The Makers Unite desk is a project created by the folks at Open Works. a makerspace in Baltimore, to supply desks to kids that are learning from home during the Covid pandemic. It gives a child that is working at the kitchen table (or the coffee table, the couch, or their bed!) a place of their own to comfortably work and keep their school supplies in one place. You can read more about this project, download their original dxf files, and/or donate to support the project on their website. There's even a desk assembly video available to give you a sense of just how simple it is to put one of these desks together.

As part of ShopBot's support of this very cool project we're sharing the production files that we're using to cut the desks and stools in North Carolina and Virginia. These files are for the 25" tall version, which is suitable for elementary aged kids and is based on the dxf files that Open Works shares. The download includes ShopBot files, VCarve v10.022 files (including the toolpathing data that we use), and dxf files.

Before you download and use these files, make sure you understand that these plans are made available under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International Public License. Users may share, adapt, and remix these files as long as Open Works is credited as the originator and the product is not used for commercial purposes.

There are five different sheet layouts included in the download. Descriptions and diagrams of each are on the next three pages of this document.

1) To help check the fit for the plywood and bit that you are using, there's a "Test stool on one desk and one stool sheet" file that cuts an extra stool in the offcut section of the "one desk and one stool" sheet. We suggest cutting that first before cutting the rest of the parts to see how everything goes together, and if you are happy with the fit then continue by cutting the "one desk and one stool" sheet out of that same sheet of plywood. If not, you'll need to adjust the sizes in the CAD files and re-toolpath.

