

# ***Before We Begin***

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## **Laser Cutter Orientation:**

- Please sign-in on the attendance sheet. Include your first and last name, email address, and check 'yes' or 'no' for if you have a Beanstack account.
- If you do not have a Beanstack account, please stay after the orientation to create an account. You must have an account if you want to use a PPL Laser Cutter!
- Take a seat and we will get started shortly.

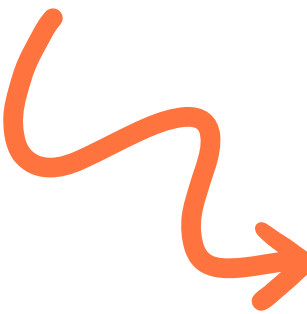
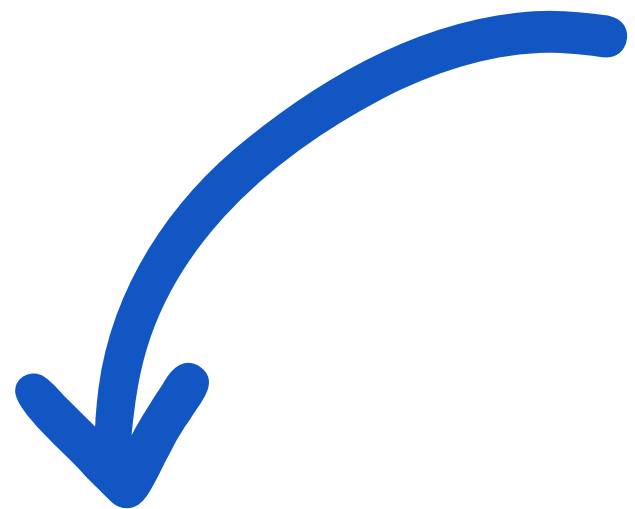


Sounds like a plan

# Laser

# Cutter

# Orientation!



Great idea!

On it!

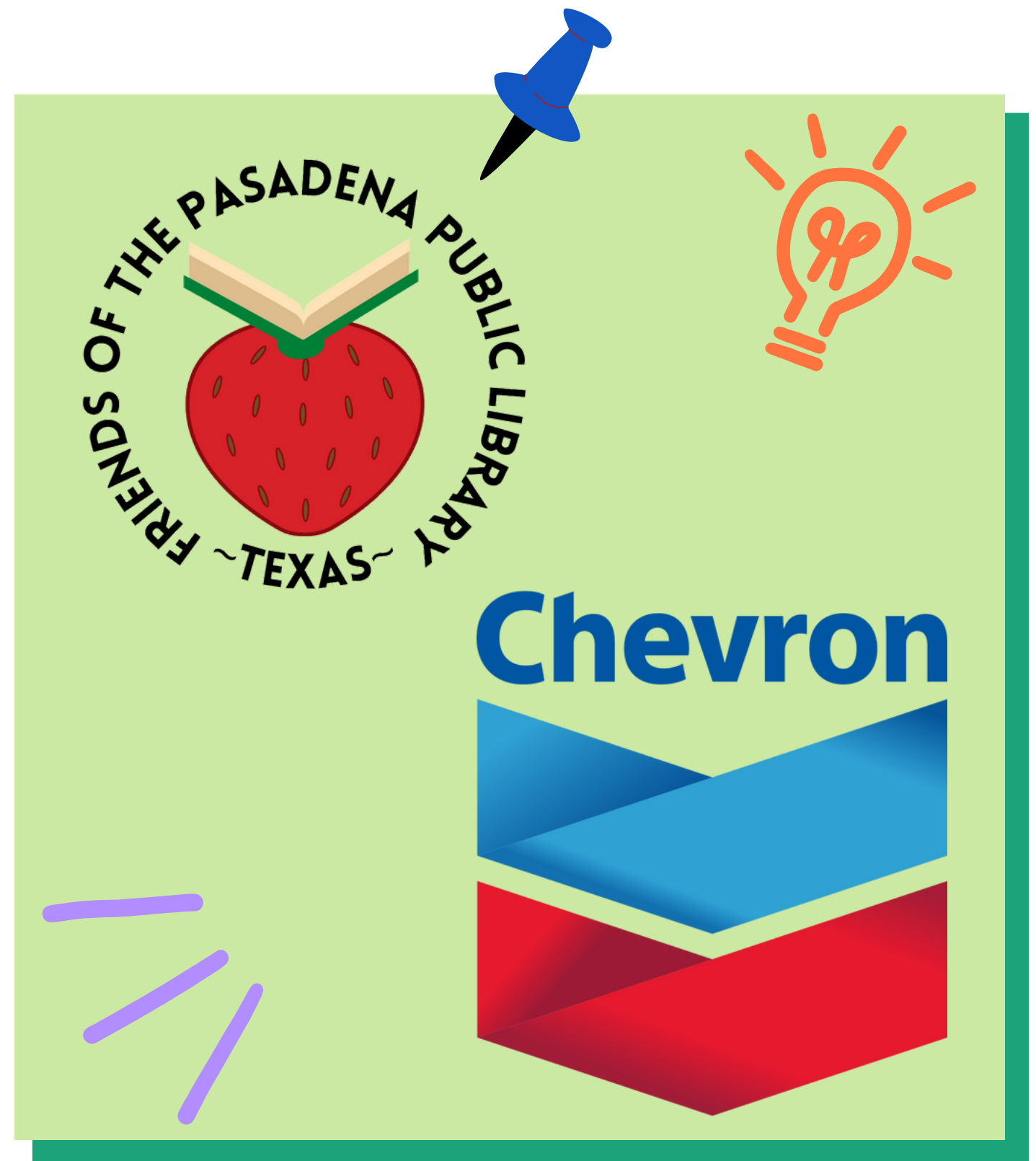
Let's get started



Presented by: Pasadena Public Library

# Pasadena Public Library Maker Lab

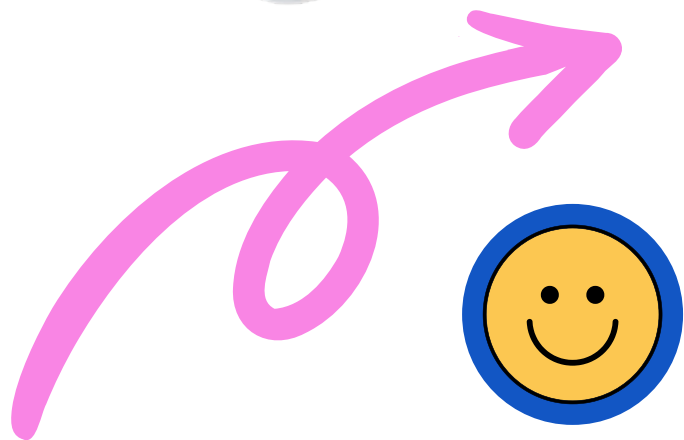
This Maker Lab, its equipment, supplies and services, are made possible with the assistance of the Friends of Pasadena Public Library and Chevron Pasadena Refinery.



