



# MAKE A CARDBOARD ROVER

## ACTIVITY INSTRUCTIONS

[www.ncscifest.org/starparty](http://www.ncscifest.org/starparty)

### MATERIALS YOU'LL NEED

- corrugated cardboard body (6-inch/15-cm square)
- 2 corrugated cardboard wheels (5-inch/13-cm square)
- 2 round candies (the hard, white, mint ones with a hole in the middle)
- 1 sharpened round pencil
- 2 rubber bands
- ruler
- 1 plastic drinking straw
- scissors
- tape

### ROVING ON THE MOON

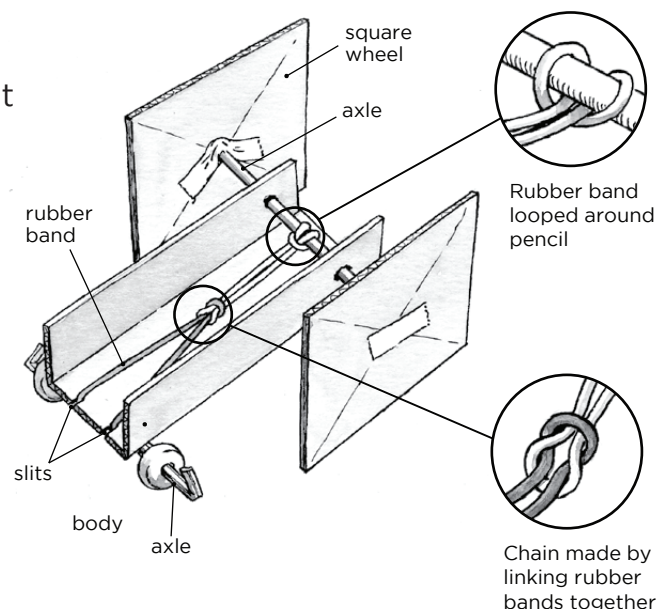
Can you imagine driving an all-terrain vehicle (ATV) on the Moon? NASA can. It's building a fleet of ATVs (called rovers). Some can be driven by astronauts. Others are remote-controlled. All of them can handle the Moon's dusty, rugged terrain.

Talk about off-road adventure!

We challenge you to design and build a rubber band-powered rover that can scramble across the floor.

### BUILD

1. **First, you have to make the body.** Fold the cardboard into thirds. Each part will be about 2 inches (5 cm) across. Fold along (not across) the corrugation (the tubes inside a piece of cardboard).
2. **Then, make the front wheels.** On the two 5-inch (13-cm) cardboard squares, draw diagonal lines from corner to corner. Poke a small hole in the center (that's where the lines cross). On the body, poke one hole close to the end of each side for the axle. Make sure the holes are directly across from each other and are big enough for the pencil to spin freely.



CONTINUED ON THE BACK

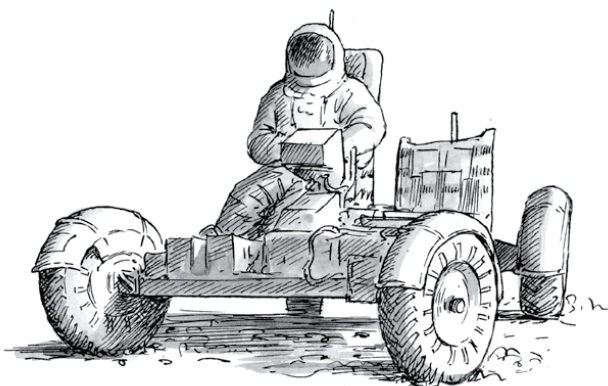
3. **Now attach the front wheels.** Slide the pencil through the body's axle holes. Push a wheel onto each end. Secure with tape.
4. **Next, make the rear wheels.** Tape the straw under the back end of the rover. Slip a candy onto each end. Bend and tape the axle to stop the candies from coming off.
5. **Finally, attach the rubber band.** Loop one end around the pencil. Cut small slits into the back end of the body. Slide the free end of the rubber bands into the slits.

## TEST, EVALUATE, AND REDESIGN

Test your rover. Wind up the wheels, set the rover down, and let it go. Did everything work? Can you make your rover go farther? Engineers improve their designs by testing them. This is called the design process. Try redesigning the wheel setup or rubber band system.

For example, if:

- **the wheels don't turn freely**— Check that the pencil turns freely in the holes. Also, make sure the wheels are firmly attached and are parallel to the sides.
- **the rover doesn't go far**— Wind up the wheels more. Try wheels of different sizes or shapes. Or, add another rubber band or use a rubber-band chain.
- **the wheels spin out**— Add weight above the square wheels; put more wheels on the pencil; use bigger wheels; or cut open a rubber band and use only a single strand of elastic.
- **the rover won't travel in a straight line**— Check that the pencil is straight and the front wheels are the same size.



### RIDE IN “STYLE”?

A rover may not be the hottest-looking vehicle around, but with a price tag of over ten million dollars, it's one of the most expensive. And it sure is convenient to bring along. Rovers can be folded and stored in a landing module the size of a small room. Look at the picture of the rover. Which features are also found on cars designed for use on Earth?

Answers: Chassis, wheels, fenders, motor, seats, seat belts, antenna, battery, camera (some cars), and steering controls.

### CREDIT: NASA

For more about this activity, visit

<https://www.jpl.nasa.gov/edu/learn/project/make-a-cardboard-rover/>



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