

# Tips and Tricks for Cardboard Design and Engineering

Presented at CA STEAM Symposium 2022



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Our Mission is to develop children's creativity through hands-on making with sustainable materials.



REAL TOOLS  
UPCYCLED MATERIALS  
KIDS MAKERSPACE



OPENING OPPORTUNITIES **FOR YOUTH**  
**FROM ALL WALKS OF LIFE** TO PURSUE THEIR  
INTERESTS AS TINKERERS AND INNOVATORS.



reDiscover



<https://rediscovercenter.org/pedagogy/>



### Prototype a Transportation Vehicle/Vessel

We've created an activity guide on prototyping transportation vessels! This project was inspired by Rosie Revere, Engineer, written by Andrea



### Make a Plastic Bottle Soaker

We've created an activity guide on making a fun, recycled Super-Soaker to get you through the heat this summer! This



### Make a Spinning Selfie

We've created an activity guide on Spinning Selfies inspired by The Girl who Thought in Pictures: The Story of Dr.



### Pedagogy Resources

Tinkering Resources These resources are aimed at helping children learn through making in home, school, and community settings. The Tool



### The Tools We Use

reDiscover has 10+ years experience putting powerful tools in the hands of kids ages 7-12. We've tried out countless hand



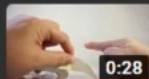
### Teacher Resources

reDiscover provides professional development and support to PreK-12 teachers to integrate making, tinkering, and creative reuse materials into classroom activities,

## reDiscover Center on Youtube

### Tiny Techniques

reDiscover Center - 1 / 9



#### How to Tear Tape

reDiscover Center



#### Tiny Techniques - How to Use the Canary Cutter

reDiscover Center



#### Tiny Techniques - How to Use a Hot Glue Gun

reDiscover Center



#### Tiny Techniques - How to Tear Tape

reDiscover Center



#### Tiny Techniques - How to Protect Your Workspace

reDiscover Center



#### Tiny Techniques - How to Make a Hole with Screwdriver

reDiscover Center



#### Tiny Techniques - How Much Hot

[https://www.youtube.com/playlist?list=PLv8jYe2j5-4aQcnz7hn1N9AV\\_6hTrSY5m](https://www.youtube.com/playlist?list=PLv8jYe2j5-4aQcnz7hn1N9AV_6hTrSY5m)



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Tiny Techniques



Show more

## SUBSCRIPTIONS



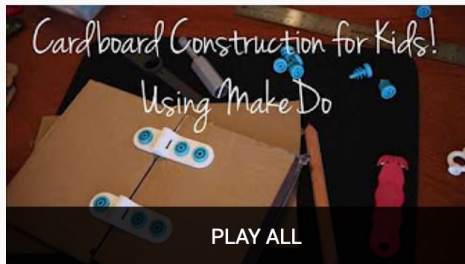
Barb Makes Things



Sketch



adaptivedesignnyc



## Cardboard Construction for Kids!

7 videos • 1,126 views • Last updated on Jan 11, 2021



jumekubo4edu

SUBSCRIBE

1



### 01. Cardboard Construction for Kids - MakeDo

jumekubo4edu

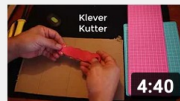
2



### 02. Cardboard Construction for Kids - Flutes, Bends, Supports

jumekubo4edu

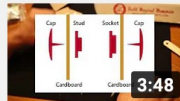
3



### 03. Cardboard Construction for Kids - Cutting Tools

jumekubo4edu

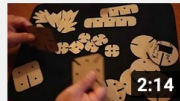
4



### 04. Cardboard Construction for Kids - Connections

jumekubo4edu

5



### 05. Cardboard Construction for Kids - Laser Cut Wafers

jumekubo4edu

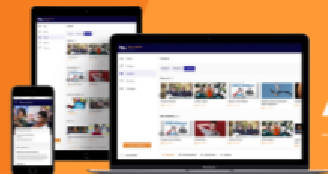
6



### 06. Cardboard Construction for Kids - Supports and Carpenter's Square

jumekubo4edu

# Reignite & Reengage with Mizzen by Mott



**ALL-IN-ONE TOOL**



## **CONTENT**

Content that engages, content that equips, content for all

## **PRO TIPS**

Professional development in your pocket

## **SCHEDULING**

Planning for the week made simple

## **STUDENT GROUPS**

Schedules, attendance & activities for each group

Through support from the Mott Foundation, this all-in-one tool is free to afterschool educators who are empowering young learners everywhere.

