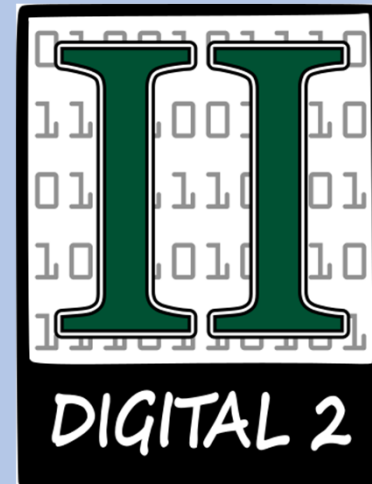


Tulane MakerSpace

Digital-2
Training
Presentation

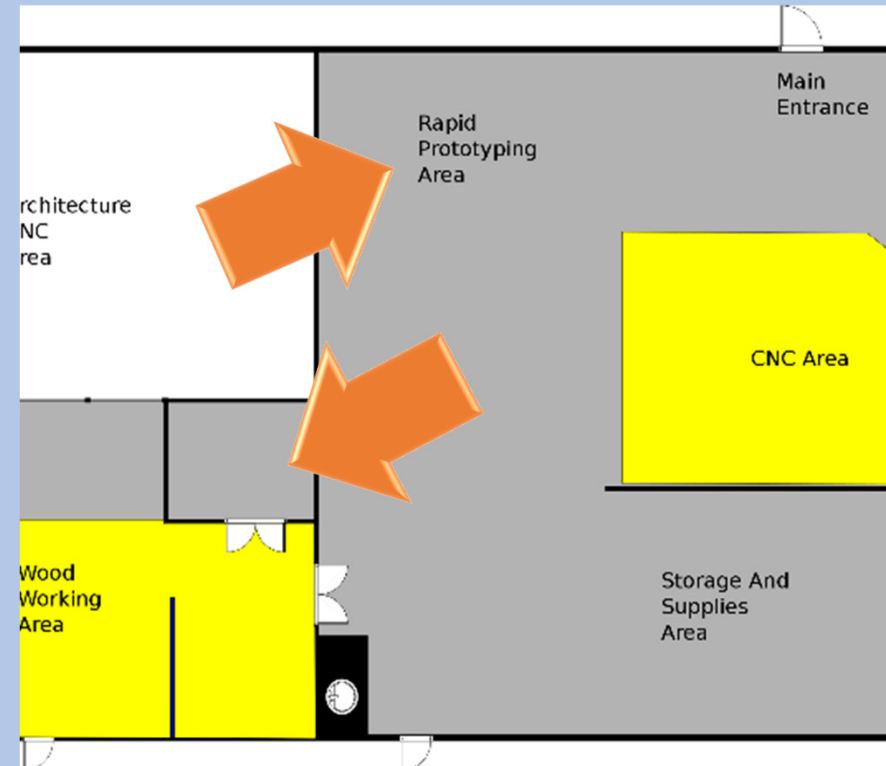


Digital-2 Training



➤ MakerSpace Layout:

- **This presentation will focus on tools in the “Rapid Prototyping Area”, which is used for developing prototypes and short term models.**
- **This area is a “gray zone”, meaning no specific Personal Protective Equipment (PPE) is required to enter.**
- **Training for the Digital-1 Badge requires completing this presentation and quiz, plus making the two parts described on the website.**





