SPACE WEEK

Our Planet • Our Space • Our Time

Resource Book for Teachers

TOPIC: **Mission to the Moon**

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Mission to the Moon Integration Plan

SPHE & Science

AstroFood & AstroFarmer

Space Picnic

Strand: Myself
Strand Unit: Taking care of my body: Food & Nutrition

Geography

Daily or ICT activity: observe and record the positions of the Sun when rising and setting and at different times of the day.

Geography solar system lesson ideas: SpaceWeek booklet Our Solar System.

Strand: Natural Environment
Strand Unit: Planet Earth in Space (5th and 6th class)

Music

Song singing: A selection of David Bowie songs, such as Life of Mars, Space Oddity and Starman. Vocal warm-up

Strand: Performing
Strand Unit:
Song Singing

Drama

Interview an astronaut

Strand: Drama to explore feelings, knowledge and ideas, leading to understanding

Physical Education

Mission X: Train like an astronaut

Strand: Athletics

History

Topic: 50-year anniversary of Apollo 11

Strand: Story
Strand Unit: Stories from the lives of people in the past

Maths

What Would You Bring to Space?

Strand: Measures
Strand Unit: Length and Area.

English

Writing: Keep a diary of your time on the ISS
(Lesson 1: Planning & Drafting.
Lesson 2: Revising, Editing and Publishing)

Oral Language:
What would you bring to space?

Reading: 'Chasing Space: An Astronaut's Story of Grit, Grace, and Second Chances' (Amistad, 2017) Autobiography of Leland Melvin
'Cosmic Disco' by Grace Nichols

Visual Art

Design a Mission Patch

Strand: Drawing
Strand Unit: Making Drawings

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Luca Parmitano's mission is called 'Beyond'. The mission patch illustrates his journey. The Earth and the ISS are reflected in the astronaut's visor as he looks out into space. In the distance are the Moon and Mars.

Astronaut Paolo Nespoli travelled to the ISS in July 2017, as part of Expedition 52/53. Astronaut Peggy Whitson's name is on the patch – what is she famous for? What else can you see in the mission patch?

Things to consider when designing a mission patch

- Shape
- Colour
- Pattern
- Light and shade
- Texture
- Story
- Name of Mission
- Names of astronauts
- Flags
- Symmetry/asymmetry

OVER TO YOU! DESIGN YOUR OWN MISSION PATCH...

Apollo Program Insignia, Expedition 52 Credit: NASA
Beyond Credit: ESA

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WHAT WILL YOU TAKE INTO SPACE?

Credit: NASA

Astronauts may take some personal belongings on their missions to space. Some take a book or photos.

Others might take a camera or a gift from a close friend.

What would you take with you if you could take only five items?

YOUR list

1 _____

2 _____

3 _____

4 _____

5 _____

What Would You Take into Space?: Teacher Activity Guide

Suggested class level:
Senior

Equipment:
A3 cm squared paper
Rulers
Pencils
Worksheet: *What will you take into space?*
Shoebox

Background information:

Astronauts can take some personal belongings on their missions; however, space is limited on the International Space Station. Many astronauts continue their pastimes while in orbit, such as Karen Nyberg who quilted and Chris Hadfield who played the guitar. Food can be sent to the astronauts on resupply vehicles; fresh food and condiments are very popular.

Cross curricular links

Maths: Strand: Measures. Strand Units: Length and Area
English: Oral Language
Gaeilge: Caitheamh Aimsire

Trigger questions:

What do you think astronauts do in their spare time?
What would you take on a mission?
What are your hobbies?
In space, would it be possible to do the things you normally do in your spare time?
Would you pack everything you own if travelling on a mission to space? Would it all fit?
What would *you* take to space?

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Activity 1

In groups children discuss their hobbies. What equipment is required for this hobby?
In space, would it be possible to do the things you normally do in your spare time?
Teacher distributes worksheet to each child.
Each child fills in which 5 items they would bring to space.
Class discussion on what children would bring and why.
Teacher notes some of the suggested items on the board.

