creativity lab

Lighthouse Community Public Schools

in collaboration with

Maker Ed

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ELEMENTARY WOODWORKING

A Guide from the Creativity Lab

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Based on
Lessons developed by Robbie Torney & Emily Smith

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About This Project

Kindergarten woodworking is a series of basic carpentry exercises designed to give young students the know-how to safely use sandpaper, files, hammers, screwdrivers, hot glue guns, drills, clamps, and saws. After an introduction to each tool, students will have the year to practice their crafts, and bring their imaginations to life. These exercises encourage creative and critical thinking, and facilitate agency at a young age.

This project is structured such that teachers provide minimal instruction, and students learn through the process of design, test, and redesign. We encourage you to customize this project to the needs of your class, but maintain the ideal of students learning through exploring.

The lessons were developed by Emily Smith and Robbie Torney at Lighthouse Community Charter School. This guide begins with an overview of kinder making at Lighthouse, then goes into depth for specific tools and activities.

Our Story

At Lighthouse, kinder making happens year-round within the classrooms themselves. Making happens once a week for roughly an hour, and students have the option of further making every afternoon during their free-choice time.

New tools are introduced during the first two quarters. Students have the opportunity to continue exploring these tools throughout the rest of the year.

Quarter 1 (8 Weeks)
- Wood
- Files
- Sandpaper
- Hammers
- Hot glue
- Saws

Quarter 2 (10 Weeks)
- Foam
- Screwdrivers
- Drills

At Lodestar, all elementary students participate in a quarter of woodworking in their Making, Art, & Design classes. They begin learning about the tools and techniques; the culminating project for the past year was a “speedform”, where students brainstormed and designed a figure that was “speedy” to them.

Materials & Tools

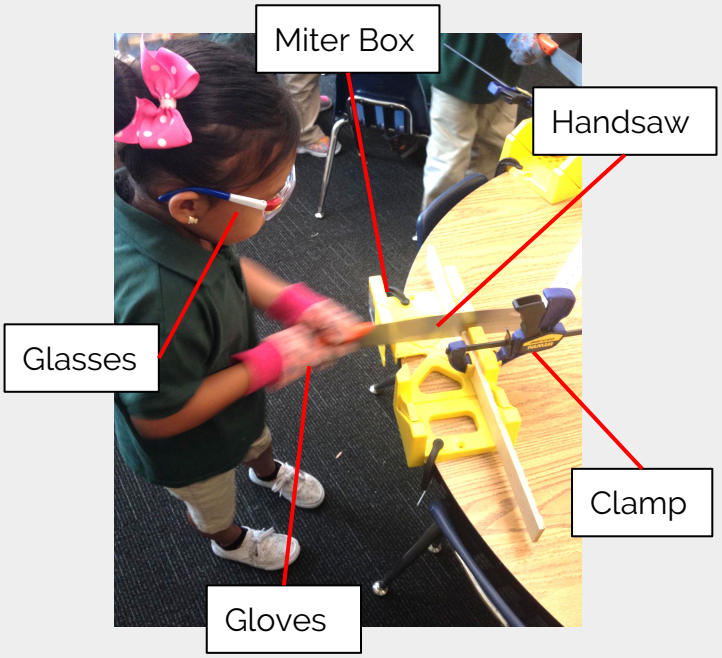
MATERIALS
- Scrap wood
- Assorted craft materials

TOOLS
- Safety glasses
- Work gloves
- Assorted files
- Sand paper
- Hammers
- Roofing nails
- Screwdrivers
- Screws
- Small drills
- Hand saws
- Miter boxes
- Clamps
- Hot glue & glue guns (low temp)

Learning Targets

- I can look closely.
- I can explore complexity.
- I can use tools safely and correctly
- I can be strategic in my project planning.
- I can produce prototypes of potential design solutions.

TIME: semester-long overview



Context: Before we make...

