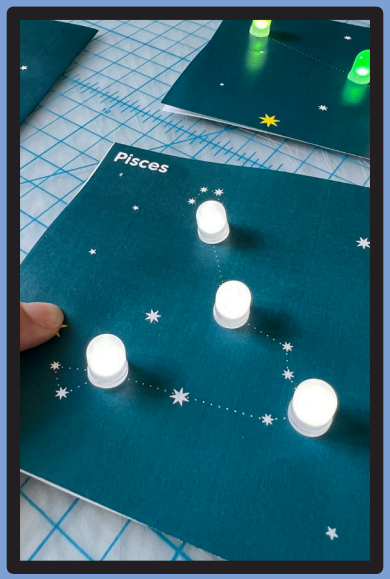
BROWN DOG Gadgets

Illuminated Zodiac Paper Circuits



About Zodiac Constellations

Constellations are groups of stars in the sky that make a specific shape or pattern. Humans observed these celestial star groups and named them after mythological figures and other significant cultural beings.

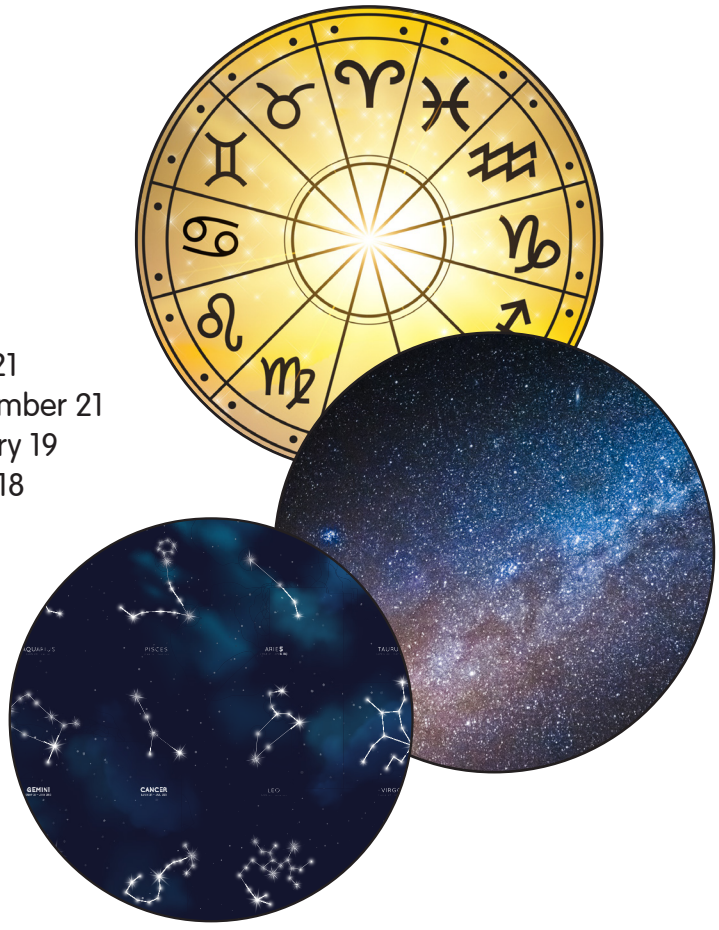
The "Zodiac" are a series of 12 different constellations that are visible near the path of the sun at different times throughout the year, about one per month.

Each constellation is attributed a "Zodiac sign" based on the time of year that it passes over the path of the sun, as viewed from earth. So, **YOUR** "Zodiac Sign" is based on the constellation that was above you on the day you were born!

In this eBook:

We'll show you how to build a simple paper circuit to illuminate the stars in your Zodiac constellation. Choose your Zodiac Sign, print the corresponding template, and follow the instructions on the page.

Look up your Zodiac sign in the chart below:



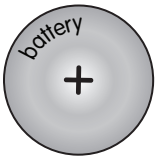
A Quick Overview: Electronics and Paper

Adding electronics to paper crafts is a fun way to take any project to the next level. A design can really shine when you incorporate lights, and by adding a switch, you can change how someone interacts with the project. Here's an overview of the electronics needed to make the circuits in this eBook, and other paper circuit projects.

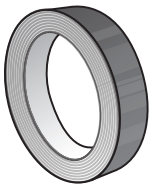
If you need paper circuits parts or supplies, pick up the Paper Circuits Kit from BrownDogGadgets.com

What makes a circuit a circuit?

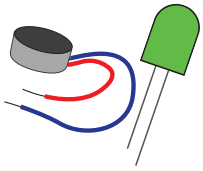
Every circuit has 3 or 4 main components:



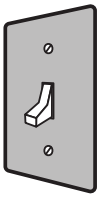
Power:
Every circuit needs a power source. For paper circuits, a coin-cell battery is perfect because it's small and flat. We use CR2032 batteries, but any 3V coin cell battery will work.



Wire:
Most circuits use metal wires to connect components. For paper circuits, we use Maker Tape, a conductive tape that's made of woven metal fabric with conductive adhesive on the bottom. It's flexible and flat, like paper!



Outputs:
The output of a circuit is what it "does." The circuits in this eBook light up with LEDs (light emitting diodes). Other circuits could vibrate, make sound, or even change color.



Inputs:
Inputs are ways to interact with a circuit like buttons and switches. Yes, you can have a circuit with no input, but a string of lights is way better with a switch! Inputs add interactivity and control.

