

Intro to Tinkercad & 3D Printing

In this tutorial, you will set up a Tinkercad account, design a basic object, and 3D-print it!



Introduction

Tinkercad is an online program that lets you design and export 3D models. These models can be downloaded and sent to one of our 3D Printers.

Tinkercad is free, and you can use your school email to create an account. Models you create can be private, or can be made public for others to copy as a starter for their own projects. It's simple to learn, but you can make amazingly complex models with it.

This tutorial is designed to give you a taste of using Tinkercad, and to enable you to print your very first object!

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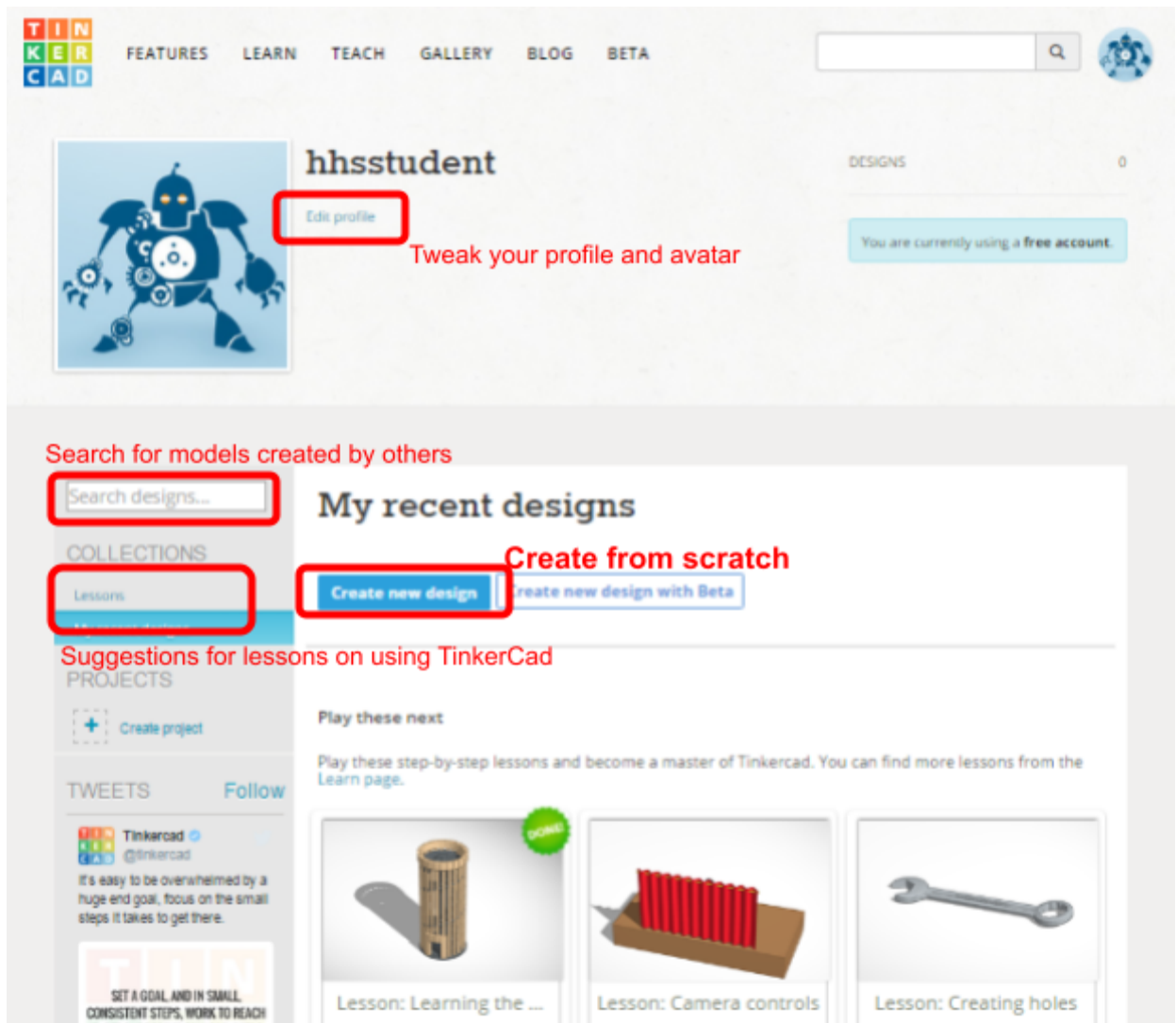
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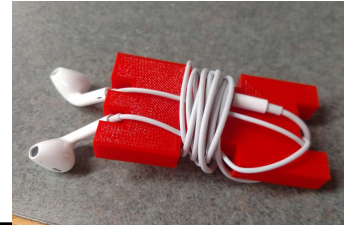
Setting up your account

