Maker Design Challenge:

Rebuilding a Damaged Earth

Overview

Students develop their design thinking and core competencies through a design challenge that includes empathic interviewing, sketching and sharing of designs, giving and receiving feedback from a "critical friend," prototyping, and showcasing of designs.

In this activity, students are challenged to design a prototype machine or tool that is capable of restoring balance to Earth's damaged ecosystems. Teachers should build prior knowledge related to the concepts of sustainability and ecosystems before the design day.

Teachers planning to implement design thinking in their classrooms are encouraged to review the Maker Day Toolkit, in order to develop a deeper understanding of maker pedagogy.

Area of Learning:
Applied Design, Skills, and Technologies, Grade 4

Big Idea:

Designs can be improved with prototyping and testing.

Curricular Competencies:

- Outline a general plan, identifying tools and materials
- Demonstrate their product and describe their process
- Reflect on their design thinking and processes

Cross-curricular connection: Science, Grade 4

Big Idea:

All living things and their environment are interdependent.

Elaboration:

What evidence is there of interdependence between living and non-living things in ecosystems?

Curricular Competencies:

- Make observations about living and non-living things in the local environment
- Identify some simple environmental implications of their and others' actions

Core Competencies

Communication:

- Connect and engage with others (to share and develop ideas)
- Acquire, interpret, and present information (includes inquiries)

Thinking:

- Developing Ideas

Social Responsibility:

- Contributing to community and caring for the environment

Prior knowledge

- Concepts related to sustainability and ecosystems

Possible Resources

- Aboriginal Perspectives on Sustainable Development (http://www.edu.gov.mb.ca/k12/cur/socstud/frame_found_sr2/tns/tn-41.pdf)
- WALL E (2008) – IMDb (http://www.imdb.com/title/tt0910970/)
- The Martian (2015) (http://www.imdb.com/title/tt3659388/)

Assessment considerations

- Teacher observes students communicating in small and large groups
- Students defend design decisions during the small group "gallery walk"
- Students provide evidence of their design thinking through the creation of a design prototype
- Students track the progression of their design thinking through a portfolio of learning (interview sheet, design prototype, reflection panel)
- Students engage in peer and self-assessment

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Rationale

First Peoples in British Columbia have traditionally created tools from materials found in their natural environment. For example, animal skins were used for clothing, trees were carved into dugout canoes, branches and stones were used to create spears for hunting, and vines were woven into nets for fishing.

In the near future, Earth has been damaged and humans only live in colonies on the Moon. Humans want to recolonize Earth, but first they need to restore its natural ecosystems and rebuild cities in a planned and sustainable way.

An expedition has just returned from Earth and brought back a small bag of artefacts (the materials found inside the paper bag – see Materials) that represent the only items left on Earth. Like the First Peoples using only materials from the natural world, your team must build a prototype machine or tool that is capable of restoring and rebuilding an Earth colony, using only the waste materials left on Earth.

Parameters

Your team must design a unique machine using these found objects to help repair the damaged air and water and re-establish natural ecosystems on Earth.

- You must use at least one of every item in the bag of artefacts.
- You may also use items from the pantry.
- Each member of the team must participate.
- Each member of the team must use one tool they've never used before.