

Adobe Photoshop/Illustrator

Cast a designer toy

Collectable figures are a massive global industry. **Lunartik** reveals how to get your hands dirty and make your designs a reality

Designer vinyl toys aren't only decorative – they're also highly collectable, and a great way for artists and illustrators to get their name out there on a 3D canvas.

Many smaller designers choose to customise existing figures from companies like Kidrobot, Toy2R and Crazy Label. But making your own from scratch isn't as daunting as you might think. In the following steps, I take you through the creative process of producing a low-volume run of cast-resin toys, from initial sketches right through to physical production.

Due to space limitations, the moulding and casting techniques demonstrated here are relatively basic. For more complex shapes, you might need to cast several individual components separately, and fit them together afterwards. Naturally the fewer components you have, the more straightforward this will be – so bear this in mind when sketching your designs.

You'll need a variety of tools to complete this project, including modelling material and silicone rubber – a full list for both stages of the process can be found in the margin notes. Remember to work in a well-ventilated environment if you're using spray paint or sanding, and if you aren't qualified to operate large machinery such as a band saw or disc sander, give the job to a professional.



Lunartik

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On your disc

You'll find the resources you need to work along with this project on your cover disc, in the Resources section

Skills

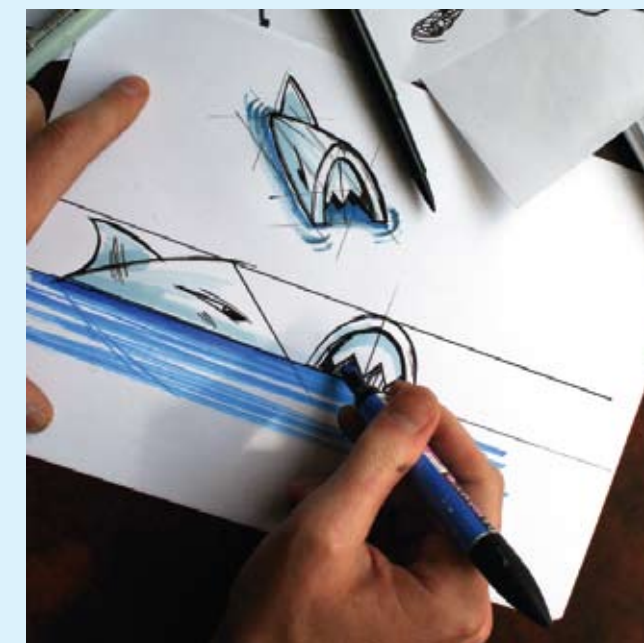
- Master basic line work in Illustrator
- Create a silicone mould
- Cast multiple figure designs
- Pick up useful model-making tips and tricks



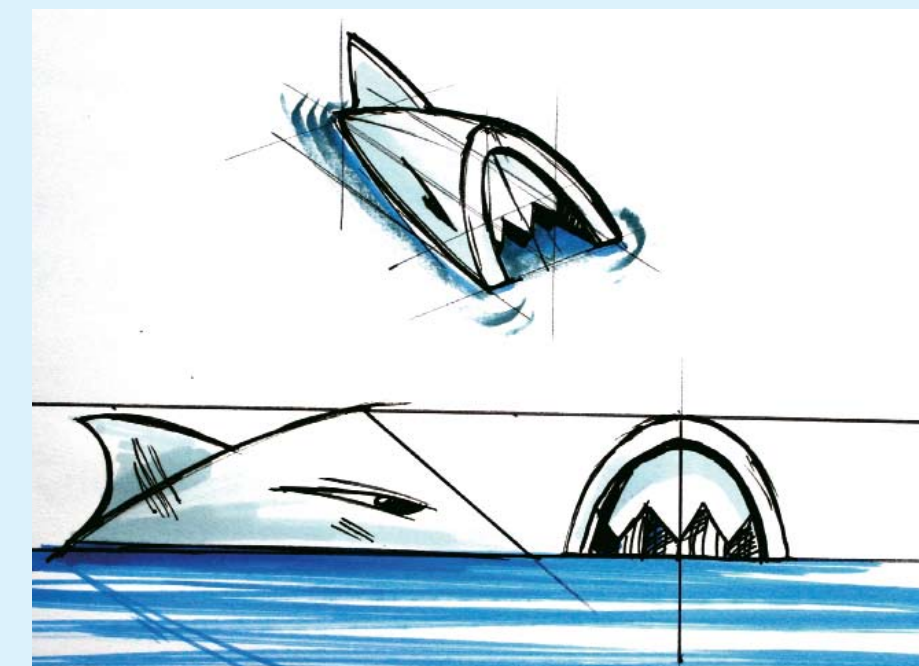
Essential kit list

You need the following tools to make the profile for your model:

