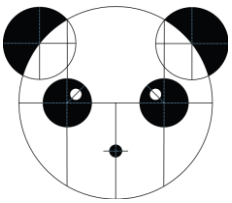
NAME PUZZLE

Panda Plans for Laser Cutter

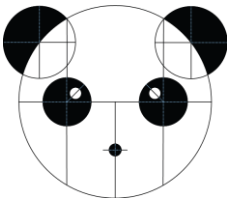


PROJECT DIFFICULTY: BEGINNER

ABSTRACT

This simple puzzle is a great gift for small children. It helps to teach fine motor skills and spelling. The personalization on this gift will make any child feel special. The plywood is quite durable and the puzzle makes a great keepsake if it is well taken care of.

Designed by Andrea 'Panda' Sawyer



Panda Plans For Laser Cutter

Name Puzzle

Description:

This simple puzzle is a great gift for small children. It helps to teach fine motor skills and spelling. The personalization on this gift will make any child feel special. The plywood is quite durable and the puzzle makes a great keepsake if it is well taken care of.

Materials:

The materials listed below may be substituted for comparable materials as needed. Note that any change in material will change the recommended power settings for this project.

Material	Quantity	Notes
12”x16” sheet of ¼” birch plywood	x1	• Actual depth dimension is 0.2” thick • Solid wood ply (not MDF ply) • Obtained from a 4’x8’ plywood sheet purchased from Menards and cut on a home table saw
Wood Glue or Glue-All	x1	• Glue must work for wood
*Craft Paint	Any	• Matte finish recommended

*Optional

Additional Tool Requirements:

- Protection for your work surface (newspaper for example)
- Paper towels and cotton swabs to help with glue clean-up
- Small clamps or heavy object to flatten puzzle as it dries
- Craft knife to trim any burrs left behind from imperfect laser cuts
- (*Optional) Paint brushes and similar tools for decoration

	Color	Mode	Power	Speed	PPI	Z-Axis
●	Black	Raster	100%	70%	500	0.200 “
●	Red	Vector	100%	2.4%	300	0.200 “
●	Green	Skip	100%	100%	500	0.000 “
●	Yellow	Skip	100%	100%	500	0.000 “
●	Blue	Skip	100%	100%	500	0.000 “
●	Magenta	Skip	100%	100%	500	0.000 “
●	Cyan	Skip	100%	100%	500	0.000 “
●	Orange	Skip	100%	100%	500	0.000 “

Expected time needed to complete Laser Cutting: 12 to 18 minutes

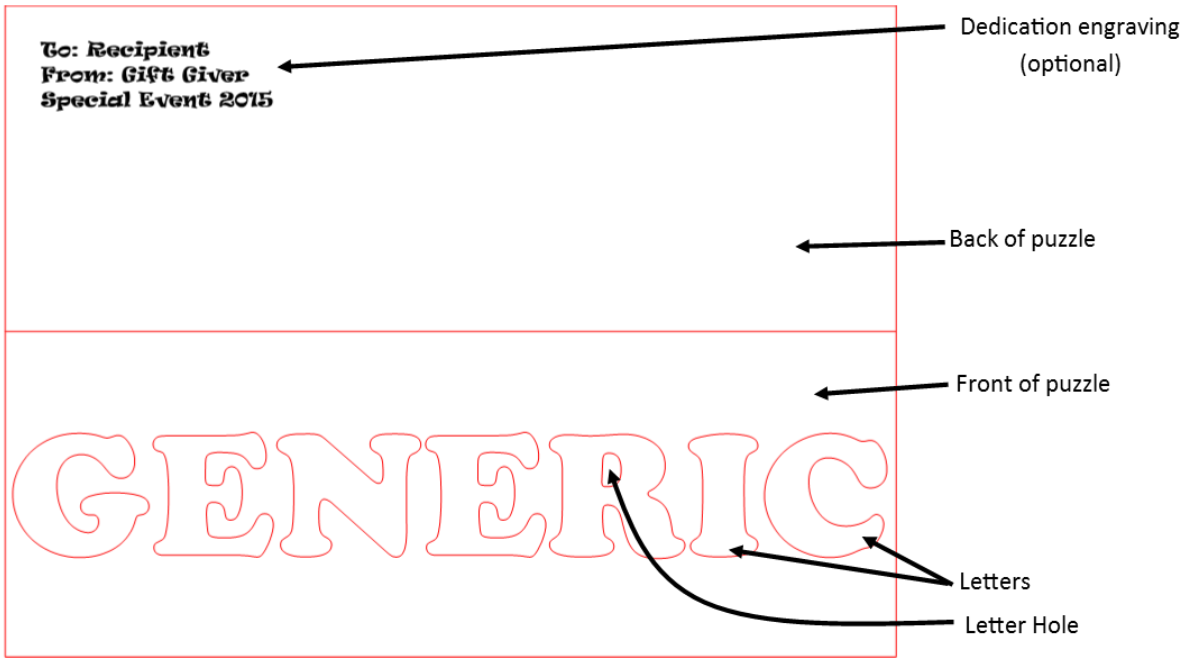
Expected time needed for assembly: 30 to 60 minutes