<https://app.mizzenapp.org>

MIZZEN BY MOTT x REDISCOVER CENTER

# 16 Activities, 6 Pro-Tips

CONTRIBUTORS: LIZ REYES AND HANABEE CARTAGENA

[Any Shape Box](#)

[Arm & Belt Accessories](#)

[Create a Cardboard Self-Portrait](#)

[Create Hanging Door/Wall Signs](#)

[Creative Reuse Collection Box](#)

[Fantastic Footwear](#)

[Loose Parts](#)

[Make a Spinning Selfie](#)

[Masquerade Mask](#)

[Prototype a Transportation Vehicle/Vessel](#)

[Shadow Puppets](#)

[Shadow Puppet Stage](#)

[Slot Construction Animals](#)

[Slot Construction Sculptures](#)

[Windchimes & Mobiles](#)

[Revolving Door Technique](#)

[Cardboard Connections](#)

[Material Exploration: Flutes and Corrugation](#)

[Tool Training: Canary Cutter](#)

[Tool Training: Hot Glue](#)

[Tool Training: Making Holes with Screwdrivers](#)

[Tool Training: Snips and Pliers](#)

ADAPTED FROM GUIDES WRITTEN BY  
FACILITATORS AT REDISCOVER.  
THANK YOU FOR YOUR TALENTS!

Cardboard is...

Cardboard is...

A word cloud of attributes for cardboard, arranged in a roughly triangular shape. The words are in two colors: orange and green. The largest word is 'cheap' in green, slanted upwards. Other large words include 'strong' in orange, 'sustainable' in orange, 'available' in orange, and 'natural' in green. Smaller words include 'formable' in orange, 'familiar' in green, 'brown' in green, 'cuttable' in green, 'flexible' in orange, and 'paper' in green.

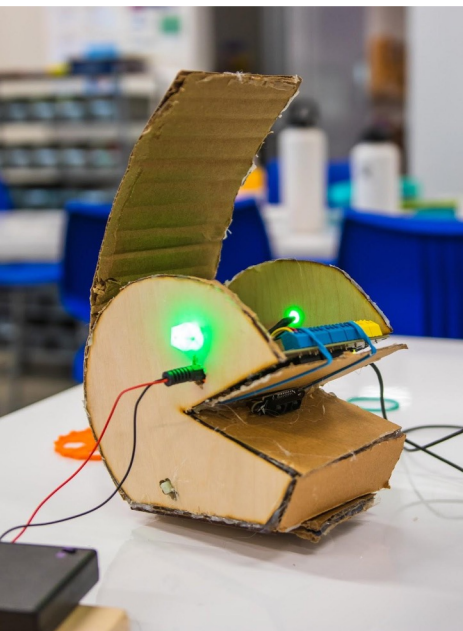
formable  
familiar  
brown  
cheap  
cuttable  
strong  
sustainable  
available  
natural  
flexible  
paper

