

RUBBER-BAND POWERED CAR

Car Building Instructions



Instructions for the building a rubber-band powered car are provided here.

https://video.deakin.edu.au/media/t/0_301m4wb4

The resulting car can be used to investigate the physics concepts of Newtons First Law, friction, and how the potential energy of a stretched rubber band is converted into kinetic energy as the car is propelled forward.

The design allows for students to adjust various sections of the car to test how different weight, rubber-bands, wheel friction can impact the speed and/or distance travelled of the car.

Materials	Tools
Milk carton Drinking straws Paddle pop sticks Bamboo skewers Rubber bands (multiple length and thickness variation where possible) Toy truck wheels (multiple size variations) Machine washers 1/8" (or suitable size to fit bamboo skewers) Textured tape (e.g. duct tape, cloth tape, electrical tape)	Ruler or measuring tape Scissors Craft knife or blade Hot glue gun Extra hot glue gun glue Stop watch Safety glasses

Various weights Tape Blu-tack	
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Procedure

Making a chassis

1. Start by cutting a milk carton in half lengthways.



2. You will construct two paddle pops to lie on the milk carton and extend 3-5cm past the rear edge of carton.

The milk carton used measured 12.5cm lengthways so our paddle pops were made 17cm in length



Note: The paddle pops must extend past the rear enough to allow the notch on the rear axle enough room to spin.

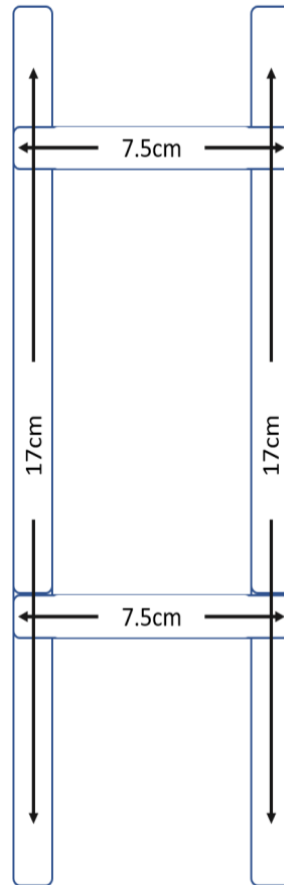
3. You should reinforce the frame by measuring and cutting 2 paddle pop sticks and gluing them to the two longer paddle pop sticks.

The distance between the two long paddle pops must be equal to the width of the carton.

The milk carton used here measured 7.5cm across and 12.5cm lengthways.

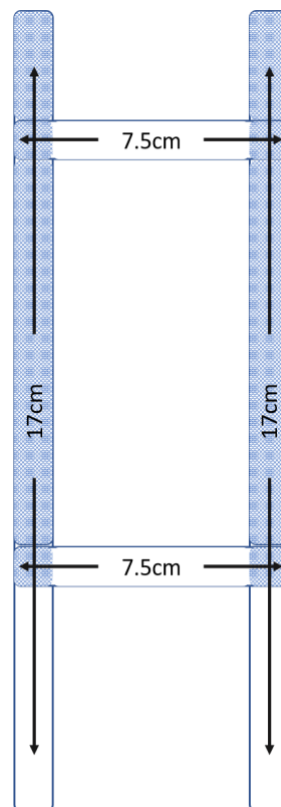
Therefore, the frame consisted of:

- 2 x 7.5cm paddle pops
- 2 x 17cm paddle pops



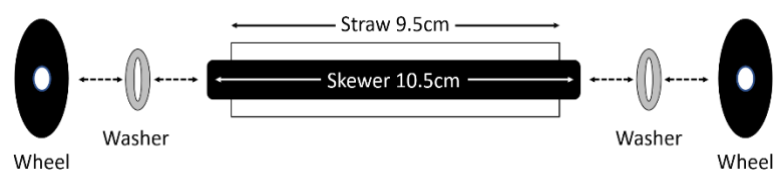
4. Glue the frame to the milk carton. You should only glue the long sides, as shown by the shaded sections in the diagram.

The horizontal paddle pops are left unglued as that is where the rubber band/s will be anchored.



Making the Front Axle and Wheels

1. You will cut one skewer 10.5cm in length and one straw 9.5cm in length with scissors.
2. Then you will insert one end of skewer into wheel, thread washer, straw, add another washer onto skewer and insert exposed end of skewer into another wheel. As seen in diagram.



Not drawn to scale.

You should make sure there should be little gap between wheel-washer-straw. A large gap will make the wheels wobble, no gap the straw will impede the wheels turning. Extra washers may need to be added to reduce the gap.

3. Glue axle onto the front of the frame so the wheels are equal distance from the chassis

Make sure you leave a small gap between the paddle pop stick and straw to thread a rubber band through, as shown in the image.

Note: The rubber band is only looped around the paddle pop stick, not the straw.



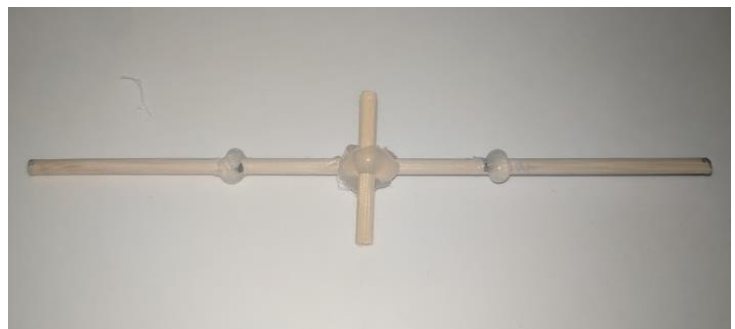
Making the Rear Axle and Wheels

1. Cut one skewer 10.5cm in length and one skewer 2.5cm in length using scissors.
2. Using a ruler measure and mark the middle of the 10.5cm skewer.
3. Using the hot glue gun, glue the 2.5cm skewer onto the middle of the 10.5cm skewer to make a notch, as seen in the image.

This notch will take a lot of stress so ensure it is secure by gluing all sides. Make sure you wait until glue is fully dry until proceeding to the next step.



4. Measure and mark 2cm either side of the notch. Glue all the way around the skewer to form a small barrier. This is important as the rubber band will be wound up in this space.



5. You will then cut two straw pieces 2cm in length using scissors.

6. Assemble the rear axle.
You should insert one end of skewer into wheel, thread washer, straw, then add another washer onto skewer on the left of the glue barrier. Repeat on the other side, as seen in the image.

Ensure there is little gap between wheel-washer-straw-glue.

A large gap will make the wheels wobble, no gap the straw or glue will impede the wheels turning.

Extra washers may need to be added to reduce the gap.



7. Now you will place rear axle onto frame and make sure the notch has enough room to spin without touching the chassis or frame. Wheels should be equal distance from chassis.

When lined up correctly, glue rear axle in place using hot glue gun. To prevent slippage, also glue the wheels to the skewer.



8. Loop the rubber band over the notch and wind up.

When released the car will be propelled forward.

Note: Ensure when you are winding the wheels are being rotated back so that when released the car moves forward.



Finished!

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