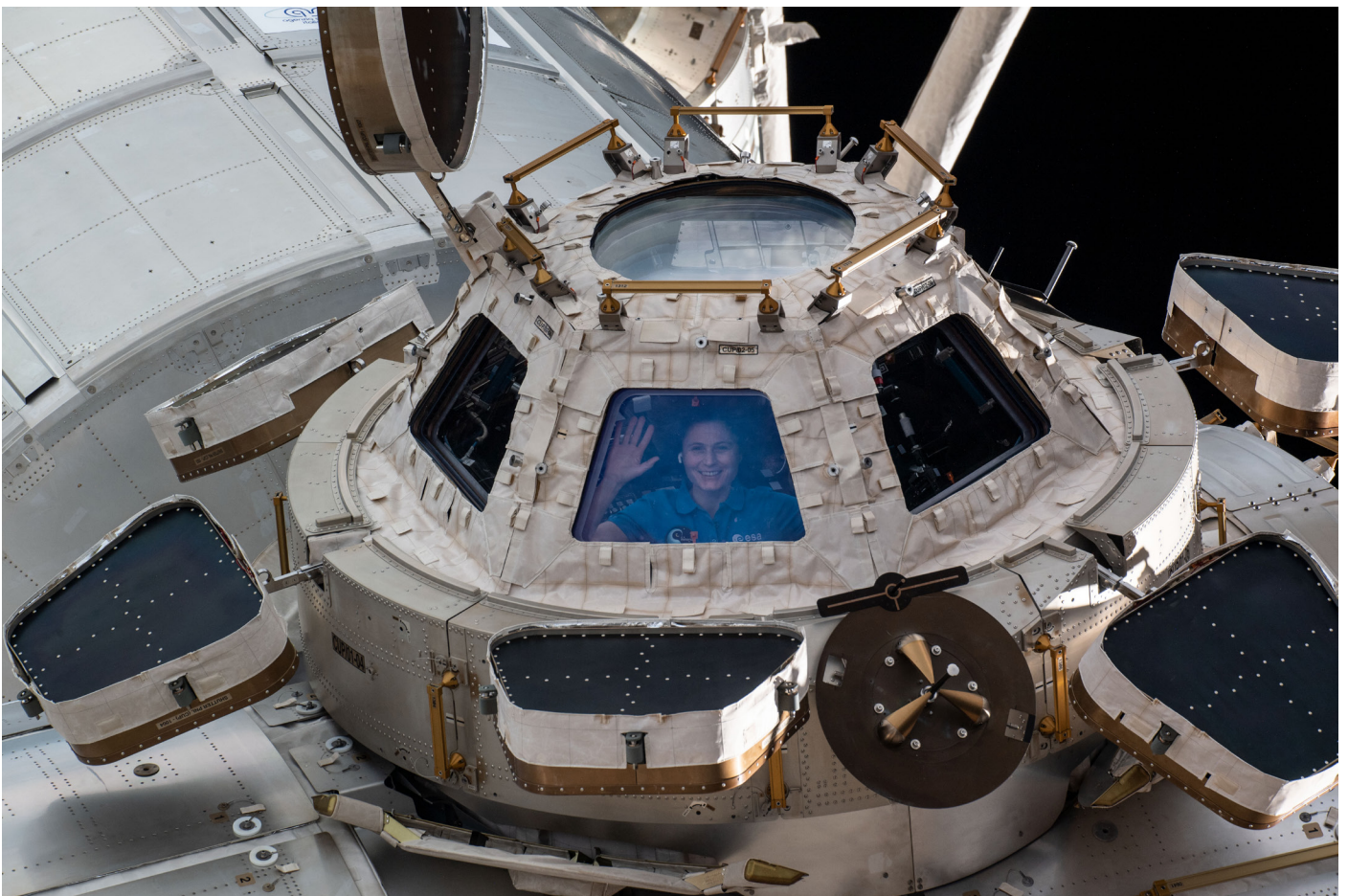


# teach with space

## → ASTRONAUT LOGBOOK

*A week in the life of an astronaut with Samantha Cristoforetti*



# ALL ABOUT ASTRONAUTS

## What is an astronaut?

An astronaut is a space traveller. Astronauts are professional crew members in spaceflights that travel beyond Earth's atmosphere. Due to the challenges and hostility of life in space, astronauts spend a large part of their career training for their missions.

## Where do astronauts travel to?

Astronauts have travelled to stations orbiting the Earth, like the International Space Station (ISS), and to the Moon. In the future we will probably see astronauts visit further away locations, like Mars.

