

First CNC project

All students except Make 2 students who have used the Carvey before who don't want to do this again (come tell me you will not be doing it, by default, I expect you to do it.)

Due: 4th period: Tuesday 10/26

5th period: Wednesday 10/27

We have multiple CNC machines here in the Maker lab, but the main one we use is called the "Carvey", made by Inventables. CNC stands for "computer numeric control" and in many forms the technology has been around for decades. Our CNC machine uses a computer to control a drill bit that moves over a material to cut a design. We use software called Easel from Inventables, the makers of the Carvey, to cut things.

[Click this link](#) to watch a short video that shows you in 45 seconds what the Carvey machine can do.

Each of you is going to design and cut a design on a six by six inch piece of MDF wood like the sample I showed you at the start of class. Our projects will not cut all the way through; we will be carving designs into the top layer of white wooden blocks.

Steps:

1. Launch Chrome.
2. Create an account on [Inventables](#) using your school Gmail account by clicking on Log in on the top right, then saying you're a new user. It's free. Remember the password you choose.
3. After you have an Inventables account, enter Easel.
4. After Easel opens come back here to this PDF and click on this link to open our template: <http://easel.inventables.com/projects/rYY60NGJVNQThXQ4WyR9CA>
5. Under the File menu inside Easel, choose Make a copy. This tells Easel to copy the template file into your account.
6. Click on the title "Copy of Template" and rename the document to be your first and last name.
7. Make your design. See requirements below.

Requirements:

Your creation must have at least two required parts:

1. **Your name** in letters that are close to 1 inch tall. Check out the different fonts.
2. An **image**. You have two choices: 1) create something in Inkscape, then import the .svg file using the Import SVG function, or 2) use the "Image Trace" feature under Import to try to import a graphic or image from the Internet. For this assignment, even though the built-in Icons are fun, I'd like you to create your own artwork using Inkscape. You can even set up your name in Inkscape then import that; be sure to choose "Object to Path" on everything in Inkscape before you try to import it into Easel. Don't use an image that is super complicated.

Other important things to remember:

- Stay 1 inch away from all sides. The machine uses clamps to hold the wood in place, and we can't have the drill bit getting too close to the clamps.
- Keep your image fairly simple.
- You're not done yet, continue with instructions on next page.

When you like your design, set the depth of cut carefully as follows:

1. With nothing selected type Control-A to select all.
2. Switch to the "Cut" tab on the little window that appears.
3. Set the depth of cut to .02 then press Enter. (That is "point zero two", not "point two".

At first it might seem that this makes your design disappear, but don't panic. It's still there, just showing lightly because the cuts are very shallow. Zoom in here to the right and you can see my image is still there.

4. Down at the lower part of the floating window, consider changing the cut settings. Easel can either cut out the insides entirely, or it can just do the path outlines. The default for most things is "Cut Path: Clear out a pocket". You may need to change the setting to "Cut on shape path".
5. A general rule of thumb is to not try to clear out a pocket on everything because that takes too long. Don't fill everything because that makes the cut take too long.

Click off of everything and take a look. Everything should be the light grey color. If anything is darker in color, such as a strong black, select All and re-set the depth of everything to .02.

Over to the right click the **Simulate** button. Make sure your design will take less than 10 minutes to cut. If it says more than 10 minutes, simplify your design, change the cut path settings (pocket, or cutting on shape path) (clearing out pockets takes longer than outlines) or change your design. Run the Simulate button again until your design is less than 10 minutes to cut.

When you are done with everything, log out of Easel before you close your window by clicking the easel icon located at the top left near your document title, then click Log out (Easel automatically saves your work for you.)

Then tell Mr. Hays that you're ready to cut your design out.