Tips:

- Read through all steps before completing this project.
- If this is your first time completing this project, or if you're using new material in the laser, bring in extra material to be used as test pieces. Never count on a perfect run the first time.
- Complete all steps of File Set-Up before the time you've booked on the laser. This ensures you don't waste valuable time that could be used for cutting. If you are uncertain of how to use software you can request a Mentor from Do Space to help you.
- While working on your project save early and save often. (Don't lose your changes)
- Document everything as you go along. (Printable worksheet pages are available in Appendix A) Document what settings worked or didn't work as well as any tips and tricks that you discover. This documentation will help you for future projects. Please give back to the community and share copies of your notes in the Laser Binder so that others may learn for your experiences as well.

Description of Source File:

File Name: Generic Name Puzzle.ai (Adobe Illustrator)
Generic Name Puzzle.cdr (Corel Draw)



File Set-Up:

1) Load file into Adobe Illustrator or Corel Draw
2) Edit text content, font, and size as desired.
    - Ensure that all text remains within the borders of its rectangle.
    - Avoid overly complex fonts or extremely thin fonts. (these can result in puzzle pieces that are not very durable)
    - Do not change text color or line thicknesses unless you fully understand the effect it will have on the cut and engraving.
3) Select "Save As"
    - Change the title of the file to something easily identifiable and unique to you.
        Ex. "Your name _ So and So's Name Puzzle _ 11-07-2015"
    - Save as an AI file (Adobe Illustrator) or a CDR file (Corel Draw).
    - Save file to a personal flash drive.
4) Have a staff member help you book time on the laser at the Do Space Help Desk. Reserve a Do Space laptop with the Laser drivers (UCP) for the same time frame, plus a few minutes early to give some extra time for set-up.

Laser Set-Up:

1) **Make sure that the cutting table is in the Laser.**
2) **Turn on the exhaust for the Laser.**
3) Plug the Laser into the USB port of the Laptop.
4) Open your file in Adobe Illustrator or Corel Draw.
5) Print the file to the Laser (VLS2.30)
6) Open UCP and power the on the Laser.
7) Open your drawing from the queue.
8) Click on "Settings" to adjust the power settings for your material.
    - Power Settings for recommended material (¼" birch wood plywood)

	Color	Mode	Power	Speed	PPI	Z-Axis
●	Black	Raster	100%	70%	500	0.200 "
●	Red	Vector	100%	2.4%	300	0.200 "

    - Click "Set" after editing each individual line
    - Click "Apply" then "OK" after all edits are made
    - Don't worry about changing settings for any other colors (they aren't used)
9) Click on the "Estimate View" icon then click "Start". Take note of the estimated Laser run time.
10) Open the lid of the laser and examine the cutting table. Remove any debris that may prevent your workpiece from sitting level.
11) Deposit your material on the cutting bed. Line the material up squarely with the edges of the cutting table. Take special care to ensure the material is lined up on the top left side of the bed. Close the lid of the laser.
12) Click on "Focus View" and use the buttons on the Laser to adjust the Z-axis close to the thickness of your material.
    - Recommended material is 0.200"
    - The Z-axis may not land on the exact number but try to get it within 0.010" of the materials actual thickness.

