

Balloon-Boat



What you will need

- styrofoam (20 cm x 10 cm x 2 cm)
- knife or thermo saw
- front part of a ballpoint pen
- balloon
- parcel string
- scissors
- drill

How to build it

1. Work on the styrofoam with a knife or a thermo saw in such a way that it has the form of a boat body.
2. The front part of the ballpoint pen (nozzle) is put half of it into the balloon and is wrapped in string firmly and is knotted.
3. Now fasten the nozzle at the rear end of the boat record. In addition lay them concentric on the boat record and bore two holes in it (on the left and on the right beside the ballpoint pen shell) and fix the nozzle with a piece of string (or wire). For a better stability you can fasten the nozzle with two string pieces, too. You should pay attention to the fact that the nozzle just out some centimetres above the back, what allows you to blow up the balloon using the nozzle.

How it works

The air streaming out under high speed causes a reaction in the opposite direction. Besides, the nozzle dives not into the water, but rises in the air.

Hints

The balloon should not be inflated too strongly not to impair on the one hand the stability of the boat and not to let become too big, on the other hand, the air resistance.

Candle Boat



What you will need

- styrofoam (20 cm x 10 cm x 2 cm)
- knife or thermo saw
- scissors
- aluminium bowl (grill bowl, cake bowl, ashtray, ...)
- 2 candle lights
- drawing pins
- matches

How to build it

1. Work on the styrofoam with a knife or a thermo saw in such a way that it has the form of a boat body.
2. Cut out a rectangular stripe (about 8 cm x 18 cm) from the aluminium bowl.
3. Put two tea lights under the aluminium stripe.

How it works

The hot flame gases of the burning candle flow upwards and hit on the aluminium stripe. A part of the besides working strength is directed forwards and speeds up the boat slowly. The principle resembles a Christmas pyramid.

Hints

The aluminium stripes are very susceptible to wind of course. Therefore, you should pursue the boat only sheltered from the wind. If the aluminium bowl has slits (often with grill bowls), one must seal this before.

Jet of Water - Boat

TYPE 1



What you will need

- big sturdy plastic bottle with screw cap (e.g., 1.5 litres)
- glue
- adhesive tape
- PVC tube (4 mms of inside diameter, length about 18 cm)
- office tacker
- drill
- empty battery
- bicycle valve (Dunlop valve)
- air pump

How to build it

1. In the screw cap bore a hole which must be so big that the PVC tube sits tightly in it.
2. The PVC tube is put up to half by the hole of the screw top; in addition, seal the contact place with glue.
3. The tube must have a small bend (on the bottle inside). Mostly he has this by itself. If not, put some weight at the end (e.g., with a mother) or bend it in hot water into shape.
4. Now, make a nozzle from the outwardly pointing end of the tube piece. Simply use an office tacker (clip has to be orientated parallel to the tube). It is enough fixing only one half of the clip to the tube. Cut excess wire (the second half) away.
5. The screw top with the tube piece is screwed on the bottle. At the place, where the tube bends inside down, fix a battery on the outside of the bottle. She serves only as a weight.
6. In the belly of the bottle, on the opposite site of the battery, bore a hole (at a smooth place) that must be so big that a normal bicycle valve fits tightly. Also this connection is sealed with glue.
7. Before you start the boat, fill the bottle to one quarter with water. Then close the bottle and pump air in using an air pump. Besides, the front tube piece must be bended, so that the water does not spray at this moment. Then lay the boat in the water. As soon as the tube is under the water surface, you can release it and the boat drives off.

How it works

The boat is driven by a jet of water resigning from the bottle. So that the water at a very big speed resigns from the nozzle, the air in the bottle must be under pressure. For that you have to pump air into the bottle.