The following ideas have been helpful for facilitating elementary making at Lighthouse, though you should not feel limited or confined by them. The key to a successful makerspace is the continuous process of customizing and refining it to your own needs:

- Let students participate in organizing and developing their space.
- Do making within the classroom itself.
- Have as many tools and materials as possible available for students.
- Give students plenty of work space. At Lighthouse, students work at their normal tables.
- Pegboards are good for storing tools while also keeping them visible.
- Extra storage/display space allows students to work on the same project over an extended period, rather than start a new project every class.

Material Management

- Contact a local lumberyard for scrap wood. Document your students' making to share with them as a thank you.
- Students will naturally develop making projects on their own. Storage space for completed and in-progress projects is important.

How to Introduce New Tools & Tech SAFELY

Sit your students in a circle and let them pass the day's new tools around. As they pass the tools, offer them exploration questions for considering how to safely and correctly use each tool. Possible exploration questions are provided in subsequent sections. Model how to use the new tools, then give students their own tools and wood to work with at their individual tables. At the end of the work period, come back together and revisit the exploration questions. What new ideas do students have?

Students should always wear safety goggles. When using saws, they should wear gloves. Make this a classroom norm.

For specific tools and materials, follow these guides:

- Demonstrate how to start a nail with light taps while holding it, then remove your hand to hammer with force. Use an exaggerated gesture when removing your hand, even putting it behind your back.
- Don't pass the saws around. Instead, walk the circle with a saw, and have students make Observations. Students should always wear eye protection and gloves when sawing.
- Show students how to use clamps, then let them do it for themselves. Check their work, but offer minimal instruction.
- Let students plug their own hot glue guns into the outlets, but remind them of the dangers involved—never stick anything but a plug into an outlet.

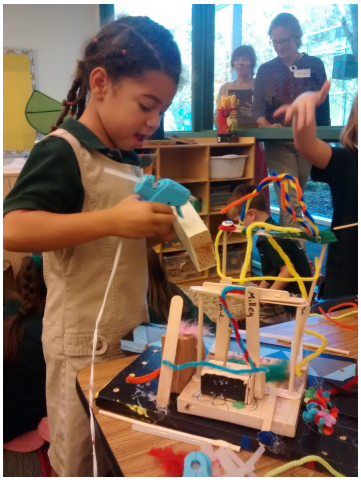
Looking Closely

Class Facilitation

When students are working at their own tables, avoid over-instructing. This is the time for them to explore and discover on their own. Some additional facilitation tips include:

- After introducing students to new tools, give them the chance to go back and further explore prior tools.
- Encourage students to try all tools, but give them the ultimate say in what they do or do not use.
- Once students have practiced with new tools, come back together to revisit exploration questions.
- If possible, store tools & materials in such a way that students can access them freely. Let students' discoveries lead to natural discussions.

Hot Glue Guns



Exploration Questions

- What techniques allow me to glue without burning myself?
- When will things stick?
- When won't they?

Project Idea

- Have students design and build toys for each other. This project should span several weeks, and include students interviewing each other to learn one another's likes and dislikes. Make sure students are designing their toys based on their friend's likes, and not their own. This is a design thinking exercise, as it considers the needs and wants of "users."

Files & Sandpaper

Exploration Questions

- How do files & sandpaper change wood?
- How do they make wood smooth or rough?
- How does one sandpaper differ from another?
- What's the best way to hold & use these tools?
- How do we take care of our tools & each other?
- Have students color their wood with crayon, then sand the wood. How does sandpaper affect the crayon?

Hammers & Nails

Exploration Questions

- How do hammers work? How can you hold a hammer & nail at the same time? What are ways I could hurt myself with these tools?

Facilitation Tips

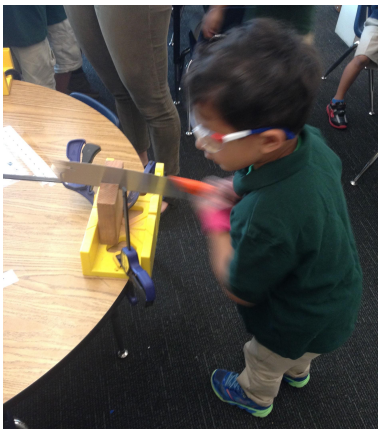
- Have a couple of stumps available in the classroom for students to practice hammering in nails.

