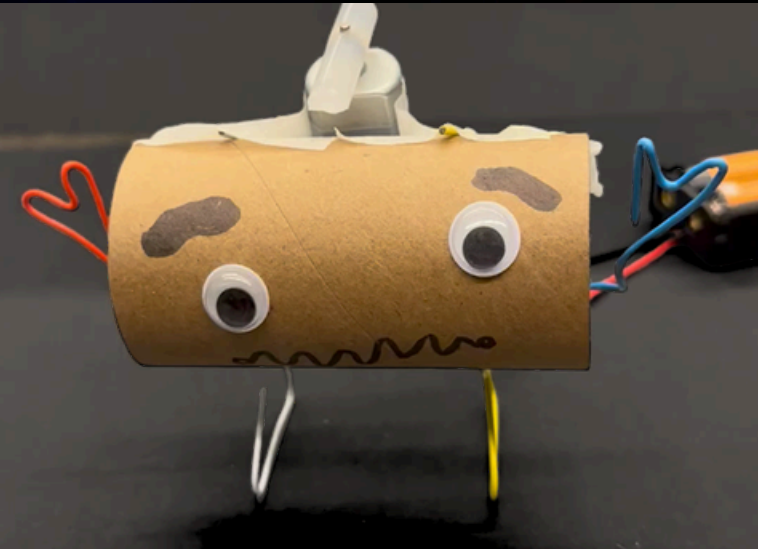


Tinkering Play Kit



ASTC Association of Science and Technology Centers

What is tinkering?

Tinkering is a form of open-ended play exploring materials and phenomena.

Tinkering invites creativity, iterative design, and discovery using everyday materials. Tinkering might look like a child stacking blocks in different ways and observing when they fall, or an adult learning a new software platform by playing around with the different features.



About this kit

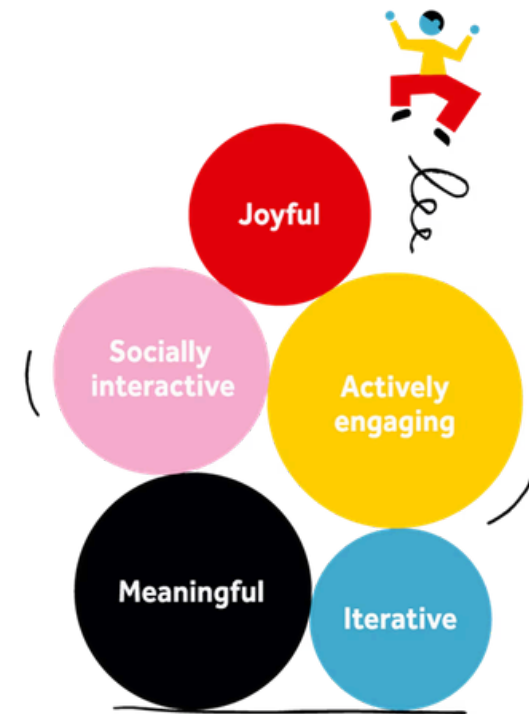
This Tinkering Play Kit includes activities designed, tested, and implemented by members of the LEGO® Playful Learning Museum Network.

These tinkering activities are inspired by the five characteristics of learning through play.

In addition to helping learners explore phenomena and solve problems, tinkering invites joy, social interaction, active engagement, iteration, and meaningful connection.

You can use these activities as-is, or let them inspire new ideas for engaging tinkerers of all ages, whether in the museum or in the community.

Tinker away!



Five characteristics of learning through play

Tips for tinkering

In a museum setting, tinkering-based activities can be deeply engaging for visitors, inviting both children and adults into playful, curiosity-driven learning.



Consider these tips for designing and facilitating tinkering activities.

- **Keep it open-ended.** Avoid fixed goals or outcomes. Instead, encourage exploration with prompts like, “What would happen if...?” and “What do you notice when...?”
- **Follow the ideas.** Facilitate with flexibility, letting the tinkerer take the lead. Encourage generative ideation by using prompts like, “what do you think we should try?”
- **Encourage iteration.** For materials, provide loose parts that can be easily rearranged and repurposed. Use prompts like, “Want to try it another way?” and “What if this piece was different?”
- **Use everyday materials.** Tinkering doesn’t need to be high-tech. Source inexpensive, everyday materials from the craft closet, nature, or even the recycle bin.

Contents

The tinkering activities in this kit are organized around the phenomena and materials they explore.