Tulane MakerSpace

The “Ember” SLA
3D Printers

Ember SLA Printers



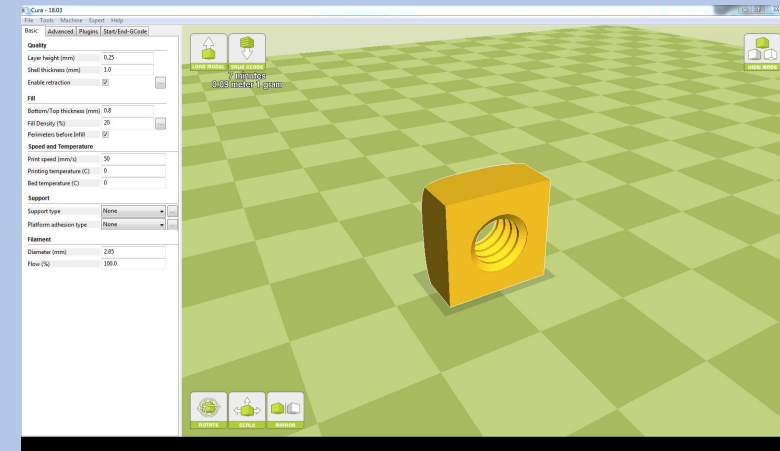
- **The Autodesk Ember is a SLA (stereolithography apparatus) 3D printer which uses a UV projector to harden plastic resin on the build-plate.**
- **It can create very high-resolution prints, but it has a much smaller build area than other 3D printers.**
- **The resin it uses is also rather expensive, so it cannot be used for free in all cases. Users will need to purchase their own resin.**



Ember SLA Printers



- **Once you have a suitable model saved as an .stl or .obj file, you will need to translate it into the language of the printer (called “gcode”), using “slicing” software.**
- **For the Ember, you must use Autodesk’s Print Studio software, which is located on the computer near the other 3D printers.**
- **Once your file is set up you can save it to a Mini SD card (using an adapter if necessary) and transport it to the Ember printer.**



Ember SLA Printers

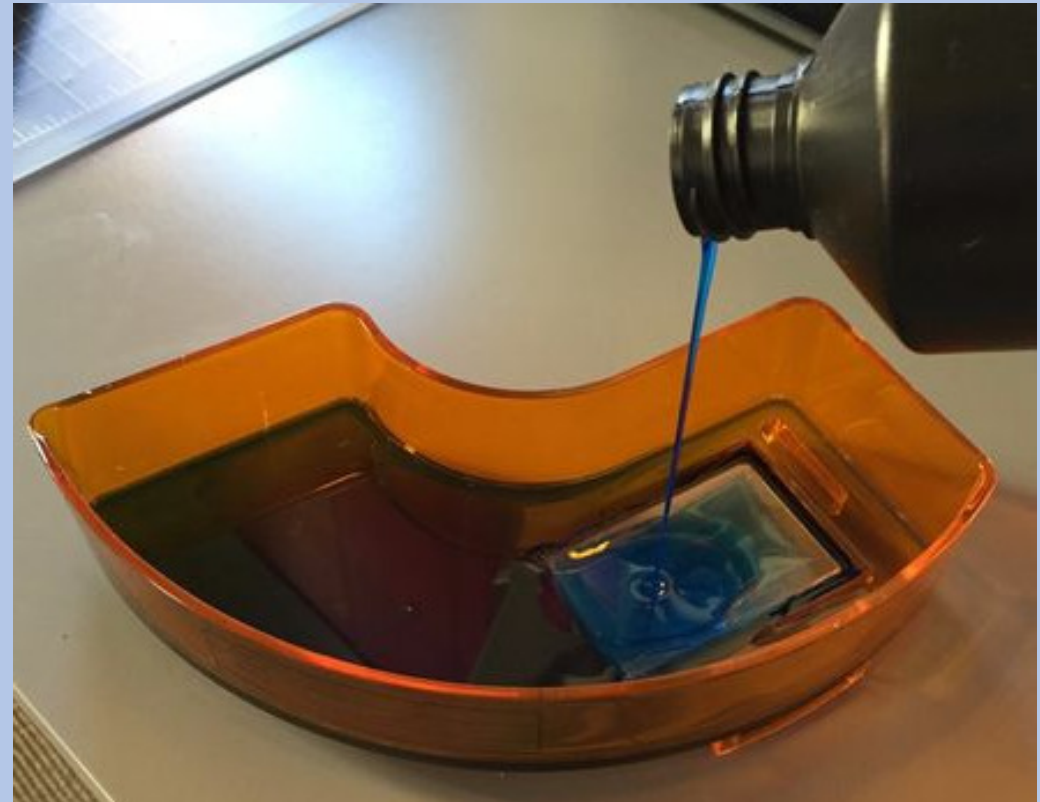


- **The basic steps of using Print Studio is familiar to anyone who has used another slicing software.**
- **Import an STL file.**
- **Choose a resin profile.**
- **Click “Layout” and position your part.**
 - **Tip: Support is easier to remove if your part is angled. Try arranging it to a 45° angle before moving on.**
- **Click “Repair” and repair any issues with your STL file.**
- **Click “Supports” and add the necessary support material.**
 - **Tip: ALL prints on these machines need support, the print will fail without it.**