Tricks of the Trade

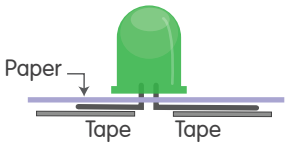
Here are a few universal techniques that will help you build the paper circuits in this eBook:

Positive and Negative

LEDs have one positive leg and one negative leg. The long leg is positive, and the short leg is negative. If you connect an LED backwards, it won't light up!

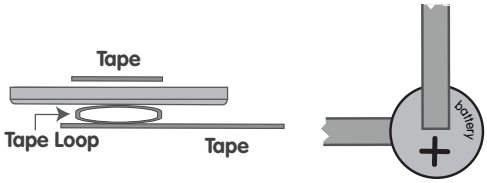
Hide the Circuit

In many projects like the ones featured in this eBook, you don't want the circuit to show on the front of your project. To hide it, use a safety pin or other sharp object to poke holes where the LEDs go and thread the legs through the paper, then build the circuit on the backside. This will make the light seem like magic!



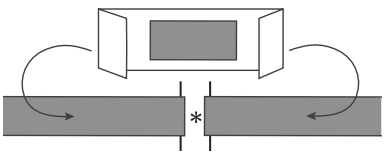
Connecting the Battery: The Tape Loop Method

Make a small tape loop with the adhesive facing out, and place it on top of the negative strip of Maker Tape. Then, stick the negative side of the battery to the loop. This will make the connection secure and help keep the battery in place.



The Tape Switch (Optional)

Cut a small strip of paper, fold the edges over, and place a piece of Maker Tape in the center. Tape it over a break in the Maker Tape in your circuit. Now, squeeze the paper in that spot to activate the switch!

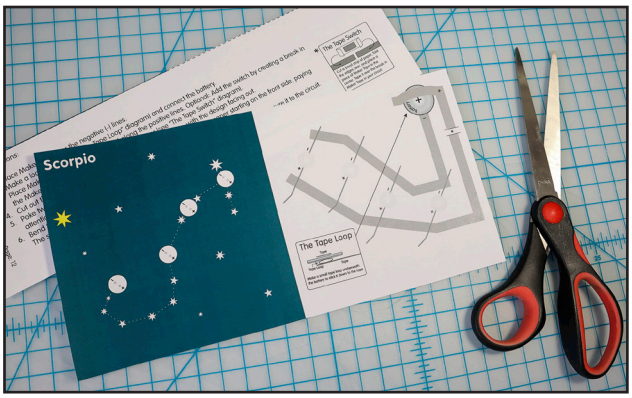


In this eBook, we've indicated the location to leave a break in the Maker Tape with this symbol: *

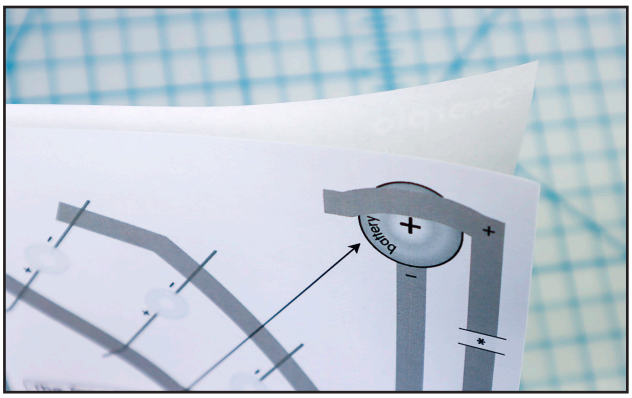
This location aligns with the yellow star on the front. Squeeze that star to make the project light up!

A Few Things to Note:

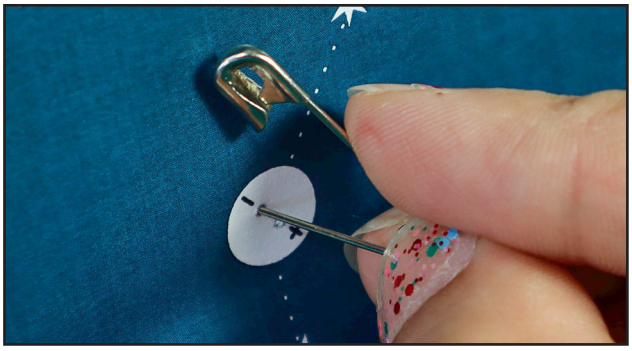
These photos may clear up any quesitons, so read this page before staring your project.



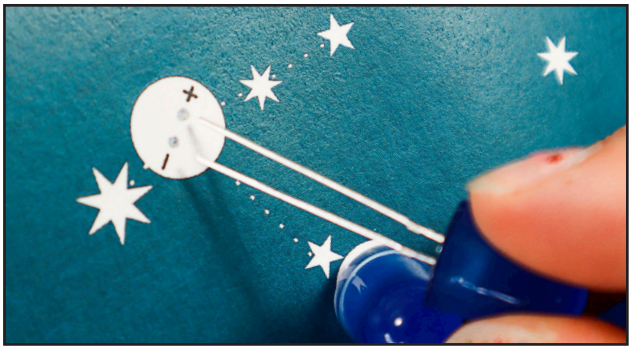
Cut out the large rectangle, keeping the dark and light sides attached.



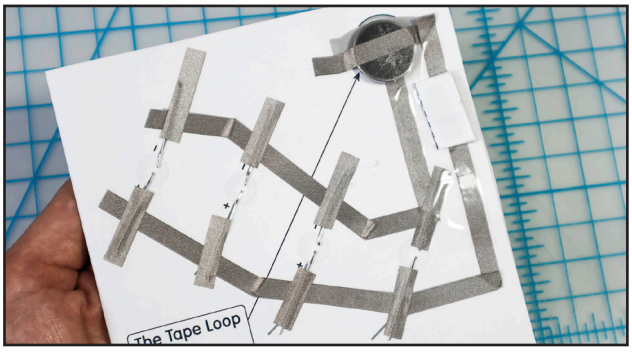
Fold the rectangle in half with the printed side facing outward, so it becomes a square.