Activity 2

Teacher explains to the class that their 5 items must fit into a shoe box (Length: 30cm, Width: 15cm, Height: 15cm / or dimensions of teacher's shoe box)
Each child given a ruler and cm squared paper. Children measure items in the classroom environment, perhaps using the items listed on the board as inspiration.
Children select and use appropriate instruments of measurement.
- Regular shaped items such as a phone/ipad or book could be measured using a ruler.
- Irregular shaped items such a camera or a keyring could be measured with cm squared paper.
- Larger items, such as a hurley could be measured using a metre stick.

Children record the length, width and height of each of their selected items.
Children investigate if their 5 items will fit in the shoe box. Are they all under 15cm in height? What if you rotated it? By adding the length of each item together, is the total length less than 30cm? By adding all of the widths together, is the total figure less than 15cm?
If the children's 5 items would not fit in a shoe box, which item would they change? Would they bring less than 5 items or substitute one of their current items for something smaller?

Class discussion on what items each child would bring. Did their answers differ to what they had originally said in activity 1?

Differentiation

Use of concrete materials: Have a shoe box in the classroom so that students can check their answers or test if they fit in as they are measuring and investigating. It may be challenging for weaker students to visualise the size of an item in comparison to a shoebox (i.e. may need to test that a hurley cannot fit in a shoe box to understand their measurements and calculations). Is there anything smaller they could bring instead of a hurley?

Encourage the more able students to draw diagrams of their box on A3 cm squared paper rather than testing as they go to promote mathematical learning. Students would use their workings to determine which 5 items they would bring (i.e. within the dimensions outlined), prior to testing with concrete materials using the shoe box.

To make the activity more challenging the teacher could ask students to draw their box on cm squared paper to half scale. Ensure students have a solid understand of the size of a centimetre before engaging in this task.

Sample questions

Why did you choose those items? Would they come in useful in space?

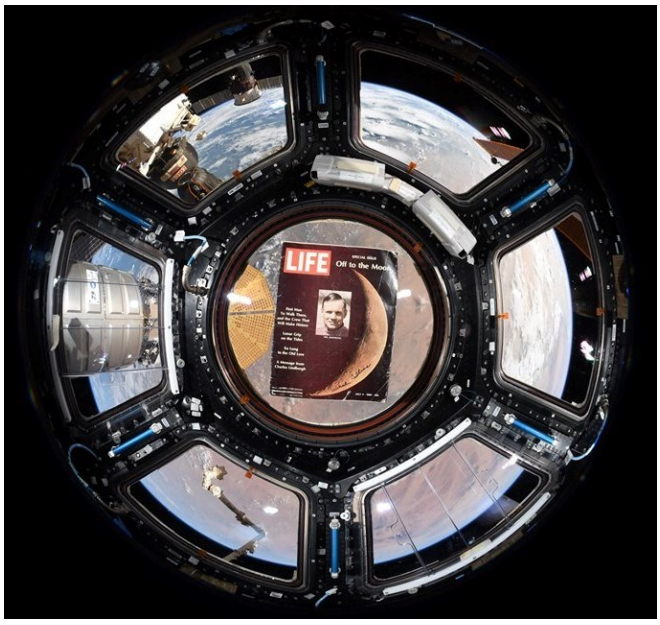
(If child's five items did not fit in the box)- Is there anything you could swap? What would you leave? What would you take instead?

Which is the biggest item? Which is the most valuable item, why?

Could you take 3 or 4 bigger items in the box instead of 5 smaller ones? Would another item fit in the box?

How much space is left in the box? (i.e. If totals came to 27cm in length, 13cm in width and 10cm in height)

Could you think of another item that would fit into this empty space? (i.e. an item measuring 3cm in length, 2cm in width and 5cm in height?)