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BALANCE

These activities explore the concept of **center of mass**. Using simple materials, tinkerers examine how factors such as placement, position, and air flow influence their designs.



Tinker with Towers

Inspired by

exploratorium

Explore balance and stability by constructing unconventional towers with conventional materials. Celebrate towers that topple as well as towers that stand tall. Both are exciting avenues for discovery.

Possible prompts

- Create a Tower using your favorite materials from the kitchen (or bedroom, or school bag, or backyard)
- How can objects stack in unusual or surprising ways?
- Can you make an asymmetric stack?
- Can you reverse the order of the stack?

Suggested materials

- Blocks
- Rocks or other nature objects
- Household objects

Additional resources

[Tinker With Towers guide \(Exploratorium\)](#)



Possible prompts

- ## Suggested materials

- ## Additional resources

Balancing Sculptures guide (Boston Children's Museum)



Unstable Tables

Inspired by

exploratorium

Tinkerers use their own creativity to build unexpected scenes on a unstable platform. In the process, they explore balance, symmetry, and leverage.

Possible prompts

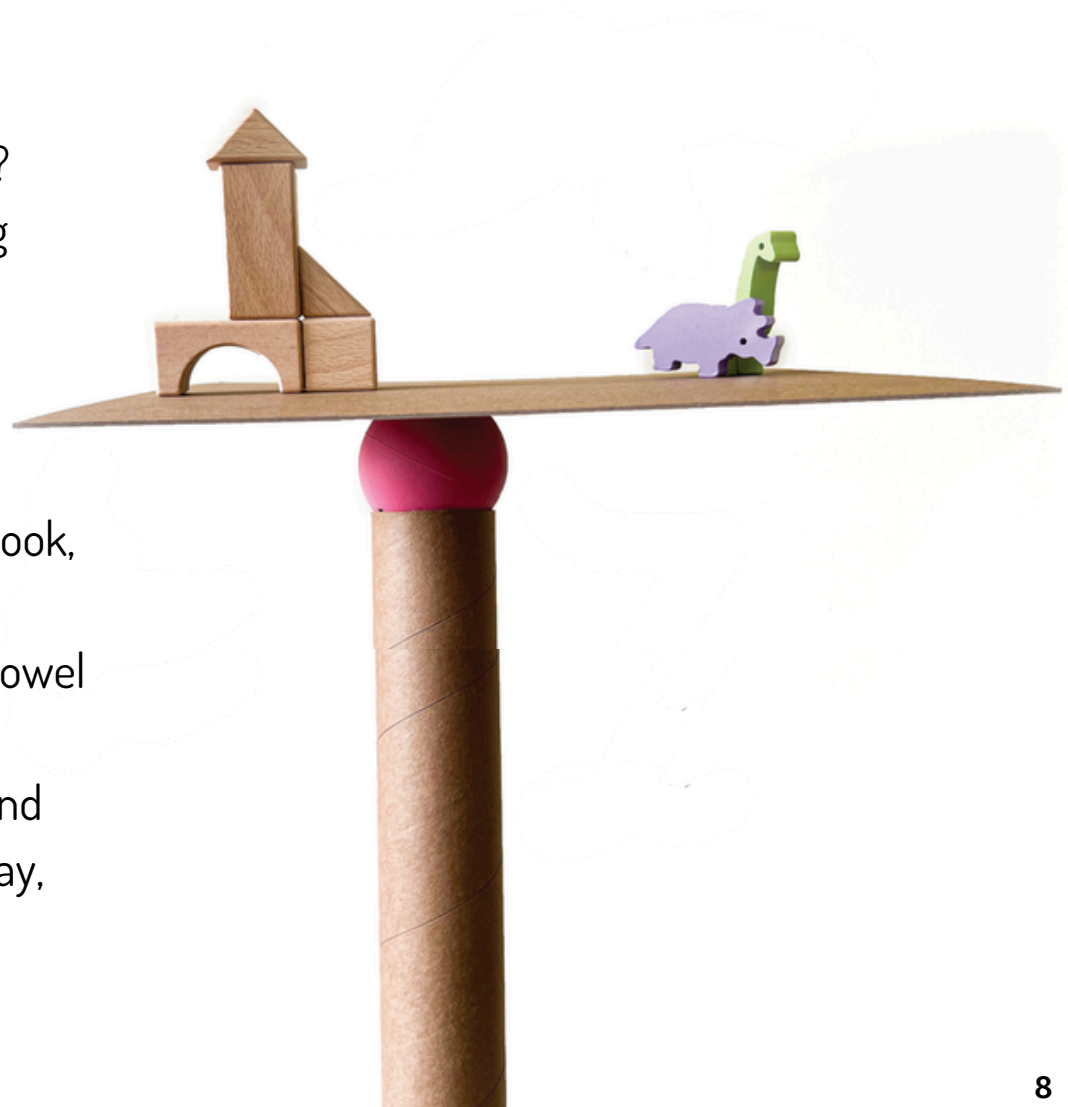
- Can you build your dream playground?
- Can you and a friend take turns adding pieces, one at a time?
- What happens if you move a piece?