Ember SLA Printers



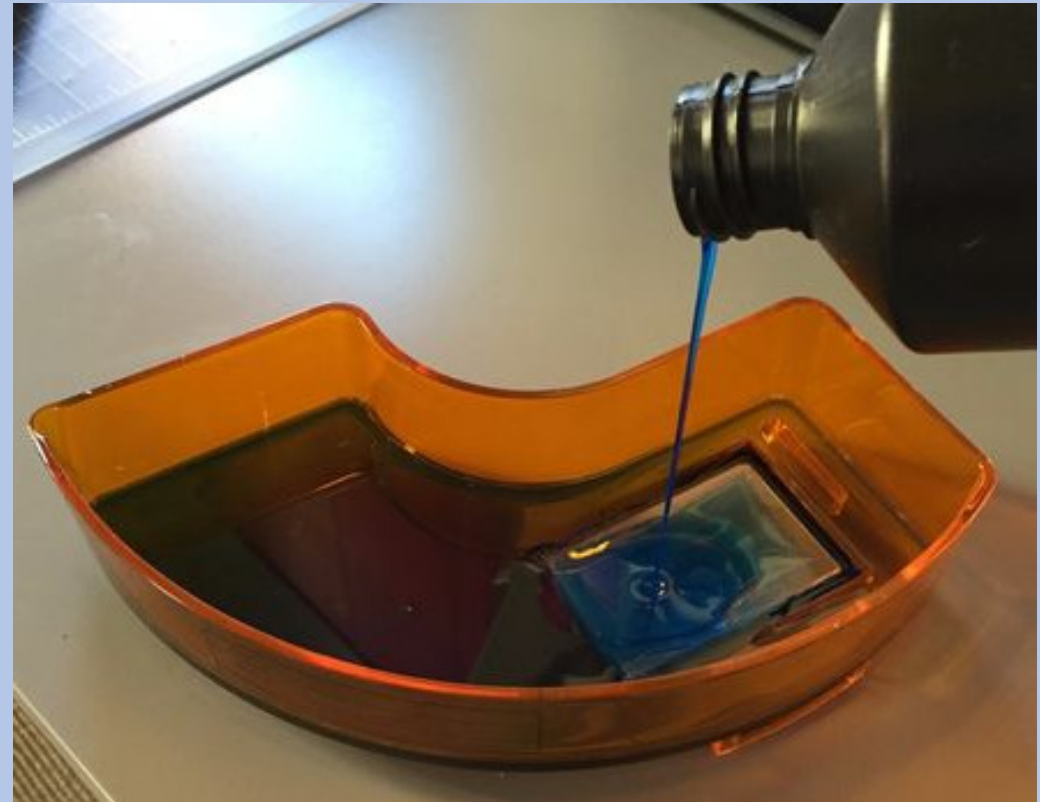
- **Click “Preview” to perform the slicing operation and preview the slices.**
- **Click “Print” to save the job to the mini-SD card.**
- **To start the print, first fill the resin tray to the Max Fill line.**
- **Press “Start” on the printer.**
- **Follow the calibration steps if necessary.**
- **Close the door and press “Done”.**



Ember SLA Printers



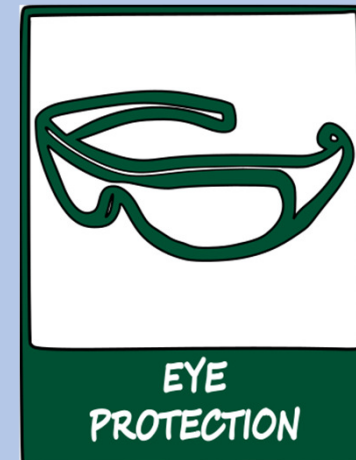
- **When your print is finished, remove the resin tray, pour any remaining resin back into the container, and clean it with isopropyl alcohol.**
- **Remove the print head and peel off your object. Then clean the print head with isopropyl alcohol.**
- **Finally, *clean your part with isopropyl alcohol* to remove any toxic resin.**