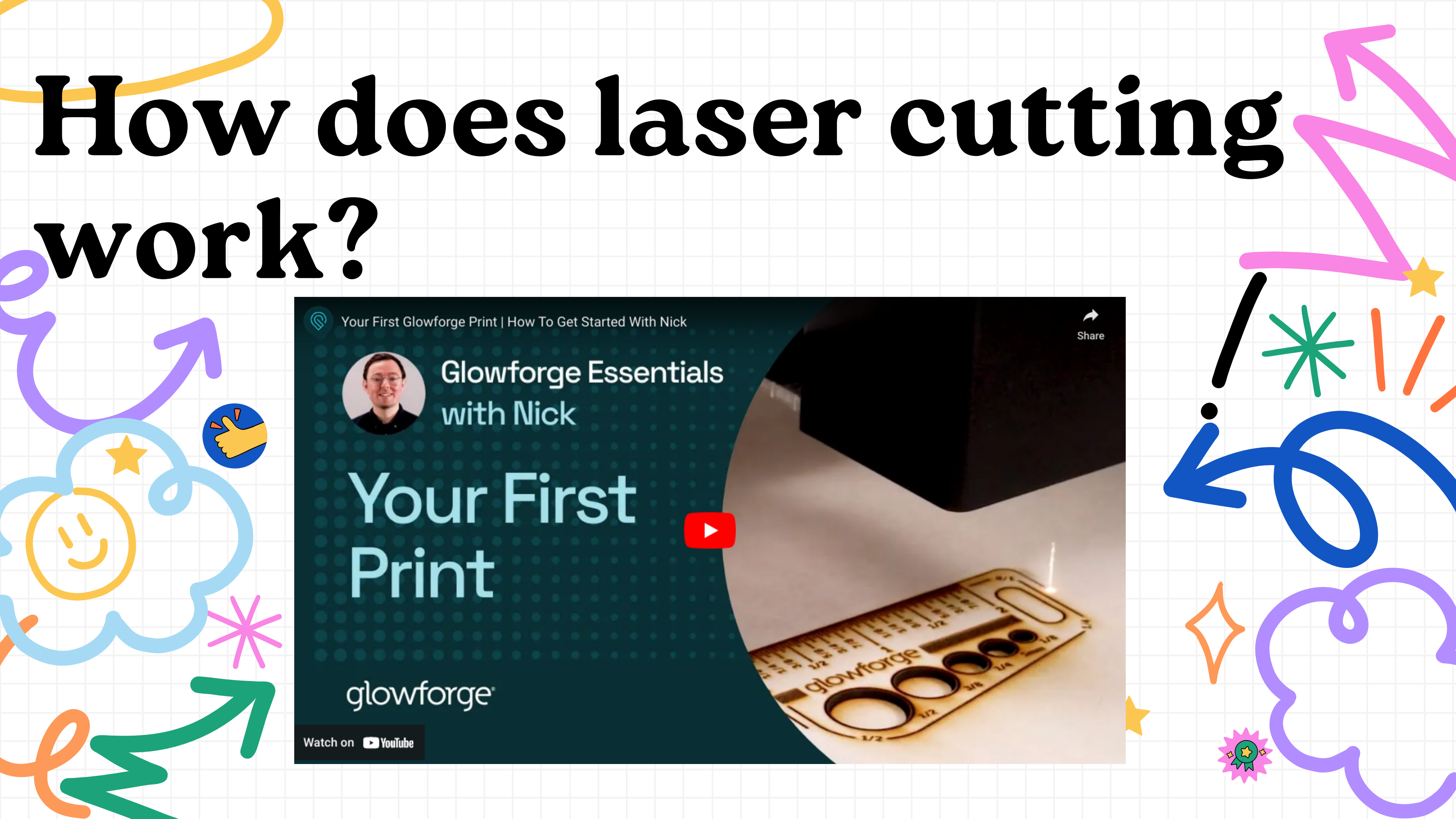
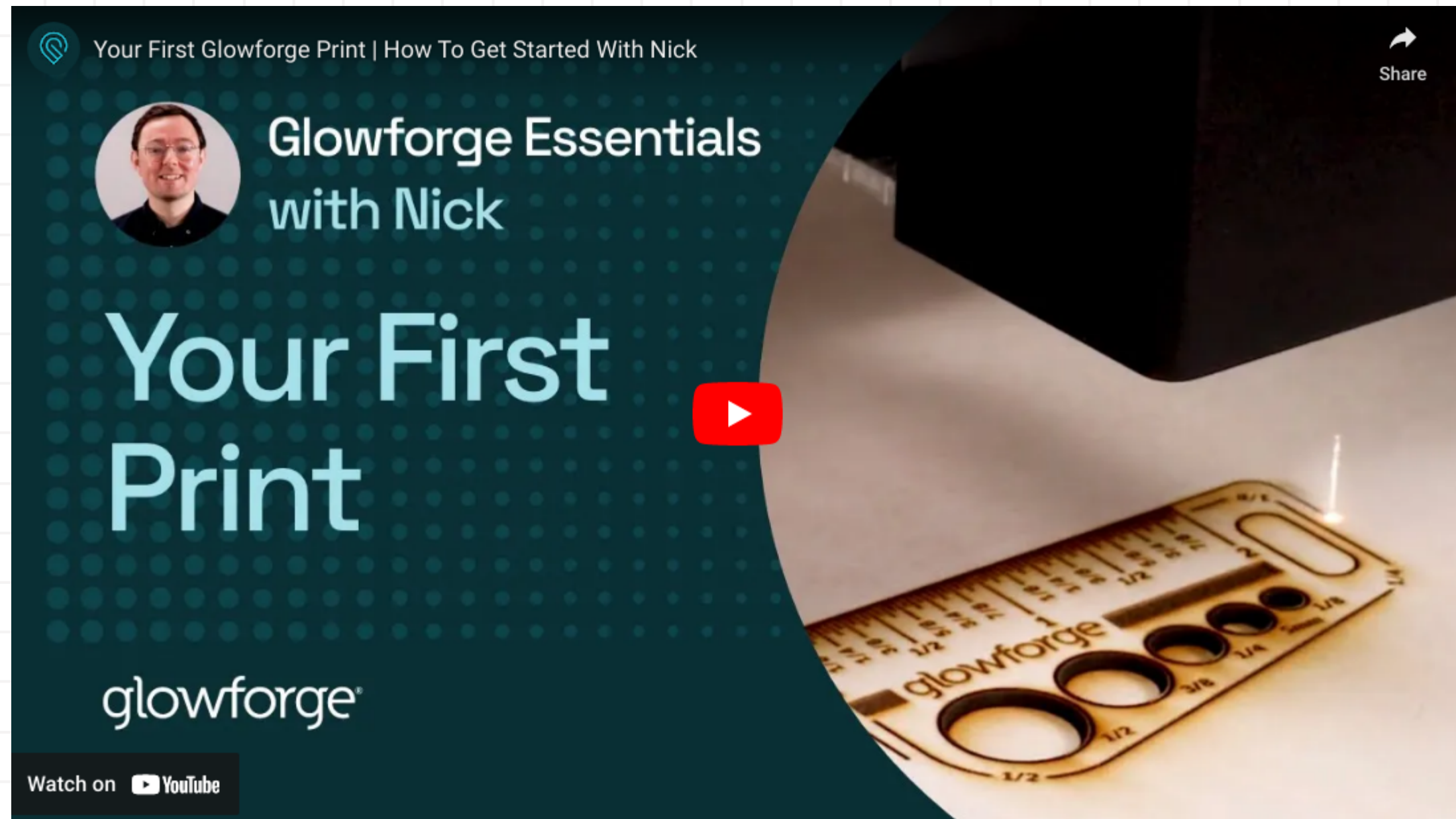
# Glowforge Plus