Jet of Water - Boat

TYPE 2

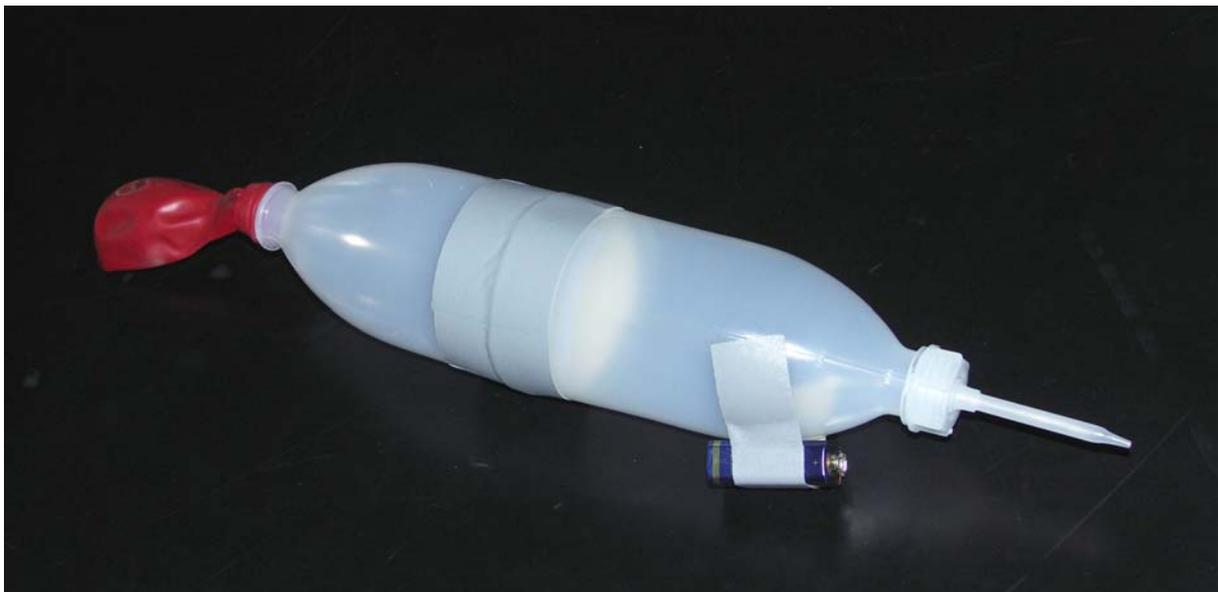
What you will need

- 2 dash bottles from polyethylene (0.5 l)
- adhesive tape
- empty battery
- scissors
- balloon
- knife/cutter



How to build it

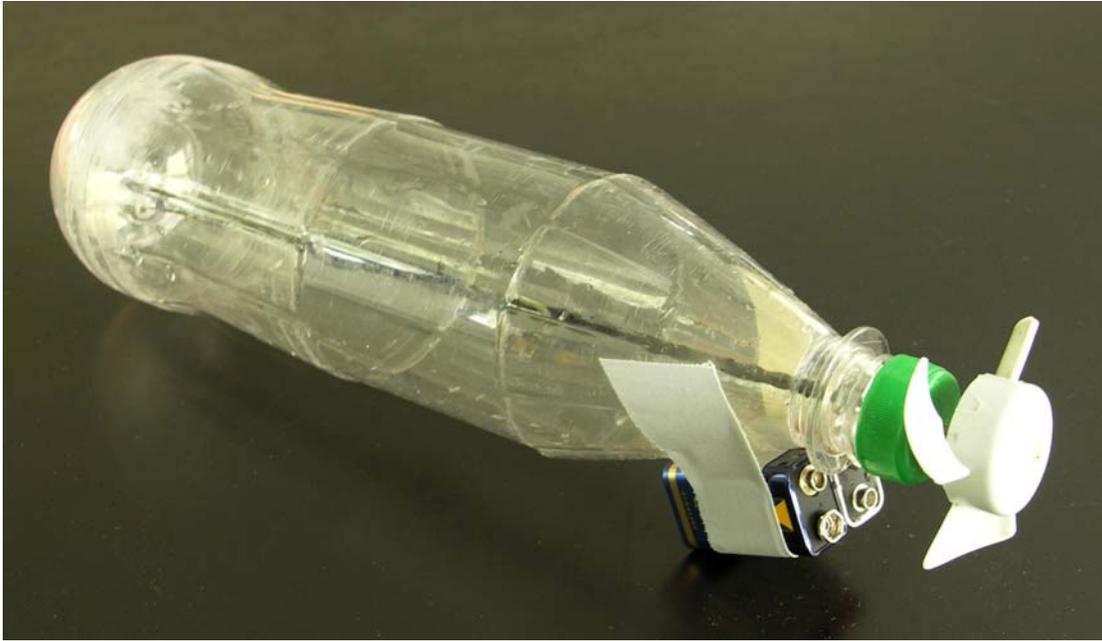
1. Cut both bottles on the bottom.
2. Push the open sides into each other (perhaps, cut in a bit) and wrap adhesive tape around to seal the contact place.
3. Shorten the pipe, so you will get a small nozzle. Put this nozzle in one of both screw caps.
4. The other end stays open, i.e. the screw cap is not required here. There put on the balloon.
5. For starting the boat, unscrew the lid with the nozzle, fill in there some water and then blow up the balloon through this hole. Close the balloon with your fingers. Screws on the nozzle lid again, (if necessary empty the balloon from water). Releasing the balloon the water flows out of the boat and speeds up it.



