

DISCOVERY FILM FESTIVAL

Scotland's International Film Festival
for Young Audiences



Teachers' Resource: **Zero Gravity**

Second and Third/Fourth Levels (and beyond) | Created by Meg Brough

Discovery Film Festival: Sat 22 October – Sun 6 November 2022

DCA

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SCOTTISH FILM EDUCATION

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Introduction

Discovery Learning Resources give you exciting classroom activities to enhance Curriculum for Excellence delivery.

They are created by classroom teachers and education professionals.

Each resource aims to:

- support and extend working with film in the classroom
- help prepare teachers for a class visit to a Discovery Film Festival film and to extend the impact of that visit for delivery of CfE
- develop confidence in Moving Image Education approaches and working with 21st Century Literacy/moving image texts

Each resource is free and available to download from:
<http://www.discoveryfilmfestival.org.uk/resources>:

Zero Gravity

Dir: Thomas Verrette

USA 2021 / 1h14m

English (and Spanish with English subtitles)



Zero Gravity

Synopsis:

Zero Gravity follows a diverse group of middle-school students from San Jose, CA, who compete in a nationwide tournament to code satellites aboard the International Space Station. Seen through the wondrous eyes of three young students and their first-time coach, they each take an intimate and personal journey to space as their team grows from amateur coders to representing California in the ISS Finals Tournament – the culmination of a summer-long adventure that sees their incredible accomplishment performed by astronauts in orbit.

Themes:

Education, space exploration, Coding, applied science, International Space Station, reaching goals, STEM, resilience, ambition, teamwork, overcoming adversity.

Age 10+

Advisory:

Brief mention of racist attitudes, bullying, one instance of language (“damn it!” heard off-screen).

Teachers’ notes:

This is an interdisciplinary resource pack. Included in this pack are resources to support the analysis of the documentary with an English and literacy focus. This film focuses on STEM outcomes, this pack also includes resources to support learners with a basic understanding of coding and robotics. There are also outcomes for Health and Wellbeing, Social Subjects, Science and the technologies.

Ages 10+ would gain most benefit from the film and the associated tasks. It may be easier in a primary school setting to take advantage of all of the available resources. However, there is scope for many secondary school teachers to use these resources in their day-to-day practice. This could also be used as an interdisciplinary project in elective classes.

The work in this pack has been designed for second and third level pupils although there is scope for progression into fourth level and beyond. The most obvious Experiences and Outcomes have been listed after each task.

Before the film



Activity 1: **Film trailer analysis**

Watch the trailer at: <https://youtu.be/z45ojMdOWhl>

Analyse the media language used before you attend the screening. This will give you a better understanding of how the director uses film language to explore the issues surrounding the film. (These questions will help you to analyse any film trailer.)

- 1 What is the purpose of a film trailer? What might the reasons be for the creation of this film?**
- 2 What is the form of this film?**
- 3 What information should be included in a successful film trailer? Has this film trailer been successful in providing this information?**
- 4 Which genre do you think this film falls into? How can you tell?**
- 5 What will the tone or mood of this film be? How can you tell?**
- 6 Who do you think might watch this film? Think about things such as age, gender and interest. Give reasons from the trailer to back up your answer.**
- 7 What are the main themes and/or issues you think will be highlighted in this film? How can you tell? Do you think this piece of media will challenge how you see the world?**

As I listen or watch, I can identify and discuss the purpose, main ideas and supporting detail contained within the text, and use this information for different purposes. LIT 2-04a



Activity 2: **Space exploration**

See Appendix 1 – Space Exploration Worksheets

Before the film – The history of Space Exploration

It may be advantageous to have learners discuss the history of space exploration before watching the film. The worksheet in Appendix 1 has an activity which learners can use to understand the history of humans in space.

Their first task is to discuss with a partner what date order they think these significant historical space exploration events happened in. Then use the internet to research the dates to confirm their knowledge.

During the film – The importance of Space Exploration

Throughout the film, the participants, teachers and astronauts talk about the importance of space exploration. Pupils should use their worksheet to write down three reasons why space exploration is important.

After the film – The future of Space Exploration

NASA wants to send humans to Mars by 2030, and Elon Musk's SpaceX wants to get there even sooner, with plans to have people there by 2024. One of the astronauts in the film explains the work that the participants completed complements their plans to become an 'interplanetary species.' Pupils should consider the future of Space Exploration and whether we should colonise Mars. They should use the internet to help them to fill in the pros and cons list. This table can then be used as a paragraph plan for an extended piece of discursive writing, answering the question "Should we colonise Mars?"