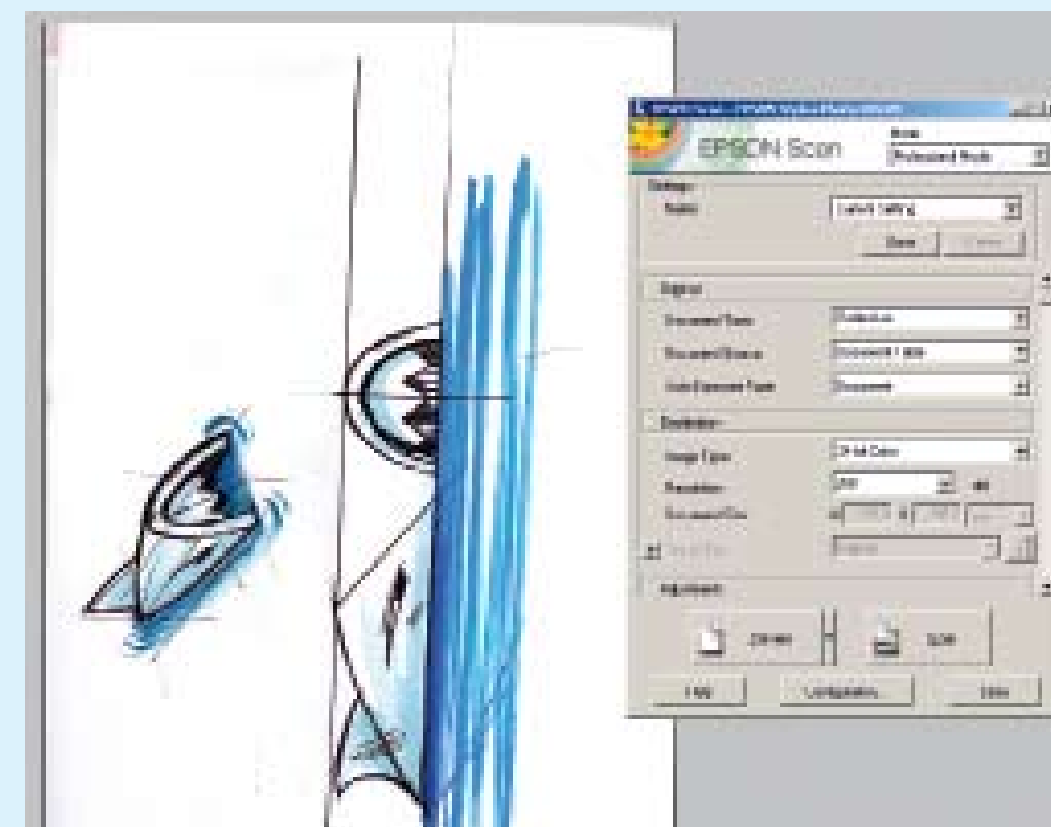
- Computer, scanner and printer
- Scalpel and 10A blades
- Files and chisels of different sizes
- Model board
- Spray glue
- Dust mask
- Safety goggles
- Primer spray paint
- Wet and dry sandpaper, plus assorted grades from fine to coarse
- Coping or band saw



