MakeIT

PROGRAMME GUIDE

MakeIT with Laser Crafting Starter Session

Content

1 - The Hook
15 minutes

1. **Introduction to Digital Cutters**

2 - The Activity
100 minutes + 10 minutes break

1. **How Does a Laser Cutter Work?**
How a laser cutter works and the components

2. **Safety Considerations for Laser Cutting**
Safety features of laser cutters and how to safely operate Lionsforge Craftslaser

3. **Designing Laser Cut Parts**
Use Tinkercad to make a keychain, prepare cut file using Inkscape, and cut on laser cutter

3 - Extensions
25 minutes

1. **Frequently Asked Questions**

Materials

What You Need

1. **Tinkercad Account - *www.tinkercad.com***

2. **Inkscape - *www.inkscape.org***
Inkscape also needs a laser cutting plugin, such as J Tech Photonics plugin for Inkscape *https://jtechphotonics.com/?page_id=2012*

What You Don't Need

1. **Laser Cutter** -
MakeIT provides access to the Lionsforge Craftlaser, which may be booked for up to 2.5 hours.

MakeIT will also provide **one** A3-sized sheet of 3mm clear acrylic, MDF, or bamboo plywood for cutting per booking.

Learner's Profile - Confidence Card

Need help understanding content

Content is paced well and is understandable

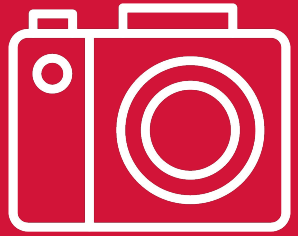
If you need help during the programme, feel free to ask. Our team is happy to pace this content to your needs.

Feel free to also help others! If you notice somebody struggling, offer your support.

A Maker values curiosity, exploration, and openness.

Smile!

You might be our next star maker!



Please be reminded that photos and/or videos of this programme and its participants may be taken.

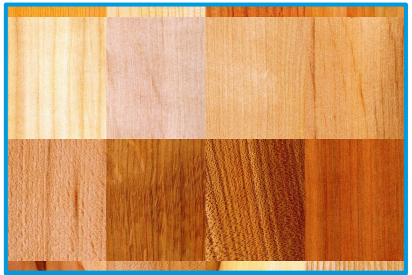
Introduction to Digital Cutters

How do we cut things?
That depends on what we need to cut.

Paper

↓

Scissors



Wood

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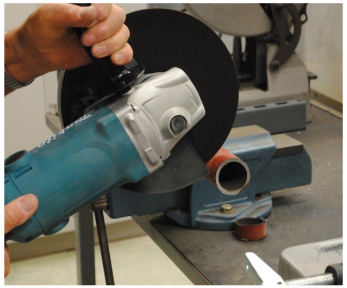
Saw

Steel

↓

Angle Grinder



Leather

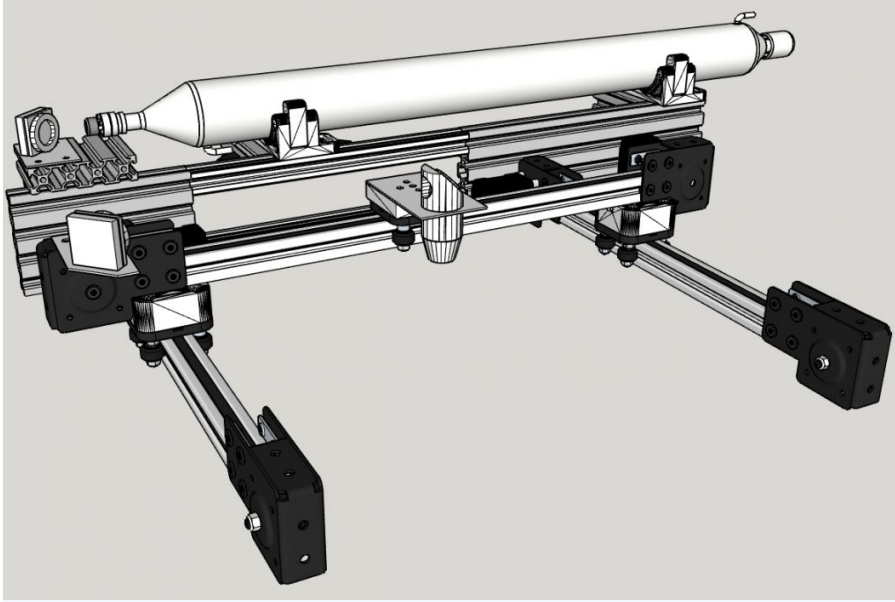
↓

Rotary Cutter

Introduction to Digital Cutters

Manually cutting objects can be tedious for the following reasons:

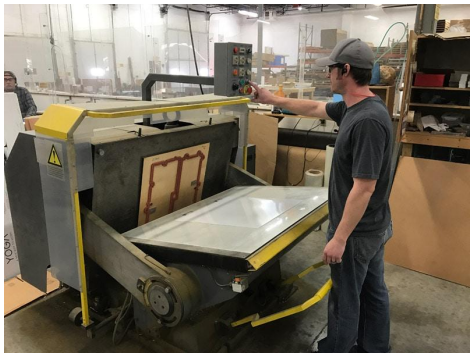
1. You don't have the appropriate tool available to do the job
2. You don't have the strength or dexterity to cut the workpiece yourself
3. You don't have enough time to cut your object
4. You don't want to waste excess material



Digital, or automatic, cutters, use mechanisms to direct a cutting head across a workpiece. There are many kinds of digital cutters available, each designed to work with specific materials.

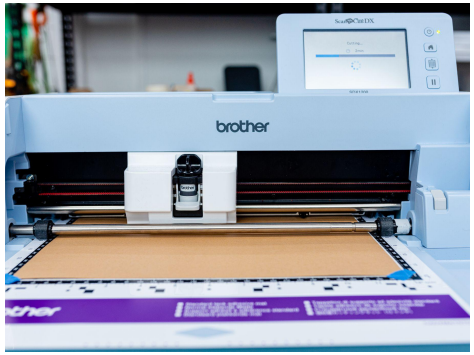
Introduction to Digital Cutters

Die Cutting



A die is created that presses into the cut material, making the part.

Vinyl Cutting



A bladed cutting head presses into cutting material, controlled by a computer.

Laser Cutting

A laser beam fires into cutting material, controlled by a computer.

Introduction to Digital Cutters

A **digital cutting** machine enables cutting of precise designs done on a computer otherwise known as **Computer Aided Design** or **CAD** for short.

What used to be an industrial service is now made accessible by the introduction of desktop digital cutters at a **fraction of the cost**.

Introduction to Digital Cutters

This video describes the features of laser cutters, how a laser cutter works, and the three types of laser cutters available.

Introduction to Digital Cutters

Laser cutters cut or etch planar (flat) materials, which can be assembled together afterward. There are many applications, including the following:

1. Making **mechanical parts**, such as gears, plates, pinions, and precision parts
2. Creating **structural parts** for enclosures, puzzles, or cabinetry
3. **Engraving** and **cutting** logos
4. Making **stencils** for painting, lithography, and decorations

Lionsforge created the Little Hands, Big Hearts initiative, which connected designers with children to build toys for the holiday season. 130 toys were built in 2020.

Introduction to Digital Cutters

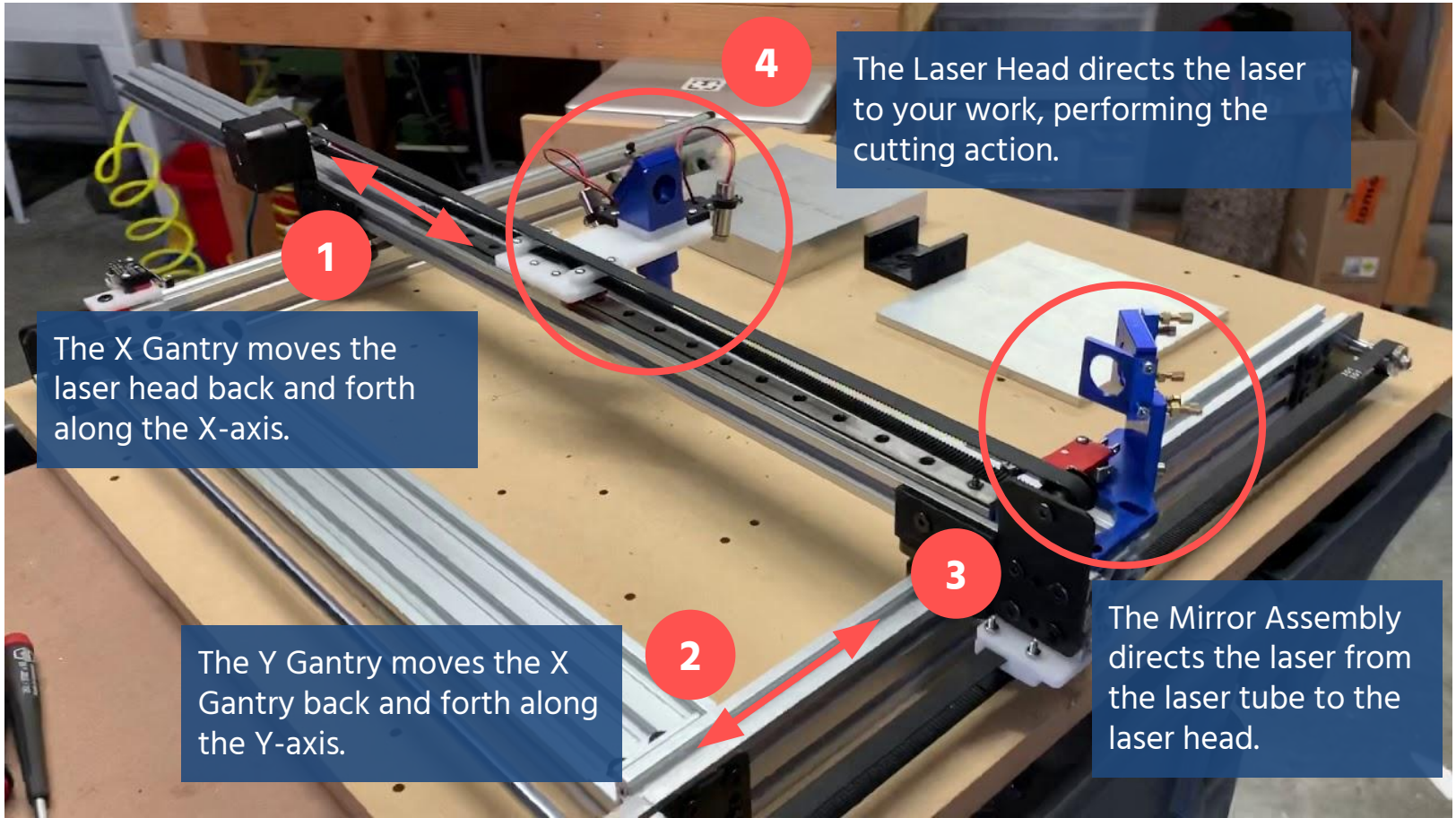
Laser cutters are among the most accurate tools to use for making objects, allowing for very precise measurements to be incorporated into designs.

Learning how to design and create objects using a laser cutter can transfer over to other digital cutting machines. Many of the file types and work processes are similar!

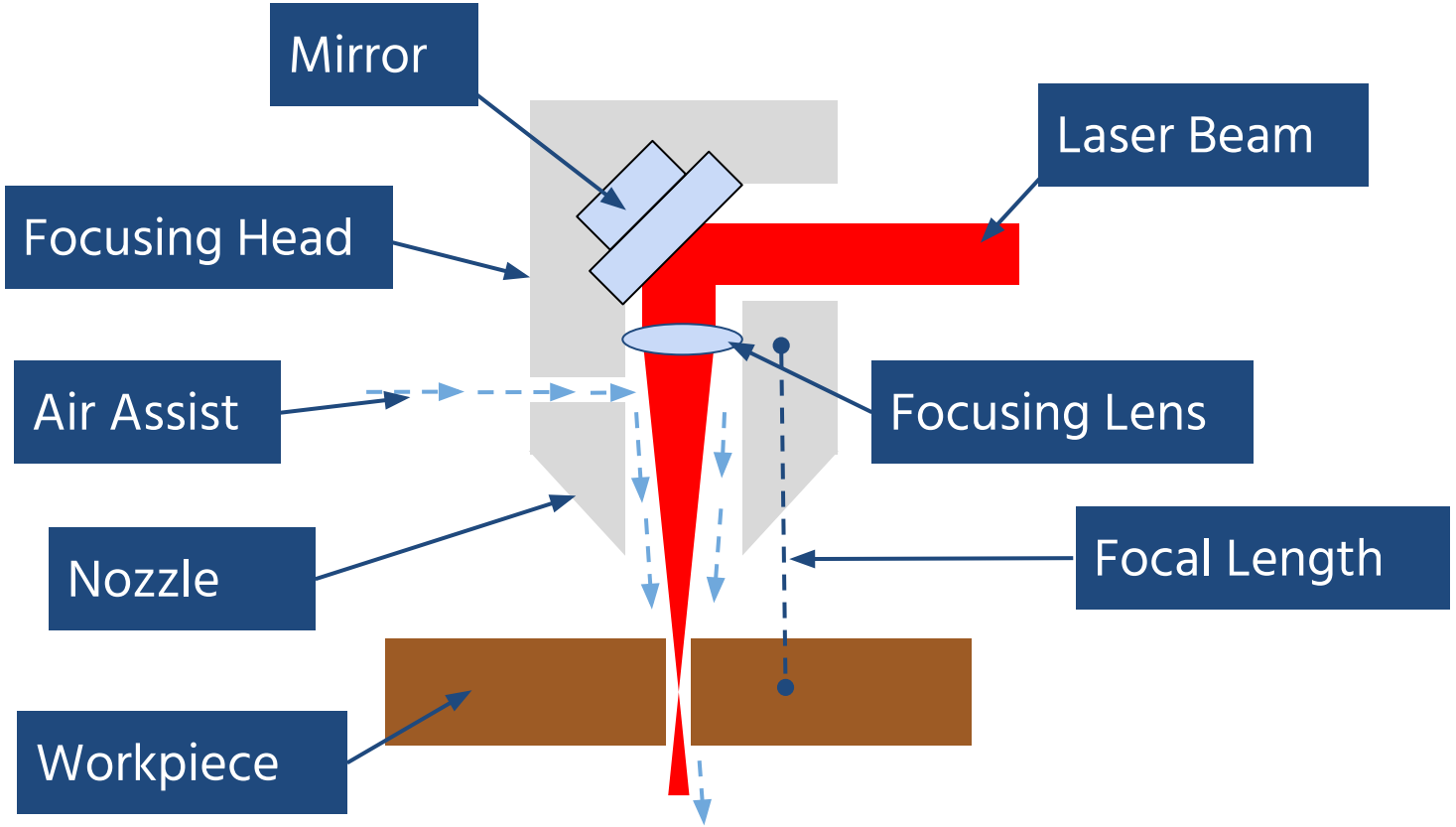
Every cutting tool creates a cutting pathway, called a kerf. The width of the kerf of a laser cutter is typically 0.2mm, or the width of a human hair. We can incorporate this into our designs to get very accurate parts.

HOW DOES A LASER CUTTER WORK?

How does a Laser Cutter work?

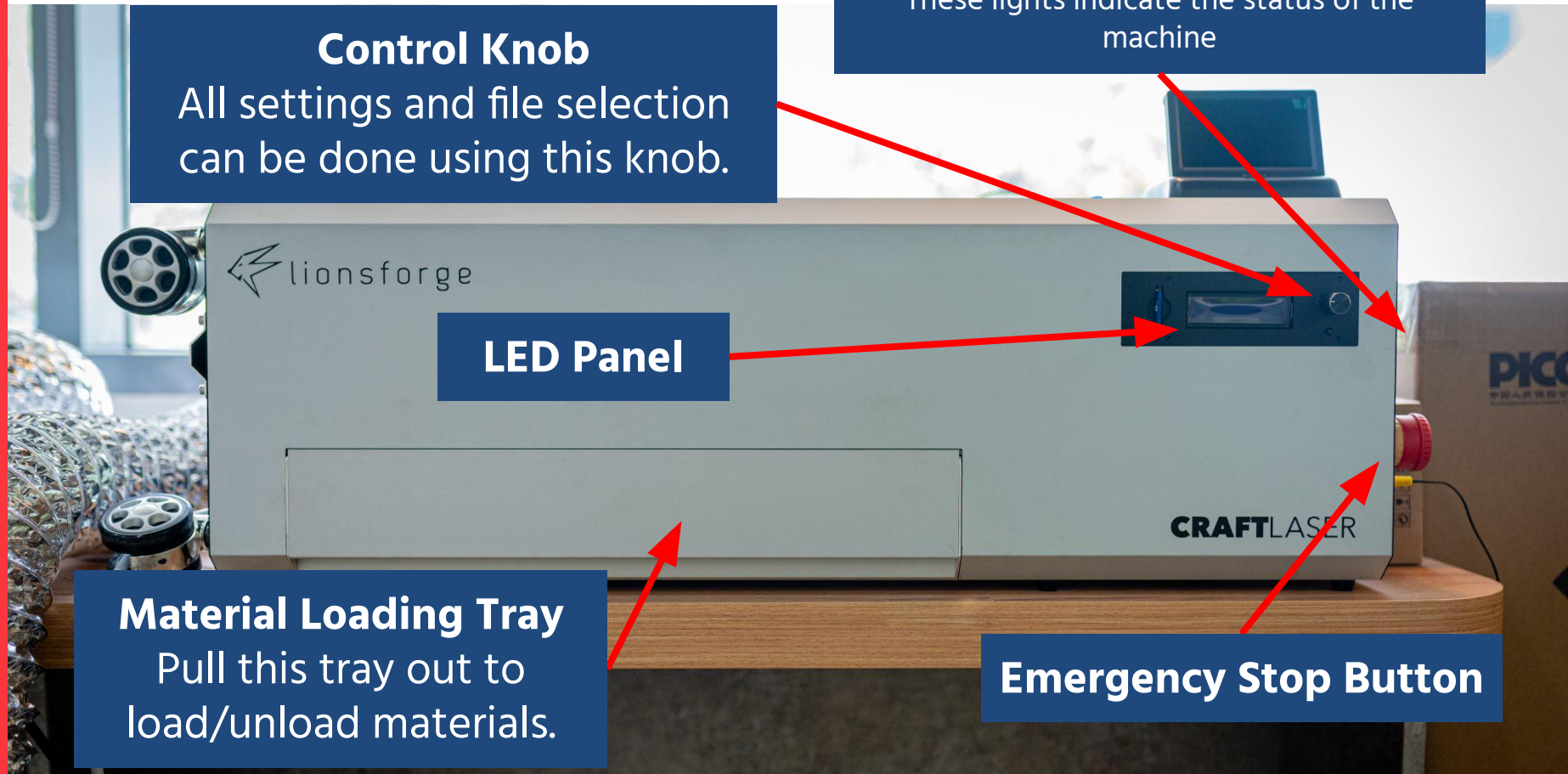


How does a Laser Cutter work?



PARTS OF THE LASER CUTTER

How does a Laser Cutter work?



LED Indicator lights
These lights indicate the status of the machine

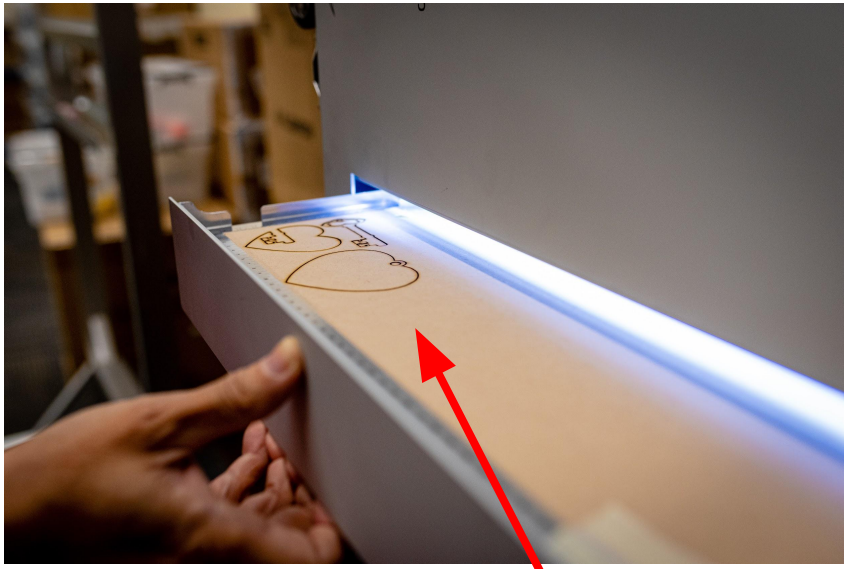
Control Knob
All settings and file selection can be done using this knob.

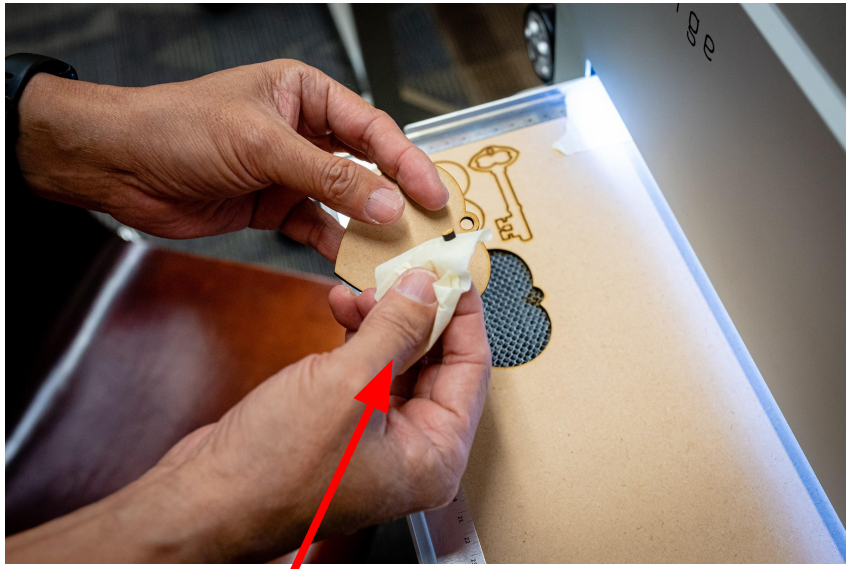
LED Panel

Material Loading Tray
Pull this tray out to load/unload materials.

Emergency Stop Button

How does a Laser Cutter work?





Material Loading Tray

Pull this tray out to **load** and **unload** materials. To secure your material in the tray, you might need to tape the material down. We will demonstrate how this is done later in the class.

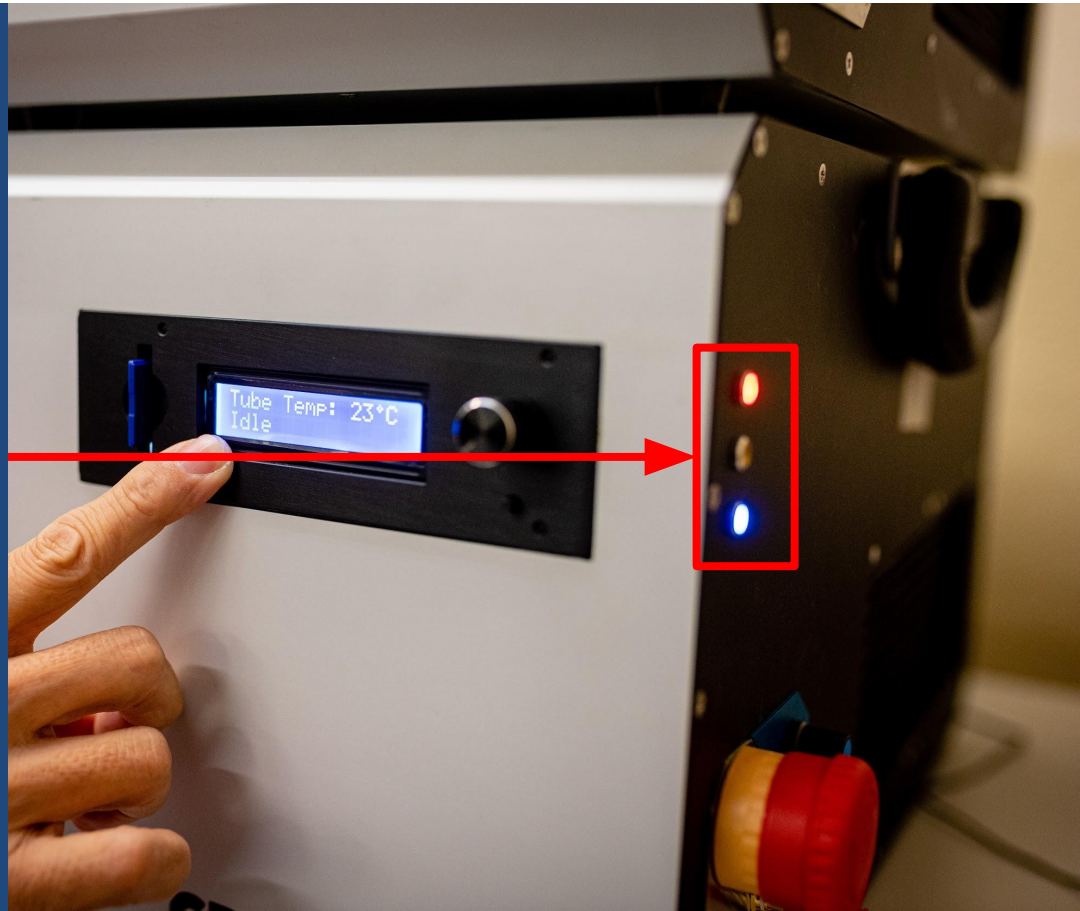
How does a Laser Cutter work?

LED Indicator Lights

Top Light (Tray Status) - Red Light on indicates the materials tray is closed

Middle Light (Laser Status) - Yellow Light on indicates the laser is firing

Bottom Light (Water Status) - Blue Light on indicates the cooling system is functioning



How does a Laser Cutter work?