While a test cut is not required, it's generally a good idea to run one in order to avoid delays and additional material waste as go into production.
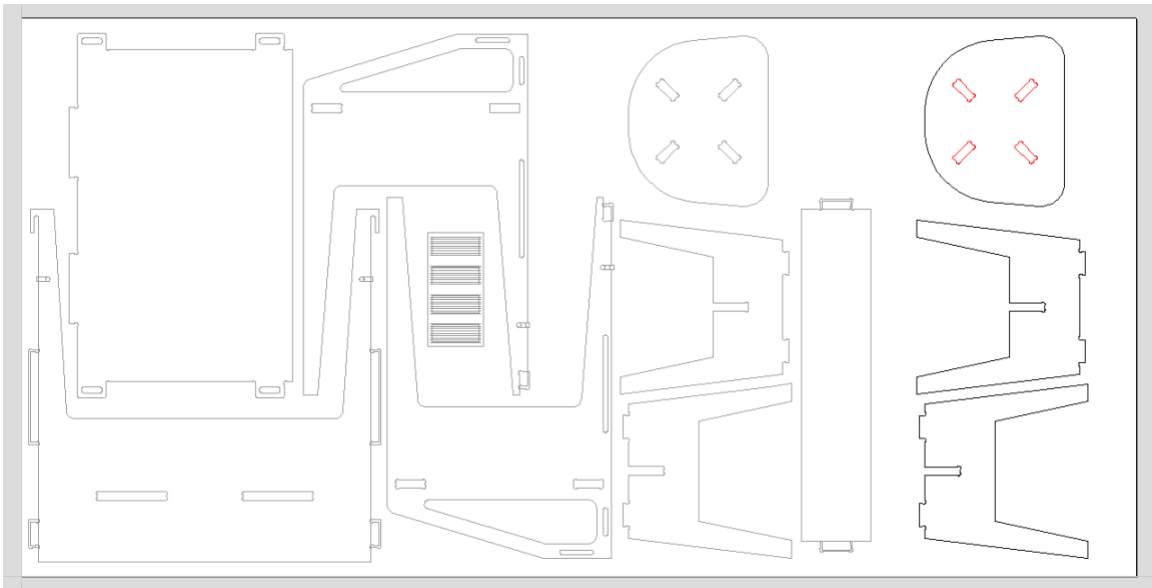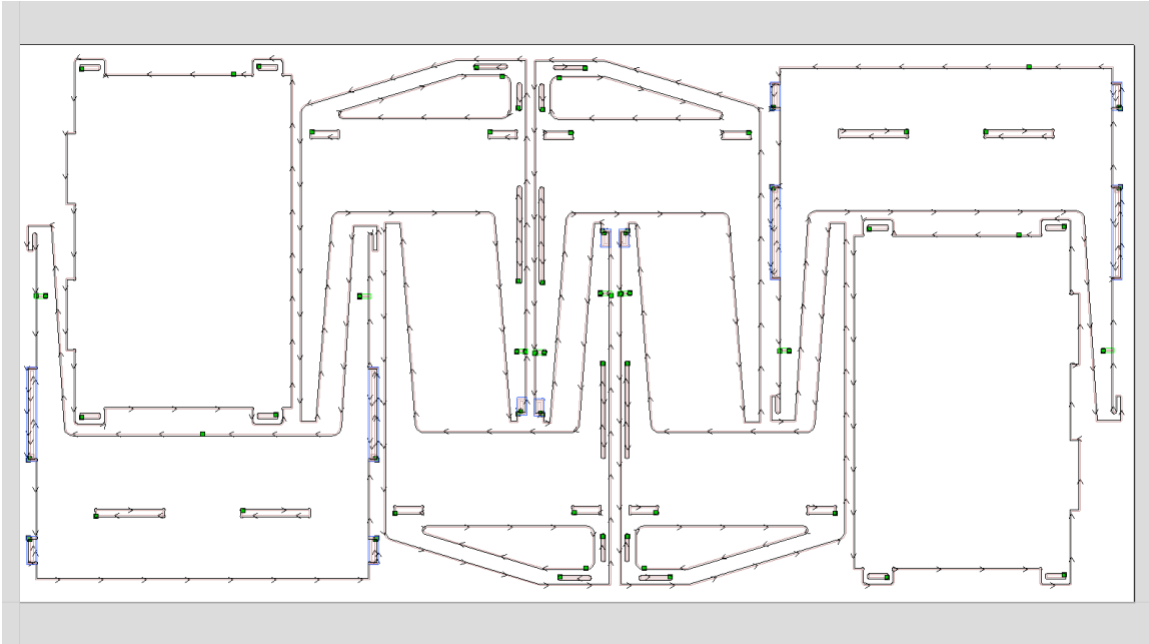
2) One file cuts out both a desk and stool from a sheet, but