

# ChompSaw Ideas for Teachers

Eight cardboard challenges with materials, build steps and learning prompts

Turn recycled cardboard into structures, science models and moving creations. Use these challenges to help students sketch an idea, build it, test it and explain what they changed.

Grade bands, times and test targets below are planning suggestions for these adaptations. Allow extra time when groups share a machine.

## Plan the making session

Gather plain cardboard, pencils, rulers, tape, markers and the scoring tool. Add the hole punch only when a project needs holes.

Rotate through planning, supervised cutting, assembly and testing. One student operates at a time; others mark parts or build. Budget for queues and glue drying.

Practise a straight cut, a broad curve and a trial slot. Students can design and assemble prepared pieces while an adult handles cutting.

## Prepare the cutting station

Demonstrate first and supervise. Follow the supplied manual and your school's tool and protective-equipment procedures.

Use flat, clean cardboard **no more than 3 mm thick** that fits easily beneath the guard. Work on a clear, stable surface.

Wait about 10 seconds after switching on. Feed forward; rotate for curves. Switch **OFF between cuts**. Cut before adding tape or glue.

Start with an empty dust drawer; empty it at least every 30 minutes. [Operating guide](#)

## Choose a challenge

| Project                       | Grades | Suggested time | Page |
|-------------------------------|--------|----------------|------|
| Build a stronger bridge       | 3-8    | 2 x 40-50 min  | 2    |
| Design a tilting ball maze    | 3-6    | 2 x 40 min     | 2    |
| Make an animal habitat        | 1-4    | 2 x 40 min     | 3    |
| Create a shadow story         | 1-5    | 1-2 x 40 min   | 3    |
| Build a slot sculpture        | 2-6    | 1-2 x 40 min   | 4    |
| Design a welcoming park       | 3-8    | 2-3 x 40 min   | 4    |
| Animate a cardboard character | 5-8    | 3 x 40-50 min  | 5    |
| Create a food truck model     | 5-8    | 2-3 x 40 min   | 5    |

## Look for learning

Ask students to show their plan, describe a test and identify one improvement. A photo with the sentence "I changed \_\_\_ because \_\_\_" makes a useful exit ticket.

Original classroom adaptations informed by ChompShop, the Exploratorium and MIT. Source links accompany each project; illustrations show examples rather than cutting templates.

**More lessons** [chomps.shop/pages/educator-hub](https://chomps.shop/pages/educator-hub) | **Operating guidance** [learn.chomps.shop/learn-chompsaw](https://learn.chomps.shop/learn-chompsaw)

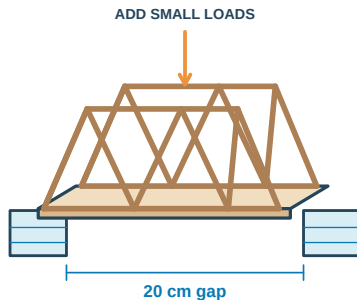
# Structures and motion

Build, test and make one useful improvement

## 01 Build a stronger bridge

Suggested Grades 3-8 | 2 periods of 40-50 min

Structures, forces, measurement and fair testing



### MATERIALS

Cardboard, masking tape, ruler, two equal support blocks, a small cup and identical light counters.

**Challenge** Span a 20 cm gap, then improve how much weight your bridge supports.

1. Sketch a deck at least 25 cm long. Cut the deck, side strips and braces while the cardboard is flat.
2. Assemble with tape. Try folded edge beams or triangular side braces. Rest both ends on equal supports.
3. Put a light cup at the centre and add counters one at a time. Stop when the bridge begins to sag; change one feature and retest.

**Test and discuss** Record the number of counters held before sagging. Keep the gap, cup and loading point the same.

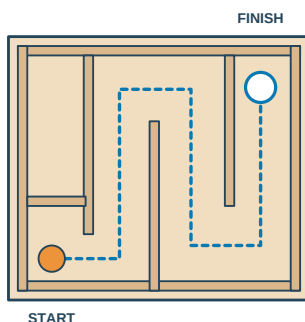
**Adapt it** Start with a folded deck. Extend by comparing load held with the mass of cardboard used.

**Inspiration** ChompShop Bridge Engineers | [chompsshop.com/pages/lesson-6-8-2](http://chompsshop.com/pages/lesson-6-8-2)

## 02 Design a tilting ball maze

Suggested Grades 3-6 | 2 periods of 40 min

Forces and motion, spatial reasoning and sequencing



### MATERIALS

Cardboard base and strips, tape, ruler and a table-tennis ball or other age-appropriate rolling ball.