LED Indicator Lights

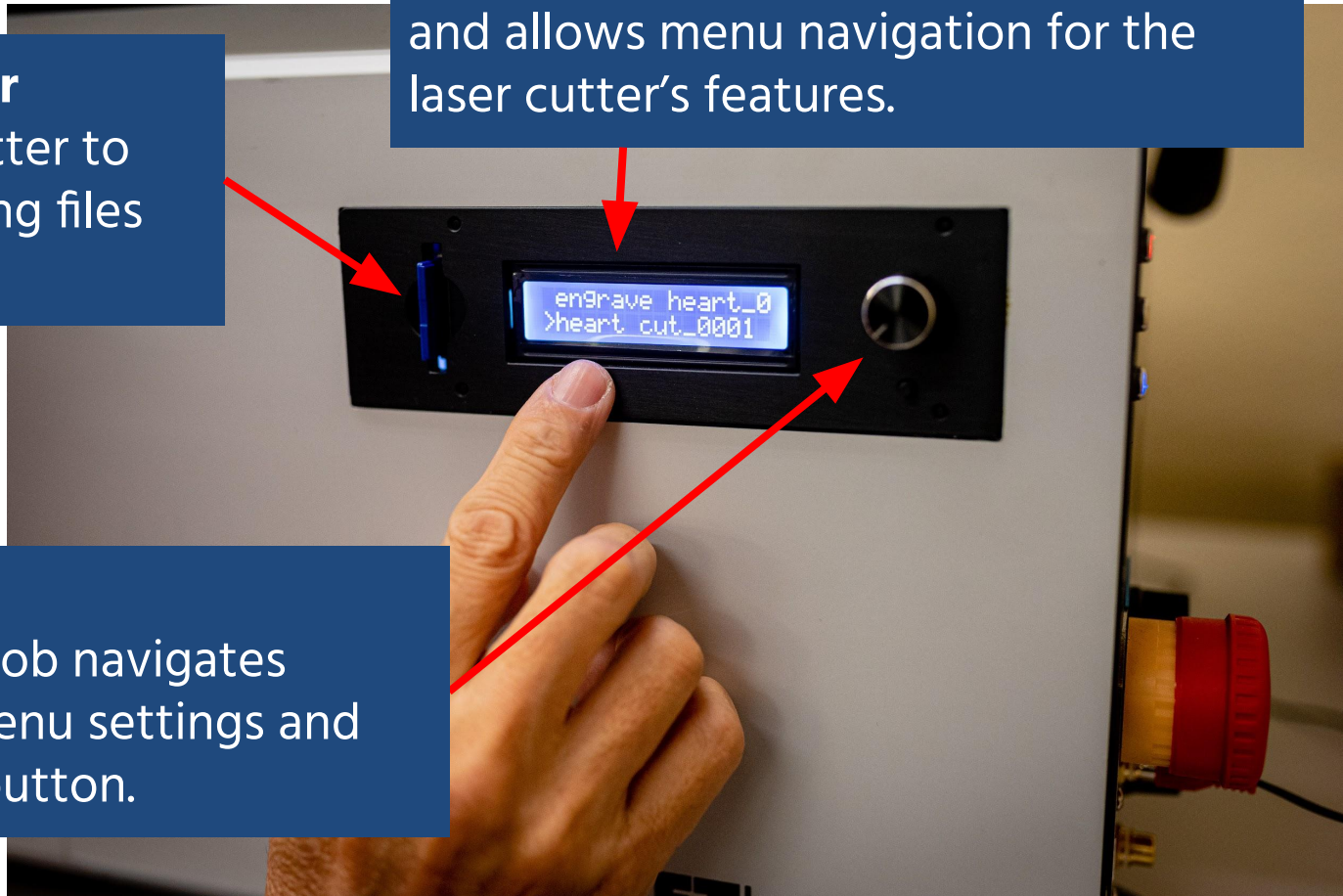
Check the status of the lights before using the laser cutter.

The **red and blue lights should be on** when you're ready to start a cut.
If they are not and your material is in the tray, notify MakeIT staff.

How does a Laser Cutter work?

LED Panel Display
The LED Panel displays key information and allows menu navigation for the laser cutter's features.

SD Card Reader
Allows laser cutter to read laser cutting files for cutting.

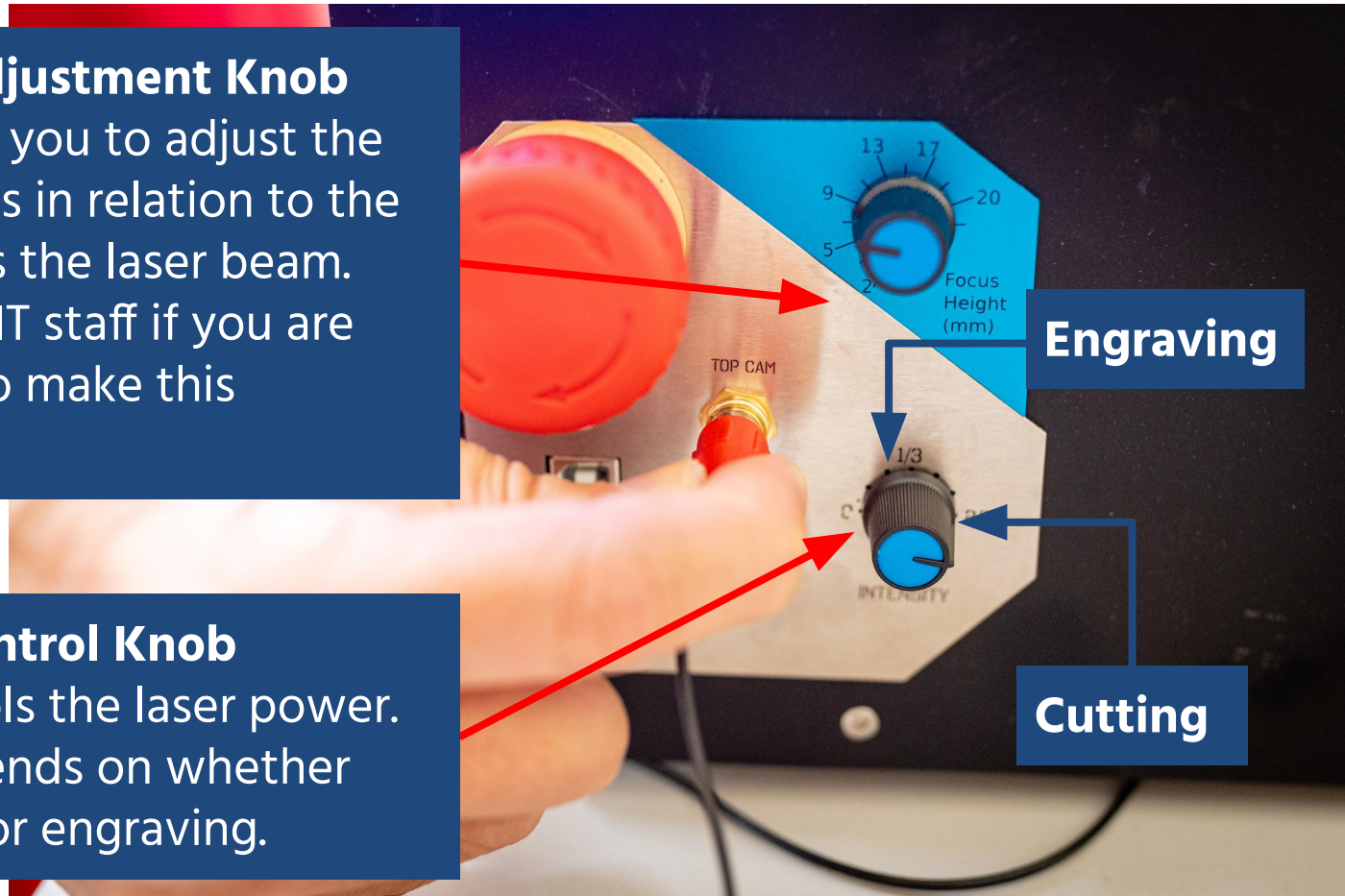


Control Knob
The Control Knob navigates through the menu settings and also acts as a button.

How does a Laser Cutter work?

Laser Height Adjustment Knob
This knob allows you to adjust the height of the lens in relation to the material to focus the laser beam. Please ask MakeIT staff if you are unsure of how to make this adjustment.

Laser Power Control Knob
This knob controls the laser power. The setting depends on whether you are cutting or engraving.



SAFETY WHEN USING THE LASER CUTTER

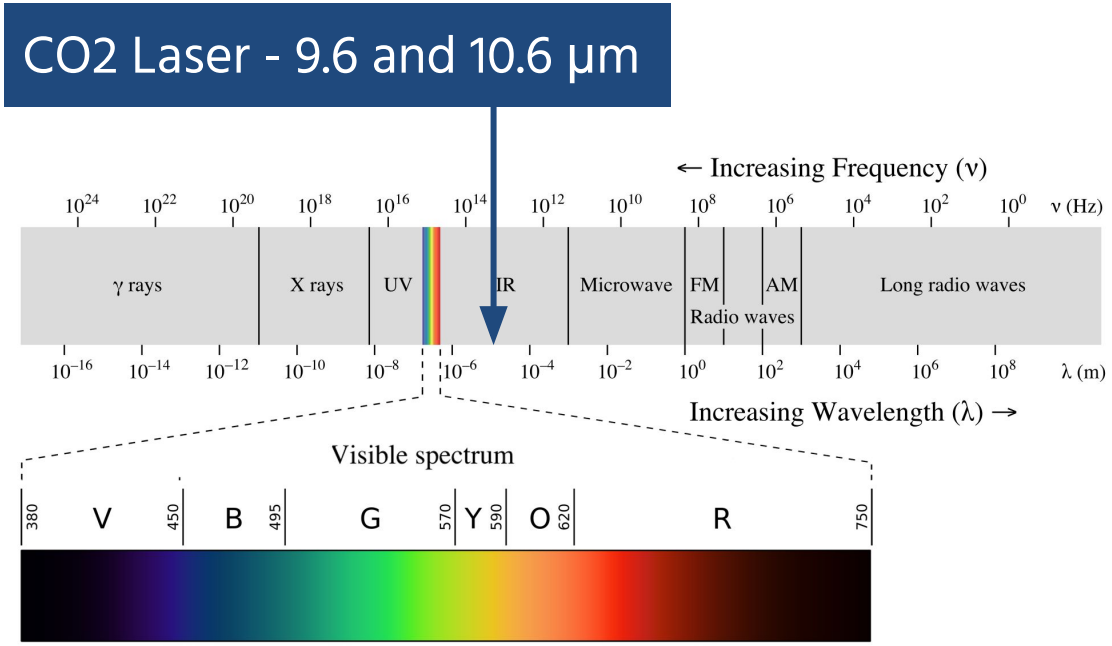
Safety Considerations for Laser Cutting

Lasers concentrate light into a precise beam, allowing for energy to be directed to specific places. This can produce a lot of heat, which can be useful for work such as cutting, as well as being very bright.

Our eyes can only detect a small spectrum of the electromagnetic spectrum, and many lasers that are used produce light that we cannot see with our eyes but can still pose a hazard.

Any laser can pose a potential hazard while being used. Always understand the risks and hazards possible when using a laser-based product.

Safety Considerations for Laser Cutting



Laser beams that we cannot see can still damage our eyes.

The laser used melts material, and can set a variety of materials aflame. Always be present when cutting materials.

Safety Considerations for Laser Cutting

All laser appliances are classified into one of four classes. All laser appliances will have a label showing its class.

Check out the following URL for hazard levels for each class of laser product: *https://www.lasersafetyfacts.com/laserclasses.html*

Class 1 CD/DVD Player, Laptop or Personal Computer
Class 2 Presentation laser pointer, barcode reader
Class 3R Measuring/ Targeting Devices, Higher powered laser pointers
Class 3B Higher powered laser products intended for professional applications
Class 4 Medical lasers, Industrial cutting/ welding, Scientific Applications and ***most*** Laser Light Show equipment.

Safety Considerations for Laser Cutting

The CraftIaser is a Class 1 laser because it is fully enclosed. Under normal conditions, using the machine poses no risk as an eye hazard.

UL CERTIFIED Class I Laser Safe

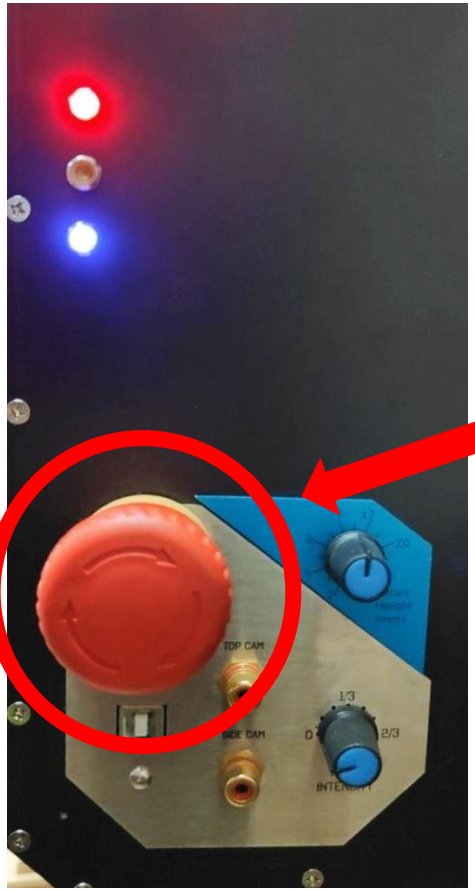
Safety Considerations for Laser Cutting

Monitor

There are two cameras installed in the Craftlaser to allow you to view your job.

Monitor your cutting for fire and flames, and notify MakeIT staff **immediately** if you observe any flames while cutting.

Safety Considerations for Laser Cutting



IN CASE OF EMERGENCY ONLY

In the event of fire or emergency, press the emergency stop button to turn off the laser cutter.

Under normal circumstances, turn off the laser cutter using the switch at the back of the device

REMINDER

Do not open the material loading tray when machine is in operation.

THE ACTIVITY I SECTION 2.2 | 20 MINUTES

Safety Considerations for Laser Cutting

Fume Extractor

As the laser vaporizes the materials, fumes are created. Different materials create different fumes, some of which are hazardous to humans.

Each laser cutter is attached to a fume extractor to filter and clean the air around the laser cutter.

Make sure the fume extractor is turned on before using the laser cutter and notify MakeIT staff if it is not working.

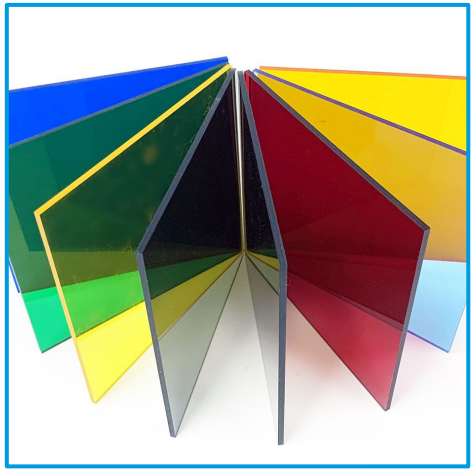
Safety Considerations for Laser Cutting

Air quality is monitored on a daily basis at MakeIT. During the laser cutting process, detecting odours is common and can be cause for concern.

If particulate matter (PM2.5, PM10, VOCs) exceed safe thresholds, MakeIT staff will stop usage of laser cutting equipment to protect anyone inside MakeIT.

WHAT CAN YOU CUT ON THE LASER CUTTER?

Designing Laser Cut Parts



Acrylic

Plywood

MDF

The Laser Cutter machine has a cutting and engraving area of 420 mm by 297 mm (A3). The following materials will be precut for you that fit those dimensions in 3mm thickness. Each has different uses.

Never Cut the Following Materials with a Laser Cutter

Material	Type of Danger	Consequence
PVC (Polyvinyl Chloride), vinyl, pleather, artificial leather	Emits Chlorine Gas when cut	Cutting PVC will damage the machine and harm the environment.
Polycarbonate, Lexan	Cuts poorly and can catch fire	Polycarbonate cuts very poorly, and while strong
ABS	Emits cyanide gas and melts when cut	ABS cuts and engraves poorly, and can melt, damaging the cutting grid.
HDPE (milk bottle plastic)	Catches fire and melts	Like ABS, cuts and engraves poorly.
PolyStyrene Foam	Catches fire	Catches fire and melts easily
PolyPropylene Foam	Catches fire	Catches fire and melts easily
Fiberglass	Emits fumes	Glass can't be cut, and resin will generate fumes
Carbon Fiber	Emits noxious fumes	Carbon fiber is difficult to cut

THE ACTIVITY I SECTION 2.3 | 80 MINUTES

Never Cut the Following Materials

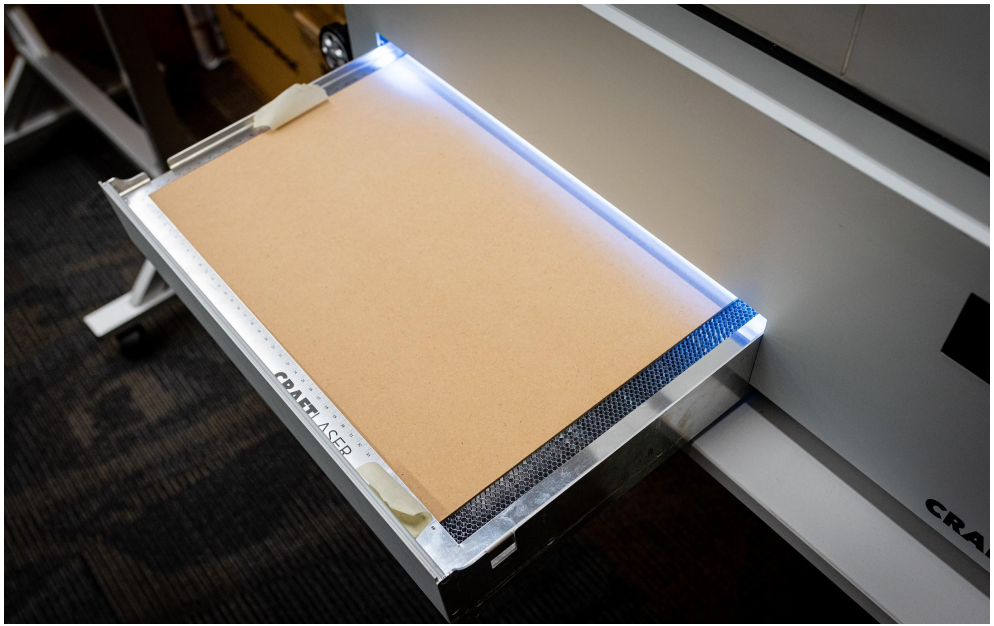
Identifying materials can be challenging, especially without proper markings.
Please use only the materials provided at MakeIT to cut your projects.

It is common to mistake one material type for another, even if you think you are provided materials from reliable sources.
Never cut or engrave materials unless you are 100% certain what that material is.

MakeIT reserves the rights to revoke your laser cutting privileges if you misuse the laser cutter.

Testing plastics can be unreliable, but to find out more information about home tests to do, check out: *https://makezine.com/article/science/identifying-unknown-plastics/*

Designing Laser Cut Parts



Medium-Density Fibreboard (MDF) is easy to use and is durable for laser cutting projects. It is made by combining wood fibres together with a binding agent, then is pressurized. The boards can be different thicknesses and colours, and can be used to make furniture, panelling, and DIY projects.

Designing Laser Cut Parts

MDF

+ Easy to work with and cut
+ Consistent shape and thickness
- Not durable or waterproof
- Holds wood screws poorly

Designing Laser Cut Parts

Acrylic sheets are also easy to use, rigid and with consistent thicknesses throughout the material. You can find acrylic sheets in multiple colors and thicknesses. **However, not all sheets labelled as “Acrylic” is Acrylic.**

Designing Laser Cut Parts

Acrylic

+ Can be transparent or any colour
+ Consistent shape and thickness
- Rigidity makes it unforgiving for fitment
- Brittle and susceptible to breaking

Designing Laser Cut Parts

Bamboo plywood is an engineering wood, like MDF, but consists of strips of bamboo wood that are pressed and bound together. Bamboo plywood looks like wood, but is significantly cheaper.

Designing Laser Cut Parts

Bamboo Plywood

+ Aesthetically pleasing look
+ Stronger than MDF and less prone to breaking than Acrylic
- Prone to warping, making cutting more difficult

BREAK

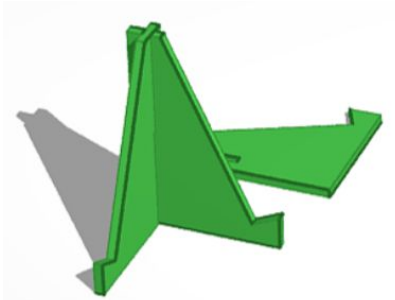
https://go.gov.sg/makeit-onsite-loi

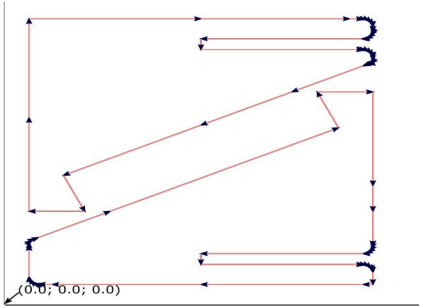
Please follow the link above to provide feedback for this workshop. We'll use this information to continue to develop your learning journey within MakeIT.

MAKING A DESIGN FROM SCRATCH

Designing Laser Cut Parts

Digital cutting is a four step process. Here's what you need to know.





Design

Turn your idea into a Tinkercad design and export as an SVG file.

SVG/GCode

Convert your design into a set of instructions that your laser cutter can follow.

Cut

Use a laser cutter to cut chosen material.

Finish

Sanding, priming, painting, and other techniques to make sure your project is the way you want it.

Designing Laser Cut Parts

TASK

Design a name tag using Tinkercad and Inkscape and cut your project

TIME

50 minutes

MATERIALS

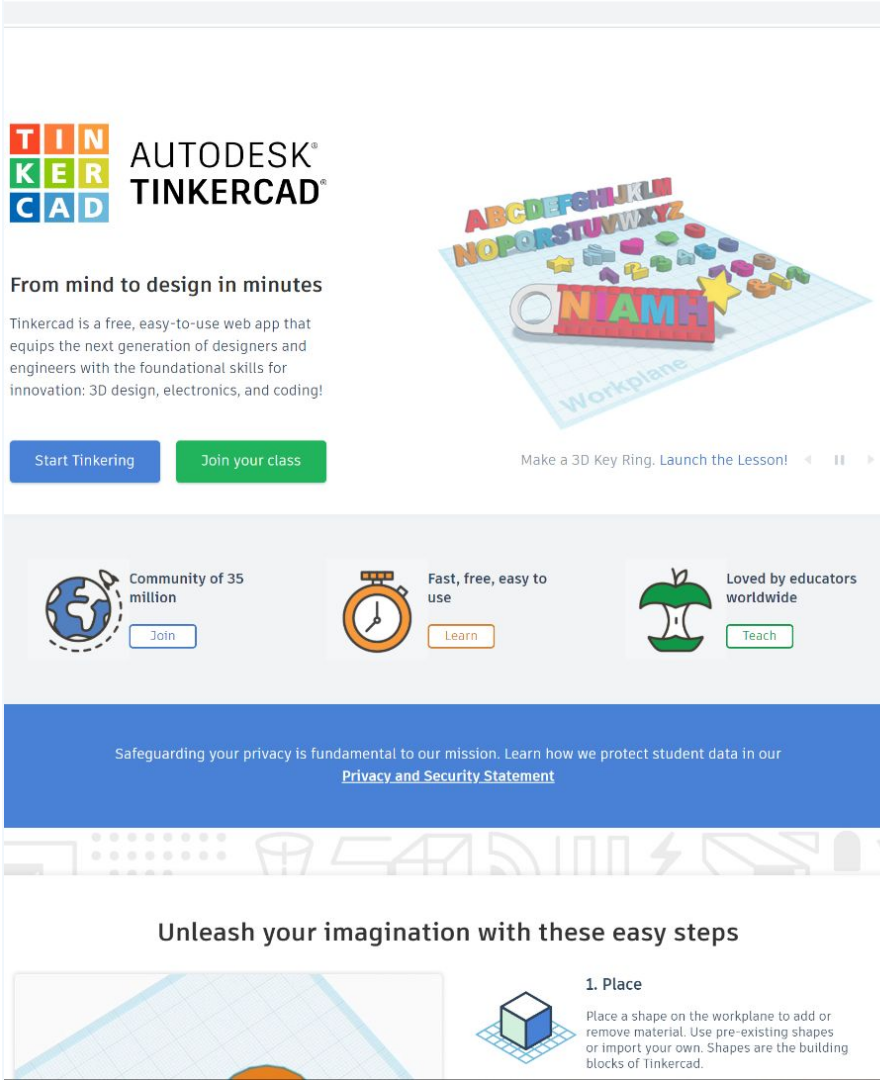
Laptop, SD card, SD card reader
Small acrylic piece

Designing Laser Cut Parts

Tinkercad is a free, cloud-based Computer Aided Design (CAD) Platform designed to simplify the process of creating 3D objects.

