3D Printed Children's Tactile Book

by kellyelise

From this Instructable, you're going to learn how to design and 3D print your own tactile book!

This can be a really fun project to make for someone in your life or if you want to make it for a larger audience, consider submitting your design to Tactile Picture Books Project where they make tactile books with braille for children with visual impairments! Check out their website here: https://tactilepictureboo ks.org/

Here we go...

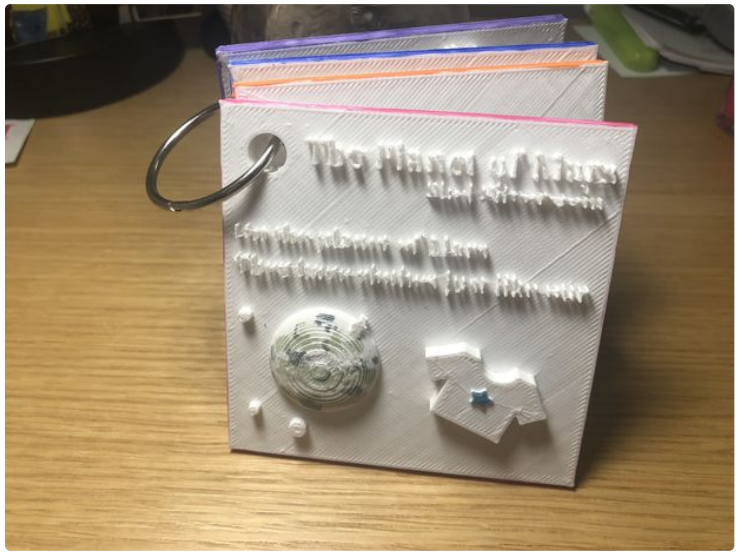
1. First you need a concept for your book. I chose to do a poem called "The Planet of Mars" by Shel Silverstein, but get creative! Think about the kinds of things you loved to read as kid.

You can do this any way you want, but it can help to brainstorm using Play-doh to simulate how your ideas will look in 3D. When making the model, think about how the weight needs to be distributed in order to stand up and it will help you to know which designs will work well once it's 3D printed.

2. Think about how many pages you want your project to be. These instructions give dimensions for a four page booklet, but if you want more pages then just make the grid size bigger on whatever program you use.

3. When it comes to actually making the design online, there are many options! One free and easy to use website is TinkerCad. TinkerCad is the program that the pictures here are from.

Here is a list of some free resources that might help you with your design process: https://all3dp.com/1/be st-free-3d-printing-softwar...



Step 1: Making the Pages

1. Edit your grid size to be 200mm by 200mm square by clicking "Edit Grid" in the bottom right hand corner of the screen.

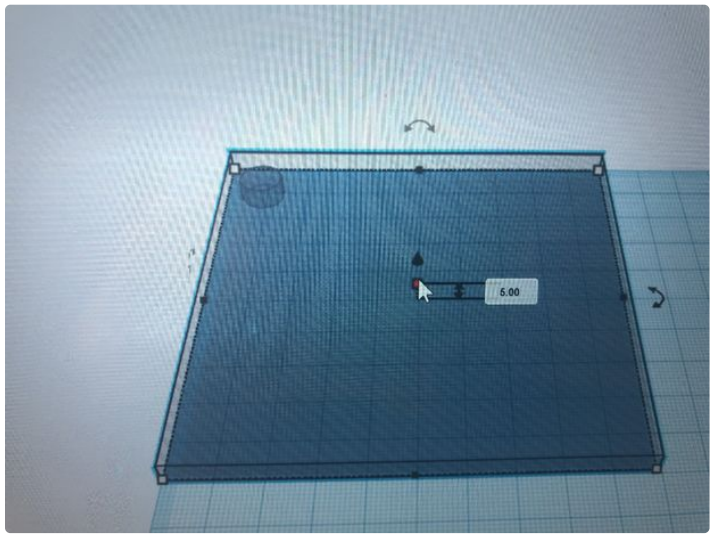
2. Start by adding one box and sizing it to 99mm by 99mm with a 5mm height against the plane of the grid.

