

Cartesian diver

Create a diver that you can control with a squeeze.

AGE
7+ yrs

TIME
20-40 min

water

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What do you need?

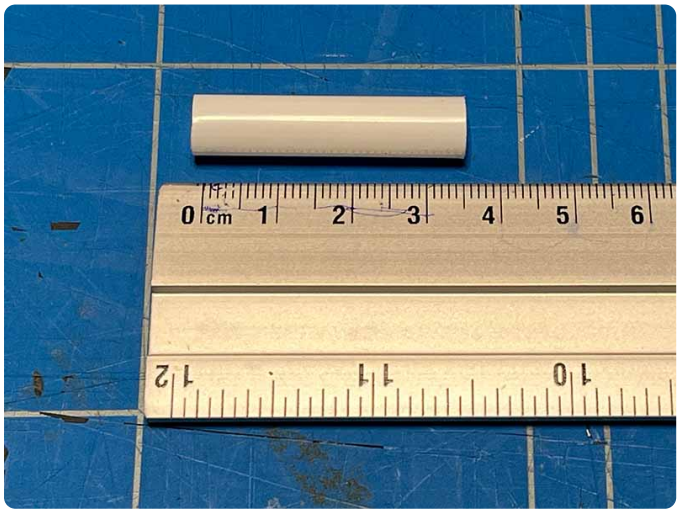
MATERIALS

- [ ] PET bottle
- [ ] Shrink foil
- [ ] Plastic straw / tube
- [ ] Fishing weights

TOOLS

- [ ] Scissors
- [ ] Candle / Lighter
- [ ] Pliers
- [ ] Glue gun
- [ ] Metal sieve
- [ ] Waterproof markers
- [ ] Heat gun
- [ ] Tub
- [ ] Towel

Steps

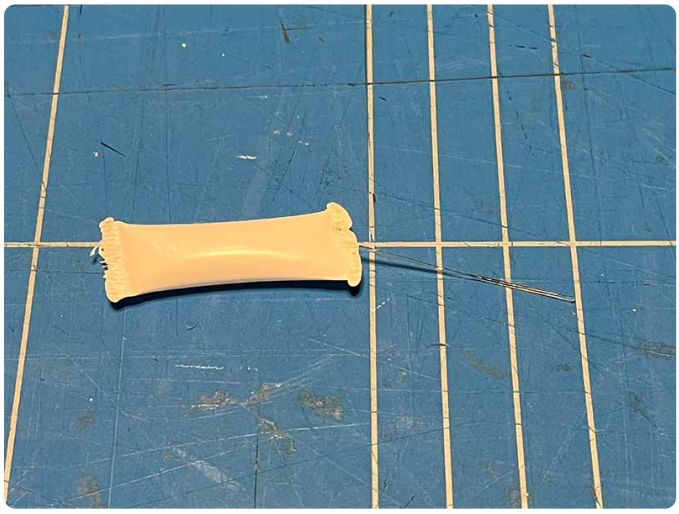


1 The float

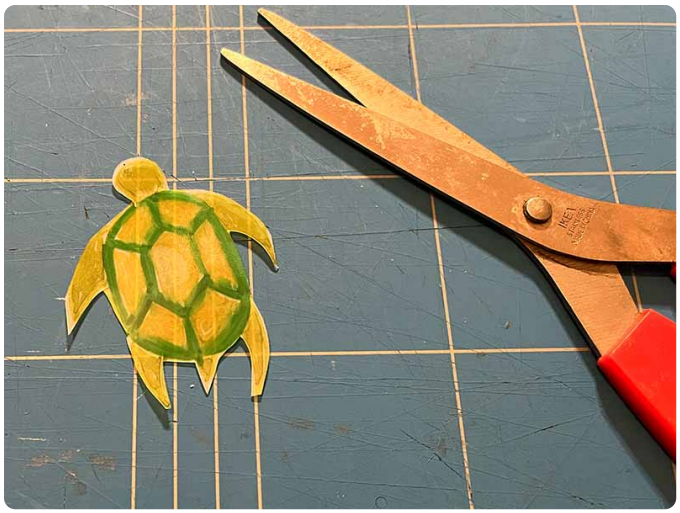
- Cut a 3.5 cm long piece form the straw / tube.
- Heat one side with the lighter and squeeze them together to make a seal.
- Cut 7 cm of the nylon wire.
- Tie a knot on onde end of the wire.
- With 2 people, heat the other end of the tube. Stick the knotted end of the wire inside the straw/tube and squeeze with th epliers to make a seal.







1 The float — *continued*



2 The diver

GOOD TO KNOW
For normal bottles with a small opening, use a 6x4cm /2.5x1.5 inch piece of whrinkfoil. If you have a wider opening you can go bigger.

- Draw your diver or sea animal on the shiny side of the plastic.
- Use scissors to cut out your design.
- If you want, you can make a design for both the front and the back.



3 Shrink your design

- Place your cut design in the metal sieve and heat it up with the heat-gun.



4 Glue the diver to the float

- Using a very small amount of hot glue, glue the shrunken plastic design to the float. Make sure the wire from the float is at the bottom.



5 Add weights

WATCH OUT
Lead is not a healthy substance. Make sure you wash your hands after handling the lead weights.

- Add weights to the wire until your creation barely floats.
- You can test in between in the big tub of water.





6 Fill the bottle

- Remove the label from the plastic bottle.
- Put your float inside.
- Completely fill the bottle and put the cap on.
- Test your diver. Squeeze the bottle as hard as you can. The diver should sink down. Release your grip and the diver should ascend again.
- Adjust the weights to fine-tune your diver.



7 Decorate your bottle, and done!

- Dry the bottle and use the markers to decorate the outside of your bottle.



8 How does it work?

GOOD TO KNOW

When you squeeze the bottle, you're also squeezing the air inside the float. This makes the float a bit smaller. The smaller float hasn't got enough bouyancy to keep it afloat (Archimedes' principle), so it sinks. When you release the pressure, the float goes back to its original size and floats again.