*I can use my notes and other types of writing to help me understand information and ideas, explore problems, make decisions, generate and develop ideas or create new text. I recognise the need to acknowledge my sources and can do this appropriately. **LIT 2-25a***

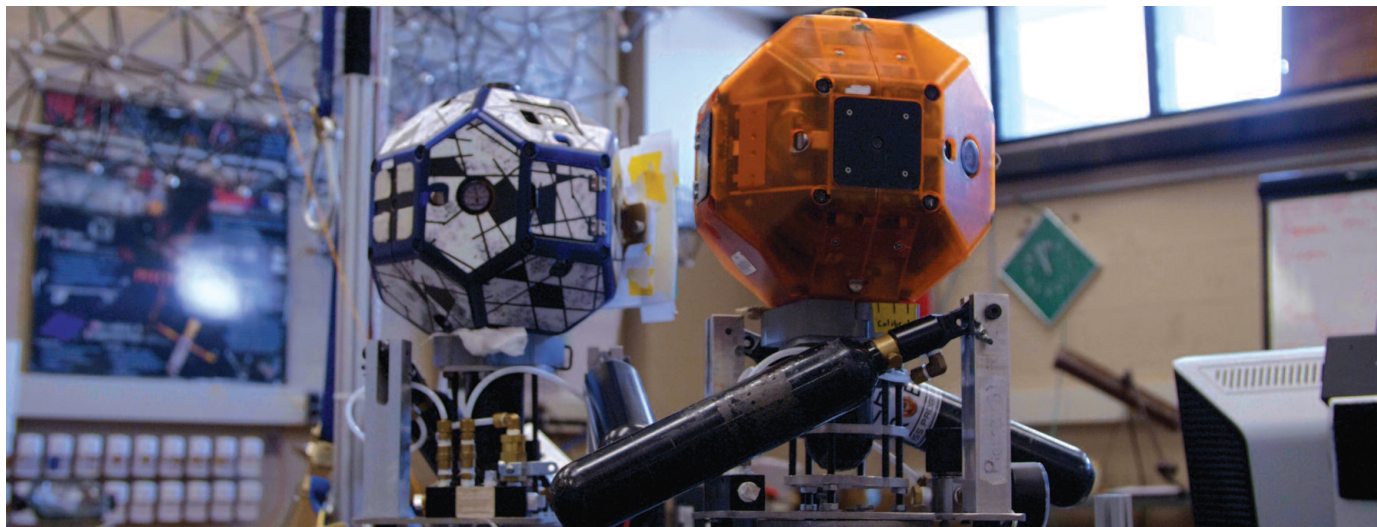
*I can discuss why people and events from a particular time in the past were important, placing them within a historical sequence. **SOC 2-06a***

*Through research and discussion I have an appreciation of the contribution that individuals are making to scientific discovery and invention and the impact this has made on society. **SCN 2-20a***

*I can report and comment on current scientific news items to develop my knowledge and understanding of topical science. **SCN 2-20b***

*By using my knowledge of our solar system and the basic needs of living things, I can produce a reasoned argument on the likelihood of life existing elsewhere in the universe. **SCN 3-06a***

Activity 3: 'Unplugged' Outdoor Learning



To understand what the children are coding in the documentary, it is useful to understand the concept of 'capture the flag'. It would also be helpful for learners to understand the concept of creating algorithms using instruction in physical game.

Capture the Flag – Unplugged outdoor/gym hall activity

When describing the coding competition to the audience it is described as a version of 'capture the flag.' This game aims to demonstrate to learners what the team is trying to do with the SPHERES in the documentary.

- Create a game play area. This can be a rectangular area split into two halves (as long as each team has an equal playing area).
- On each side of the playing area there must be a base area and a jail area. These can be marked out with hula hoops and cones, for example.
- Separate the class/group into two equal teams and assign them both a base area. Each team is given a flag. This flag is placed in the team's base and can't be moved by any member of that team.
- The object of the game is for one member of the team to steal the other team's flag and return it to their base. If they do, their team gets 10 points.
- If a player is caught while transporting the flag then they must surrender the flag and allow it to be taken back to their own team. They must also go to jail.
- One of the player's team members must then free them from jail.
- Players are not allowed to be around the perimeter of their own base for more than ten seconds.
- Points – Capture the flag for 10 points. Recapture own flag and bring it back to base for 10 points. Most points in a given time frame wins.



