

## Key Stage 2 & 3 Worksheet

# Marshmallows in space!



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Open file in your web browser to click on the links.

Watch video here:  
[youtu.be/O7oPgiW2cSU](https://youtu.be/O7oPgiW2cSU)

## What is it about?

This short video shows a bell jar experiment where a marshmallow, which is full of air, is subjected to a vacuum.

In the video, the air is pumped out of a bell-jar to decrease the air pressure inside the jar and create a vacuum, just like in space. Read more about it “**Is Space a Perfect Vacuum?**”.

The video illustrates the effect the low pressures in space would have on the human body if astronauts did not wear space suits.

Marshmallows are soft and bouncy because they are filled with tiny pockets of air. As the air is pumped out of the bell jar the first thing that happens is that the air pressure in the jar decreases. The pockets of air inside the marshmallow expand in the low pressure, causing the marshmallow to grow. This would happen to the air in your lungs if you held your breath in the vacuum of space. After the air is let back into the jar (by releasing the vacuum pump) the air pressure returns to normal, the marshmallow looks like it is deflating and it is also stretched out of shape.

So, if you ever find yourself in space without a spacesuit – remember to breathe out!

## What happens to our bodies in space?

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Did you know that 2<sup>nd</sup> November 2000 was the last time that all living humans were on Earth at the same time?

Since that date, the International Space Station has had at least one person on it at all times. So, understanding how we survive space, and what happens to our bodies in space, is really important.

The human body is under immense pressures when entering, living in, and leaving space. We have evolved to survive the conditions on Earth and the conditions in space are very different. Because of this, going into space can have strange effects on the human body. Astronauts have to wear high-tech spacesuits to stay alive and healthy. If they went into the vacuum of space without their space suit, one of the things that would happen to them, is the air in their lungs would expand – just like our marshmallow!

## Spectacular space suit facts:

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- Neil Armstrong and Buzz Aldrin, the first humans to land on the moon, spent 2 hours and 32 minutes on the moon and one of the things they were doing was testing out their space suits!
- Each astronaut on the early Apollo moon missions had three space suits, one for the space flight, one for training in and a space in case anything went wrong.
- A really important test for a space suit is whether or not you can stand back up if you fall over wearing it!
- NASA used an x ray machine to check whether the sewers had left any pins in the space suits when they were making one. If they had the pin could fly out in the vacuum of space and injure the astronaut!
- These super space suit facts are from the book “The Spacesuit: How a Seamstress Helped Put Man on the Moon” by Alison Donald.
- Read more about life in a space suit [here](#).
- Read all about the women who sewed the first space suits [here](#).

# Questions

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When was the last time that all living humans were on Earth at the same time?

What do astronauts wear to help them survive in space?

When we remove the air from the bell-jar, does the air pressure inside the bell-jar increase or decrease?

## Activity

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Astronauts usually have a patch on their spacesuit which shows which space mission they are part of. These patches are sometimes designed by the astronauts and have their names and pictures related to their mission. **Click here** to see some examples.

Imagine you are going on a mission to explore the surface of Mars to find a suitable spot for humans to start a colony (a place to live). Design the mission patch for your spacesuit.



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