

DESIGNED TO MOVE

EXPERIMENT: RUBBER BAND CAR

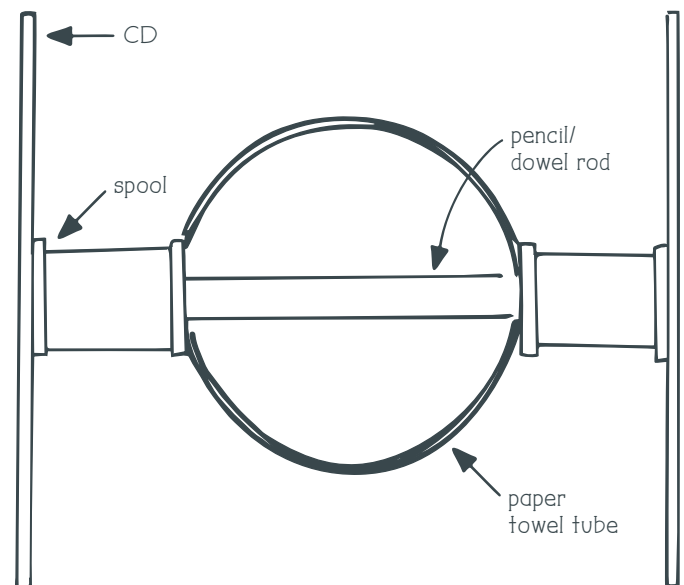
Cars move by transforming stored electrical energy to kinetic energy that pushes the vehicle. Try building a simple wheeled vehicle that uses the potential energy in a twisted rubber band to move. Use our suggestions to get you started, then use your creativity to design your own.

MATERIALS

- | | |
|---|---------------------------------------|
| <input type="checkbox"/> CDs or other round items for wheels (wide bottle caps, container lids, etc.) | <input type="checkbox"/> Paper clip |
| <input type="checkbox"/> Two pencils or dowel rods for the axles | <input type="checkbox"/> Rubber bands |
| <input type="checkbox"/> Paper towel tube for the body | <input type="checkbox"/> Hole punch |
| <input type="checkbox"/> Super glue | <input type="checkbox"/> Four spoons |
| <input type="checkbox"/> Four balloons | <input type="checkbox"/> Duct tape |
| | <input type="checkbox"/> Scissors |
| | <input type="checkbox"/> Markers |

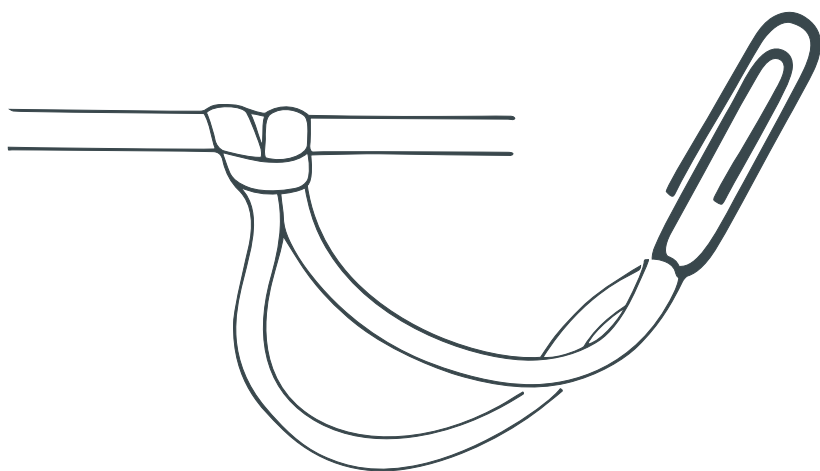
INSTRUCTIONS

Prepare the car's body by using the hole punch to make two holes opposite each other on one end of the paper towel tube. The holes should be large enough so the dowel or pencil can fit through and spin freely. Repeat with two more holes on the opposite end of the paper towel tube and insert the dowels. The dowels should be far enough away from each other so that when the wheels are attached the wheels don't touch. Decorate the body with markers or other art supplies.



Attach the wheels firmly to the axles by inserting the end of the dowel into a spool, then using super glue and duct tape to attach the CD wheel to the spool and dowel. The spool has more surface area, so there's more space to attach the CD wheel. Let the glue dry.

Use a rubber band that's almost as long as the body of the car. If you don't have one long enough, loop two or more rubber bands together. Loop one end of the rubber band around an axle and hold it in place with duct tape. Attach a paper clip to the other end of the rubber band, stretch the rubber band through the paper towel tube and clip the paper clip to the opposite end of the paper towel tube. The rubber band should not have slack, but it shouldn't be too tight, either.



Wind the rubber band around the axle by spinning the back wheels until the rubber band is tight. Place the car on the floor while holding the back wheels and let it go! To give the wheels more traction, cut the mouth off a balloon and stretch it around to cover the CD. Repeat for the other wheels. You can also try covering the wheels with tape or wrapping them with a few rubber bands.

WHAT'S HAPPENING

The rubber band stores energy when it's wound up. This stored energy is called potential energy. When you release the wheel, all the energy makes the wheels spin to push the car forward. The potential energy is transformed into kinetic energy, which is the energy of motion. The more you wind the rubber band around the axle, the more energy is sent to the wheels which makes it move faster and farther.



GAME ON

Challenge a friend to a race! Be an engineer and alter your car design - what other materials can you use for the body or the wheels? Try fewer or more wheels, or a different body shape, or more rubber bands. Can your car overcome obstacles, like ramps or debris?

TIPS

The wheels need to be larger than the car body.

LEARN MORE

The wheel and axle is one of six simple machines, which are machines designed to help make work easier. Find out about the others by playing MSI's online Simple Machines game at msichicago.org/simple-machines.

RECOMMENDED READING

Poem-Mobiles: Crazy Car Poems by Patrick J. Lewis, illustrated by Jeremy Holmes

Are We There Yet? by Dan Santat

The Museum of Science and Industry gratefully acknowledges the support of the Chicago Park District on behalf of the citizens of Chicago.