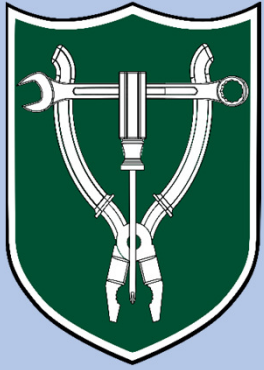


Ember SLA Printers

➤ SAFETY:

- **The resin used for the SLA printers is toxic, you must wear chemical gloves when handling it at all times.**
- **The projector is designed to give off ultra-violet light, while the shielding is protective remember that UV light is dangerous and do not ever attempt to look directly into the light source.**





Tulane MakerSpace

The “Carvey” Router

The “Carvey” Router



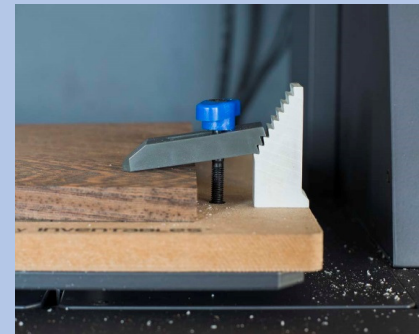
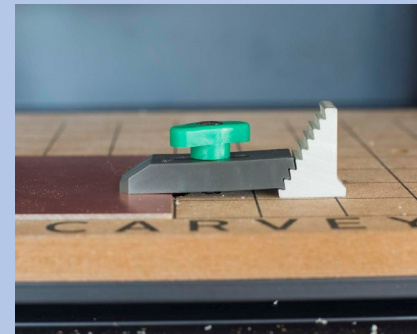
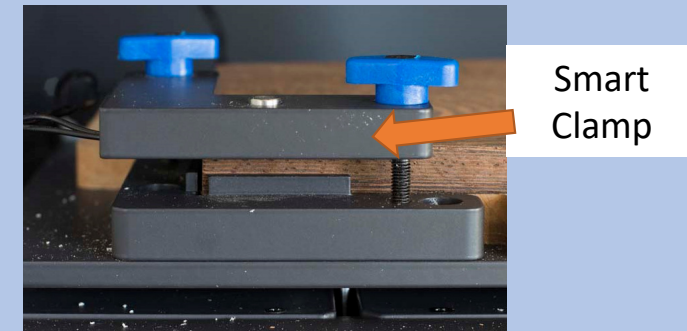
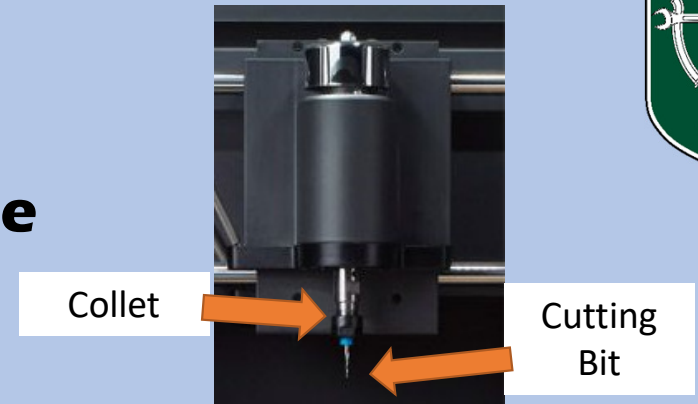
- **The Carvey is a small CNC router/mill that can be used to cut parts out of thicker materials. It will work with most common wood and plastic materials (**NO metal**).**
- **The Carvey will trace any vector image (.svg) to either engrave the image into the material or cut out specific shapes. The depth of the cut can be set by the user.**
- **You can also import CAM files from Autodesk Fusion 360 for more detailed 3D models.**



