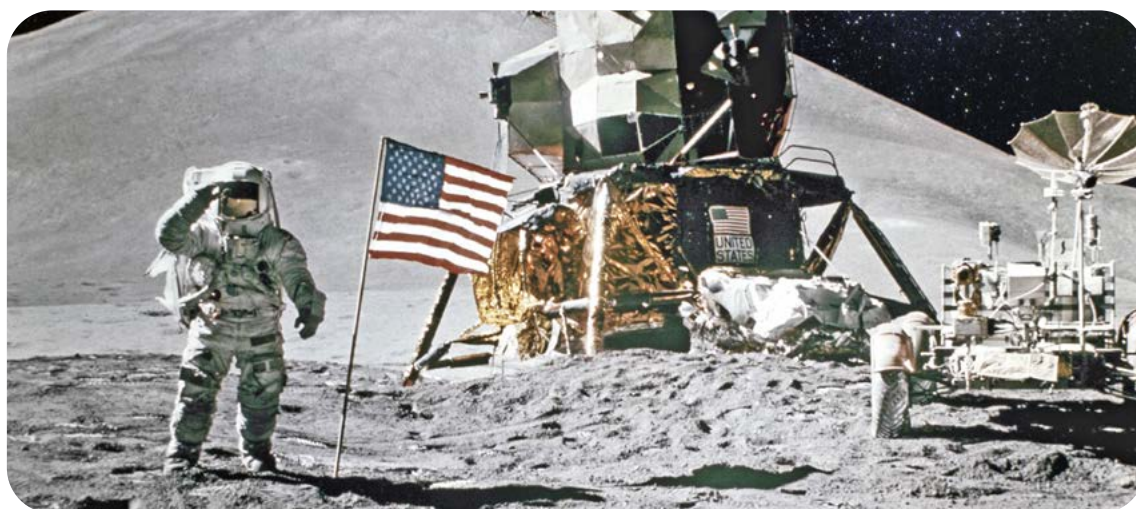
Take a look at the links below. You might have to do a bit of own research to answer some of the questions in this module.

By the end of this task you will know more about the Earth's moon and why it is an important part of exploring space.

Moon 101 National Geographic

**History KS2 | Explorers: Neil Armstrong | BBC Teach - You Tube Artemis**

1. What is the Moon?
2. What resources have been discovered on the Moon?
3. When did humans go to the Moon?
4. When are the next human trip to the Moon?
5. Who was the first human on the Moon?
6. How long would it take to drive to moon?



## Activity 2 – Eat some Moon cheese

Congratulations you have made it to your second physical activity. Have some fun and make some Moon cheese!

This will take 1 hr and 5 mins to do and will need an adult to help with the use of a hot oven and sharp knife.



**Prep time:** 5-10 min.

**Cook time:** 60-90 min.

**Oven temperature:** 90-95 °C to start with. Later turn up to 140-150°C

**Tools needed:** Knife, Cutting board, Baking tray

**Ingredients:** 200gr of cheese. Gauda, Cheddar or another that is your favourite hard cheese.

1. First, preheat your oven to 90-95°C (200°F)
2. Now, cut the big piece of cheese into small dices and bits
3. Then, put baking paper onto a baking tray and scatter the cheese bits on it. Remember to leave big enough gaps between the pieces
4. Afterwards, slide the baking tray into the oven and bake the cheese for 60-90 minutes in order to dry it. This time period may vary, depending on your oven and the type of cheese you use. If your oven doesn't have ventilation or if its thermostat isn't that accurate, I recommend to open the door about every 10 minutes or leave it opened with a small gap during the drying process
5. Always have an eye on the cheese, look after it every 10-15 minutes. In case it starts melting too much, open

Take photos of the making of the Moon Cheese and the final outcome. (2-3 photos)

Send the photos with your submission of this task.

1. What process did the cheese go through to become Moon Cheese?
2. What happened to the cheese?
3. Tell us did you like the moon cheese?

your oven's door to let evaporated water and some heat out. Also, the cheese should continuously decrease the amount of bubbles that it throws (evaporating water)

6. When almost all the water has evaporated from the cheese (no more bubbling), you can turn the heat up to 140-150°C (285-300°F) to make the cheese popping and give it some crisp
7. Afterwards, simply take out the baking tray and let the popped cheese cool down for a few minutes

You need to evaporate the water from the cheese, therefore a temperature of about 100°C -or right below it- is needed. This way, the water evaporates, without the cheese melting too much.

Here is a link to look at to get an idea of what you need to do. **How to make Moon Cheese**

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# Mars colonisation

In this activity, you will spend a bit of time learning about Mars and colonisation.

Below are resources where you will see how humans can get to Mars, how they can survive, and missions planned for Mars.

Use these resources and conduct your own research where necessary to answer the questions on the right-hand side.

## NASA - Humans to Mars

## NASA - Mars

## NASA - Mars Odyssey

## Video

## NASA - Mars in a Minute: How Do You Get to Mars?

## Interesting map of Mars

## SpaceX - Mars & Beyond

1. How long does it take to get there?
2. What projects is there working on colonisation of Mars?
3. Should the colonisation of Mars be done by private organisations?



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## Re-entry

In this activity, we want you to do research into the topic of coming back to Earth.

Spacecraft (crewed or uncrewed), if they are in Low Earth Orbit will re-enter Earth's atmosphere at very high speeds, they can be designed to survive re-entry or destroy the spacecraft.

## Astronauts Return To Earth From the ISS. Undocking and Landing - YouTube

## Soyuz undocking, reentry and landing explained - YouTube



## Crewed Spacecraft

Perform some research into how Humans come back to Earth and survive

1. How are spacecraft designed to survive re-entry?
2. What is a re-entry capsule?
3. How hot does the capsule get on its way back to earth?
4. What type of areas on Earth spacecraft returns?

## Un-crewed Spacecraft

5. What happens when an uncrewed spacecraft re-enters?
6. What is a spacecraft cemetery / graveyard?

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## Let's protect space!

With Space being as big as you now have learned. We hope you have an idea of what is going on and what we need to be doing to make sure we take care of it, keeping it usable for the next generations to come.

Below are resources to help you answer the questions. You can look at the videos first and then look at the reading material.

[Laws of Space - European Space Agency](#)

[What is Space debris Mitigation Guidelines](#)

[Low Earth Orbit Visualization | LeoLabs](#)

[Stuff in Space](#)

[How many satellites could fit in Earth orbit?  
And how many do we really need?](#)

[Case Study Space Sustainability](#)

[Space Law Treaties and Principles](#)

[How much space debris is in Earth orbit?](#)

1. How many satellites are currently in orbit around the Earth?
2. Do you know of any other human-made satellites orbiting a planet other than Earth?
3. What regulations do we have in the UK that deal with Space activity?
4. How do we protect our space?
5. What international treaties are there that the UK has signed up to?
6. How can we protect against what is being sent up into space?