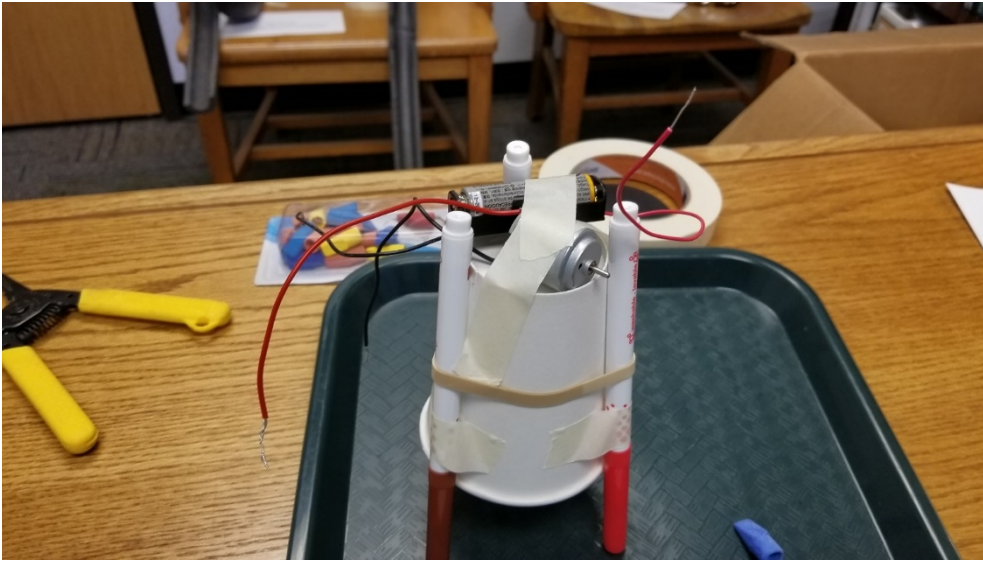


# Science & Engineering Activities

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## Scribbling Machines

*Challenge: Design, build, and test a scribbling machine that will make drawings on paper.*



### Essential Materials

- Paper cups
- Motors (<https://kelvin.com/project-motor-with-leads-1-2v-3v/>)
- AA Batteries
- Markers
- Tape
- Rubber bands
- Erasers
- Flat surface with paper

### Extra

- Battery holders

### Tips

- Attaching the eraser to the motor drive shaft is important to make the cup to wobble & move.
- Probably limit to max 4 pens so there's enough to share.

**Reference:** Exploratorium at <https://www.exploratorium.edu/tinkering/projects/scribbling-machines>  
4-H Junk Drawer Robotics at <https://4-h.org/parents/curriculum/robotics/>

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Adapted by Steven Worker, 4-H Youth Development Advisor, [smworker@ucanr.edu](mailto:smworker@ucanr.edu).  
Find a companion video training at <https://youtu.be/ot3FxNNo1pQ>



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# Science & Engineering Activities

## Cork Mobile

**Challenge:** Design, build, and test a wheeled car to roll down a ramp. The card should only contain corks, cardboard, and paper clips.



### Essential Materials

- Cardboard
- Paper clips
- Corks
- Scissors
- Pliers

### Extra

- Pens
- Tape
- Cutting board and knife (adult only)

### Tips

- Youth might need help with the pliers when putting the paper clip into the corks.
- The adult (only) should cut corks in half. But youth could use the full cork.

Adapted by Steven Worker, 4-H Youth Development Advisor, [smworker@ucanr.edu](mailto:smworker@ucanr.edu).

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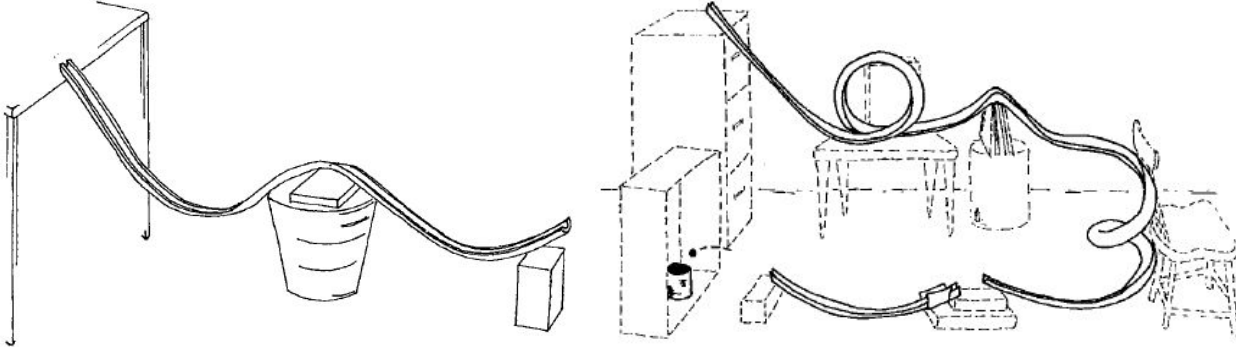
4-H Youth Development Program

# Science & Engineering Activities

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## Balls and Tracks

**Challenge:** Design and build a roller coaster for marbles! See if you can get a loop-de-loop or a jump into a cup!



### Essential Materials

- Foam pipe insulation
- Tape
- Marbles

### Extra

- Paper cups (as the end target for the marbles)

### Tips

- Height is needed. Perhaps start on the wall and have chairs available.

Reference: EDC Design It! Curriculum at <https://kelvin.com/teacher-resources/tsedei-tsep/>

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Adapted by Steven Worker, 4-H Youth Development Advisor, [smworker@ucanr.edu](mailto:smworker@ucanr.edu).

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# Science & Engineering Activities

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## Happy City

**Challenge:** Design and build something to add to Happy City. Include a circuit (light + battery) in your item.



### Essential Materials

- Cardboard
- Tape
- Scissors
- Miniature lights
- AA batteries
- Flat surface with paper (add a few streams and roads)

### Extra

- Pens (for decoration)
- Battery holders
- Wire strippers (for adults)

### Tips

- Probably limit to max 2 lights so we have enough to share.

Reference: New York Hall of Science at [https://learnxdesign.org/learnxdesign\\_record/happy-city/](https://learnxdesign.org/learnxdesign_record/happy-city/)

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Adapted by Steven Worker, 4-H Youth Development Advisor, [smworker@ucanr.edu](mailto:smworker@ucanr.edu).

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# Science & Engineering Activities

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## Float your Boat

*Challenge: Design and build a boat to hold as many pennies as you can. Can you get it to hold even more pennies by adding corks?*



### **Essential Materials**

- Pennies
- Aluminum foil
- Green tub filled with 6 inches of water

### **Extra**

- Corks

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Adapted by Steven Worker, 4-H Youth Development Advisor, [smworker@ucanr.edu](mailto:smworker@ucanr.edu).

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