



Lighthouse Community Public Schools

in collaboration with

Maker Ed

Maker Promise

# CARDBOARD CHAIRS

*A Guide from the Creativity Lab*

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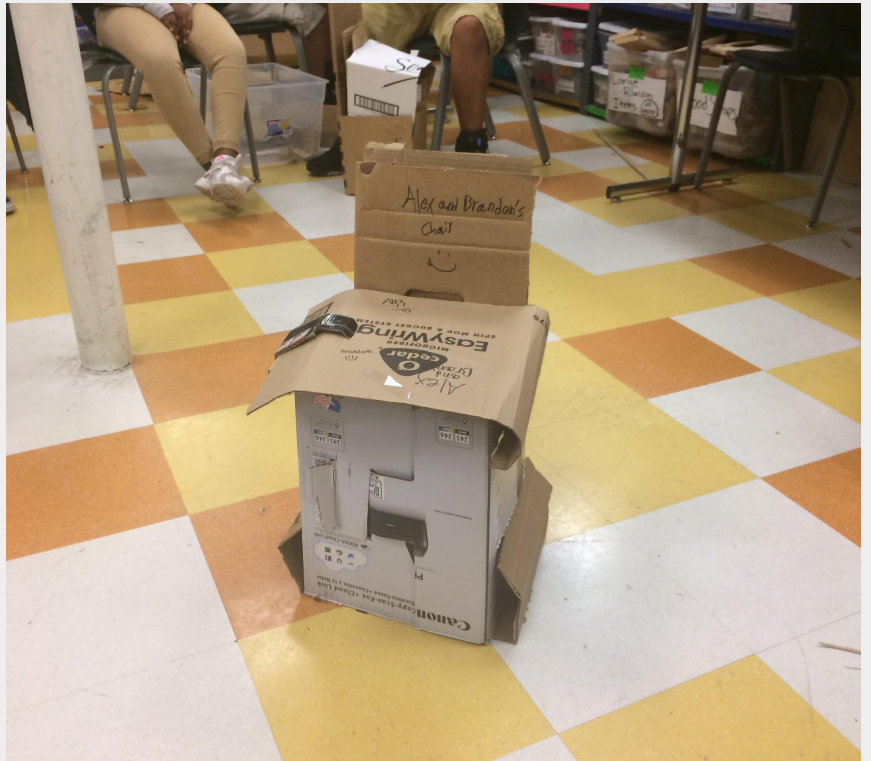
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**Based on**

Cardboard Chair Design Challenge by

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[www.lighthousecreativitylab.org](http://www.lighthousecreativitylab.org)

[www.makered.org](http://www.makered.org)

# About This Project

This design challenge encourages students to move quickly through the process of design, testing, and redesign. It is creative, hands-on, and involves a lot of teamwork and iteration, along with problem solving and time-management.

## The Challenge:

Students are divided into pairs or teams to design a cardboard chair. In larger groups, it may be helpful to have one person on each team in charge of documenting the group's building process.

Parameters for the Chair:

- Must be at least 18 inches tall
- Must support a person at least 18 inches off the ground.
- Must support a person of at least 130 lbs.
- May only use cardboard and brads.
- Cannot use an assembled box — all the boxes must be altered in some way.

# Our Story

This project is part of our 7th grade Making elective course, and it spans about one week (5 to 6 classes).

Our Making Teacher Ms. Dobras completed a Summer Workshop at the Exploratorium in San Francisco, where she was introduced to cardboard construction techniques (see photo on Page 3). She took this as a starting point for a design challenge that would involve cardboard: creating a chair with a group of 3-4 students, that would hold up a person weighing 100-150 lbs.

For this activity, we use recycled cardboard from our school site, and store it - cut and flat-packed - in our classroom. We often reach out to staff a couple weeks beforehand to save any boxes or interesting cardboard packing material.

