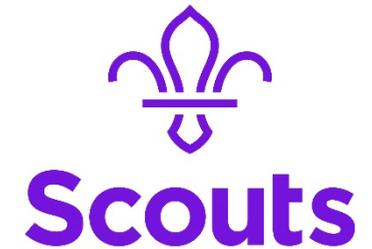


Base cards

Cut out each card and place at a different base for your very own 'Mission to Mars'.



Shape up to suit up

Astronauts need to be fit. Before Scout Ambassador Tim Peake spent s on the International Space Station (ISS), his training included lots of exercise such as cycling and weight lifting.

It's especially important to exercise in space, because our bodies aren't designed to work there. To stay healthy, Tim spent about two hours a day exercising on the International Space Station. They have special gym machines for the astronauts which work in zero gravity. Astronauts are strapped to the treadmill with a harness so they don't float away – Tim even ran a marathon on the space treadmill.

Tim spent six months on the ISS; however, the journey to Mars could be up to eight months each way, plus the time spent on the planet itself. Mars has around a third the gravity of Earth, which has a huge impact on a person's muscles and health. So it is crucial for the astronauts to exercise daily to remain healthy for such a long journey.

Now it's time for you to shape up to suit up. Have a go at the endurance challenges at this base – have you got what it takes?



It's all in the details

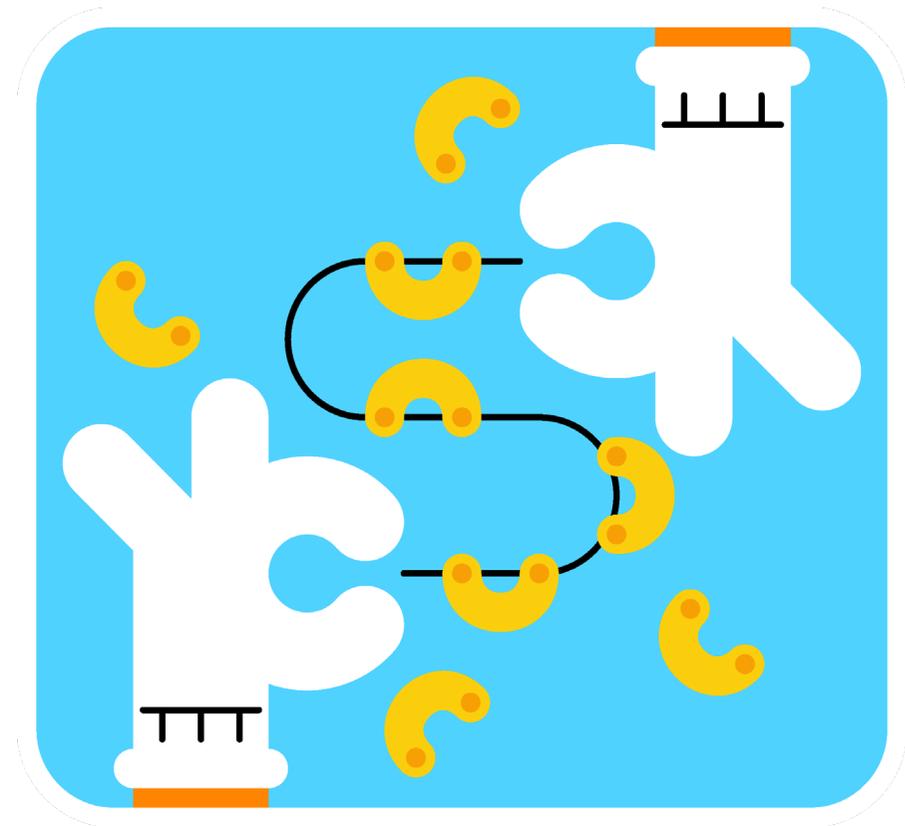
When they're on a space shuttle, or the International Space Station (ISS), astronauts can wear simple overalls or their own clothes. During take-off and landing, they wear orange suits which offer some protection in case things go wrong, and make them easy to spot if they parachute out in an emergency.

During a spacewalk, astronauts wear spacesuits. These keep them safe from the extreme conditions in space, including:

- Temperature. It can be as cold as $-153\text{ }^{\circ}\text{C}$ on the surface of Mars.
- Radiation. Mars also does not have the same protection from the dangerous radiation emitted by the sun that the Earth has.
- Air. Mars has a very thin atmosphere made mostly of carbon dioxide.
- Water. Spacesuits have water for astronauts to drink.
- Dust storms. Even small pieces of dust can be dangerous because they're moving so fast.

This means the astronauts that explore Mars will need special space suits that will protect them from the cold, dust storms and radiation, while enabling them to breathe. They will need to perform complex tasks and experiments while wearing gloves.

Bulky spacesuits can make it difficult to do fiddly tasks. Now it's time for you to see that it's all in the details. Have a go at doing some of the fiddly tasks, wearing the bulky gloves – have you got what it takes?

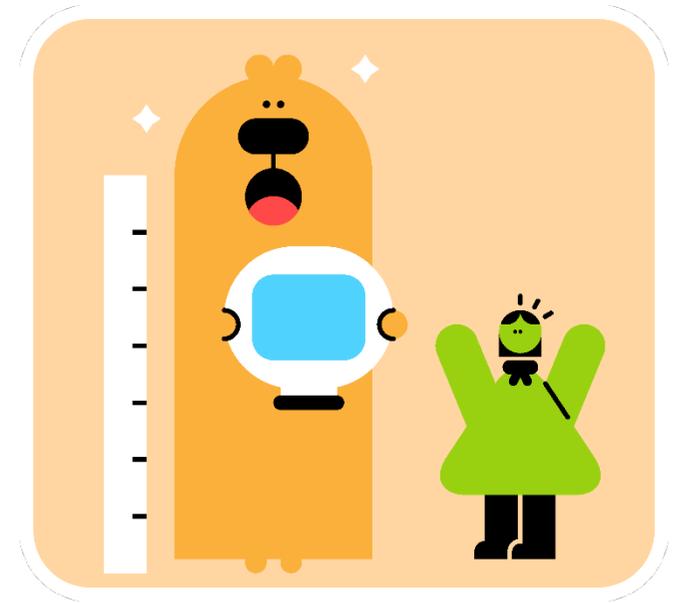


A tall tale

One of the many strange parts of being an astronaut is that space may change your body. We still don't understand all of the effects of spending time in space, but we do know that astronauts get taller in space. Our spines (backbones) are made up of 33 bones stacked on top of each other. These bones are called vertebrae. In between the vertebrae are discs that stop the bones rubbing together.

In space, there's no gravity. Over time, living without gravity lets the discs in between the bones in the spine expand, so astronauts get taller. A Mars mission could mean that the astronauts are in zero gravity and reduced gravity for up to two years or more. It's only temporary, though – when they get back to Earth, astronauts soon shrink back to their normal height.

Now it's time for you to tell a tall tale. Have a go at figuring out your space height – would you want to have a go at space growth?



Ready, set, race

A Mars rover is a vehicle that travels across the surface of Mars, across its rocky terrain. They have different technologies like cameras and rock analysers to help us learn about Mars. NASA's long term goals for its Mars Exploration Program are to:

- Understand whether there was ever life on Mars
- Find out about the climate of Mars
- Find out about the geology of Mars
- Prepare for humans to explore Mars

Since 1971, six rovers have been sent to Mars, but not all of them landed successfully. The most recent rover was Curiosity, which was launched in 2011 and landed on Mars in 2012. It was still operational in March 2019.

Now it's time to get ready, set, race. Create your own cotton reel rover – will yours be a winner?

