

 **adafruit learning system**

3D Printed D20 Molds

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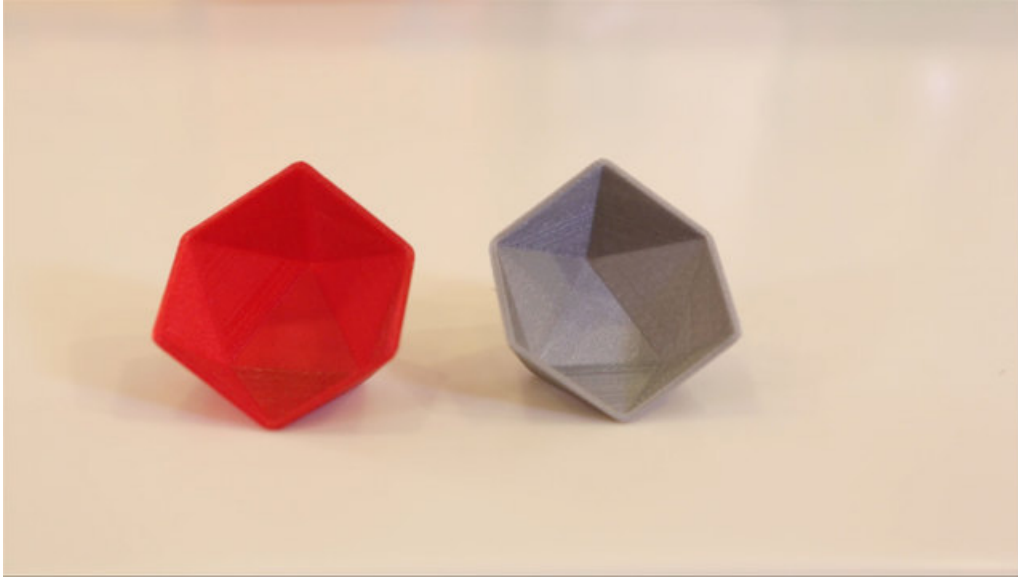


Last updated on 2018-08-22 03:52:23 PM UTC

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Overview



This year's Valentine's day, we're 3D printing molds to make DIY bath bombs.

This is a fun way to make custom bath bombs, soap or even chocolates just in time for that special Hallmark holiday.

We've remixed the design from our previous [talking D20 project \(https://adafru.it/lkC\)](https://adafru.it/lkC) and simplified it a bit so it's easy to mold parts. You can also modify the design if you'd like!



Experiment

Try experimenting with different scents, colors and shapes to use as molds.

You can even use these [8 bit hearts from our chocolate mold project! \(https://adafru.it/lkD\)](https://adafru.it/lkD)