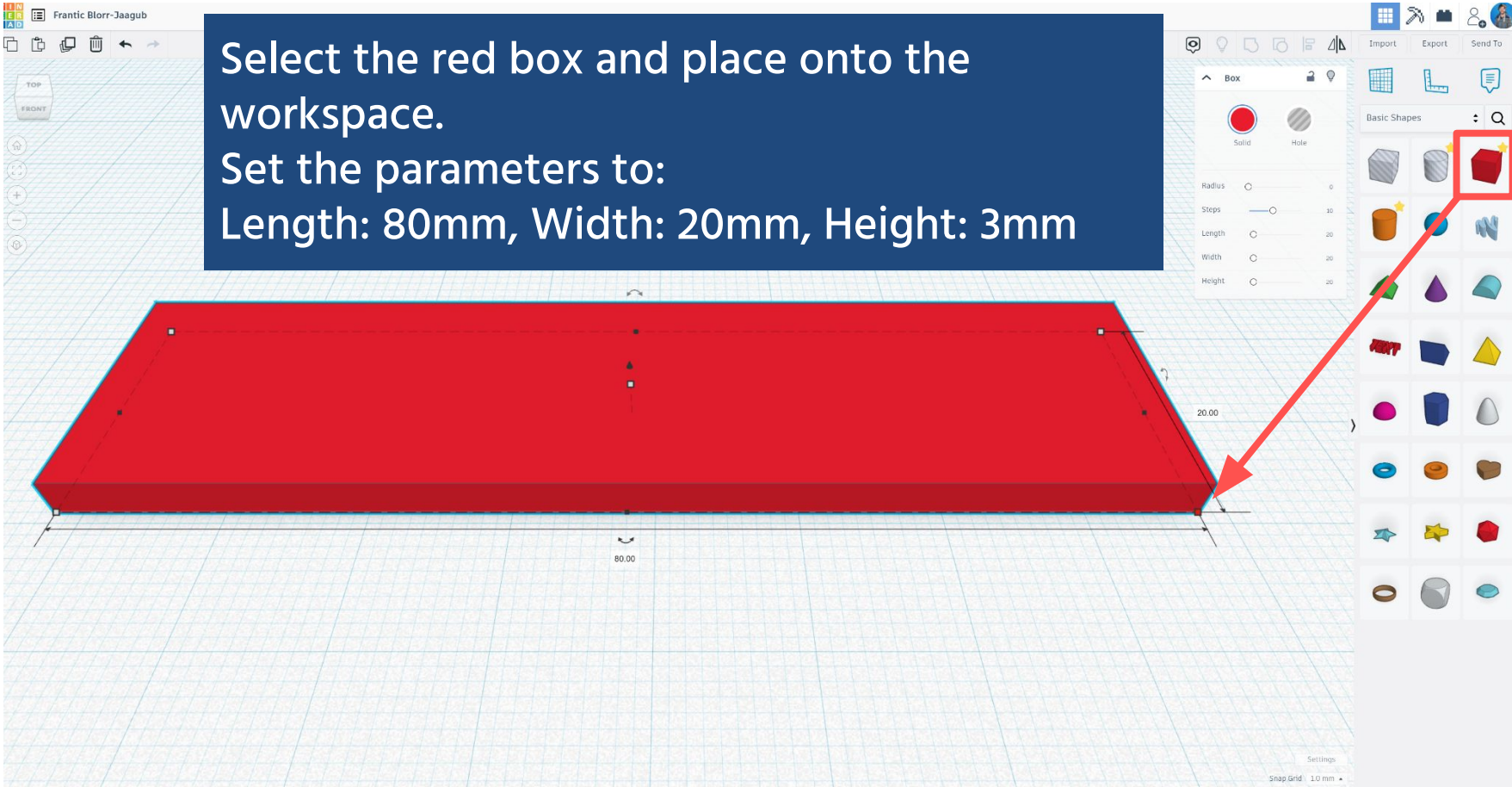
www.tinkercad.com

Don’t let its simplicity fool you; we consider it to be one of the fundamental building blocks for a new 3D designer.



Designing Laser Cut Parts

1. Design Tag in Tinkercad



Designing Laser Cut Parts

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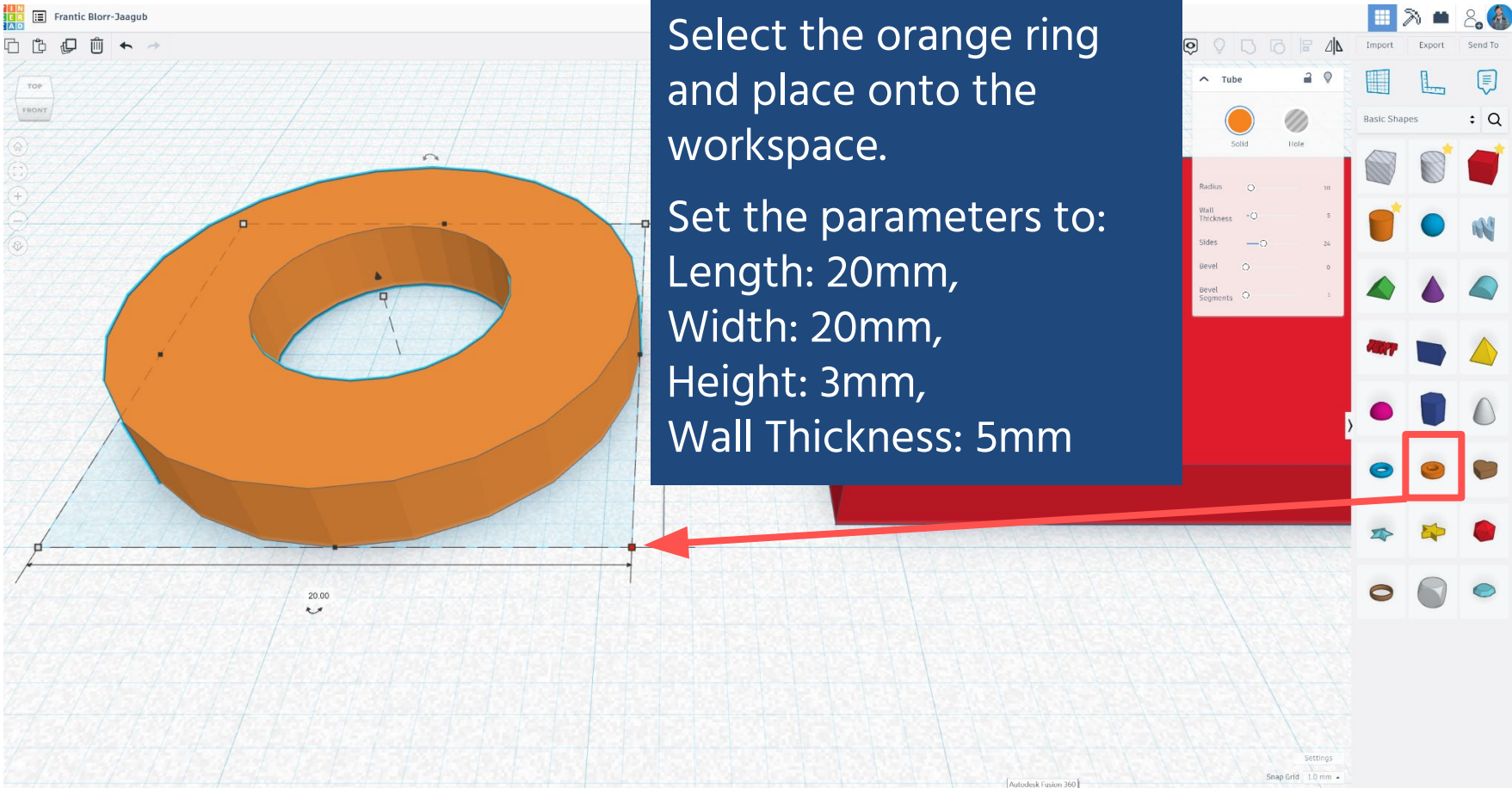
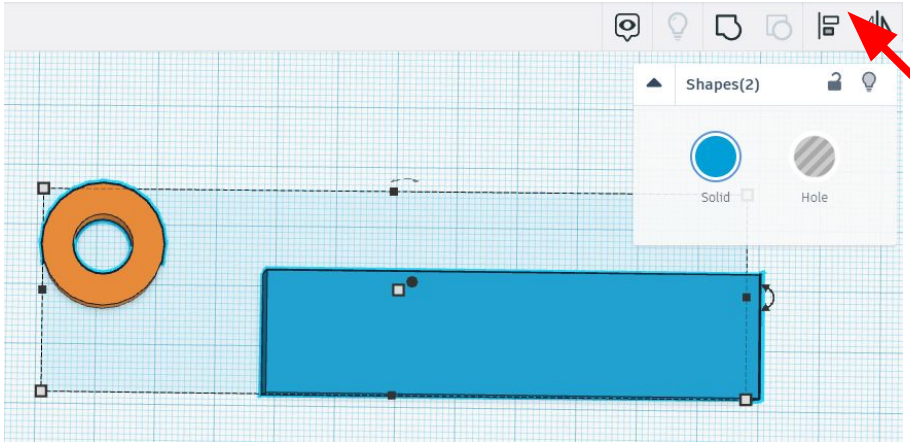


Select the orange ring and place onto the workspace.

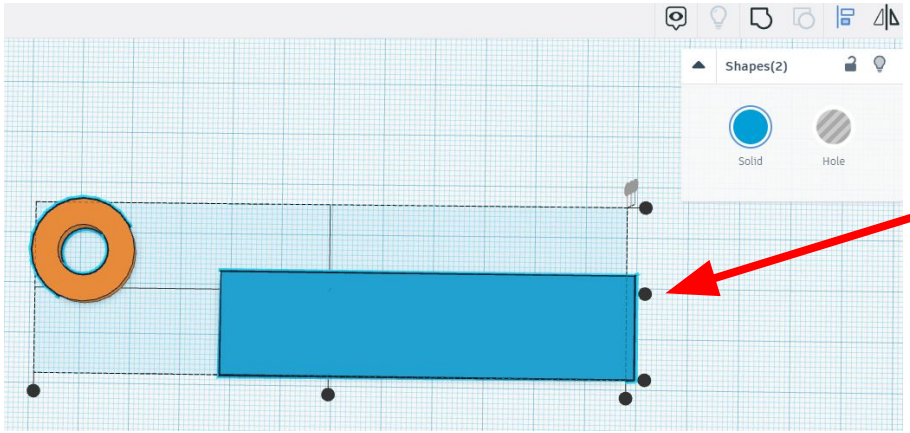
Set the parameters to:
Length: 20mm,
Width: 20mm,
Height: 3mm,
Wall Thickness: 5mm

Designing Laser Cut Parts

1. Design Tag in Tinkercad



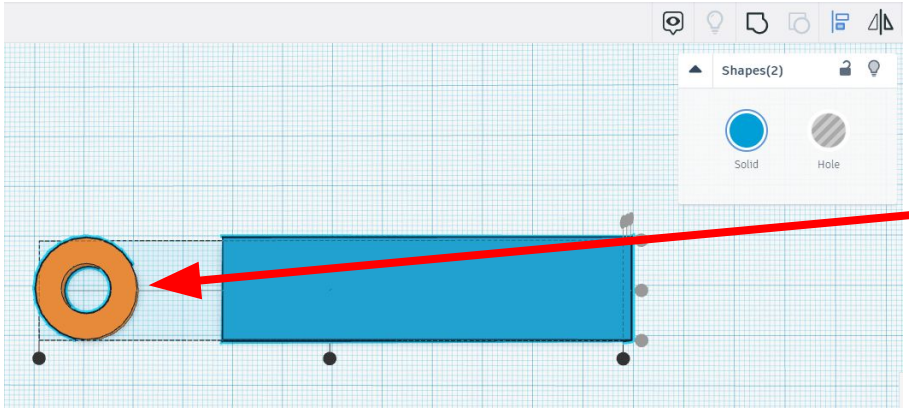
Select both objects by left-clicking and dragging a box around them, then click on the “Align” tool, or press ‘L’ on your keyboard.



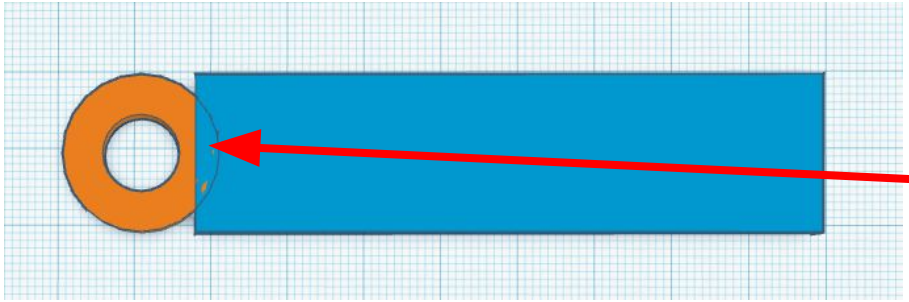
You should see 3 sets of three black dots. Align the shapes along the middle of the long side by pressing the circle that terminates at the end of the long black line in the middle.

Designing Laser Cut Parts

1. Design Tag in Tinkercad



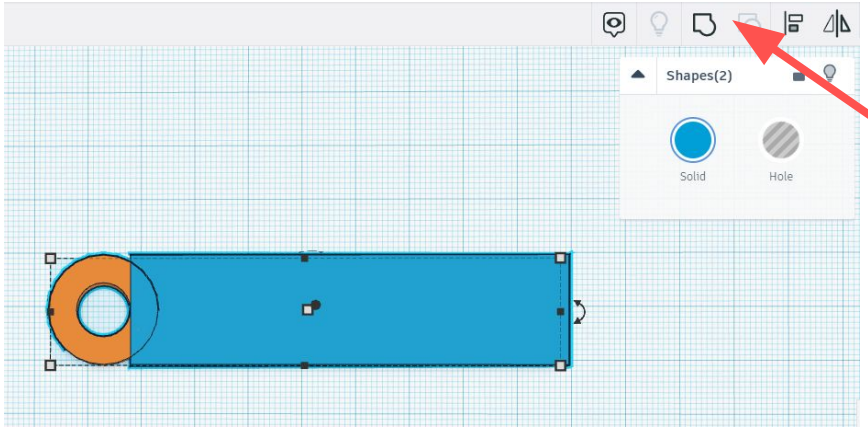
Both objects will align in the middle, indicated by the circle tools greying out. Now, select just the circle by left-clicking off the shapes, then left-clicking on the circle.



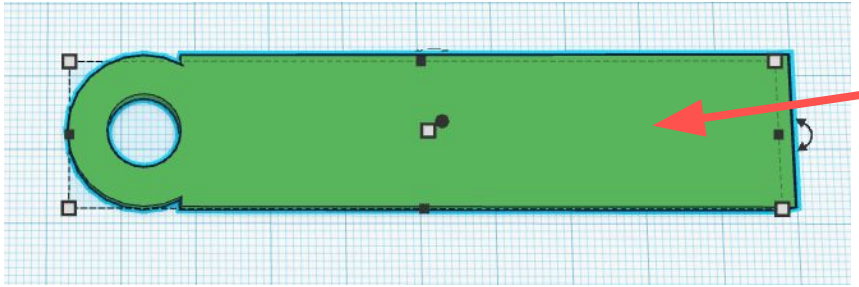
Use the directional buttons (left and right) on your keyboard to move it closer to the block. Make sure both objects overlap.

Designing Laser Cut Parts

1. Design Tag in Tinkercad



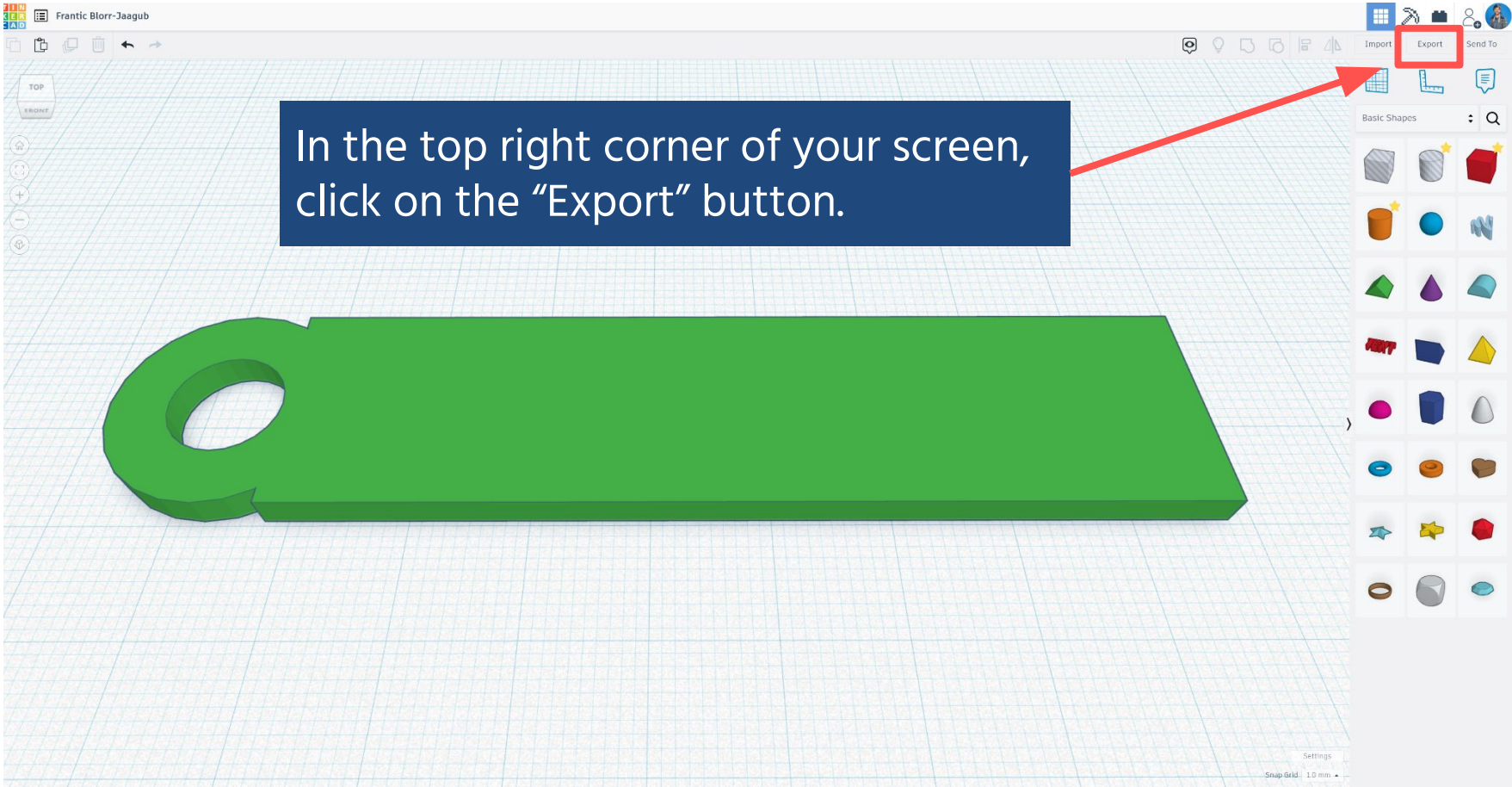
Once the objects have overlapped, select both objects and click on the “Group” tool, or press ‘CTRL + G’ on your keyboard.



Your final object should be connected together with a fully round hole.

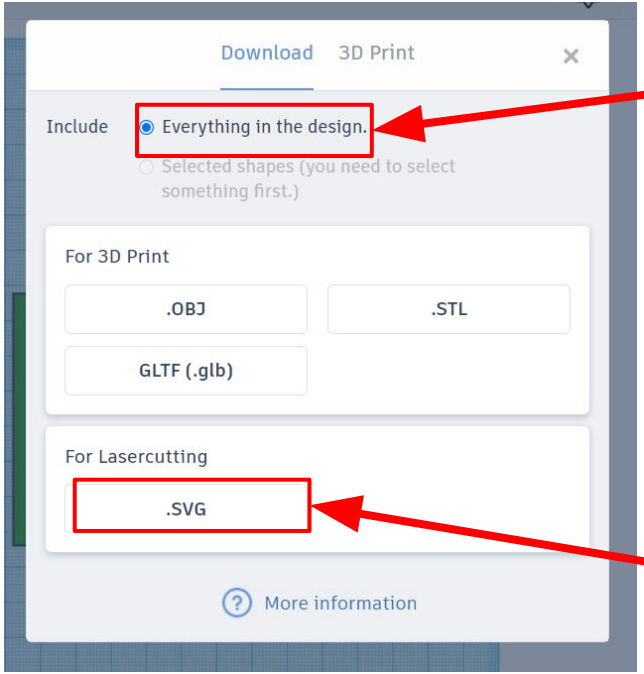
Designing Laser Cut Parts

1. Design Tag in Tinkercad



Designing Laser Cut Parts

1. Design Tag in Tinkercad



If the tag is the only object that you have created, you may select the "Everything in the design". If there are other designs, select the final object you wish to export and click "Selected shapes".

Click on the ".SVG" button to export the file as a SVG file format. SVG stands for Scalable Vector Graphic. This file format can be recognized by the laser cutting software later.

MAKING THE FILE CUTTABLE

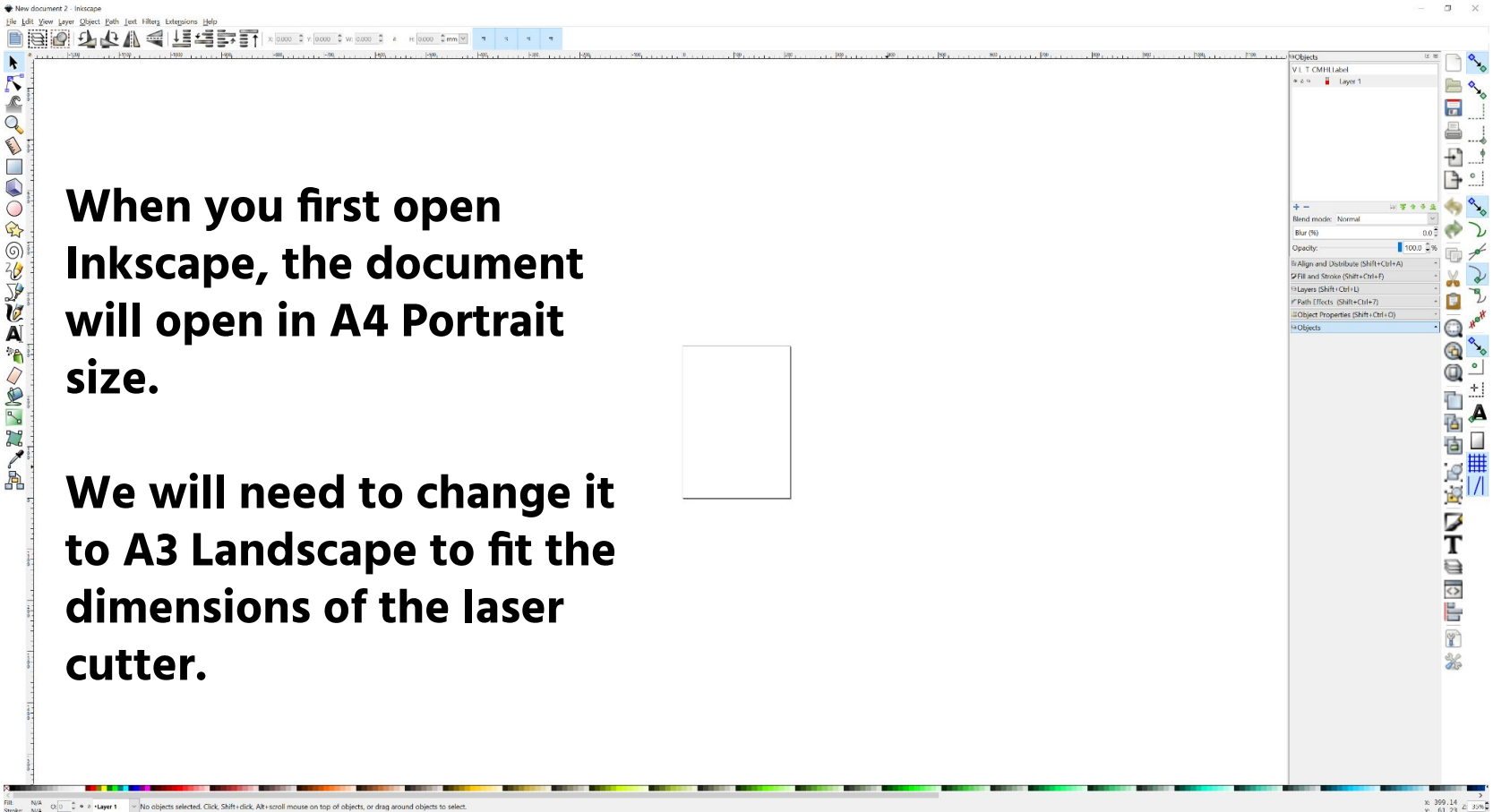
Designing Laser Cut Parts

With our keychain design ready, we can then cut it. At MakeIT, we use Inkscape as our laser Gcode generating tool, but we can also use it to edit objects.

https://inkscape.org/

Designing Laser Cut Parts

2. Use Inkscape to Prepare Work

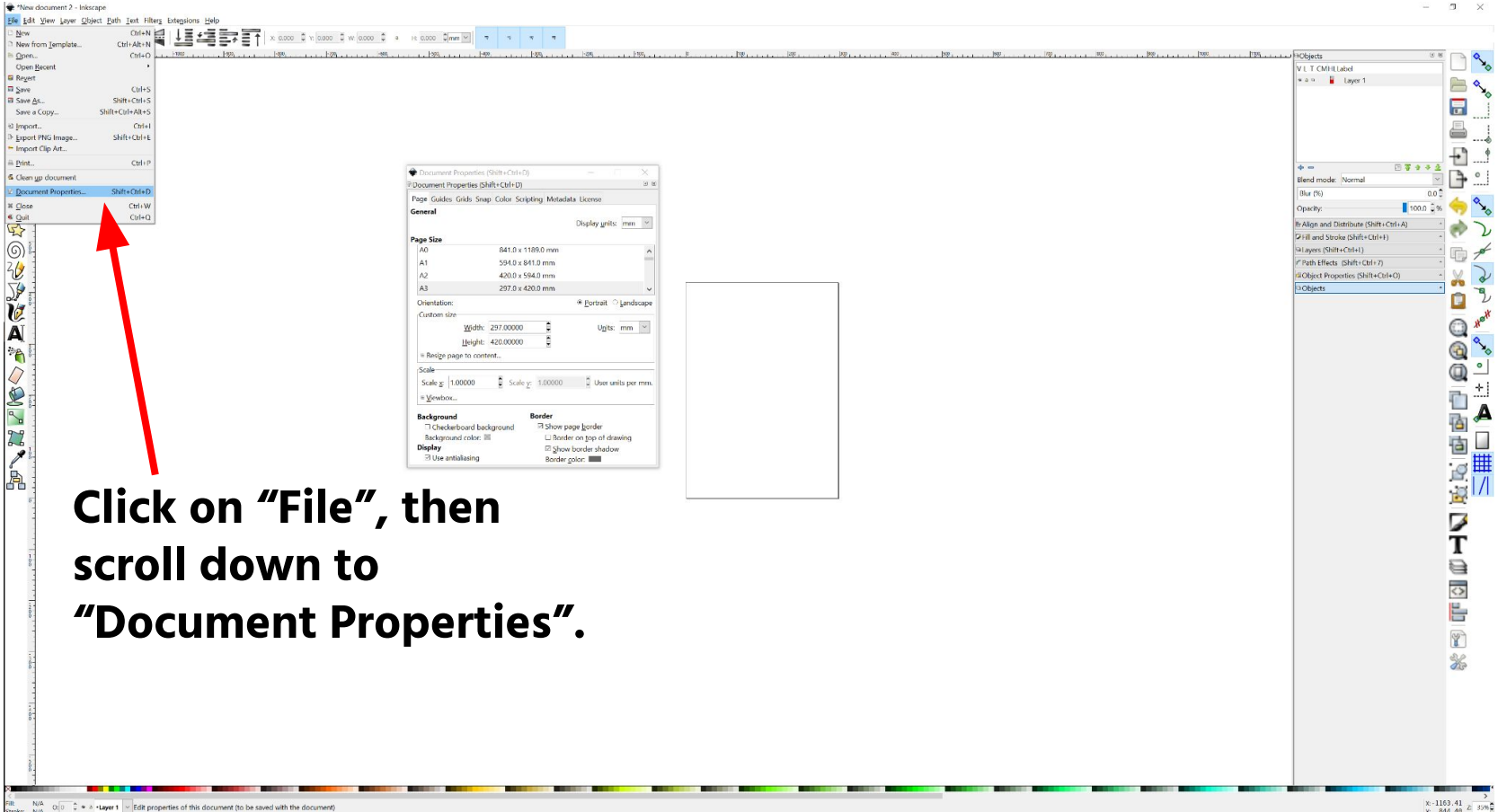


When you first open Inkscape, the document will open in A4 Portrait size.

