

# Getting Started with Tinkercad

3D Modeling In  
Tinkercad Online Design Tool

# Tinkercad Introduction (5 minutes)

- Our goals today
  - Learn how to use Tinkercad
  - Design a keychain with your name
- Entry level design software by Autodesk
  - 3D Modeling
  - Circuitry
  - Arduino
  - Other advanced options: 123D suite, Sketchup, Blender
- Designed for learning
  - Start with an existing design from the Tinkercad Gallery or Thingiverse
  - Start from scratch
- Download designs to prepare for your printer
- Upload, modify, and share designs
- Order 3D Prints





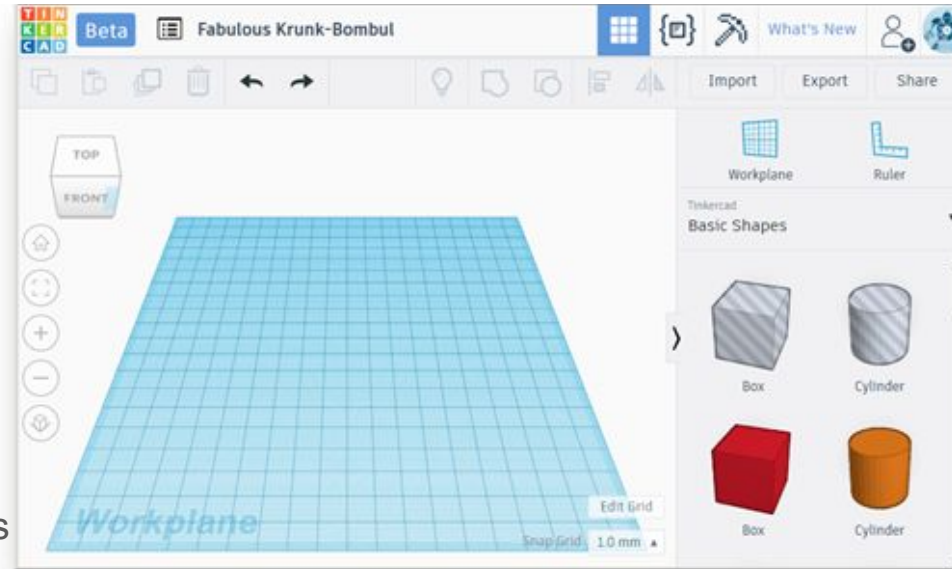
# The Workplane/Editor

## First Steps (20 Minutes)

Go to [Tinkercad](https://tinkercad.com) and demonstrate how to

- Click your profile icon to go to the dashboard
- Click *Create new*
- Open an existing project and demonstrate
  - Show parts of workspace: tool bar, shapes
  - Moving the workplane
  - Adding a shape
  - Move, resize, raise, lower, rotate it
  - Copy/Paste, Duplicate
  - Align
  - Group/Ungroup

Have people create accounts or log in.



You can also have participants go to LEARN > [Basic Skills](#) and walk through tutorials.

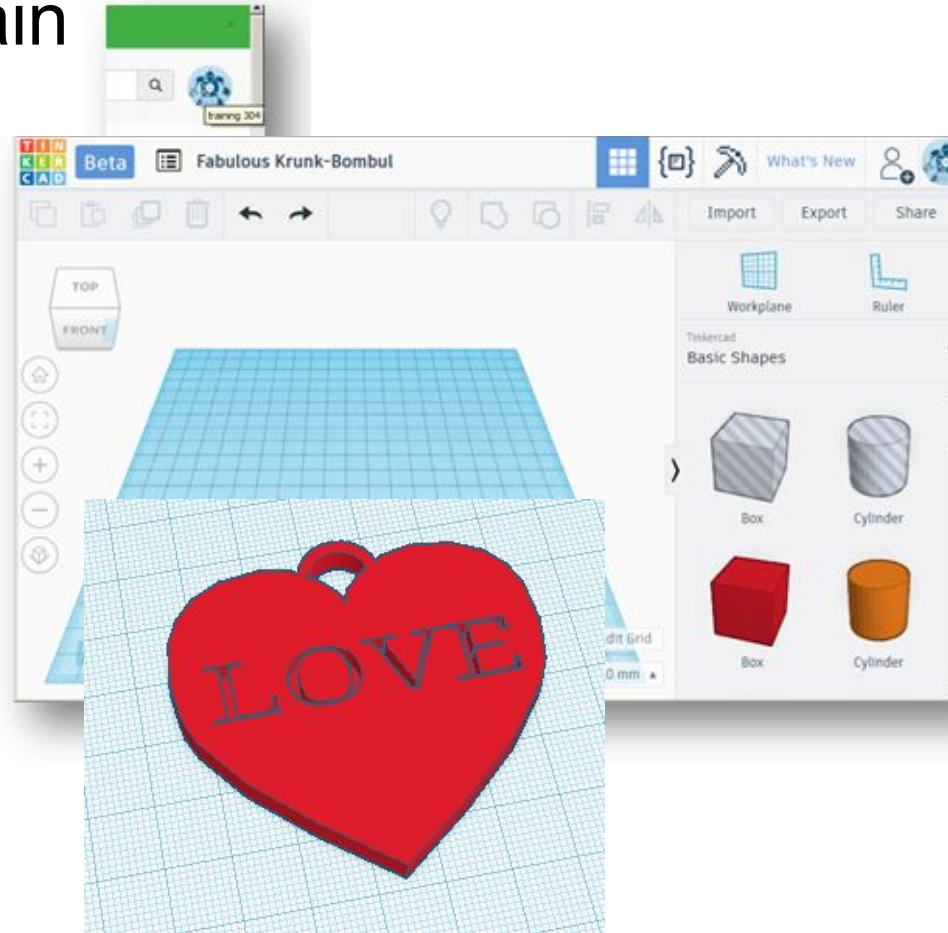
- Read the instructions on the left
- Use them to complete the steps in the main panel