The “Carvey” Router

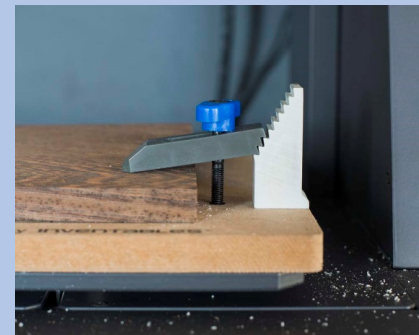
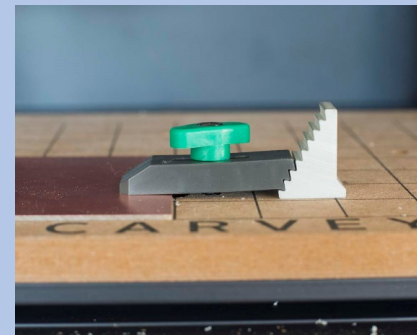
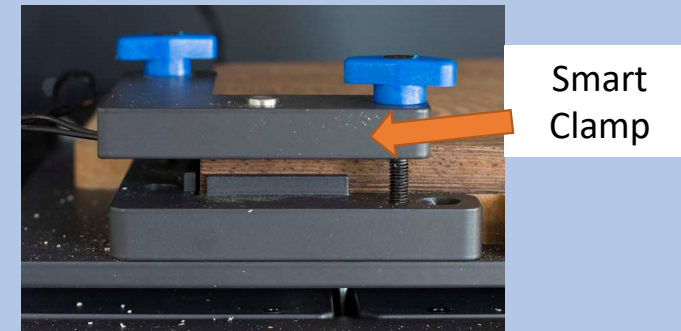
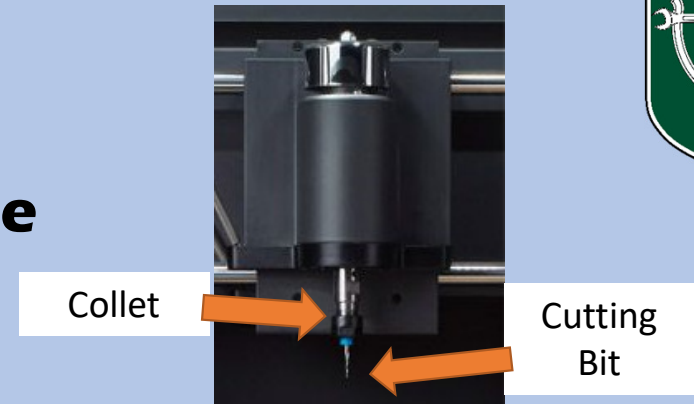


- **First, insert your cutting bit into the correct-sized collet and tighten with the provided wrenches.**
- **There are a number of different cutting bits that can be used, but all must fit a 1/8" collet.**
- **If you need to change cutting bits, make sure the machine is **turned off** before doing so.**
- **The Smart Clamp sets the height of the material and **MUST be used** every time**