We will need to change it to A3 Landscape to fit the dimensions of the laser cutter.

Designing Laser Cut Parts

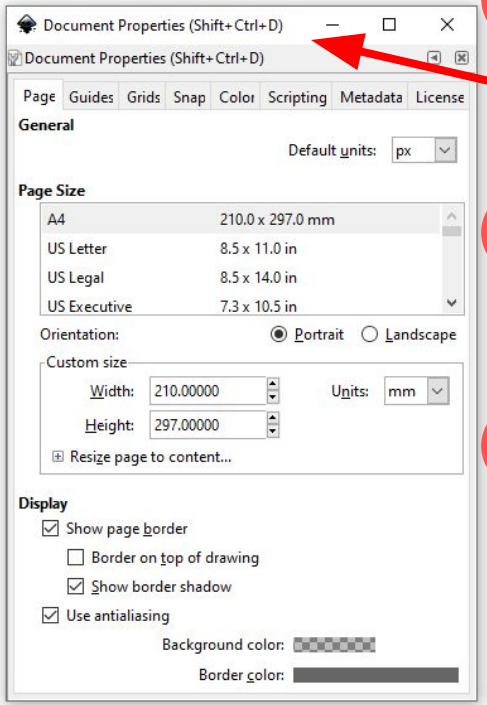
2. Use Inkscape to Prepare Work



Click on “File”, then scroll down to “Document Properties”.

Designing Laser Cut Parts

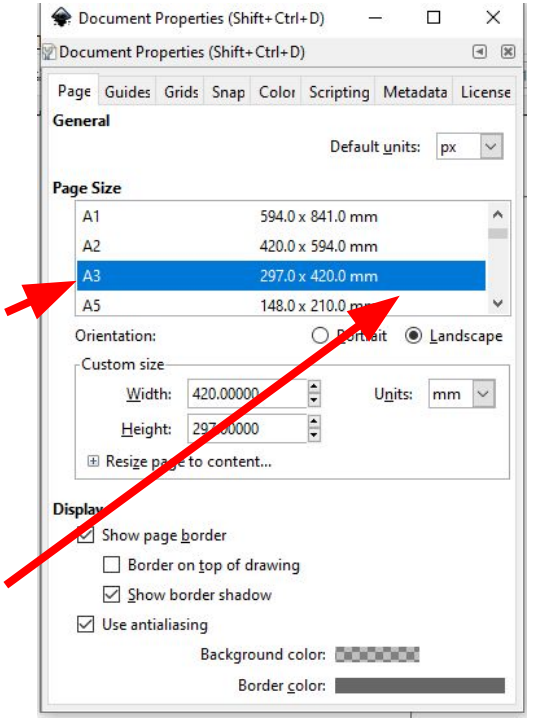
2. Use Inkscape to Prepare Work



1. A small window should appear like this.

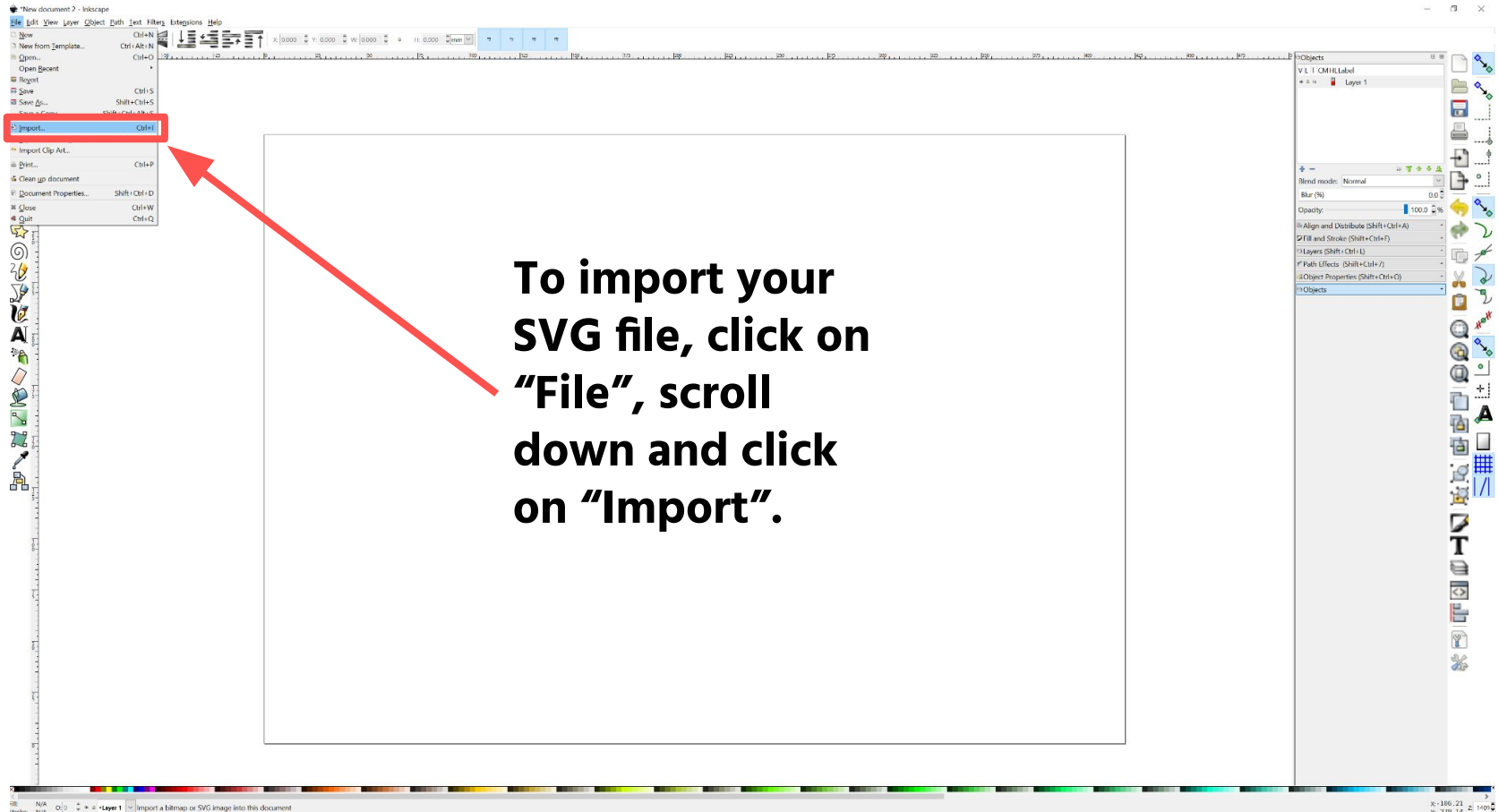
2. Scroll down to A3.

3. Select the “Landscape” option to rotate your canvas sideways.



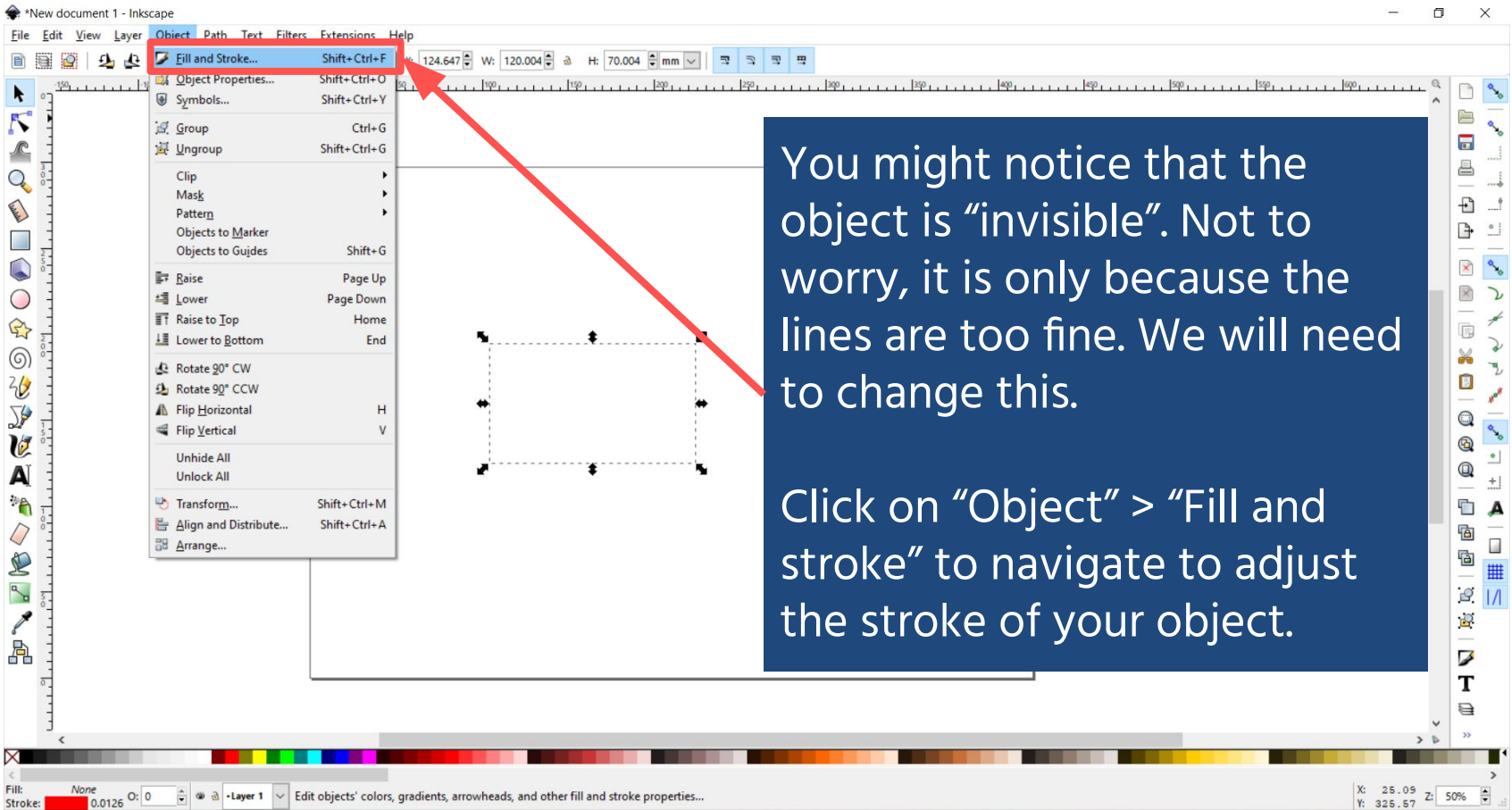
Designing Laser Cut Parts

2. Use Inkscape to Prepare Work



Designing Laser Cut Parts

2. Use Inkscape to Prepare Work

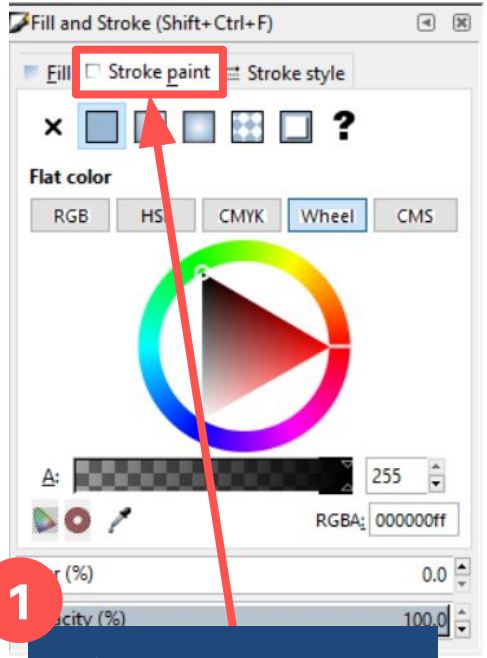


You might notice that the object is “invisible”. Not to worry, it is only because the lines are too fine. We will need to change this.

Click on “Object” > “Fill and stroke” to navigate to adjust the stroke of your object.

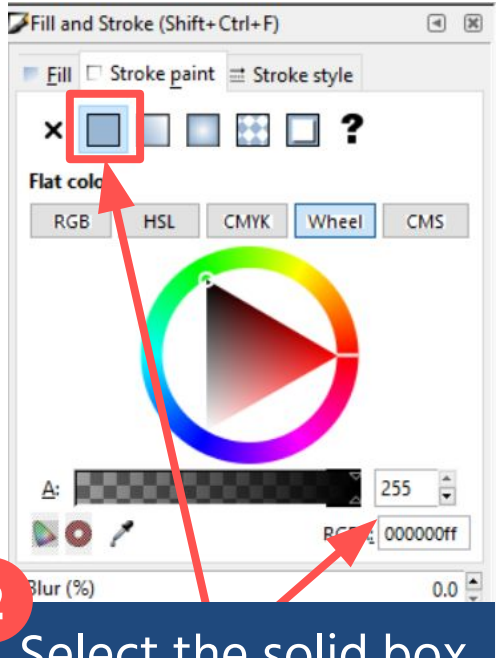
Designing Laser Cut Parts

2. Use Inkscape to Prepare Work



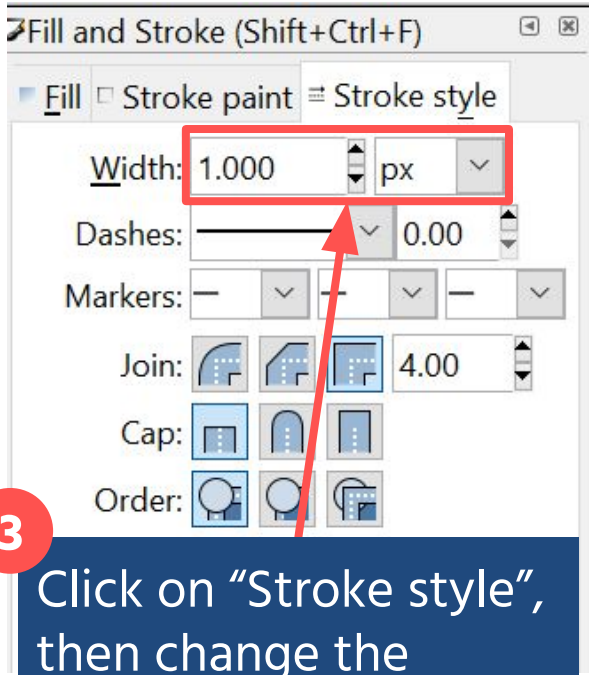
1

Click on “Stroke paint”.



2

Select the solid box for flat colour and change the color to black.

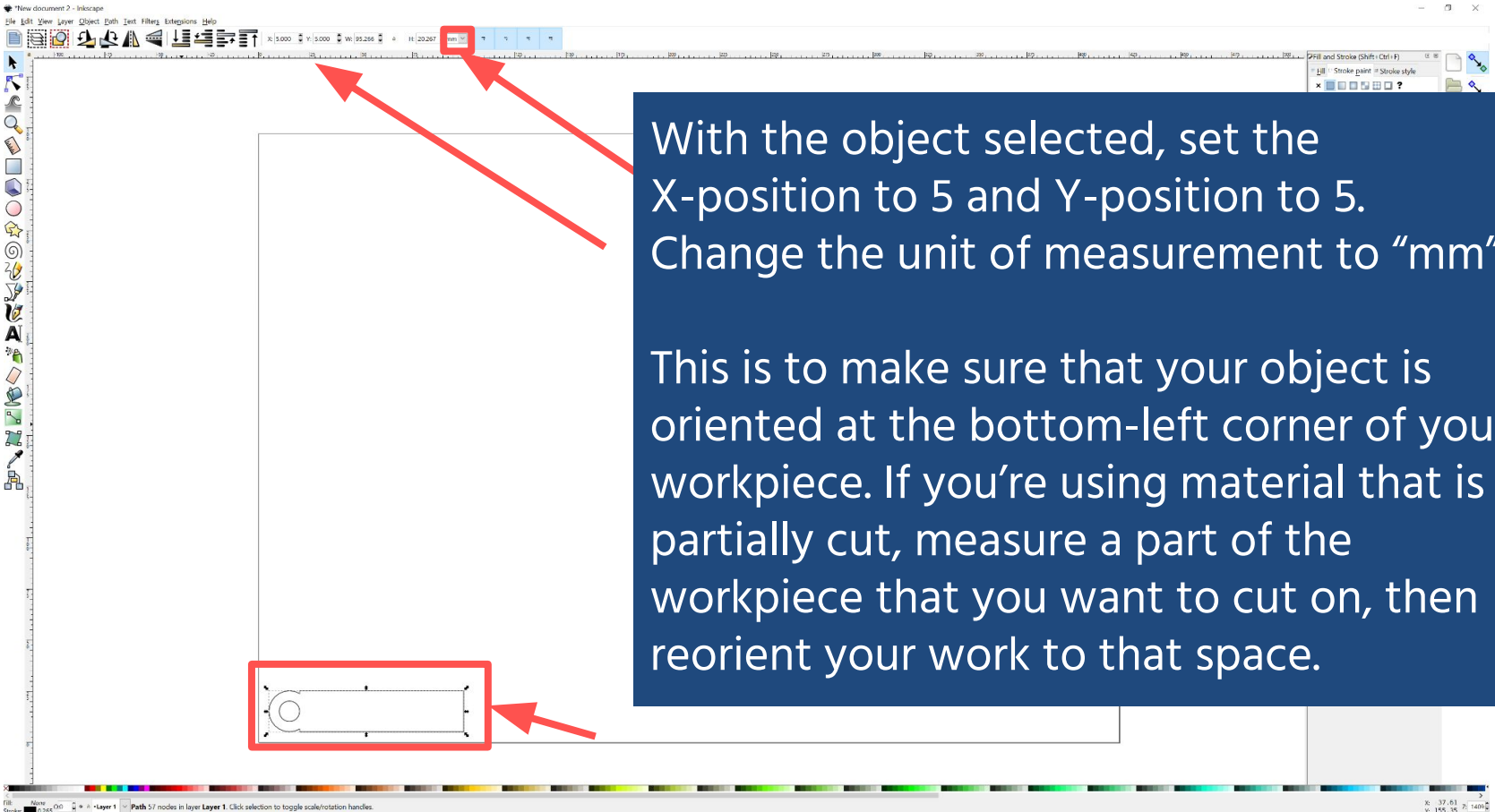


3

Click on “Stroke style”, then change the “Width” to 1.000 and the unit to “px”, or pixel.

Designing Laser Cut Parts

2. Use Inkscape to Prepare Work



With the object selected, set the X-position to 5 and Y-position to 5. Change the unit of measurement to “mm”.

This is to make sure that your object is oriented at the bottom-left corner of your workpiece. If you’re using material that is partially cut, measure a part of the workpiece that you want to cut on, then reorient your work to that space.

Designing Laser Cut Parts

2. Use Inkscape to Prepare Work

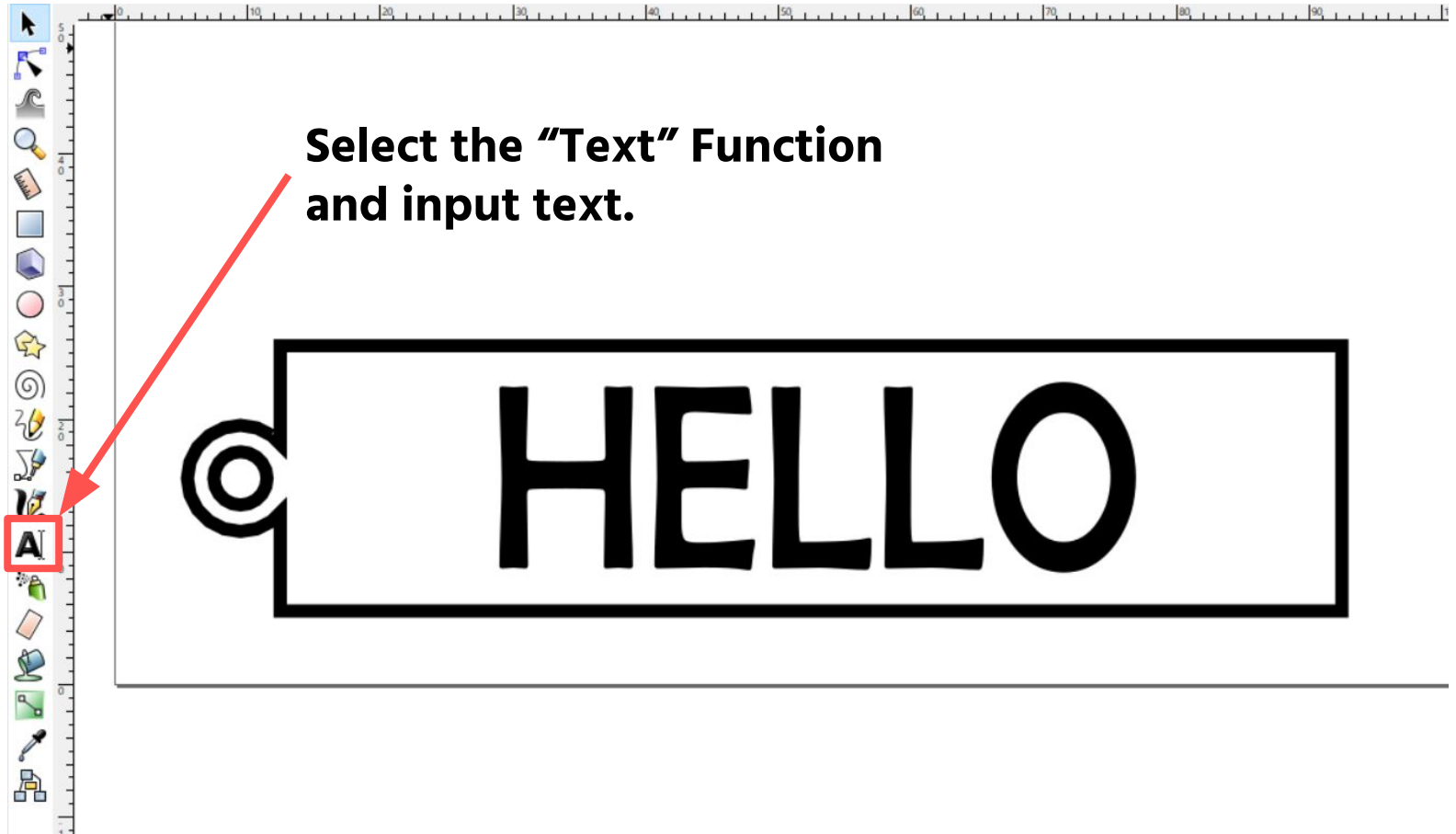
Cutting and engraving are separate operations for our laser cutter. We need to prepare the files separately, making sure we don't move our workpiece between jobs.

Always engrave before cutting, as cutting can move your workpiece.

Engraving changes an image into a feature where just the top layer is burned off. The thickness of the engraving depends on your speed and power settings.