Goal: comfort

Goal: fluency

Goal: normalcy

# Project Gallery



Westside Neighborhood School  
Los Angeles, CA

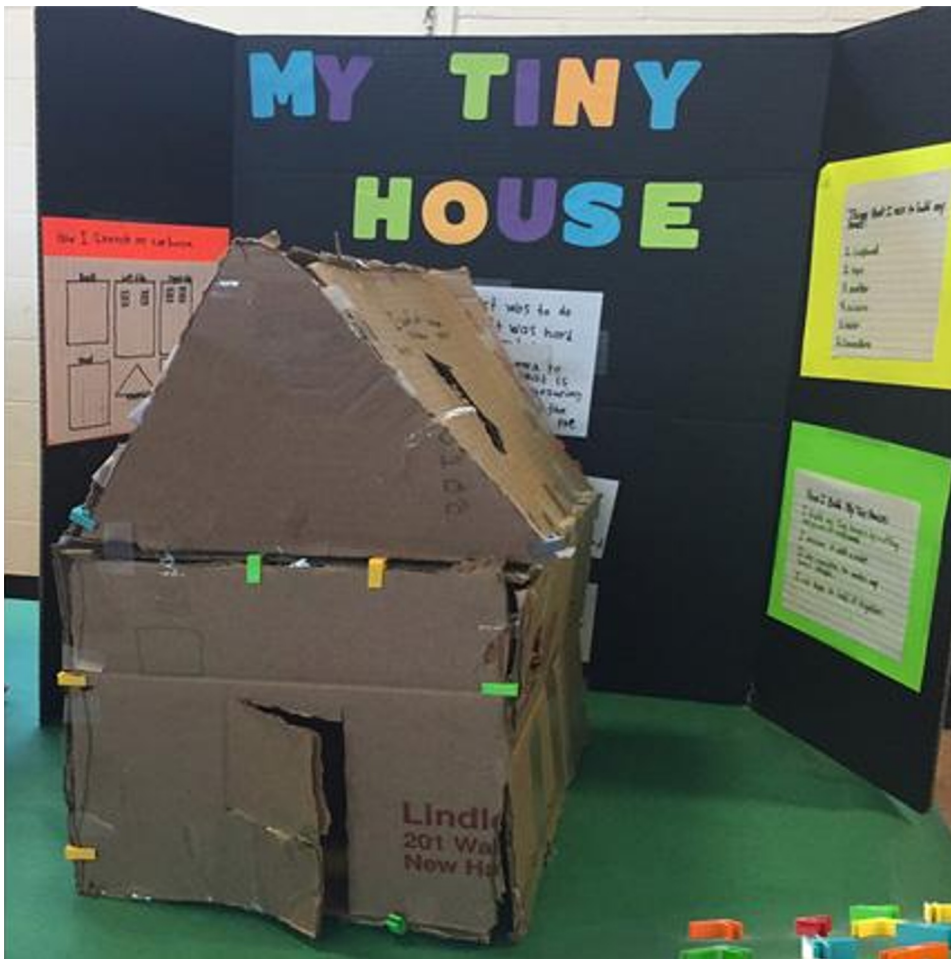
Robot Petting Zoo



Leon Sheffield Elementary School  
Decatur, Alabama

Working Windmill Challenge

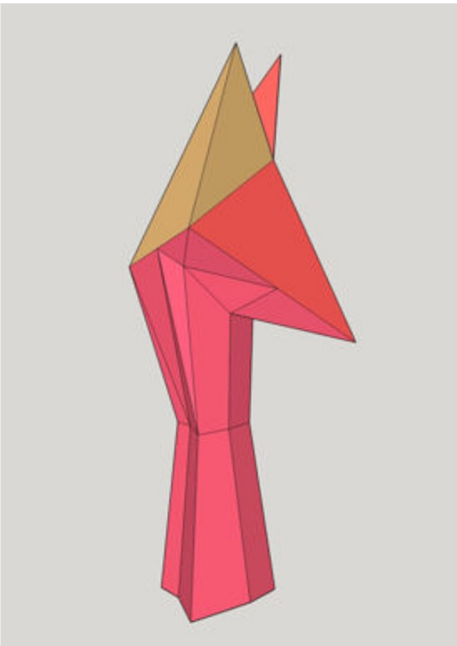
<https://www.weareteachers.com/stem-cardboard-ideas/>