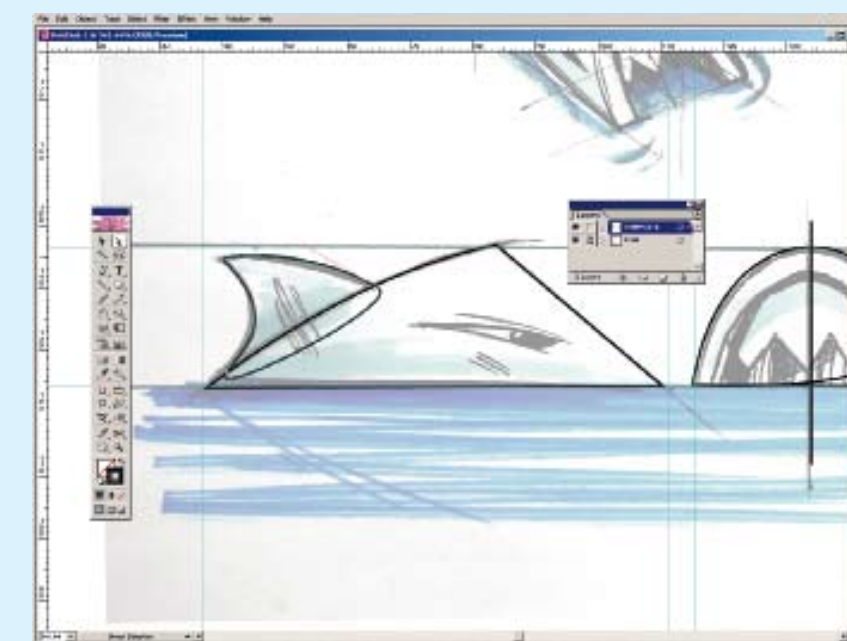
01 — The first stage is to create a profile model of your toy, which you'll use later as a basis for your silicone mould. Begin with some concepts for your toy: sketch a series of different ideas, and then build on them. Imagine them in 3D, and think about what kind of space your final design will take up – best practice is to keep it simple.



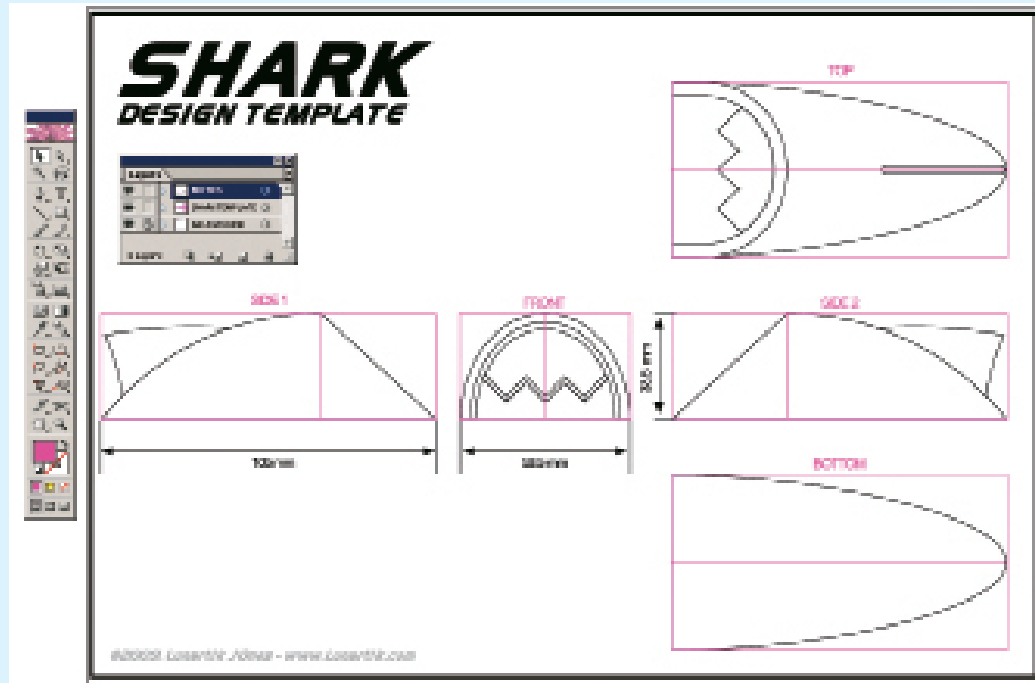
02 — Now produce some 2D-turnaround sketches. You will be starting the profile from a block of model board – the shark lives inside, and will be carved from this – so sketch out different views of your toy onto paper. Visualise it sitting inside a cube or rectangle that has six sides: left, right, top, bottom, front and rear.



03 — Once you're happy, scan the drawings into Photoshop. Use the Brightness, Contrast and Erase tools to clean them up, making the outlines of your drawings crisper, clearer and easier to trace in Illustrator.