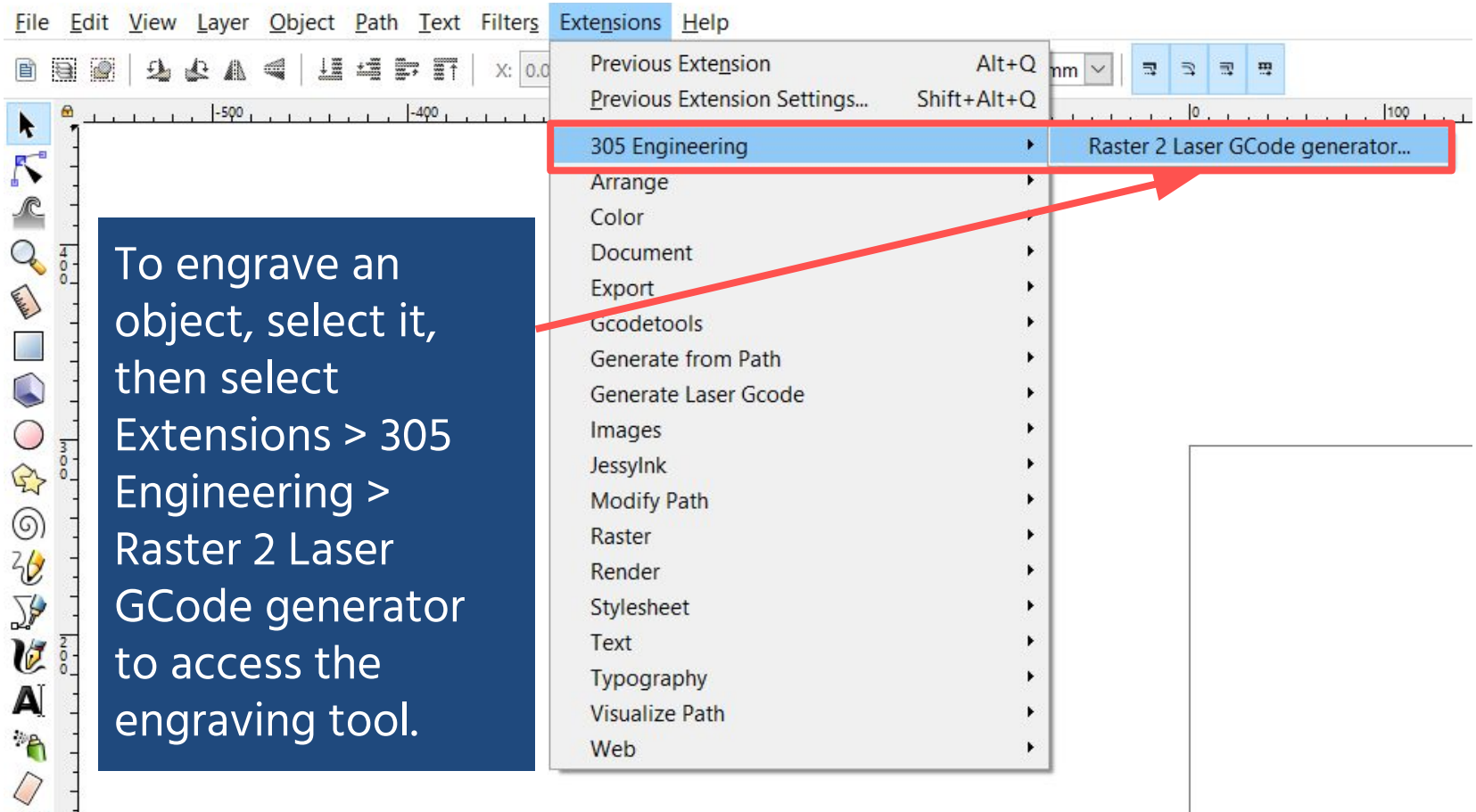
Designing Laser Cut Parts

3. Use Inkscape to Engrave Object



Designing Laser Cut Parts

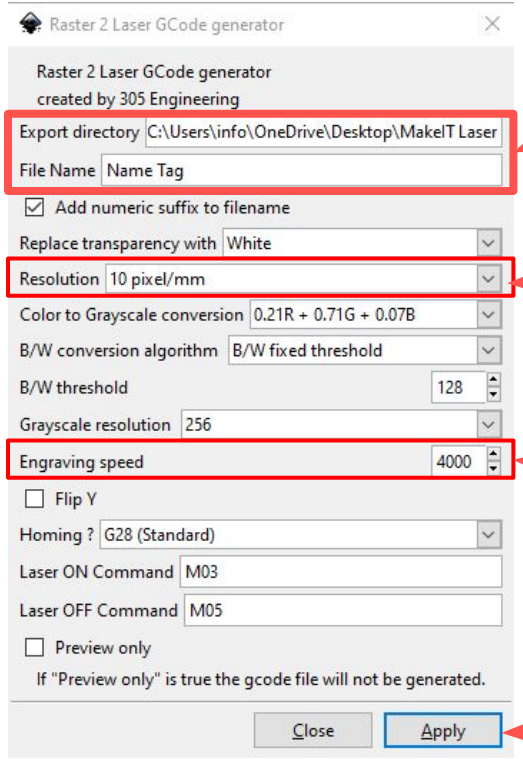
3. Use Inkscape to Engrave Object



Designing Laser Cut Parts

3. Use Inkscape to Engrave Object

Engraving Settings



1. Note your output directory and change the file name.

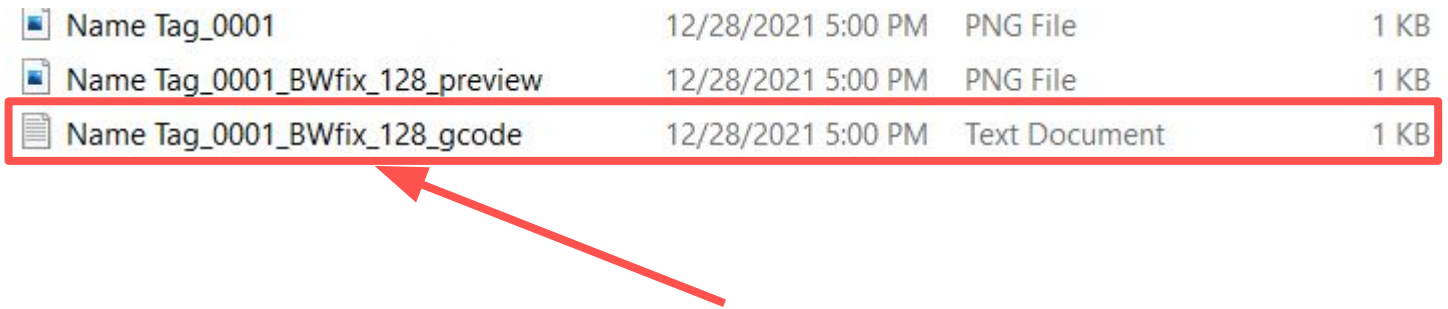
2. Set Resolution to 10 pixel/mm. Higher resolution creates higher quality engraving.

3. Set Engraving speed to 4000.

4. Select “Apply”.

Designing Laser Cut Parts

3. Use Inkscape to Engrave Object

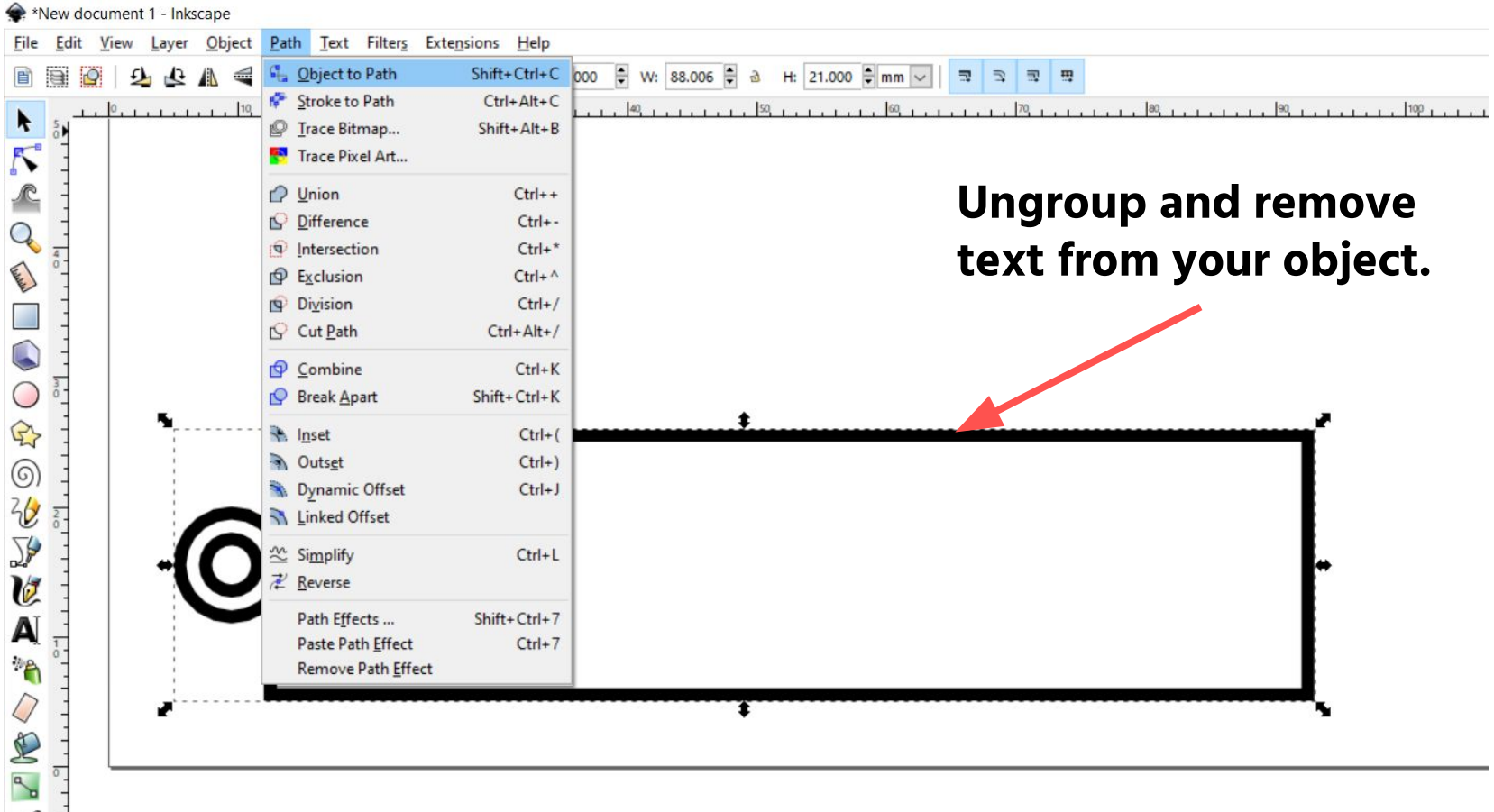


Once settings are applied, the file should be saved in your computer. Transfer only the gcode file to an SD Card. The other files are images and only for preview purposes.

You may also name the file with the term “engrave”.

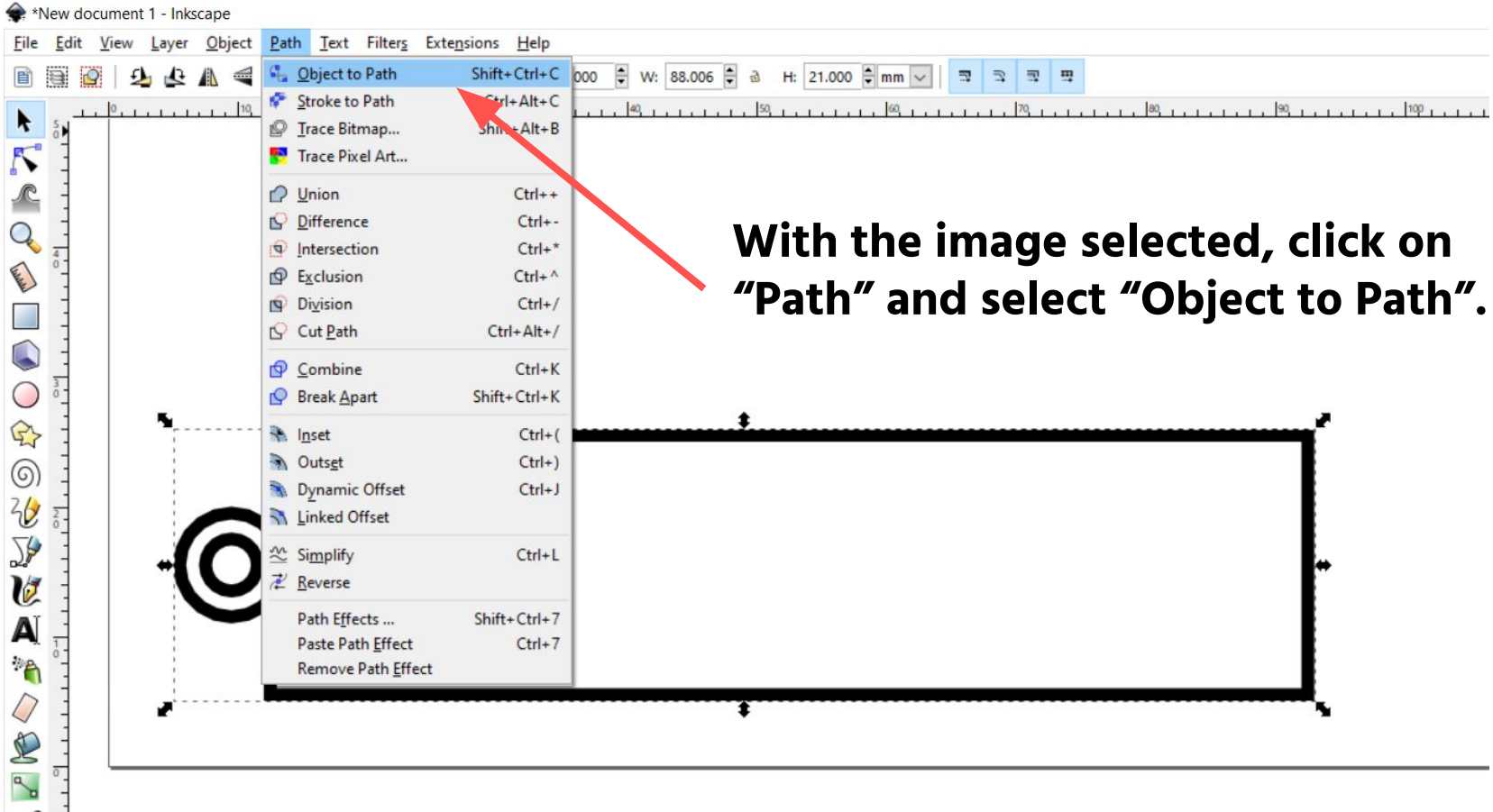
Designing Laser Cut Parts

4. Use Inkscape to Cut Object



Designing Laser Cut Parts

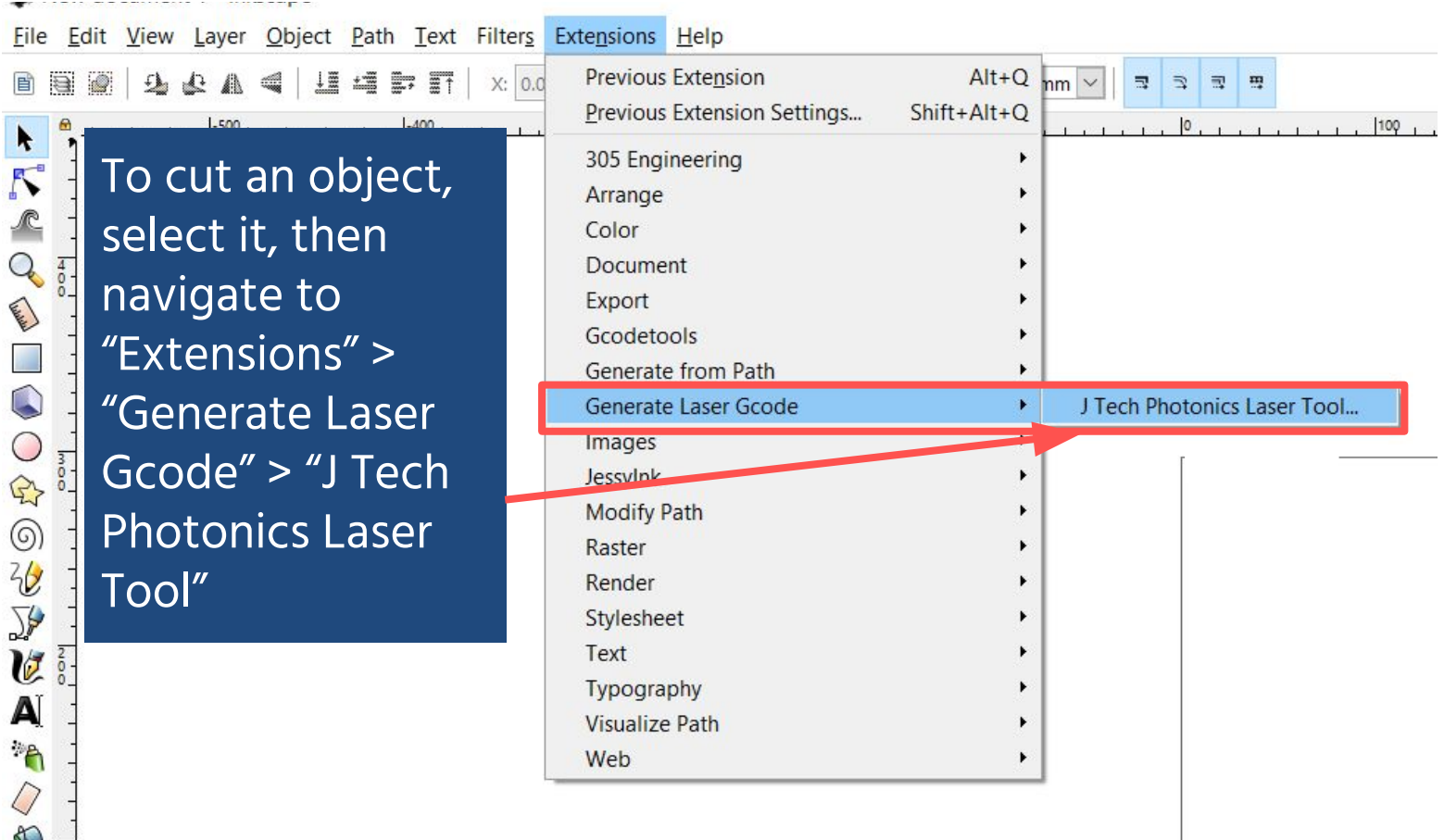
4. Use Inkscape to Cut Object



With the image selected, click on "Path" and select "Object to Path".

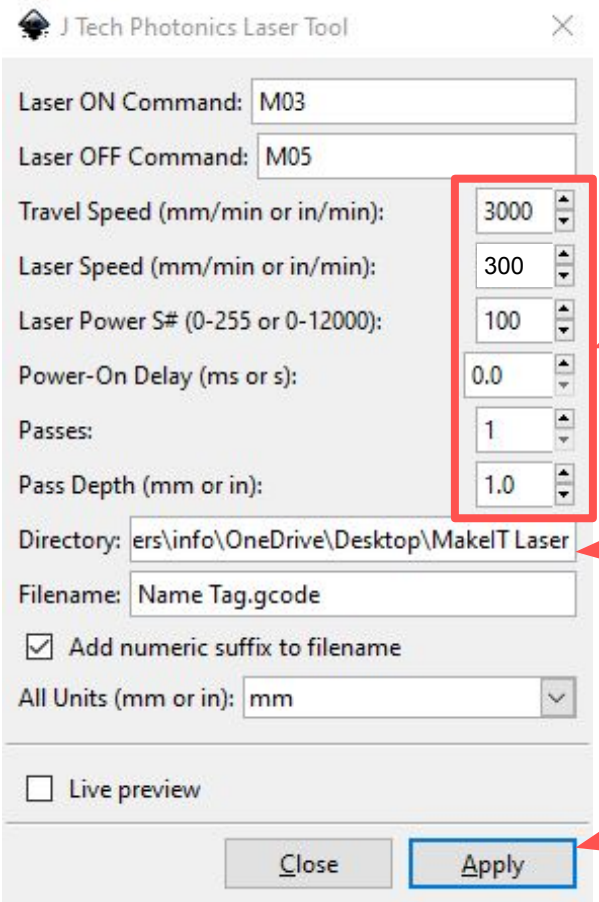
Designing Laser Cut Parts

4. Use Inkscape to Cut Object



Designing Laser Cut Parts

4. Use Inkscape to Cut Object



1. Change the settings to the values shown to the left.

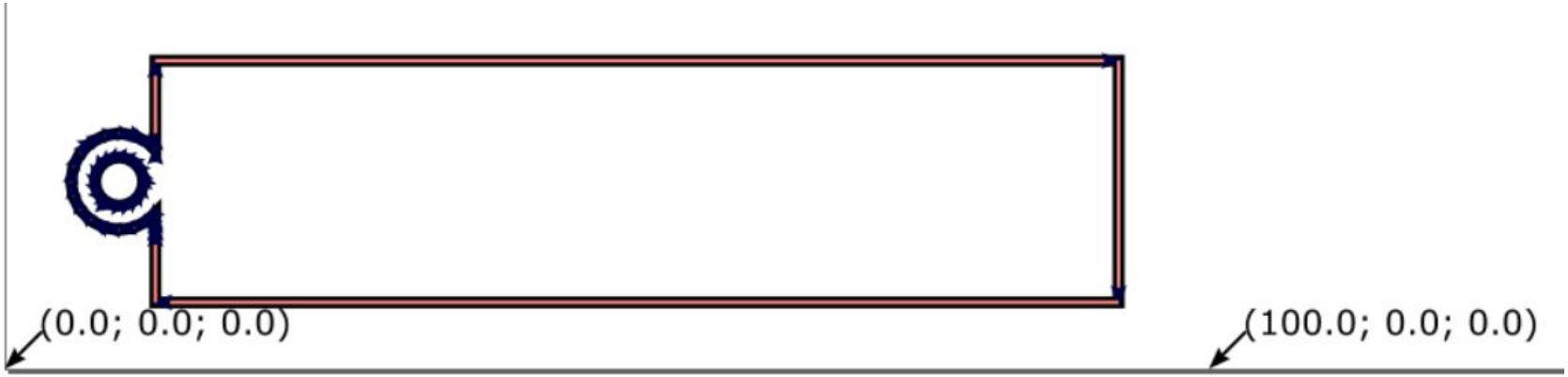
2. Paste the file directory that was previously copied.

3. Select “Apply”.

Designing Laser Cut Parts

4. Use Inkscape to Cut Object

Once settings are applied, there should be arrow markings on your drawing with the axis parameter at the bottom. Inkscape lets you preview your job before you sent it to be cut. Check it to make sure the path aligns with your object.



Designing Laser Cut Parts

4. Use Inkscape to Cut Object

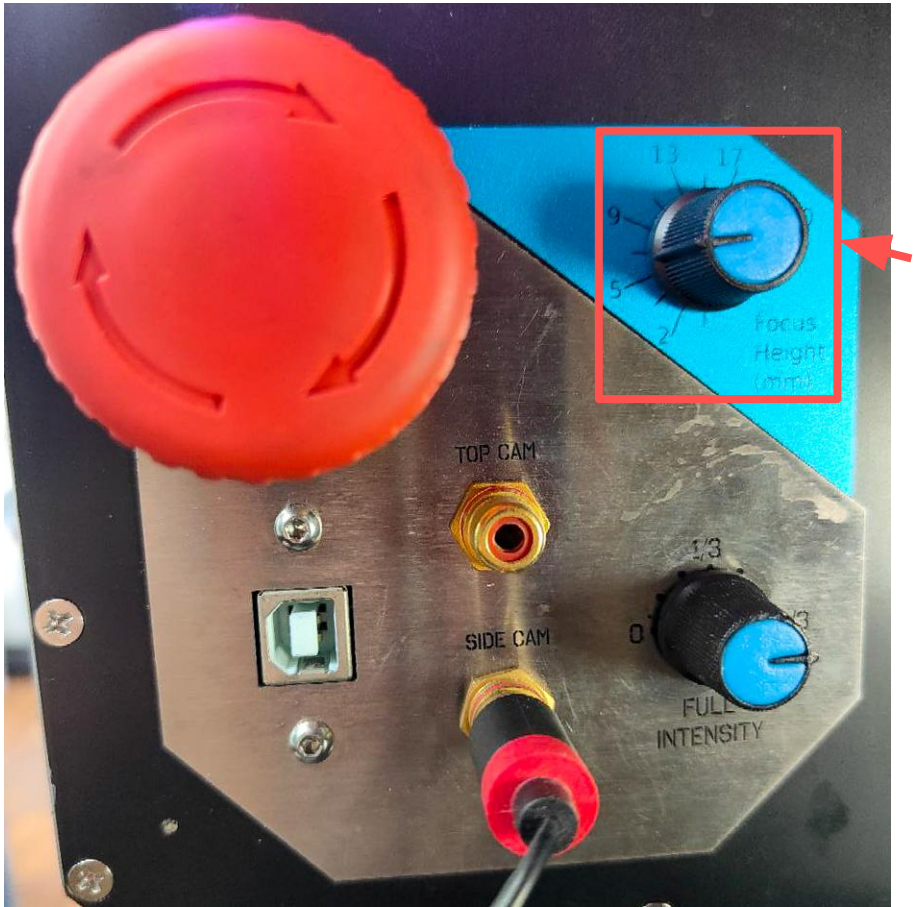
Once settings are applied, the file should be saved in your computer. Transfer the gcode file to an SD Card.

You may also name the file with the term “cut” to distinguish it from an engraving file.

OPERATING THE CRAFTLASER

Designing Laser Cut Parts

5. Operating the Laser Cutter

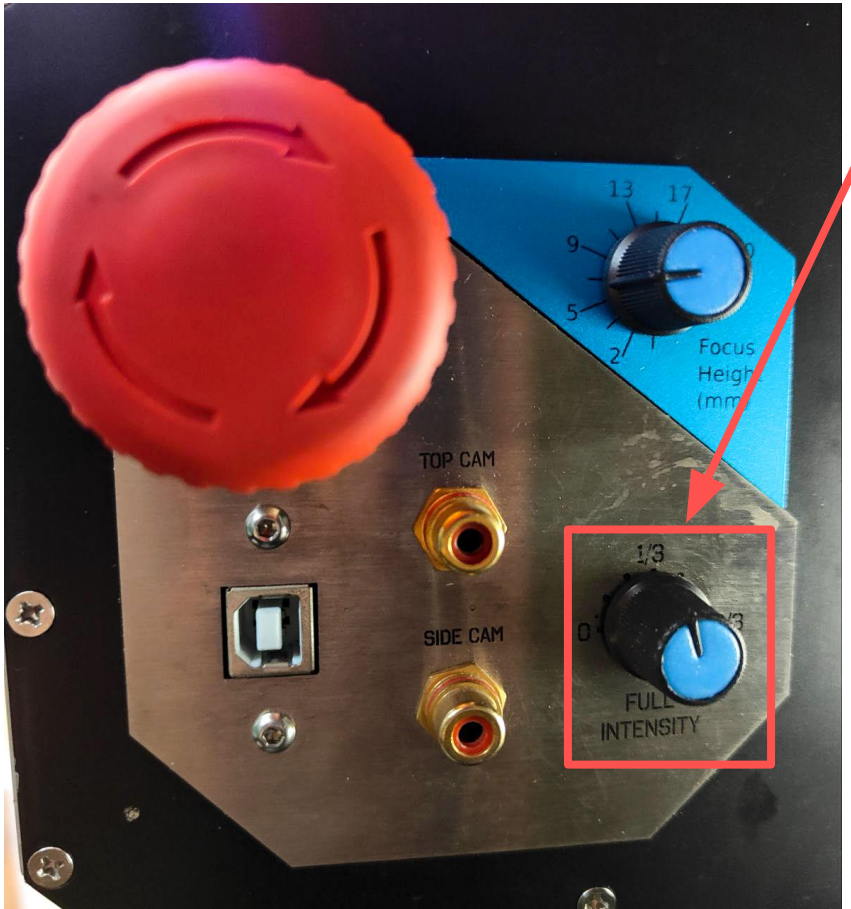


Adjust Focus Height to 4mm above material. The easiest method to roughly gauge this 4mm height is to use a 3mm piece of acrylic on top of your material to be cut. Place both pieces and lower the laser cutting head slightly above the acrylic piece.

Turn the knob anti-clockwise or to the left to lower the laser cutting head to the desired height.

Designing Laser Cut Parts

5. Operating the Laser Cutter



For engraving, adjust the laser intensity knob to 2/9 power (11 O'Clock).

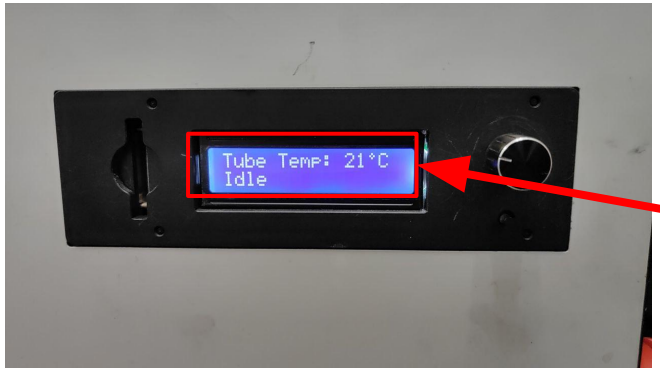
REMINDER

Do not exceed this power setting. Exceeding this setting might result in your material getting burnt.