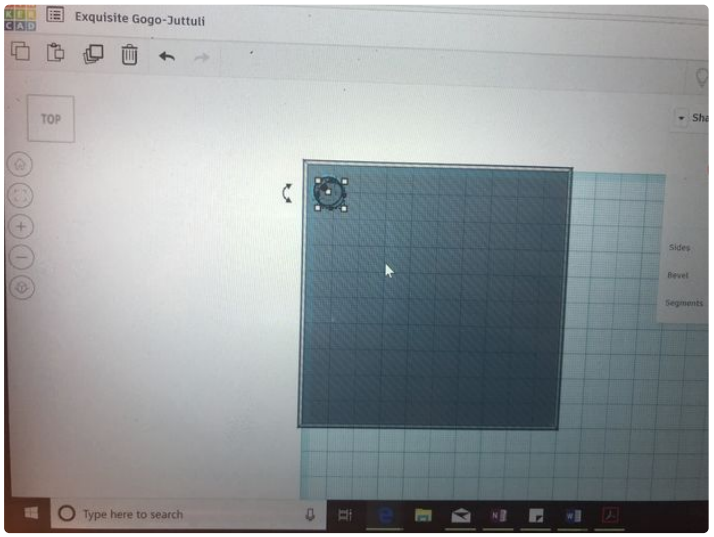
3. Add a cylinder 10mm by 10mm in the top left corner and put it the same plane as the box. In order to make sure that the hole isn't too close to the edge to be sturdy once it is printed, place it at least 3mm from the top and left edge of the box.

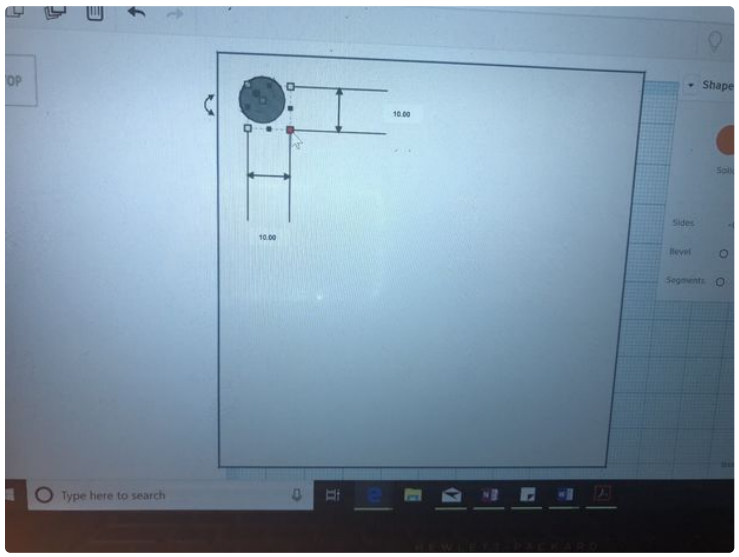
***TIP: Sometimes when viewing from the top, it can be difficult to tell what plane your objects are in. Always check your project from the side view to confirm that they are at the correct height.

4. Make the box a solid object and the cylinder a hole by manipulating the object properties box that drops pops up on your screen when you select any object.

5. Select the cylindrical hole, hold down the shift key while you select the box, and merge the objects by pressing the button in the top right corner that looks like two objects becoming one called "Group" or press "Ctrl + G."