**Challenge** Guide a ball from start to finish through at least four changes of direction.

1. Draw a route on a base about 35 x 45 cm. Make every passage wider than the ball; check that the route connects.
2. Cut wall strips and an outside rim. Use folded tape tabs to attach the strips upright after cutting.
3. Tilt the board gently to move the ball. Ask a classmate to try it, then adjust one section that traps the ball.

**Test and discuss** Complete three runs with the ball staying on the board. Explain which change made the route work better.

**Adapt it** Begin with a wide zigzag. Extend with alternate routes or a removable gate.

**Inspiration** Exploratorium Marble Machines | [www.exploratorium.edu/tinkering/projects/marble-machines](http://www.exploratorium.edu/tinkering/projects/marble-machines)

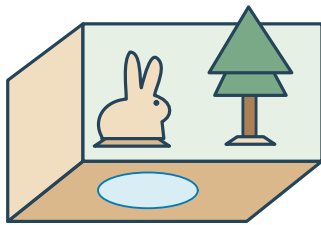
# Habitats and shadows

Connect a cardboard model to a scientific explanation

## 03 Make an animal habitat

Suggested Grades 1-4 | 2 periods of 40 min

Living things, habitats, animal needs and communication



FOOD WATER SHELTER

### MATERIALS

Cardboard, tape, paper, markers and age-appropriate animal reference books or pictures.

Build an indoor learning model, not a shelter for live animals.

**Challenge** Show how one animal finds food, water, shelter and space in its habitat.

1. Choose an animal and research its needs. Draw a plan that labels where it eats, drinks and shelters.
2. Cut a base, terrain, plants and shelter parts. Stand pieces up with folded tabs or small cardboard feet.
3. Add a cardboard animal. Label the features and explain how at least three meet that animal's needs.

**Test and discuss** Ask a partner to use the model to explain how the animal survives. Add a missing feature or clearer label.

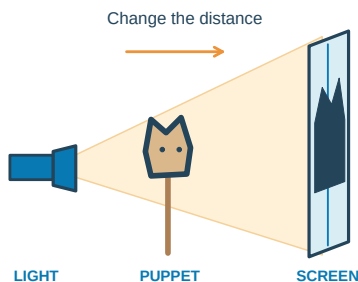
**Adapt it** Offer broad shapes and picture labels. Older students model a habitat change and propose a response.

**Inspiration** ChompShop Shelter Builders | [chompsshop.com/pages/grades-k-2-lesson-2](http://chompsshop.com/pages/grades-k-2-lesson-2)

## 04 Create a shadow story

Suggested Grades 1-5 | 1-2 periods of 40 min

Light and shadows, storytelling, drama and measurement



### MATERIALS

Cardboard, craft sticks, tape, flashlight, ruler and a blank wall or white screen.

**Challenge** Tell a one-minute story with three clear cardboard silhouettes.

1. Draw large, simple characters. Cut their outer outlines; build details from separate pieces to avoid enclosed cuts.
2. Tape a craft-stick handle behind each figure. Place the puppet between the flashlight and the screen.
3. Perform a short story. Then keep the flashlight and screen fixed while moving one puppet closer to and farther from the light.

**Test and discuss** Compare shadow height at two marked puppet positions. What changed, and what stayed the same?

**Adapt it** Start with familiar characters. Extend by measuring distances and graphing shadow height.

**Inspiration** ChompShop Making Shadows | [chompsshop.com/pages/grades-k-2-lesson-3](http://chompsshop.com/pages/grades-k-2-lesson-3)

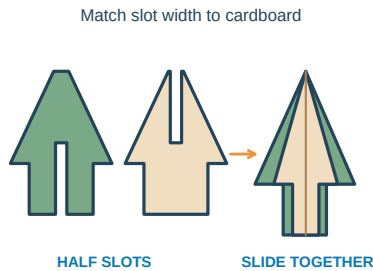
# Sculptures and shared spaces

Think about balance, fit and the people who use a design

## 05 Build a slot sculpture

Suggested Grades 2-6 | 1-2 periods of 40 min

Two and three dimensions, symmetry, balance and fit



### MATERIALS

Cardboard, ruler, pencil and markers.  
 No glue is needed for the main joint.

**Challenge** Make a tree, animal or abstract sculpture that stands using interlocking slots.

1. Draw two upright profiles of equal height with flat bases. Mark the same halfway level on both pieces.
2. Test the slot width on scrap to match the cardboard thickness. Cut one slot from the top and the other from the bottom to the halfway marks.
3. Slide the pieces together at right angles. Adjust the slots or widen the feet until the sculpture stands.

