

MM4:Space Innovation and Enterprise



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Experimentation and Exploration

Lesson 4 Exploring Inclusion in the Space Industry 1

Subject Areas: CSPE/ SPHE, Design, English and Communication, Science, Sustainability, Technology

8 DECENT WORK AND ECONOMIC GROWTH



10 REDUCED INEQUALITIES



12 RESPONSIBLE CONSUMPTION AND PRODUCTION



17 PARTNERSHIPS FOR THE GOALS



Lesson Title and Summary: Exploring Inclusion in the Space Industry 1

In these three, linked lessons, learners will consider the importance of diversity and inclusion in space entrepreneurship, with a focus on the participation of women, indigenous communities, people of colour, and differently-abled individuals.

By recognising and celebrating diverse perspectives and contributions, a more equitable and innovative future for space exploration and beyond, can be created. By understanding the value of representation and equity, learners will be equipped to advocate for a more inclusive space economy.

Lesson 4, focuses on showcasing women highlighting challenges and opportunities of promoting inclusive practices in space-related industries, identifying the barriers that marginalised groups face and considering ways to overcome them.

Vocabulary: Differently-abled, Diversity, Equity, Inclusion, Indigenous, Representation

In this lesson, the learner will:

- understand the role of women in the space industry
- Identify opportunities and challenges in promoting inclusion in the space industry
- consider the social and ethical implications of lack of diversity in the space industry
- critically consider the need to promote inclusion and diversity in future space industries

Materials

- Worksheet: Female Space Professionals
- Worksheet: Planning Your Poster
- Teacher's Guide: Female Space Professionals
- Paper / pens
- AV equipment
- Computers with internet access

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Activity Instructions

Activity 1: Female Space Professionals - a showcase (25 mins)

1. Working in groups of four, assign learners one of the female space professionals from the Teacher's Guide: Female Space Professionals to research as the focus of their showcase.
2. Ask learners to gather the following information for their assigned professional
 - Background:
 - Space Sector / Profession:
 - Contributions to the Space Industry:
 - Anecdotes / Facts:
3. Remind learners to divide the task between the group, with each member responsible for one of the research points the Worksheet: Female Space Professionals completed on time.

Activity 2: Create a Showcase Poster (25 mins)

1. Continuing to work in their groups, learners will organise their information on their assigned professional to create a showcase poster.
2. Using the Worksheet: Planning Your Poster, learners will plan their poster's layout and design to enable them to create a clear, engaging showcase poster that effectively communicates the space explorer's achievements and story
3. Once their planning is complete ask learners to log into Canva or access a lesson you have set up previously in Canva www.canva.com/education - see module overview for set up details.
4. Select a template using their planning ideas and assign each member of the group to take one of the bullets below
 - A brief biography of the space professional, highlighting key milestones and achievements.
 - Images/photographs depicting the space explorer in action or participating in space missions.
 - Quotes or inspirational messages from the space explorer.
 - Optional: Fun facts or trivia about the space explorer's life and career
5. Circulate encouraging groups to develop their template using the worksheet guidelines

REFLECTIVE EXERCISE: 3-2-1 (10 mins)

- Three things they feel they have learnt from the tasks
- Two things they found most interesting and would like to explore more
- One – their opinion they have about the tasks

Use Post-its or a mentimeter survey - www.mentimeter.com to gather reflections

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EXTENSION / REDUCTION ACTIVITIES

Reduction: For a shorter lesson, complete the planning for the showcase poster and complete poster in a follow-up class.

Extension: For a longer lesson, summarise the key takeaways from the discussion and ask learners to share their thoughts and ideas for fostering a more inclusive space industry. See the Teacher's Guide for a list of questions and links used to extend the discussion

Option B: In the follow-up class, use any remaining time to explore challenges faced by women in the space industry, such as gender bias, lack of representation, and barriers to advancement

MEDIA BOX: (materials, online video links, extra resources, case studies etc)

Getting involved in the Space Industry as a young woman - Accessing Space' [1:58 mins]

<https://youtu.be/P1PHJOOdmf8?feature=shared>

Why we need more women in the space sector

<https://www.skyatnightmagazine.com/space-missions/need-more-women-in-space-sector>

Women in the New Space - Recruitment Insights

<https://www.evona.com/blog/women-in-the-new-space-sector/#:~:text=Whilst%20it's%20true%20that%20the,SpaceX%3B%20and%20Ellen%20Stofan%2C%20the>

Youtube playlist - Inclusion in Space seven videos from different perspectives on inclusion in space

<https://www.youtube.com/playlist?list=PLjvl2quYK9xz3s9MDPmAHyHtdMmQV2ild>

Local Trip / Expertise / Additional Work and Assessments

Inclusive Space Explorer Showcase: Learners can create a presentation / exhibition in school or online showcasing the significant contributions to space exploration, breaking barriers and inspiring future generations of scientists, engineers, and explorers that diverse individuals have made. Each group can undertake presenting their showcases to others in the class or in the school, or create short introductory videos, for an online showcase

Ask learners to research initiatives that key players (can use the key players from MM4: Lesson 2 as well as agencies e.g. NASA, ESA) in the Space Industry are doing or could do to support diversity and inclusion within the sector.