Understanding algorithms – Unplugged activity, outdoor learning

This game aims to give children understanding of the concept of algorithms. This is an ‘unplugged’ activity which means that no digital technology is required to understand computing science concepts.

An Algorithm is a process or set of rules to be followed. This helps computers to make calculations or other problem-solving operations.

- 1 Give each team a piece of chalk and ask them to draw a grid. (You can create this advance or use masking tape and/or a tiled surface.) This can be as large or small as you like, depending on resources and ability of learners.
- 2 Place small objects in various grid boxes (bean bags etc).
- 3 Designate a starting grid.
- 4 One pupil must be directed by team mates to retrieve object by being given directions. For example ‘One step left’ ‘Two steps forward’. They must follow these instructions to retrieve an object and bring it back. Meanwhile, a member of the team writes down the instructions they have given.
- 5 When the team has retrieved all objects, they can count how many instructions they had to give the designated person.
- 6 Their next task is to try and reduce the number of instructions they gave and to retrieve all of the objects in fewer steps.
- 7 Teams can compete against each other to see how few steps they can achieve in a given time frame.

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This can also be turned into an indoor unplugged numeracy or algorithm lesson by using grid paper.

Within and beyond my place of learning I am enjoying daily opportunities to participate in physical activities and sport, making use of available indoor and outdoor space. HWB 1-25a

I understand the operation of a process and its outcome. I can structure related items of information.

TCH 2-13a

I can demonstrate a range of basic problem-solving skills by building simple programs to carry out a given task, using an appropriate language. TCH 1-15a

Activity 4: Representation



Characters

It is important to consider how a director represents their characters in a film. In a documentary these are real life people, and it is the director's responsibility to portray their personalities truthfully. These directing choices will often help to highlight a film's themes or issues.

The three main characters in the film are Carol Gonzales, Advik Gonugunta and Adrien (Makayla) Engelder. For each of the participants, consider the following questions:

- 1 What did they say they wanted to do for a living at the start of the film?
- 2 How can you tell they had overcome hardship? How did the director portray this?
- 3 How did they want to help people?
- 4 How can you tell they had been positively affected by this experience?

Theme

Learners should use the worksheet provided in Appendix 2.

The theme of dreams, possibilities and ambition is represented in the film. Learners should first use the table to discuss how the people and symbols can represent dreams and ambition.

Learners can then think about how the film has inspired them and what their own goals are in the future. They should also consider how they will achieve these goals.

I can: • discuss structure, characterisation and/or setting • recognise the relevance of the writer's theme and how this relates to my own and others' experiences • discuss the writer's style and other features appropriate to genre. **ENG 2-19a**

I am developing the skills and attributes which I will need for learning, life and work. I am gaining understanding of the relevance of my current learning to future opportunities. This is helping me to make informed choices about my life and learning. **HWB 3-19a**

Activity 5: **Reflective Writing**



Teamwork and Resilience Writing Prompts

Throughout the film, the participants have to work together as a team to achieve an end goal. Despite what may not have been the desired outcome, the participants discussed what they had learned and how they had been positively impacted by the process. Learners can use the following writing prompts to complete a piece of personal writing to encourage growth mindset and reflection.

Write about a time you had to work together as a team.

You might want to think about the following: How did you feel at the beginning? What was the goal? How was your relationship with your teammates to start with? Did this change at all? Did you achieve your goal? Why do you think this was? What did you learn from the experience? Why is it important to work as a team? How will you put this into practice when working as a team in the future?

Or Write about a time where something didn't go as you expected.

This could be a time when you didn't win a competition, or you came close. This could be a time where you were disappointed in the outcome of something someone else was competing in. It could be about when someone let you down or it can just be a time where you were expecting something to happen and it didn't.

You might want to think about the following: Description of the build-up to the expected outcome. How did this outcome come about? Was there a lot of hard work involved? Describe your emotions when you realised this outcome was not as you expected. How did you show these emotions? Do you think this was the right way to handle the situation? What did you learn about your own coping mechanisms? How can you use what you learned about this in the future?