(optional) [Skills Review and Supplement Video](#)

# Project 1: Design a Keychain

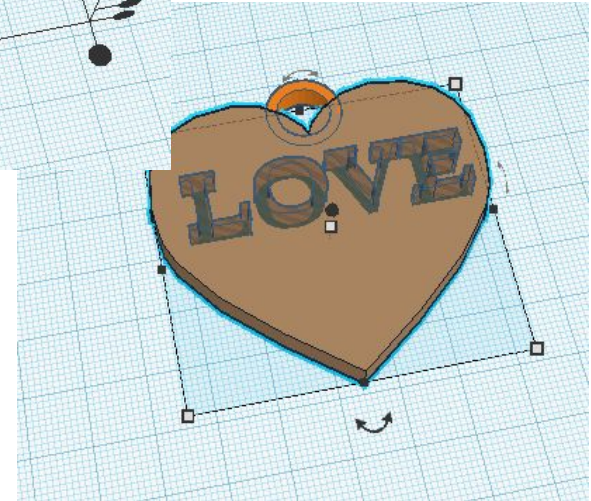
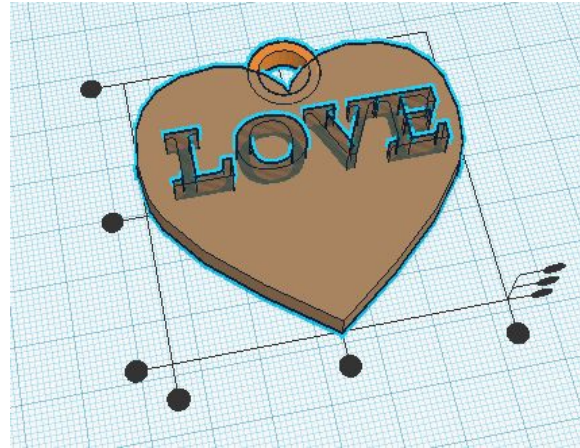
Design a keychain (55 minutes)

1. Click your profile icon to go to the dashboard
2. Click *Create new*. The editor loads.
3. Drag a shape - square, cylinder, heart - on to the workplane
4. Resize to 50mm x 50mm x 5mm approx.
5. Drag the text shape onto the workplane
6. Type in your text and choose font.
7. Turn the text into a hole.
8. Resize it and drag it over the solid shape



# Project 1: Finish your design

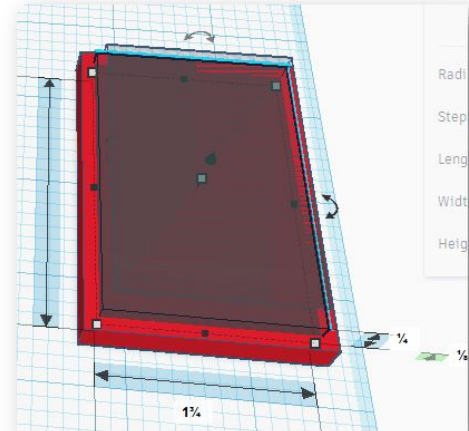
12. Select all and use the align tool to center the text in the shape.
13. Lift the text up 1mm.
14. Select both shapes and group
15. Drag a ring to the top of the solid
16. Resize to 5mm x 5mm
17. Select all and group



