



4-H STEMonstration Guidelines

One important way scientists and engineers share information about their discoveries is through presentations. Sharing about an experiment you did or something you designed and built, like a Mousetrap Car, is a great way to practice presenting. STEM stands for Science, Technology, Engineering and Math, and demonstrations about STEM subjects are called STEMonstrations. A STEMonstration is just like a 4-H Demonstration and follows the same basic guidelines. It should tell about a familiar STEM topic, usually something you have studied, experiments you have done or something you have designed and built. STEMonstrations are evaluated using the STEMonstration Scoresheet.

A basic STEMonstration should: (Mousetrap Car Example)

- Tell what you did and why you did it.
- Tell how you did it. – Include things like
 - What materials you used to build a car
 - the steps you took to build it and how it works
 - how you designed and built it
 - how you modified and tested your car
 - Tell what worked and what didn't work
- Show what you did
 - Include models of your car both first and final models, if possible.
 - Include a poster with diagrams that show what you did or what you learned
- Tell what you learned
 - What observations did you make? how did your car perform?
 - What did you discover?

Building a Simple Mousetrap Car

The following steps are a guide to build a simple mousetrap car.

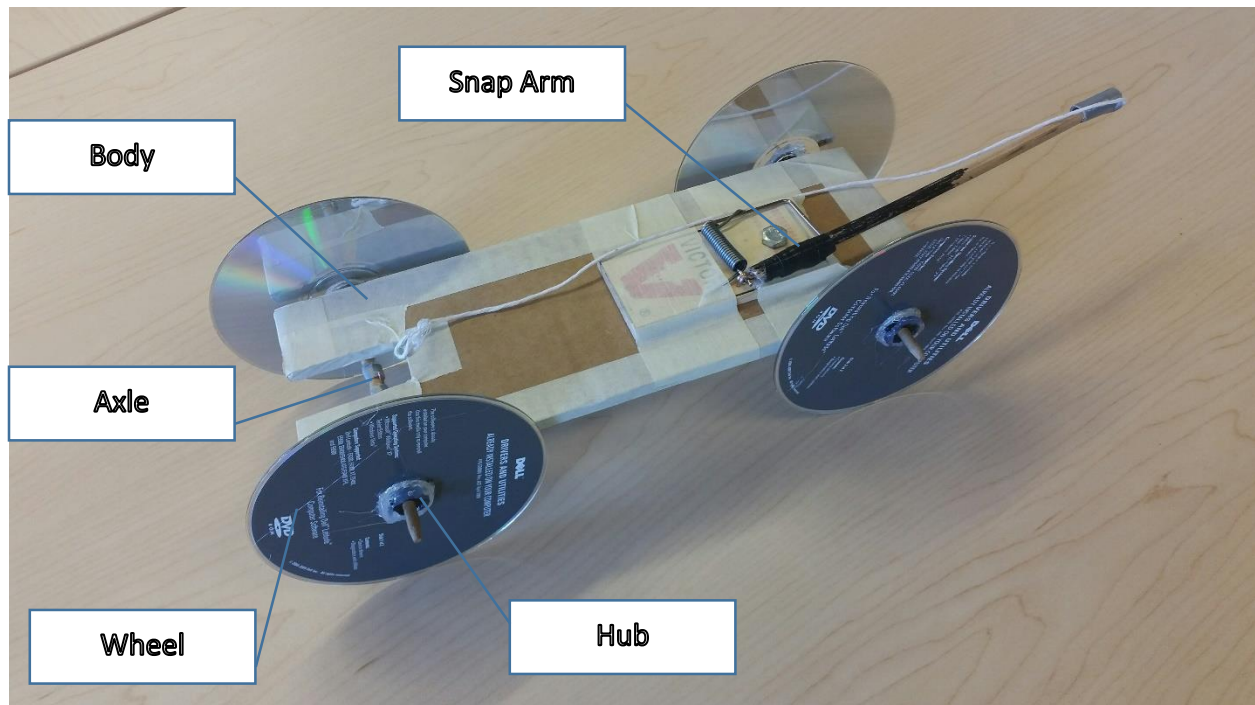


Figure 1 Basic car design

Materials (for a single car)

- 2 pieces of Cardboard (4" x 10") many dimensions will work, but this is a good starting place.
- 4, DVD's (old used ones work great or new black ones from an office supply store)
- 4, 1/4L (19/32") Beveled Faucet Washers (found at most hardware stores in the plumbing dept.)
- 2, 3/16" Dowels - 6" long (these will need to be longer if you use wider pieces of cardboard)
- 1, 1/4 inch dowel, 6 – 12 " long
- 2, Straws
- Tape – Masking & Duct
- zip ties (an assortment of 4" & 8" works well)
- String
- Hot Glue
- Scissors
- Something to cut wooden dowels

Step 1 – Cut a rectangular notch (about 1" x 2 ") on the short side of each piece of cardboard so that the notches overlap (Figure 2).

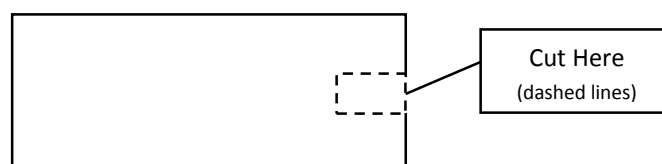


Figure 2 Cutting the cardboard pieces

Step 2 – Place the two pieces of cardboard on top of each other and tape them together to make a double thick piece of cardboard. Make sure the notches line up as in Figure 2.

Step 3 – Cut 3 sections of straw to fit on the body of the car like in the illustration below. Glue them in place using a glue gun (Figure 3). This will be the underside of the car.

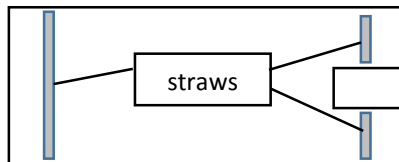


Figure 3 Attaching the straws

Step 4 – Glue the mousetrap in place on the topside of the car with the glue gun. Be sure the closed snap is facing away from the notch in the cardboard. See Figure 1 for placement.

Step 5 – Use 2 zip ties to secure the $\frac{1}{4}$ inch dowel to the snap arm and reinforce with tape or hot glue (Figure 1).

Step 6 – Glue the faucet washers into the center of the DVD's. Be sure to use a generous bit of glue to make sure they hold.

Step 7 – Place the $\frac{3}{16}$ " dowels into the straws and press the wheels onto each end.

Step 8 – Attach a 4" zip tie to the center of the axle exposed by the notch in the cardboard, and cut it short, about $\frac{1}{4}$ inch. This is the hook for the string. A dab of glue will help keep it in place.

Step 9 – Tape a piece of string to the end of the $\frac{1}{4}$ inch dowel. On the other end tie a small loop. It should be long enough to reach the hook on the rear axle.

Your car should look something like Figure 1. Hook the Loop over the zip tie hook on the rear axle and wind the wheel up. Place the car on the floor and let it go. You will likely have to tinker a bit with it to make it run smoothly.

Website and Video Suggestions for Building Ideas

1. This video shows a similar design:
Mousetraps in Motion - Sick Science! #087
<https://www.youtube.com/watch?v=mVNFxIEMWvw>
2. This video shows a different design:
Let's make a Mouse Trap powered Car <https://www.youtube.com/watch?v=8BN-zdrd8pw>
3. The Doc Fizzix Website has lots of super helpful information on the science, building and racing of Mousetrap Cars. They also sell Mousetrap Car kits. <http://www.docfizzix.com/>
4. [A quick Google search will also turn up dozens of other videos and websites](#)