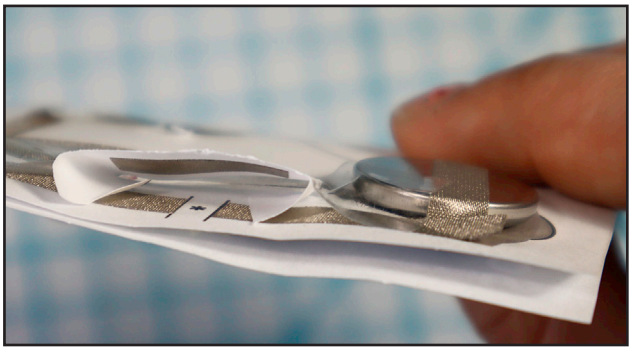
Use a safety pin or other sharp object to poke out the holes where indicated, making sure to poke through both pieces of paper.



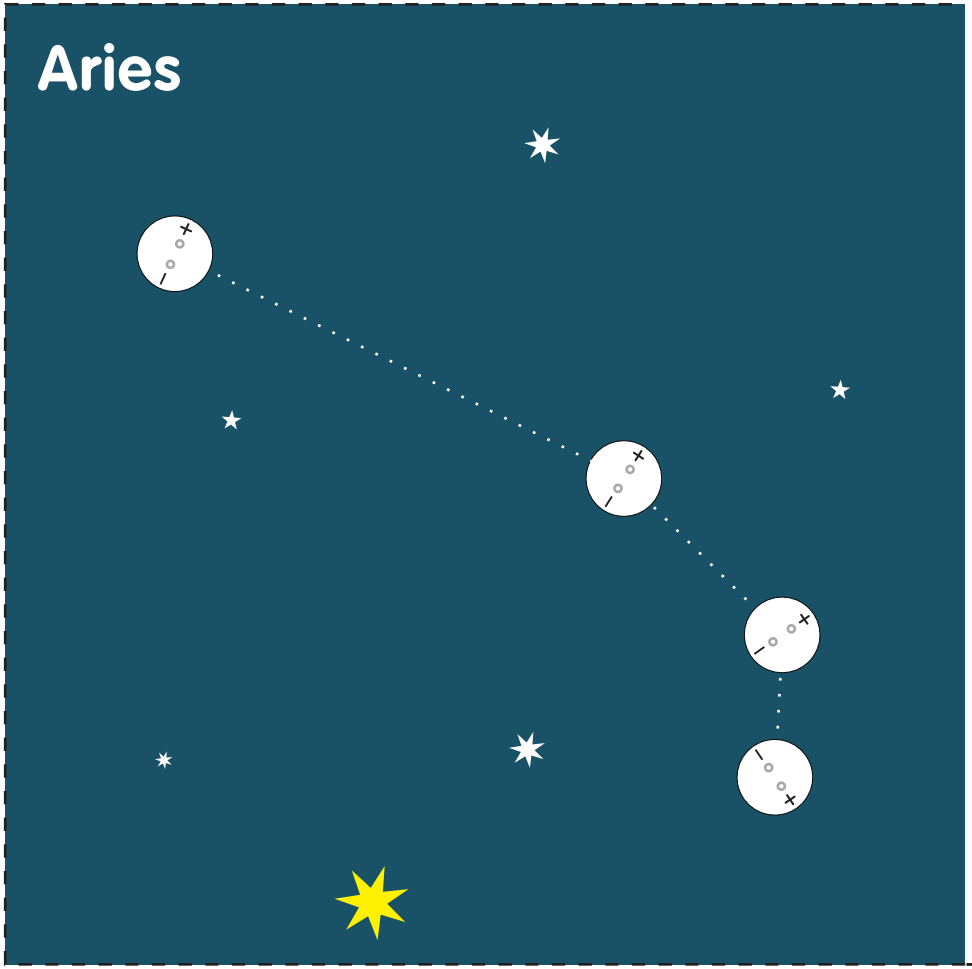
Pay attention to the polarity of the LED: the long leg goes in the "+" hole and the short leg goes in the "-" hole.