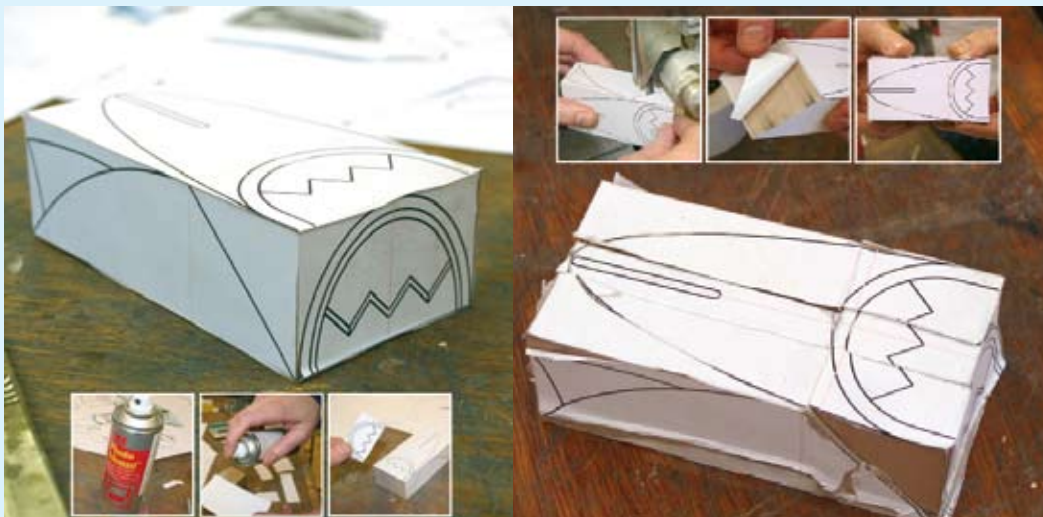
04 — Open a new document in Illustrator, and place the improved scan in the centre of the layer (File>Place>Choose File From Location). Name the layer 'scan'. Create a new layer, and name it 'template'. Now lock off the scan layer, and work directly on the new template layer. Using the Pen tool, overlay the scan with an outline. When you're drawing up the components, split the shark into two parts: body and fin. Make sure each piece fits together precisely before you start getting your hands dirty.



05 Once you've completed all six views in Illustrator, draw a clear-filled rectangle with a pink stroke around the outside edges of each design view, to make sure they will all match exactly in width and height (or open the template provided on your cover disc). Imagine these views as sides of a cube, which are being projected onto a flat surface. If you were to construct them edge-to-edge, they would become a perfect rectangular net. Print them onto paper, and cut them out with a scalpel and ruler so that you end up with rectangular shapes.

Modelling material

If you can't get hold of model board, you could also use blue foam (extruded polystyrene), or make the master model from clay or wood. I used a band saw to cut the material, which I was given access to at a local model-making studio. Try tracking down your local toy designers and ask if they have any off-cuts.



07 When you've cut out your block, glue the corresponding profiles to each side using spray glue. These should all join up nicely. Each side must be cut to expose the shark from within, so when the guides are in place, begin cutting out the profiles for both the body and then the fin – for best results, use a band saw.



06 It's now time to turn your 2D designs into a reality, and make the master model. These are the shark's outside dimensions: main body – (w) 53.5mm x (h) 33.5mm x (d) 105mm; the fin – (w) 8mm x (h) 20mm x (d) 34mm. Mark out the top, side and front views of the shark on a piece of model board. Using a band or coping saw, cut the model board to form a block – it should look like a long rectangle. Then do the same for the fin. Take care when using sharp tools, and always wear eye protection.



08 Now that the body and fin of the shark are in their separate raw forms, it's time to sculpt them. Use files, chisels and sandpaper to achieve the correct shapes. Note that the silicone rubber mould you create later will replicate the surface-finish of the master model exactly – any imperfections such as scratches or gaps will show up every time you use it, so ensure it's as close to perfect as possible.

Chop-stick

A good technique for cutting out the two profile parts is to chop off unwanted parts of the block, and then stick them back in place with double-sided tape before moving onto the next view. This helps keep the block in one usable lump, and also makes cutting out the different parts of the design easier. It's a simple chop-stick, chop-stick action – you may have to tackle each side several times to reveal the basic profile of the shark.