- 40-watt CO2 laser
- Cutting & engraving area: 19.5 in. by 11 in.
- Maximum material height: 2 in. (50 mm)
- Maximum material height with tray: 0.5 in. (13mm)



# How does laser cutting work?







**DO NOT LEAVE LASER UNATTENDED  
DURING OPERATION**

# Digital Fabrication!



A manufacturing process  
where the tools/machines are  
controlled by a computer

# Digital Fabrication: Laser Cutting

## Model Creation

### Vector and Image Software

Inkscape  
Adobe Illustrator  
Photoshop  
Cuttle

## File Preparation

### Printer Setup

Dependent on laser cutter

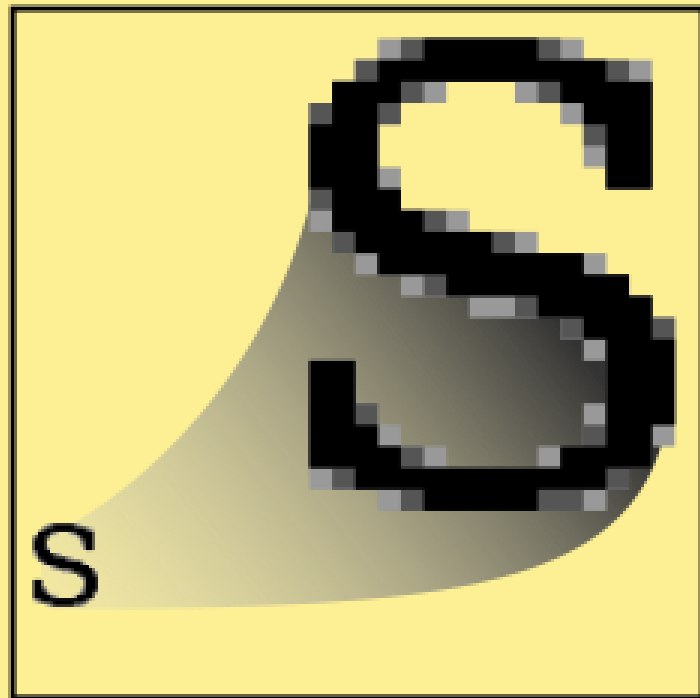
## Machine Operation

### Laser Cutter

Glowforge Laser Cutter



# Vector vs. Raster



**Raster**  
GIF, JPEG, PNG



**Vector**  
SVG



# Vector Images

Vector images can be cut, scored, or engraved

**Many of these file formats can contain raster images. The file format does not guarantee that the image can be cut.**

CAD programs (.dxt, .dwg)

Inkscape (.svg)

Adobe Illustrator (.esp, .ai)

CorelDRAW (.cdr)

Portable Document Format (.pdf)

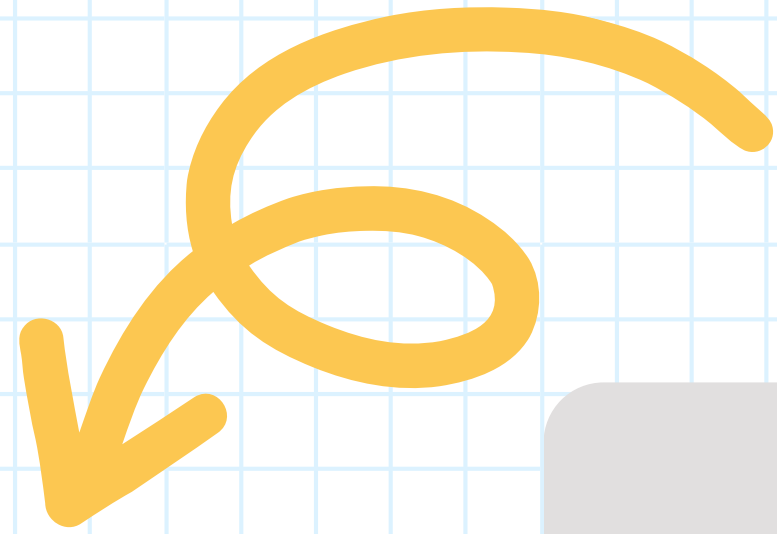
# Sources of Vector Files

- [Epiloglaser.com/resources/sample-club.htm](http://Epiloglaser.com/resources/sample-club.htm)
- [Glowforge.com](http://Glowforge.com)
- [Inventables.com/projects](http://Inventables.com/projects)
- [Makercase.com](http://Makercase.com)
- [Obrary.com](http://Obrary.com)
- [Thingiverse.com](http://Thingiverse.com)
- [Vecteezy.com](http://Vecteezy.com)

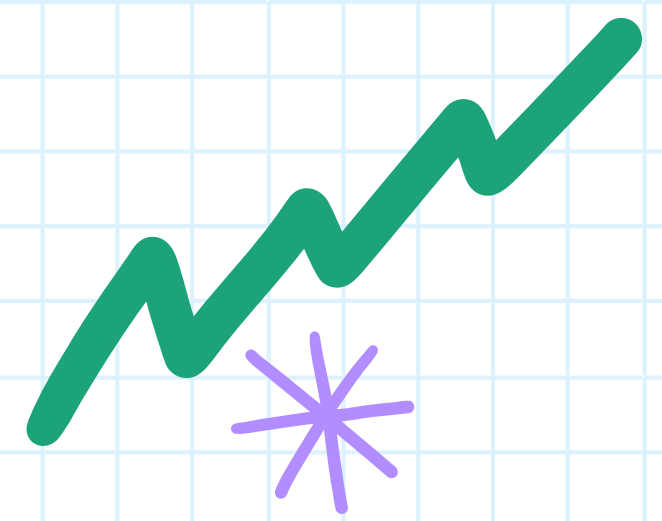




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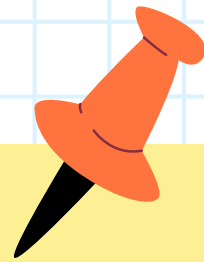


# Raster Images



Raster images can only be engraved.