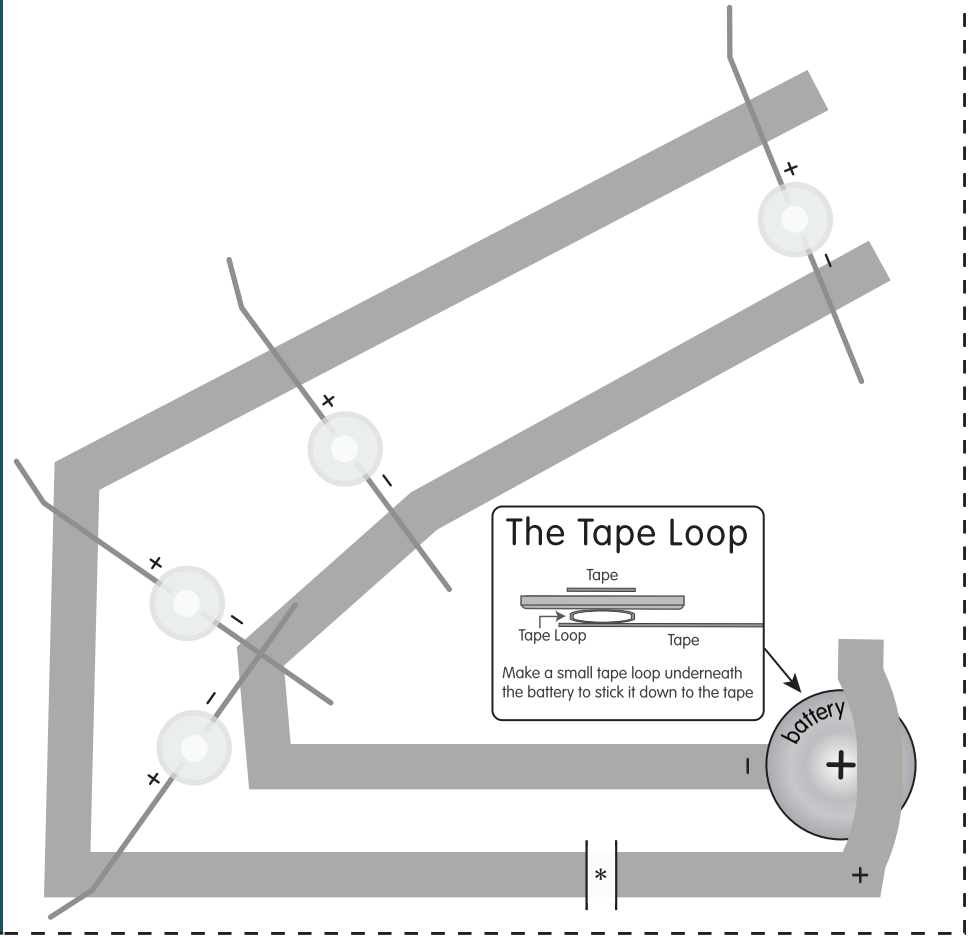


Place Maker Tape on top of the LED legs. Make sure that none of the pieces touches both positive and negative, or it won't work!



Use a small piece of clear tape to keep the switch in place. Give the switch some slack so it stays off until you squeeze it.