Capital Prep Harbor Charter School  
Bridgeport, CT

## Tiny House Architecture Design

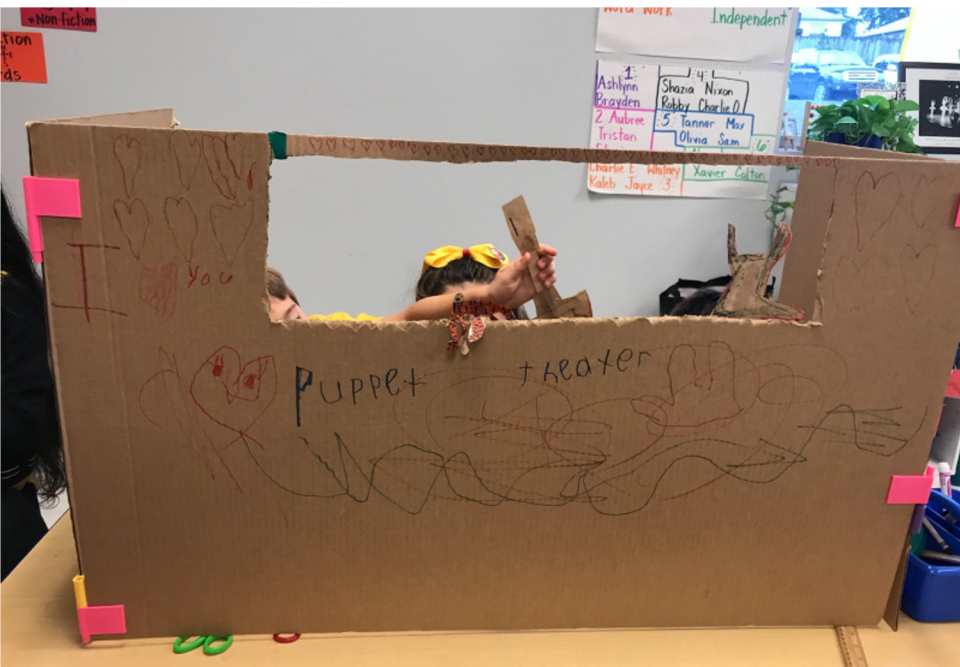
<https://www.3duxdesign.com/blogs/news/one-tiny-house-for-capitol-prep-harbor-one-giant-step-for-a-sustainable-future>



Garden Street Academy High School  
Santa Barbara, CA

Sketchup->cardboard model

<https://gardenstreetacademy.org/high-school-art-polyhedral-cardboard-sculptures/>



