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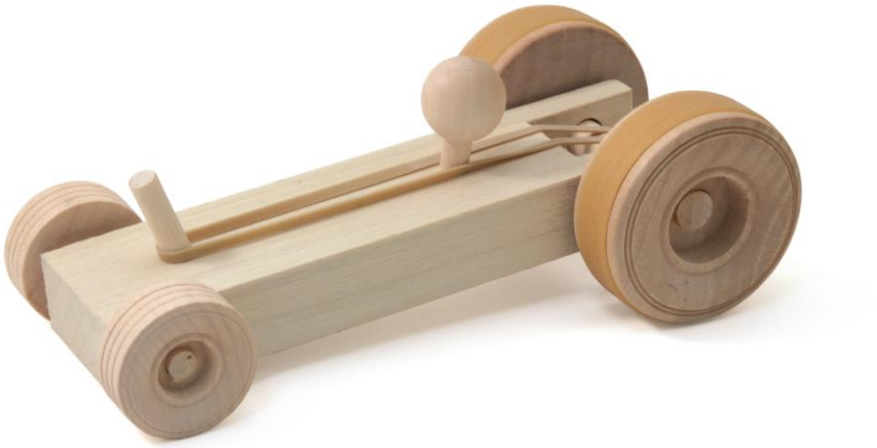
Educational Innovations Inc.®

Wooden Car Kit

WK-1



Materials:

- ✓ 1 block of wood with 5 holes
- ✓ 1 rear axle (⅜" diameter)
- ✓ 1 front axle (¼" diameter)
- ✓ 2 small wheels
- ✓ 2 large wheels
- ✓ 1 peg (¼" diameter x 1¼" long)
- ✓ 1 peg (⅛" diameter x ½" long)
- ✓ 1 sphere with attached peg
- ✓ 2 elastic bands (½" x 2½" long)
- ✓ 3 elastic bands (⅛" x 3½" long)

Notes:

You need to provide sandpaper, white glue, and a hammer.

Please keep in mind that wooden parts can expand or shrink depending on temperature, humidity and other factors.

It may be necessary to sand down dowels and other parts to improve fit.

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NGSS Correlations

Our Wooden Car Kit and these lesson ideas will support your students' understanding of these Next Generation Science Standards (NGSS):

Elementary

4-PS3-4

Using this car, students can apply scientific ideas to design, test, and redefine a device that converts energy from one form to another.

Middle School

MS-PS3-2, MS-PS3-4, MS-PS3-5

Using this car, students can develop an investigation and model to describe that when the arrangement of objects interacting at a distance change, different amounts of potential energy are stored in the system.

High School

HS-PS3-3

Students can use this car to design, build, and redefine a devise that works with given constraints to convert one form of energy into another form of energy.

Suggested Science Idea(s)

S&E • 4-PS3-2 • MS-PS3-2 • MS-PS3-4 • HS-PS3-3

Students use the cars to perform experiments. Make observations to produce data to serve as the basis for an explanation.

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Car Construction

1. Sand the edges of the holes that go completely through the wooden block and the two axles (the two longer dowels) until the axles easily turn when inserted into the block.

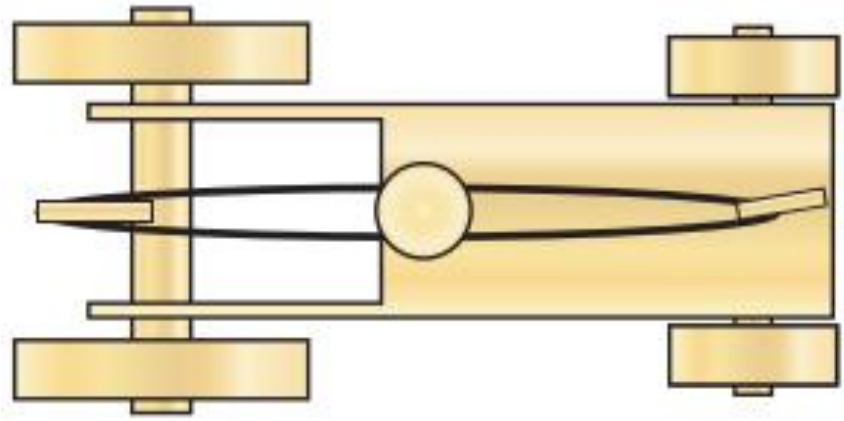
2. Place the larger, rear axle through the two holes in the block and attach the two larger wheels. If glue is necessary, use sparingly. It may be helpful to sand down the axle or gently use a hammer to tap the wheels on. Remember, the wheels must freely turn.