How it works

The function is the same as of type 1. Just, in this case the increased air pressure results from the inflated balloon.

Rubber Motor - Boat



What you will need

- big sturdy plastic bottle with screw cap (e.g., 1.5 litres)
- more thinly long elastic thread (model construction)
- small ship screw and wave, about 5 cm long (model construction)
- several pearls (or smooth metal point of a ballpoint pen), on the wave suitably
- nail (4 cm) or metal pencil head
- adhesive tape
- drill
- 2 tongs
- piece of parcel string
- empty battery

How to build it

1. Bore a hole in the middle of the screw top which must be so big that the wave can turn easily in it. To prevent a penetration of water in the bottle, however, the hole should not be also too big.
2. Fasten the ship screw well to the wave.
3. Between ship screw and lid put several pearls (or something similar) on the wave to hold the friction low.
4. Behind the lid bend the end of the wave with two tongs to a hook.
5. In the middle of the bottle ground bore a hole. It should have a diameter of about 4 mm.
6. Tie the ends of the elastic thread together. Then fold up the resulted ring so often, until a loop originates, with a length slightly shorter than those of the bottle.
7. With the help of the parcel string (or a hook) "take" an end of the elastic loop and pull it through the hole of the bottle ground. Besides, clamp the other end of the elastic loops in the hook of the wave at the front. Put a nail or metal pencil, fixed with some adhesive tape, on the bottle ground to prevent the loop from moving inside.
8. The lid of the plastic bottle is screwed together.
9. To reach a sufficient sloping position of the boat (the ship screw must lie completely under the water surface), weight the bottle with the empty batteries which are fastened from the outside with adhesive tape. One can also fill the bottle with water, until the suitable draught is reached.

Rubber Motor - Boat

10. After you have gathered the engine by multiple tricks of the ship screw, lay the plastic bottle in the water and release the ship screw.



How it works

The distorted rubber brings the ship screw in rotation. Water is pushed away by the form of the screw to the back. A reaction which drives the boat in the opposite direction originates from it.

Hints

If you don't find a ship screw, you can also use an air-screw from an old miniventilating fan (as in the picture on top) or form one from the metal of a tin (danger - carry gloves!). In this case, use a metal pencil (e.g., bicycle spoke) as a wave.

Instructions to build the "Steam Jet Boat"



What you will need

- an old tin (not too small to make the boat stable)
- an old aluminium cigar tube with a threaded cap
- thread sealing tape
- some uninsulated wire
- a small aluminium cup from a candle
- white solid firelighter (candles are often not hot enough)
- a hammer
- some pliers
- a medium-sized nail
- a needle
- long matches

How to build it

1. With the hammer and the nail poke 4 holes in the upper edge of the tin. The holes serve for the connection of the wire in the tin and must be big enough to put the wire through.
2. Pass a piece of wire through the front hole, bent and tighten it with the help of the tongs. Then lay the cigar tube centrally over the tin, wrap the wire once around the tube and fasten him to the hole on the opposite side. Wrap and tighten the wire at the back in the same way as at the front. When the cigar tube is firmly secured use the pliers to cut excess wire away.
3. In the middle of the screw cap make a tiny hole in the end of the cap using the needle.
4. Lay the aluminium cup with a piece of the firelighter in the middle of the boat.
5. The steam jet boat is complete and can be put on the water surface
6. For starting it fill the cigar tube about one quarter with water and screw the cap on. Then light the fuel.