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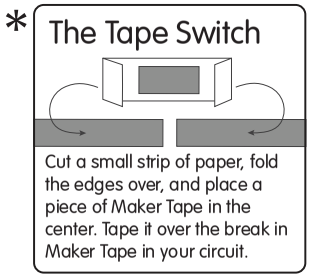
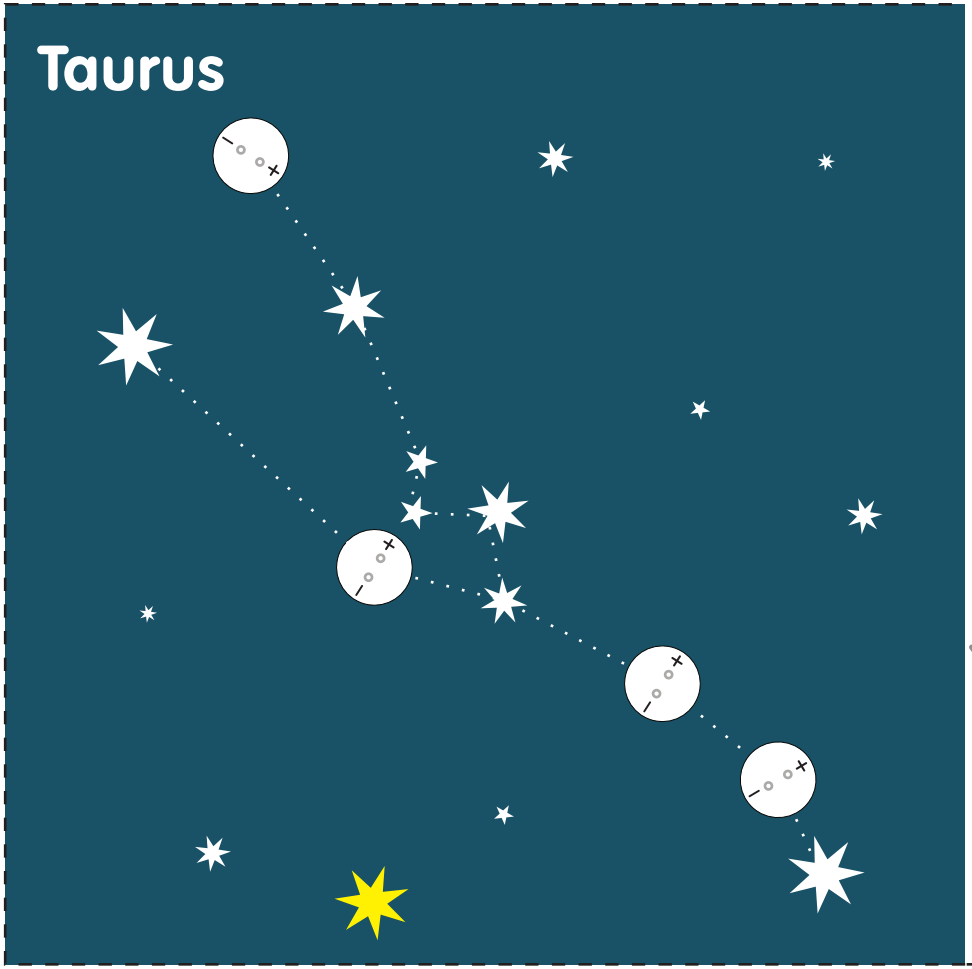
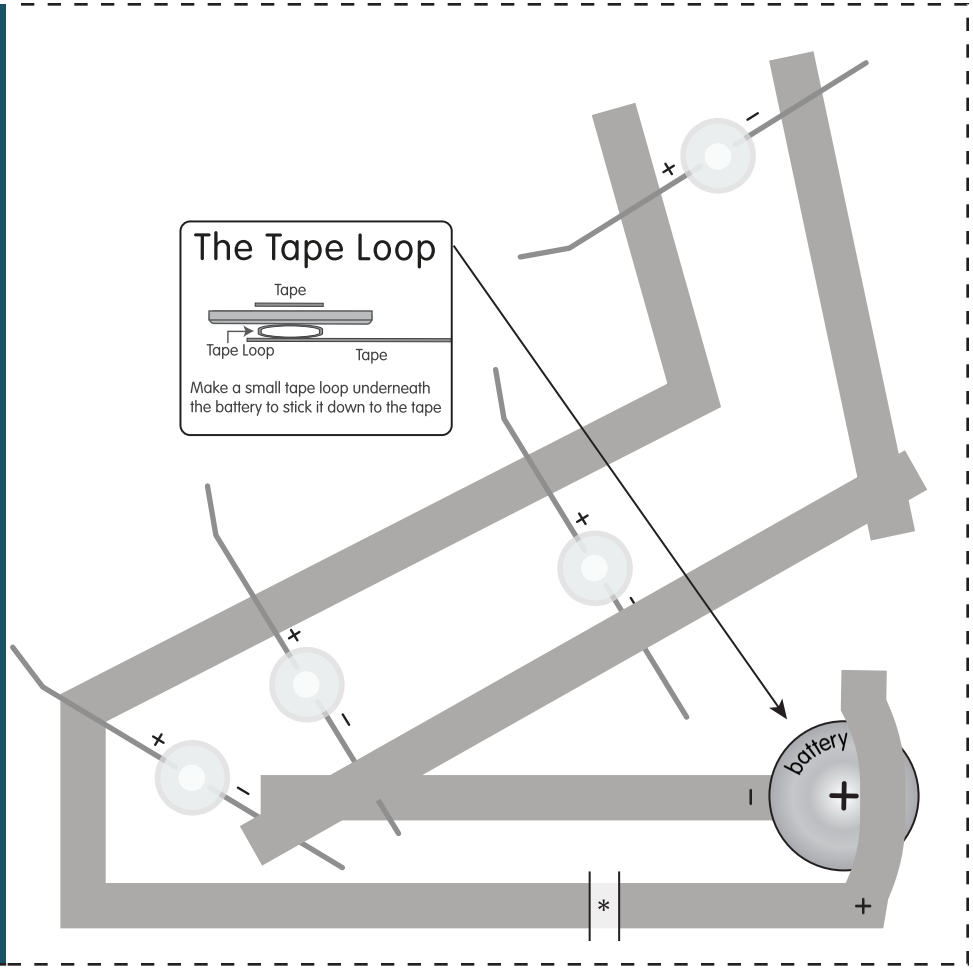
2. Make a loop of tape (see "The Tape Loop" diagram) and connect the battery.
3. Place Maker Tape over the battery and along the positive lines. Optional: Add the switch by creating a break in the Maker Tape and a patch with a scrap of paper (see "The Tape Switch" diagram).
4. Cut out the project rectangle and fold it in half where shown with the design facing out.
5. Poke two holes where each LED will go. Thread the LEDs through the paper starting on the front side, paying attention to the positive and negative labels.
6. Bend the LED legs flat as shown, then add a piece of Maker Tape on top of each leg to secure it to the circuit. The stars will light up! If you added the switch, squeeze the gold star to turn it on!