MM4: 4TG FEMALE SPACE PROFESSIONALS

List of Women in Space - A Showcase

These individuals have made significant contributions to space exploration, breaking barriers and inspiring future generations of scientists, engineers, and explorers. Assign one space professional to each group in the class

1. Valentina Tereshkova: First woman to fly in space, aboard the Vostok 6 spacecraft in 1963, becoming the first and youngest woman to travel to space.
2. Sally Ride: First American woman in space, flying aboard the Space Shuttle Challenger in 1983. She later founded Sally Ride Science, an organization dedicated to inspiring young people, especially girls, to pursue STEM education.
3. Eileen Collins: First female Space Shuttle pilot and first female Space Shuttle commander, piloting the Space Shuttle Discovery in 1995 and commanding both the Discovery and Atlantis shuttles on subsequent missions.
4. Peggy Whitson: Record-setting astronaut who has spent the most time in space by any American astronaut, male or female, with a total of 665 days across three missions. She also served as the first female commander of the International Space Station (ISS).
5. Kathryn D. Sullivan: First American woman to walk in space, completing a spacewalk aboard the Space Shuttle Challenger in 1984. She later served as the Administrator of the National Oceanic and Atmospheric Administration (NOAA).
6. Christina Koch: NASA astronaut who set the record for the longest single spaceflight by a woman, spending 328 days aboard the International Space Station (ISS) from 2019 to 2020.
7. Nicole Stott: NASA astronaut and aquanaut who has completed two spaceflights and participated in a NASA mission to the Aquarius underwater laboratory. She is also an artist and advocate for STEAM education.
8. Kellie Gerardi is an American social media influencer, popular science communicator, and citizen astronaut who is known for a sub-orbital spaceflight with Virgin Galactic as a payload specialist in 2023. She was among the first 100 women in space and was also a candidate for the Mars One mission. She is scheduled to lead an all-female sub-orbital spaceflight with Virgin Galactic in 2026.
9. Dr Norah Patten is an Irish aeronautical engineer and an award-winning STEM (Science, Technology, Engineering and Maths) advocate from Ballina, County Mayo. Dr Patten was selected to become Ireland's first person in space as part of a mission on board Virgin Galactic's second generation of spacecraft, known as Delta in 2026/2027.
10. Dr Shawna Pandya is a physician, aquanaut, scientist-astronaut candidate program graduate with the International Institute for Astronautical Sciences (IIAS), skydiver, pilot-in-training, VP of Immersive Medicine with Luxsonic Technologies, Director of Medical Research at Orbital Assembly Corporation and Fellow of the Explorers Club. She is Director of IIAS' Space Medicine Group and Chief Instructor for IIAS' Operational Space Medicine course. Dr. Pandya was on the first crew to test a commercial spacesuit in zero-gravity in 2015 and part of the all women Virgin Galactic Delta mission in 2026/2027.

MM4: 4WS FEMALE SPACE PROFESSIONAL

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AND INFRASTRUCTURE



Assigned Space Explorer:

Background:

Space Sector / Profession:

Contributions to the Space Industry:

Anecdotes / Facts:

Create a showcase Poster: Each member of the group should take one of the bullets below and include the following points on your poster.

- **A brief biography of the space explorer, highlighting key milestones and achievements.**

- **Images or photographs depicting the space explorer in action or participating in space missions.**
 - Make sure you have permission to use the image (s) you have selected
 - Download and save your images to your online learner folder space - by right-clicking the image, select save as image, naming it clearly and save

- **Quotes or inspirational messages from the space explorer.**

- **Optional: Fun facts or trivia about the space explorer's life and career**



Points to consider when planning your showcase poster and choosing a template:

1. Choosing a Layout/Template:

- Balance between text and visuals: Select a template that offers space for both written content (biography, quotes) and visuals (images, photographs). Ensure it's easy to read and visually appealing.
- Sections: Choose a design that allows you to organise content into clear sections (e.g., "Biography," "Key Milestones," "Quotes," "Fun Facts") so the viewer can navigate the poster easily.
- Image placement: Choose a template with designated spaces for images, ideally near or alongside the text they relate to (e.g., images of space missions next to key milestones).

2. Biography Section:

- Brief, impactful biography: Ensure the biography section is concise with key life milestones (e.g., education, career beginnings, major space missions). Highlight significant achievements such as space missions, leadership roles, or contributions to space science.
- Text formatting: Use bullet points or short paragraphs to keep it clear and readable. Avoid long blocks of text.

3. Images or Photographs:

- Choose high-quality images: Use clear, high-res. images of the space explorer, showing them in action (e.g., during space missions, training, or key moments in their career).
- Captions: Add short captions to the images to explain what's happening or the significance of the moment.

4. Quotes or Inspirational Messages:

- Highlight with design: Use a distinct font or colour for quotes to make them stand out. Place them in visually prominent spots on the poster, like near the top or in the middle, where they'll catch attention.
- Relevance: Select quotes that reflect the space explorer's philosophy, motivation, or views on space exploration and science.

5. Fun Facts or Trivia (Optional):

- Placement: Set aside a small section for "Fun Facts" that's separate from the main biography. This could be at the bottom or in the side margins for easy visibility.
- Engage your audience: Include interesting, lesser-known facts (e.g., personal hobbies, unique experiences in space, or unexpected career paths) to make the space explorer more relatable.

6. Design and Visual Appeal:

- Color scheme: Consider Choosing colours that align with the space theme (e.g., dark blues, blacks, and silvers) and that also make the text and images stand out.
- Typography: Ensure the font size is large enough for easy reading, with headings and key information in bold or larger fonts.

7. Conclusion / Call to Action (Optional):

Closing thought: Include a final section summarising the impact and contributions or encouraging others to explore careers in space.