## The International Space Station

The International Space Station (ISS) is a large laboratory in space and is an international collaboration between lots of different space agencies across the world. Humans have lived onboard the ISS since 2000, with up to six astronauts at a time living and working alongside each other.

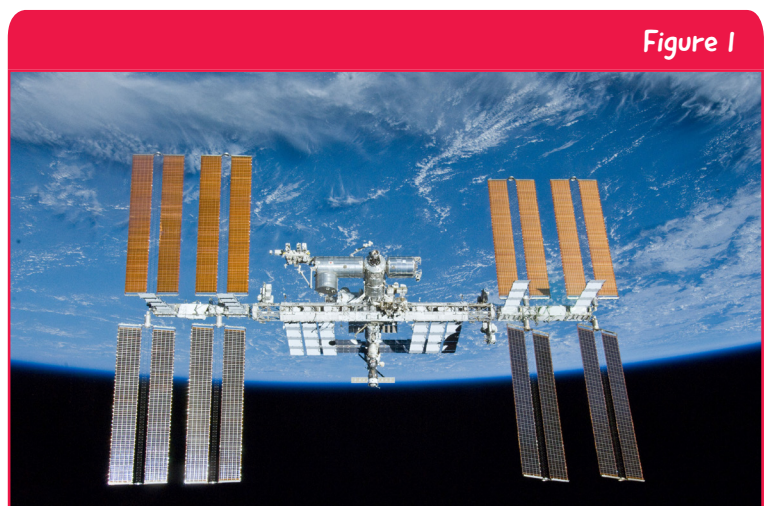
In the ISS environmental conditions are a bit different than on Earth. The astronauts are in an environment of micro-gravity (due to its big speed orbiting Earth) and are less protected from radiation and temperature fluctuations. The ISS is also outside of Earth's atmosphere, so there is no air when astronauts step out of the space station.

## What do astronauts do when they are in space?

The main job of an astronaut is to conduct scientific experiments and keep the space station in working order. It is important that they work well as a team and collaborate efficiently with the controllers and scientists back on Earth.

Most of the time their tasks are performed inside the ISS, but when they venture outside, for example to maintain the solar panels, they must wear special spacesuits for protection.

Astronauts must stick to strict routines whilst living in space, to make sure they stay safe, healthy, and happy. Astronauts do daily exercise and eat nutritious foods to keep fit and healthy in space. In their free time, astronauts do a lot of things similar to what we do on Earth, like relaxing, cleaning and talking to friends and family.



↑ The International Space Station. Credit: NASA (S132-E-012208)



# BE AN ASTRONAUT FOR A WEEK

## Meet ESA Astronaut Samantha Cristoforetti



Figure 2

Samantha Cristoforetti is an astronaut working for the European Space Agency (ESA). As an astronaut, Samantha has travelled to space twice, and lived on the ISS for over 350 days.

In April 2022, Samantha began her second journey to space on the ESA Minerva mission. She spent a long time preparing for her mission, training for how to live and work in space. During her Minerva mission, Samantha became the first European woman to command the ISS.

↑ ESA Astronaut Samantha Cristoforetti holding her Minerva mission patch

**YOUR MISSION:** Follow Samantha's routine at the ISS for one week and compare her daily tasks to yours. Observe your everyday routine and keep a record of it.

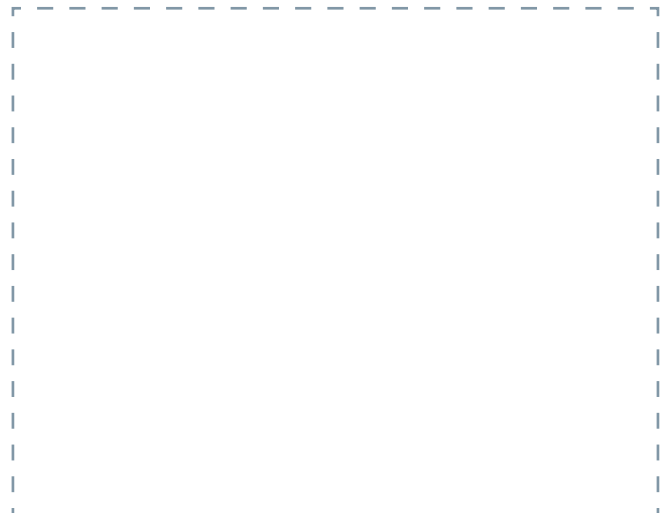
*You are ready to start your astronaut mission with ESA!*

Like all astronauts, you will also have to create your mission patch and name your mission.

