

Here are the materials and tools you'll need to make the pop pop/ putt boat

- You'll need access to patterns printed out from [sciencetoymaker.org](http://sciencetoymaker.org) It's important that the patterns not be re-sized. Choose the print options that say something like "Actual Size" or "Scale: 100%." And there's a scale check for 2 inches and 5 centimeters
- an aluminum beverage can--it should not be dented, or even have been dented and pushed back out
- high quality scissors
- While a single edge razor or X-acto is not essential, it is convenient
- Tape to hold things temporarily. I like masking tape because it is easier to get off than clear tape.
- a sharp corner--usually this will be the sharp corner of a table top--to fold the aluminum sheet. The corner must be sharp like these; not rounded like these. If you can't find a table with a sharp corner, sometimes the inside of a drawer or even a door frame works.
- A plastic identification or money card
- ruler--inch or metric.
- Related to that, you need something hard and flat to flatten aluminum folds. If the ruler you use for measuring is made of wood, you could use that. If the ruler you're using is plastic like this it won't work for flattening because it's not flat, so you'll need a block of wood or something.
- some kind of marker
- 3 Flexible plastic straws. I have found that the 1/4" diameter--which is 6mm--seems to work better than the thinner kind.
- 5 minute, or quick set epoxy, which is a 2 part glue that you mix up thoroughly. It comes in double syringes like this, or tubes like this. You can use an epoxy with a longer cure time but you'll have wait around more.
- a little stick like a wooden match stick to mix and apply the epoxy.
- soap, towels for clean up
- a container that holds water, for finding leaks.

- Scrap thin cardboard--an old cereal box works well.
- A low temperature hot glue gun. I know this sounds like an oxymoron, but the big 40 watt kind is too hot--it will ruin the plastic straws. You need the lower power, cheaper kind with smaller glue sticks. This kind is much safer, too, it's hard to burn yourself.
- thin birthday party candles are the best fuel for the steam engine. Lots of people ask me about the low, wide, metal encased so called tea candles. I think they do not provide enough heat for maximum speed, especially in outdoor conditions, but I have gotten feedback from people who have used tea candles and they're happy with them.
- aluminum foil

When you've finished and tested the engine you can decide what kind of boat to make for it. Quickest to make is a simple flat boat.

- For that I recycle thin foam trays that meats, poultry and vegetables come in.
- You'll also need some coins and rubber bands.

Alternately--or later when you have a little more time--you might decide to make a more 3 dimensional boat. For that you'll need

- a half gallon milk or juice carton. A friend from Australia uses the similar, metric 2 liter beverage carton.
- And if you make this kind of boat hull you'll need a stapler.

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