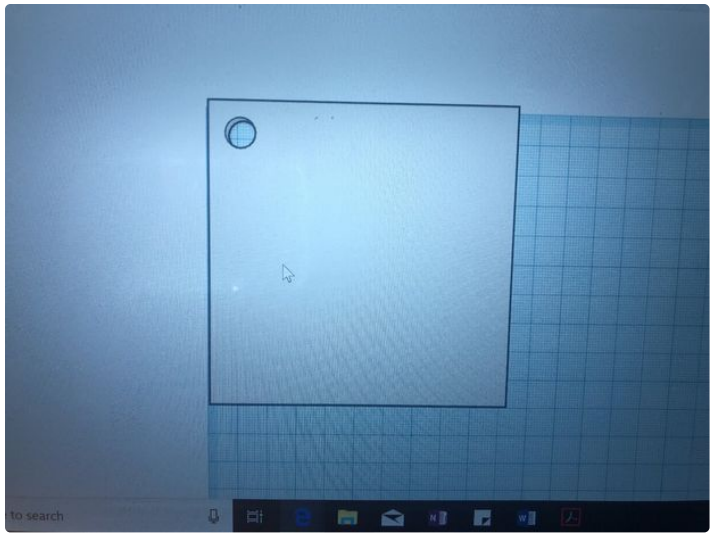
Step 2: Sructuring the Book

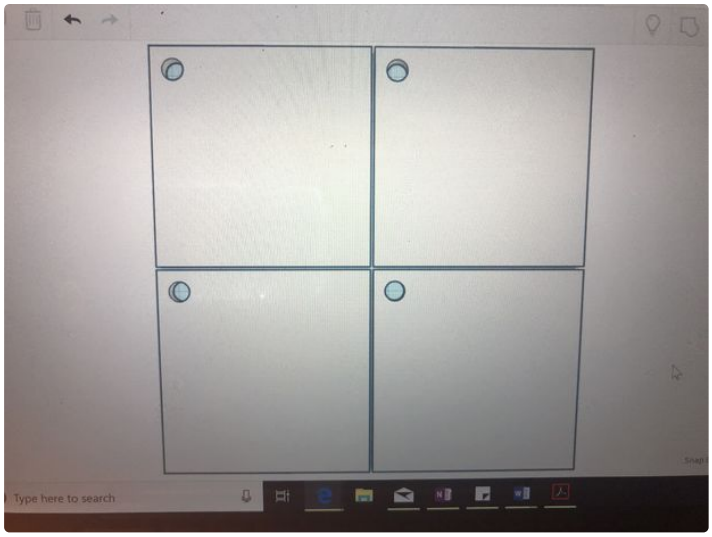
1. Now that they are linked, copy the whole object and paste three copies of it so that there are four pages total. The "Copy" and "Paste" buttons can be found in the top left corner of the screen and look like clipboards.

2. Place them on the grid with 2mm (two of the small grid squares) in between them on every edge to make sure that they print as separate pages instead of one big page.

When printed, this will make four pages that are about 4 inches square and about 1/4 of an inch thick.

Think about your audience when choosing the thickness. I wanted something durable so that kids could flip through it easily and for me 5mm was perfect.





Step 3: Decorating the Pages

1. Start to add shapes by dragging them from the column on the right directly into your workspace. There is a cool "scribble" shape in the same area that lets you free hand your own designs.

Find different shapes to add in the right column under "Basic Shapes" and if you want to add text you can go under the "Shape Generators" category and select "all." That's where I found most of the shapes that I wanted in my book.

I started with the placement of the text for my book, because I wanted that to be in specific places and then I placed the objects around the text.

***TIP: My words ended up being too small and the 3D printer struggled with them. Make your letters BIGGER than 8mm tall. Also when you're adding shapes, consider the fact that in the end the pages will be hooked one on top of the other, so if you're concerned about the bulk of the end product, make sure the height of any object on each page is below around 10mm.