# Materials & Tools

## MATERIALS

- Cardboard boxes, pre-cut
- Brads, pipe cleaners, or any other non-adhesive attachments

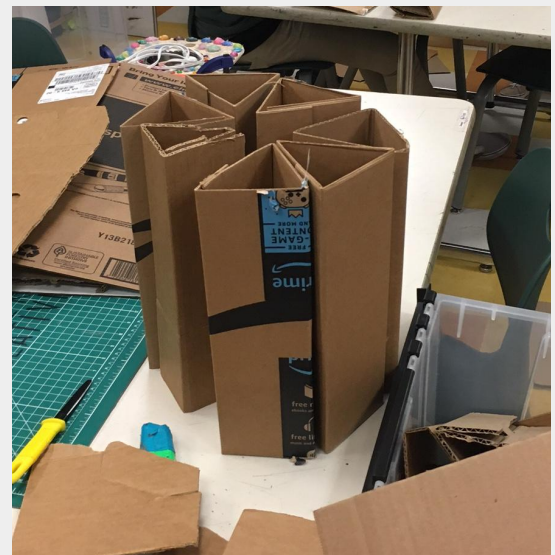
## TOOLS

- Cutting mats
- Box cutters
- Canary knives
- Bandage scissors

# Learning Targets

- I can generate many potential solutions to a defined problem.
- I can explicitly borrow and build on others' ideas.
- I can learn from mistakes and follow unintended paths.
- I can collaborate with others as an artist, maker, and designer.

**TIME: 5-6 classes of 50 mins each**



# Context: Before we make...

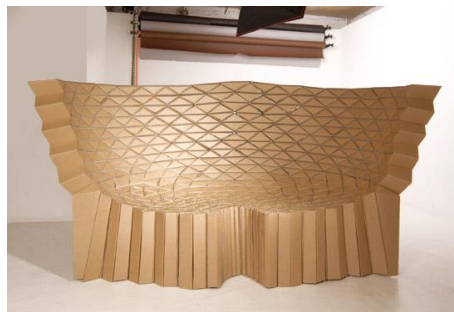
Cardboard is a cheap and versatile material. We use it for 3D prototyping because it is accessible in schools and easily repurposed. And, even though this material has been adapted and used by us for many years, designers and architects have also used it to create high-end products. In 1972, Frank Gehry created a furniture set using exclusively corrugated cardboard. The idea of using cardboard for furniture is becoming more popular as demands for sustainability and "eco-friendliness" increase.

Showing relevant, real-world connections to students is important. It is also important to start off small, with a warm-up activity around cardboard construction. For the first 50 minutes of this project, encourage students to create notch/slot, insert, and flange examples before starting on their chairs. After going to the Exploratorium, we created our own "Cardboard Construction" board to inspire students.

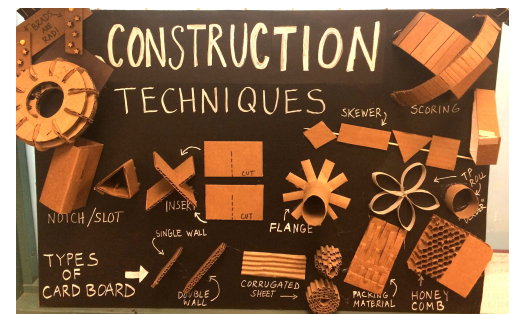
[Make Magazine has a good resource page of how to work with cardboard.](#)

## LINKS

- [Instructables Guide to Cardboard Chairs](#)
- [Inhabit article on Cardboard Design](#)
- [Designboom article on Cardboard](#)



Richard Sweeney at [lazerian](#) studio



Cardboard Construction Board

# Material Management

This project requires a bit of planning around collecting and storing the cardboard. We tend to collect around the school up to a couple of weeks before the project, and then cut and flat-pack everything for our classroom storage box. Students are free to choose whichever pieces they want when it's time to start the project. We store box cutters and knives in locked cabinets, and students use these tools under supervision.

# How to Introduce New Tools & Tech SAFELY

This project involves the use of sharp and potentially dangerous tools. Box cutters, canary knives and bandage scissors all function differently, and students should know how to use each tool appropriately. At the beginning of each trimester, we have students sign a safety contract in order to use the sharp tools in the classroom.

If you have time before the project, you can have students analyse each cutting-tool (using a [Parts, Purposes, Complexities](#) thinking routine) and have them create a safety contract of their own, which lists the potential danger, correct use, and responsibility of each student.

This is a group project: teams of 3-4 people are preferable.



