SCIENCE NORTH SCIENCE NORD
SUDBURY, ONTARIO, CANADA

Space Station Design Part 3 **Grade 9 Applied – Space Exploration**

Lesson Plan

Assessment	AFL, discussion, feedback
Cross-curricular	Health, P.E., Technology

Big Ideas

- Celestial objects in the solar system and universe have specific properties that can be investigated and understood.
- Technologies developed for space exploration have practical applications on Earth.

Learning Goals

- Ways to keep astronauts alive and healthy
- The important components of a space station
- How to choose roles for an effective team

Specific Expectations

D1.1 research the challenges associated with space exploration, and explain the purpose of materials and technologies that were developed to address these challenges and how these materials and technologies are now used in other fields of endeavor
D2.1 use appropriate terminology related to space exploration
D2.3 use a research process to compile and analyse information on the characteristics of various objects in the universe
D2.4 investigate a technological challenge related to the exploration of celestial objects that arises from the objects' specific properties, and identify the solution that has been devised
D3.3 identify the factors that make Earth well suited for the existence of life

Description

This is **lesson three** in a series of four lessons where students will be creatively introduced to a problem (How can we keep astronauts alive on a distant planet or moon), will self-direct the specific nature of their learning (choose a planet or moon), will research background details (planet research), and then develop solutions to the specific nature of their problem. This lesson will be organized around a Problem-Based Learning (PBL) Framework.

Materials

Superb Space Stations Plan & Peer Assessment

Safety Notes

No safety concerns

Introduction

- In lesson 1, students devised a list of astronaut needs. In lesson 2 students chose and researched a terrestrial object as host site for a space station. In this third lesson, students will consolidate the two themes by proposing solutions to help astronauts thrive on their chosen planet or moon.
- Students will form in their groups and retrieve their copies of 'Superb Space Stations-Choice' from the previous period.
- The teacher will have taken the list of astronaut needs developed by the students at the beginning of this module (lesson 1) and used them to modify or contribute to 'Superb Space Stations-Plan'.
    - 'Superb Space Stations-Plan' will be handed out to each student in the groups and students should be helped to recognize that this matches up with their list of identified astronaut needs.

Action

- In their groups, students will use their imagination and ingenuity to identify a solution to each astronaut need listed on 'Superb Space Stations-Plan'.
- The solutions should be specific to their chosen terrestrial object
    - Ex. If students chose Callisto, a moon of Jupiter, they will have to deal with the cold temperatures (average surface temp of -139 0C) and the low amount of light from the sun (making it hard to grown plants for food).
- Although they will work together as a group, students will write in their solutions INDIVIDUALLY so that they can easily conference with a student from another group.
- Students will fill out their choice of astronaut specialties at the end of 'Superb Space Stations-Plan'.

Consolidation/Extension

- The teacher will pair students with a student from another group.
    - Pairs must sit together and describe their space station plan for their partner.
    - The partner will respond in written from 'Superb Space Stations-Peer Assessment' then verbally explain what they wrote.
- Groups will meet together again, discuss the feedback that they received and make corrections and additions to ONE STUDENT'S COPY of 'Superb Space Stations-Plan'.
- They will hand this copy of 'Superb Space Stations- Plan', along with ALL copies of 'Superb Space Stations- Peer Assessment' to the teacher.
- The teacher will provide descriptive feedback on 'Superb Space Stations-Plan' to be returned at the beginning of next class.
- Lesson will continue the following period in Part 4