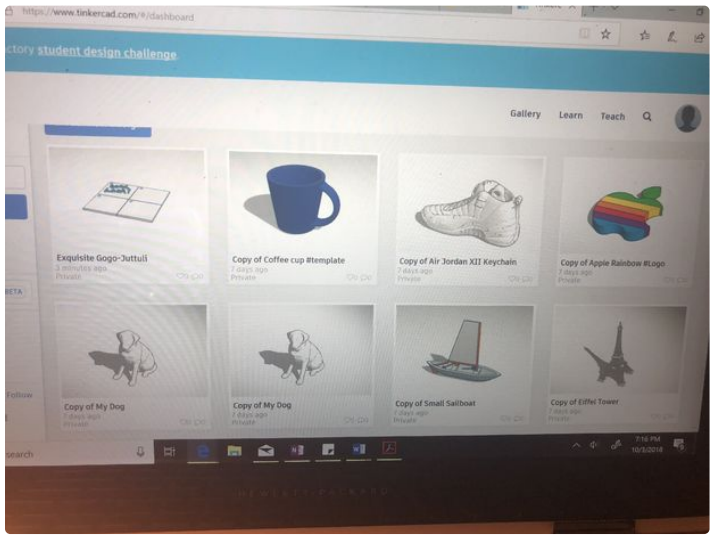
2. Don't be afraid to mess around with TinkerCad a bit. They have a lot of premade designs that people have uploaded that you can add to your own project. You can find them by clicking the home logo in the top left of the screen and then just typing the object you're looking for into the search bar. That's how I got the hands, feet, and shoes, but they have so many more designs you can choose from. It also helps to watch YouTube instruction videos to help with using the program and making certain objects.

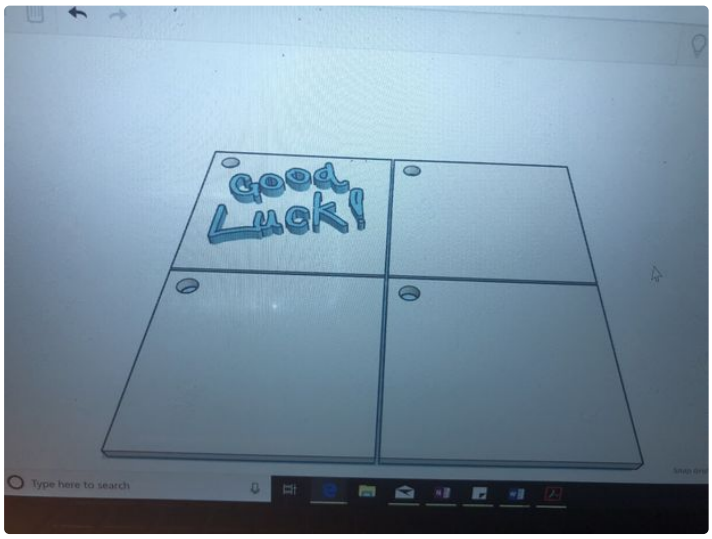
***TIP: To get the imprint of the shoe soles on the second square I copy and pasted the shoe, made it a hole instead of a solid object, and lowered it into the plane of the paper.

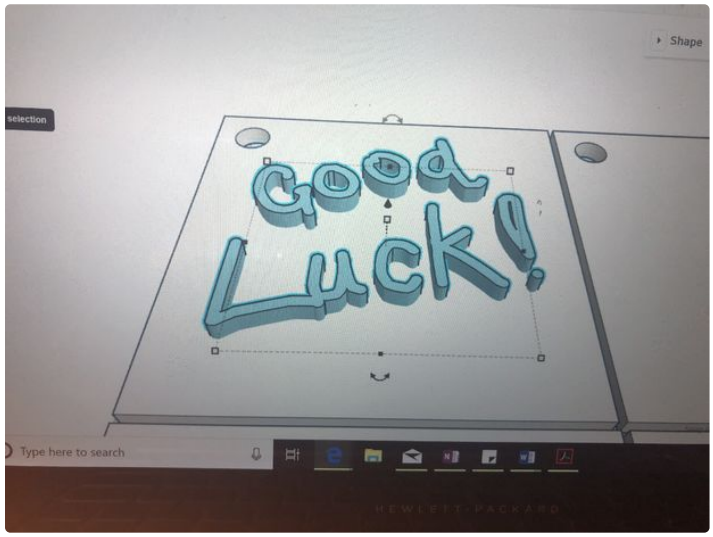
Remember, the 3D printer works from the bottom up, so you can't have pieces hanging off or over without some kind of support printed in place underneath.