Suggested materials

- A platform. Try a piece of cardboard, book, or cutting board.
- A base with a curved top. Try a paper towel tube with a ball set on top.
- Objects with different weights, sizes, and shapes. Try blocks, animal figurines, clay, cardboard.

Additional resources

[Unstable Tables \(Exploratorium\)](#)



ROLLING

By experimenting with different shapes, movements, and ramps, tinkerers learn about phenomena like **friction, gravity**, and **rotation**.

Can It Roll?



Inspired by

exploratorium

How does the shape of wheels affect an object's motion? Tinkerers design objects that roll on flat surfaces and down ramps, exploring motion, shape, friction, balance, and iteration.

Possible prompts

- Design an object that can roll
- Can you make it go faster/slower, farther/shorter, straighter/windier?
- What happens if you change ____?

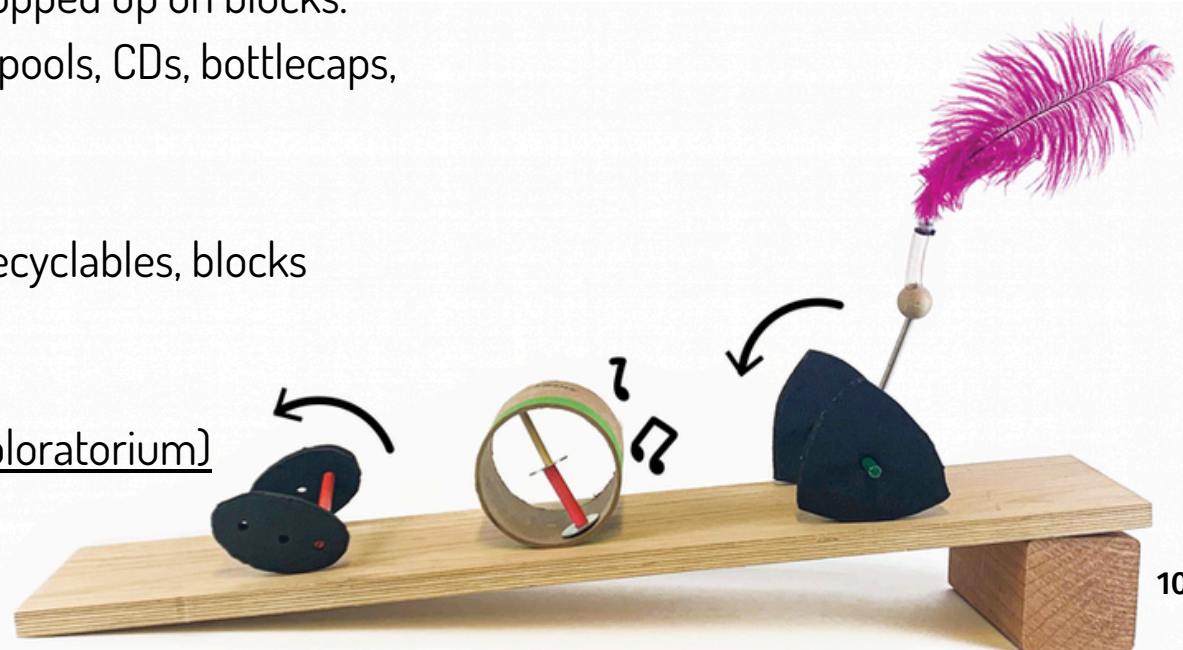
Suggested materials

- A ramp. Try a sheet of wood propped up on blocks.
- Wheels/axles. Try toy wheels, spools, CDs, bottlecaps, lids, toilet paper tubes
- Connectors. Try hot glue, tape
- Body supplies. Try cardboard, recyclables, blocks

Additional resources

[Open Kit for Rolling Exploration \(Exploratorium\)](#)

[Can It Roll? guide \(Thinkery\)](#)



Treadmill Rodeo

Tinkerers explore how different objects roll, by placing them on a moving treadmill belt. This activity offers endless iteration, by tinkering with the size, shape and weight of the rollers, as well as the speed and angle of the treadmill.