Common file formats:



Joint Photographic  
Expert Group  
(.jpeg)



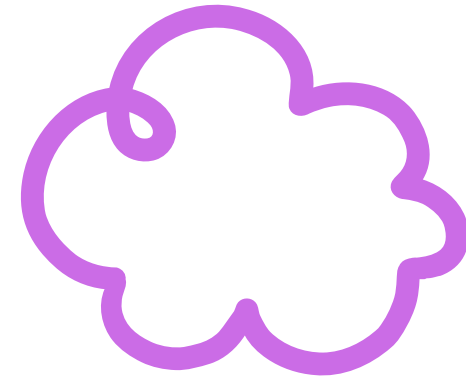
Portable Network  
Graphic  
(.png)



Windows  
Bitmap  
(.bmp)



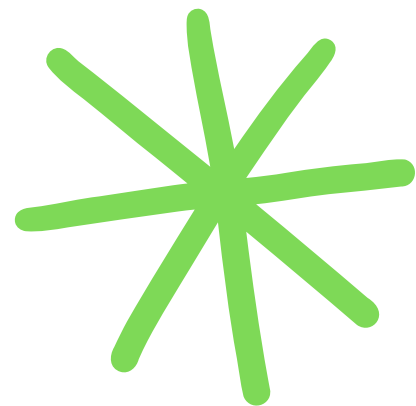




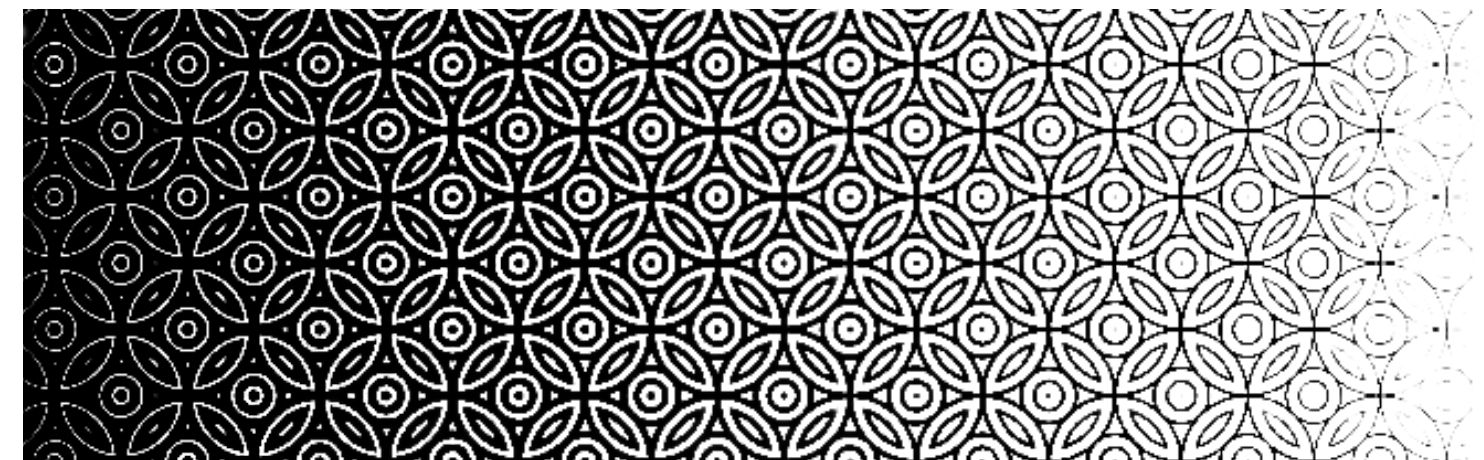
# Engraving



# Bitmaps



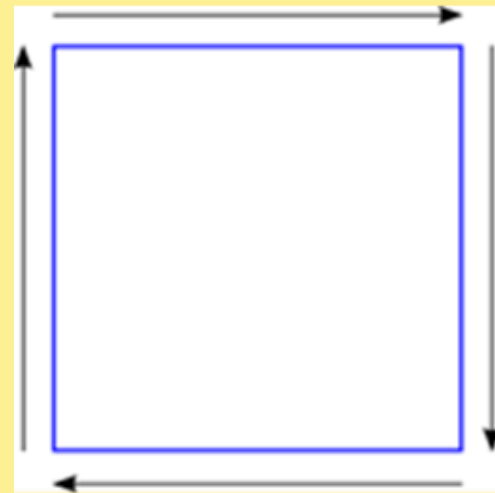
- The laser can only print black pixels. Grayscale is printed by changing the pixel density.
- The quality of the original image will have a significant effect on the quality of the engraving



# Modes of Operation

## Vector (Cut/Score).

- Cutting precise shapes or engraving/etching precise lines
- Cut, score, or engrave



## Raster (Engrave).

Printing and engraving bitmap images



# File Preparation

Cut

Score

Engrave

You will have to use the Glowforge web application to print your job. Some file creation can be done in this app, or you can use a vector editing program, such as Inkscape or Adobe Illustrator.

Each different line color will allow you to set different settings for all lines in that color. (For example, cut all orange lines at full power. Score all blue lines at 20 power. Engrave all magenta shapes.)

You can upload .SVG or .PDF files for cutting. You can upload .PNG or .JPEG files to engrave.

# Generally Allowed Materials

natural wood

natural fabric

tile

paper

cardboard

acrylic

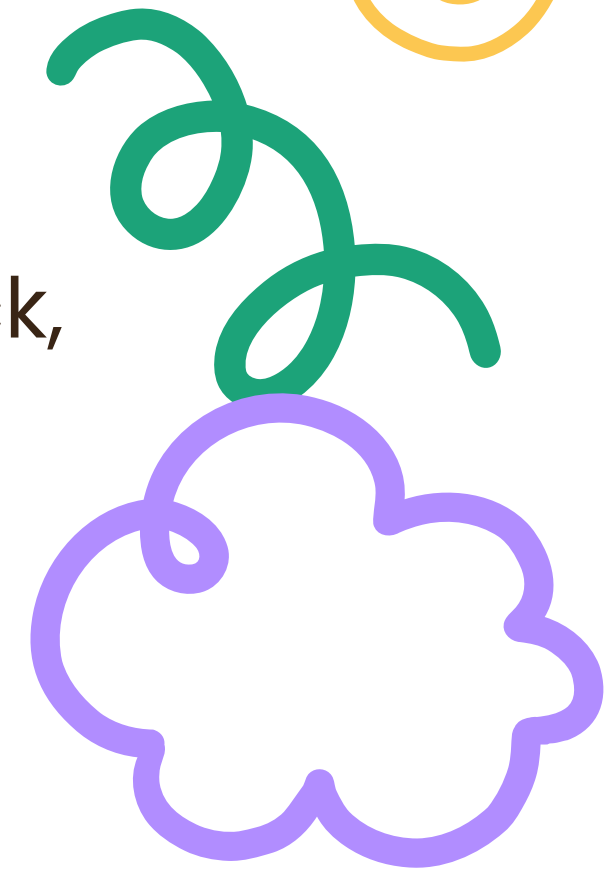
No PVC or chloride-containing materials!