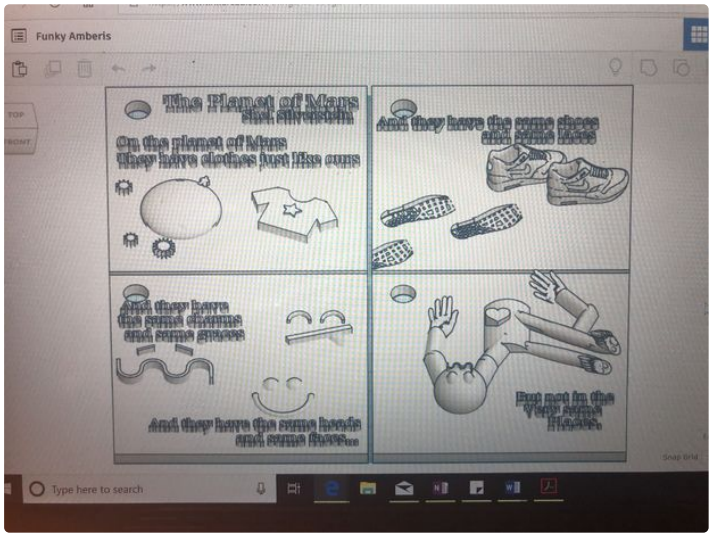
3. Look at your pages from the side and make sure that the bottom is flat and that you don't have objects sticking through to the other side.

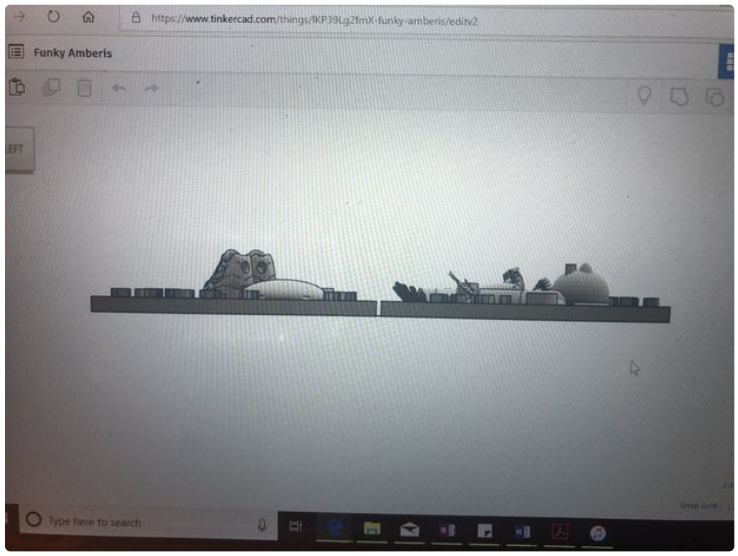
If they are sticking out, select the object that is sticking through and select the square representing your page of paper and click the button on the right of the top bar of the screen and hit "Align." It is two buttons to the right of the "Group" button you hit in a previous step.






Shape
selection
Good Luck!
Type here to search


Funky Amberis
The Planet of Mars
On the planet of Mars
they have clothes just like ours
And they have the same shoes
And they have
the same charms
And same shoes
And they have the same heads
Type here to search


https://www.tinkercad.com/things/lKP39Lg2fmX-funky-amberis/editv2
Funky Amberis
Type here to search

Step 4: Printing Your Design

1. When you're happy with your design, drag your mouse over the entire grid as if you're highlighting it so select everything and click the "group" button.

2. Click the export button and save the file as an ".stl"

3. To get access to 3D printing resources, Marston Library on University of Florida's campus has 3D printing that you pay for by the gram. There are also online printing resources that can be found on the link mentioned in the beginning of this tutorial.

A project of this size came out at about 19 dollars. In order to use Marston printing, you need to spend a minimum of $3.