Once you are done cutting, remember to reset the laser intensity knob back to the '0' position.

Designing Laser Cut Parts

5. Operating the Laser Cutter



Open the material loading tray when the display reads “Idle”. This is to ensure that the machine is done cutting/rastering. Check on the monitor and display to confirm the machine is done cutting before opening the tray.

REMINDER

Do not cut other materials other than what is specified.

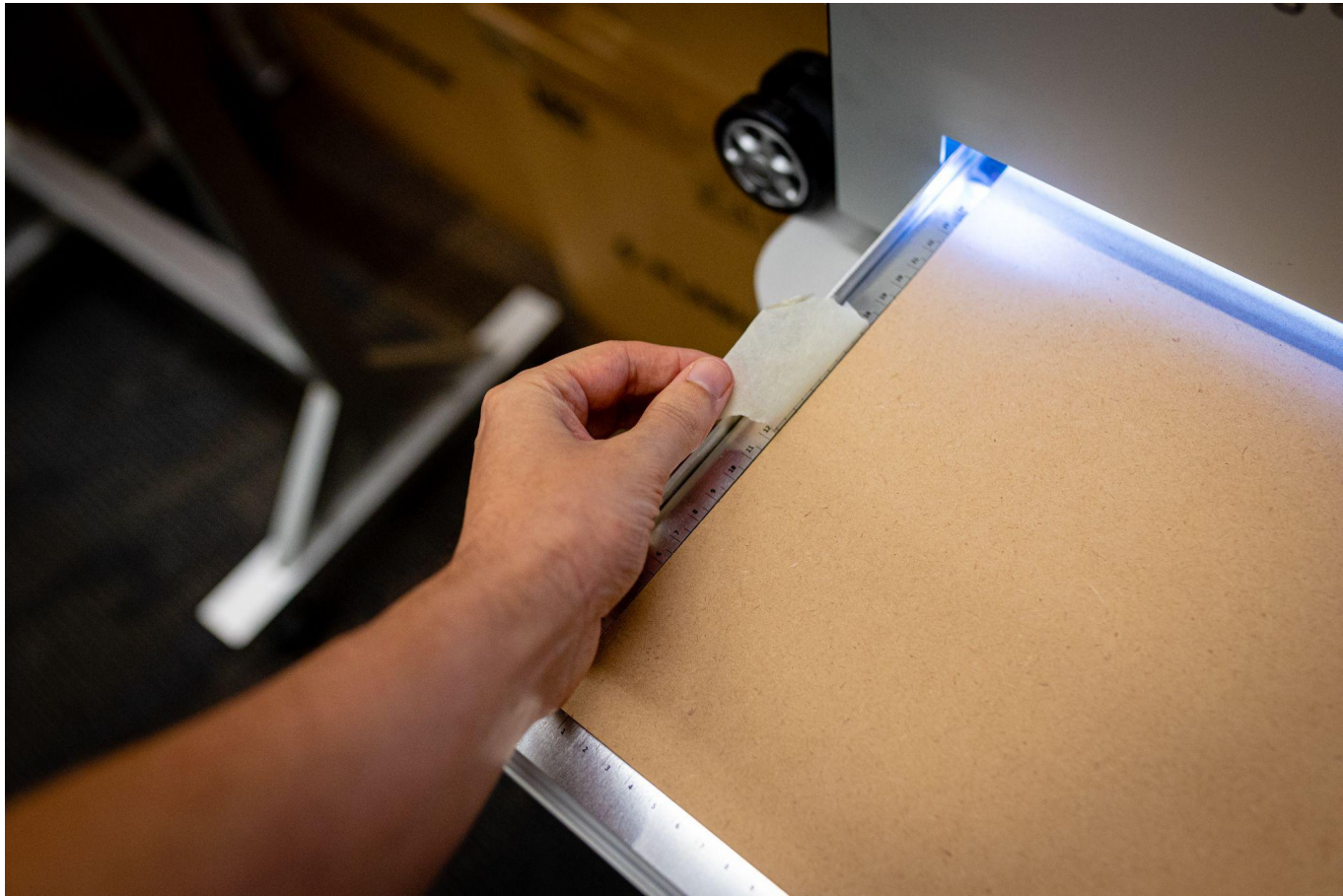
Monitor the ‘Tube Temp’ and make sure it does not exceed 35 °C.
If it does stop the machine and let it cool down for at least 10 mins.

Designing Laser Cut Parts

5. Operating the Laser Cutter

Align your material to the bottom-left corner of the materials tray.

Apply tape to the sides to prevent the workpiece from moving.



Designing Laser Cut Parts

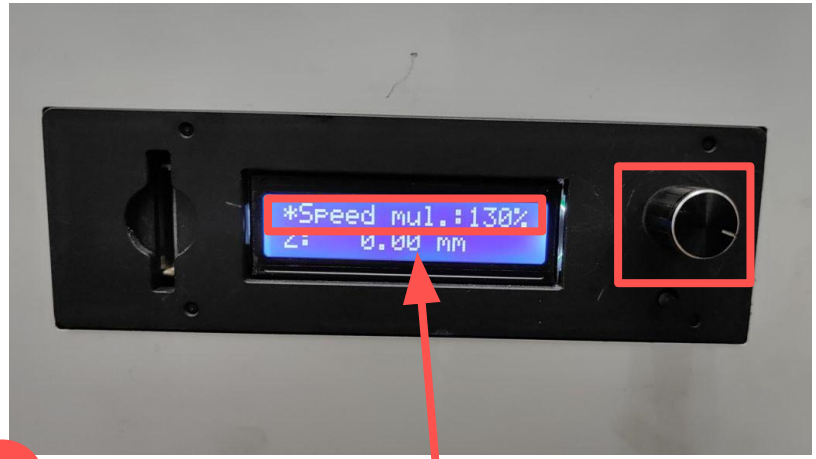
Try to make sure your job does not go over the tape.

Position the tape strategically to avoid any potential mistakes.

Laser Cutter Settings for Engraving

1

Select “Quick Settings”.

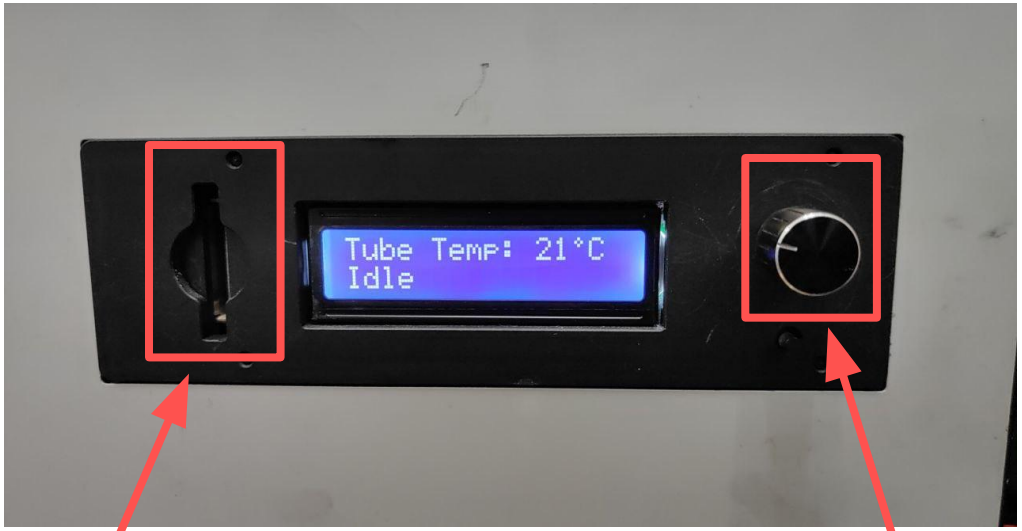


2

Set “Speed mul.” to 200% by rotating the knob clockwise and pressing the knob to select.

Designing Laser Cut Parts

5. Operating the Laser Cutter



1 **Insert SD Card.**

2 **Select file to print by rotating the knob and pressing the knob to select file.**

Designing Laser Cut Parts

5. Operating the Laser Cutter

Insert your SD card after you've adjusted the cutter settings.

The menu will automatically navigate to the files on the card, making it difficult to adjust settings after.

Designing Laser Cut Parts

5. Operating the Laser Cutter

For cutting, adjust the laser intensity knob to 2/3 power (3 O'Clock).

REMINDER

Do not exceed this power setting. Exceeding this setting might result in your material getting burnt.

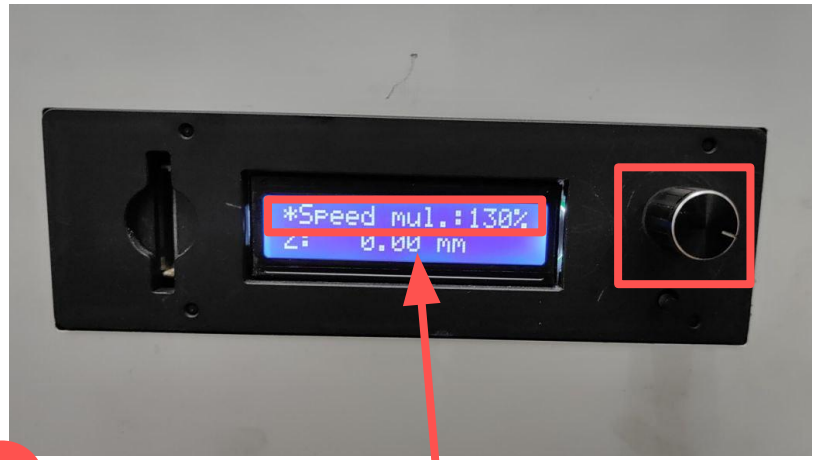
Once you are done cutting, remember to reset the laser intensity knob back to the '0' position.

Designing Laser Cut Parts

Laser Cutter Settings for Cutting

1

Select “Quick Settings”.



2

Set “Speed mul.” to 130% by rotating the knob clockwise and pressing the knob to select.

Designing Laser Cut Parts

5. Operating the Laser Cutter

Remove your work when you're done both engraving and cutting.

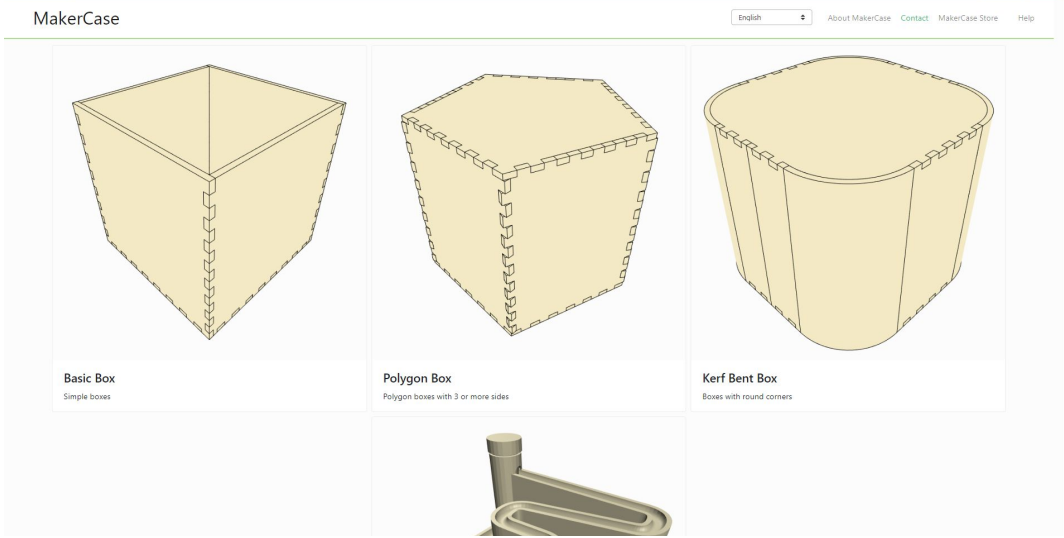
Keep the machine on and close the materials tray to ensure fumes are directed to the extractor.

3D Shapes and Boxes

EXTENSIONS

Potential Projects

There are lots of projects to create with a laser box, but a powerful and flexible option is to make boxes. Boxes can be used for other projects, hold cherished objects, or for other creative purposes.



https://en.makercase.com/

There are many free box generators available online, speeding up the process. Makercase is showcased because of how easy it is to use.