Name your mission: \_\_\_\_\_

Fill in your personal information in your ESA badge

Design your mission patch





# DAY 1 – FOOD

## What Samantha ate today...

Food is very important for astronauts to stay healthy in space, and they usually have three meals a day: breakfast, lunch, and dinner. They must get all their nutrients in these meals, whilst ensuring they have enough food to last them throughout their mission.

*Check out Samantha's diary of what food she ate today:*

*Eating on the International Space Station is very different than on Earth: we don't cook! All our food is pre-cooked: sometimes it can be eaten as it is, like nuts, sometimes we just need to warm it up in our little oven, and sometimes we need to add water, because the food is dehydrated.*

*I get to choose what I eat in space from what is available, there is no strict meal planning, and I get to take some special foods with me from Earth too!*

*Today I ate mushroom soup, omelette with broccoli, tomatoes, and asparagus – all of those are rehydratable – and some macadamia nuts.*

*Mushroom soup is one of my favourite foods to eat on the International Space Station. I also have a very good spelt salad.*

*I really like big salads with plenty of fresh ingredients like tomatoes, mozzarella, cucumbers, nuts, and plenty of olive oil! I wish I could eat them in space, but unfortunately we rarely have fresh food on the space station, so I'll just have to wait until I'm back on Earth!*

Samantha Cristoforetti

### Exercise

1. What is Samantha's favourite food on the ISS?

2. What is Samantha's favourite on Earth?

3. Why can't Samantha have her favourite food from Earth in space?

4. Can you think of another food that astronauts may not have in space?

5. What meal would you like to make for an astronaut, and why?



Figure 3

↑ Samantha onboard the ISS with her lunch



# DAY 1 – FOOD

## What I ate today...

Staying healthy and eating a balanced diet is very important for astronauts on board the International Space Station, but also on Earth.

**→ SPACE FOOD**

**Dining Time**

FROM TIME TO TIME, THE SPACE STATION CREW SHARE A MEAL. THEY GATHER AROUND THE FOOD PREPARATION AREA IN THE RUSSIAN ZVEZDA MODULE.

**NOT SPACE-FRIENDLY**

**CRUMBS**  
There is a danger it could clog air vents, contaminate equipment or get stuck in an astronaut's eyes. All seasoning comes in liquid form.

**BIG PACKAGES**  
Wrappers and empty packages are compressed to minimise trash.

**HEAVY FOOD**  
Every gram launched into space is precious. The average weight of daily rations is 4 kg per person, including beverages.

**CARBONATED BEVERAGES**  
In space, bubbles do not separate from other fluids in the stomach, so when they 'rise', so does everything else.

1. What food did you eat today?

-----

2. What is your favourite food?

-----

3. If you were an astronaut, would you eat the same food?

-----

4. How could you package the food, so it would last longer in space?

-----

-----



# DAY 2 – EXERCISE

## How Samantha keeps fit...

*Keeping fit and doing daily exercise is very important for astronauts on the ISS.*

*Check out Samantha's video of what exercise she did in space today:*



### Exercise

1. Which exercise equipment was Samantha using in the video?

-----

2. How many hours does Samantha exercise every day?

-----

3. What types of exercise equipment exist on the ISS?

• -----

• -----

• -----

4. Why is it important for astronauts to do exercise?

-----



# DAY 2 – EXERCISE

## How I kept fit today...

Keeping fit and doing daily exercise is very important for astronauts on board the International Space Station (ISS) and on Earth.

Think of all the exercise you do without realising – walking, running or even going up and down stairs. You may also play sports or do activities that require you to exercise like playing football, swimming or even horse riding.

What kind of exercise have you completed on Earth today?

Exercise / Activity	Duration (minutes)	Which part(s) of the body did you exercise?
e.g., I walked to school	20	My legs and arms

### Exercise

1. In total, how many minutes did you exercise today?

-----

2. What is your favourite exercise activity?

-----

3. Why is it important to exercise often?

-----

4. What kind of exercise would you prefer to do in space?

-----





# DAY 3 – HOBBIES

## What Samantha does in her free time...

Samantha's day onboard the ISS usually starts at around 7am. During a typical day, she will need to tend to experiments and essential maintenance for around 10 hours, exercise for 2 hours, and participate in daily task meetings as well as weekly health checks. Once all the work is done, she gets free time to relax before going to sleep and starting it all again the next day.