4. Complete guidelines for submitting a print job can be found here:

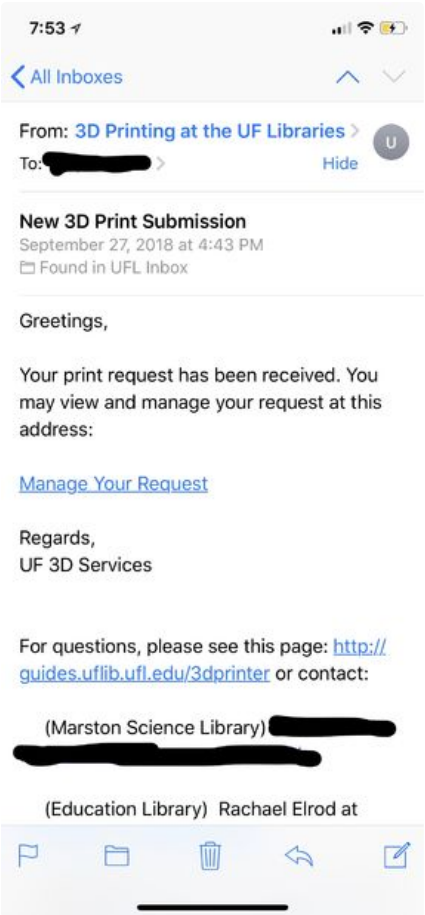
http://guides.uflib.ufl.edu/3dprinter/submit

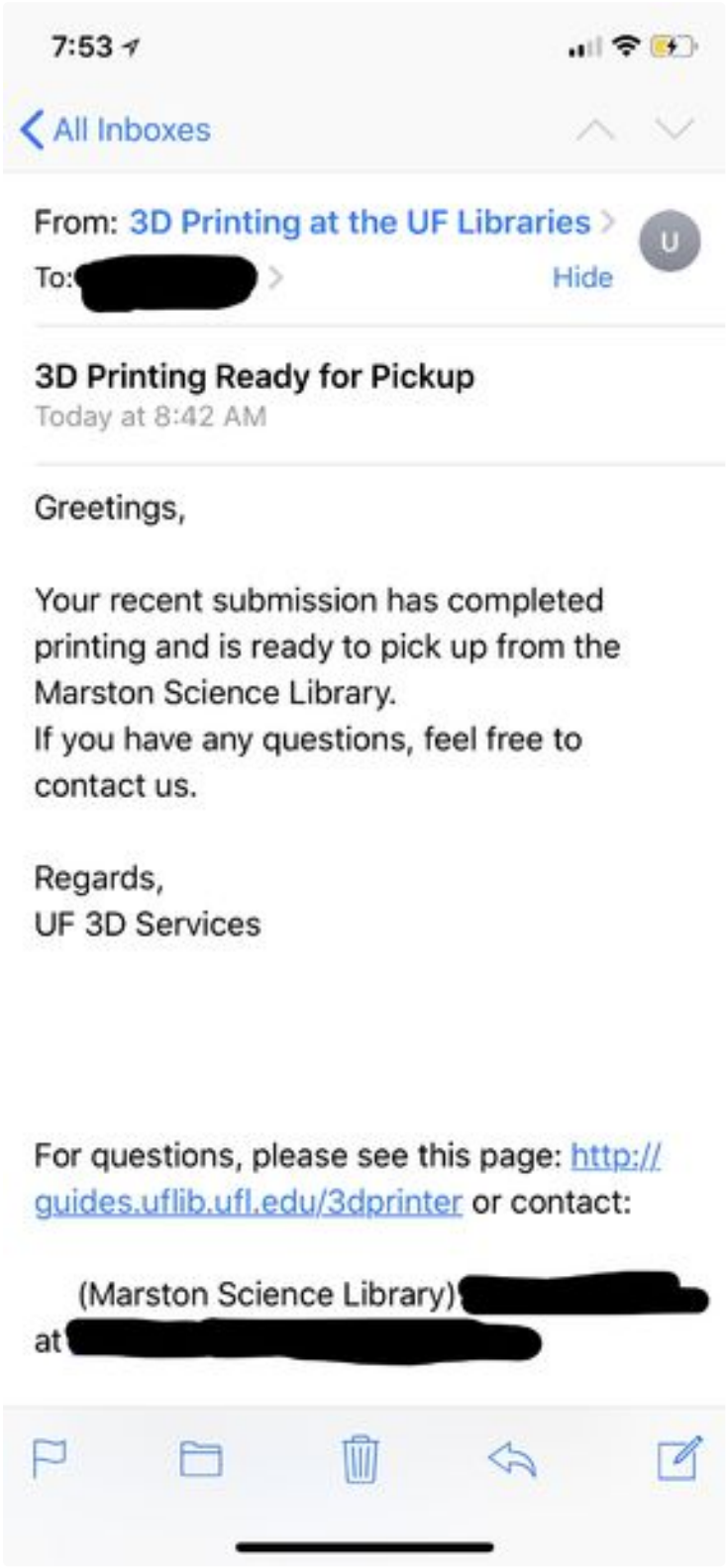
And here is the actual link for submitting the job:

https://3dprint.uflib.ufl.edu/

The 3D printing experts at the front desk of the library will update you at every step of the process and work with you to fix potential support issues if you have them.

***TIP: If you are concerned about the price, you can ask them to adjust the percent infill of the print. Standard infill is 15%, but you can make it lighter or heavier depending on your specific needs.




7:53
All Inboxes
From: 3D Printing at the UF Libraries
To: [redacted]
Hide
U
3D Printing Ready for Pickup
Today at 8:42 AM
Greetings,
Your recent submission has completed printing and is ready to pick up from the Marston Science Library.
If you have any questions, feel free to contact us.
Regards,
UF 3D Services
For questions, please see this page: http://guides.uflib.ufl.edu/3dprinter or contact:
(Marston Science Library) [redacted]
at [redacted]

Step 5: Putting It All Together

1. Paint with nail polish.

For my intended audience, which was children with visual impairments, I didn't need to add color, but I thought it would be fun so I just added a bit on the edges and as accents.

It works really well to use nail polish for painting your project, because it sticks really well to the plastic material.

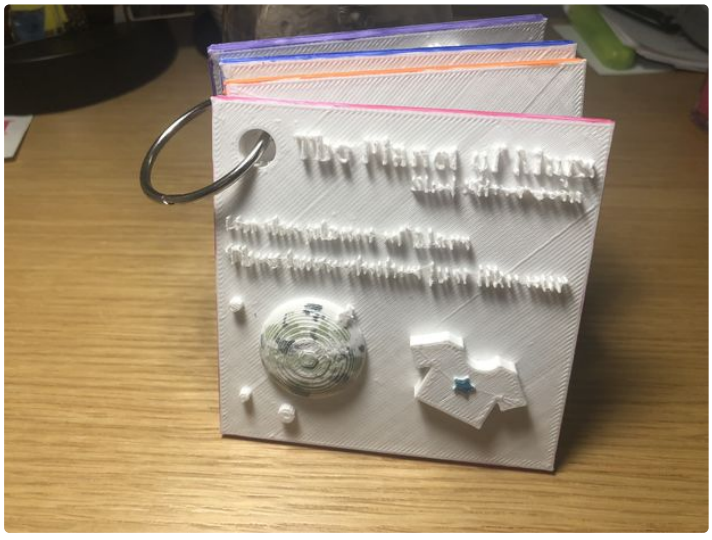
***TIP: If you choose to use another paint besides nail polish and have trouble getting the paint to stick to the plastic surface, try roughing up the surface a bit gently with a nail file so that the paint has a bit more grip.

BUT do NOT try to remove the nail polish with acetone if you make a mistake because acetone will dissolve the plastic.

I would recommend just trying to wipe it off quickly or paint over it. The good news is that nail polish is quite opaque, so no one will see your mistakes.

2. Once it's dry, pick up a small metal ring from your local Target or convenience store and put the whole thing together! The ring I used had a 2in diameter and it fit 4 pages well.

3. CONGRATULATIONS! You've just 3D printed a Tactile book!!



This is fantastic! We have several 3D printers at our library and I'm going to print one for my daughter!

That makes me so happy to hear! Post a picture here when you do so I can see it! :)

What a great idea! I've never thought to 3D print a book before!

Thank you, I appreciate it! I can't claim credit for the idea, but check out the Tactile Picture Books Project :)