2020

Part VIII Craft Projects: Carving Cute Critters (pp. 235-239). In E. Kroski (Ed.) 53 Ready-to-Use Kawaii Craft Projects

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#51 Carving Cute Critters

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AT THE PURDUE Library of Engineering & Science, we have a variety of services, such as 3D printing, and Maker tools for check out, such as handheld 3D scanners. We use our Maker events as a way to let students know what we have available to them. To reach as many patrons as possible, on a campus of 40,000 students, we make our events mobile and call the program Mobile Making. The events revolve around the library tools and services, including the one for this project, subtractive technologies. We host projects that support the intersection of engineering, technology, and art. The Carving Cute Critters project demonstrates subtractive, CNC technology and gives students an opportunity to paint and talk to their Library faculty and staff in an informal, fun way.

With Carving Cute Critters, students are given pre-carved blocks of wood to decorate with painter markers. We use the Inventables Carvey machine and their free software, Easel, but any CNC carving machine with compatible software works for this project. This is a layered activity. Participants can either decorate wood blocks and see how a tabletop CNC carving machine works, or they can take is a step further and create their own Cute Critter to be carved. We have found this to be one of our most successful events. Students are focused on painting the blocks and ask questions about the machine. We are thanked for offering the event and asked when we will hold it again.

Age Range
- Tweens (Ages 8-12)
- Young Adults (Ages 13-18)

- Adults

Type of Library Best Suited For
- Public Libraries
- Academic Libraries
- School Libraries

Cost Estimate
- Approximately $80-100
- Does not include initial cost of a CNC machine.

OVERVIEW

We hold Mobile Making events on the second and fourth Thursday of each month for three hours in the afternoon, but we have been getting requests to host events for classes and as a study break during our finals week. We find this project is best to host over a few hours, allowing people to come and go. Some students go through the project quickly, but we have found the majority spend time adding details. Our events primarily draw female students, but not overwhelmingly. Male students also connect with this project. We have one faculty member and two to three staff members present. We introduce who we are, let them know the library resources we have for them, and ask them what they know about the topic we are covering, in this case subtractive technologies. We then step back and let them draw, only giving directions if they want to design a Cute Critter that will be carved. We have not had to limit the number of students to painting on the blocks, but we have limited the amount of students who can work on designing their own Cute Critter to two at a time, because we only have one carving machine.

Materials List
- (3) ¾-inch x 6-inch X 6-foot pine boards that are cut into 5 ½- inch x 6-inch at the hardware store at the time of purchasing the boards
- Paint markers (you can use paint, but the paint markers don't leave a mess to clear)
- Paper for students to draw
- Black felt tip markers, a range in thickness

Optional Materials
- We always have out washi tape because students seem to love it and apply it to just about any project we offer

Necessary Equipment
- Tabletop CNC carving machine -- we use the Inventables Carvey
- Two computers – either laptops or tablets, whatever you have available that has an internet connection and that allows you to download the CNC software

- CNC Software that connects to your CNC carving machine if you are letting students design a drawing to be carved. We use the Inventables free, web-based software, and free software download.
- Wet/dry vac with HEPA filter to clear shavings from CNC carving machine
- Access to a printer/scanner

We chose the Carvey because the company ensures that fumes stay within the hood. That is what makes it portable. If you are working with a different CNC machine, where exhaust is a concern, or if you do not have a tabletop machine, you may have to think about just doing the wood blocks. You could also host two sessions: one where you have students do the drawings, then you have them carved, and a second session is for drawing their blocks that have been carved.

Step-By-Step instructions

Preparation
- Set up two long tables with chair and place pre-carved Cute Critters blocks, painting markers, and paper with felt-tipped markers for drawing.
- Set up one small table with computers to use CNC software.
- Set up one small table with table-top CNC carving machine.
- Vacuum is next to the table with the CNC machine on it.
- Event should be set up close to a printer/scanner to scan the images students draw.
- We set up a flat screen next to our event with a slide show showing our Mobile Making logo, then examples of painted wood blocks.