Possible prompts

- Can you get an object to roll in one place on the treadmill?
- What happens if you add weight to the roller?
- What happens if you change the treadmill angle? The speed?

Suggested materials

- Small portable treadmill. See photo for suggested setup.
- Rollers. Try PVC pipe sections, toy cars, balls, rings
- Weights. Try clay, washers

Additional resources

[Treadmill Rodeo guide \(Connecticut Science Center\)](#)



LIGHT & SHADOW

This assortment of activities explores science concepts like **color mixing**, **shadows**, and **light**.

Light and Shadow Play

Create shadow scenes with everyday materials. Tinkerers can create narrative or abstract scenes, while exploring the properties of materials to block, bend, or diffuse light.

Possible prompts

- Can you make an interesting shadow?
- What does the shadow look like to you?
- How can you change the color/shape/size of the shadow?

Suggested materials

- A light source. Try a flashlight or desk lamp
- A variety of objects for casting shadows. Try blocks, kitchen utensils, animal figurines, magnetic tiles
- A surface to cast shadows on. Try a wall or sheet

Additional resources

[Light and Shadow Play guide](#) (Boston Children's Museum)



Shadow Remix

What do YOU see in a shadow? In this activity, tinkerers use various materials to cast shadows on paper, then interpret those shadows as images, scenes, or abstract works of art. Add a social dimension by passing shadow drawings from one person to the next, inviting each new creator to add to or reinterpret the shadow-inspired image.

Possible prompts

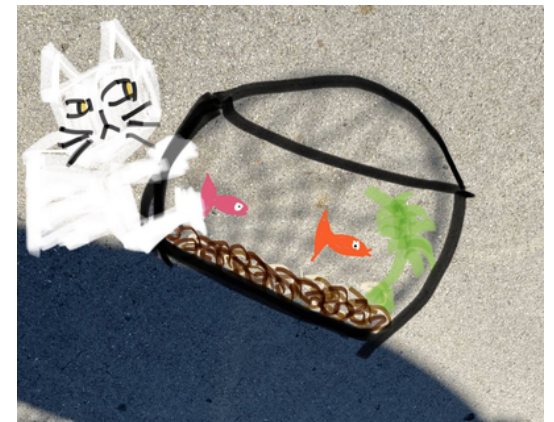
- Can you make an interesting shadow?
- What does this shadow look like to you?
- Can you turn this shadow image into something totally different?

Suggested materials

- A light source and various objects for casting shadows
- Paper and drawing utensils

Additional resources

[Shadow Remix guide \(Exploratorium\)](#)



ELECTRICITY & CONDUCTIVITY

These activities explore a range of different materials that can be used to make, break, and build **circuits**.



Circuit Blocks

Create circuits out of simple, pre-made blocks, each containing either a power source, load, or switch. By tinkering with different arrangements and connectors, learners explore circuitry, conductivity, and resistance.

Possible prompts

- Can you connect the power source and the output to power the circuit?
- What happens if you connect another load?
- Can you control your circuit so that one output turns off, and the other turns on?