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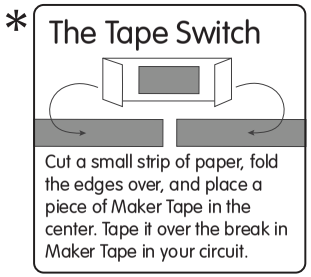
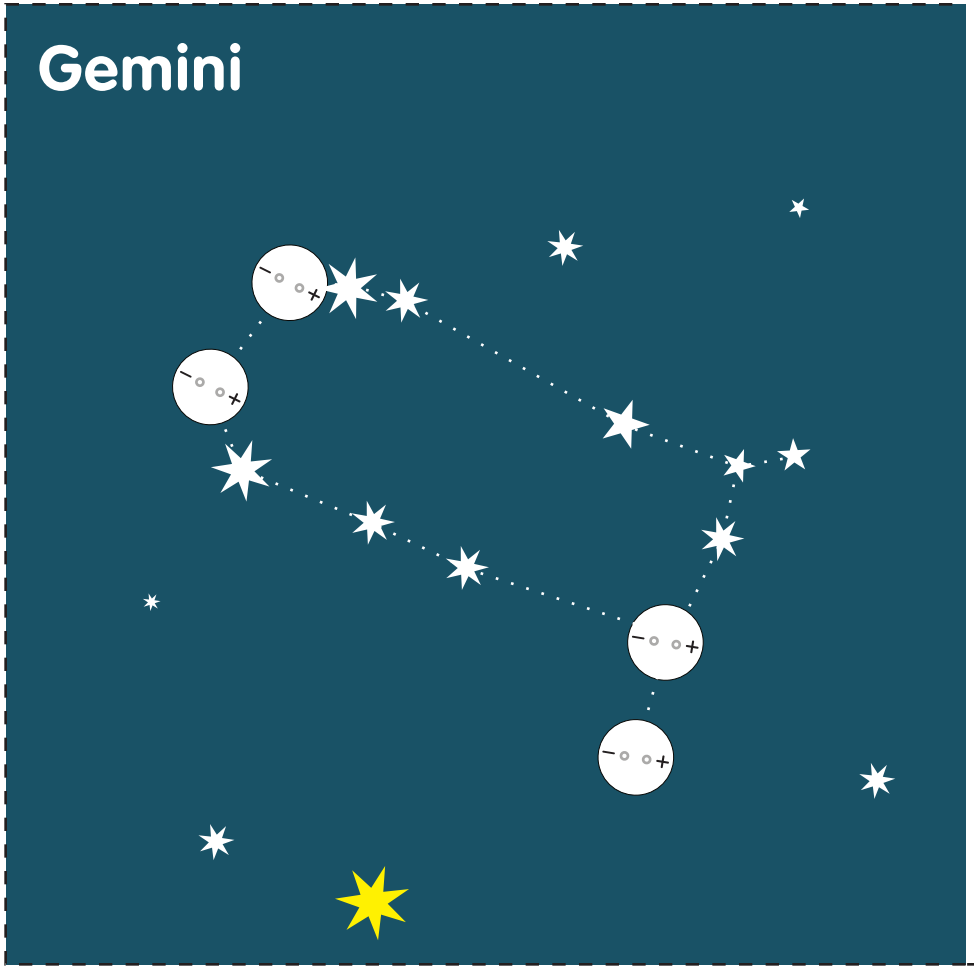
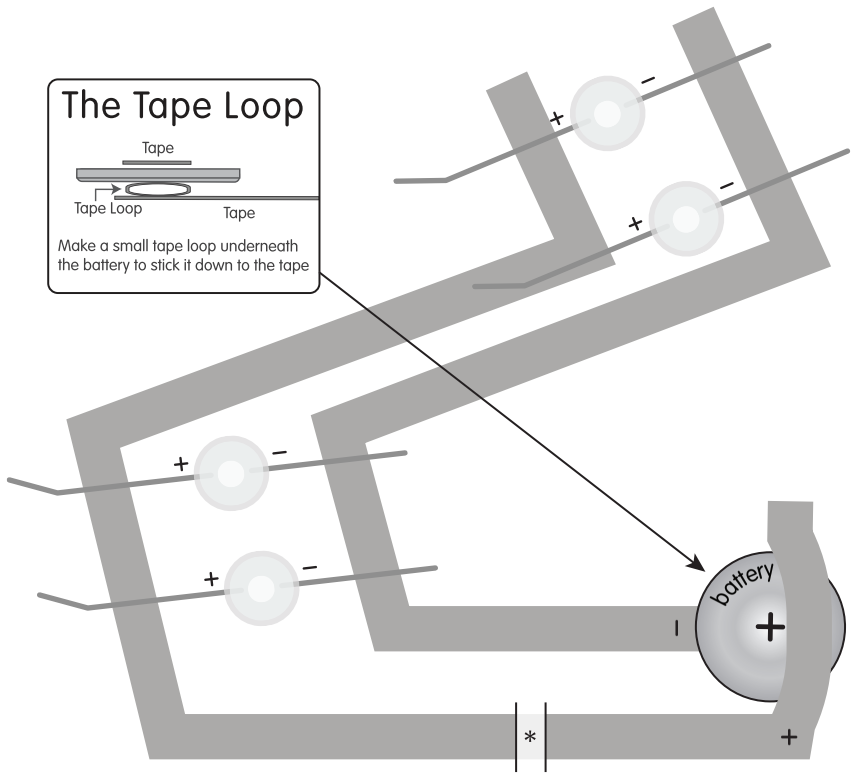


Gemini





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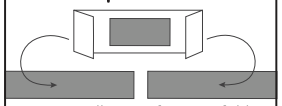