# Project 2: Design a picture frame from scratch

Add shapes, resize, duplicate, align, and group

1. Drag the ruler onto the workplane.
2. Drag a cube to the workplane.
3. Drag to change dimensions to 2" x 3".
4. Drag to reduce the height to  $\frac{1}{4}$ " tall.
5. Duplicate the shape. Move the shape off to one side about 1" so you can see it.
6. Drag or enter numbers to reduce its size to  $1\frac{3}{4}$ " x  $2\frac{3}{4}$ " x  $\frac{1}{4}$ ".
7. Use the cone to lift it  $\frac{1}{8}$ " off the workplane.
8. Turn it into a hole.
9. Select both shapes. Use the align tool to center the cubes in the Y and X axes.
10. Select Group.

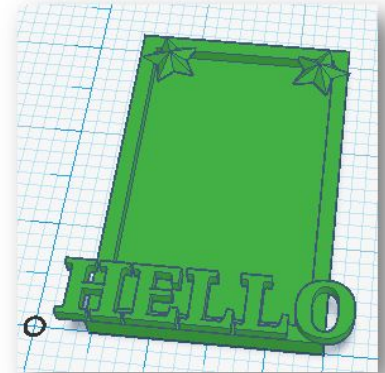
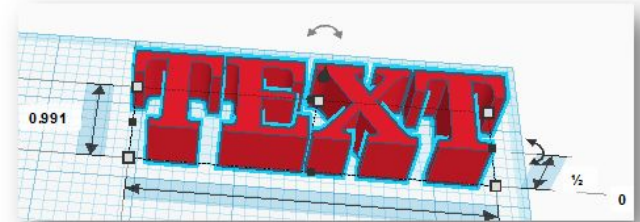


**You're almost there! Go to the next slide!**



# Finishing your design

1. Drag a star onto the workplane.
2. Shift-drag to reduce it to  $\frac{1}{4}$  " wide.
3. Use the cone to lift the star  $\frac{1}{4}$ " off of the workplane.
4. Duplicate the star. Flip the new star.
5. Drag each star over each top corner of the frame.
6. Drag the text tool onto the workplane.
7. Enter text for your frame.
8. Shift-drag to scale the text to  $2\frac{1}{2}$ " wide.
9. Use the cone to lift the text  $\frac{1}{4}$ " off the workplane.
10. Drag the text to the bottom of the frame.
11. Select the frame and text and use the align tool to align them at the bottom to hold the photo.
12. Select all and group.
13. Change the color (doesn't determine the color of the printed object).



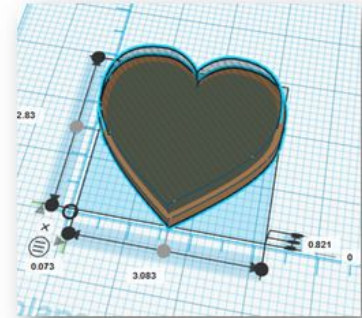
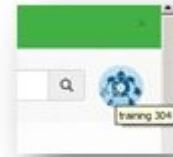
Closing and survey (10 minutes)



# Project 3: Design a Valentine frame from scratch

Add shapes, resize, duplicate, align, and group

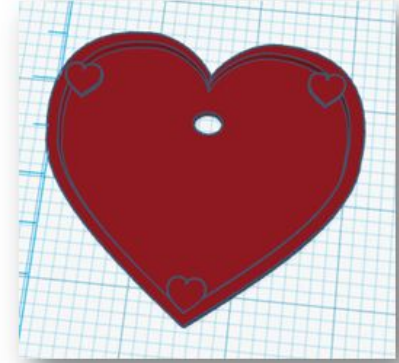
1. Drag the ruler onto the workplane. Edit the grid (change to inches)
2. Drag a heart to the workplane.
3. Shift-drag to scale heart to 3" wide.
4. Drag to reduce the height to  $\frac{1}{4}$ " tall.
5. Duplicate the shape. Move the shape off to one side about 1" so you can see it.
6. Shift-drag to reduce its size to about  $\frac{3}{4}$ " tall.
7. Use the cone to lift it  $\frac{1}{8}$ " off the workplane.
8. Turn it into a hole.
9. Select both shapes (Shift-click). Use the align tool to center the hearts in the Y and X axes.
10. Select Group.



