# Bathtub Boats

## Upcycled Crafts for Kids (and their grown-ups)


# Plastic Egg Submarines!

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01

# GATHER

Plastic eggs, paint, paint brushes, paper straws, coins or other small but heavy objects, tape and glue or putty.

We used marine putty to seal holes and attach periscopes, but if you don't have any at home, hot glue or school glue works as well!


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02

# PREP

Cut paper straws into thirds for periscopes. Use tape (on the right) or putty/glue (on the left) to seal holes if you want to keep your Sailors dry.

We sealed two eggs and left two eggs open to conduct a little experiment on sinking/floating with our six year-old Bathtub Boat Builder.

**You can find more information on the experiment on the last page.**

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03

# PAINT


To build your very own Becuna (SS-319), mix 2 parts black with 2 parts white and 1 part blue to achieve her bluish gray color.

For the rest of your submarine designs, If you don't have paint, permanent marker works well too!

**Pro-tip: Avoid tears by avoiding washable paint! Our gray Becuna didn't stain the table, but also turned back to egg-blue as soon as she was submerged in the tub. Very sad.**

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04

# BUILD

Bend the paper straws slightly, at about 1/3 of the way down.

Add glue or putty to the bottom of the straw and top of the egg to attach the periscope. Press the periscope in place for the recommended drying time.

**Pro tip: If you're adding sailors, money or other objects to your submarines, make sure not to attach your periscope on the seem of egg.**


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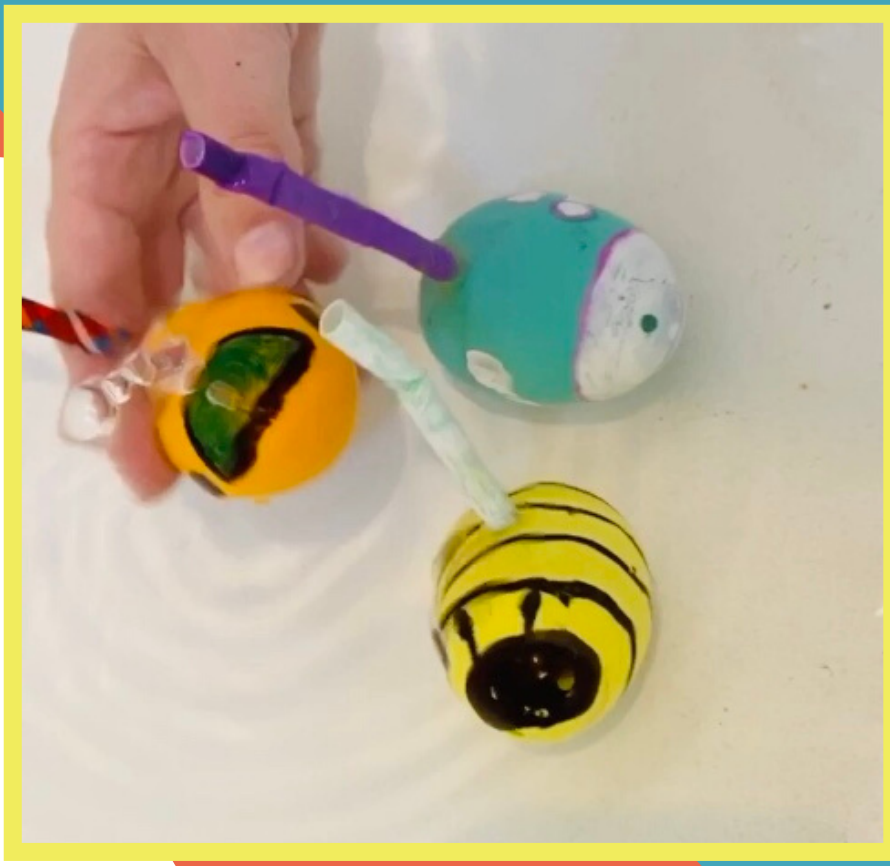

05

# CRUISE

Launch your submarines where ever you find water! Use #bathtubboats on social media to show us your creation!

**Pro tip: If your submarines aren't sinking, tilt them forward to replace the air inside with water. This transfer of ballast is what allows real submarines like Becuna to move up and down in the water.**

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# EXPERIMENT

Which plastic egg submarines will sink and which plastic egg submarines will float?

We know that real submarines, like Becuna (SS-319), rise and sink in the water by controlling their buoyancy with ballast and trim tanks. To sink, the tanks are filled with water, and to rise, the tanks replace the water with air.

We decided to conduct a small, kid-friendly experiment on buoyancy and ballast using our five plastic egg submarines.

Before decorating your vessels, seal the holes on two out of the five submarines (see Step 02: Prep).

Using coins or other small, heavy objects, fill one sealed submarine and one unsealed submarine. We found that 10 quarters, 2 septa tokens and five pennies in each did the trick.

Leave the other sealed submarine and one unsealed submarine empty.

Fill the final unsealed submarine with half as many coins.

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# RESULTS

Once your subs are ready to launch, make sure you launch them at the same time.

We found that both the sealed sub filled with coins AND the unsealed sub filled with coins sank almost immediately.

The unsealed sub half-filled with coins sank slowly and steadily.

The unsealed sub that was empty sank after about fifteen minutes of turbulent tub time.

The sealed sub that was empty never sank.

Our six-year-old Bathtub Boats Builder concluded the following:

- Air is lighter than water.
- Stuff that is heavier than water sinks. Filling any vessel too much could sink it (like with the 17 coins).
- Filling the sub helps accelerate the sinking process, because there is less air to displace with water (like with the sub that was half-filled with coins).
- If we were designing a real submarine, we should fill it with stuff and add tanks to let water in and out as needed.

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