1. On a school computer, school Chromebook, or personal laptop, visit www.tinkercad.com
2. In the top right corner, click "Sign Up"
3. Enter your country and date of birth and click Next
4. Enter your school email account, and then enter a new password that you will use for Tinkercad.
5. Once signed in, you will be brought to your profile page. This is your starting point for work in Tinkercad.



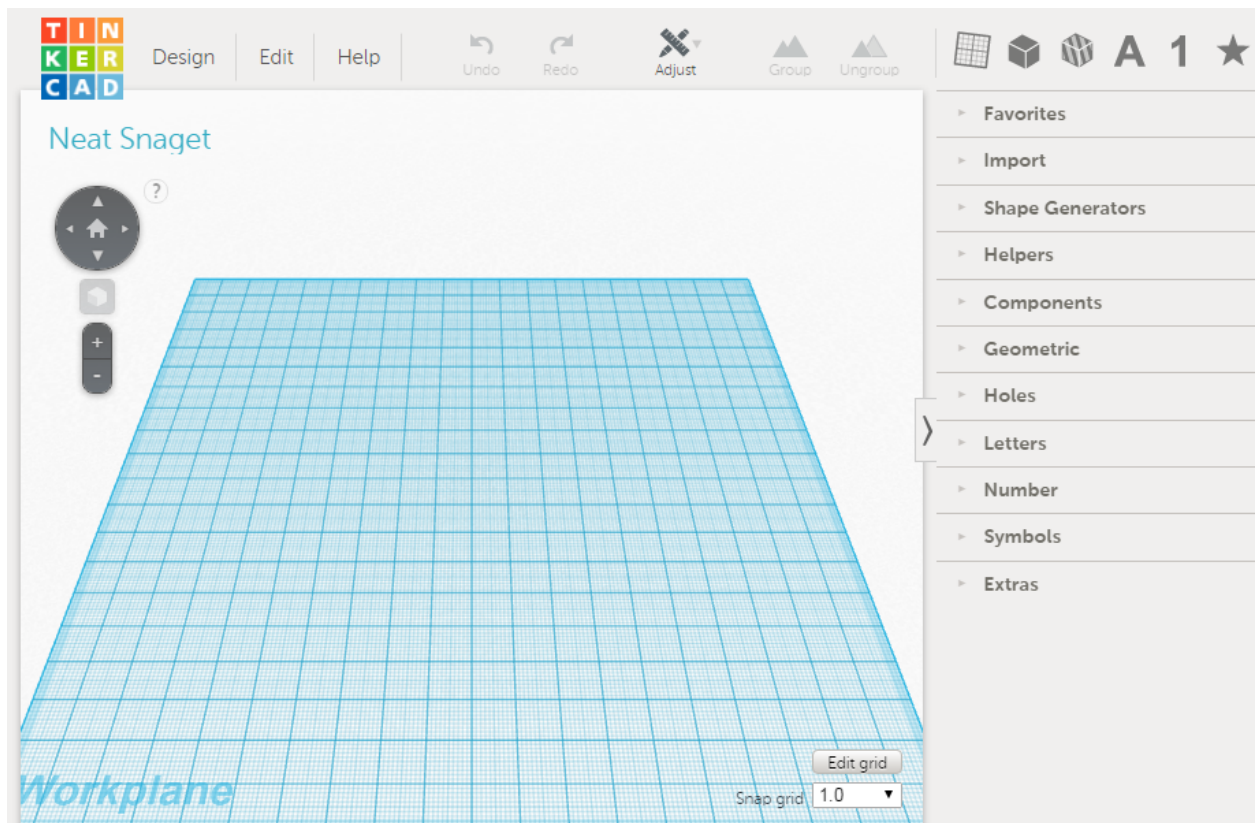
Making your first model

For this tutorial, we'll make a very basic object: an ear bud holder.