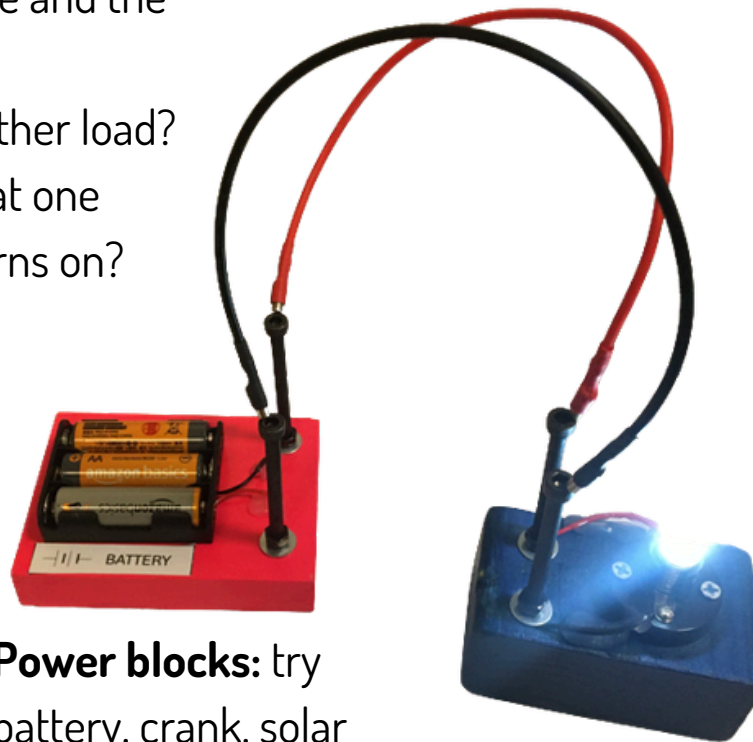
Suggested materials

Use a pre-made kit, or create blocks using wood, 3-D printing, or other materials.

Additional resources

[Circuit Blocks guide \(Connecticut Science Center\)](#)

Connectors: Try magnetic test leads, alligator clips, wire, or metal tape



Power blocks: try battery, crank, solar



Switch blocks

Output blocks: try lights, fans, buzzers

Homemade Switches

Tinker with switches! Explore everyday materials to learn about their conductive and insulating properties, and come up with creative ways to turn a circuit on , off, and on again.

Possible prompts

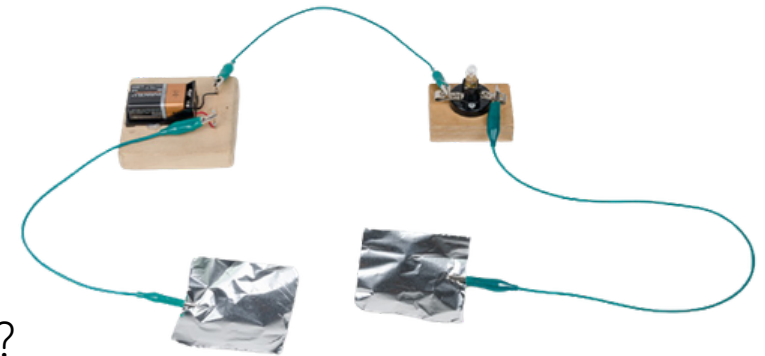
- Create a simple circuit connecting a battery to an output. Pick a material (foil, foam, etc) and insert it into the circuit. What happens?
- Can you make a switch that stays **off** until connected?
- Can you make a switch that stays **on** until connected?

Suggested materials

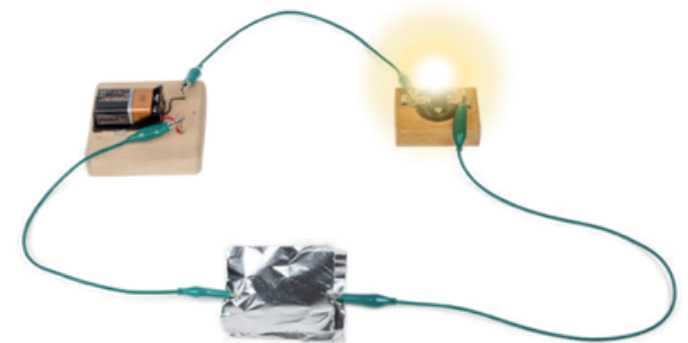
- Battery packs (9V or 2-4 AA batteries)
- Outputs, such as lights, motors, and buzzers
- Alligator clip connector wires
- Various conductive and nonconductive materials. Try foil, wire, coins, craft foam, wood, clips, and silverware.

Additional resources

[Homemade Switches Guide \(Exploratorium\)](#)



Open switch



Closed switch

MIXED-MEDIA EXPLORATION

These activities explore mixed materials to produce a wide range of creative results. **Simple materials can create big ideas!**

Cardboard Construction



Ubiquitous and sturdy, cardboard is a fantastic medium for all kinds of creative builds.

Possible prompts

- Create a costume you can wear
- Create a building and add it to a city
- Add a moving part to your creation. Can you make it open, shut, swivel, or roll?

Suggested materials

- Cardboard of various types
- Cutters. Try child-safe cardboard shears, or scissors, awls, and box cutters for adults.
- Connectors. Try tape, hot glue, brads, and staples.

