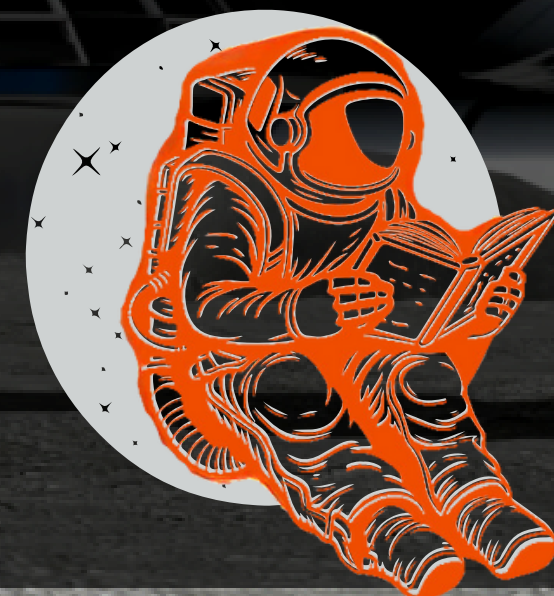


NGen Youth STEAM Activity

Space Survival Case Study: Exploring Survival & Sustainable Lunar Mining



Sustainable Development Goals

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE



11 SUSTAINABLE CITIES AND COMMUNITIES



12 RESPONSIBLE CONSUMPTION AND PRODUCTION



13 CLIMATE ACTION



17 PARTNERSHIPS FOR THE GOALS



Space Survival Case Study: Exploring Survival & Sustainable Lunar Mining

Project Objective

To create a poster and presentation that depicts an innovative lunar mining and space survival operation and explores the concept of sustainable resource extraction on the Moon. Students will engage in research and a case study where they will explore solutions to address the challenges of space survival and lunar mining.

Space Survival Case Study: Exploring Survival & Sustainable Lunar Mining

Learning Outcomes

- Gain understanding of lunar mining
- Develop research skills
- Develop creativity
- Foster critical thinking
- Promote awareness of sustainability

Space Survival Case Study: Exploring Survival & Sustainable Lunar Mining

Materials Needed

- Access to research and learning resources
- For hand-crafted posters, materials such as; poster board, markers, printed photos, scissors and glue.
- For digital posters, access to design software

Space Survival Case Study: Exploring Survival & Sustainable Lunar Mining

Project Outline

Part 1 - Case Study & Research in Mission Control Teams

Part 2 - Poster Design and Presentation Preparation

Part 3 - Showcase, Discussion and Reflection

Let's Get Started!

Part 1: Case Study & Research

Research

Case Study

In the early 2030s, Dr. Aztrow Naught embarks on a historic mission as part of the Lunar Exploration Initiative, tasked with laying the groundwork for mining on the Moon sustainably. Learning from the past, the lack of sustainable mining on Earth has presented many challenges such as environmental degradation, resource depletion, and social impacts. Thus, Dr. Aztrow employs the expertise of her mission control teams to establish humanity's presence beyond Earth through sustainable In-Situ Resource Utilization (ISRU).

When Dr. Aztrow arrives on the moon's surface, she is equipped with a very basic setup to adequately provide for the primary needs of one person (a temporary shelter, small green house, solar panels, water generator); she must expand and improve her lunar base in order to facilitate more astronauts.

Dr. Aztrow needs to adapt to the new life on the moon considering ethical implications, navigating legal frameworks, and other important factors.

So she contacts her mission control teams (YOU!) for guidance in various sectors.

Research

Mission Control Teams

Survival

You have been assigned to the Survival sector. Dr. Aztrow is currently looking for solutions to improve her life on the moon. How can lunar settlements be built/improved using sustainable ISRU solutions while still maintaining survival needs? Considering the holistic approach of indigenous ways of knowing, why is it important that Dr. Aztrow's well-being is accounted for spiritually, mentally and emotionally as well? What methods will ensure that Dr. Aztrow's well-being is maintained holistically during mining expeditions?

- Research the different ways of survival on the moon and types of lunar settlements
- Research how mental, emotional and spiritual well-being may be impacted on the moon
- What are your ideas and strategies for survival needs and ISRU?

