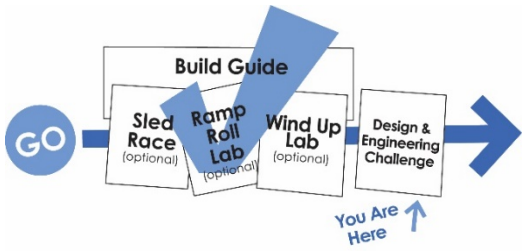
RUBBER BAND RACER
LONG SHOT CHALLENGE



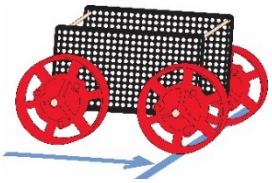
The Challenge

Redesign your racer to go as far as possible.

Before you start... Make sure you have built a **Rubber Band Racer** for use on this challenge.
Documents & supplies at teachergeek.com/learn

Considerations

(things your design can not, or must, do or be)



Power:

- Racer power may only come from ***up to five*** of the provided #16 rubber bands.
- Tire Rubber Bands ***may not*** be used to power the racer.

Allowable Materials:

- TeacherGeek components
- Recycled food packaging
- Other available materials (wood, plastic, etc.)

Geometry:

- At the start of the competition, vehicles must fit within a **50cm x 50cm x 50cm** area

Function:

- Your racer wheels must begin behind starting line
- Measure the distance racer travels to its front wheels
- Racer must travel on ***at least three*** TeacherGeek wheels

Getting Started

Supplies:

- Tape Measure
- Rubber Band Racer
- Extra TeacherGeek components, Other/recycled materials

Setup:

- Flat, 10 meter (30ft) long area of floor
- Mark starting line with a strip of tape

Ways to Play

Distance Challenge:

Can you redesign your racer to go incredibly far? Should it release the power stored in the rubber bands fast or slow? Will weight, design or number of wheels change how far it can travel? Experiment and find out.

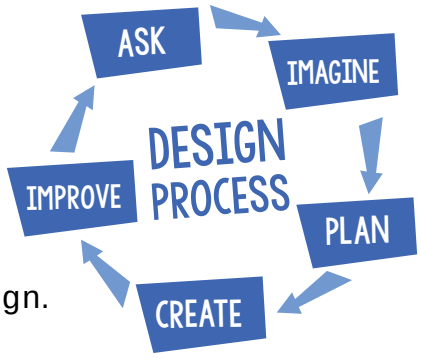
Scoring: Wind it up and let go! When it stops, take a piece of tape (with your racer/team name on it) and place it where the front wheel(s) touch the ground. Keep redesigning and retesting your racer. If your racer travels farther than a previous run, move the tape to mark your new farthest distance.

Heavyweight Challenge:

How much can your racer carry, and how far can it carry it? Redesign your racer to carry a book, or books, as far as possible. **Newton's Second Law** states **F = M x A** (**force** equals **mass** times **acceleration**). Examine how changing the mass of your racer affects its acceleration (how your racer gains speed), or the force needed to move it. Your racer will probably have to change how it releases energy to carry more books.

Design Process

You will be using the Engineering Design Process.
What does that mean? Your design is never finished - it can always be improved). There is no such thing as a perfect design.



Mars Rescue Mission

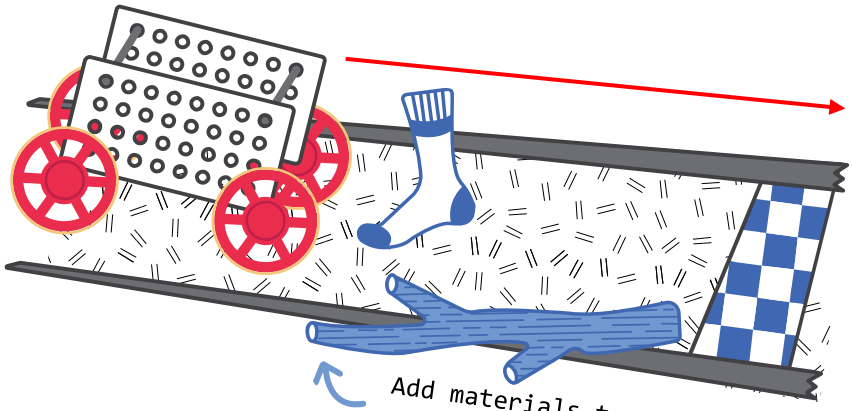
Mission Brief

Redesign your Mars Rover to travel as far as possible across the **Zunil Crater.**

