Make your own soap

How to 3D-print moulds and create personalised soap

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Poppy started making soap to raise money for a dolphin charity aged twelve. She later started a natural skincare range and taught groups to make their own cosmetics. **poppymosbacher.com**

Made in small batches and scented with natural essential oils, the ingredients for each bar can cost less than £1, even if you choose to go organic. If you have access to a 3D printer or laser cutter, it's easy to create your own moulds and put names, logos, or patterns on your design.

Tinkercad provides geometric shapes, customisable gems, and even a butterfly in solid and hole formats which can be paired up to create a mould. We're going to combine its preset boxes to create personalised moulds and a separate alphabet mould to make it easy to add raised text in different colours.

Making soap from scratch involves neutralising an acid with an alkali in a chemical reaction, which can seem scary for beginners. There are safety precautions to follow and it takes time to 'cure', so many soap makers prefer to start with a natural glycerine soap base. This tutorial uses an easy melt-and-pour recipe, with suggestions for adding fragrances and colours to make unique bars of soap.
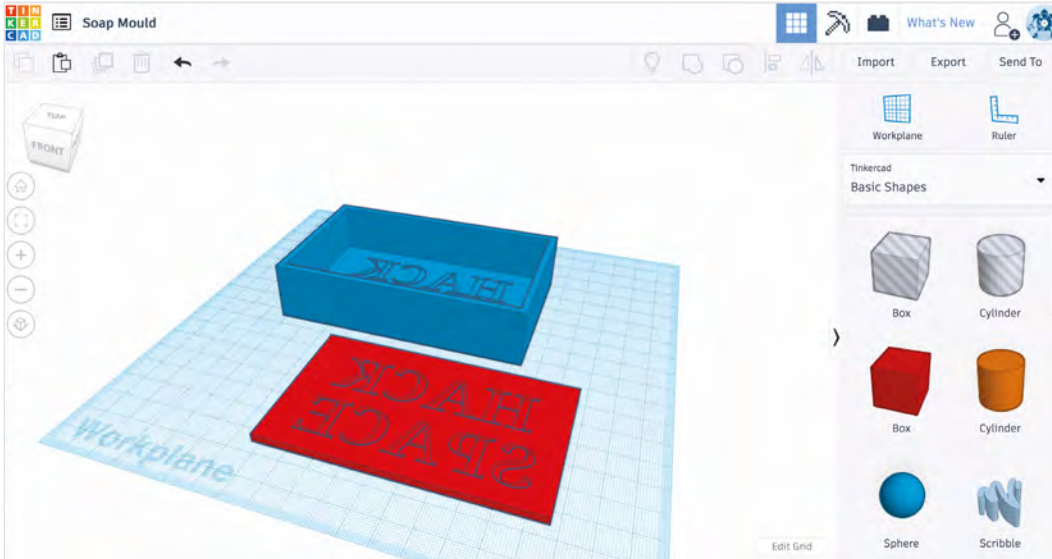
FIRST YOU NEED A MOULD
Go to **tinkercad.com** to get started and open a free account, if you haven't already got one.

Click 'Create New Design' and drag a box from the Basic Shapes toolbar and drop it onto the workplane. You can make soap any size you like, but for this exercise let's make the outside of the mould 105×65×24 mm. Just click on one of the little grey squares at the corners of the box, and alter the dimensions that appear. Add a hollow box anywhere on the workplane and resize it to 100×60×22 mm.

BUYING SOAP SUPPLIES

As well as online stores and eBay, craft shops such as Hobbycraft in the UK and Jo-Ann in the US stock soap basics, and health food shops sell essential oils. To be kind to the environment, look for soap bases with natural or organic ingredients and avoid palm oil unless it has an RSPO certificate from the Roundtable on Sustainable Palm Oil.
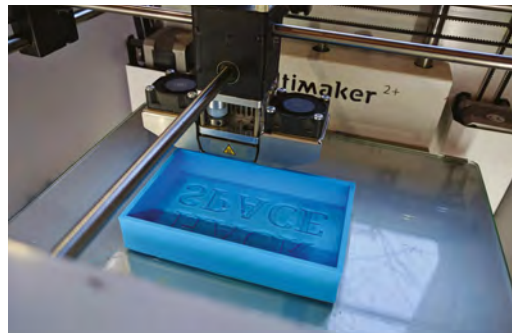
YOU'LL NEED

MOULD MAKING:

◈ TPU flexible filament

◈ 3D printer capable of printing TPU

◈ A few drops of light cooking oil (if 3D printer has a Bowden tube)

◈ SD card or lead for transferring design to 3D printer

◈ Tweezers

SOAP MAKING:

◈ 500 g White glycerine soap base to make five bars

◈ 5 ml essential oil or fragrance

◈ A few drops of liquid soap colouring

◈ 1 × medium and 1 × small heatproof bowl

◈ Saucepan of boiling water or microwave oven

◈ Hob (if not using microwave)

◈ Oven gloves for removing bowl from heat and pouring

◈ Knife and chopping board

◈ Spoon for stirring

◈ Measuring spoons

Click on the hollow box, and use the tiny black triangle above it to move the hollow box upwards by 3 mm.

Select all, then click on the Align icon near the top-right of the screen. A grid appears with buttons around the edges. Choose the middle ones on both bottom edges, and the hollow box will be almost swallowed up inside the solid box. Click away from the objects to cancel the Align tool.