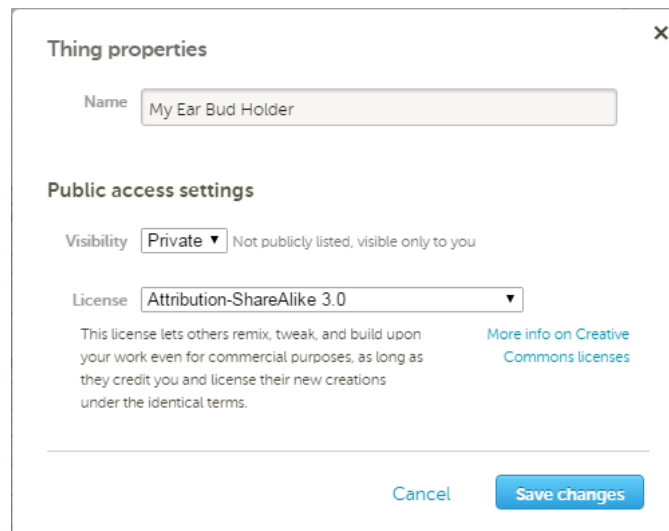
Note: It is much, much easier to work with Tinkercad using a mouse than with a trackpad.

1. From the profile page shown above, click the “**Create new design**” button.
This brings you to a new blank model.



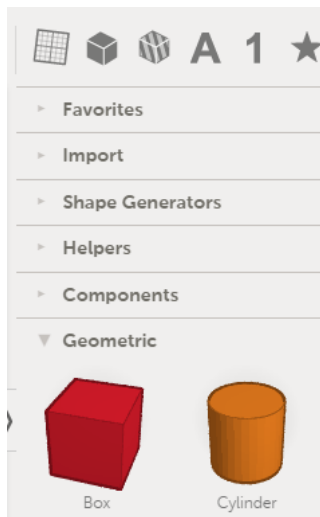
2. Your model will be given a cute, silly name -- some random adjective and fake noun, like “Neat Snaget” in the image above. Let’s **change the name** to something more useful.
 - a. In the menu, click **Design...Properties**.