Kindergartener-built Puppet Theater



double  
decker

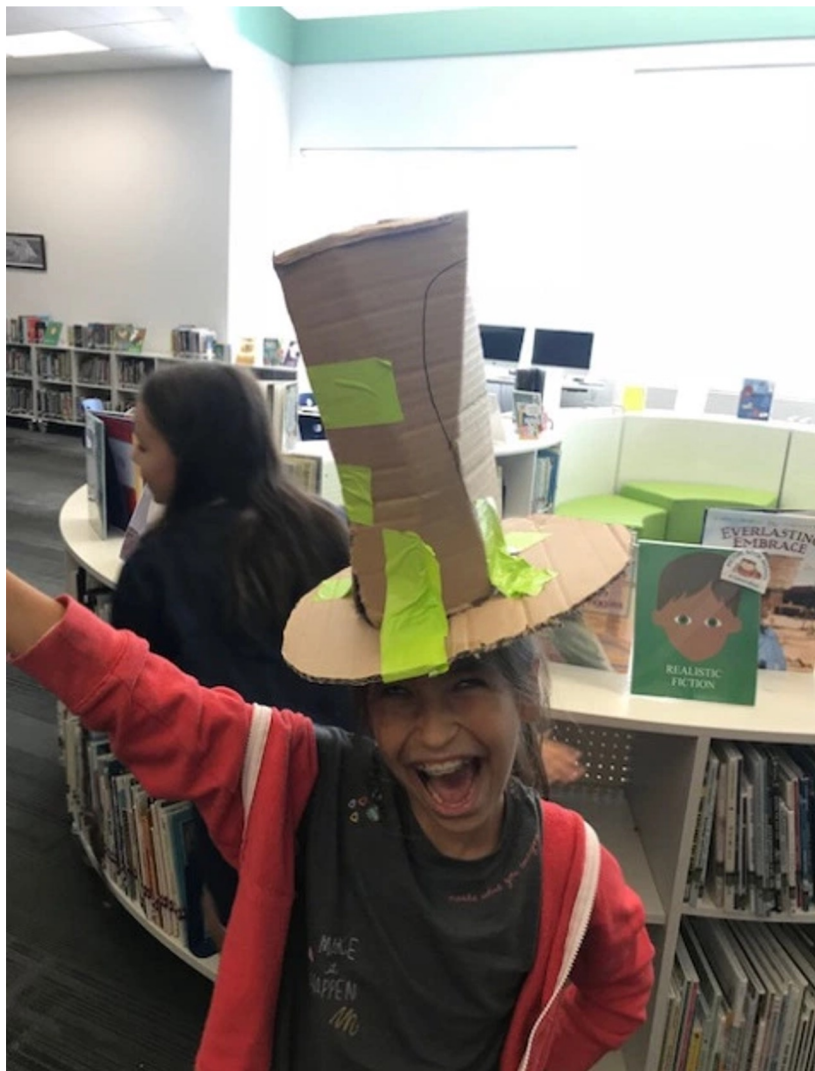
Chairigami

Highland Park, IL

Cardboard Classroom Furniture

<https://www.chairigami.com>





David C. Barrow Media Center  
Athens, GA

Cardboard Costuming

<https://expectmiraculous.com/tag/uga/>



Hawthorne School  
Beverly Hills, CA

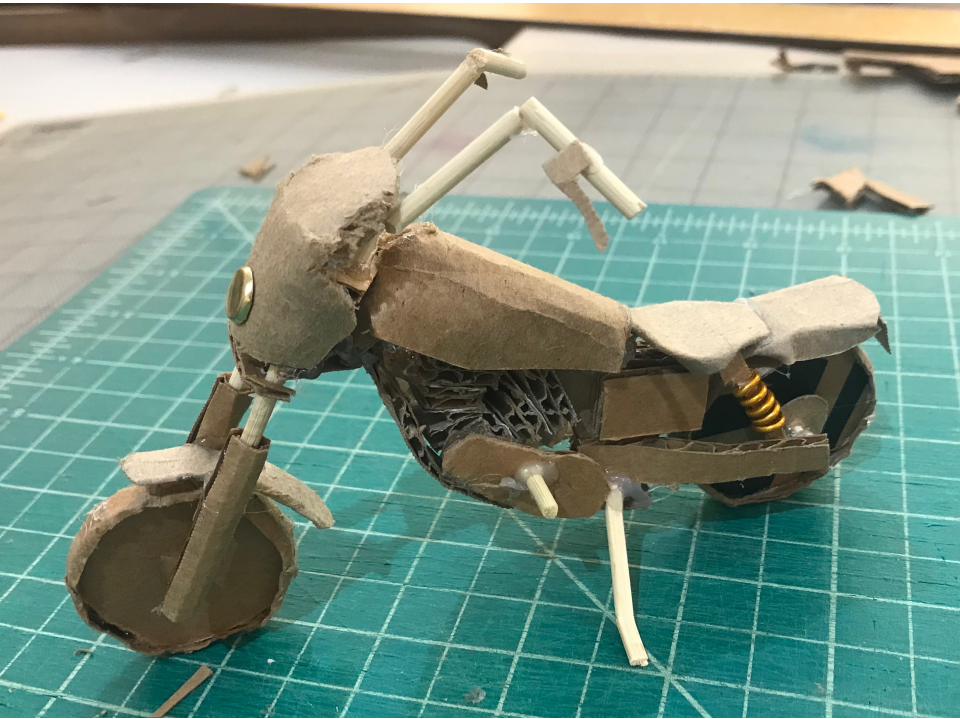
Cardboard Playground

<http://rediscovercenter.org/pop-up-cardboard-playground/>

Where it can go



**Kiel Johnson**



**Cardboard City**  
**Santa Monica, CA**



Cardboard City  
Santa Monica, CA



**Cardboard City  
Santa Monica, CA**



**Cardboard City  
Santa Monica, CA**