Additional resources

[Mini Metropolis Guide \(Connecticut Science Center\)](#)

[Cardboard Costumes \(Science Museum of Virginia\)](#)



Scribble Machines

These motorized contraptions produce delightfully unexpected results. First, create a simple circuit connecting a battery to a motor. Attach it to a base, then add an offset propellor to make the bot spin and jiggle. Add a marker to make whimsical, abstract art as the bot moves.

Possible prompts

- Can you make it move smooth and slow? Fast and jumpy?
- Can you add materials to change the motion or the marks?
- Can you add an on/off switch?

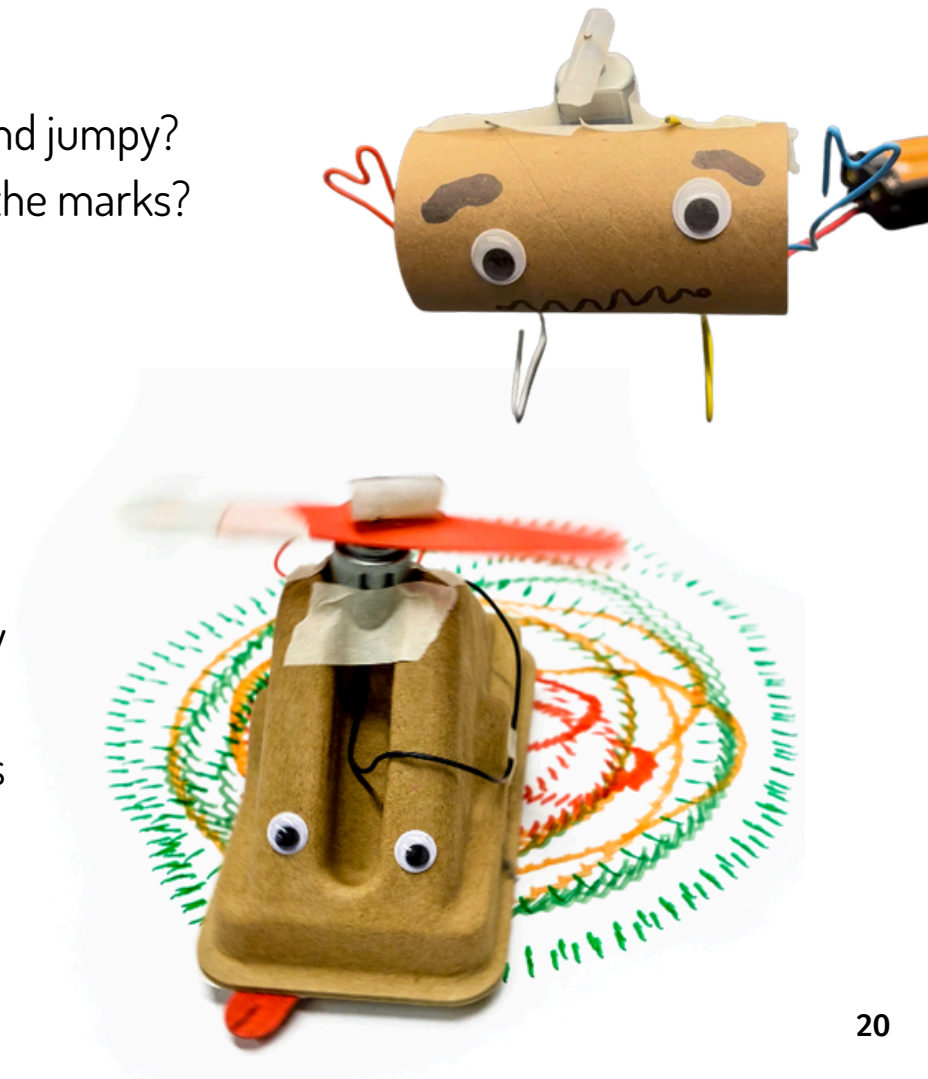
Suggested materials

- A battery, hobby motor, and wire connectors
- Markers or other coloring materials
- Connectors. Try tape, hot glue, rubber bands
- Structural materials. Try egg cartons, strawberry baskets, paper tubes, or plastic cups
- Extras. Try wheels, propellers, googly eyes, lights

Additional resources

[Scribbling Machines \(Exploratorium\)](#)

[ScuttleBots Guide \(Connecticut Science Center\)](#)



More resources

Inspired to keep tinkering, exploring, and learning through play?

Access a growing collection of resources from the LEGO Playful Learning Museum Network.

astc.org/playful-learning

Contact us at PlayfulLearning@astc.org



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