**Test and discuss** Stand it unsupported for 30 seconds, then take it apart and reassemble it without tearing the slots.

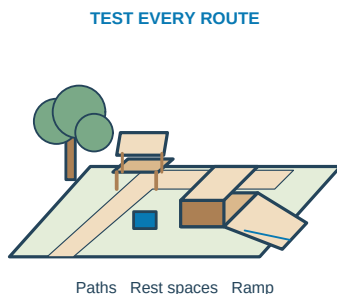
**Adapt it** Begin with two simple shapes. Extend to three or more interlocking parts.

**Inspiration** ChompShop Basics connecting and measuring skills | [learn.chompsaw.com/chompsaw-basics](https://learn.chompsaw.com/chompsaw-basics)

## 06 Design a welcoming park

Suggested Grades 3-8 | 2-3 periods of 40 min

Community design, geometry, scale and accessibility



### MATERIALS

Cardboard, tape, ruler, markers and small model figures or a simple wheeled model.

**Challenge** Create a park with play, green space, seating and connected routes for different users.

1. Sketch a plan on a 30 x 30 cm base. Discuss who will use the park and agree on one model scale.
2. Cut paths, trees, seats and platform pieces. Assemble with tape; add a ramp where the model changes level.
3. Ask another group to trace a route to every feature. Look for narrow gaps, steps and missing resting places; revise the plan.

**Test and discuss** Explain two changes made after feedback and whom they help. Measure the footprint of one park feature.

**Adapt it** Build one shared class park. Older students calculate areas and compare space allocated to paths and features.

**Inspiration** ChompShop Park Architects | [chompsaw.com/pages/grades-3-5-lesson-3](https://chompsaw.com/pages/grades-3-5-lesson-3)

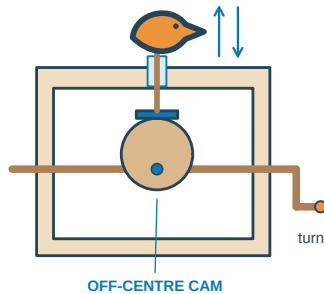
# Moving ideas and model businesses

Make a mechanism work and give a model a clear purpose

## 07 Animate a cardboard character

Suggested Grades 5-8 | 3 periods of 40-50 min

Mechanisms, rotation, linear motion and iterative design



### MATERIALS

Cardboard, pre-cut blunt dowels, straws, tape, glue and hole punch.

Cut only the cardboard on the ChompSaw; supply dowels pre-cut.

**Challenge** Turn a handle to make a lightweight character rise and fall.

1. Build a rigid open-front frame. With adult support, prepare aligned axle holes and a top hole for a vertical follower.
2. Fix an off-centre cardboard cam to a horizontal dowel axle. Guide a vertical dowel through a fixed straw. Glue a cardboard foot to its bottom so it rests on the cam.
3. Add a crank and a light character. Keep the axle free to turn and the follower free to slide. Adjust and test before decorating.

**Test and discuss** Make ten full rotations without jamming. Explain how the cam changes the character's motion.

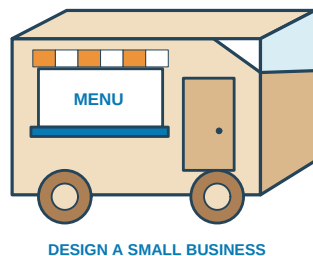
**Adapt it** Provide a prepared frame first. Extend by comparing cam shapes or adding a second moving character.

**Inspiration** MIT K-12 Maker Lab Box Automata | [k12maker.mit.edu/project/automata-with-cardboard-box](http://k12maker.mit.edu/project/automata-with-cardboard-box)

## 08 Create a food truck model

Suggested Grades 5-8 | 2-3 periods of 40 min

3D geometry, measurement, design and entrepreneurship



### MATERIALS

Cardboard, tape, ruler, markers and paper for a sign and menu. Optional scoring tool.

**Challenge** Design a model food truck that serves a clear customer need.

1. Choose a menu and sketch a rectangular truck body. Label its length, width and height in centimetres.
2. Cut separate wall, roof and floor panels. Form the serving opening from strips around a gap, then tape the panels together.
3. Add a counter, sign and decorative wheels. Measure the finished body and prepare a short pitch explaining the layout.

**Test and discuss** Ask another team whether the serving area and sign are clear. Improve one feature after their feedback.

**Adapt it** Use a small box as the body. Older students calculate the rectangular body's volume and exterior area.

**Inspiration** ChompShop Food Truck Designers | [chompshop.com/pages/grades-6-8-lesson-1](http://chompshop.com/pages/grades-6-8-lesson-1)