# Material Sources

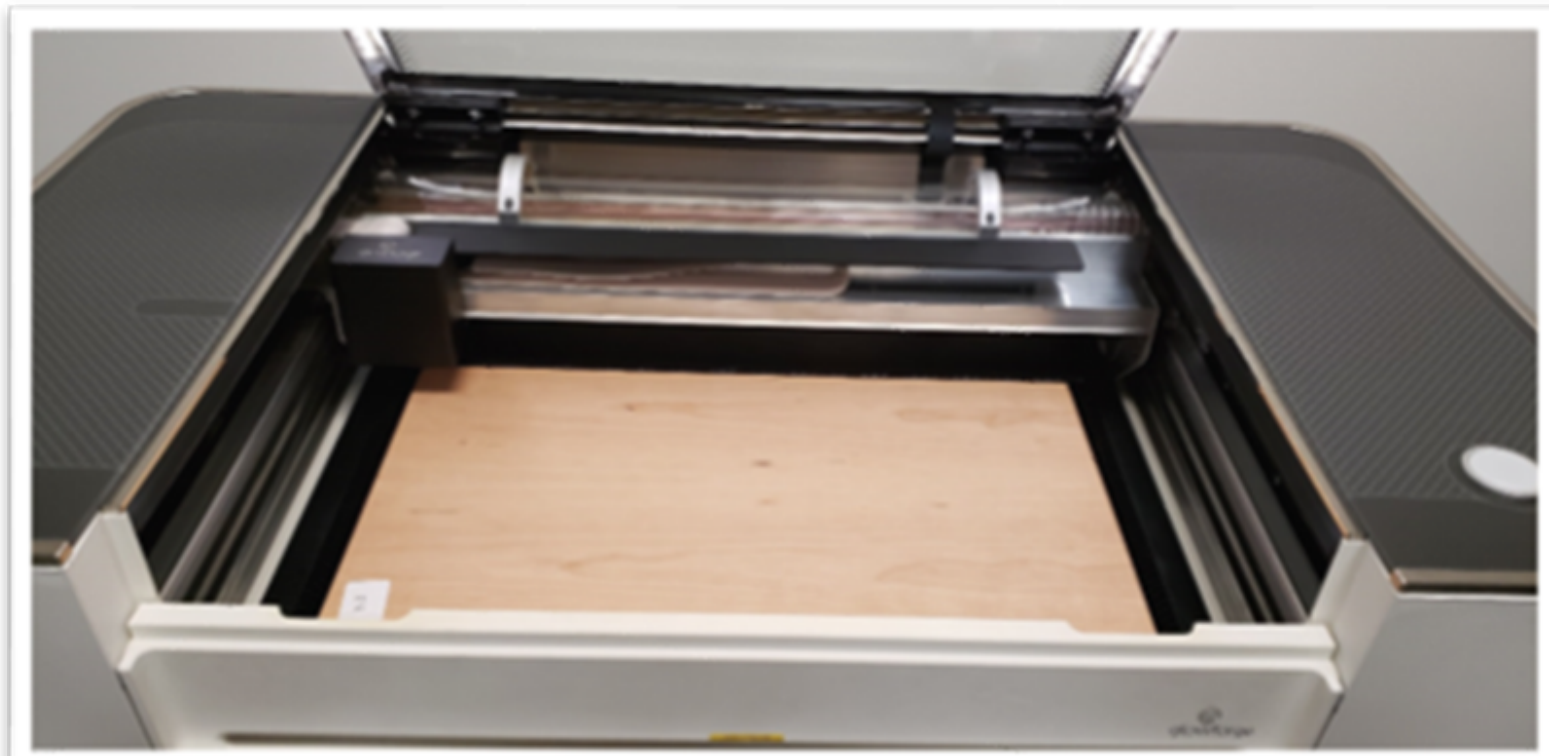


- Hobby stores (Michaels, Joann, etc.)
  - Balsa wood, thin birch plywood, EVA craft foam, cardstock, foam-core, slate, craft paper
- Hardware Stores
  - MDF, thin plywood, thin poplar wood, tiles, acrylic
- Art supply stores
  - Scratch board, canvas board, foam-core
- Inventables.com
- JohnsonPlastics.com
- Local plastic suppliers





# Preparing the Laser Cutter



Load your materials carefully.  
Do not bump the laser head!

Center the material under  
the camera, and line it up  
towards the bottom of the  
crumb tray to maximize the  
cutting area.

Use pins to hold down  
materials if necessary.

# Preparing the Laser Cutter

Turn on the Glowforge.  
The switch is on the back of the machine, on the right side.

The machine will automatically scan the bed, center and home the laser head, and focus on the crumb tray.



# Preparing the Laser Cutter



Turn on the air filter when you are ready to print. The button is on the back on the lower right side.

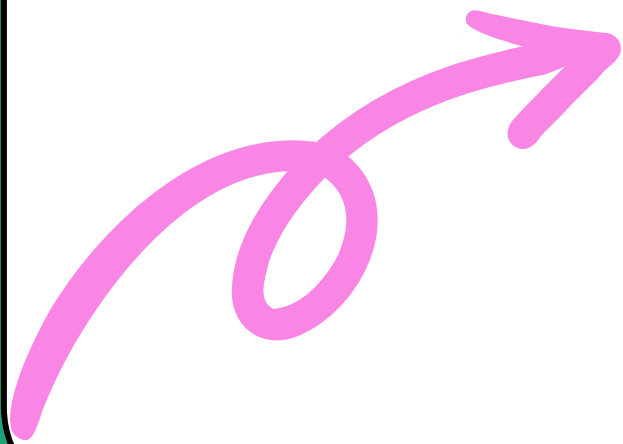
The dial on the front will be set to the last needed setting. Do not adjust the dial without Maker Lab staff approval.



# Machine Operation: Running the Job



- Click "Print" in the Glowforge App.
- Turn your filter on
- Write down the Magic Time
- Press the Magic Button

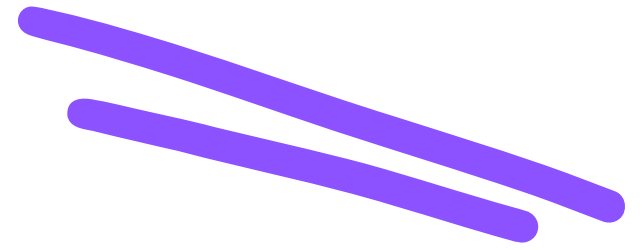




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DURING OPERATION**



# Safety & Tips



## **If there is a lot of smoke...**

- This clouds the optics and causes them to get dirty – stop the job and lower the power.

## **If there are flames...**

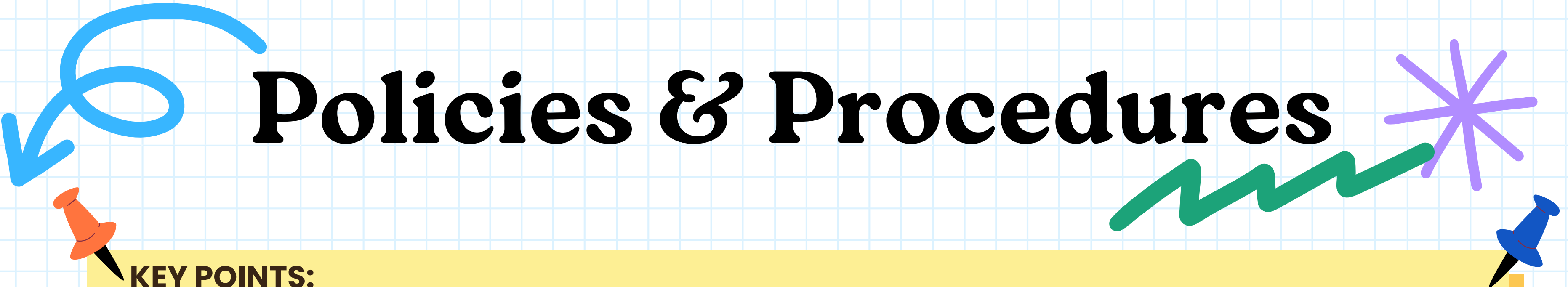
- Small flares are expected. Large flames are not – stop the job and lower the power.
- If the material catches fire or is smoldering, stop the job by pressing the magic button. Use the spray bottle of water for small problems and keep the lid closed until the smoke clears.



