Build a Rover- Post-Activity

Assessment | Assessment *for* Learning

Big Ideas

Grade 5: Understanding Structures and Mechanisms

- Structures and mechanisms throughout our environment have forces that act on and within them.

Grade 6: Understanding Earth and Space Systems

- Technological and scientific advances that enable humans to study space affect our lives.

Overall Expectations

Grade 5: Understanding Structures and Mechanisms

2. Identify forces that act on and within structures and mechanisms, and describe the effects of these forces on structures and mechanisms.

Grade 6: Understanding Earth and Space Systems

1. Assess the impact of space exploration on society and the environment.

Specific Expectations

Grade 5: Understanding Structures and Mechanisms

1.1 Analyse the effects of forces from natural phenomena.
3.2 Identify external forces acting on a structure.
3.4 Describe forces resulting from natural phenomena that can have severe consequences for structures in the environment, and identify structural features that help overcome some of these forces.

Grade 6: Understanding Earth and Space Systems

2.3 Use scientific inquiry/research to investigate scientific and technological advances that allow humans to adapt to life in space.
3.1 Identify components of the solar system
3.3 Identify the technological tools and devices needed for space exploration.

Description

In the *Mission to Mars* program, students were given a design challenge to protect the motherboard of a lander upon Mars entry. In this post-activity, students will be tasked to build a model of a Mars rover that can withstand the planet's climate.

Materials

- Hair dryer or fan
- Popsicle sticks
- Elastics
- Tape
- Pipe-Cleaners
- Buttons or wheels
- Paper
- Glue
- Various other building supplies.

Duration

45 minutes

Introduction

- Remind the students that during the *Mission to Mars* program, they had successfully landed on Mars. Now that they have arrived, their new design challenge is to build a model of a Mars rover that can explore the planet. On their model, students must have a representation of a power source and a sample collecting component.(e.g. rocks, soil)
- Discuss with the students the following details about Mars that they could consider when making their model.
    - Mars has about ⅓ Earth's gravity.
    - Mars has low atmospheric pressure.
    - Mars temperatures can vary from -153°C to 20°C.
    - Mars has dry ice (carbon dioxide) polar caps.
    - Mars has large dust storms that can cover the entire planet.
    - Mars' surface consists of volcanoes, craters, red dust (iron oxide) and rock.

Action

1. Have students brainstorm a design for their rover.
2. Have the students build their designs using only the materials provided in the classroom.
3. Once students have completed building their rovers, ask them to explain the key components of their design.
4. Test the students' designs against a Mars dust storm using the hair dryer or fan. If possible, gradually increase the speed of the wind throughout the test.
    a. During testing, ensure students keep in mind that dust would cover certain components of their rovers. (*e.g. if they had solar panels on their rover as a source of power, they may not be as effective covered in dust*)

Consolidation

1. Have a discussion about the various rovers that were built during this activity.
2. Visit https://mars.nasa.gov/msl/mission/rover/ to meet Curiosity, a Mars rover that has been exploring the surface since August 6, 2012.

Extension

You can test the strength of the students' design by adding weights to the rover. The weight can represent sample collection of surface rocks.