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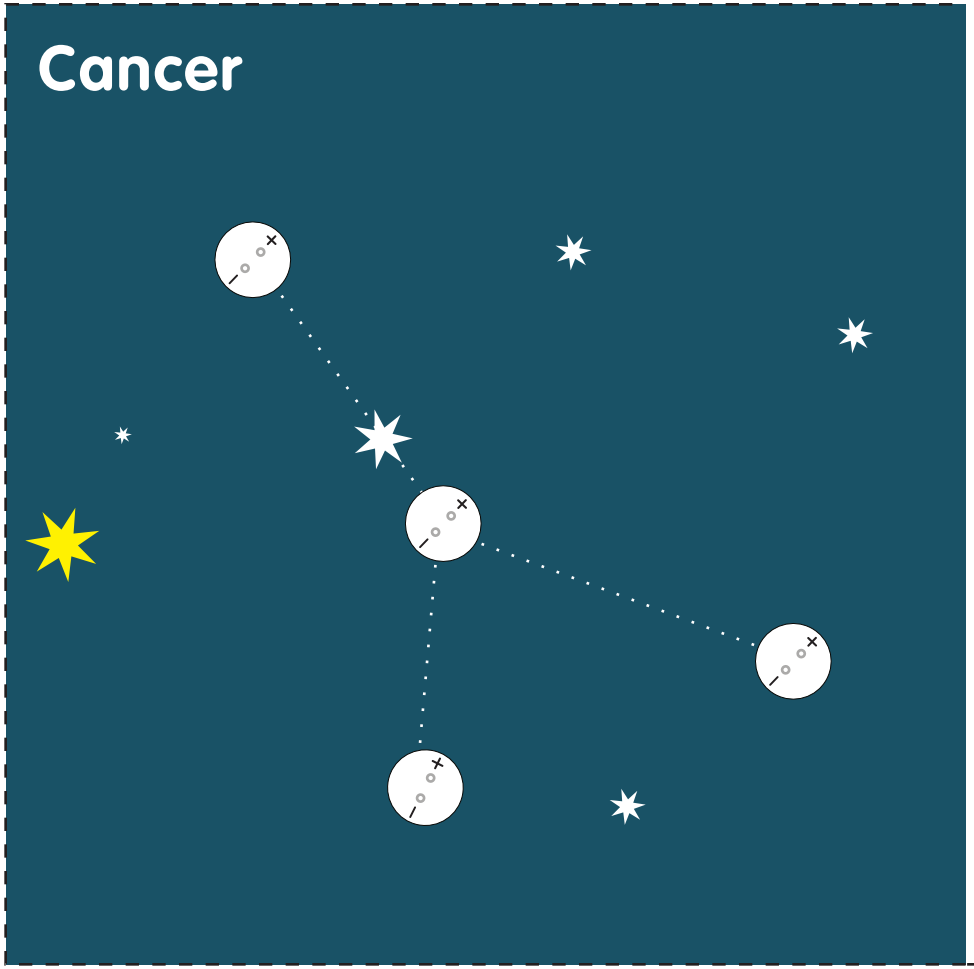
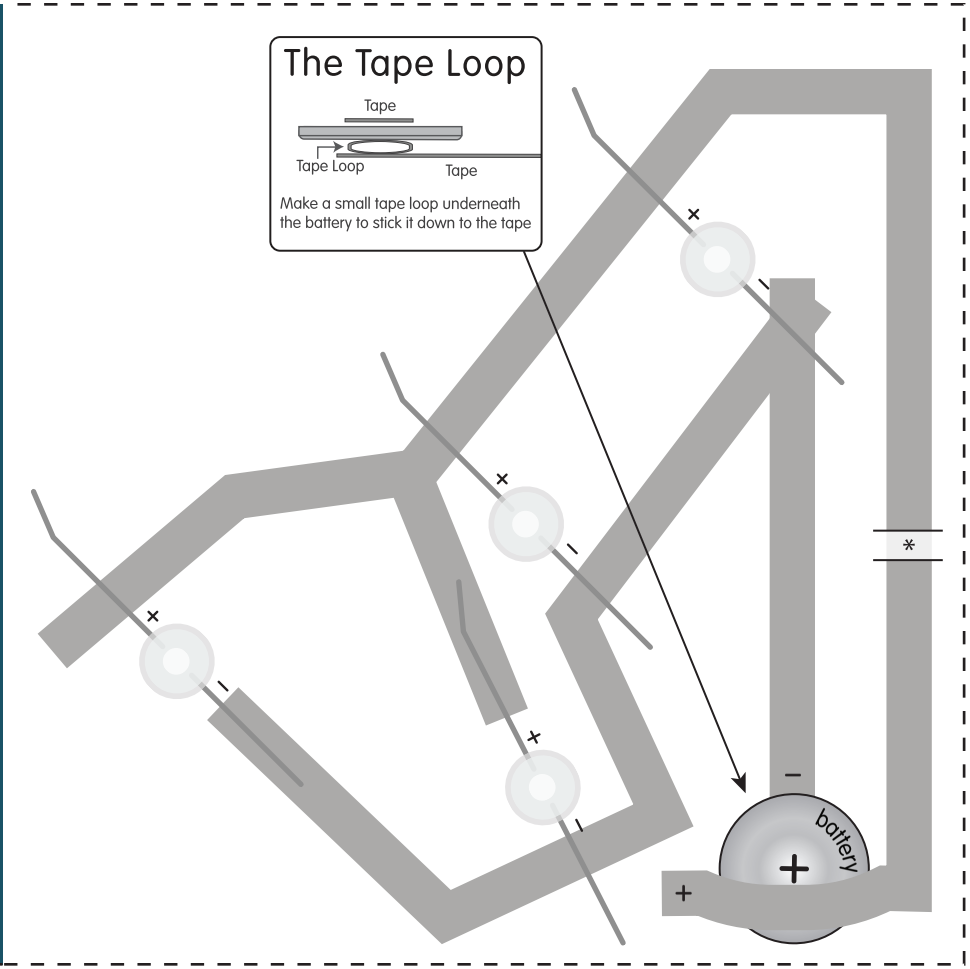
Cancer





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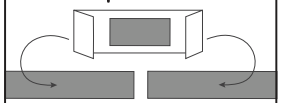