> **Instead of letters,**
> you can import a
> logo or drawing

Select both boxes and click on the Group icon. After a moment the parts will merge, and you've created the basic mould. If you want to edit the individual parts, use the Ungroup button to separate the boxes and then group them again when you're done.

MAKE IT PERSONAL

Drag the word 'TEXT' from the Basic Shapes area and drop it anywhere on the workplane. Set the dimensions to be 2 mm thick and 2 mm above the workplane, then click on the Flip icon. Choose the horizontal arrow that appears below the word to reverse the letters. Select both the text and the mould to align and use the two central buttons that appear on the bottom plane to centre it as before. The text will be half submerged inside the base of the mould, but still visible.

Whenever the Text object is selected, a sidebar appears with options to type in words and change the font. With the text in its current position you get a clear idea of how it will look, so now's a good time to write your message and resize to fit. Also, change the text from a solid to a hole.

Instead of letters, you can import a logo or drawing that's been created in different software. →

SAFETY PRECAUTIONS

Check the safety precautions on bottles of essential oils before using and avoid touching the neat oils, except lavender, as they may burn the skin. Some essential oils are contraindicated during pregnancy or are too intense for soap.

Figure 1 ◈
Balancing the bowl on a metal cookie cutter or other heatproof object stops the bowl from bobbing about in the boiling water

> **Once the soap base has melted, stir in the essential oils;** when you add them to heated soap mix, they fill the room with a heady aroma

Above ◈
Wispy trails of filament may appear in letter moulds. Use tweezers to remove them, otherwise they will anchor the soap in the mould

It needs to be saved as an SVG file, which stands for Scalable Vector Graphics. If your design is a JPEG or PNG, there are free, online conversion tools which will turn it into an SVG. Once you've imported a logo or drawing, you can resize and move it around in the same way as other shapes.

When you're happy with the design on your mould, select all and click Group. Export your design as an STL file and use slicing software such as Cura to prepare a file for 3D printing.

When setting up the 3D printer, choose an infill density of 40% to make the mould strong and durable. If your printer has a Bowden tube, flexible filament will kink slightly and could get stuck. Wipe a few drops of light cooking oil, or sewing machine oil, along the first half metre of TPU before inserting it in the tube to reduce friction.

After printing, your mould is ready to use for one colour-embossed soap. If you want your soap to have a contrasting colour for your lettering or logo, the most effective way is to make a separate mould for the design or an alphabet mould, if you plan to create soaps with different messages. Just repeat the process of sinking indented letters or logos,

but this time in a box 100×60×3 mm. Also, make the design 2 mm deep instead of 1 mm, so that the design will end up half embedded and half raised in the finished bar of soap. If the letters were just on the surface, they might fall off when the soap is used.

MELT AND POUR

Melting soap is similar to melting chocolate. First, cut the soap base into small chunks, and place about 100 g in the medium heatproof bowl. Either melt in a microwave using 30-second bursts, or create a double boiler by placing the bowl of soap base over a pan of boiling water on the hob (**Figure 1**). Once the soap base has melted, stir in the essential oils. These are highly concentrated scents extracted from plants, and when you add them to heated soap mix, they fill the room with a heady aroma. You may think you've added too much, but as long as you've

QUICK TIP

No 3D printer or laser cutter? Soap moulds come in all shapes and sizes and you can make use of household items such as bread tins and plastic food boxes.

QUICK TIP

When looking for inspiration online, the American spelling, 'mold', brings up many more relevant results than the British spelling, 'mould'.

Left ◈
To create a simple rustic look, wrap soap in greaseproof paper. You can attach labels and list all the ingredients in case someone has allergies

measured correctly, and not used peppermint or pepper which really are too strong, the smell will become more pleasant as it dissipates and will be even more appealing in the finished bar.

ADDING COLOUR

Pour a little of the melted soap mixture into the small bowl. Add a few drops of soap colouring and stir, adding more to get the desired shade. If the soap mixture starts to harden before you're ready to pour, put it back in the microwave or double boiler to melt again. Carefully pour the soap mixture into the alphabet mould. Remove any excess with a knife on its side. This is easiest when the soap has been left for a few minutes and is starting to set.

When the soap has set, remove the letters, and press into position in the main soap mould. Top up with a different colour of soap base, and leave to set firmly before removing the soap. Avoid too much contrast between colours because a tiny amount of bleeding between colours may occur.

THAT'S A WRAP

Making your own soap helps cut down on unnecessary packaging, but when it's for gifts, you may want to wrap bars individually. **Templatemaker.nl** has free customisable designs for little boxes, including pillow packs which are ideal for soap. Simply type in the measurements, click 'Create', and download your template. Then laser-cut, or print on card and cut out.

Glycerine soap with essential oils keeps for at least two years if wrapped well and stored in a cool, dry place. When other natural ingredients are added, such as dried flowers, the soap needs to be used much sooner. Avoid storing the soap in the bathroom before use, because glycerine attracts water from the air, and little droplets can form on the surface of the soap, which could soak the packaging. ❑

GOING **ORGANIC**

Organic soap is usually a natural yellow colour, which remains translucent when soap colours are added. It can be coloured using pink or white powdered clay, found in face masks. To prevent lumps, mix the desired amount of clay with a little liquid glycerine, available from supermarkets, before adding to the melted soap base. Avoid red clay because it may stain towels.