Cross the Crater

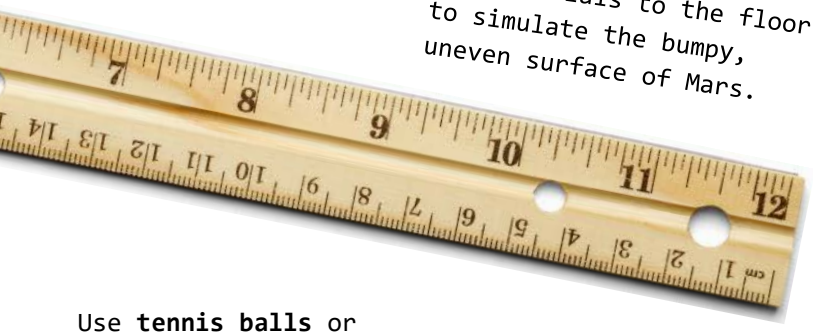
Bumpy, uneven basalt (rock) covers the 10 km (6.5 mile) surface of the Zunil Crater. How will you plan for this **friction** (traction)?

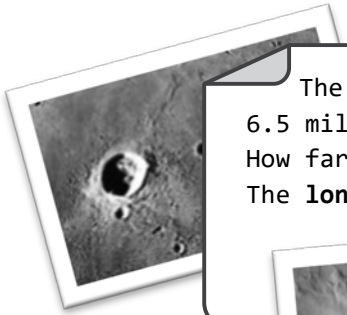
For a more in-depth **Mars Rescue Mission**, download the free, immersive powerpoint *Presentations at teachergeek.com/learn*



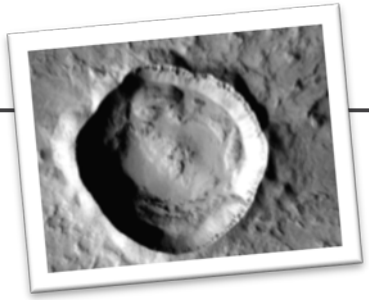
Add materials to the floor to simulate the bumpy, uneven surface of Mars.

Named after a town in **Guatemala.**





The **Zunil Crater** is 6.5 miles (10 km) wide. How far can your racer go? The **longer**, the better.



Use **tennis balls** or another object with mass to represent alien specimens. Decorate and name your new species!

Name: _____ Set: _____

Revolutions/Distance Ratio

Distance Traveled
(Dependent Variable)

10m
9m
8m
7m
6m
5m
4m
3m
2m

Revolutions to Wind Wheel/Rubber Bands
(Independent Variable)

RUBBER BAND RACER
LONG SHOT CHALLENGE

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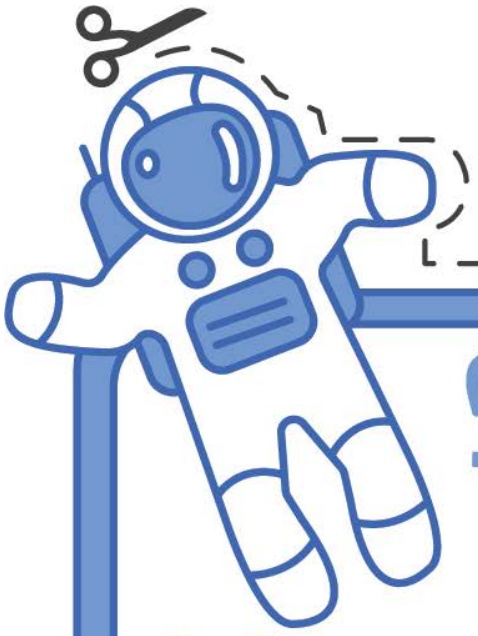
Name: _____ Set: _____

Design/Group	Trial #1	Trial #2	Trial #3	Trial #4	Trial #5	Trial #6	Trial #7	Trial #8	Trial #9	Total or Average



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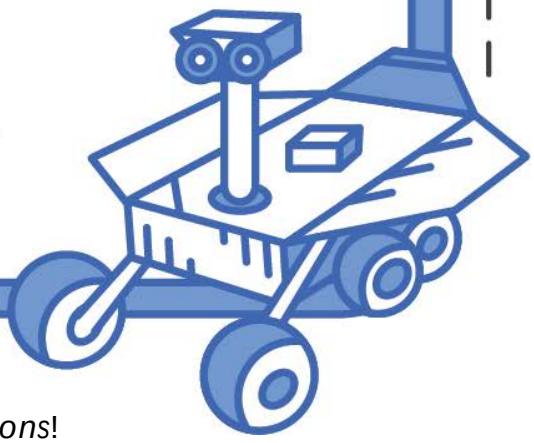
Mars Rescue Mission

Certificate of Completion

is awarded to

Your Name Here

for the succesful and creative
completion of the TeacherGeek
Mars' Engineering Challenges



Receive this award after successfully finishing all three **Mars Rescue Missions** – *congratulations*! You are now a true Mars Engineer Emeritus.