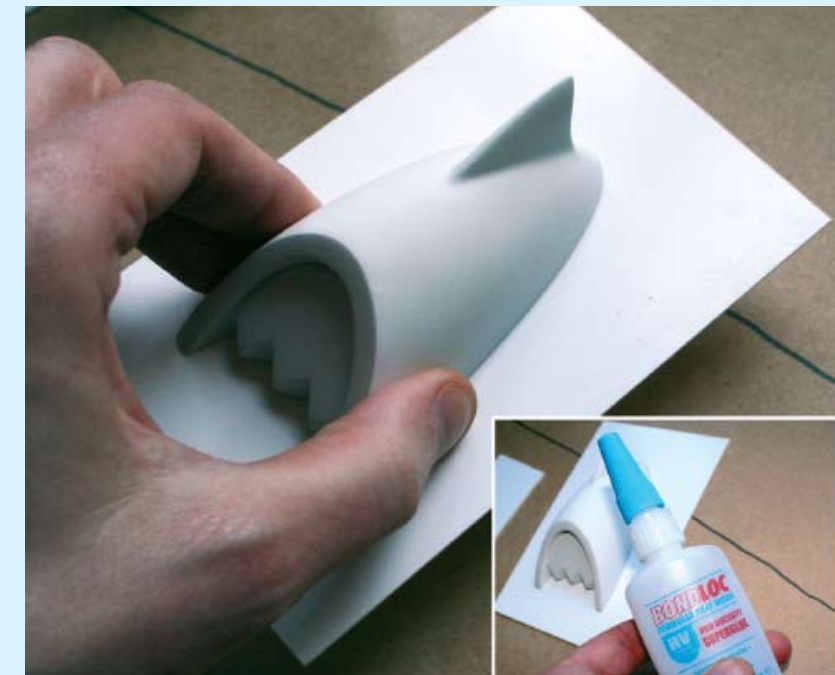
09 Cut out and chisel the teeth recess of the shark. This can be a tricky task so be careful – follow the action depicted in the first image, and always chisel away from yourself. Use a scalpel to get the outline shape, and remove material with the chisel.

Now attach the fin to the back of the body with superglue, as in the second image. There will be a gap that needs to be filled in; for this you need some quick-drying car body filler, such as P38 – this is a two-component filler, and should be mixed in correct parts; see the instructions on the product. Use a scalpel to apply it to the gaps, and sand it down with wet and dry sandpaper.