- b. Change the name to “**My Ear Bud Holder**” and click **Save Changes**



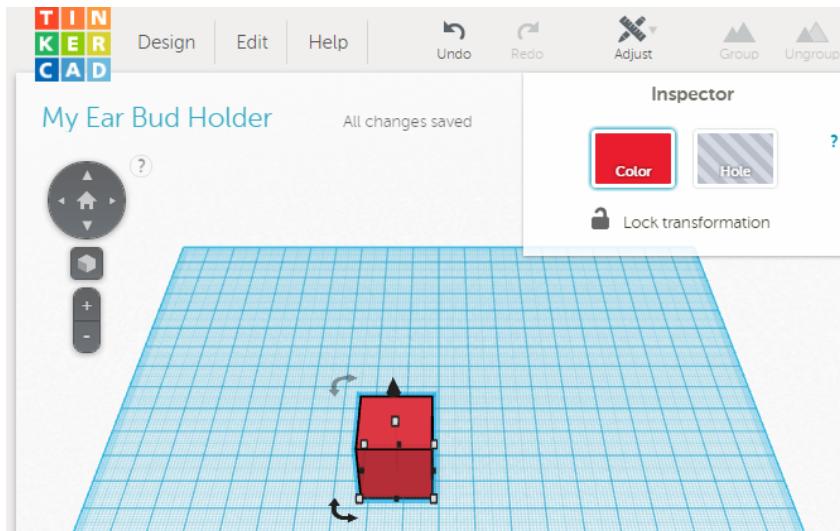
The screenshot shows the 'Thing properties' dialog box. The 'Name' field is set to 'My Ear Bud Holder'. Under 'Public access settings', the 'Visibility' is set to 'Private' (with a note 'Not publicly listed, visible only to you') and the 'License' is set to 'Attribution-ShareAlike 3.0'. A description of the license is provided, along with links for 'More info on Creative Commons licenses'. At the bottom, there are 'Cancel' and 'Save changes' buttons.

3. Now let's make the basic shape of your ear bud holder. We will start with a rectangular box. In the **right-hand menu**, open the **Geometric** section and locate the **Box**.

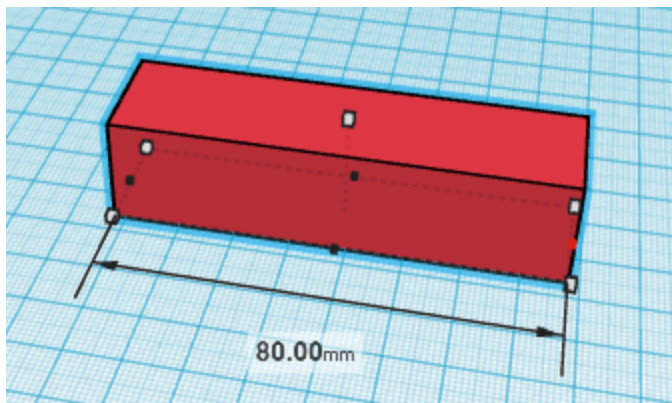


4. **Drag and drop the box icon** onto the blank grid.

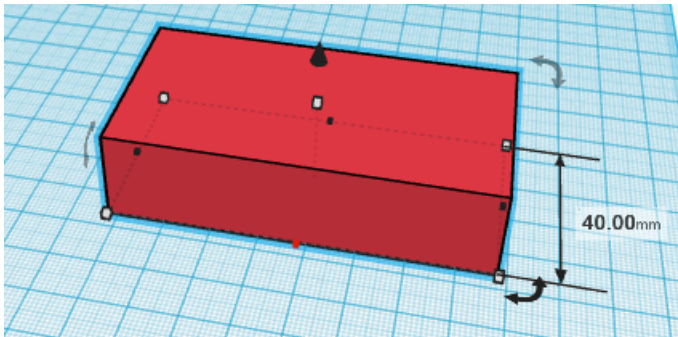
Note: the color of the model in Tinkercad has nothing to do with the color that will eventually get 3D printed.



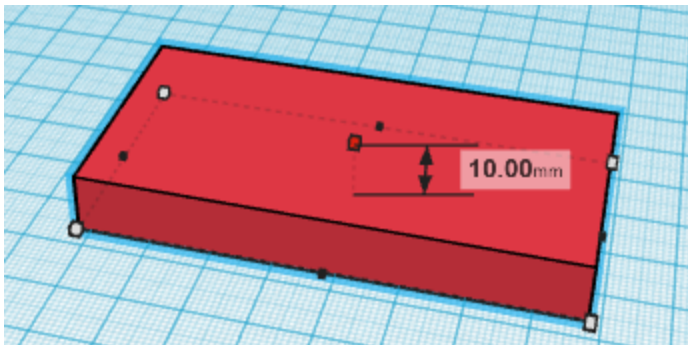
5. **Right-click and hold** and move your mouse around (on a Chromebook trackpad, use your left hand to hold Alt key and hold-click the trackpad, and with your right index finger, slide around on the trackpad). Notice how this rotates your view so you can see the box from different angles. Also, note the **arrow and zoom controls** on the left, that let change angles with a single click.
6. Click and drag the **black dot** on the **right-hand edge** of the box. Stretch the box to the right until it is about **80 mm long**. (Exact dimensions are not important for this tutorial.)



