Minds in Motion

Drip - Drop Cruisers

What's The Plan?

Humans have been harnessing the power of water for centuries. Thousands of years ago, farmers used a *water wheel* to power the gear to grind their wheat into flour! These days engineers attach huge *water wheels*, hidden in dams, to generators. When the water spins the wheel, also called a *turbine*, the generator spins to create electricity! This electricity is used to power houses, businesses and much more, but what if we could use it to power cars? Your challenge is to do just that and create a water-powered car!

We'll show you how we made ours below, you can follow along or use the *engineering design process* to create your own prototype!

Important Note: This is a project that may require some adult help, since it uses hot glue guns, requires cutting skewers, and can be a bit tricky to build. It is a project best suited for older inventors who are looking for a bit of a challenge!

What You'll Need:

Here's a list of everything you'll need! Don't have something exactly? Get creative! Some of our suggested swaps are listed in Grey.

For the *Turbine:*

- Between 4 and 6 small bottle caps | Spoons with the handles cut off, Small cups cut in half, anything that is small and can 'scoop'
- 1 skewer | Coffee stick, Pencil, Something long and skinny to be your turbine's *axle*
- 1 large bottle cap | The bottom 3 cm of a paper cup, anything that you can poke an *axle* through and glue your scoops to!
- 1 more small bottle cap | Playdough, anything that you can poke an *axle* through and helps stabilize your turbine!

For the Wheels:

- 3 CDs | Paper plates, Large cardboard circles, anything that can roll and you can poke an *axle* through!
- 6 small bottle caps | Modelling Clay, buttons with holes in the middle, anything you can poke an *axle* through and will help stabilize your wheels!

For the Car Structure:

- 1 Plastic Straw | Paper Straw, paper rolled into a small cylinder, something you can fit your *axle* through.
- 6 - 8 popsicle sticks | Skewers, Straws, anything sturdy you can frame your car with
- 2 Wooden Skewers | Coffee sticks, Pencils, anything long and skinny to be your wheel's *axle.*

For the Water Tower:

- 1 Plastic Bottle with the lid | Paper cup, plastic bowl, anything you can poke a hole in the bottom of and use as a water tank
- 4 Popsicle Sticks | Skewers, Straws, something tall that will support your water tank
- 1 Plastic Straw | Paper Straw, …, anything water can flow through
- 2 More Popsicle Sticks | Skewers, Cardboard, anything you can rest your water tank on

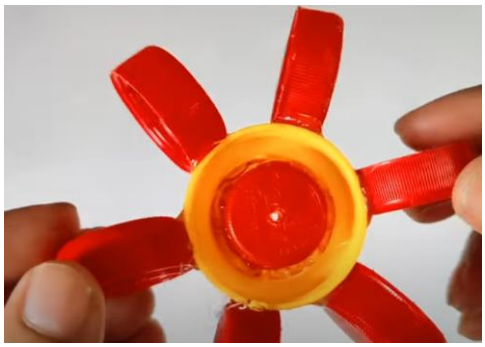
Tools You'll Need:

- Hot Glue | White Glue, Sticky Tack, Tape, anything sticky!
- Scissors | Screwdriver, Pin, anything to poke holes through the bottle caps with!
- Pliers | Scissors, Exacto Knife, anything to cut skewers and popsicle sticks with!

What To Do:

Creating the Turbine:

- Use hot glue to attach between 4 and 6 bottle cap lids around a slightly larger lid, such as one from a milk jug. Try to have the lids spaced out evenly, and have the flat part of them all facing the same direction.
- Hot glue another, smaller bottle cap lid onto the inside of the larger lid, so that both lids have their flat parts facing out.
- Make a hole going through the very center of the two lids.
- Poke a skewer through your milk jug/bottle lid hole.

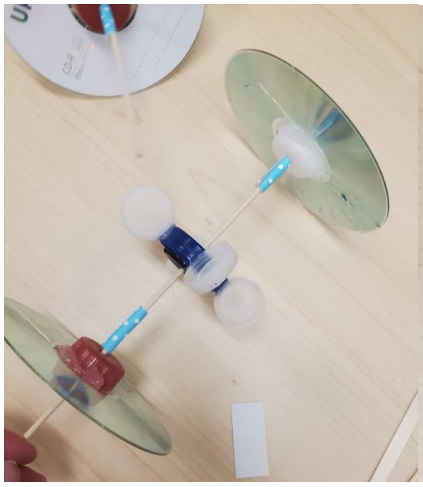


Creating your Wheels:

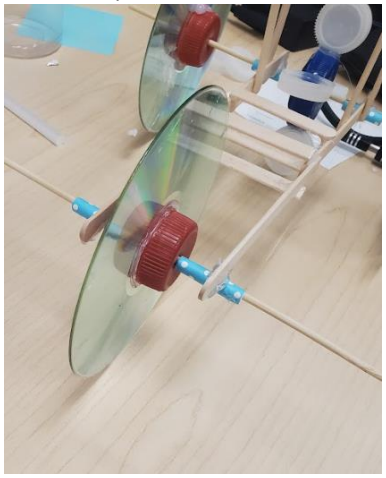
- Take 2 bottle cap lids, and with the help of an adult hot glue them onto either side of a cd, so that they cover the holes and have the flat top of the lids facing outward, repeat this step 3 times to create 3 cd wheels with bottle caps glued onto them.

Creating your Car Structure:

- Hot glue 2 popsicle sticks together so they make one longer stick, then repeat one more time so you have two long popsicle sticks.
- Cut a straw into 4 small pieces.
- Place your popsicle sticks down so that one edge is facing up, and hot glue one piece of straw to one edge of each, creating a place that will allow your skewer axle to spin.
- Stick the popsicle stick through the straw pieces, so that you have created an axle for the lid to spin on.
- Take two CDs, and push one onto each end of the skewer.




