

Where and when:

Date: Monday, 13 March 2023

Time: 11:00

Duration: 30 minutes

Location: bbc.co.uk/livelessons

This programme is available to view from home or school, and no sign-up is required.

Simply visit the website on the day and follow the instructions on the page to watch. Subtitles will also be available.



Curriculum links:

KS2 Science / Science Second Level / Science and Technology Progression Step 2 / KS2 The World Around Us.

- Explain that unsupported objects fall towards the Earth because of gravity acting between the Earth and the falling object.
- Identify the effects of air resistance and friction that act between moving surfaces.
- Investigate how friction, including air resistance, affects motion and suggest ways to improve efficiency in moving objects.

Setup:

This Live Lesson will be broadcast on the CBBC channel and simultaneously on the BBC Teach website. We will be running a live commentary page on BBC Teach during the broadcast to share contributions from children watching from home and school.

The lesson can be viewed in a classroom or at home with a device (computer, tablet or mobile phone) linked to a reliable broadband connection or watched on a television on the CBBC channel. We will be asking children to get involved in activities throughout the lesson and have provided downloadable activity sheets to help guide them through this.

Lesson content:

This programme is designed to engage primary learners from the ages of 7 to 11.

Section 1 - Introduction:

From the Science Museum in London, Rhys Stephenson and Maddie Moate will start by explaining how this lesson will explore forces and space travel. With the help of real-life astronauts, Bob Hines, Helen Sharman and Tim Peake, they will find out how they can use forces to design a crew capsule to bring Live Lessons astronaut, Frankie, safely back down to Earth.

Section 2 - Gravity and the moon:

The presenters will begin by introducing Bob Hines and finding out about his journey into space.

They'll introduce pupils to the concept of gravity and how it can be used to help bring our astronaut, Frankie, back home. With the help of an explanation from Tim Peake, they will discover that the real challenge of the Live Lesson is to use forces to slow the crew capsule down and manage a safe landing.

Section 3 – Friction:

The presenters will explore the concept of friction with the help of Science Museum expert, Ashante, and use three friction slides made of different materials - wood, fibreglass and grass - to test their theories out.

For activity 1, pupils will be challenged to use what they know about friction and the descriptions of the slides to make a prediction on which slide they think will generate the least amount of friction. They will be asked to put the slides in order of fastest to slowest.

Download activity sheet 1 [here](#).

The children will then test out their predictions by going down the slides and comparing the time difference. Ashante will dive a little deeper and use a model of the slides and two hairbrushes to explain why different materials create more friction.

Section 4 - Air resistance:

Because the descent capsule travels through air, Maddie will introduce the team to a type of friction force called air resistance that can be used to slow Frankie's capsule down.

She explains that the shape of an object has an impact on the amount of air resistance generated and demonstrates this by dropping a sheet of paper and a scrunched up ball of paper. The sheet takes longer to reach the ground which, Maddie explains, is due to its surface area. The presenters ask Bob Hines for his expert advice on what shape and size their descent capsule should be.

Bob explains how parachutes are deployed before the crew capsule lands back on earth to slow it down. The team investigate the importance of air resistance and surface area by dropping three different sized parachutes and comparing the time it took for each one to fall.

For activity 2, the presenters will ask the audience to look at a data table for the parachute experiment and answer three scientific questions.

Download activity sheet 2 [here](#).

Section 5 - Meeting an astronaut and the final drop

Rhys meets the first British astronaut to travel into space, Helen Sharman. Together, they will look at her space suit and answer questions sent in by children across the UK.

Before Rhys and Maddie reveal their final parachute and capsule design, for activity 3 they will challenge pupils to use what they have learned in the lesson to design their own space capsule and label the different features that will help slow it down.

Download activity sheet 3 [here](#).

Rhys and Maddie will reveal their final design and put it to the test by successfully dropping Frankie from a balcony in the Science Museum and bringing the Live Lessons astronaut back 'home' safely.

After a recap from the presenters of everything they've covered in the lesson, Bob Hines will leave the audience with an inspirational piece of advice about how you can become an astronaut or pursue a career in space travel.

Useful links:

BBC Teach: [Forces and electricity](#)

BBC Bitesize: [What is friction?](#)

BBC Bitesize: [What are water and air resistance?](#)