# After the Job

- The Glowforge interface will indicate when it is safe to open the lid.
- Turn off the Glowforge.
- The filter must remain on minute for minute after each job. For example, after a five minute job, the filter must remain on for five additional minutes.

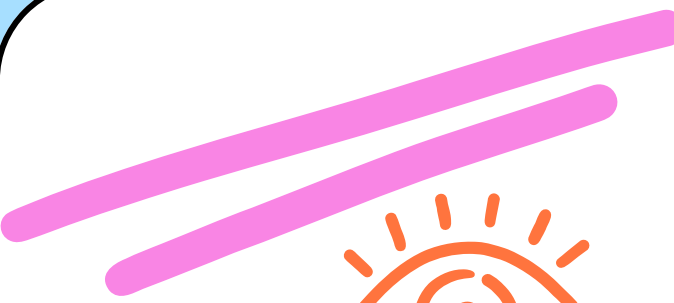




# Policies & Procedures

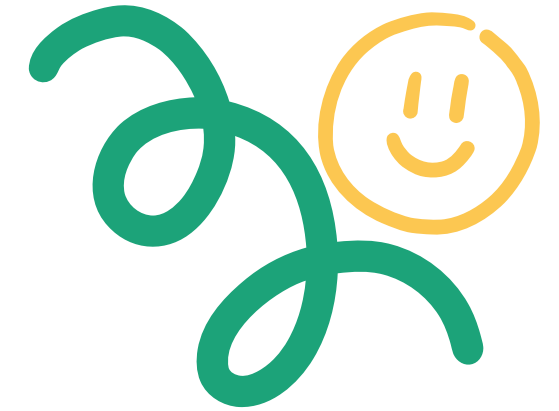
## KEY POINTS:

- Patrons need to be badged in the machine to be requested (e.g., earn the “Laser Cutter” badge to use the Laser Cutter).
- Patrons under age 16 must be accompanied by a badged adult guardian.
- Illegal or inappropriate items, or items which would violate copyright laws are not permitted.
- Default reservation time is one hour, with extensions possible based on machine and staff availability.
- Makers supply their own material, AND is subject to approval from Maker Lab Staff.
- Library staff supervision required at all times.
- Patrons need to be present throughout the use of the laser cutter.

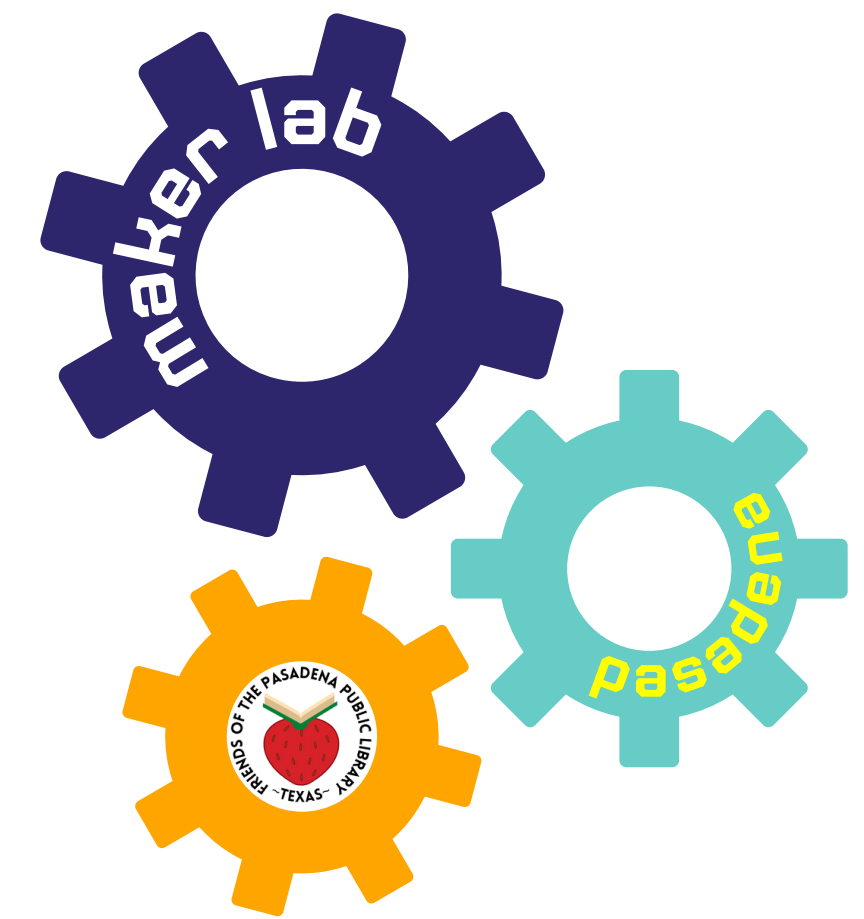


# Sign up for the Maker Lab challenge!

## [ppltx.beanstack.org](http://ppltx.beanstack.org)

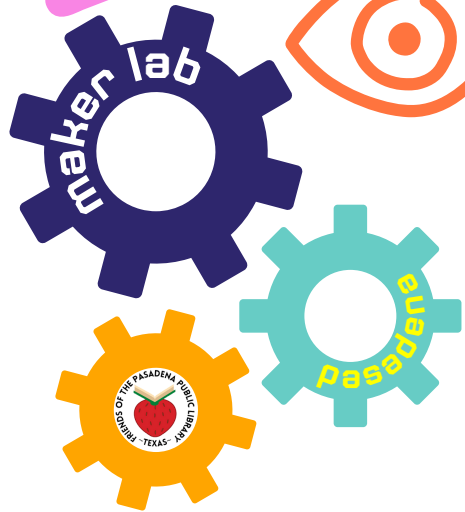


- Log into Beanstack and join the Maker Lab Challenge
- If you haven't created a Beanstack account:
  - Create an "individual" account
  - Join the Maker Lab Challenge
- Staff will register your orientation completion in Beanstack
  - Please allow for two business days
  - You will receive a confirmation email
  - You can now click on the rewards tab and make a laser cutter reservation
- Join us for other orientations and get "badged" for all of our machines!

