



NDSGC Lesson Plan

Bristle Bot Rovers



- 1.5V Cell [Batteries](#) (Also available at [Digi-Key](#))
- [Motors](#) (available at Digi-Key)
- [Bristle](#) (head) of a toothbrush (break off or cut off of the handle)

Additions

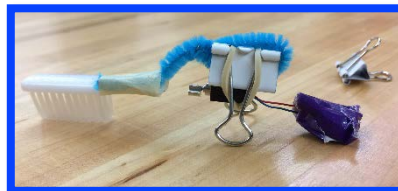
- Rubber bands (different sizes)
- Paperclips
- Foam stickers
- Bendable straws
- Wooden craft sticks (different sizes)
- Binder clips (different sizes)
- Pipe cleaners
- Cotton Balls
- Clothespins (different sizes)
- Legos

Tools

- Duct Tape
- Transparent Tape
- Double Sided Tape
- Masking Tape
- Scissors
- Glue
- Glue dots
- Tweezers
- Pliers

Martian Regolith/Solar Panels

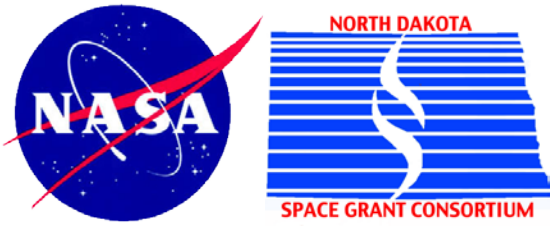
- Glitter
- Tinfoil



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Scenario:

Your crew has reached the surface of Mars. Now you need a rover to help you complete various tasks on the Red Planet. You must design and build a Mars Rover (Bristle Bot) to help your crew complete the following tasks to successfully complete your mission.

Students work individually, in pairs, or in teams to design and build a rover that can complete 1, 2, or 3 of the following tasks.

Rover Obstacle Course

1. Rove from point A to point B. (These points could be marked on a table top, on the floor, or even outside!) The rover could also be required to carry a payload from Point A to Point B (could be a paperclip, cotton ball, etc.) or there could be obstacles in the way, that it must go over, around, or under.
 - a. This task represents mobility on the uneven surface of Mars and transporting tools and equipment along the surface.

Let the Sun Shine In!

2. Clear a sample of glitter from a tinfoil covered object (like a paper plate).
 - a. This task represents maintenance of solar panels on Mars, which power the entire mission. Martian regolith (dust/glitter) can accumulate on the solar panels and reduce the amount of energy available to astronauts. The bristle bot can clear in a circular motion, straight lines, etc.

To Infinity and Beyond!

3. Rove along a straight line, indefinitely. (This could be masking tape on a table top or floor, or even a chalk line on a sidewalk.) The further the bristle bot can travel in a straight line, the better.
 - a. This task represents the rover's ability to traverse great distances where astronauts may not be able to travel due to needs provided by the safety of their habitat. This capability is also necessary for extended exploration for interesting landing sites for future missions.