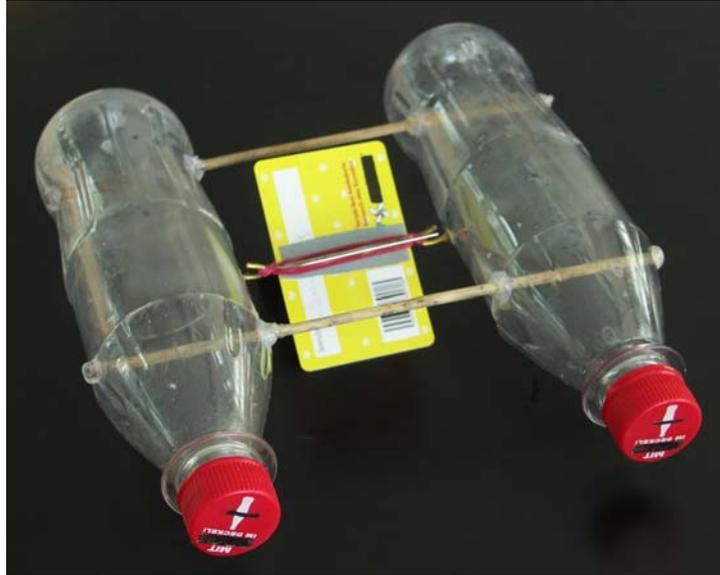
How it works

The boiling water generates a fine steam jet which will give the boat some forward momentum.

Hints

- If water leaks from the cigar tube seal it by using thread sealing tape.
- Be careful: the cigar tube and the steam jet are very hot, even after the candle is blown out!

Shovel Wheel - Catamaran

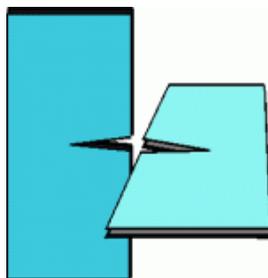


What you will need

- 2 small sturdy plastic bottles (e.g., 0.5 litres)
- 2 wooden sticks about 23 cm long
- glue
- adhesive tape
- drill
- 2 metal hooks
- 2 old telephone cards (or other stable cards)
- thicker rubber ring

How to build it

1. In every plastic bottle bore 2 holes in the upper top and drag (in between let at least 10 cm space) which exactly subtend themselves. The holes should be so big that the wooden sticks can be putted through. Pay attention to the fact that the holes lie with both bottles on the same height and with the same position.
2. Then lay the bottles side by side and connect them with two wooden sticks.
3. The holes are sealed with glue.
4. In the middle of every bottle screw - something above the water level line - a metal hook and seal the place by glue.
5. From two old telephone cards make up a shovel wheel (see picture). The inside edges are stabilised with adhesive tape.



6. The rubber ring is pulled over the shovel wheel and the hooks.

How it works

By much-times tricks of the shovel wheel the rubber twists itself. If one releases the maps, the tense rubber brings the shovel wheel in rotation and speeds up thus the boat.

Construction of a simple thermo saw

For the production of several boat bodies from styrofoam the construction of a thermo saw is worthwhile. In principle, a thermo saw exists of a piece constantan-wire, in which flows an electric current. Besides, the wire warms itself up so strongly that one can cut with it styrofoam quite easily. To hold the wire always taut, clamp him anyhow (e.g., quite simply between two thin wooden strips which you can stretch with your hand). As a voltage regulator offers a transformer (e.g., 6 V). Good ventilation is recommended.

Material

- 2 wooden strips
- nails or drawing pins
- constantan wire (about 20 cm long; from the electronics specialist shop)
- small transformer
- perhaps some bell wire