微信号: JTgoodmorning

微信号: JTgoodm



## Adaptive Design

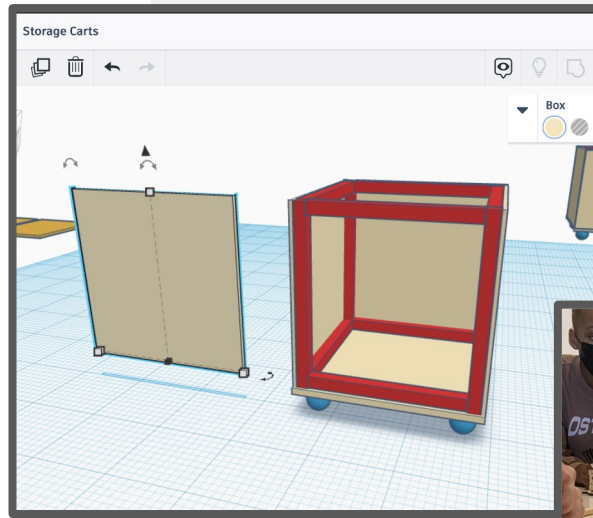
Custom furniture for children with restricted mobility

<https://www.adaptivedesign.org/>

# Prototyping

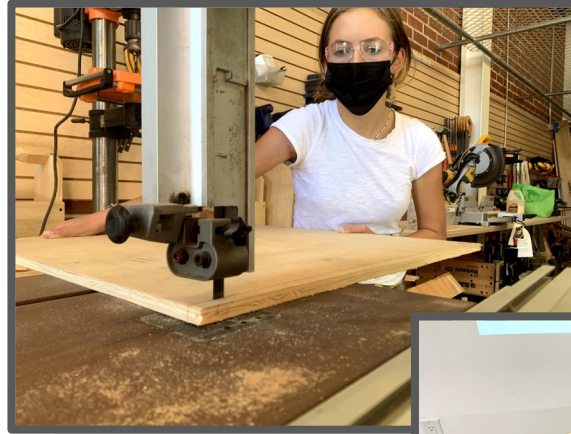
Using cardboard to understand how something will be built in another material.

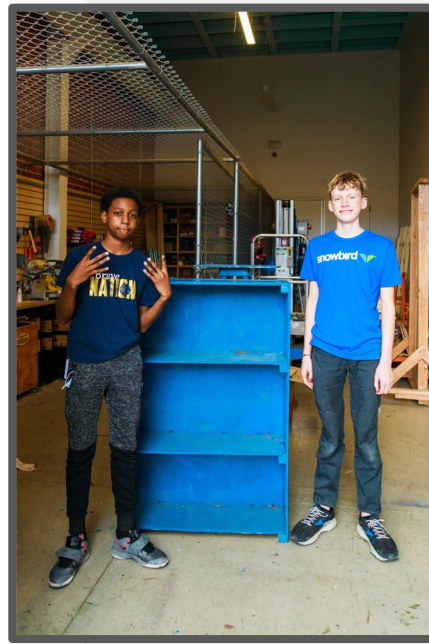
- Modeling
- Scaling
- Proportions
- Material widths



# Life Size Build

Moving from prototype to final project with sturdier material, different scale, and new skill set.





# Final Project

From common build to personal projects for faculty clients.