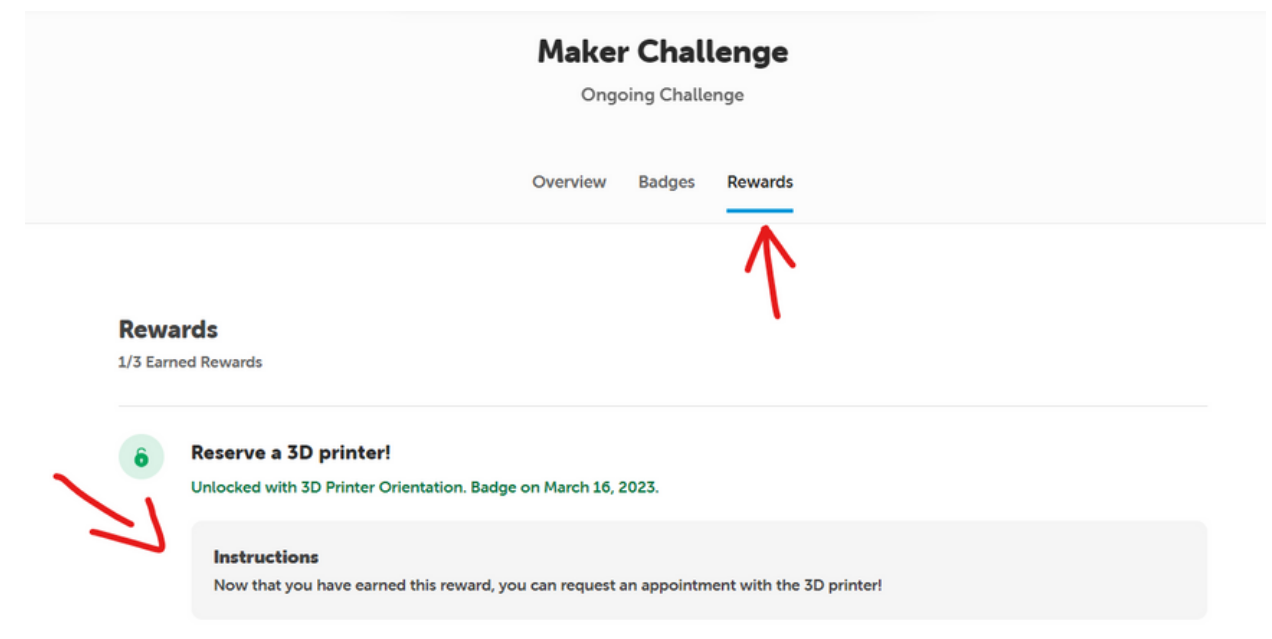
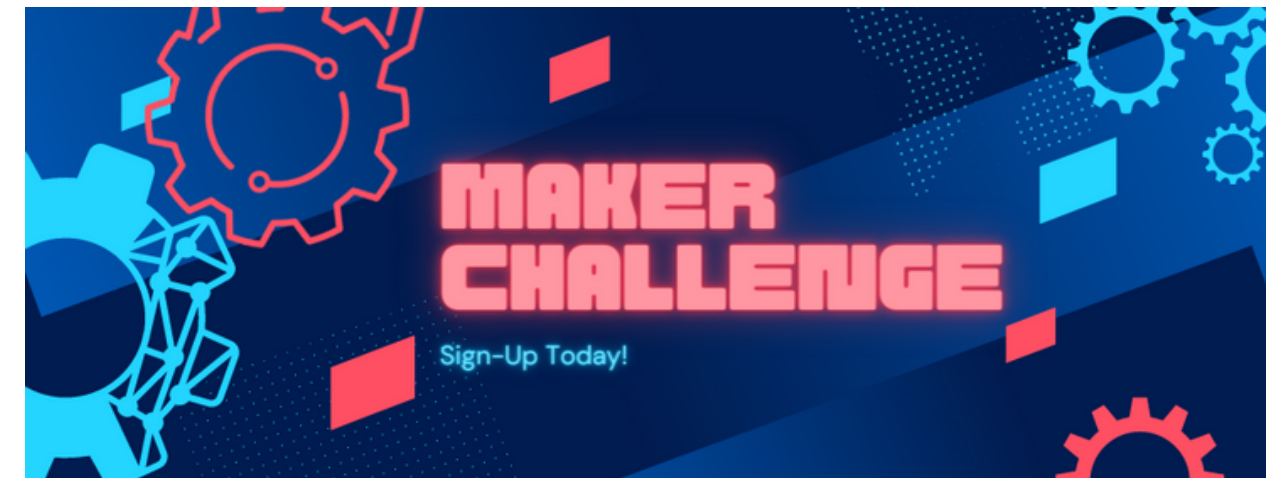


# Making a Reservation

[ppltx.beanstack.org](https://ppltx.beanstack.org)



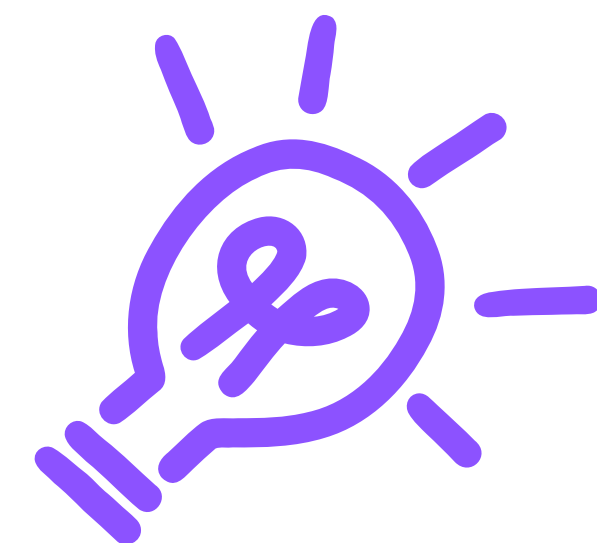
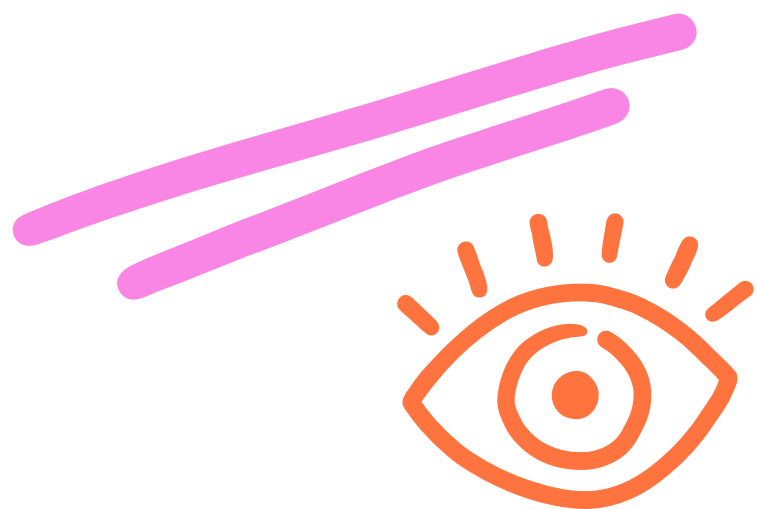
- AFTER you receive your confirmation email, log into Beanstack and return to the Maker Lab Challenge
- Click on the rewards tab to see your earned rewards. Follow the link to schedule your reservation.