The “Carvey” Router

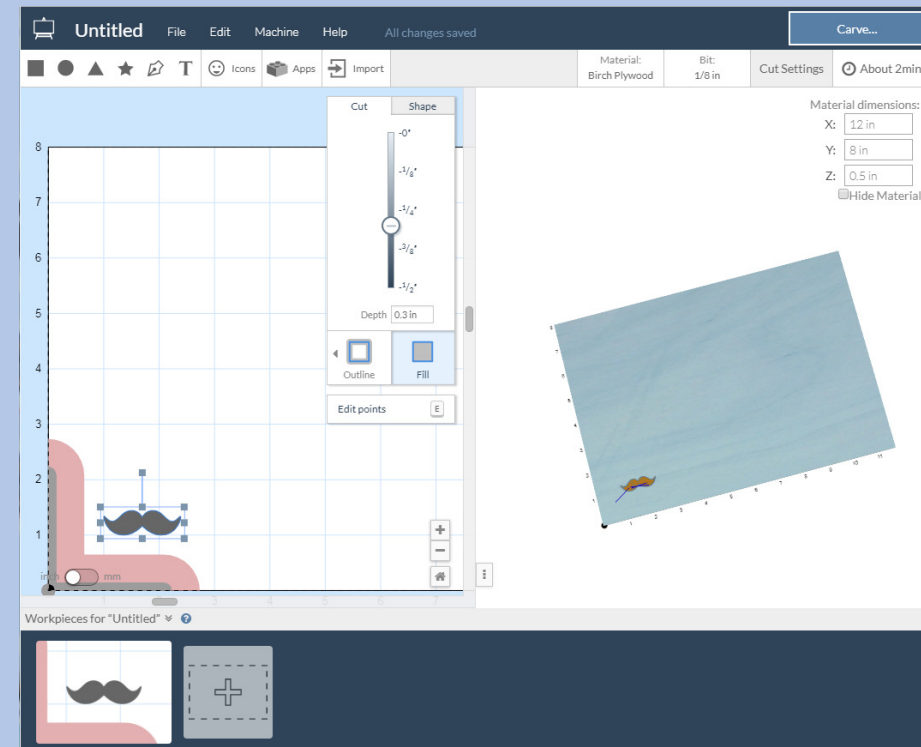
- **First, insert your cutting bit into the correct-sized collet and tighten with the provided wrenches.**
- **Clamp your material in place using the Smart Clamp (L-shaped clamp in lower left corner), then use other clamps as necessary.**
 - **The Smart Clamp sets the height of the material and **MUST be used** every time.**
 - **Keep other clamps away from where the cutting bit will travel.**



The “Carvey” Router



- On the computer, click the link to open the “Easel” software.
- Import your .svg file and adjust the position and depth parameters. Click “Simulate” to generate a preview of the result.
- Select the correct material and bit size, then click “Carve”.
- When your piece is finished, remove it carefully and use the shop-vac to **clean the dust out of the machine.**

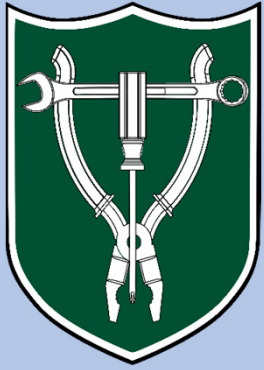


The “Carvey” Router



➤ **SAFETY:**

- **Make sure that your workpiece and cutting bit are securely held in place.**
 - **Broken bits and loose pieces can become projectiles.**
- **Do not try to open the lid while the machine is running.**
 - **The Carvey will shut down if the door is opened, but it is still dangerous to remove the protective covering and place fingers near the moving parts.**
- **Do not try to cut metal, or any other unapproved material.**
 - **There is a long list of usable materials on the website, if you have a question about a material please ask.**



Tulane MakerSpace

The “iSense”
3D Scanner

The “iSense” Scanner



- **The “iSense” scanner is a simple device that attaches to an iPad in order to scan physical items in 3 dimensions.**
- **It uses both the iPad’s original camera and an infrared lens in order to produce the image.**
- **The scanner and iPad are kept in the Director’s office, ask a Ninja for help if you want to use it.**