there is a bit of waste from the sheet. If you just want one desk and stool then that's the one to cut, but even if you'll be cutting a lot of them you might consider cutting this one first to test the fit.
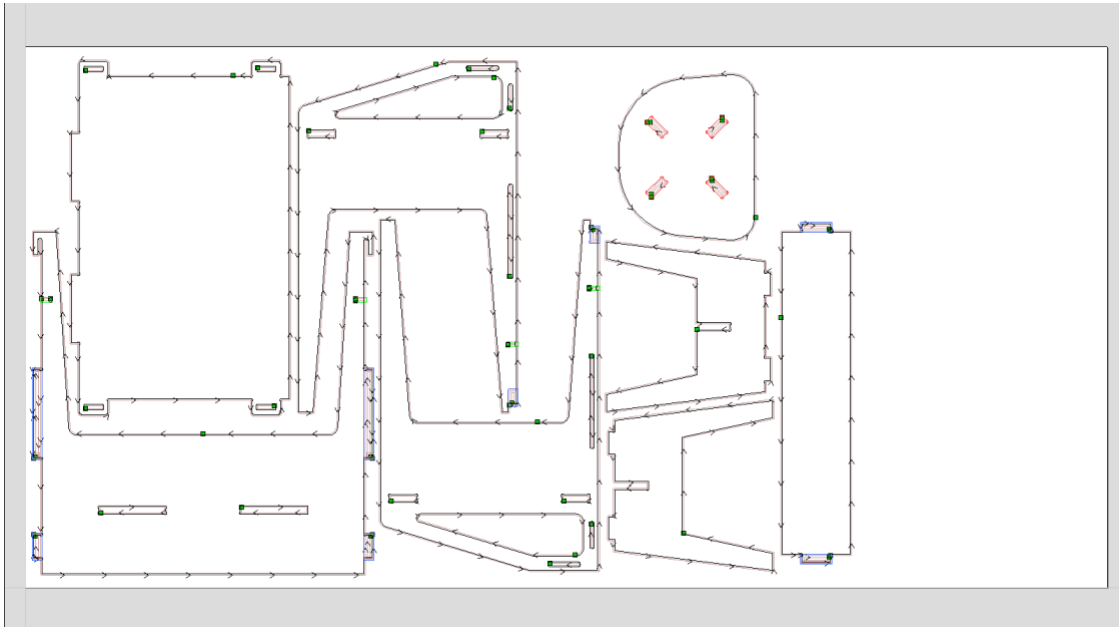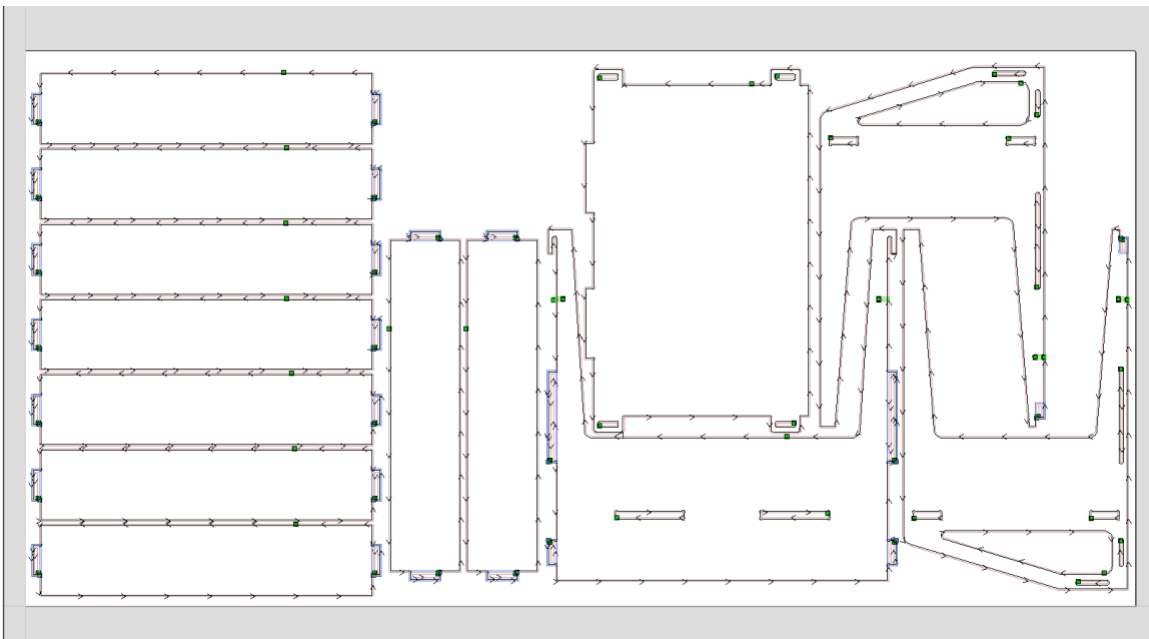