3. Attach the front wheels to the smaller axle in a similar fashion.

4. Use glue to attach the front peg, middle peg with sphere attached, and the small rear axle peg. Allow the glue to dry. It is important that the small rear axle peg be tapped in all the way. Only a small portion should show—just enough to catch the elastic band.

5. Place the two thick elastic bands over the back wheels to serve as tires.

6. Attach the longer, power elastic band over the legs as shown below:



Operating the Car

Turn the back wheels to wind up the elastic band, set on the floor and release.

Things to Try:

1. Does the type of floor covering have any effect on the car's performance? Wind the elastic band the same number of turns as before and release the car on a rug and a tile or wooden floor. Measure the distances traveled.
2. How does the number of turns in winding the elastic band affect the distance traveled?
3. Add weights to the car. How does the addition of weights to the car affect the distance traveled?
4. Try using two or three elastic bands at the same time. How does the number of elastic bands affect the distance traveled?
5. Use powdered graphite to lubricate the back axle where it turns inside of the wooden block. You can create powdered graphite by rubbing pencil lead against a piece of sandpaper and collecting the powder. This may produce surprising results!

Try adding another variable to your wooden car! Perform "weightier" experiments with metal washers.

How does the extra weight affect the car's performance and distance traveled?

Available on our website
WK-105 (pack of 8 washers)

Take Your Lesson Further

As science teachers ourselves, we know how much effort goes into preparing lessons. For us, "*Teachers Serving Teachers*" isn't just a slogan—it's our promise to you!

Please visit our website for more lesson ideas:

www.TeacherSource.com

Check our blog for classroom-tested teaching plans on dozens of topics:

http://blog.TeacherSource.com

To extend your lesson, consider these Educational Innovations products:

OneCar (PHY-280)

OneCar is a comprehensive, open-ended STEM system that allows students to explore energy and motion in as many ways as they can imagine—without soldering! Every Kit includes eight OneCars. Each has a low-friction car chassis, four wheels, and ample components that can be assembled and de-constructed for multiple use. Students can design, build, test, and propel their cars in six different modes, using a solar panel, electric motor, capacitor, kitchen chemicals, compressed air, propeller and more. Your students will be in the engineering fast lane as they learn about simple machines, Newton's laws, electrical circuits, renewable energy, chemical reactions, energy conversion and more!

Flywheel Powered ZeCar (KLW-200)

These wonderful "simple machines" are perfect examples of the wheel and axle in action. Each beautifully constructed car consists of a brightly colored stainless steel flywheel connected to a pair of wheels through a series of gears. A gentle push spins the flywheel and supplies the zeCar with the energy it needs to move and even climb gentle inclines. Have your students calculate the energy stored in the flywheel by measuring how high the zeCar is able to climb up a ramp, race them, or discuss the benefits of front wheel verses rear wheel drive. Great for all levels.

Mousetrap Racing Car Kit (MID-100)

We designed our classic Mousetrap Racing Car kit for students ready to try the construction and operation of their first mousetrap race car (recommended for 4th grade and up). Our robust design features die-cut parts from Micro-lite Plywood for lasting durability, and detailed instructions for each student. Kit includes complete illustrated teacher's guides with learning exercises and background information.