[Check out Samantha's video describing what she was doing in her free time once her work was complete on the ISS today:](#)



### Exercise

1. What is Samantha's favourite hobby on the ISS?  
-----
2. What is Samantha's favourite hobby on Earth?  
-----
3. What hobby would you suggest for Samantha to try when she is back on Earth, and why?  
-----  
-----



### Did you know?

Samantha Cristoforetti is the first person to make a Tik Tok video in space!



# DAY 3 – HOBBIES

## What I did in my free time today...

Having hobbies and doing something relaxing after school in your free time is a great way to stay happy and keep your mind healthy.

What hobbies do you take part in during your free time?

My Hobbies are....	Why do I like doing this activity?
<i>e.g., I read a book</i>	<i>I learn a lot from reading and find it very relaxing.</i>

### Exercise

What two items would you like to take with you to space to use in your free time, and why?

1. ....
2. ....

### Did you know?

Samantha Cristoforetti likes to take pictures of the Earth from space. Here is one she took while the ISS was flying over Slovakia.



# DAY 4 – CLOTHING

## What Samantha wore today inside the ISS...

Surprisingly, astronauts can wear the same clothes they wear on Earth whilst they're on the ISS! There is little time in an astronaut's day to get changed into new clothes, and they can't do laundry in space, so they change their clothes a lot less often than we do on Earth!

Check out Samantha's diary of what clothes she wears on the ISS:

Inside the space station we have a comfortable environment. We have air at the same pressure as on Earth, and the temperature is about 22°C. To work, we usually wear T-shirts and trousers with plenty of pockets and a lot of Velcro stripes to attach things. We only wear socks – no need for shoes!

I have one pair of trousers per month, one T-shirt per week, and I can change underwear every 2 days and socks every four days. I also have separate sets of exercise clothes. I can choose between which of my clothes to wear, for example whether I wear long-sleeved or short-sleeved shirts.

There are some materials we don't wear often in space, due to their properties. We typically don't wear synthetic fabric, except for exercise, because it is flammable. We mostly wear cotton!

Samantha Cristoforetti

### Exercise

1. How many T-shirts does Samantha wear in a week?

2. Why doesn't Samantha wear clothes made from synthetic fabric?

3. Why can Samantha wear normal clothes inside the ISS?



Figure 4

↑ Samantha on her very first spacewalk outside the ISS.  
Credit: ESA / NASA / Roscosmos

# DAY 4 – CLOTHING

## What Samantha wore today outside the ISS...

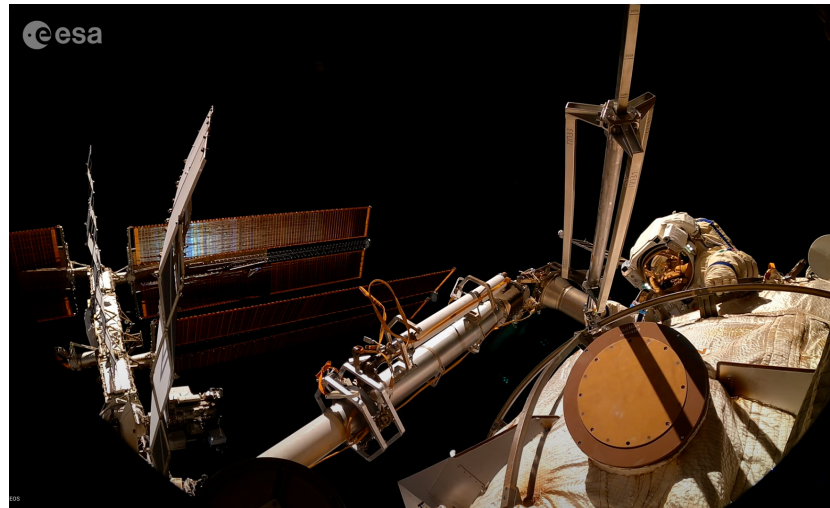
Sometimes astronauts need to venture outside the ISS for maintenance and repairs. In this case, astronauts wear an EVA (extra vehicular activity) suit, which is what we commonly call a spacesuit!

[Check out Samantha's video describing a spacesuit she's worn on an EVA:](#)

When we do EVA activities, we wear long underwear and a cooling undergarment under our suit, with lots of small tubes that wrap around your body. Water circulates in those tubes to keep you cool while you work hard during a spacewalk.

The EVA suit is very complex. You have the pressure suit, with gloves and a helmet, and you have the life support system, that provides oxygen to breathe, water for cooling, removal of the carbon dioxide (CO<sub>2</sub>) that you exhale, and a radio system to communicate.