# Cardboard Construction Techniques

Here are some examples of cardboard construction techniques; you can recreate your own to show as examples to students and inspire them in the construction of their chair. Below is some terminology for prototyping with cardboard:

**“Stacking”** cut multiple layers of cardboard and glue/stack them together to achieve thickness and stability

**“Folding”** fold cardboard into the desired shape. Triangular shapes, with the base at the bottom, are the strongest.

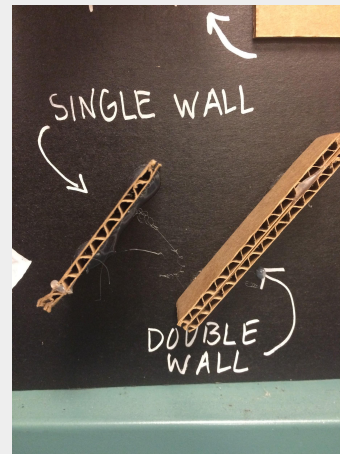
**“Slot/insert”** cut slots into the cardboard, then insert one piece on top of the other.

**“Notch”** cut a slot on one side of the cardboard, and a tab on the other. Fold the piece and insert the tab into the slot to hold it in place.

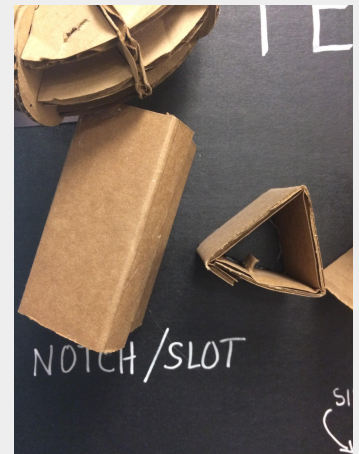
**“Flange”** cut tabs into the end of a tube, and spread them out flat to give the tube more stability.

**“Stitch”** punch holes and sew together pieces of cardboard

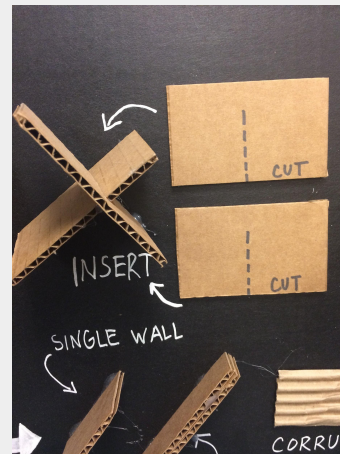
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Add layers for thickness



Triangular shapes have the best stability



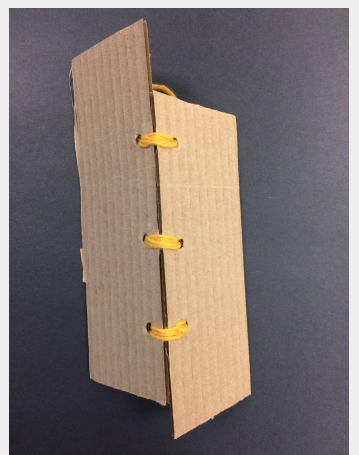
Slots and inserts



Creating a 3D shape with slots and inserts



Flange with a tube



Stitching 2 pieces together

# Scheduling the Design Challenge

Below is a step-by-step guide to planning the chair challenge in class. Feel free to adapt this timeline to meet your own needs and schedule.

Note that our Making class comprises of 24 students, and each class is 50 minutes.

## DAY ONE

1. Presentation (10 mins): students are introduced to the activity and are shown real-life examples.
2. Warm-up (35 mins): students learn how to create a notch and slot with cardboard, are shown other cardboard construction techniques for reference.
3. Clean-up (5 mins)

## DAY TWO

4. Start Making! (45 mins): students are reminded of the design restrictions, start working in groups. Students will spend the next couple of days *creating, iterating and testing*.
5. Clean-up (5 mins)

## DAY THREE/FOUR

6. Making (45 mins)
7. Clean-up (5 mins)

## FINAL DAY

8. Final Test! (30 mins): A volunteer will take turns sitting on each chair.
9. Assign a winning group
10. Clean-up (10 mins): break down the cardboard and recycle

# Project Examples



The Cardboard Chair Challenge Winner!