Make it happen



## Cutting Tools

Canary Cutter

Skil Power Screwdriver with Cutter

Makedo Cardboard Saw



## Connectors

Tape: Duct, masking, packing, paper

Stapler, regular and plier grip

Zip ties

Hot glue

White glue



**Connectors**

Makedo Scrus

Brads

Wire



## Speciality Tools

Awl or screwdriver

Crop-a-dile punch

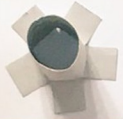
Circle cutter

Scroll saw

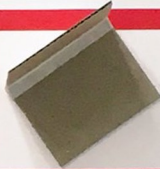


**A word on utility knives**

# CARDBOARD CONNECTIONS



FLANGE



L-BRACE

SLOT



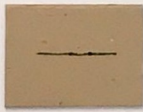
CUT + CUT



= INSERT

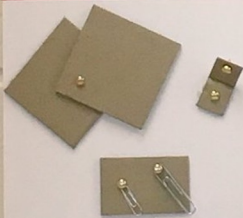


TAB



SLOT

=

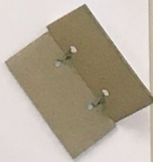


BRASS FASTENERS

SCORE  
AND  
FOLD



HOLE PUNCH  
+  
WIRE



## Connection Techniques

Flange

L-brace

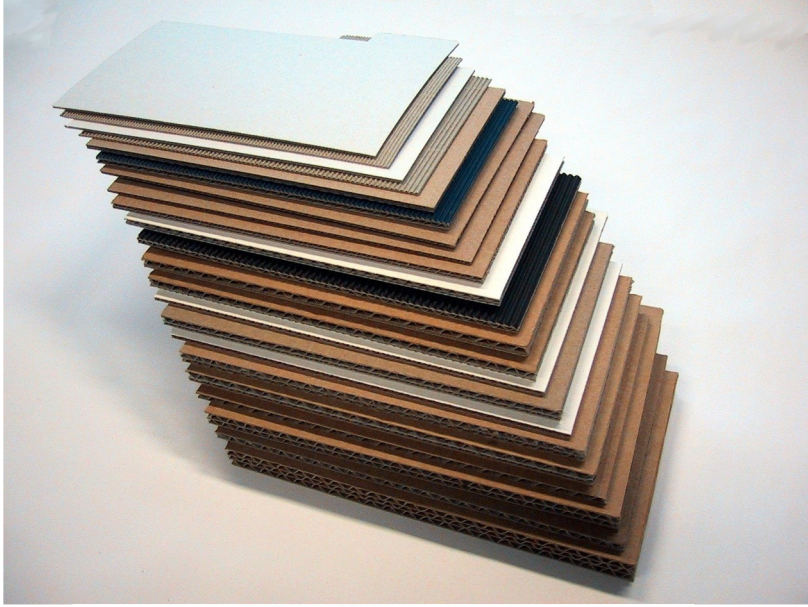
Slot and slot

Tab and slot

Fasteners

Score and fold

Wire



## **Types of Cardboard**

Corrugated Cardboard

Paperboard

Tubes





## **Cardboard Sources**

Boxes at school

Donations from school community

Carpet stores

Appliance stores



## **Managing Cardboard - Prep**

Flatten boxes

Trim to panels

Trim to strips



## Managing Cardboard - Storage

Cart



## **Managing Cardboard - Storage**

Flat File



## **Managing Cardboard - Storage**

Tuck it anywhere

-behind furniture

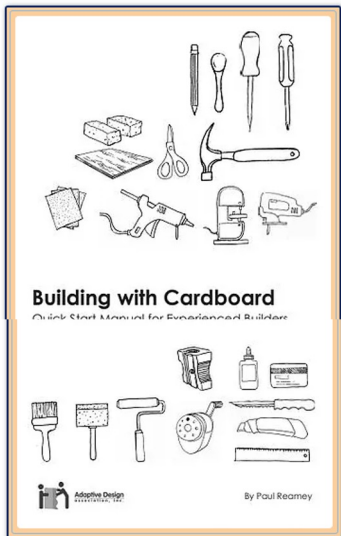
-under furniture

-in the closet



**Laminated Cardboard for  
“cardboard lumber”**

## QUICK-START GUIDE to Building with Cardboard



Download booklet (.PDF) in English

Descarga el folleto (.PDF) en español

Here are 24 quick pages of sketches and tips for building with cardboard, intended for makers who have experience working with other materials. You are welcome to download it and share with others, as long as you share the entire booklet, not just excerpts. Please let us know how you like it.

## VIDEO LIBRARY of cardboard carpentry techniques

These 33 videos are great as a glance at what to expect if you're thinking of taking a course. Even better, they're a good review or reference afterward. They briefly demonstrate individual techniques visually, but, by themselves, can't explain when to employ them, nor how to design or assemble adaptations.

### CARDBOARD BASICS



Grain strength | Layering 1 | Layering 2 | Make your own

### MEASURING



# Video Library of Cardboard Carpentry Techniques

<https://www.adaptivedesign.org/fabrication>

# CONSTRUCTION

# TECHNIQUES

Skewer



Flange



Links



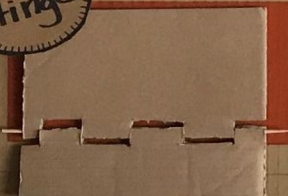
Curve & Curl



Tabs



Hinge



Brads



Strips



Score



Notch



Fold



Slots



Gusset



L-Brace



# ATTACHMENT Techniques



↑  
Flange



Gusset → Δ supports



L-brace

Slot



cut

+



cut

=



insert

Tabs



tab

+



slot

=



Brass Fastener



Hey-  
It moves!