3) One file cuts seven stools out of one sheet.
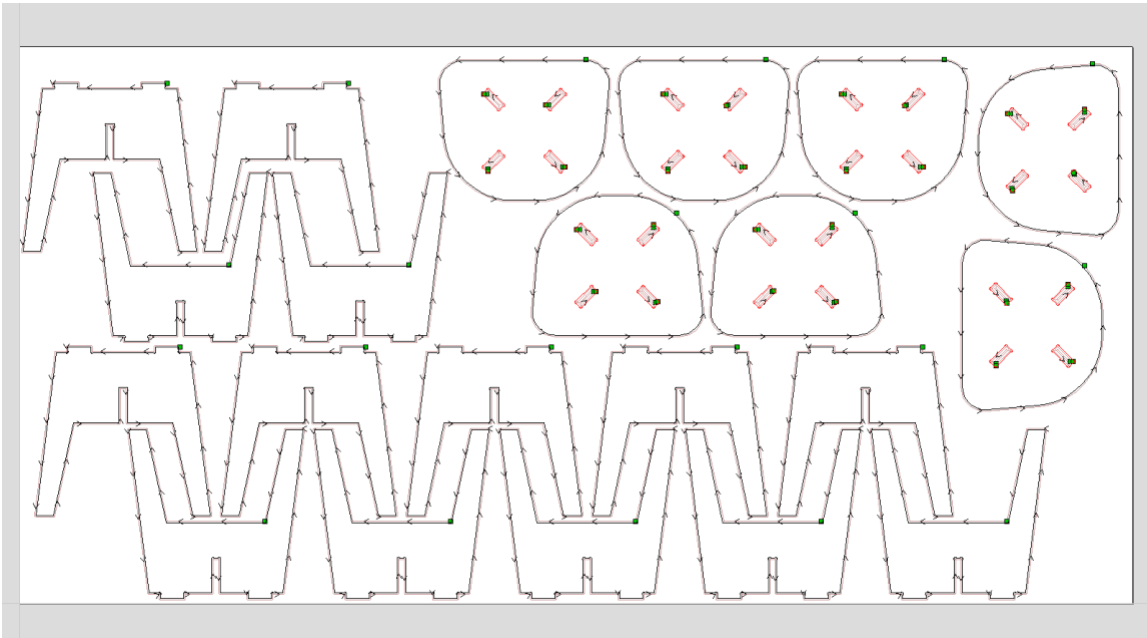
4) One file cuts two desks (minus the upper shelves) out of one sheet.