**You're almost there! Go to the next slide!**

# Finishing your design

1. Drag another heart onto the workplane.
2. Shift-drag to reduce it to  $\frac{1}{4}$ " wide.
3. Use the cone to lift the heart  $\frac{1}{4}$ " off of the workplane.
4. Drag it over the bottom of the big heart.
5. Use the align tool: center hearts on x axis, bottom justify on y axis
6. Select the small heart.
7. Copy and paste two more hearts onto the work plane.
8. Move each heart to the top corners of the heart.
9. Align each small heart to the outside of big heart so that they'll hold the photo.
10. Drag a cylinder hole to the workplane.
11. Shift-drag to reduce the size to  $\frac{1}{4}$ " diameter.
12. Drag the cylinder over the big heart to create a hole in the back of the frame.
13. Select all and group.
14. Change the color (doesn't determine the color of the printed object).



Closing and survey (10 minutes)

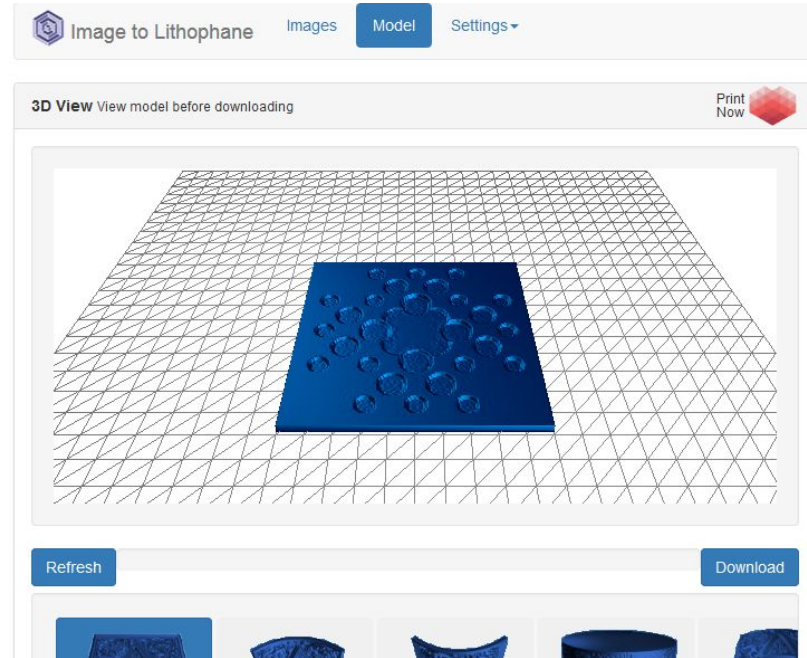
# Project 4: Design a Library Keychain

Start with a black and white image.

- File types jpg, png, gif
- Simple shapes or line drawings are most effective

Turn your image into an .stl file

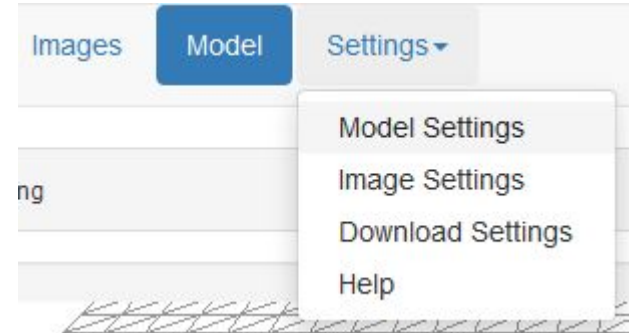
- Go to <http://3dp.rocks/lithophane/>
- Go to Images, browse to your file, and open it.  
The file will load in the Model display.



[Instructable: Lithophanes 101](#)