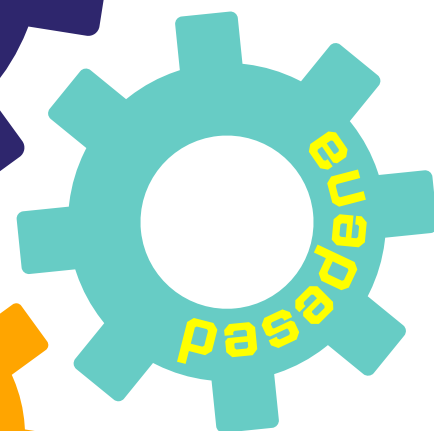
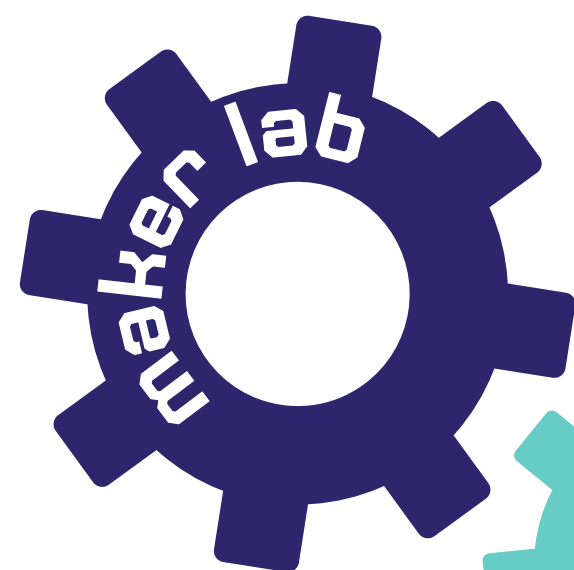


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We want to see your creations!  
Share them on our Facebook and  
Instagram pages!



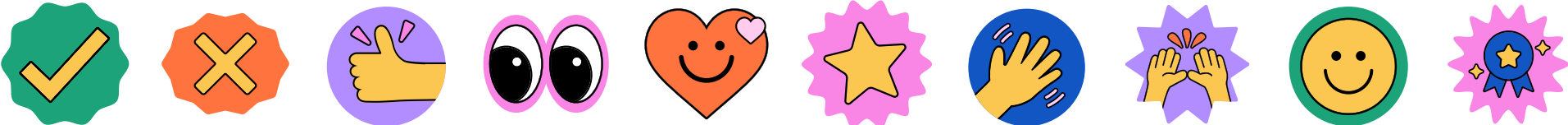
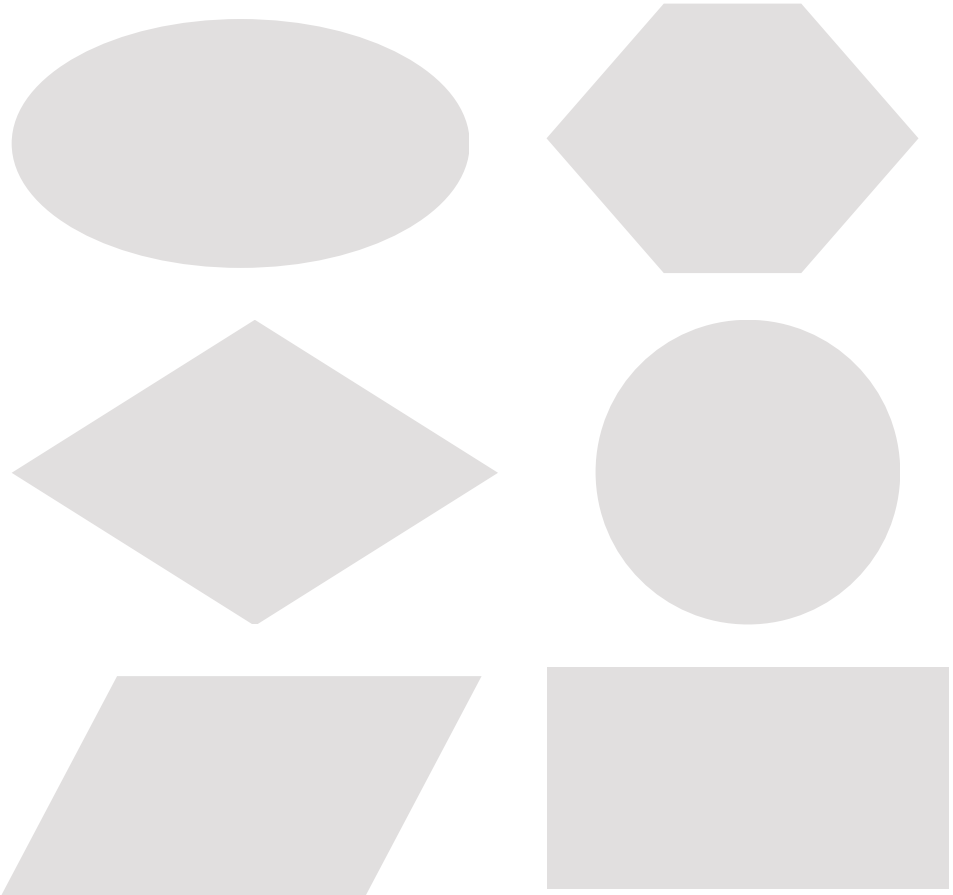
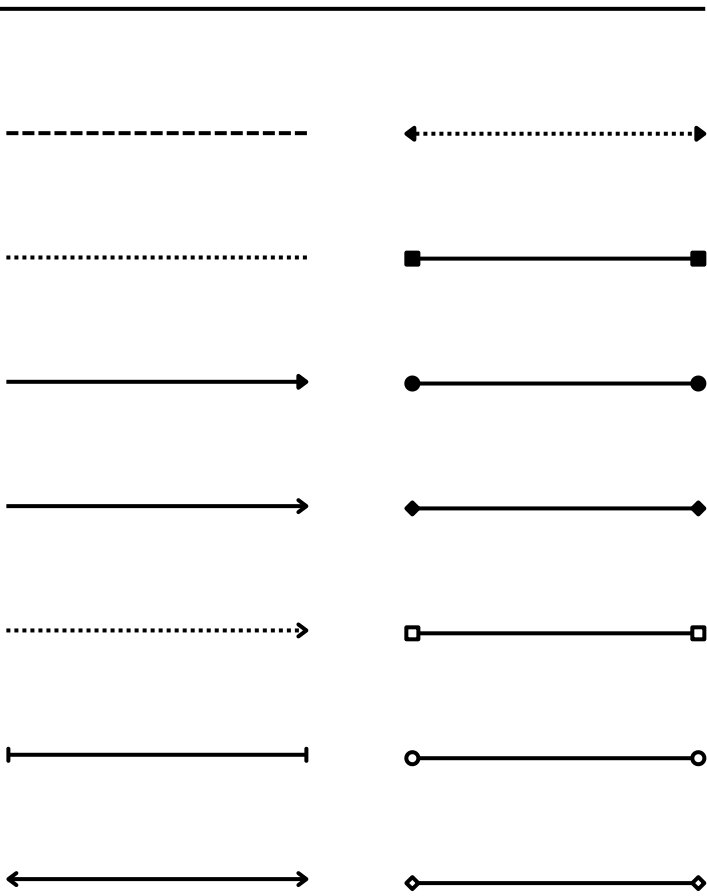
**Any Questions?**

**[ppltx.beanstack.org](http://ppltx.beanstack.org)**



# Resource Page

Use these whiteboard design resources in your Canva Presentation. To access more of these elements, right-click and expand any page into a whiteboard then check out the elements tab. Happy designing!  
**Delete or hide this page before presenting.**



# Resource Page

Use these design resources in your Canva Presentation. Happy designing!

Delete or hide this page before presenting.