The “iSense” Scanner

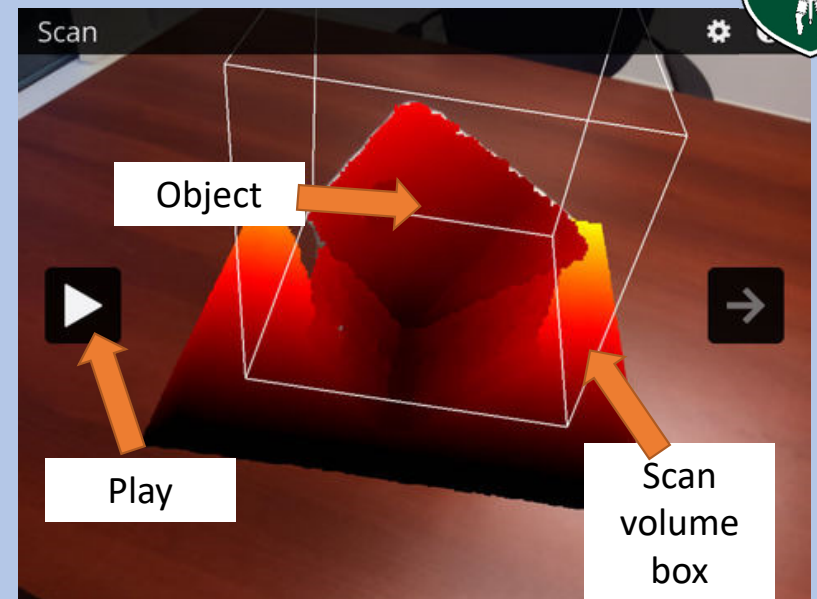


- **To use the scanner, first make sure the iPad is charged and then attach the scanner as shown.**
- **Make sure you clamp it firmly in place, you don't want it to move during scanning.**
- **Start the tablet and select the iSense app.**



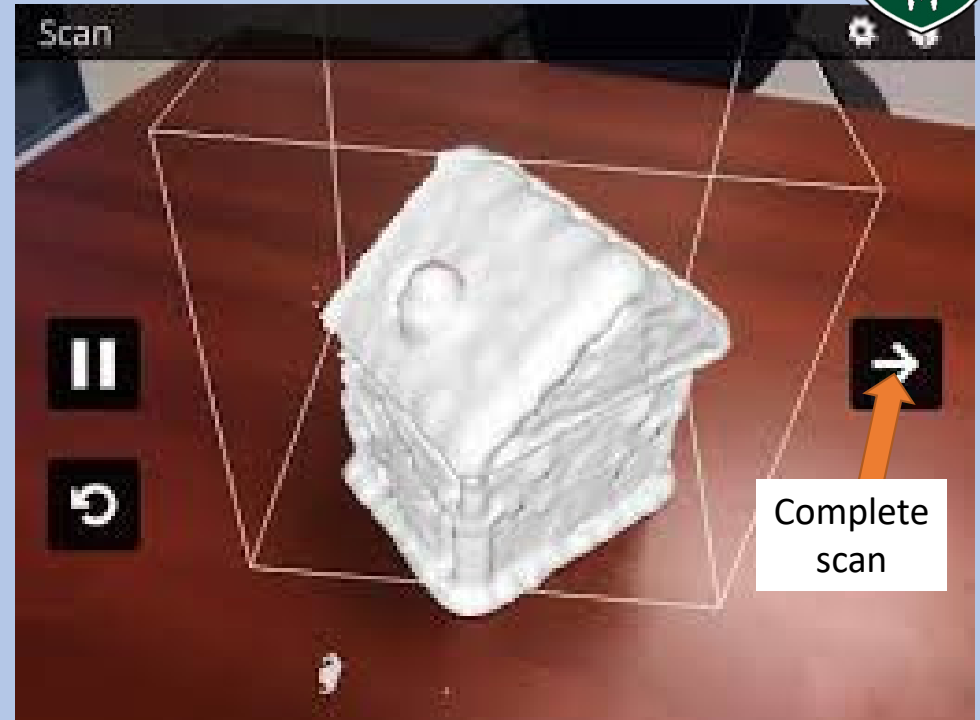
The “iSense” Scanner

- **A box will appear on the screen, this is the volume that will be scanned.**
- **You can change the size of the box by pinching the screen or moving closer/farther from the object.**
- **Make sure the box is surrounding your object, then hit the “Play” button on the left side of the screen.**
- **Hold the computer still as it begins to scan the object.**



The “iSense” Scanner

- **As parts of the object are scanned, they will fill in with a white texture.**
- **As the scan fills in, move the camera around the object to allow it to scan other parts. Tilt the camera up and down in order to scan the top and bottom of features.**
- **When the object has been fully scanned, press the arrow button on the right side of the screen to complete the scan.**



The “iSense” Scanner



- **Review the scan and press “Solidify” to turn the scan into a solid object.**
- **On the next screen you can play with some of the editing tools if you wish.**
- **When you are finished, save the scan under a name you will recognize.**
- **You can only download the scans from the computer by using the “iTunes” software. Connect the tablet to the computer by the 3d printers and open iTunes to save it to a drive.**