*I can convey information, describe events, explain processes or concepts, and combine ideas in different ways. **LIT 3-28a***

*I can recreate a convincing impression of a personal experience for my reader, sharing my feelings and reactions to the changing circumstances with some attempt at reflection. **ENG 3-30a***

*I am aware of and able to express my feelings and am developing the ability to talk about them. **HWB 0-01a / HWB 1-01a / HWB 2-01a / HWB 3-01a / HWB 4-01a***

Activity 6: Robotics and Coding Projects – STEM Resources



Here are some real-life projects and resources that can be completed with learners of varying abilities which will help them to understand the concepts and themes in Zero Gravity. These materials and resources have been created by organisations which are currently recommended and used by Scottish Teachers.

Introduction to coding with CodeMonkey Space Adventure Challenge

This is a very simple game with a space context to introduce absolute beginners to basic coding concepts.

<https://app.codemonkey.com/space/challenges/1>

Nasa Climate Kids – Build a Cube Sat

A **CubeSat** is a small, relatively low-cost cube-shaped spacecraft. Schools, universities, and institutions can design CubeSats to explore space in ways that previously required big, expensive satellites. In the NASA game **CubeSat Builder**, build as many CubeSat spacecraft as possible in a NASA cleanroom before time runs out!

[CubeSat Builder: Build a NASA Spacecraft! | NASA Climate Kids](#)



Microbit

Throughout the film, many of the participants and tutors discussed the reasons for the project. This was to help others. We also saw footage of the effects of Global Warming and discussions around why it may be necessary for us to become an “interplanetary species.”

Each Primary school in Scotland has been gifted two sets of Microbits. *do your :bit brings together the micro:bit and the UN’s Global Goals to provide inspiring activities for your classroom or club and an exciting digital challenge. Depending on when these resources are accessed, the Do Your: Bit challenge may not be open for submissions. However, the resources available here can support your class to consider the UN’s Global Goals or Sustainable Development Goals (SDG’s) which are “a call for action by all countries to promote prosperity for everyone while protecting the planet.”* There are also resources for Quick projects in MakeCode to help you explore the Global Goals with the micro:bit.

[do your :bit | micro:bit \(microbit.org\)](#)

Minecraft

If your school has access to Minecraft: Education Edition, there are a wealth of resources which support the understanding of coding and robotics concepts as well as having a focus on Space. All resources can be found at <https://education.minecraft.net/>

Timecraft by Hour of Code is one example. This includes lesson plans and a link to a gaming world which you can assign your pupils. This can be used with coding novices and can progress to more complex coding skills as pupils can choose between block coding or Python.

[Hour of Code 2021 \(TimeCraft\) | Minecraft Education Edition](#)

Learners will:

- Understand the importance and benefits of computer science in all aspects of life.
- Practice computer science concepts such as sequences, events, loops and debugging.
- Create coding solutions to successfully complete a task or solve a problem.
- Recognize the expanded career connections offered through computer science.
- Analyse and solve problems using algorithmic thinking and problem decomposition.

STEM. Org.uk and ESERO-UK

STEM. Org.uk and ESERO-UK provide resources which are set in the context of the European Space Agency ExoMars mission, which includes the launch and operation of the Rosalind Franklin rover to the surface of Mars in 2022/2023. (Please note these lesson plans and resources require a teacher login for [STEM.org.uk](#) which is free.)

Minecraft

<https://www.stem.org.uk/resources/collection/485079/mars-challenge-%E2%80%93-unplugged-computing-primary-resources>

This collection of activities provides a series of lessons linked to computing using the context of Mars exploration. Children learn about algorithms, debugging, flow charts, repeat loops, decision trees, and how images and data are relayed. They find out about search engines, the reliability of information found on the internet and infographics. There is also a D&T activity where children learn about the design process and design their own rovers for exploring Mars.

There are a wealth of other resources with the context of Mars exploration for upper primary school pupils or additional resources for secondary school pupil, or those who are more comfortable with STEM concepts.

