

# hubs mini STL printing guide

Below is a suggested approach for producing a working set of hubs minis using your 3D printer.

**Print at 100% fill and at least .2 mm resolution – the finer the better.**

## STEP 1: PRINT ONE BALL JOINT AND TEST THE FIT ON YOUR STRAWS

The ball joint from your printer needs to fit your straws that you have to hand. We've sized the files to a good general size for 6mm diameter paper drinking straws and it might work well straight away, but at this scale small differences from different set-ups will mean that your straw could be too loose. If it's too loose, or too tight to push into the straws, adjust the scale, print and test until you've got a good fit with your straws. Try a 5% scale at first, then by smaller amounts once you're near. It may take three or four goes.

## STEP 2: ADJUST THE HUBS TO FIT YOUR BALL JOINT

Now you've got a ball joint that works with your straws, print one 6-way hub and test the fit with the ball joint. If the fit is good you can print the rest of the set for the dome. If it's too loose or tight, scale accordingly, print, test and repeat until you get the fit right. A good fit is when the ball and socket offers some resistance to movement. It shouldn't be loose. Play with the joint for a while; you may find it loosens up.

## STEP 3: PRINT A FULL DOME'S WORTH

For the full 2V dome you need to print:

- Twenty 6-way hubs
- Six 5-way hubs (scaled as 6-way)
- 130 ball joints
- Ten base feet (scaled as ball joint)

It's always useful to have a more hubs and ball joints so you can test adaptations, so it might be worth printing extras of all of them.

## STEP 4: CUT YOUR STRAWS TO LENGTH

To make your 2V dome you need:

- 30 x Shorts
- 35 x Longs

To figure out the lengths of the straws for different diameters, see the table to the right. If you want to use an online calculator – subtract 33mm from each length to account for the hub.

## STEP 5: BUILD YOUR DOME!

Start with a 5-way hub at the centre with Shorts coming out from it. Attach 6-way hubs to the ends of the Shorts and connect them together with Longs to create a pentagon. That's 1/6th of your dome complete! See if you can figure it out from there. We'll send you the fuller hubs mini guide when it's complete, in the meantime – good luck!

### LET US KNOW HOW YOU GET ON

Hope the initial guide helps and it'd be great to hear how you get on and how the STLs cope with being printed through a variety of machines.

Email us at:  
kickstarter@buildwithhubs.co.uk

We'd also love it if you could take pictures of some of the steps on the way as you print your hubs mini, or perhaps just capture any domes or adaptations that you create.

We're not sure what we'll do with them just yet, but it'd be great to see them!

Again you can send those to us at:  
kickstarter@buildwithhubs.co.uk

*Thanks and good luck!*

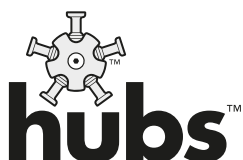
Chris and Mike

### SOME EXAMPLE STRAW LENGTHS:

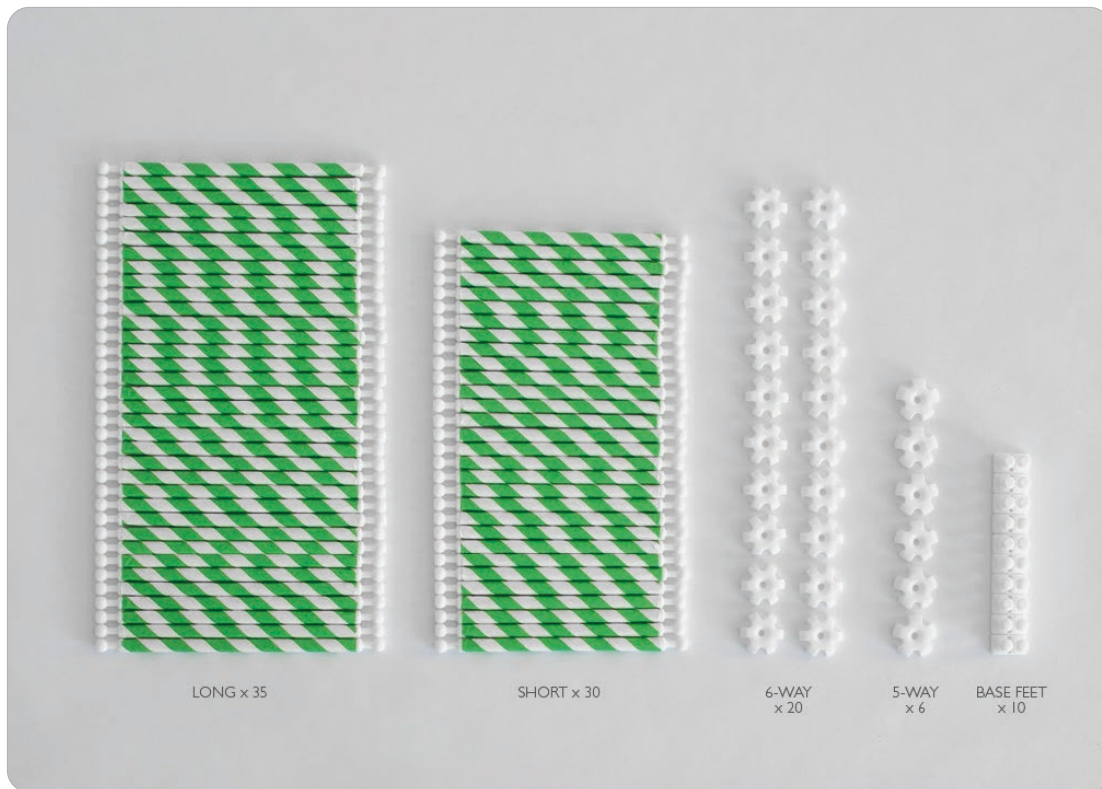
DOMES DIAMETER	LONG	SHORT
300mm	60mm	49mm
400mm	90mm	76mm
448mm	105mm	90mm
500mm	121mm	103mm
600mm	152mm	131mm
740mm	195mm	169mm

*Cut a standard 195mm straw once to create the two lengths you need.*

*A whole straw is a Long.*



geodesic domes  
made simple



**To make a 2V dome:**

30 x Shorts  
 35 x Longs  
 20 x 6-way hubs  
 6 x 5-way hubs  
 10 x base feet

Here's one ready to go.



**NOTE:**

*The hubs in the STL files have holes in the middle – like the full-size hubs. The base feet also have a small hole in them.*

*This means you can tack the hubs and base feet down (into wood or MDF for example) once constructed to test the structural integrity of adaptations like the one shown here.*