Looking Closely

Saws & Clamps

Exploration Questions

- How do saws work? How can we be safe with a saw? What is the most effective way to use a saw? How do saws and scissors differ?



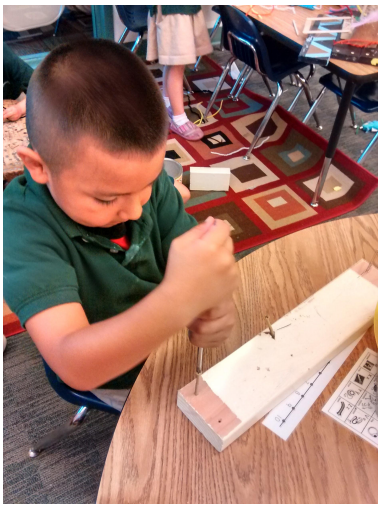
Sawing Stations

- All sawing happens at the sawing station, and with adult supervision. One adult can supervise roughly four students at once. Rotate who works at the station every class.
- Clamp miter boxes to the edges of a table such that the clamps don't interfere with the movement of the saw.
- Ensure that each miter box is far enough from the others such that the students have plenty
- of room to safely work.
- Use a clamp (or cam pins) to secure a piece of wood in the miter box. Have students check to make sure their wood is held firmly in place, and that their fingers are clear of the saw.

Screws, Screwdrivers, & Drills

Exploration Questions

- How do screws work?
- How are screws different from nails?
- How can we use the screwdriver with the screws?



Facilitation Tips

- Screws and nails are similar but have key differences. Show students how you can push a screw through a piece of foam—like you would a nail—then pull the screw out. Unlike with a nail, the screw will chew the foam up. Why do students think this is? What is the proper way to use a screw?
- Secure some corks in vises, and have students practice marking the center of the cork and drilling through that mark

As Making Continues...

Integrate planning into students' making.

- Have students plan their projects by drawing/describing how they will use their tools and materials.
- Facilitate student independence by ensuring that the materials they need are accessible without your assistance.
- The goal is to develop student empowerment, or "agency"—recognition that the world is designed, as well as the inclination and ability to further design it.

Woodworking with Older Students

Although this guide focuses on introducing younger (kindergarten) students to woodworking tools and materials, there are numerous ways to add complexity for middle and high school students.

Classes can choose to focus on the design process with students, where students learn about basic woodworking tools and techniques, then transition to a culminating project with prototypes and iterations.

Design Process

Brainstorm

With your project in mind, have students create an inspiration board. This can be words, drawings, magazine cutouts, textiles, or anything they feel inspired by!

Project Plan

Once students know the scope of their project and what they will create, have them create a project plan with step by step instructions. For younger students this can be basic pictures with the words “cut” or “glue”, and for older students this can include detailed instructions and diagrams.

Prototype

Next, the students create prototypes out of cardboard, scrap wood, or anything that’s available, refining their project plan as they pass through iterations.

Final Design

Finally, students use their revised project plan to create their final project. Consider showcasing their work with all documents and prototypes.

With this design process and project, classes could create industry connections - visiting local woodworking studios, create a product to sell, or work for a client to address a need and see the end to end process.

Reflection & Community Connection

Woodworking is a great unit to solidify concepts of the design process described above. It is also a method to create projects that contribute to your community.

Consider evaluating a need for your school or community site as a class, and design projects around that. Here at Lighthouse, one of the starter projects in the High School Making class was to create and decorate basic chairs. Along with reinforcing woodworking skills, these chairs are now dispersed throughout the school. A group of them is outside of the middle school Making class as “Peace Chairs”, where students can sit if they need to take a break from class. It serves as a step before admin intervention.