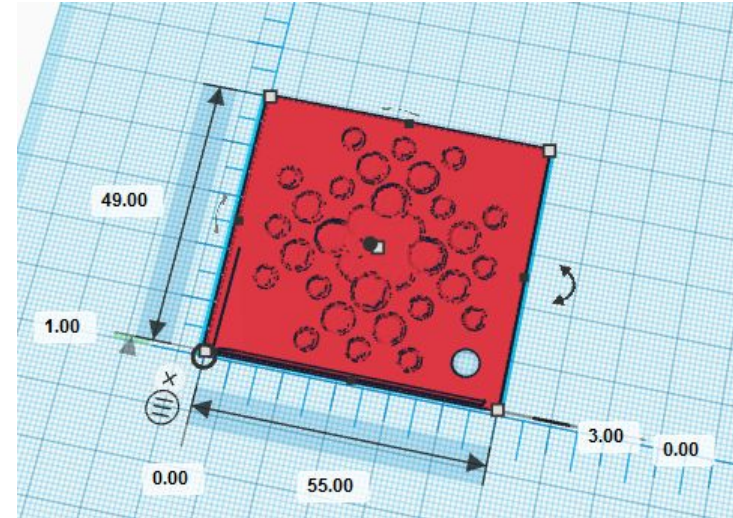
# Project 4: Design a Library Keychain

- Go to Settings:
  - Image Settings - positive > negative.  
The dark parts of your image will be thickest in the print.
  - Model Settings - Vectors Per Pixel = 2  
The model is simplified for Tinkercad upload.
- Go back to the model. Refresh.
- Download the model, saving to the desktop or downloads folder.



# Project 4: Design a Library Keychain

- Go to Tinkercad.com. Create a new design and import the file you just saved.
- Add a square or circular platform under your logo and a hole for the keychain attachment.  
\*The align tool is very helpful here!\*
- Export as stl. File.
- Open it in your printer software, scale, save the code, and print.

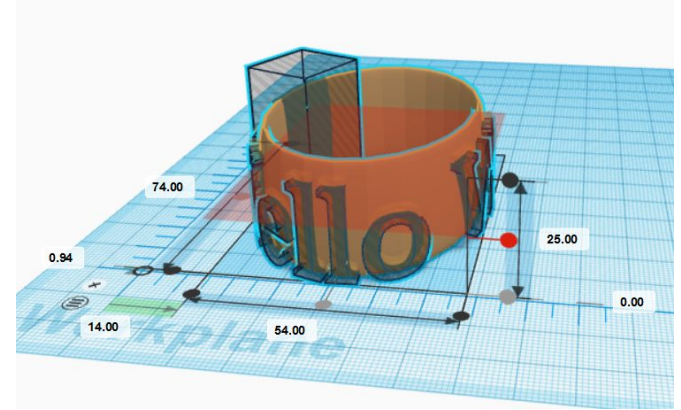


**Other possibilities: copy and tinker new objects  
keychains, coins, book clips, etc. Save each of these as a separate files**

# Project 5: Design a cuff bracelet

Add shapes, resize, duplicate, align, and group

1. Drag the ruler onto the workplane.
2. Drag a Basic > Ring onto to the workplane.
3. Drag to resize the ring to 70mm x 50mm, or to fit.
4. Drag to increase to 25mm height tall.
5. Go to Shape Generators > All
6. Drag a Text Ring, Twisty Ring, or other decoration to the work plane.
7. Align and design. Turn add-ons into holes? Copy/paste/and multiply?
8. Group
9. Add a Basic cylinder hole. Make it oval to fit inside the cuff
10. Select both shapes (Shift-click). Use the align tool to center the shapes in all directions.
11. Select Group.



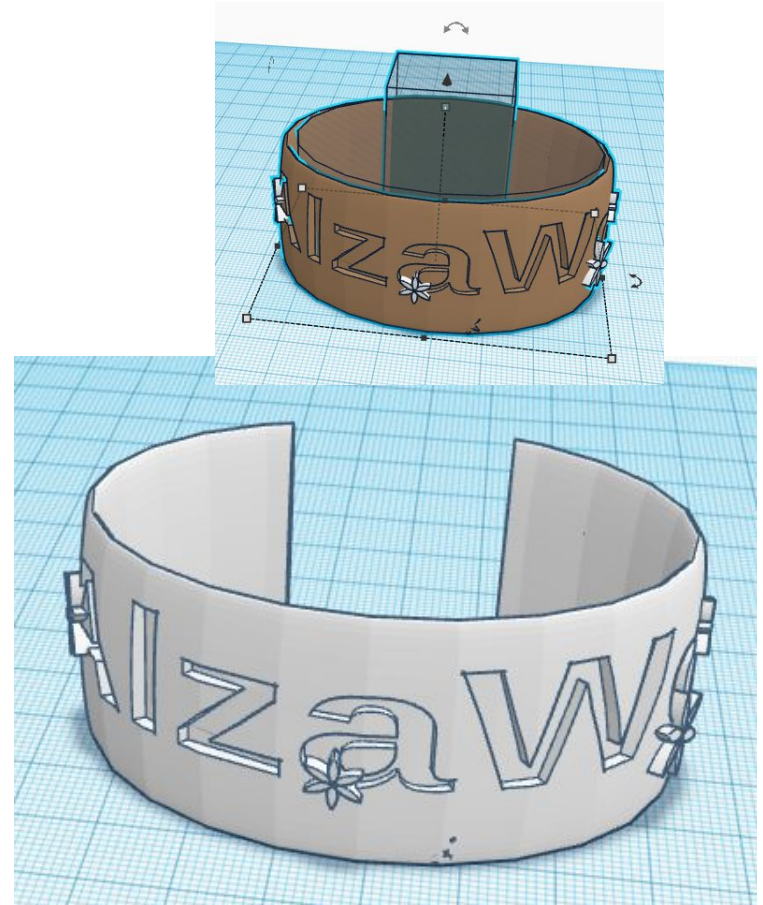
**Tip: If your letters go all the way through the cuff, you will have to add pieces to connect the “middles of letters like “o” and “a.”**  
**You're almost there!**  
**Go to the next slide!**