PROJECT INSTRUCTIONS
- As students walk by to their classes, ask if any would like to paint wood blocks
- When students come over to the tables, show the wood blocks they can paint. Because we are limited with how many students can design their own Cute Critter, we wait to see if students show a deeper interest. If they do, then we show them the steps to design their own Cute Critter.
- If a student chooses to draw their own Cute Critter, show them pre-drawn examples to demonstrate the importance of keeping the drawing simple and the lines legible and well defined. If there is a lot detail, shading, thin lines, there is a good chance the carving will not turn out. Keep it simple.
- After the student has made their drawing, scan it, and email it to their email address.
- Once they receive it, they can download it to the desktop or another storage of their choice and save it as jpeg, png, or gif. The image resolution as the scan works fine.
- The student then needs to register for a free account with Easel, which is web-based, and anyone can sign up for it, not just someone who has purchased a Carvey. There are other,

free, CNC carving software available. It is best to see what your machine's company recommends.

- For Easel, go to the Inventables site, select "Explore Easel" where you will be prompted to start a new account or sign in.
- Once in the software, select your machine at the top of the screen. Carvey and X-Carve machine have different dimensions.
- Select "New Project"
- Select the "Import" tab on the menu bar at the top of the grid screen.
- Select "Image Trace" and upload your scanned drawing.
- Manipulate the image as needed using the Threshold and Smoothing sliders, and then click the green "Import" button.
- The drawing will show up on the gridded design plane.
- If using Carvey, adjust your image to be clear of the red corner, which shows where the wood goes into the clamp.
- Choose your desired cut depth, drill bit size, and material. For our projects, we always work with pine, and choose "Soft Maple" from Easels material choices, and work with either 1/32 or 90 degree V-bit.
- Download the Easel plug-in, or choice of software, to your computer. For Easel, the download is available at easel.inventables.com/downloads
- Connect USB from Carvey to computer or tablet.
- Once connected your CNC carving machine, prompts will appear in the software to make sure all the entered settings are correct, e.g. the type of material, material placement, and that the clamps are holding the material in place.
- Start carving.
- Simple carves are typically between 5-20 minutes.
- If students cannot wait for their Carved Cute Critter, they can come back to the event later and paint them, or pick up their piece at a designated Library service desk at a better time for them.

Learning Outcomes
Participants will…
- Produce a Cute Critters wood block through their painting
- Design a Cute Critters hand drawing to be turned into a carved Cute Critters wood block
- Observe how subtractive technologies and manufacturing can begin with a simple hand drawing
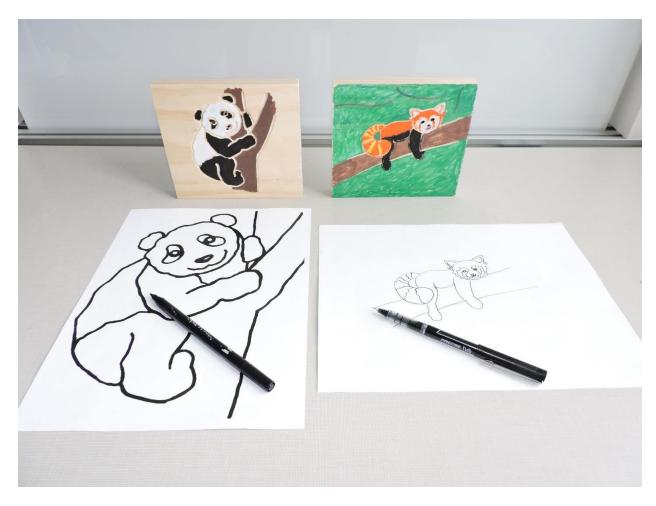
Recommended Next Projects
- A group can coordinate a number of colored blocks to create a hanging collage that represents where science, art, and technology meet.

- Blocks can be cut, colored or stained to create a structure, or individual structures, through gluing or attaching with fasteners of choice.

Hand Drawing and Carved Cute Critter

Hand Drawing and Carved Cute Critter

Carved Cute Critter

Painted Carved Cute Critter