Potential Projects

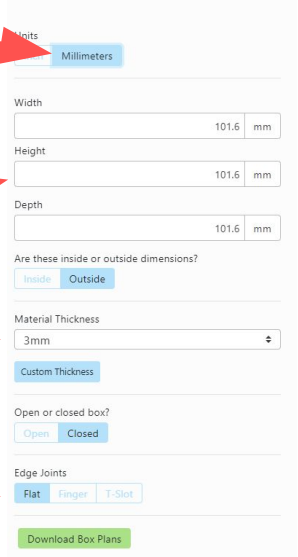
6. Design a 3D Box with Makercase

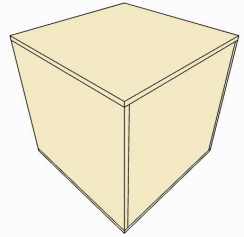
Set units to Millimeters

Set width, height, depth of box

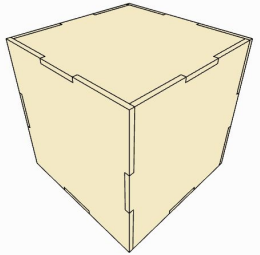
Material Thickness

Joint Type

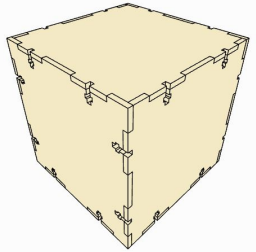




Flat Joint



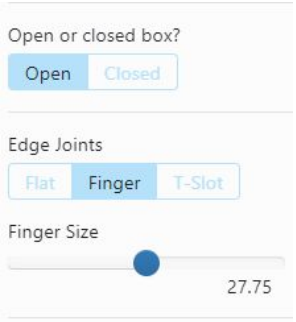
Finger Joint

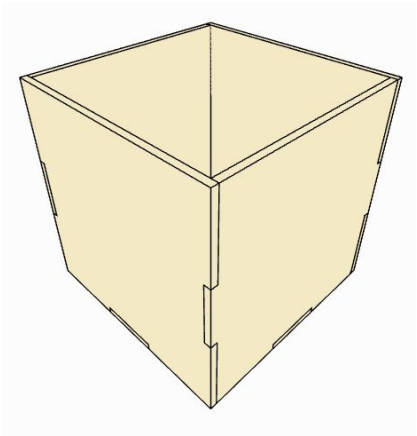


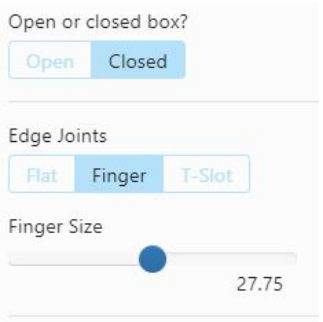
T-Slot Joint

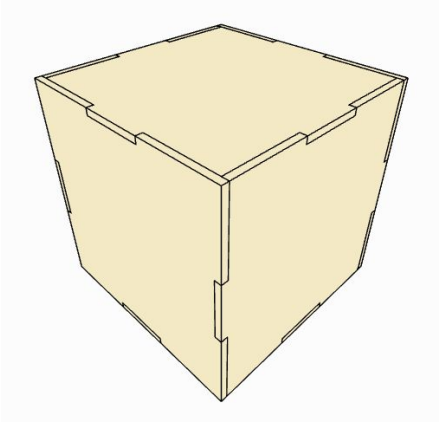
Potential Projects

6. Design a 3D Box with Makercase



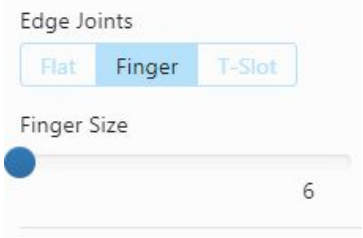


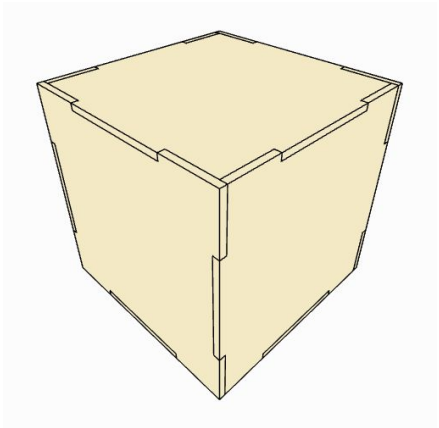


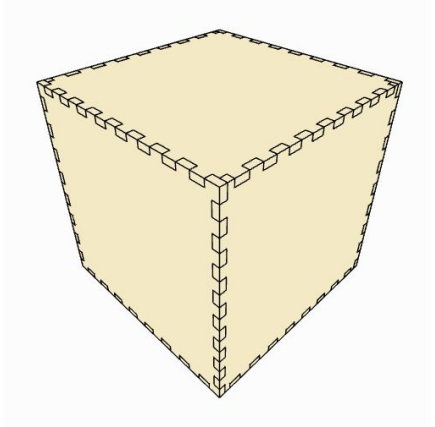


Potential Projects

6. Design a 3D Box with Makercase



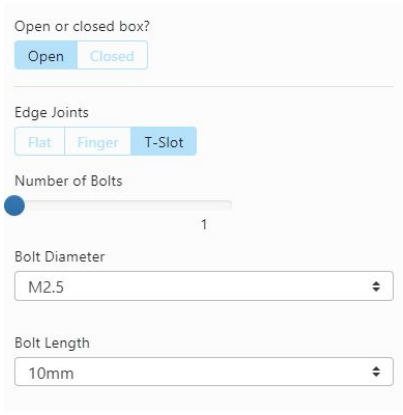


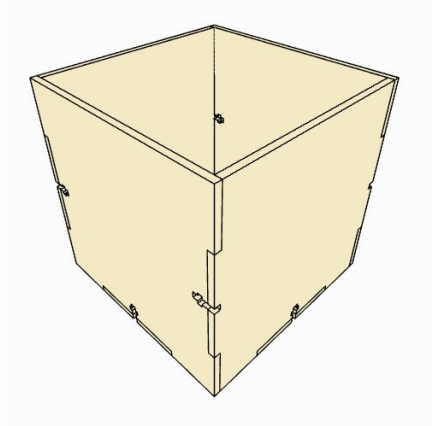


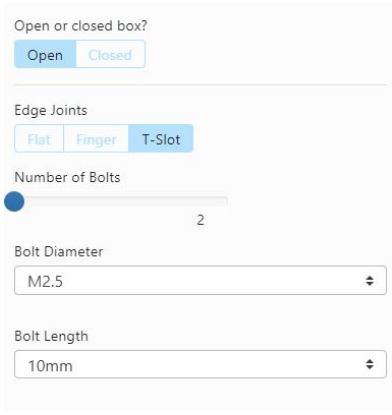
Potential Projects

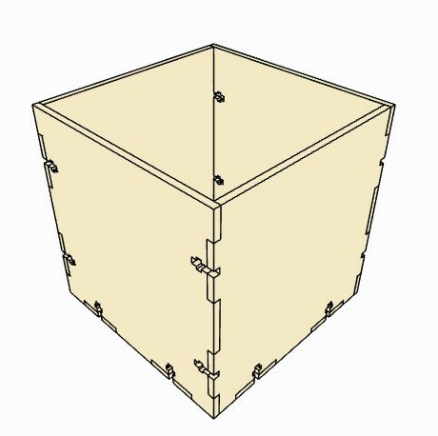
6. Design a 3D Box with Makercase

MakerCase - T Slot Joint





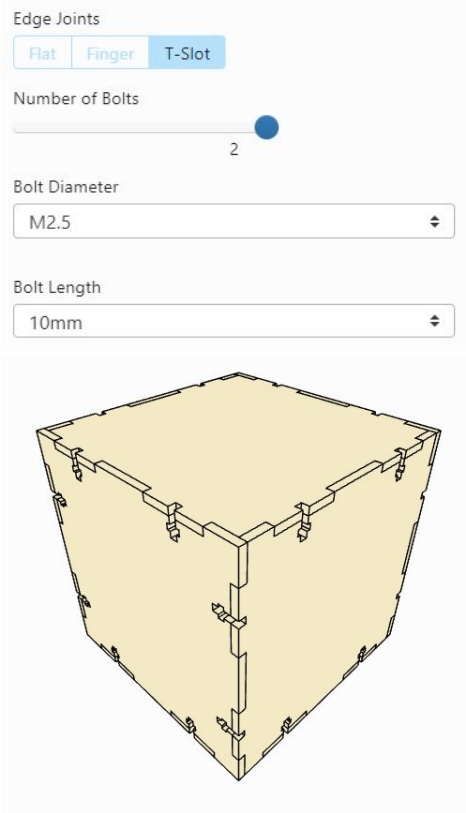


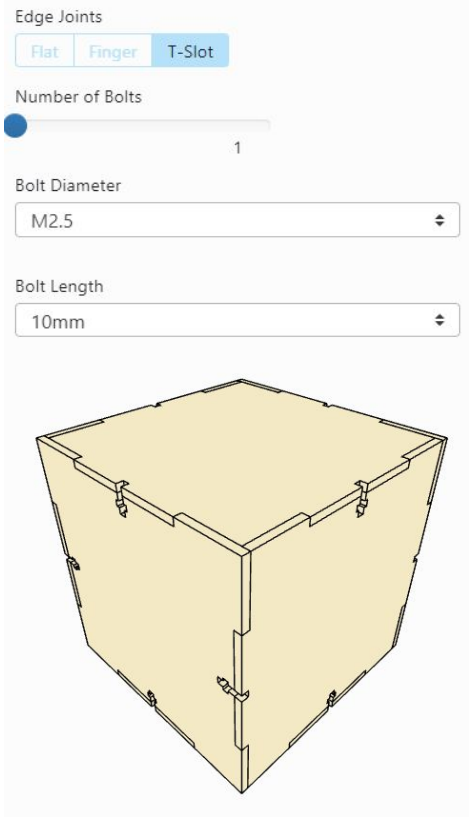


Potential Projects

6. Design a 3D Box with Makercase

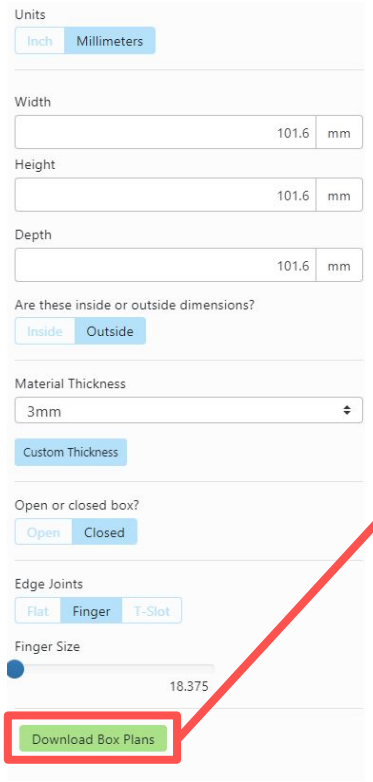
MakerCase - T Slot Joint

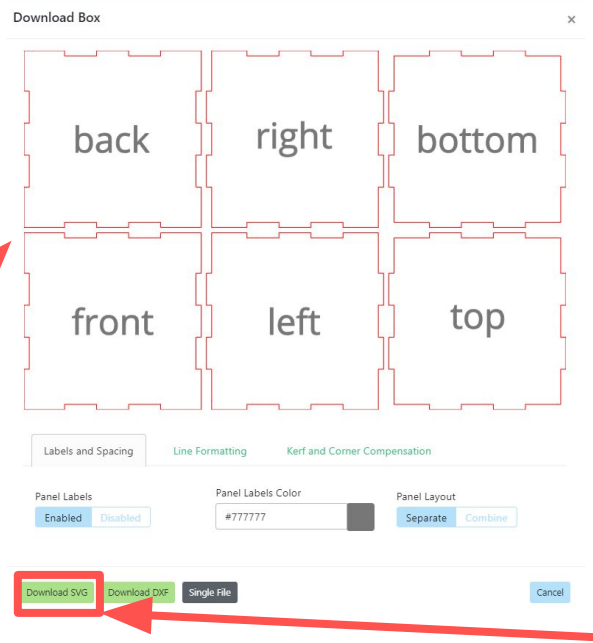




Potential Projects

6. Design a 3D Box with Makercase

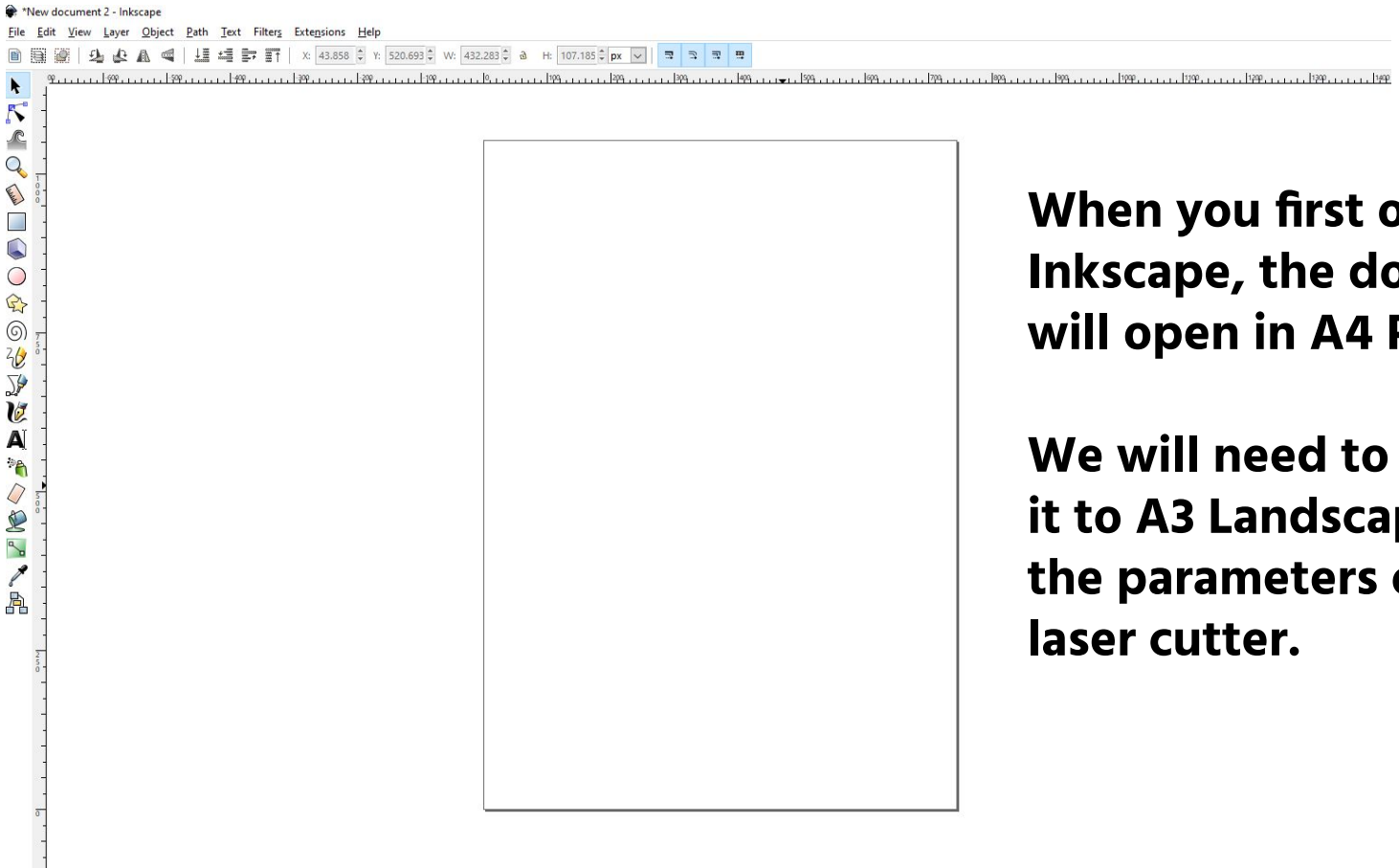




Download in SVG format

Potential Projects

6. Design a 3D Box with Makercase

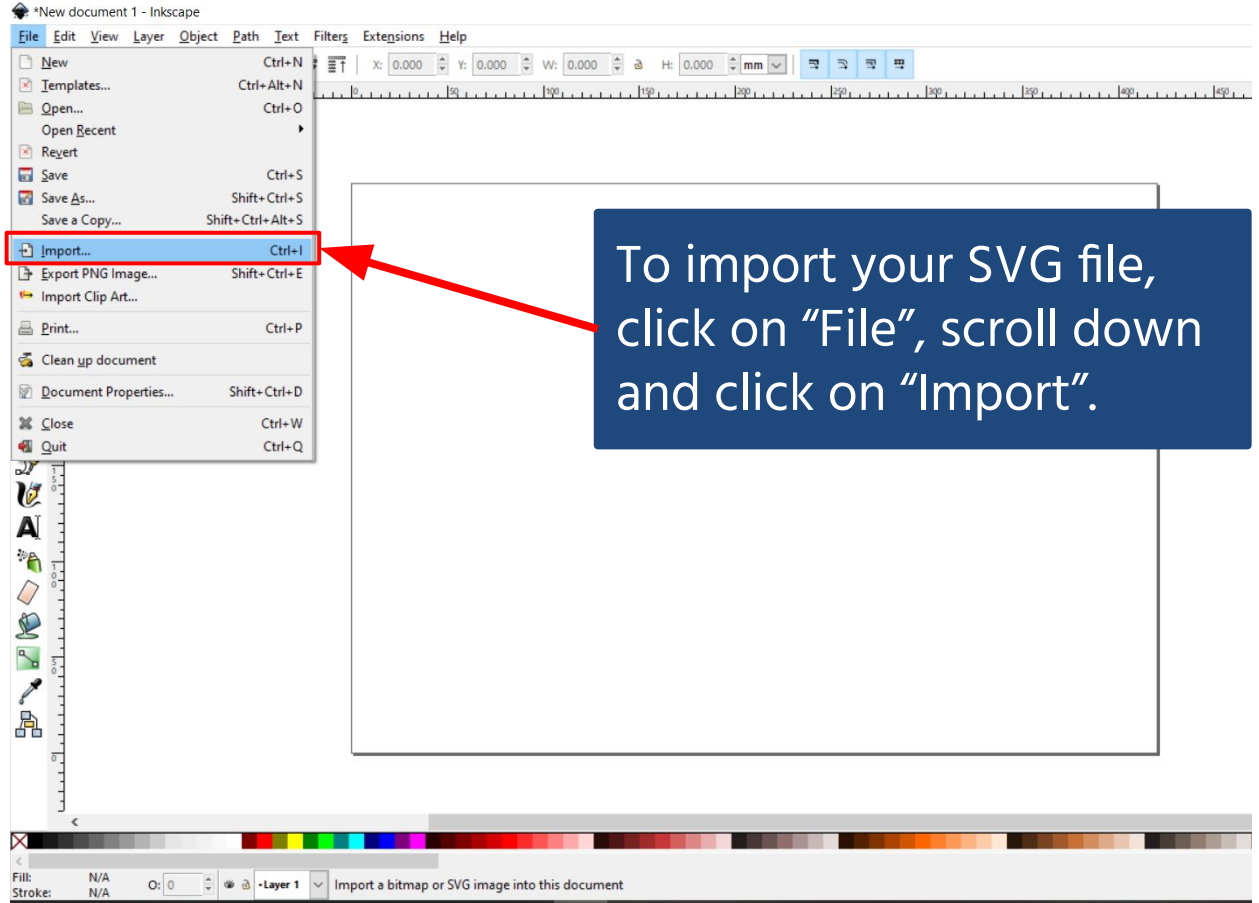


When you first open Inkscape, the document will open in A4 Portrait.

We will need to change it to A3 Landscape to fit the parameters of the laser cutter.

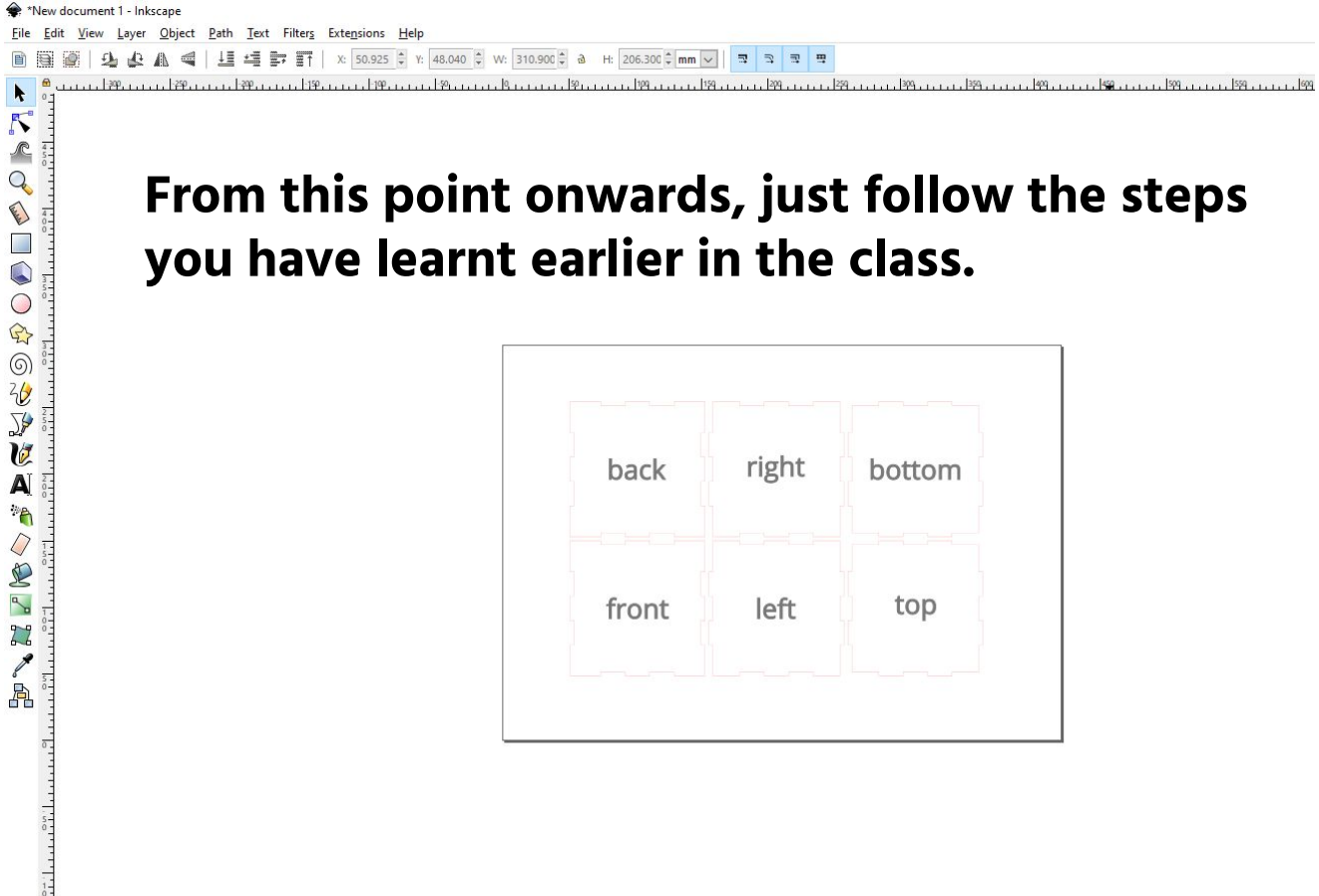
Potential Projects

6. Design a 3D Box with Makercase



Potential Projects

6. Design a 3D Box with Makercase

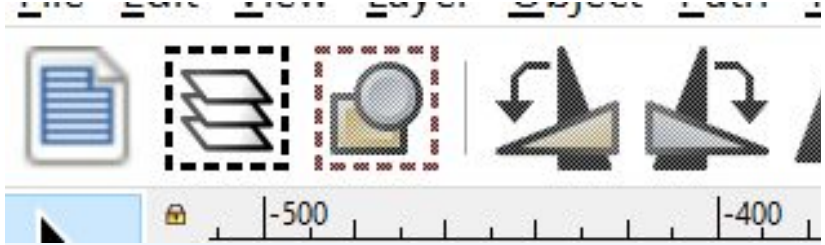


From this point onwards, just follow the steps you have learnt earlier in the class.

Frequently Asked Questions

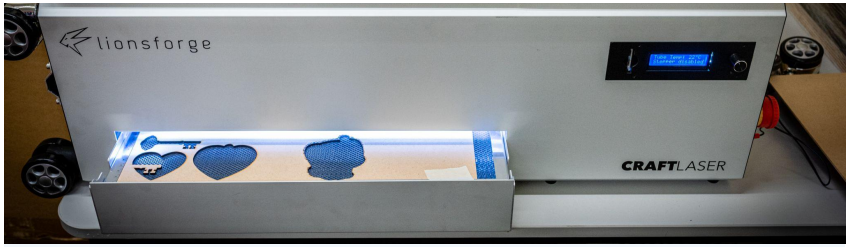
HOW CAN I APPLY WHAT I'VE LEARNED?

Applying Knowledge



Vector Design

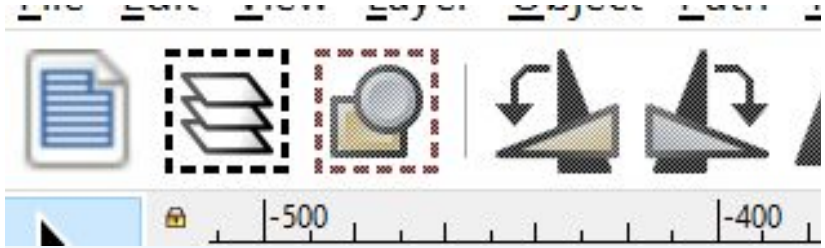
1. Seek learning resources for Inkscape (either from online sources or through NLB OneSearch)
2. Participate in Inkscape challenges to build out your skills



Laser Cutting

1. Find interesting laser cutting projects on Thingiverse or instructables
2. Make simple projects with different materials
3. Share your designs in the MakeIT Facebook group

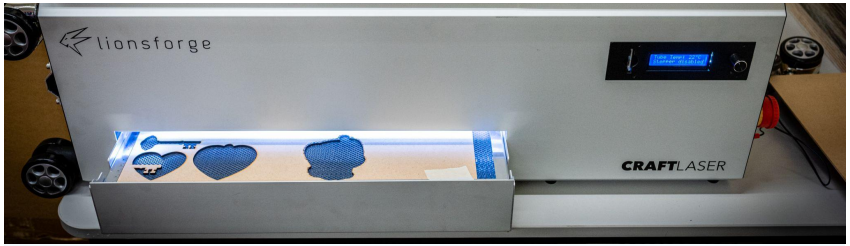
Applying Knowledge



Vector Design - Youtubers to Follow

Logos By Nick:
https://www.youtube.com/@LogosByNick

TinkerTips (Playlist):
https://tinyurl.com/TinkerTips



Laser Cutting - Youtubers to Follow

Make or Break Shop:
https://www.youtube.com/@makeorbreakshop

CraftLaser Full Walkthrough (Video):
https://tinyurl.com/craftlaser

Applying Knowledge

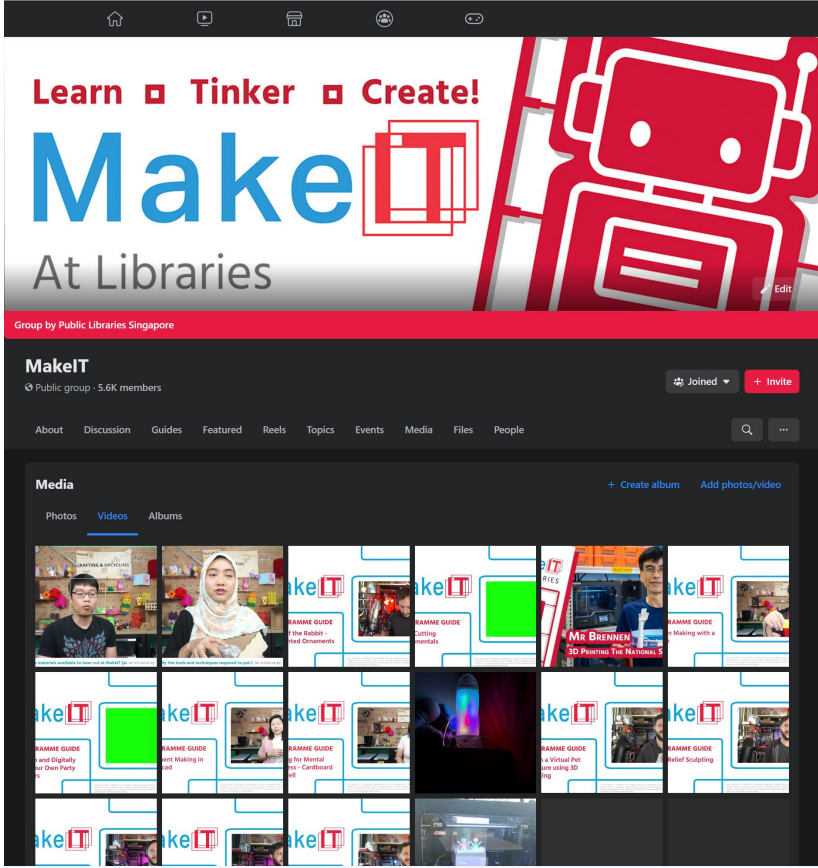
Join our MakeIT Facebook Community Group to share ideas and access our online learning guides!

To access additional guides on laser cutting, navigate to the Media tab, select Videos, and search for:

[Laser Cutting Fundamentals]

[How to Laser Cut a Wooden Book Cover]

[Laser Cut Box]



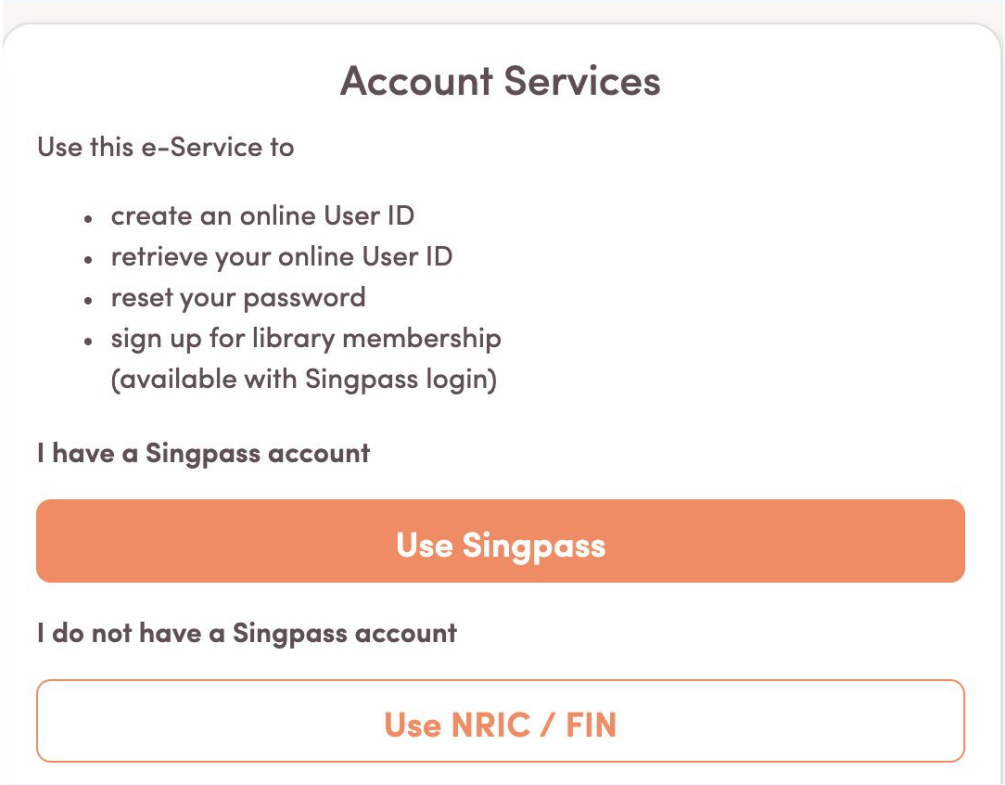
Scan the QR code or visit https://www.Go.Gov.sg/makeit

TINKERING AT MAKEIT AT LIBRARIES

MakeIT at Libraries - Making a Booking

Creating myLibrary ID

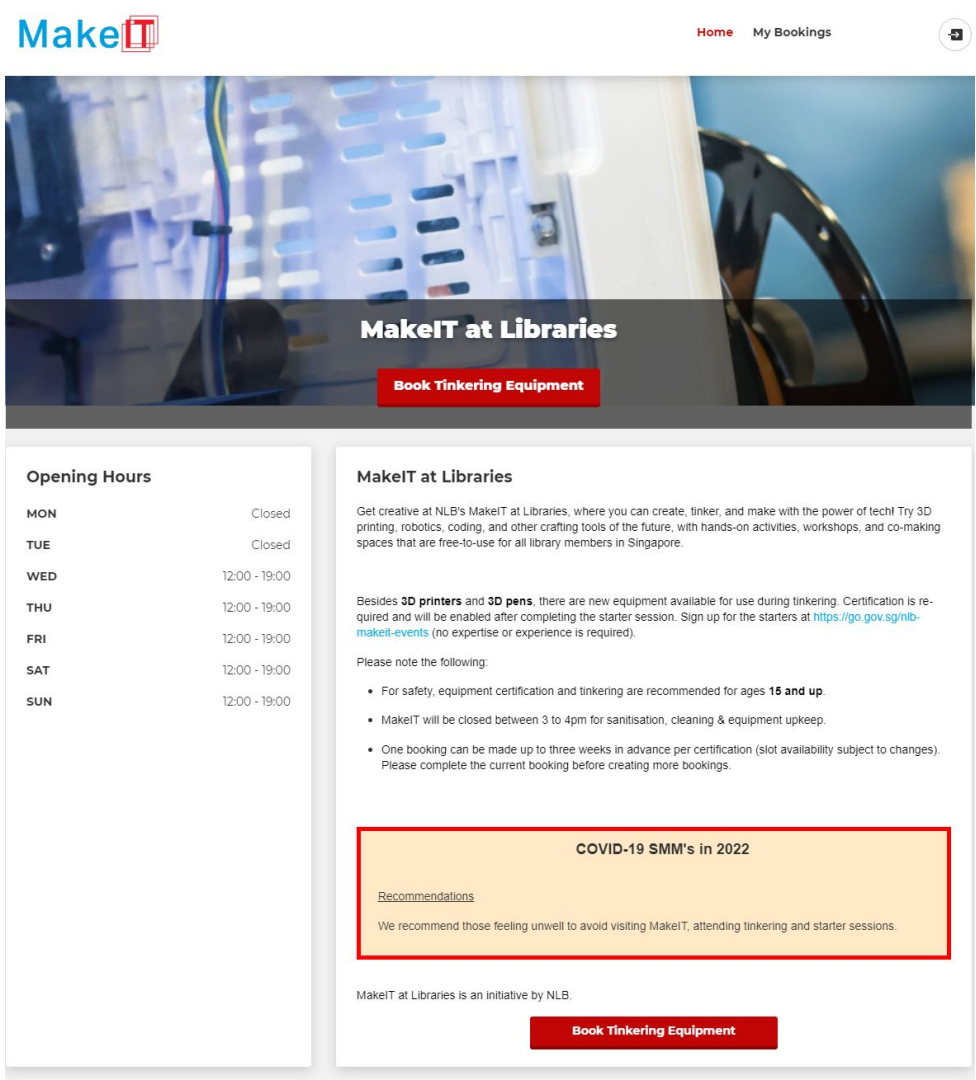
1. Go to *https://account.nlb.gov.sg/*
2. Create a myLibrary account using your Singpass or NRIC / FIN
3. Create a myLibrary ID (username) that you can remember



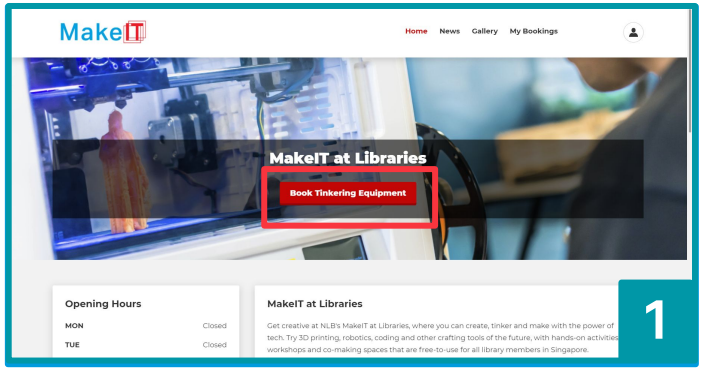
MakeIT at Libraries - Making a Booking

Simplybook

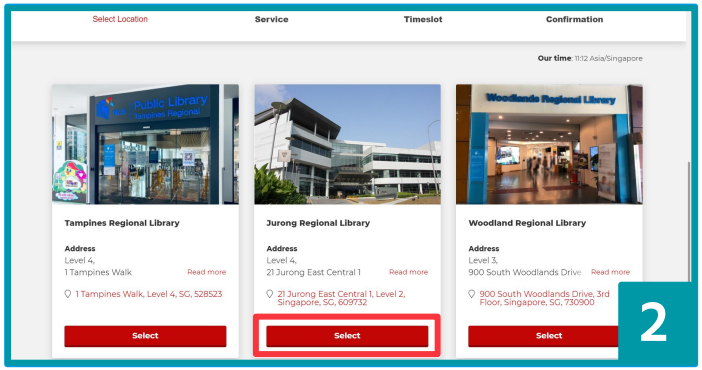
Equipment bookings are handed through Simplybook. Talk to our Centre Manager to register for an account, then visit *https://makeitsg.simplybook.asia/v2/* to book equipment.



MakeIT at Libraries - Making a Booking

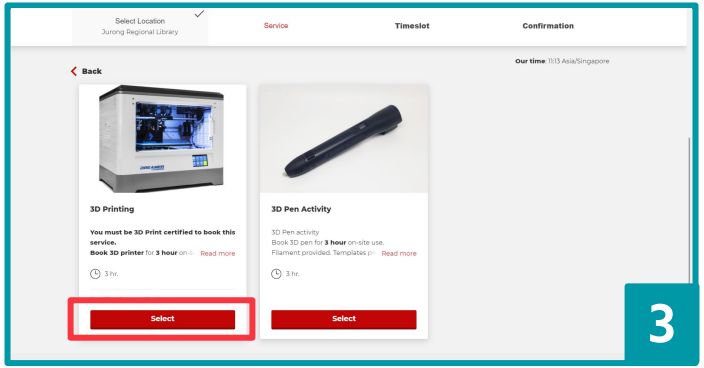


Once you have logged in, click on “Book Tinkering Equipment”.

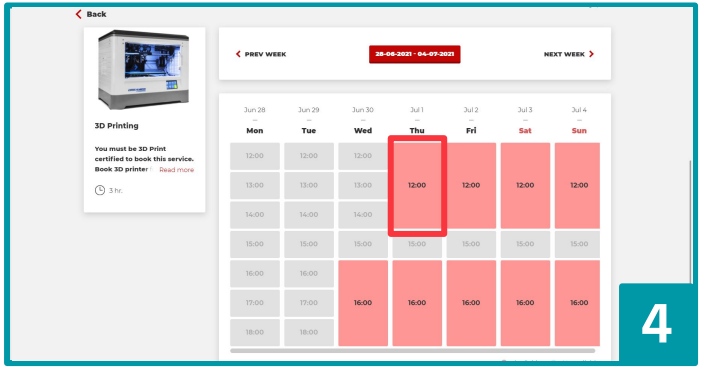


You will be redirected to a page that allows you to choose which MakeIT branch you will like to visit. Select one of the branches by clicking the respective branch “Select” button.

MakeIT at Libraries - Making a Booking



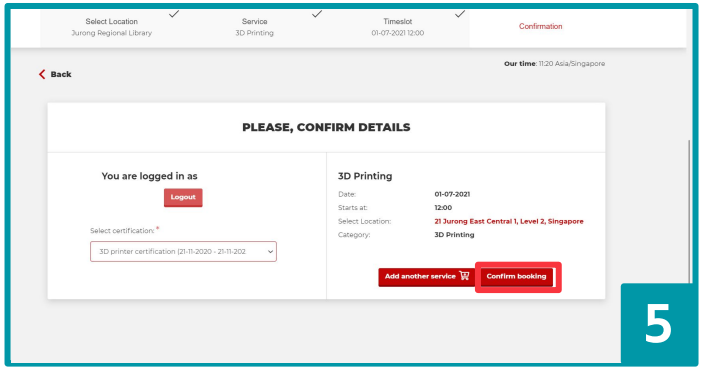
Click the “Select” button respective to the equipment that you will like to use.
Note: Bookings for most equipment can only be placed once you have gone for the required training.