Samantha Cristoforetti



### Exercise

Try to match the parts of the spacesuit to their correct function:

Pressure suit

Protects the astronaut's hands while allowing them to grab items outside the space station.

Life Support System

Allows the astronaut to maintain communication with the space station and talk in space.

Gloves

Protects the astronaut's feet in space.

Radio system

Provides a supply of oxygen, water for cooling, and removes carbon dioxide from the space suit.

Boots

Allows the astronaut to stay safe, breathe and to see.

Helmet

Maintains a steady pressure inside the space suit and protects the astronaut from the cold.



# DAY 4 – CLOTHING

## What I wore today...

Clothes are very important to keep us warm, comfortable, and looking stylish! But for astronauts they have an extra role: to keep them safe in space! The material our clothes are made from give them different properties. Some may be soft and comfortable, others may be resilient, and some may even be waterproof!

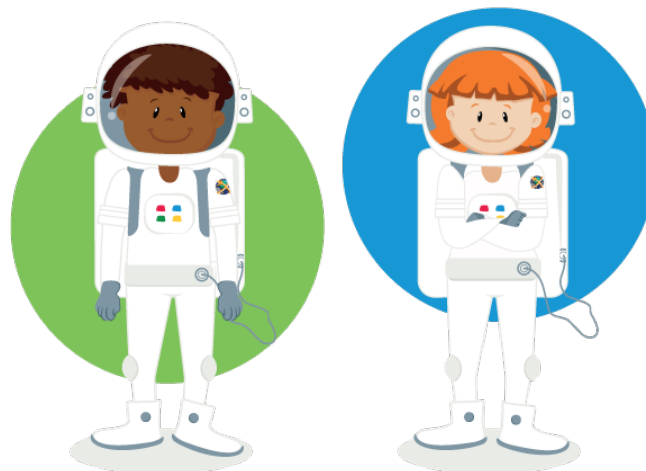
Fill in the diary of what clothing you wear in a day. Consider why you chose to wear these and what properties your clothes have.

Clothing	Why did I choose to wear this?	What properties do your clothes have?
<i>e.g., I wore my coat.</i>	<i>It keeps me warm and dry from the rain outside</i>	<i>It is waterproof and it's pink.</i>

### Exercise

1. Can you recall a special occasion where you had to wear special clothes?

2. What is your favourite item of clothing to wear?



# DAY 5 – TEAMWORK

## How Samantha works in a team...

*Working together is very important for astronauts on board the ISS.*

*Check out Samantha's diary on why teamwork is important on the ISS:*

*I love working on the International Space Station alongside the other astronauts, because my crewmates are fantastic people! They are very competent, always helpful and they have a great sense of humour.*

*Everything we do up here on the International Space Station is teamwork. A fellow crewmate might help me on a task if it is taking longer than planned, or they might notice a mistake I am making, or they might just cheer me up if I am sad about something.*

*Up here in space, we live and work together for 24 hours a day, so it's important to always look out for opportunities to help your crewmates, and always try to be aware of how your crewmates are doing.*

*It's also important to ask for feedback from your teammates, so they can tell you the things that they appreciate about you, and a few things that you can improve.*

Samantha Cristoforetti

### Exercise

1. Name two tasks you think Samantha would need help with on the ISS:

-----

2. Do you think astronauts face difficulties when working as a team on the ISS? Why?

-----

3. What advice would you give to an astronaut on how to work well in a team?

-----



Figure 5

↑ Samantha onboard the ISS with her fellow astronauts

### Did you know?

To communicate with each other, all astronauts on the ISS need to learn English and Russian. Samantha also knows Italian, German, French, and Chinese!



# DAY 5 – TEAMWORK

## How I worked in a team today...

*Being able to work well in a team is a very useful skill, especially at school! Think of all the times you have worked with someone else. Maybe you partnered up on work at school, played a group game with your friends, or helped with cooking dinner?*

### Exercise

1. What was the last activity you did as part of a team?

-----  
2. Can you think of an activity that you need to complete as a team?

-----  
3. Name one characteristic you think your teammates appreciate about you.

-----  
4. Do you think that quality would be important in space? Why?

-----  
5. What teamworking skill do you think you could improve on?

-----  
6. Imagine you are being interviewed for a job to become the next ESA astronaut. Circle which key skills you have and give an example where you demonstrated that skill.

I communicate well

I listen well

I work hard

I am fair

I am a leader

I manage my time well

I am good at problem solving