7. Click and drag the **black dot** on the **front edge** of the box. Stretch the box until it is about **40 mm deep**.

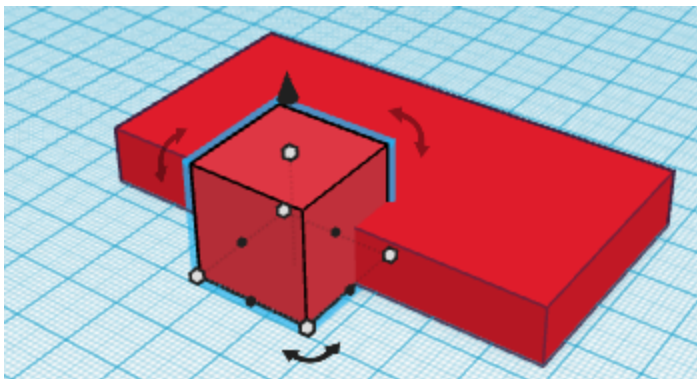


8. Click and drag the **white dot** on the **top edge** of the box. Shrink the box until it is about **10 mm tall**.

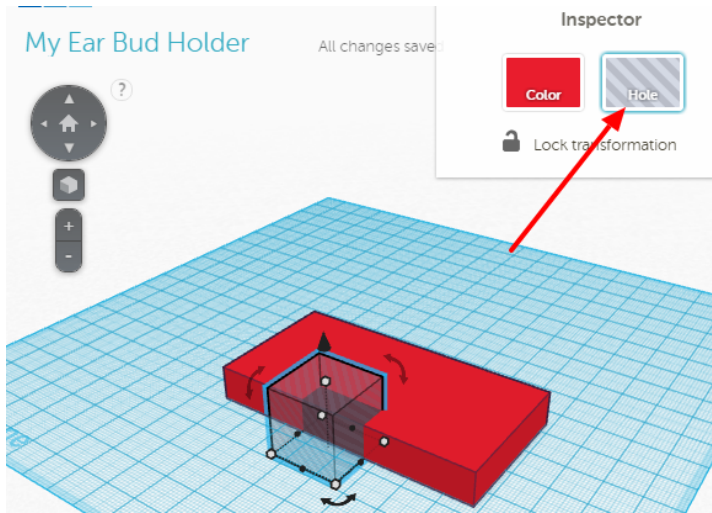


Great! Now we have our basic box. Let's cut some notches in it to hold the wires.

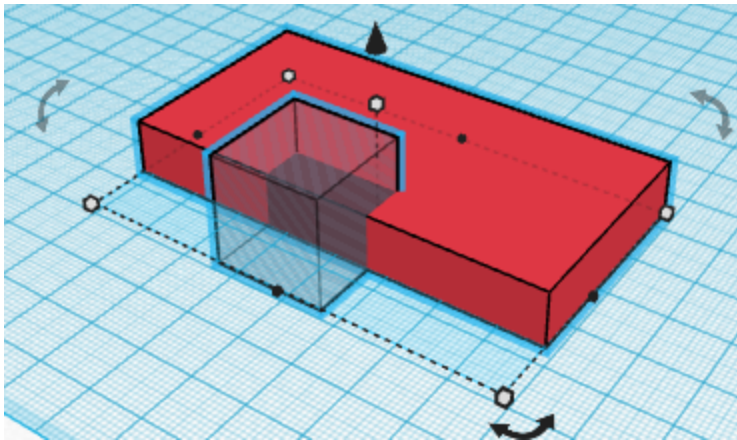
9. Drag a **new box** from the Geometric menu on the right, and drop it on the grid.
10. Click and drag the box (by clicking in it but not on a dot) and **overlap it into the front long edge** of the first box (see below).



