26 Mars Shelter and Transportation

Overview

NASA is preparing to send humans to an asteroid by 2025 and to land on Mars in the 2030's (Retrieved January 2016, **http://mars.nasa.gov/programmissions/science/goal4/**). NASA has been sending robotic explorers to Mars for years with the intention of eventually sending humans there (Retrieved January 2016, **http://mars.nasa.gov/odyssey/**). Globally, teams of engineers, designers, inventors, scientists, and others are developing technologies and tools to help us achieve the goal of humans living and working on Mars.

Design Rationale

Historically, humans have been curious about other places. We have the desire to explore and discover (Retrieved January 2016, **http://www.newworldencyclopedia.org/entry/Human_migration**). Our fascination with space and space exploration extends our natural curiosity to migrate from where we evolved. Naturally, we may expect human presence on a planet other than Earth to be a logical step for human advancement and discovery. However, many issues need to be considered: the environmental concerns on other planets (i.e. air pressure, gravity, heat, etc.), basic human needs (i.e. food, water supply, etc.), transportation issues (i.e. how to get there and back), and what might constitute quality of life on a new planet (Retrieved January 2016, **http://www.simplypsychology.org/maslow.html**).

Problem Scenario

Your team has been selected to design a lightweight, portable shelter or personal transportation vehicle for use on Mars. Your team has been tasked with developing a prototype that can be assembled quickly and withstand the rigours and challenges of the Martian environment.

Your prototype needs be made of individual components for easy storage and transportation to Mars. Your team needs to consider the added value of your components being lightweight, compact, and highly functional. Your Martian prototype must be able to satisfy one or more of the following concerns:

- Appropriateness for the Martian atmosphere
- Cost efficiency
- Quality of life

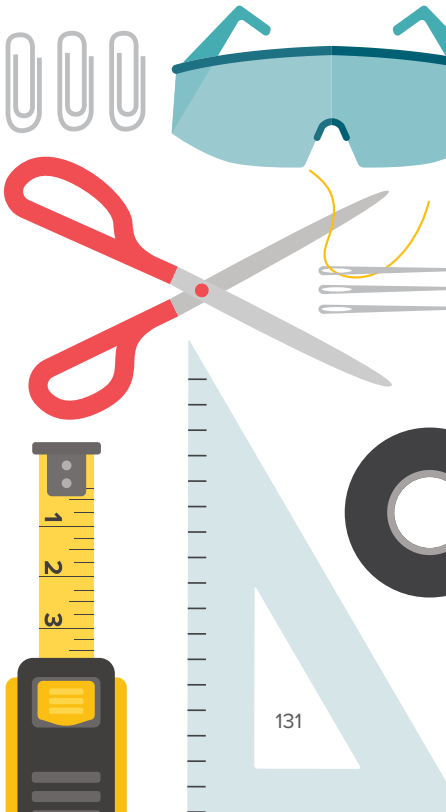
SkillsCanada Alberta

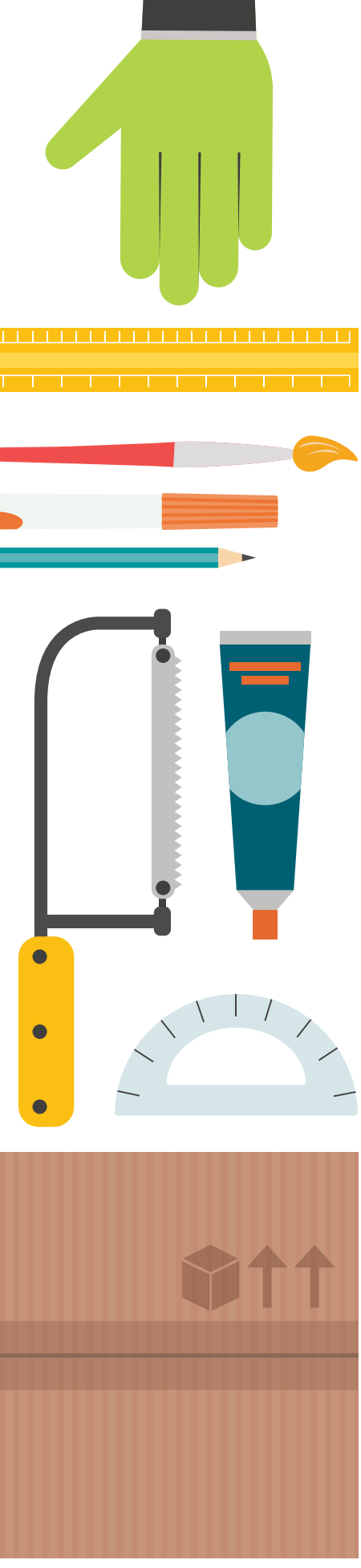
Suggested Grade Level

- Upper elementary through to secondary school
- Possibly primary grades with adult assistance

Suggested Subject Area

- Citizenship—including school culture/community
- ADST
- Physics
- Language Arts
- Social Studies
- Science 7–9





Success Determinants

Success will be determined by:

- ❒ Alignment to design motto: “Make it smaller, stronger, do more, be easier to use, be cheaper, be clean, be greener.”
- ❒ Completion of a detailed blueprint/plan before beginning construction
- ❒ Degree to which your prototype is adaptable to Martian conditions and multiple users
- ❒ Degree to which your prototype looks like your design sketch
- ❒ Ease of long term maintenance and durability
- ❒ Functionality of your prototype
- ❒ Uniqueness and usability of your prototype and the degree to which it solves an actual problem

Parameters

- ❒ You may use the tools provided to you in the classroom pantry.
- ❒ You must complete a display panel, which includes your design thinking sketch, your prototype, your design notes, and your reflections on the activity.
- ❒ You must consider how to make your prototype colourful, intriguing, and usable.
- ❒ You must use some of all the items in the participant group kit in some way.