<https://www.stem.org.uk/resources/collection/457405/exomars-collection>

Other useful coding and computing science teaching resources:

- **Education Scotland** [Computing Science by digilearn.scot \(glowscotland.org.uk\)](https://www.digilearn.scot.nhs.uk/)
- **Barefoot Computing** [Supporting primary school teaching | Barefoot Computing](https://www.barefootcomputing.com/)
- **Code Club** [Projects | Computer coding for kids and teens | Raspberry Pi](https://www.codeclub.org/)
- **Hour of code** [Join the largest learning event in history, December 6–12, 2021 \(hourofcode.com\)](https://www.hourofcode.com/)
- **Microsoft MakeCode** [Microsoft MakeCode](https://makecode.com/)

I understand the operation of a process and its outcome. I can structure related items of information.

TCH 2-13a

I can demonstrate a range of basic problem-solving skills by building simple programs to carry out a given task, using an appropriate language. **TCH 1-15a**

I can create, develop and evaluate computing solutions in response to a design challenge. **TCH 2-15a**



Appendix 1 Worksheets – Space timeline

Before the film

Before we can think about the future of space-travel we must understand the history of space exploration to this date. These historical events have been jumbled up. Your first task is to discuss in pairs what you think happened first. Write down in order what you think came first, putting a number in each box. The first has been done for you.

When you have done this, use the internet to confirm the year these things happened.

Were you correct in your date order?

Historical Event	Timeline order (our guess)	Date Confirmed
NASA land Mars Pathfinder – Sojourner – First operational rover on another planet.		
First space station – Salyut 1.		
First human spaceflight (Yuri Gagarin). First human-crewed orbital flight.		
First human on the Moon, and first space launch from a celestial body other than the Earth. (Apollo 11 – Neil Armstrong, Buzz Aldrin, Michael Collins) First sample return from the Moon.		
USSR launch first mammal in orbit, the dog Laika. The same year, US launch first artificial satellite – Sputnik 1.		
First plants and animals to return alive from Earth orbit.		
NASA launch Hubble telescope.		
Albert II, a rhesus monkey, became the first primate and first mammal in space, flying on a V-2 rocket.		
First woman in space (Valentina Tereshkova). Only woman ever to go on a solo space mission.		
First untethered space walk (Bruce McCandless).		
First international space station.		
First human spaceflight launched by a private company (suborbital). First private astronaut (Mike Melvill).		
First orbital human spaceflight launched by a private company.		
First man made object to pass the 100km space threshold (V2). Providing the very first pictures of space.		



During the film

Throughout the film, the participants, teachers and astronauts talk about the importance of space exploration. Write down three reasons why space exploration is justified as important.

1

2

3





After the film

NASA wants to send humans to Mars by 2030, and Elon Musk’s SpaceX wants to get there even sooner, with plans to have people there by 2024. One of the astronauts in the film explains the work that the participants completed complements their plans to become an ‘interplanetary species.’ Can humans really comfortably live on mars?

Do some more internet research to find out the pros and cons of colonising Mars. Write down any evidence you find to back up your points, remembering to give credit to the website where you found this information.

Why we should colonise Mars	The drawbacks of colonising Mars
Pro 1	Con 1
Evidence	Evidence
Pro 2	Con 2
Evidence	Evidence
Pro 3	Con 3
Evidence	Evidence

Now use this table as a paragraph plan to compose a response to the question
“Should we colonise Mars?”



Appendix 2 Theme Representation Worksheet

The theme of dreams, possibilities and ambition is represented in the film. Use the following table to discuss how to the people and symbols can represent dreams and ambition.

How do they represent dreams and ambition?	
The Unicorn	
Steve the Astronaut	
The Ocean	
Carol	
Advik	
Adrien (Makayla)	
Tanner	
Other Astronauts	

Can you find at least two things people say in the film which might inspire you or someone else to achieve your own dreams?



What are your dreams? Write down your main goals for when you are older. Beside each one, think about how you might go about achieving these.

I would like to achieve...	I can achieve this by...





Evaluating this resource

We hope that you found this resource useful and appropriate.

Please do send us any film reviews, letters from your pupils, documentation of classwork and your feedback by e-mailing mike.tait@dca.org.uk.

Would you make a good Discovery Film Festival Case Study?

We are seeking a number of simple Case Studies in how teachers have used or are using Discovery films in the classroom across Curriculum for Excellence and across the Levels.

Any case studies that we develop would be intended for presentation on GLOW, the Creativity Portal and on Discovery Film Festival websites. We have a simple template to be completed and are keen to have classwork and documentation included.

If you would like to be a Discovery Case Study please e-mail sarah.derrick@dca.org.uk