Hole Punch  
& Ripe Cleaners



skewer  
(cardboard  
moves)

# CARDBOARD Attachments



FLANGE



L-BRACE



SLOT  
↗



CUT

+



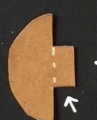
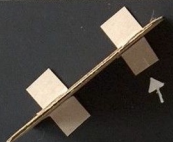
CUT

=



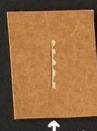
INSERT

TABS  
↘



TAB

+



SLOT

=



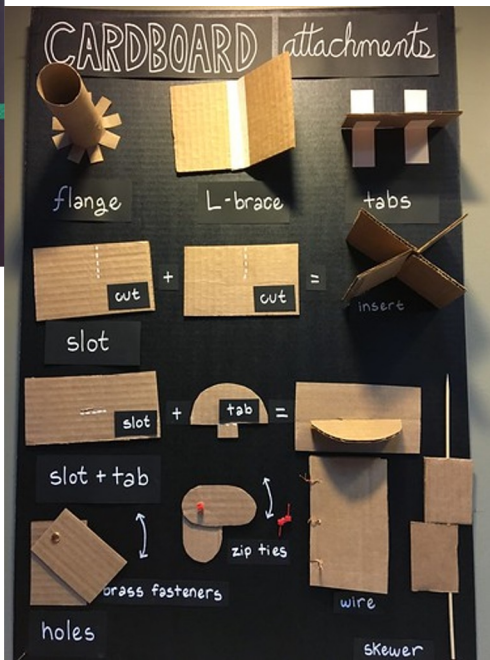
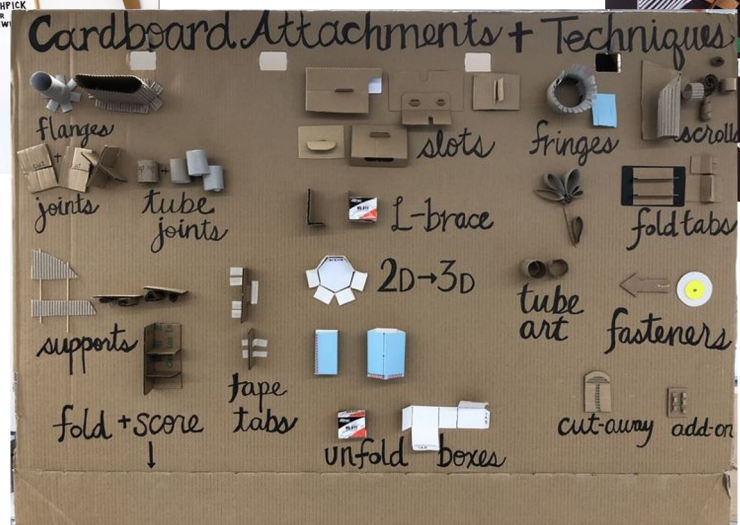
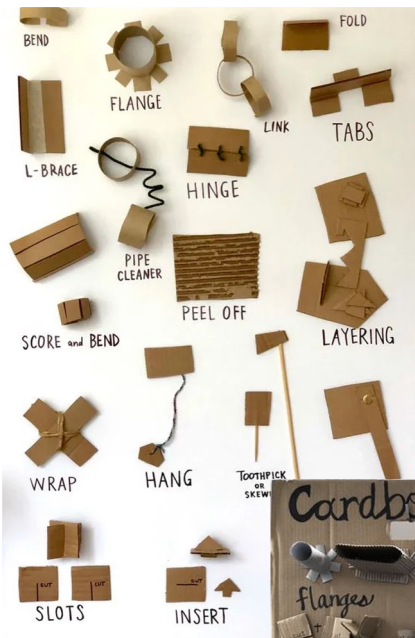
BRASS FASTENERS  
↓



Hey-  
It Moves!

HOLE  
PUNCH  
+  
WIRE





# Cardboard for is for Every Classroom!



More info at  
[rediscovercenter.org/pedagogy](https://rediscovercenter.org/pedagogy)