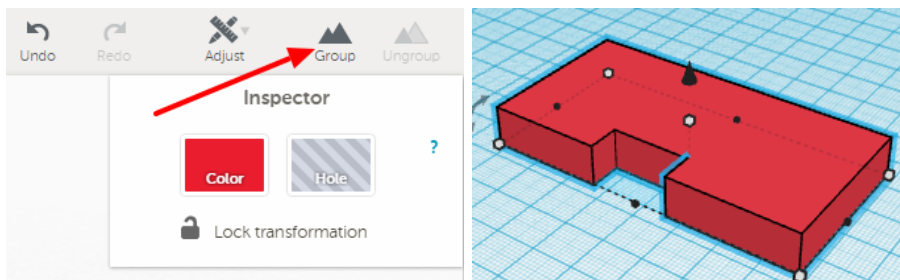
11. While the newer box is **still highlighted**, click the **Hole** button in the Inspector box. This will change the box into a transparent box-shaped hole.



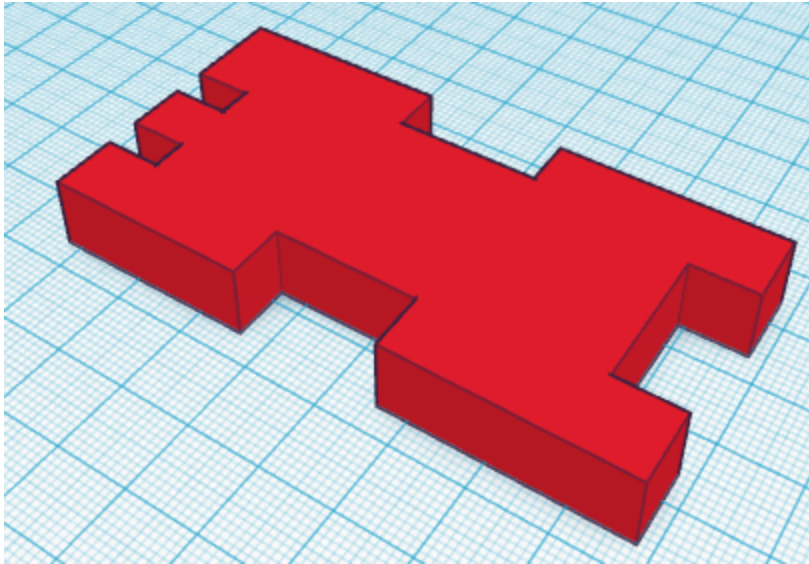
12. **Shift-click both** the transparent box and the original red box so that both are highlighted (a blue border appears around both).



13. Now for the magic: With both objects highlighted, click the **Group** button. By grouping a solid shape with a hole, it **creates a new shape** with the hole cut out! (Sometimes it takes a second or two for the result to appear on the screen. Be patient.)



14. Now repeat those steps, creating other cut-outs in the main box. Make it look something like this:



That's it! You've created your first object! The next step is printing!

Printing your Object

To print your ear bud holder, you will need to **use one of the computers attached to a 3D printer** in the library MakerSpace. These computers can be a little slow-ish, so that's it nice to be able to make your model on your own computer first.