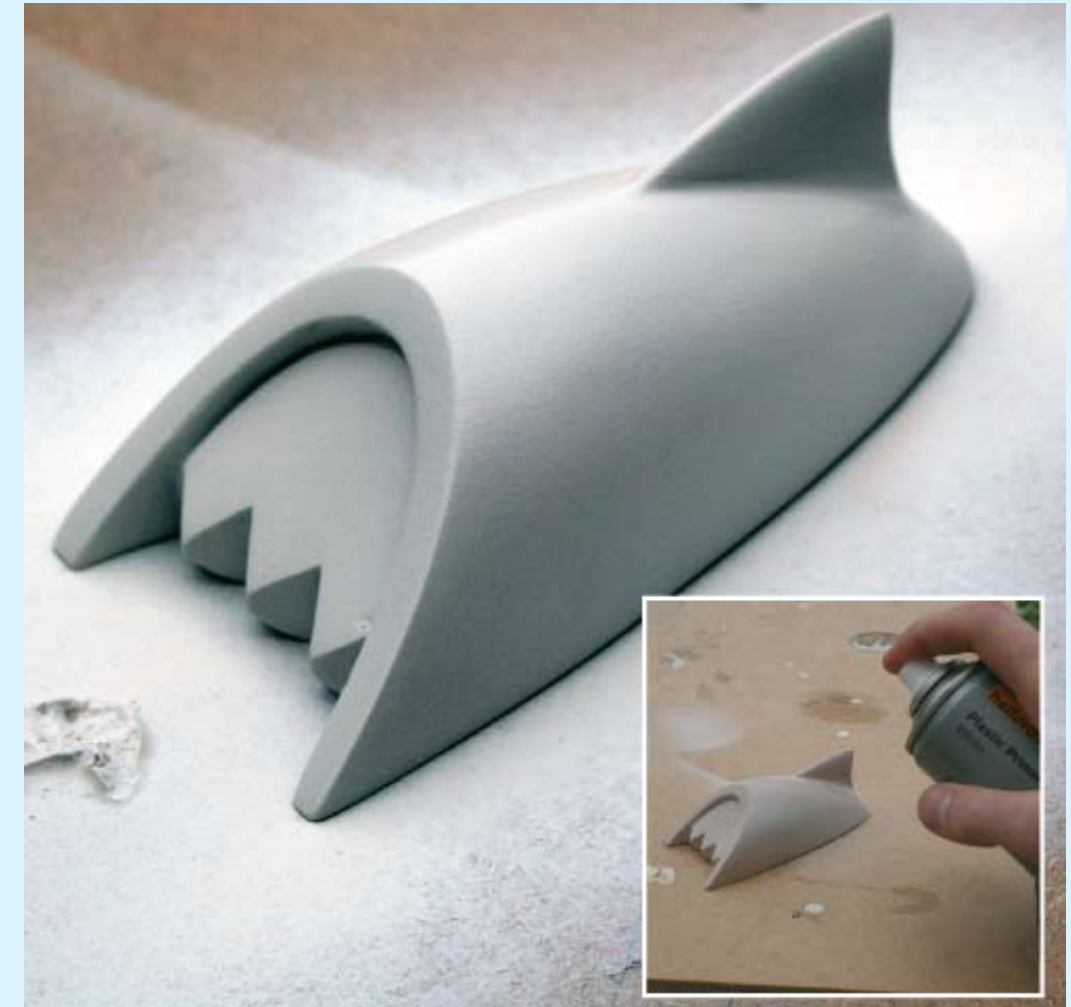
Essential kit list

You need the following tools to make the silicone rubber mould:

- Silicone rubber
- Plastic PVC sheet
- Glue gun and glue sticks
- Micro-scales
- Release agent
- Disposable plastic cups
- Rubber gloves
- Spatula
- Paper towels



11 Now for the second stage of the project: making the silicone mould. Create a base plate from a 1mm thick white polystyrene sheet. Superglue the master model into the centre of this base, ensuring you leave plenty of room around the edges so there is space to build up a framework around it.



10 After you've lovingly crafted and sanded the body, fin and teeth, coat the model with an undercoat of paint. This first coat is to show up any imperfections in your handiwork. The paint should be applied thinly, and will dry after 10 minutes in the sun. Next, sand it down with fine-grade wet and dry sandpaper. Use water for super-smooth results. Once you've filed, sanded and finalised the model, wash it in water, dry it, and apply a second coat of primer. Repeat this process until you're happy with the finish.



12 Create a simple frame using polystyrene sheet, leaving 10mm of space around the entire edge of the master model – including the top, as you will be filling this cavity with silicone gel, and the master model must be completely covered. Use a glue gun to stick the framework together, as shown here.

Fill any voids where the silicone rubber might leak. Be careful during this step: if the silicone leaks, it will become a messy process.



13 Once you've completed the framework, check it's watertight, and then give the insides a spray with release agent. This will stop the silicone from sticking to your master model, and will make it easier to remove the mould.



15 Blend the red hardener thoroughly with the white silicone, until the mixture turns light pink in colour. Place the master model and frame on the wooden board, and pour the mixed silicone slowly into the cavity. The slower you pour, the less likely you are to catch air bubbles in your mould. Once immersed in silicone gel, place the mould in a warm airing cupboard to dry – this should take roughly 12 hours.

Top tip

It's best to use clear plastic disposable cups when you're mixing the silicone, so that you can see any excess white gel remaining on the sides.



14 Gather together the silicone gel, two clear plastic cups, your micro-scales, a relatively large wooden board, rubber gloves and two spatulas. Use the wooden board as a work surface. Open the silicone gel, and give it a stir with a spatula. Pour the white silicone into a cup and weigh it, then pour the hardener into the other cup with a mix ratio (by weight) of 100:10. If you get stuck, follow the instructions that come with the pack. Use rubber gloves when handling mixtures.



16 When it's dry, remove the framework from around the edge, and pull off the hardened silicone from the base plate and master model – you might have to use some force. In some instances the model might break, so be very careful.



17 Now that you have your mould, you can start casting. Apply a coat of release agent to the cavity to prevent the casting polymer from sticking to the silicone rubber. Calculate the approximate volume of the resin you need to make by pouring tap water into the cavity and weighing it on the scales. Resin comes in two parts, so divide this number by two for an equal mix. Like the silicone gel, these should be mixed together well: pour the two parts into separate cups at a ratio of 1:1, then slowly mix them together into one cup, avoiding air bubbles. Be ready to pour the mixed resin into your mould, as it will go hard very quickly.



18 Pour the resin mix immediately into the cavity and leave it to set. You will notice that it gets hot and changes colour. Once the curing time has elapsed, pull out your resin cast from the silicone mould.



19 Now you've produced a toy using the mould, begin the process again from step 17 to refine your casting skills and make a shark army. Keep an eye on the mould though, as you may need to fill in a few air-bubble holes with P38, or sand down the edges and base, after you've created a number of sharks. Finally, paint them up and give them a protective finishing-coat of spray varnish. Happy casting!