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Wooden Car Kit

WK-1



Materials:

- ✓ 1 block of wood with 5 holes
- ✓ 1 rear axle ($\frac{3}{8}$ " diameter)
- ✓ 1 front axle ($\frac{1}{4}$ " diameter)
- ✓ 2 small wheels
- ✓ 2 large wheels
- ✓ 1 peg ($\frac{1}{4}$ " diameter x $1\frac{1}{4}$ " long)
- ✓ 1 peg ($\frac{1}{8}$ " diameter x $\frac{1}{2}$ " long)
- ✓ 2 elastic bands ($\frac{1}{2}$ " x $2\frac{1}{2}$ " long)
- ✓ 3 elastic bands ($\frac{1}{8}$ " x $3\frac{1}{2}$ " 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.

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 device 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

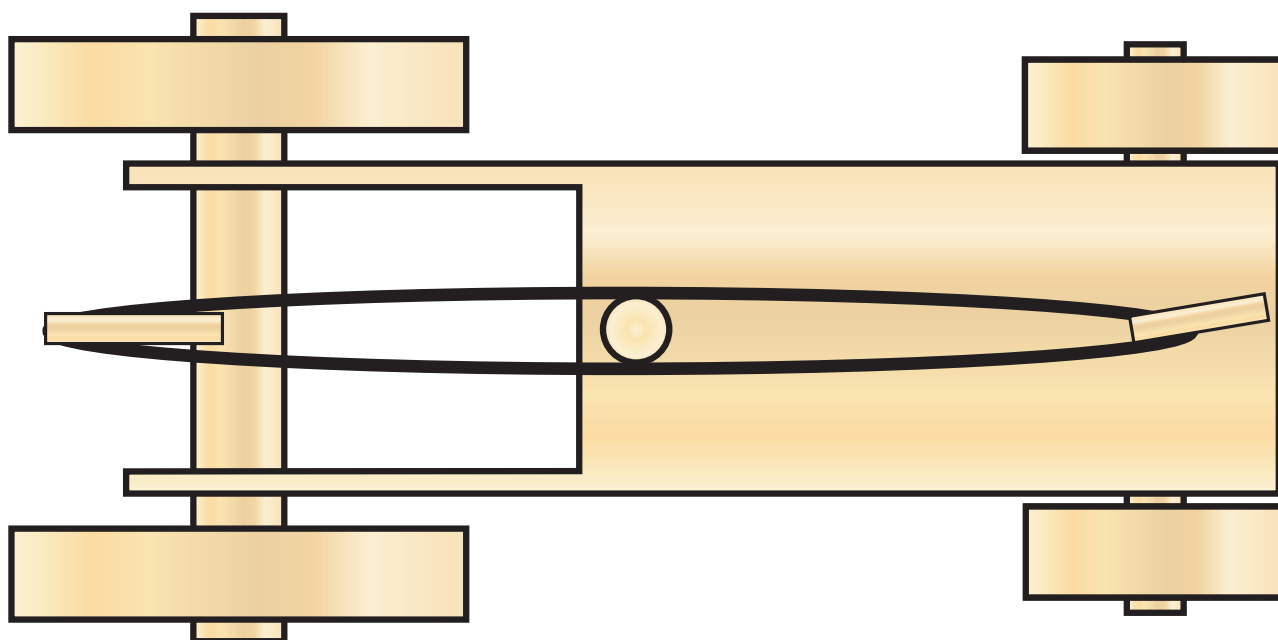
Students use the cars to perform experiments. Make observations to produce data to serve as the basis for an explanation.

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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, 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.

Notes:

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)

If you come up with an idea for another lesson for the Wooden Car Kit or one of our other products, please write to us at lessons@TeacherSource.com

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!

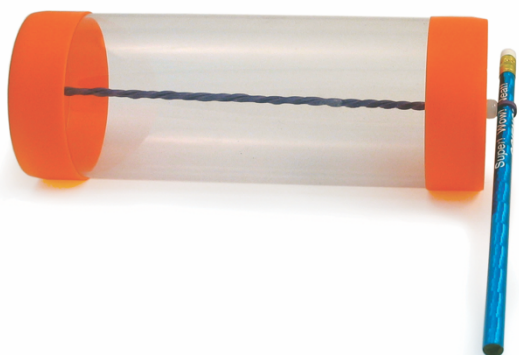
Please visit our website
for more lesson ideas:

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:



Wacky Hall Walker (WHW-100)

With this not-so-simple machine, your students investigate the amount of potential energy given the rubber band vs. the distance traveled by the Wacky Hall Walker. After collecting data and graphing the results, students can be challenged to make their Wacky Hall Walker travel a certain distance. Includes a full set of lesson plans. *Some assembly required.*

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.



[Surprising Science for Kids: Engineering Design](#) (KIT-560)



Engineering is all around us -- and is integral to our everyday life. This exclusive kit for grades 5-8 introduces students to the basics of engineering in a fun and interesting way. The kit includes almost everything needed for six activities that teach basic physics and engineering principles in hydraulics, tension & compression, flight, and much more. Each activity also includes opportunities for personalization, modification, and expansion allowing students to use and test their own ideas and imagination. Comes with a full-color, illustrated 40-page workbook. *You need to supply only scissors, a pencil, and water.*