



A CAR THAT ROLLS



MATERIALS

CAR

Wheel & Axle

- Wheels (make from cardboard, bottle lids, or use Lego wheels)
- Straws OR Skewers
- Tape

Frame

- Popsicle sticks

Body

- Construction paper OR a small box
- Cargo (1 - 6 items that will fit in the body).



RAMP

- Blocks OR Books
- Piece of wood OR cardboard
- Measuring Tape

Build the ramp by stacking books and placing a strip of cardboard on top.

Toy cars use simple machines to create movement. In this activity, use science to build a car that rolls. After your car is built, use math to calculate the car's speed.



BIG QUESTION

How can we design a car that rolls?



Step by step activity instructions on next page.



BONUS QUESTIONS!

How does the load of the car affect the distance it travels? How does the load of the car affect how fast it travels?

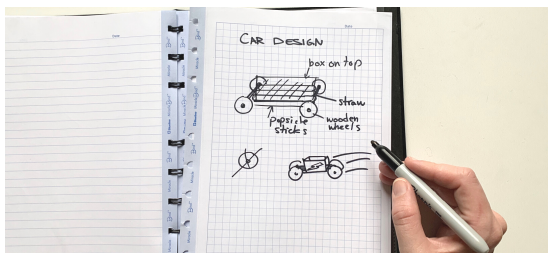


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PREPARE THE MATERIALS

1. Draw the plan for your car.



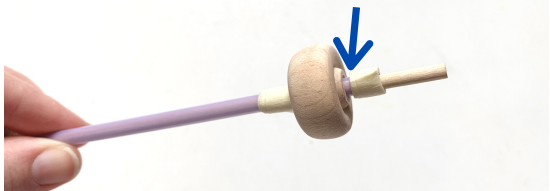
Questions to consider: What shape will it be? Why? How will you make the wheels roll?

2. Explore the materials. What materials will you use for your design? Why?

Our example uses popsicle sticks for the frame because they are strong, sturdy and easy to attach to one another.

BUILD

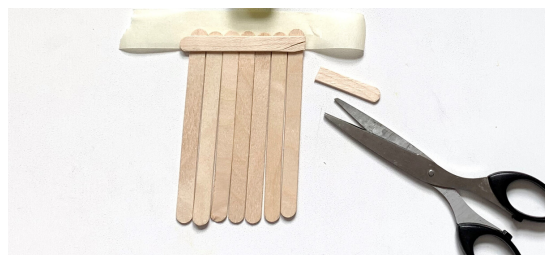
3. Build the wheel and axle. This will let your car roll. This example uses a straw and a wheel. A skewer was added inside the straw to strengthen it.



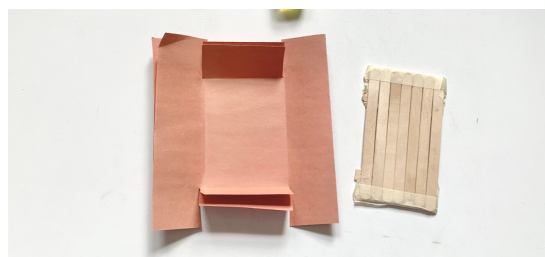
Wrap tape around the straw (axle) on either side of the wheel to secure it. Keep a small space between the tape and the wheel so it can move separately.

BUILD

4. Build the frame of your car.

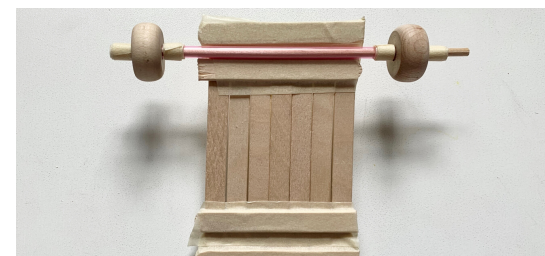


5. Build the body of your car.



ATTACH

6. Attach all the parts together.





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TEST

6. Build the ramp. Put a measuring tape along the ramp.



7. Place your empty car at the top of the ramp. Release your car. How far did your car go?

8. Add cargo to your car. This will increase the **mass** of the car. Release your car again. Did your car go further?

LEARNING CORNER

Wheel & Axle: a type of simple machine. It consists of a bar that goes through the middle of the wheel. This allows the wheel to spin.

Simple Machine: a mechanical device that makes work easier.

Speed: how fast something moves from a start point to an end point.

Load: quantity of materials put into something.

Mass: amount of matter of an object.

EXPLORE

Make small changes to your car or ramp. How do the changes affect the speed of the car or the distance it travels?

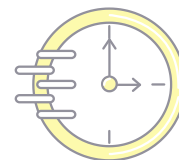
Changes to try:



- bigger wheels/ smaller wheels
- higher ramp/lower ramp
- more wheels/less wheels
- texture on the ramp (ex. add bubble wrap)

EXTEND

Calculate the speed of the car!



1. Record the time it takes for your car to travel. Start the timer when you release the car. Stop the timer when the car stops.
2. Record the distance traveled. Use a measuring tape to measure from the start of the ramp to the location of your car.
3. Calculate the speed.

$$\text{speed} = \text{distance} / \text{time}$$

Tip: Use centimetres and seconds as your unit of measurement.