

STEAM EDUCATION FOR SUSTAINABLE DEVELOPMENT and FUTURES LITERACY

SGD9 Future of Space



Programme Phase 2: Experimentation and Exploration

Micro-Module 4: Space Innovation and Enterprise

SUBJECT AREAS: CSPE/ SPHE, Design, English and Communication, Environment, Science, Sustainability, Technology



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MM4: Space Innovation and Enterprise



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Experimentation and Exploration

Curriculum Areas

CSPE/ SPHE, Design, English and Communication, Environment, Science, Sustainability, Technology

8 DECENT WORK AND ECONOMIC GROWTH



10 REDUCED INEQUALITIES



12 RESPONSIBLE CONSUMPTION AND PRODUCTION



17 PARTNERSHIPS FOR THE GOALS



In this module learners, will explore the intersection of space entrepreneurship and the myriad of career opportunities available in the space industry. With the onset of the commercialisation of space, the burgeoning field of space tourism, the potential of resource mining increases the potential of space as a marketplace for goods, services, and innovation.

Through hands-on activities, real-world examples, and interactive discussions, learners will gain insights into the future possibilities and educational pathways in space-related fields.

This module will support learners to develop a deeper understanding of the commercial aspects of space exploration, gain exposure to diverse career options in the space industry, offering inspiration to pursue their passions in STEAM fields with a focus on space entrepreneurship.

In this module, the learner will...

- gain an understanding of the commercialisation of space
- explore space entrepreneurship and emerging opportunities
- examine inclusion in the space industry
- become aware of open-source space exploration
- gain insights into the impact of space tourism
- explore career pathways in the space industry
- envision future possibilities in space exploration and entrepreneurship

This module includes:

- Lesson plans and accompanying resources
- Optional assessments
- Skill support resources

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Lesson 1: The Commercialisation of Space

In this lesson, learners are introduced to the commercial space industry, its key players, and ventures in space entrepreneurship, and to explore space as a marketplace for goods, services, and innovation.

Resources: Worksheets: Space Commercialisation Overview, Space Venture Remix Grid, Teacher's Guide: Space Commercialisation Overview

Lesson 2: Develop a Space Venture Idea

This lesson enables students to develop an understanding of the process of generating ideas starting with the Space Venture Remix Grid and then using the remix method to develop their own Space Venture idea.

Resources: Worksheets: Space Venture Remix Grid, Space Venture SWOT Analysis Teacher's Guide: Space Commercialisation Overview

Lesson 3: Space Entrepreneurship

In this lesson, learners will explore the entrepreneurial aspects of commercialising space, including identifying opportunities, overcoming challenges, considering the implications and developing innovative business solutions.

Resources: Worksheet: What is Space Entrepreneurship? Teacher's Guide: What is Space Entrepreneurship?

Lesson 4 - 6: Inclusion in the Space Industry 1 - 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. The lessons collectively highlight challenges and opportunities of promoting inclusive practices in space-related industries, identifying the barriers that marginalised groups face and considering ways to overcome them.

Lesson 4: Focuses on Female Space Professionals

Resources: Worksheets: Female Space Professionals, Planning Your Poster, Teacher's Guide: Female Space Professionals

Lesson 5, focuses on showcasing Indigenous and People of Colour Space Professionals

Resources: Worksheets: Indigenous and People of Colour Professionals, Planning Your Poster, Teacher's Guide: Indigenous and People of Colour Space Professionals

Lesson 6: Focuses on Differently Abled Space Professionals

Resources: Worksheets: Differently-Abled Space Professionals, Planning Your Poster, Teacher's Guide: Differently-Abled Space Professionals

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Lesson 7: Exploring Open Innovation in Space

This lesson introduces the concept of open-source space entrepreneurship and innovation. Learners will examine initiatives driving innovation and democratising access to space technology and resources by looking at real-world examples.

Resources: Worksheet: Open Innovation in Space, Open Innovation in Space - Projects, Teacher's Guide: Open Innovation in Space

Lesson 8: Space Tourism

In this lesson, learners will get an overview of the emerging Space Tourism sector, examining current and future possibilities for civilian space travel and reflect on the ethical considerations and challenges in commercialising space for tourism.

Resources: Worksheets: Engineering Space Tourism, Teacher's Guide: Engineering Space Tourism

Lesson 9: Space Tourism 2 - Create your own Space Tourism event

In this lesson, learners will build upon their previous knowledge to develop a space venture focused on civilian space travel. They will collaborate to define the aims and objectives of their space tourism event, considering factors such as target audience, mission profile, and ethical considerations.

Resources: Worksheets: Creating a Space Tourism Event, Peer review: Creating a Space Tourism Event, Teacher's Guide: Enterprise Planning, Lesson 10

Lesson 10: Space Related Careers

In this lesson, learners are introduced to the range of career paths within the space industry. Through exploration and discussion, they gain insight into diverse roles such as aerospace engineering, astrophysics, space medicine, and space entrepreneurship.

Resources: Worksheets: Generating a Space Tourism Logo, Planning a Space Tourism Venture Lean Canvas, Teachers Guide: Dragon's Den Event

Lesson 11: Future Possibilities in Space Exploration and Entrepreneurship

In this lesson, learners will explore future trends and developments in space entrepreneurship, examining the potential societal and economic impacts of space innovation.

Resources: Worksheet: Exploring Space Careers Challenge

Lesson 12:

In this lesson, learners will explore future trends and developments in space entrepreneurship, examining the potential societal and economic impacts of space innovation.

Resources: Worksheet: Considering the possibilities of the future Space Industry, continued next page

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Resources: Start up Space Venture, Teaching Guide: Setting up a Start-up Hub in a School

Module concept, design and and development: Dr. Anita McKeown

Peer review, recommendations and contributions: Rebecca White and Dr Jessica Garska

Using the Resources:

If you wish to use these resources, we can offer an induction and online support throughout the module to help you plan integration into your projects and timetable. To register for this option, please contact us e:hello@futurefocus21c.com For more information on the resources please visit www.muinincatalyst.com

Setting up an online learning environment for the lessons on this module:

Our lessons integrate the use of virtual learning environments. To ensure seamless use of our lessons, a module should be setup on your school's virtual learning environment such as Teams, Google Classroom, etc. Learners are encouraged to upload documents to share with their peers. If your virtual learning environment does not support document sharing, we recommend OneDrive or Google Drive.

You can also use Google Sites or Microsoft Sway to encourage learners to present their work over the year - this can easily be set up to reflect the aims of TY and provide a showcase for their work as well as an assessment tool.

Setting up a Canva Education account.

As our lessons integrate design, our lessons also refer to Canva. Educators and schools are able to open a free Canva for Education account by registering here: <https://www.canva.com/education/> Canva for Education provides primary and secondary school teachers and students with premium features and templates. You can then also set up lessons and invite your learners to the class.

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