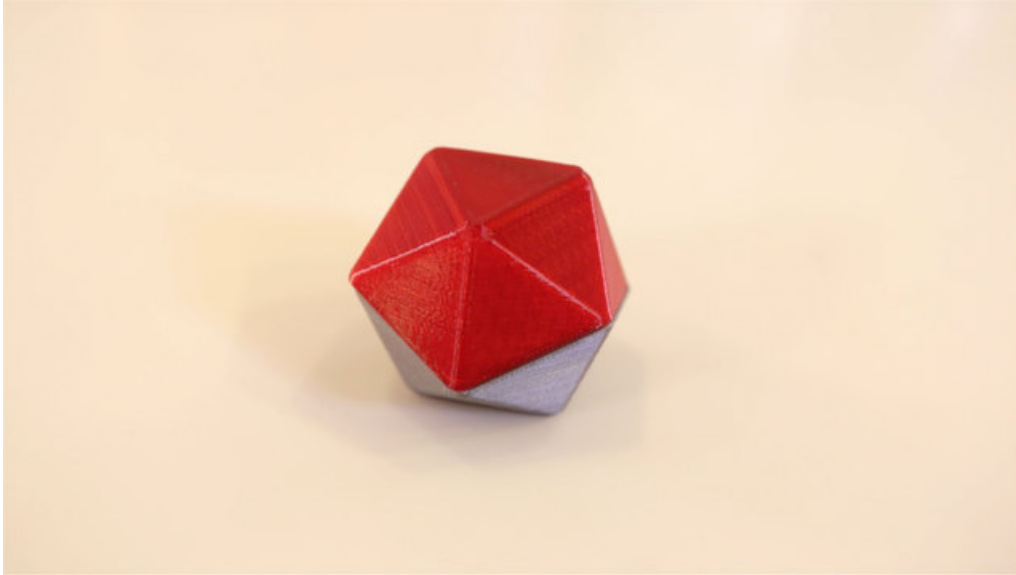


Tools and Supplies

- 3D Printer (<https://adafru.it/doT>) + Filament (<http://adafru.it/2080>)
- 1/2 cup Baking Soda
- 1/4 cup Citric Acid (<https://adafru.it/lkE>)
- 1/4 cup Cornstarch
- 1/4 cup Epsom Salt (or sea salt)
- 3 tsp Castor Oil (or any vegetable oil)
- 1 tsp Essential Oil
- Soap or Food Coloring
- 1tbs Water



3D Printing



Customize The Design

The parts were designed in Autodesk Fusion 360. The design has been made public, and available to download in different formats. If you'd like to use a different CAD software package, you are free to import the files and remix them.

d20-mold-halfB.stl d20-mold-halfB.stl	230c extruder 50mm/s print speed 120mm/s travel speed no heat on bed PVA: 210c extruder 50mm/s print speed 120mm/s travel speed no heat on bed	part are printed with a .4mm nozzle and should take about 30 mins to print each half
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<https://adafru.it/fkO>

<https://adafru.it/fkO>

<https://adafru.it/lkF>

<https://adafru.it/lkF>

Filament Materials

We recommend using PLA material to reduce warping while 3D printing. The parts can be printed in different types of filament, such as ABS, PET or Nylon.

PVA

You could also try using water soluble filament, which will let you print more details and you won't have to demold because the shell will dissolve in water. You'll want to modify the shell thickness to 1 shell to insure the mold will dissolve faster.



Slicer Settings

To slice the parts, we used Simplify3D. We recommend using the settings listed above or use them as reference. We 3D printed these parts on a Ultimaker 2+ 3D printer. If you have Simplify3D, you can download our profiles below.

<https://adafru.it/ldz>

<https://adafru.it/ldz>

Assembly



Ingredients

The main ingredients are baking soda, citric acid and corn starch, which also holds everything together. Try experimenting with different scents and colors.

Mix liquids in a separate container



Mixing

Make sure to use two different bowls for mixing the ingredients, one for the powders and one for the liquids. Mixing the liquids at the same time will activate the mixture.

- 1/2 cup Baking Soda

- 1/4 cup Citric Acid (<https://adafru.it/lkE>)
- 1/4 cup Cornstarch
- 1/4 cup Epsom Salt (or sea salt)
- 3 tsp Castor Oil (or any vegetable oil)
- 1 tsp Essential Oil
- Soap or Food Coloring
- 1 tbs Water



Mixing the liquids

To keep the ingredients from activating while mixing, you'll want to add oils, scents and dyes in small amounts at a time.



Once it's all nicely blended, we'll need to pack the mix into the molds as tightly as possible.



Packing molds

Pack the mold by layers, making sure to pack each layer down as tight as you can.

It's a good idea to pack more than necessary so the two halves fuse together.



Join molds

Join the two halves together by pressing them tightly and remove the excess from the sides.

Try to smooth out those edges so there's less of a seam.



Drying

To hold the two parts together, we can use a few rubber bands while the mold dries. We can let the bath bombs dry overnight.

For faster drying, you could pop them in the freezer for about 15 minutes.



Demolding

With our mix fully dry, we can demold by tapping and squeezing on the sides until they come loose.

Now there we have it! An icosahedron bath bomb - super cool!



Toss in the tub and enjoy!

These are great to customize with different colors and scents and it's a lot fun for kids!