Research

Mission Control Teams

Social

You have been assigned to the Social sector. Dr. Aztrow must consider the ethical implications for the lunar mining operation. What ethics are involved in lunar mining? What can you learn from the Indigenous approach to collaboration about the importance of including various perspectives in the development and enforcement of ethics? What kind of a system can be implemented to ensure that ethical decisions are enriched by diverse perspectives? How can you improve on the overall concept and structure of lunar mining to make it as ethical as possible?

- Research common ethical issues related to mining and resource harvesting
- Research how ethics on the moon differ from on Earth
- What are your ideas and strategies for the social sector in regards to space survival and lunar mining?
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Research

Mission Control Teams

Sustainability

You have been assigned to the sustainability sector. What are some sustainable practices that can be used in Dr. Aztrow's survival set-up or during mining expeditions? What approaches from indigenous principles of environmental stewardship can you learn from? Which professions might be involved in implementing sustainable practices on the moon?

- Consider how autonomous technology and the practice of recycling can be useful
- Research about the environmental impacts that lunar mining has on the moon
- What are your ideas and strategies for sustainability for space survival and lunar mining?

Research

Mission Control Teams

Technology

You have been assigned to the technology sector. What types of equipment and machinery would help Dr. Aztrow achieve her objective? Why is it important to develop new technology with an awareness of its impact on the surrounding environment, considering the indigenous approach to holistic thinking. How can Dr. Aztrow utilize technology to improve her survival set-up and lunar mining tactics?

- Research new and existing space equipment and machinery, considering impacts technology can have on the environment
- Research how 3D printing and additive manufacturing may be useful
- What are your ideas and strategies for technology in space survival and lunar mining?

Research

Mission Control Teams

Mining

You have been assigned to the Mining sector. What are some mining, processing, and refining techniques involved in lunar mining? What types of equipment is used for lunar mining? Why is it important to consider the indigenous approach to resource use to ensure that mining processes are efficiently utilizing resources and time?

- Research the mining methods used in the past on Earth
- Research the types of resources that can be mined on the moon
- What are your ideas and strategies for the mining sector for space survival and lunar exploration?

Research

Mission Control Teams

Legal

You have been assigned to the Legal sector. What are some legal issues that Dr. Astrow may face as she is on her mission? What professions could be involved with legal issues on the moon? How could the Indigenous way of knowing and respect support in this sector?

- Research the types of international agreements relating to the moon
- Research ownership and property rights in space
- What are your ideas and strategies in the legal sector for space survival and lunar exploration?

Research

Mission Control Teams

Investigation

You have been assigned to the Investigation sector. What type of exploration techniques will allow her to collect samples safely for her research? Considering the Indigenous way of harmony and balance, why is it important that Dr. Aztrow obtains her samples without disturbing the lunar environment? What equipment and technology can Dr. Aztrow use to conduct her research?

- Research about lunar geology and its importance
- Research about existing research processes on the moon
- What are your ideas and strategies in the Investigative sector for space survival and lunar exploration?

Research

Provide an overview of key concepts, theories, and research relevant to your topic.

Compile ideas and concepts for your sector.

Part 2: Poster Design and Presentation Preparation

Poster Design and Presentation Planning

Step 1: Planning

- Gather the resources you researched and compile your ideas.
- Refer to any images, articles, and videos that can help you
- Determine materials needed

Poster Design

Step 2: Create

Let your creativity shine when creating your poster and planning your presentation!

SAMPLE POSTER



An astronaut in a full spacesuit stands on the lunar surface. In the background, there are several geodesic domes, some of which appear to have green plants growing inside. The Earth is visible in the dark sky above. The scene is dimly lit, with the primary light source being the Earth.

Part 3:
Showcase, Discussion and
Reflection

Poster and Presentation Showcase

Share your posters and present your
innovative ideas and concepts for your sector!

Reflection

How can some of your innovative ideas in each sector be combined and complement one another for the future of space survival and lunar mining?

Space Poster and Presentation Gallery

Send your posters and
presentations for a chance
to be included in our
online gallery!

communications@youthculture.com