- Take your last wheel, and poke a skewer through it. Attach one straw piece to each end of the skewer and hot glue it into place so it won't fall off.
- Hot glue the remaining ends of your popsicle sticks to either side of the skewers to create your final wheel on your car.

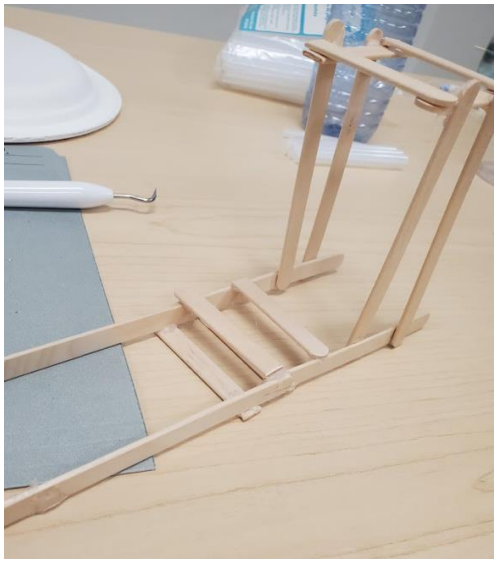


- Trim any skewer ends that are sticking out.

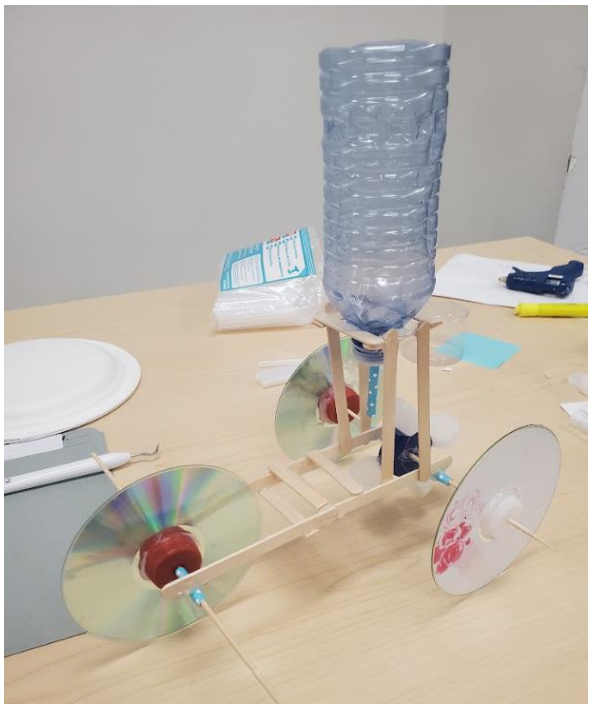
Creating the Water Tower:

- Cut two popsicle sticks so they are the same length as the distance between your car popsicle sticks and hot glue them on so they are about 1 inch apart.
- Flip the car over and repeat the same steps on the bottom of the car, so that the popsicle sticks are over top of one another.

- Cut two popsicle sticks in half, and then hot glue them together to make a square.
- Hot glue one of each of the 4 popsicle sticks onto the corners of the square you made.
- Add a drop of hot glue onto the other side of each of the popsicle sticks to attach your square shape to the car, so that one end is between the popsicle sticks laying flat, and the other end is around where the propeller is placed.



- Cut a water bottle in half.
- Take the water bottle lid and make a hole in it, then stick a straw through it and hot glue the end of the straw to the lid. The straw's end should be flat with the inside of the lid.
- Screw the lid onto the bottle and place this part of the bottle onto the square base you made, hot gluing it into place.



- Fill your bottle with water and watch your car go!!!

Check out this link for a video showing what your car should look like: [How to Make Water Powered Car | DIY Water Powered Car Project | Science Project | @Creative fest (youtube.com)]

Why Did We Do It?

Here is a list of important words we use during the project!

- *Axle:* A stick that a wheel revolves on
- *Propeller:* A wheel with paddles on it that rotates to move an object, like a car
- *Hydropower:* Using the movement of water to provide power for machines, such as cars
- *Water Wheel or Turbine:* A wheel that is covered in paddles. When water falls onto the paddles the whole wheel spins, this energy can be harnessed by attaching the wheel to a generator or gear!
- *Engineering Design Process:* This is a helpful tool for planning engineering projects.
    - You start by **Defining** the problem, then **ask** a whole bunch of questions about the problem. Now that you know what you're trying to solve, you can start brainstorming as many solutions as you can!
    - Next you **Imagine** the possible solutions you came up. How do they work in your imagination? Could that happen in the world today? Keep imagining solutions until you discover the one you think is the best possible solution for now.
    - Now it's time to **Plan** and **Prototype** your favourite idea, first, break your solution into steps that you can work through, then get to work on those steps building your prototype!

- **Test** your prototype! Watch what happens and notice when it is or isn't what you expected!
- Finally, **Improve** your prototype! You can keep rebuilding your prototype better and better after each test. The best engineering projects have several prototypes first!

How Did It Go?

We'd love to hear about all the amazing STEM projects you're doing! Show us your finished projects on any of the following social media platforms by tagging us!

Twitter: @MyMindsInMotion
Facebook: @mindsinmotion2014 || @ucactiveliving
Instagram: @ucalgaryactive

SCAN ME

Let us know how you felt about the project! Please click here or scan the QR code above to fill out a short survey!