SDG9 Future of Space
MM4:Space Innovation and Enterprise

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Experimentation and Exploration

Lesson 6 Exploring Inclusion in the Space Industry 3

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

Lesson Title and Summary: Exploring Inclusion in the Space Industry 3

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 6, focuses on showcasing differently-abled professionals 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 differently-abled professionals 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: Differently-Abled Space Professionals
- Worksheet: Planning Your Poster
- Teacher's Guide: Differently-Abled Space Professionals
- Paper / pens
- AV equipment
- Computers with internet access

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Activity Instructions

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

1. Working in groups of four, assign learners one of the Space Professionals from the Teacher's Guide: Differently-Abled 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 equally, with each member responsible for one of the research points and the worksheet is 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. Ask learners to select a template that reflects their planning 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 differently-abled individuals in the space industry, such as bias, lack of representation, and barriers to advancement.

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

Astroaccess Ambassadors https://astroaccess.org/ambassadors/

ESA Fly! Feasibility
https://www.esa.int/About_Us/Careers_at_ESA/ESA_Astronaut_Selection/ESA_s_feasibility_study_Fly%21

'It was magical' - meet the first disabled crew to fly in zero-gravity
https://www.bbc.com/news/disability-58902088

OBSERVER: Towards equality in the cosmos and diversity & inclusion in the space sector
https://www.copernicus.eu/en/news/news/observer-towards-equality-cosmos-and-diversity-inclusion-space-sector#:~:text=The%20space%20sector%20has%20traditionally,of%20representation%20from%20diverse%20backgrounds.

Local Trip / Expertise / Additional Work and Assessments

IInclusive 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.

Learners could facilitate a discussion with the on the importance and benefits of inclusive design and universal accessibility principles in space exploration and technology development.

MM4: 6TG DIFFERENTLY-ABLED SPACE PROFESSIONALS

List of Differently-Abled Space Professionals - a showcase

These individuals have made significant contributions to space exploration and have broken barriers, inspiring others from diverse backgrounds to pursue careers and opportunities in the space industry. These bios highlight the achievements of space professionals while showcasing the growing focus on differently-abled inclusion in space exploration.

1. Michael R. Clifford was a NASA astronaut who flew on three Space Shuttle missions. Despite being diagnosed with Parkinson's disease in 1994, Clifford continued his career as an astronaut and flew his last mission aboard Atlantis in 1996. He is an advocate for Parkinson's research and an inspiration for perseverance in the face of adversity.
2. Scott Kelly (Astronaut) is a retired NASA astronaut best known for spending nearly a year aboard the International Space Station (ISS) from 2015 to 2016 as part of a groundbreaking mission to study the effects of long-duration spaceflight on the human body. His twin brother, Mark Kelly, was also an astronaut, making Scott part of NASA’s famous Twin Study.
3. Haley Arceneaux (Commercial Astronaut) became the youngest American to travel to space as part of the SpaceX Inspiration4 mission in 2021. A childhood cancer survivor and physician assistant at St. Jude Children’s Research Hospital, Arceneaux is the first person with a prosthetic body part to fly in space, representing a milestone for disability inclusion in space exploration.
4. John McFall (Astronaut) a British Paralympian and physician, was selected as the European Space Agency’s first astronaut with a disability in 2022. McFall, who lost his right leg in a motorcycle accident, is part of ESA's efforts to explore how people with disabilities can participate in space missions, paving the way for more inclusive space exploration.
5. Lisa Nowak (Aeronautical Engineer and Former NASA Astronaut) is a former NASA astronaut and aeronautical engineer who flew aboard Space Shuttle Discovery in 2006. A Navy officer with an extensive career in space systems engineering, Nowak was part of the STS-121 mission, which focused on International Space Station (ISS) construction and maintenance.
6. Sina Bahram (Accessibility Advocate, North Carolina) is a computer scientist and accessibility advocate dedicated to creating inclusive experiences for people with disabilities. Although not directly involved in space exploration, Bahram’s work in promoting accessibility in technology is influential for projects like AstroAccess, aiming to ensure people with disabilities are included in space exploration.
7. Mary Cooper (Aerospace Engineering and Computer Science Student, Stanford University) is a promising aerospace engineering and computer science student at Stanford University. She is involved in the “Fly! Feasibility Project,” which aims to enable people with physical disabilities to participate in future space missions, contributing to research that advances inclusivity in human spaceflight.

MM4: 6TG DIFFERENTLY-ABLED SPACE PROFESSIONALS

List of Differently-Abled Space Professionals - a showcase

8. AstroAccess (Project for Disability Inclusion in Space Exploration) is a pioneering project that promotes disability inclusion in human space exploration by working to remove barriers that prevent people with disabilities from becoming astronauts. The project conducts research and parabolic flights to explore how space missions can accommodate diverse physical abilities, helping to pave the way for disabled astronauts in future missions.
9. Eric Ingram (Founder and CEO of SCOUT, Inc.) has a physical disability that limits his mobility, is the founder and CEO of SCOUT, Inc., a space technology company that focuses on improving spacecraft autonomy and navigation. Ingram is also an advocate for inclusion in space and was a participant in AstroAccess's first parabolic flight, which explored how differently-abled individuals could adapt to weightlessness and space environments.
10. Leah Stubbs (Engineer at NASA) is hearing impaired and works as an engineer at NASA, contributing to missions such as the Mars Perseverance Rover. Her work in communications technology and accessibility at NASA highlights the agency's commitment to ensuring that people with disabilities can thrive in technical roles within space exploration.

MM4: 6WS DIFFERENTLY ABLED SPACE PROFESSIONALS

Assigned Space Professional:

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**

MM4:6WSB PLANNING YOUR POSTER

Points to consider when planning you 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.