Nick Hague: "Just got a present in my care package on the Soyuz! It's a magazine from July 4, 1969 signed by @AstroMCollins wishing me all the best." Credit: NASA

DPSM/ESERO Framework for Inquiry

Theme	AstroFood and AstroFarmer: Growing Food in Space
Curriculum	Strand: Living things Strand Unit: Plants and Animals / Plant and animal life Curriculum Objectives: • group and sort living things into sets according to certain characteristics / to observable features • investigate the factors that affect plant growth • develop an increasing awareness of plants and animals from wider environments • become aware of the Sun as a source of energy for plants through photosynthesis Skills Development: Observing, questioning, predicting, measuring, investigating and analysing.

Engage

The Trigger	Wondering	Exploring
What is the best food to grow in space? Do you think plants can grow on the Moon? video from ESA: MoonCamp http://www.esa.int/Education/Teachers_Corner/Astrofood_-_Learning_about_edible_plants_in_Space_Teach_with_space_PR41	Would the plants grow differently in space / on the Moon compared to on Earth? Is there even space on a spacecraft for trees? Do plants need air? Older classes: use AstroFarmer Activity 1 to review knowledge about plant growth. Younger classes: discuss what plants need to grow.	Use AstroFood Activity 1 to identify, compare and group fruits, seeds and vegetables. Use AstroFood Activity 2 to imagine and draw a complete plant associated with a familiar fruit, seed or vegetable.

Investigate 1: Do plants need light?

Starter Question	Predicting	Conducting the Investigation	Sharing: Interpreting the data / results
How does cress grow in different lighting conditions?	Children can draw their predictions of how the cress will grow, based on their science understanding and their knowledge from AstroFarmer Activity 1	Using AstroFarmer Activity 2 as a guide, set up a fair test to explore the growth of cress. Discuss with children how this is a fair test and allow for any suggested improvements or changes to the experimental design. Cress grows quickly, so should not need to be watered during the week.	Compare colour, height, number of cress plants / other factors. Which plant is "healthier"?

Investigate 2: Do plants need water?

Starter Question	Predicting	Conducting the Investigation	Sharing: Interpreting the data / results
How is water transported through a plant? Similar to AstroFarmer Activity 3 but include a white flowered plant with roots for comparison.	Children can use their knowledge of root function to predict where the dye will travel.	Similar to AstroFarmer Activity 3 but include a white flowered plant with roots for comparison. Discuss with children how this is a fair test and allow for any suggestions for improvements or changes. i.e. Would a dark coloured flower work? Does the amount of food dye make a difference? Does the length of the stem make a difference? These questions could be incorporated into further investigations.	Compare colour of petals. Draw diagrams to show how the dye travelled through the plant.

Considerations for inclusion

Use diagrams as needed – for children's predictions and for summaries of learning.

Use 'new words' with children's own definitions

DPSM/ESERO
Framework for Inquiry

Investigate 3: Do plants need soil?

Starter Question	Predicting	Conducting the Investigation	Sharing: Interpreting the data / results
Which materials are good for growing radish plants?	Do you think plant can grow without soil? Children explain what they think. "In which pot do you think the plant will grow best? Why?" "Are there any pots where you think a plant cannot grow? Why?"	AstroFarmer Activity 4. Use worksheet page 24 to discuss how this activity is a fair test. More experienced children can design their own fair tests to explore how different materials affect the growth of radish plants.	Complete the summary diagram on page 25.

Take the Next Step

Applying Learning	Making Connections	Thoughtful Actions

Use AstroFood Activity 3 to analyse, compare and determine the 'best' space food for the future.
Is it possible for a plant to have too much light? How could they test this?
Do plants need a mild temperature? Use AstroFarmer Activity 5 to explore how plants are adapted to different climatic zones on the Earth.
How could plants be healthy on the Moon / in Space? Apply your AstroFarming knowledge to conditions on the Moon.

Reflection

Did I meet my learning objectives?
What went well, what would I change?
Are the children moving on with their science skills?
What questions worked very well? What questions didn't work well?
Ask the children would they change anything or do anything differently.
Are there cross curriculum opportunities here?
What further questions did students have?