13) **Double check to make sure the exhaust for the laser is turned on.**
14) Press the green button on UCP to start the Laser
    - Jiggle the mouse as needed to ensure the computer does not fall asleep.
    - Don't look at the Laser directly as it cuts, this can cause permanent eye damage.
    - If the material ignites or the laser deviates from expected operation in any way, shut it off immediately.
15) Once the job is complete the laser will return to the top of the bed and the timer on UCP will stop counting. The computer may also make a "Ta-da" sound when the job is complete.
16) Remove the material from the Laser bed. Save all cut pieces (event the "holes" in the letters will be needed later. Save them.) Dispose of the thin border piece the Laser pieces were cut from.
    - The pieces should fall away from each other easily. If some pieces were not cut all the way through carefully use a craft knife to complete the cut and shave off any burrs.
    - If the pieces do not fall away from each other easily make adjustments to settings according to Appendix B: Making adjustments to settings.
    - Ensure that the Laser bed is clean and no excess debris is left behind.

Puzzle Assembly:

1) Protect your work surface with a material such as newspaper.
2) Paint the back of the puzzle on the side opposite the engraving with any color (or combination of colors) that you desire. Let the paint dry completely. (clean your brushes while you wait for paint to dry)
3) Place the back of your puzzle down on your protective surface with the engraving side right-side-up but touching the surface. (Painted or un-engraved side should be facing up.)
4) On the reverse side of your puzzle front apply a thin even coat of glue. Ensure that all small parts between letters are coated.
5) Place the front of the puzzle on top of the back of the puzzle with the right side facing up. Align all of the edges so they are flush.
6) Use paper towels to clean up any excess glue that squeezes out of the edges. Cotton swabs are especially useful for removing any excess glue that squeezes into the small crevices in the letters.
7) After all excess glue is removed, glue all letter holes in place.
    - First place a letter in its spot.
    - Coat the reverse side of the letter hole in a thin coat of glue.
    - Place the letter hole inside the appropriate letter glue side down.
    - Remove the letter, leaving the letter hole behind. If the letter will not come out use the craft knife to gently lift the letter away.
    - Use a cotton swab to clean off any excess glue.
8) Clamp the glued puzzle using small wood clamps or heavy objects.
    - Do not leave letter puzzle pieces in the puzzle while the glue dries.
9) Allow glue to dry for time recommended by glue bottle (at least 15 minutes).
    - Use this time to clean up any used paper towels or cotton swabs.
10) Remove clamps or heavy objects once the glue is dry.
11) Put letters in back in the puzzle. Allow puzzle to sit for 24 hours before regular play.
    - Use this time to clean up your workspace.

Appendix A: Laser Project Documentation (Print as many as needed)

Project: _____

Attempt: _____

Material: _____

_____

Program Used: ☐Adobe Illustrator, ☐Corel Draw, ☐AutoCAD, ☐Other_____

Computer Used: ☐Do Space Desktop, ☐Do Space Laptop, ☐Personal Computer

Estimated time to complete: _____

Actual time to complete: _____

Color	Mode	Power	Speed	PPI	Z-Axis
● Black					
● Red					
● Green					
● Yellow					
● Blue					
● Magenta					
● Cyan					
● Orange					

Observations/Issues:

_____

_____

_____

_____

_____

_____

_____

If sharing with the community, please include any files needed and photographs of the completed project

Appendix B: Making adjustments to settings

The key to fine-tuning and troubleshooting is documentation. Use the worksheet in Appendix A to document any changes you make and the effects those changes have on your project.

Problem: Engraving is too light or cut is not deep enough.

Fixes: Increase power or Decrease speed or Increase PPI

Only change one variable at a time and make modest adjustments. Be sure to document changes.

Problem: Engraving is too dark or cut is burning/smoking too much.

Fixes: Decrease power or Increase speed or Decrease PPI

Only change one variable at a time and make modest adjustments. Be sure to document changes.

Problem: The beam is burning and creating a wide black mark on the workpiece.

Fixes: The laser is probably out of focus. Adjust the Z-axis to an appropriate height for your workpiece.

Problem: The UCP software won't power on the laser and/or quits unexpectedly in the middle of a job.

Fixes: Make sure that your computer is not going to sleep in the middle of a job. Adjust power settings accordingly if needed. If the computer didn't sleep and this error still occurred switch computers.