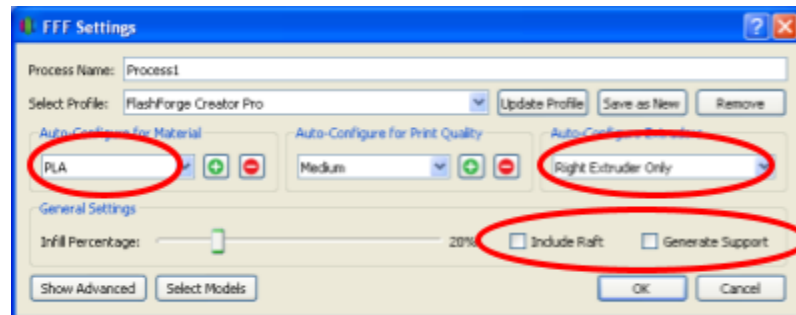
1. Before beginning, you need to **choose a color!**
We have a variety of colors of plastic available in the MakerSpace, but changing the colors in the printer requires assistance from a librarian or PIT Crew member. Ask one for help getting a color installed for you in a printer.

Note: the color of your model in Tinkercad has nothing to do with what actually gets printed. The color of your printed object depends on the spool of plastic filament loaded into the printer.

While the printer warms up and a new color is loaded, you can continue through the next steps.

2. Open **Chrome**, go to tinkercad.com and **sign in** to your Tinkercad account.

3. From your profile page, **click the image of your model**. (If you just created your model a few minutes ago, the preview image might not appear. That's OK, just keep going.)
4. In the pop-up window, below the model preview, click the **Download for 3D Printing** button, and then choose **.STL**. (This is the file type that the printer can read). The file should download automatically.
5. Once the file has downloaded, click its icon to **launch the file** in Simplify3d. The computer can be slow-ish at times, so it may take a minute or two to launch completely.
6. Click the **Center and Arrange** button to put your model in the middle of the printer's bed.
7. Click **Edit Process Settings** and confirm these settings:
 - a. Auto-configure for material: **PLA**
 - b. Auto-configure extruders: **Left-only OR Right-only**, depending on which spool is holding the color you want.



- c. For this model, you do not need a raft or supports, so make them UNchecked.
 - d. Click **OK**
8. Click **Prepare to Print**
9. Click **Begin Printing over USB**

And.... there it goes! You will hear the printer move to the start position, and then it will stop. This is because it needs to heat the print bed and the nozzles. Don't leave yet!

10. **Wait until the printer heats up**. You can see the progress on the little screen on the front of the printer. This usually takes 3-4 minutes.
11. When heated, it will start printing nice solid lines on the printbed. **Watch it lay down the first layer or two**. You are looking to see that the filament sticks to the print bed

properly, and doesn't slide around.

If there is a problem, like the plastic doesn't come out, or it blobs up and doesn't stick, call a librarian or PIT Crew member. If no one is available, use the screen and buttons on the front of the printer to *Cancel the Print Job*.

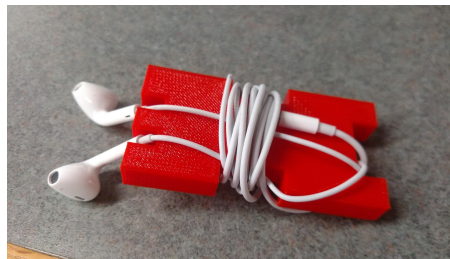
! DO NOT touch the nozzles where the filament comes out. It is extremely hot.

! DO NOT try to re-print until you get help.

12. When it finishes the first layer or two correctly, **close Chrome** but **leave Simplify3D open**. It may take anywhere between 30 minutes to 3 hours or more to print your model, depending on the size. When you **come back later**, if your model is not on the bed, check with the librarians.

- a. If no one is around to help, and your completed object is just sitting on the print bed, go ahead and take it. It will be stuck to the print bed, but a firm twist should pop it free.

Congratulations! You are now the **proud owner** of an ear bud holder that you modeled and printed yourself!



Of course, the design is **very basic**, and might not fit your particular ear buds very well. As you learn more about Tinkercad, you might find **ways to improve this design**, by

- Rounding off the corners
- Adding your name in the middle
- Changing the dimensions to fit your favorite ear buds better.

You are on your way in the MakerSpace design process! Head over to [Tutorial #2: Getting Better At Tinkercad](#) for start making some more complex models!