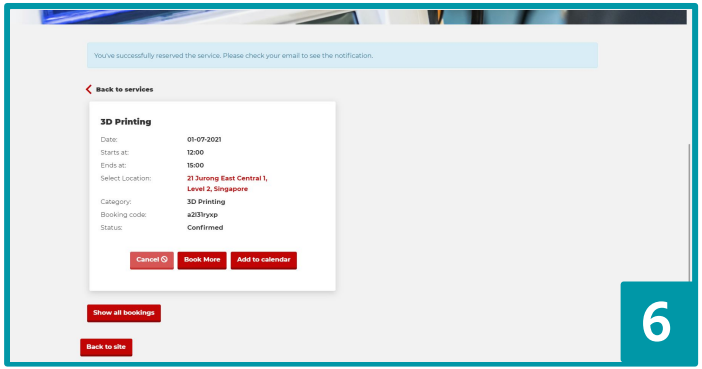


Slots available for booking will be displayed, click on the slot that you will like to book.

Red - Available for booking
Grey - Unavailable

MakeIT at Libraries - Making a Booking

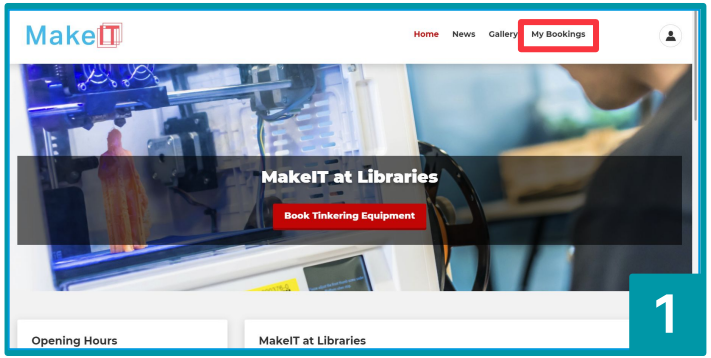




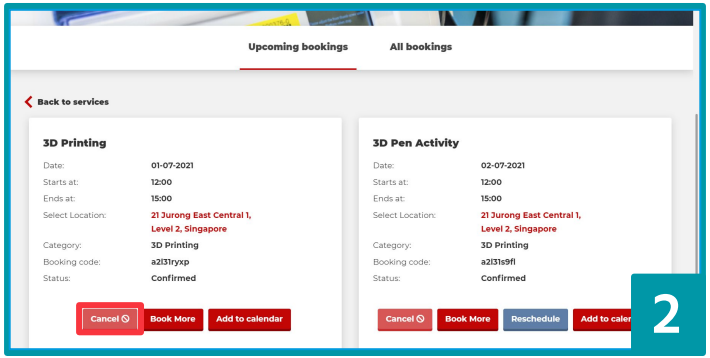
Ensure that you have selected the correct slot and click on “Confirm booking”.

You will be redirected to a confirmation page with your booking details. Should you need to cancel your booking, you may click “Cancel”.

MakeIT at Libraries - Cancelling your Booking

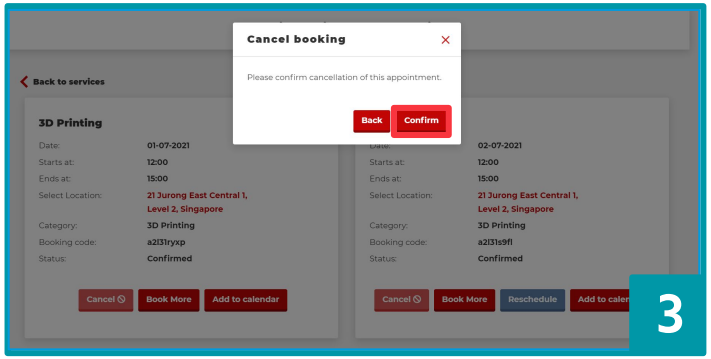


Once you have logged in, click “My Bookings”.

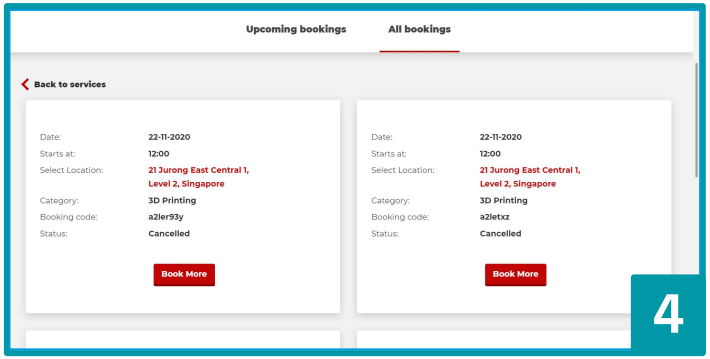


Your upcoming bookings will be displayed as shown above. To cancel your booking, click “Cancel”.

MakeIT at Libraries - Cancelling your Booking



Click “Confirm” to cancel the booking.



To see all past and future bookings, click on “All bookings”.

Frequently Asked Questions

1. How do I book a Laser Cutter?
Register as a user for MakeIT's Simplybook booking system, and book an available time slot for the Laser Cutter.

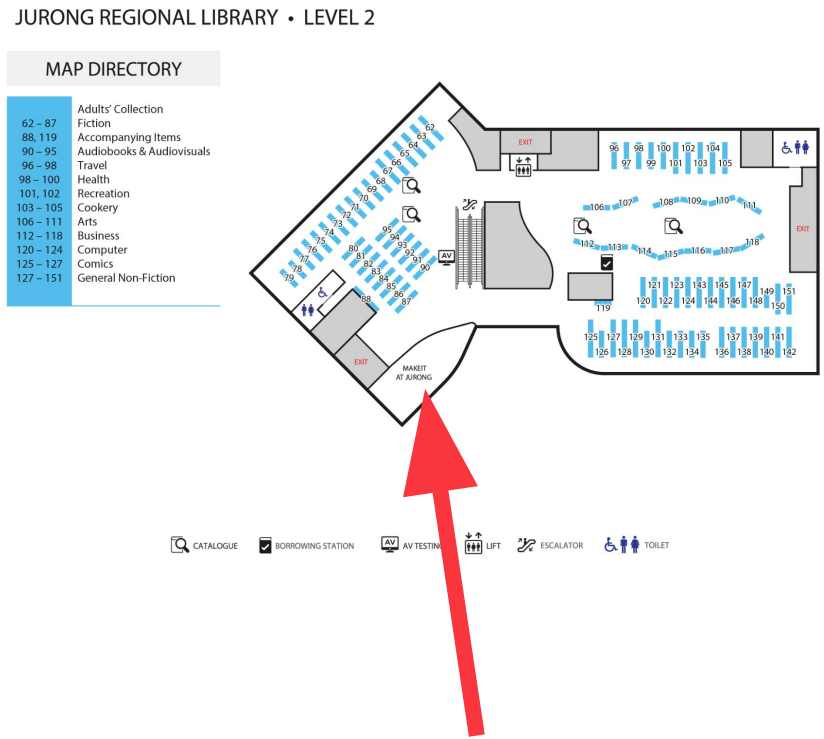
2. How long can I use the Laser Cutter per booking?
Bookings are limited to 3 hours.

3. How many Laser Cutters can I book? Can I book multiple Laser Cutters?
You may only book 1 Laser Cutter at a time within MakeIT.

4. Can I choose which Laser Cutter to use?
Laser Cutters are booked on a first-come, first-served basis. Arrive at your allocated time on time to begin using one of the available Digital Cutters.

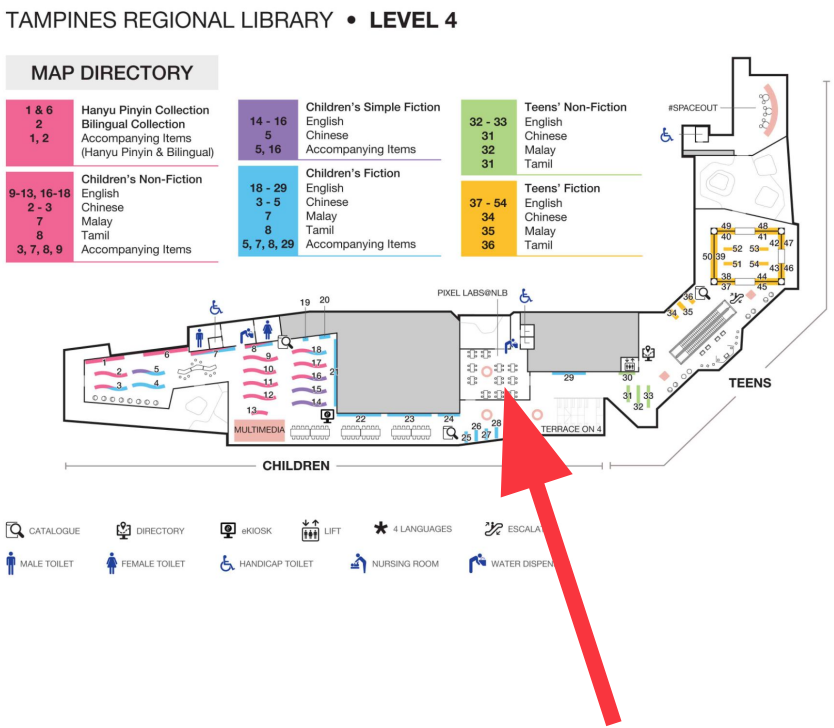
5. What can I cut? Can I bring my own materials for cutting?
You may choose one sheet of plywood, MDF, or acrylic per booking slot for cutting. In addition, you may test cut using the scrap materials provided at MakeIT. You may not bring your own materials for cutting at MakeIT.

MakeIT at Jurong



Location	Jurong Regional Library, 2nd Floor
Address	21 Jurong East Central 1 Singapore 609732
Closest MRT Station	NS1 EW24 JE5 **Jurong East**
Opening Hours	Wednesday - Sunday, 12 - 8PM

MakeIT at Tampines



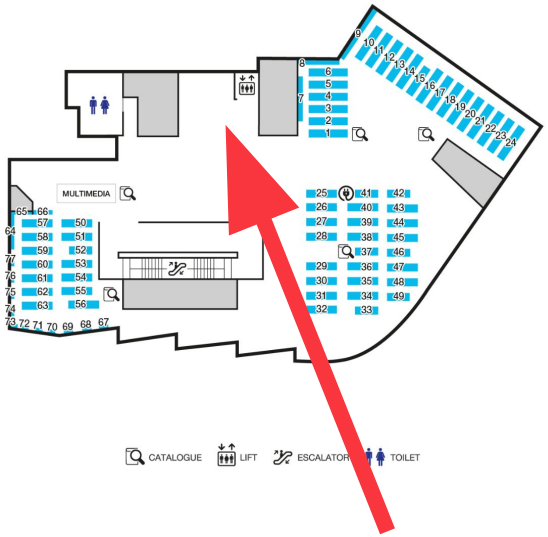
Location	Tampines Regional Library, 4th Floor
Address	1 Tampines Walk, #02-01 Our Tampines Hub, Singapore 528523
Closest MRT Station	EW2 – DT32 Tampines
Opening Hours	Wednesday - Sunday, 12 - 8PM

MakeIT at Woodlands

WOODLANDS REGIONAL LIBRARY • **LEVEL 3**

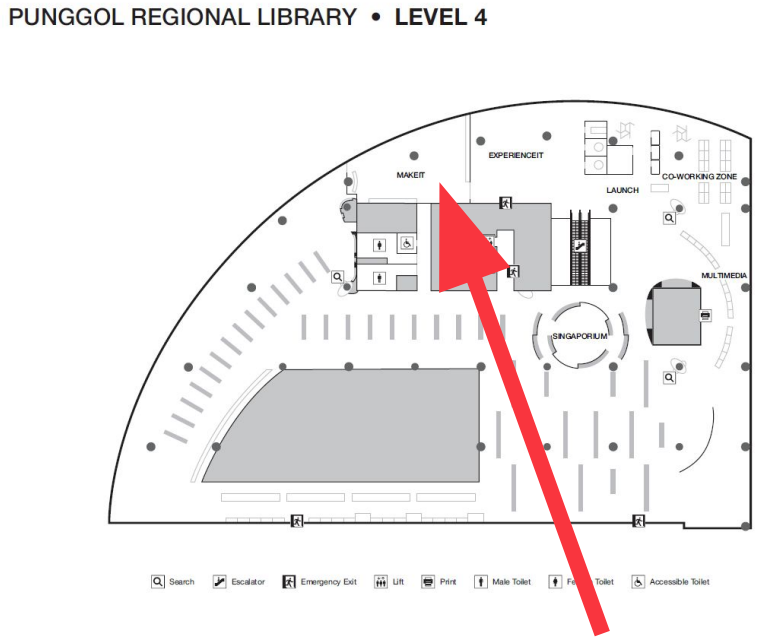
MAP DIRECTORY

	Adults' Collection
1 – 6	Singapore Collection
7 – 24	General Non-Fiction
25	Comics
26 – 28	Computers
29 – 34	Business
35 – 37	Health
38	Recreation
39 – 43	Arts
44 – 46	Cookery
47 – 49	Travel
50 – 66	English Fiction
67 – 77	English Fiction (Large Print)



Location	Woodlands Regional Library, 3rd Floor
Address	900 South Woodlands Drive #01-03. Singapore 730900
Closest MRT Station	NS9 TE2 **Woodlands**
Opening Hours	Wednesday - Sunday, 12 - 8PM

MakeIT at Punggol



Location	Punggol Regional Library, 4th Floor
Address	1 Punggol Drive One, #01-12, Singapore 828629
Closest MRT Station	NE17 PTC **Punggol**
Opening Hours	Wednesday - Sunday, 12 - 8PM

MAKE TOGETHER WITH US

Contribute your user creations with MakeIT at Libraries!

(Ongoing)

- Whether you've fabricated something physical like a 3D print or designed a digital creation, we would love to feature them at MakeIT!
- Simply leave your **physical works** and/or **source files** with our Maker Coaches at any of our makerspaces.

SHARE YOUR CREATIONS WITH MAKEIT!
Submit us your works

And have them possibly showcased at our exhibition at MakeIT!

From Nov 2023
Submissions can be contributed during MakeIT hours

Any MakeITs
Jurong Regional Library
Punggol Regional Library
Tampines Regional Library
Woodlands Regional Library

Hey there, talented users of MakeIT at Libraries!

We've seen some amazing stuff being created here in our makerspaces, and we're creating a collection of items to display and share them with others!

Whether you've fabricated something physical like a 3D print or designed a digital creation, we would love to feature them at MakeIT!

Sign up now!

Scan the QR code to join MakeIT via our Starter Sessions!

GETTING STARTED

- Contributor must be a registered user of MakeIT at Libraries. Not a member? Sign up with us in one of our Starter Sessions!
- Feel free to leave your physical works and/or source files with our Maker Coaches at any of our makerspaces.
- Your works will be part of MakeIT's open source library, which will be freely shared to other users for their own projects.
- For safety reasons, MakeIT at Libraries are recommended for ages 15 and above.

MakeIT AT LIBRARIES
go.gov.sg/makeit

NLB | National Library Board Singapore

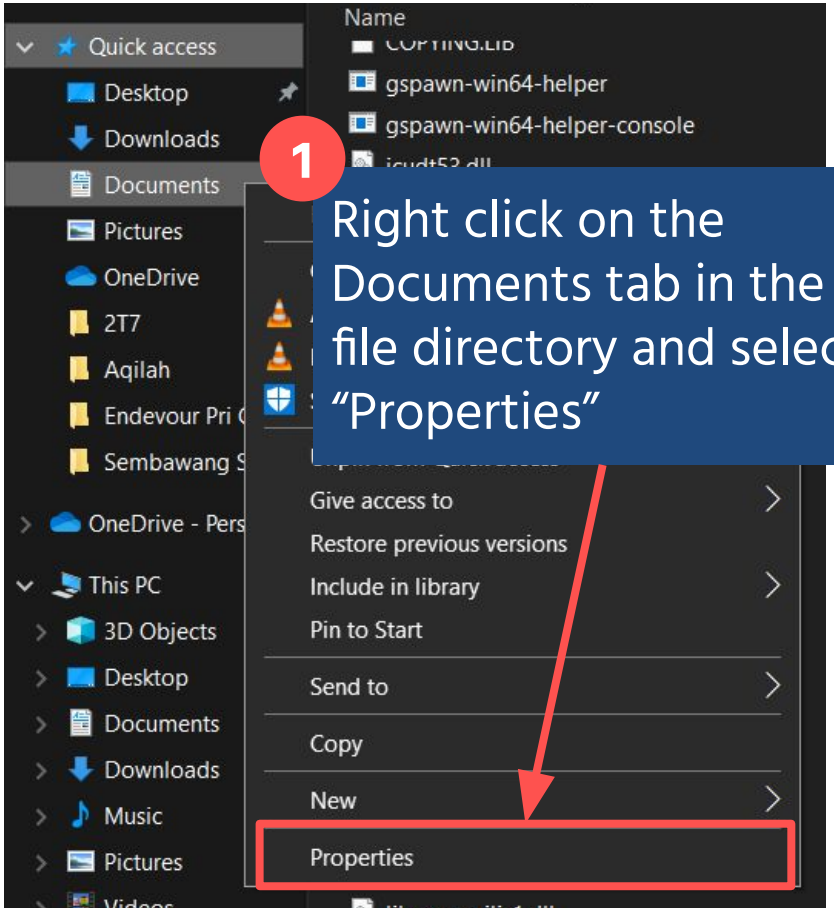
THANK YOU!

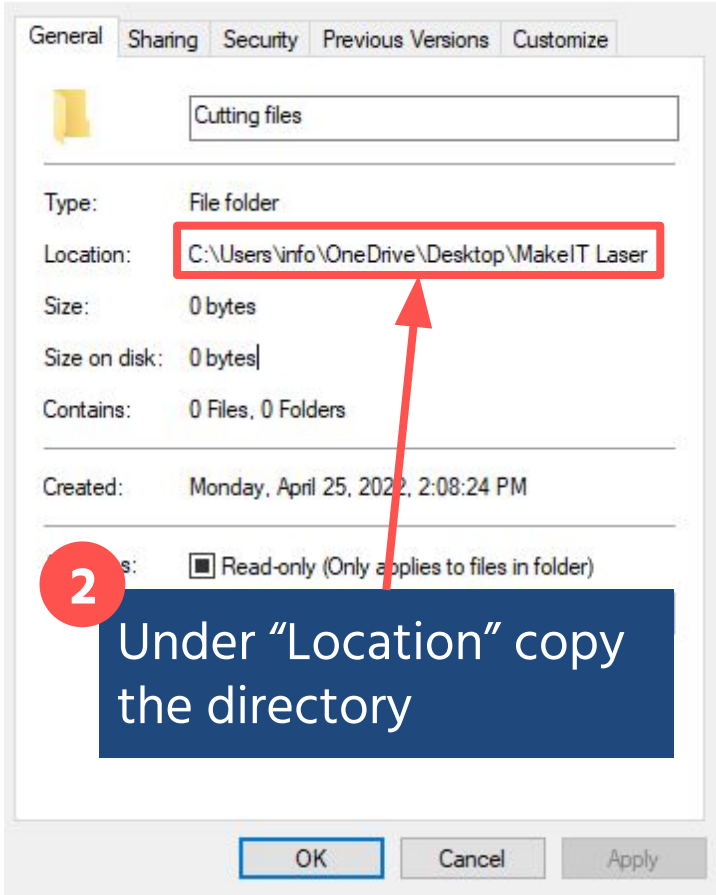
https://go.gov.sg/makeit-onsite-loi

Please follow the link above to provide feedback for this workshop. We'll use this information to continue to develop your learning journey within MakeIT.

Designing Laser Cut Parts

3. Use Inkscape to Engrave Object

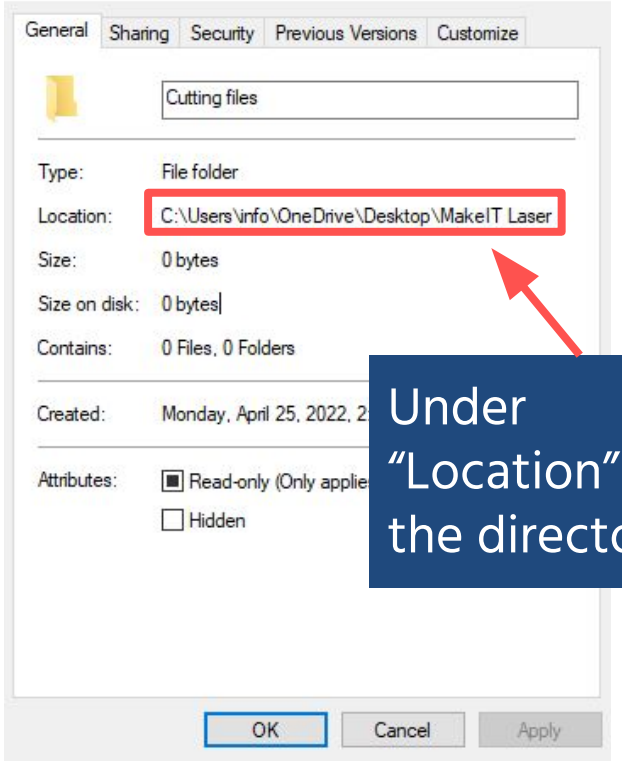




This slide is meant as notes for presenter

Right click any folder on the Desktop and select “Properties”.

In case the output location is not set within Inkscape, copy and paste the file path into the plugin pop-up window.

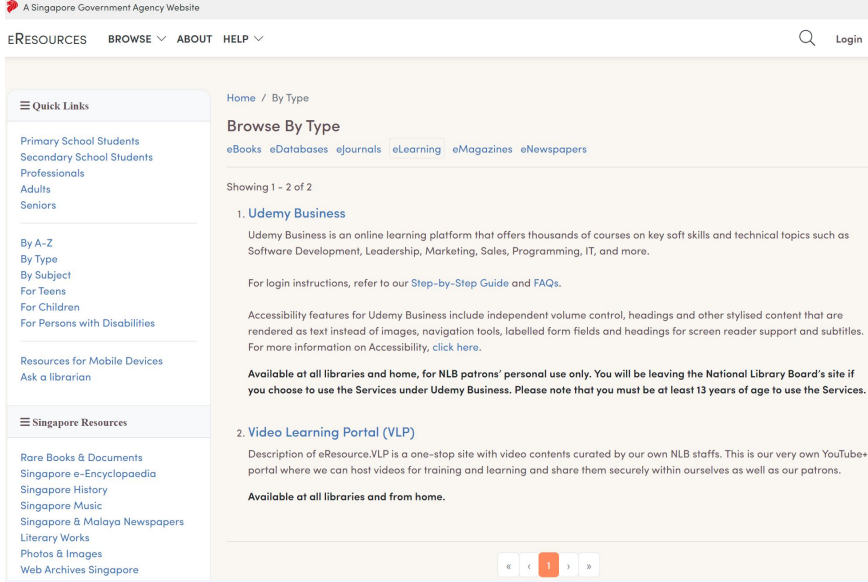


Applying Knowledge

Udemy

Users with a valid myLibrary ID can access Udemy Business with their library account to access thousands of courses online for free.

Udemy has courses ranging from technology topics to traditional crafting, all available to enroll from: *https://www.udemy.com/*



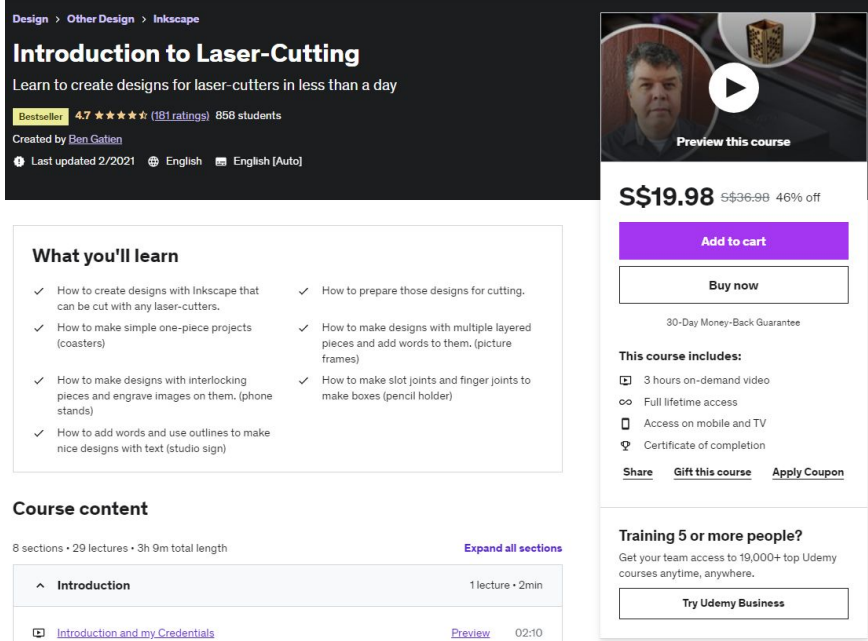
Navigate here to get started:
https://eresources.nlb.gov.sg/elearn

Applying Knowledge

Udemy - Laser Cutting

Designer and Artist Ben Gatien created a course focusing on introductory laser cutting design with Inkscape. The techniques used can apply to your projects.

https://www.udemy.com/course/introduction-to-laser-cutting/



Learner's Profile - Confidence Card

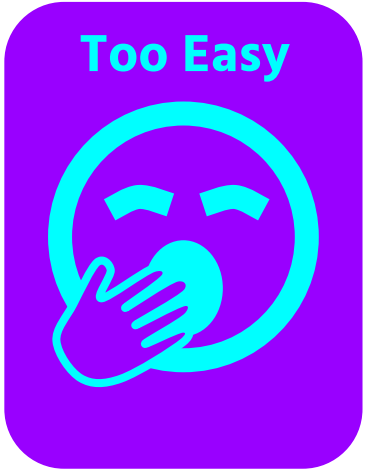
Beginner

Need help understanding content

Intermediate

Content is paced well and is understandable

Advanced



Content is too simple; need a bigger challenge