# Finishing your design

1. Drag a square hole onto the workplane.
2. Size it to 20cm x 20 cm x 40 cm.
3. Drag it so that it cuts across the part of the cuff with no lettering or decoration.  
This will create a gap that makes it easier to get the cuff on and off.
4. Resize as needed.
5. Select both shapes and group them.
6. Export the file as an .obj file.

Closing and survey (10 minutes)





# Tips and Hints

- Go to the LEARN section for basic skills and project tutorials
- Use the ruler to place your design. Edit Grid will change measurement units.
- Press and hold shift while changing size to scale a shape in all dimensions
- There are two ways to select multiple shapes
  - Click in a blank area on the screen and drag to create a box that includes the shapes
  - Hold the Shift key while you click each shape
- For 3D print models, make sure your design is ON the workplane
  - Z axis = 0.00
  - View your design from the side
- You can change sizes with mouse, arrow keys, or numerical option.
- Duplicate shapes to repeat them.
- Group shapes to combine shapes - both solids and holes - and to complete your design. It can be done more than once, at any logical point as you create your design

# Saving and File Types

Files are saved automatically in Tinkercad.

Click Export > .stl file to download a file for printing

## STL (STereoLithography)

- a file format native to the stereolithography CAD software created by 3D Systems
- after-the-fact backronyms are "Standard Triangle Language" and "Standard Tessellation Language"
- supported by many software packages
- it is widely used for rapid prototyping, 3D printing and computer-aided manufacturing.
- describes only the surface geometry of a three-dimensional object without any representation of color, texture

# Help Links

- Tinkercad
  - Lessons - <https://www.tinkercad.com/learn/>
  - TinkerTips and YouTube videos - <https://www.youtube.com/user/Tinkercad>
  - Help Center - <https://support.tinkercad.com/hc/en-us>
- [Autodesk Lessons](#)
- [Lynda.com](#)
- On the TotalBooX Shelf - [3D Printing and More](#)
- Allison Midgley - [amidgley@wlsmail.org](mailto:amidgley@wlsmail.org)



Empowering libraries. Empowering communities.

# Patron Survey

## Program Survey (Part 1)

Your response to this brief survey helps to improve programming in the short and long term. Thanks in advance for your input!

On a scale of 1 to 5, rate your knowledge of and confidence about the activity BEFORE the program.

- 1 - I've never heard of it.
- 2 - I've heard of it but don't have much knowledge of it. I haven't participated in it.
- 3 - I have participated in this activity once. I am a novice.
- 4 - I have some knowledge about the activity and have participated in it as a hobby or past time.
- 5 - I am an expert or professional in this field or activity.

On a scale of 1 to 5, rate your knowledge of and confidence about the activity AFTER the program.

- 1 - I've never heard of it.
- 2 - I've heard of it but don't have much knowledge of it. I haven't participated in it.
- 3 - I have participated in this activity once or twice. I am a novice.
- 4 - I have some knowledge about the activity and have participated in it as a hobby or past time.
- 5 - I am an expert or professional in this field or activity.

What did you like most about the activity?

# Patron Survey

## Patron Survey (Part 2)

How likely is it that you will recommend this program to someone?

Very likely

Not likely

If you answered "Not likely" above, why not?

It needs to be better organized.

It wasn't fun.

I didn't like the materials.

I wasn't happy with my finished product.

Other:

What suggestions do you have for making the activity better?

What suggestions do you have for other programs at the library?