5) One file cuts nine of the upper shelves and one desk out of one sheet.

For production runs of a larger number of desks, you can cut four of the "two desks" sheets and one of the "nine shelves and one desk" sheets, which will yield nine desks out of five sheets of plywood. The quantities of stools and desks don't quite sync until you've cut a bunch of sheets, but there might be people that want a desk but aren't in need of a stool or vice versa? Plus, you can always move parts around and delete parts you don't need to create custom layouts.

ShopBot files:

The ShopBot files are set up to cut the ¾" plywood that we use, which is actually 0.72" thick, using a quarter inch bit and cutting in two passes at 7"/second. The files are Z-zeroed to the top of the sheet and cut 0.73" deep, so it will cut a little bit into the spoilboard.

I use a very simple post-processor so you can modify the move speed and spindle rpm's in a text editor (like SBEdit that installs with the ShopBot software) to suit your bits and cutting preferences. Those settings are right near the top of each sbp file, right below the Open Works license info.

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1  ' Makers Unite desk created by Open Works
2  ''
3  ' These plans are made available as a digital download under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International Public License.
4  ' Users may share, adapt, and remix these files as long as Open Works is credited as the originator and the product is not used for commercial purposes.
5
6  ' More information and a donation to support the project can be made at
7  ' bit.ly/PayItForwardDesk
8
9  ' This file cuts 2 desks
10 ' and is cut with a 1/4" bit in 2 passes
11
12 'File created: Wednesday February 10 2021 - 12:56 PM
13 'SHOPBOT FILE IN INCHES
14 '
15 TR,14000            'Set spindle RPM
16
17 'Turning router ON
18 SC,1,1
19 PAUSE 2
20 '
21 '
22 'Toolpath Name = Merged Toolpath 1
23 'Tool Name   = End Mill (0.25 inch)
24 MS,6.97,6.97
25 JZ,0.800000
26 J3,0.899113,5.392712,0.200000
27 M3,0.899113,5.392712,-0.320000
28 M3,0.949838,5.341987,-0.320000
29 M3,0.949838,3.546987,-0.320000
30 M3,0.899113,3.496262,-0.320000
31 M3,0.949838,3.546987,-0.320000
32 M3,1.194838,3.546987,-0.320000
33 M3,1.245563,3.496262,-0.320000
34 M3,1.194838,3.546987,-0.320000
35 M3,1.194838,5.341987,-0.320000
36 M3,1.245563,5.392712,-0.320000
```

License and contact info

Change this to change spindle speed

Change this to change cutting move speed

VCarve and dxf files:

The VCarve files were created in version 10.022 which is one release back from the current 10.512. This allows people that might not be quite up to date to still use them, but if you're more than one version behind, you will need to use the included dxf files instead. You'll lose all the toolpathing information and the VCarve tricks like merged toolpaths and toolpaths that are associated with layers that make cutting more efficient, but that's what happens when you don't stay current with your software!

Although we cut the desks with a ¼" bit in two passes, the VCarve and dxf files are set up and dog-boned so that they can be cut with a 3/8" bit if that's your preference.

One more thing…wedges!!

Although the desk was designed to use commodity wedges like door shims or tile wedges (the most sensible thing to do!), we wanted to provide a couple of alternatives. I had a couple of idle 3D printers, so I have been 3D printing wedges to add a little color. The stl file for four wedges is included in the "3D printed wedges" folder along with the other files. I'm not very experienced with 3D printing but I have found that four layers for all the walls and a 15% infill works well.

The wedges are saved in inches and are approximately 4" x 1.5" in real life, so if they import in mm's the size will obviously be way off. They should look something like this in your slicer:
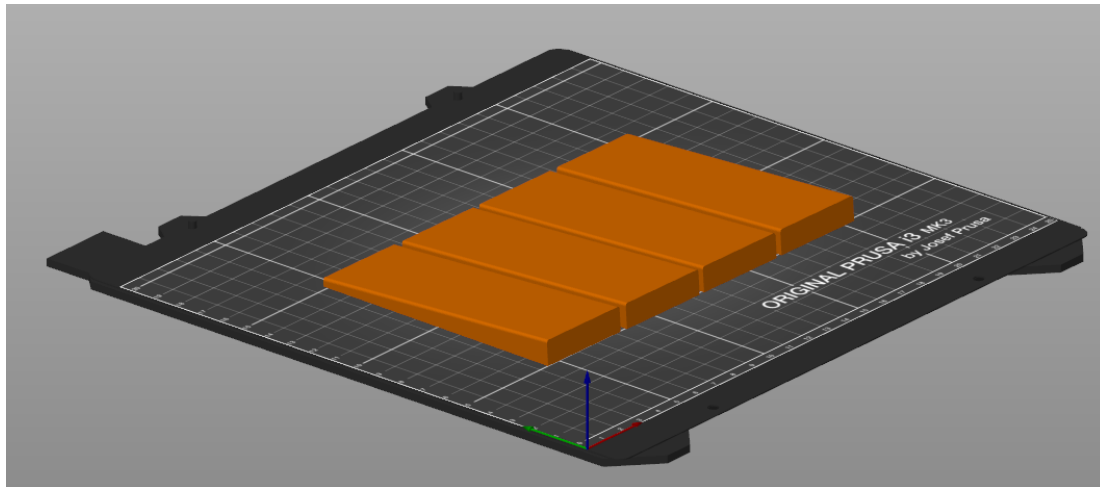
If you REALLY want to be all-digital but don't have a 3D printer, we've included optional sections for each of the sheet layouts that include desk parts that machine wedges in the waste area of the sheet. It uses a combination of the "Pocketing", "Fluting", and "Profile" cutting toolpaths. They are slow to cut and really not very practical—door shims are pretty cheap—but if you just want to try them out, select the ShopBot files that have *(with optional wedges)* in the name and they'll cut after the rest of the parts have cut out.
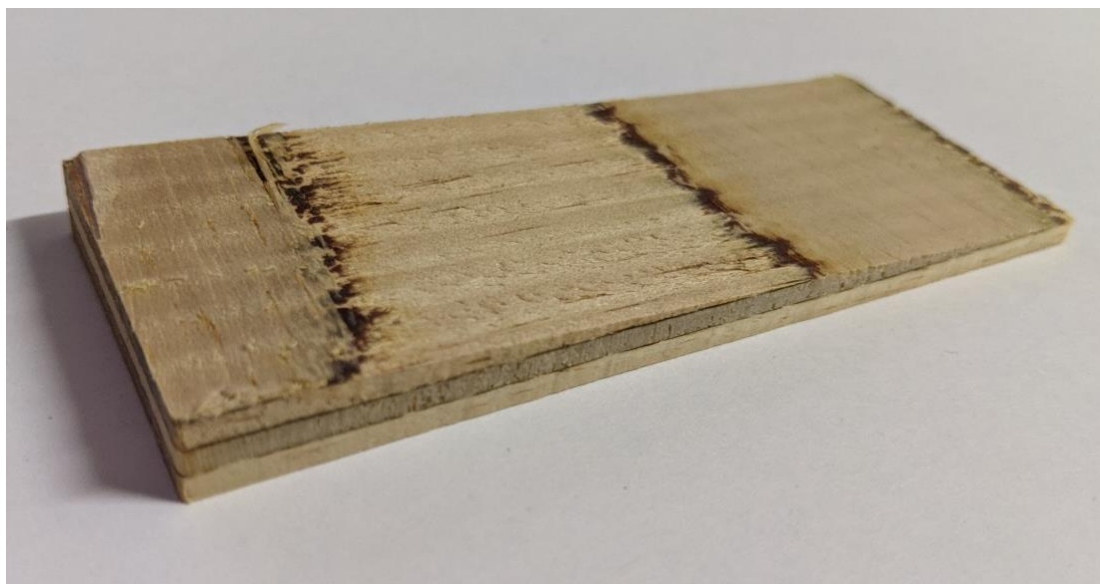
Support the project:

Most importantly, please make a donation on the [Open Works Pay It Forward Desk project page](#) if you cut desks locally to support the project.

If you are in the Baltimore area, consider helping the Open Works folks whittle down the massive number of desks they need to cut by volunteering to cut some.

Finally, please post pictures of the desks you make to help move the project along.
You can tag ShopBot Tools (@shopbottools) and Open Works (@OpenWorksBmore) and/or use these hashtags: #MakersUnite #goShopBot #ShopBotCNC