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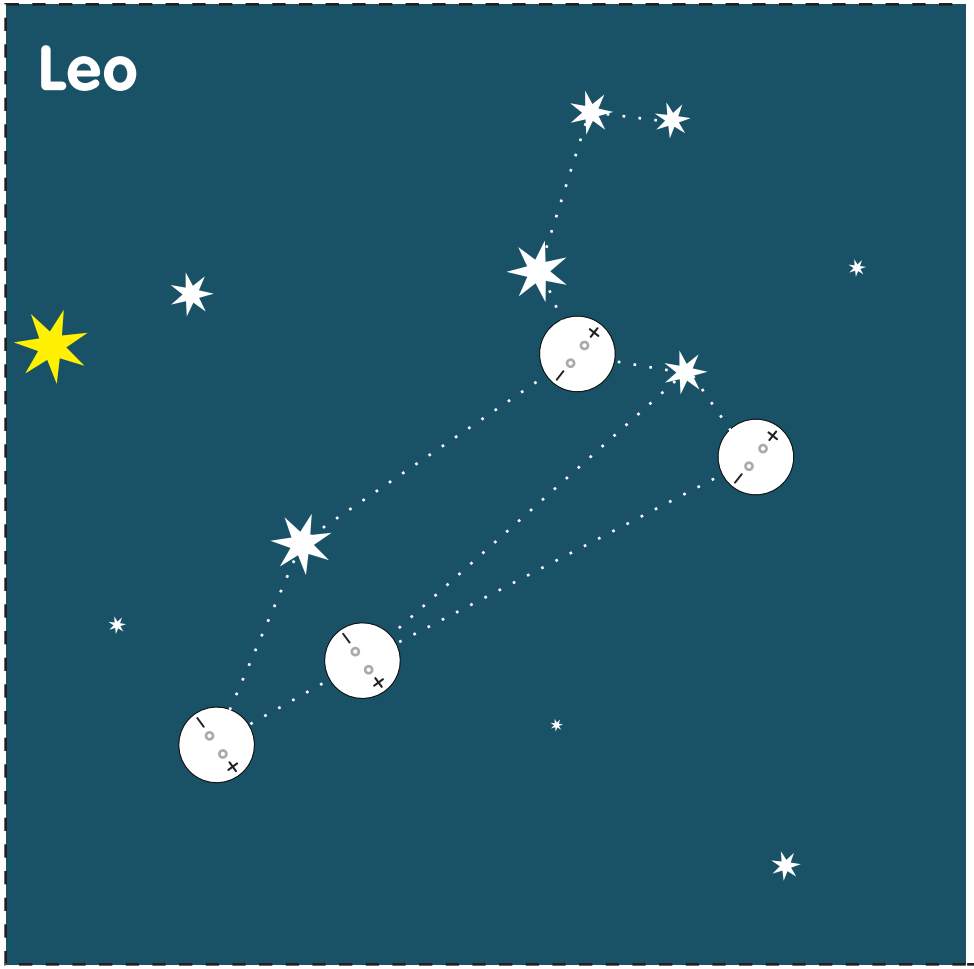

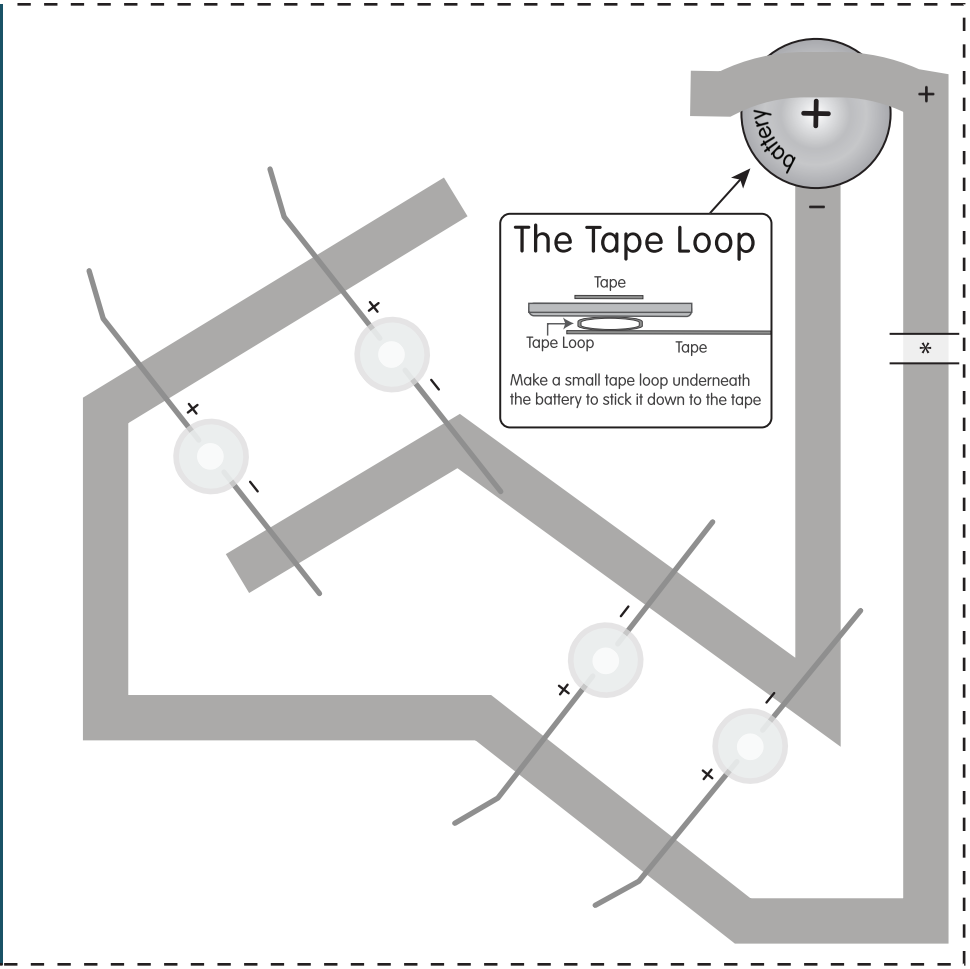

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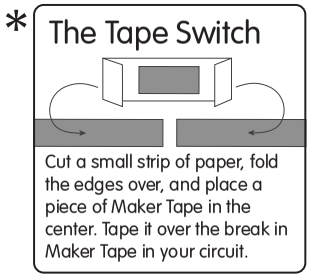

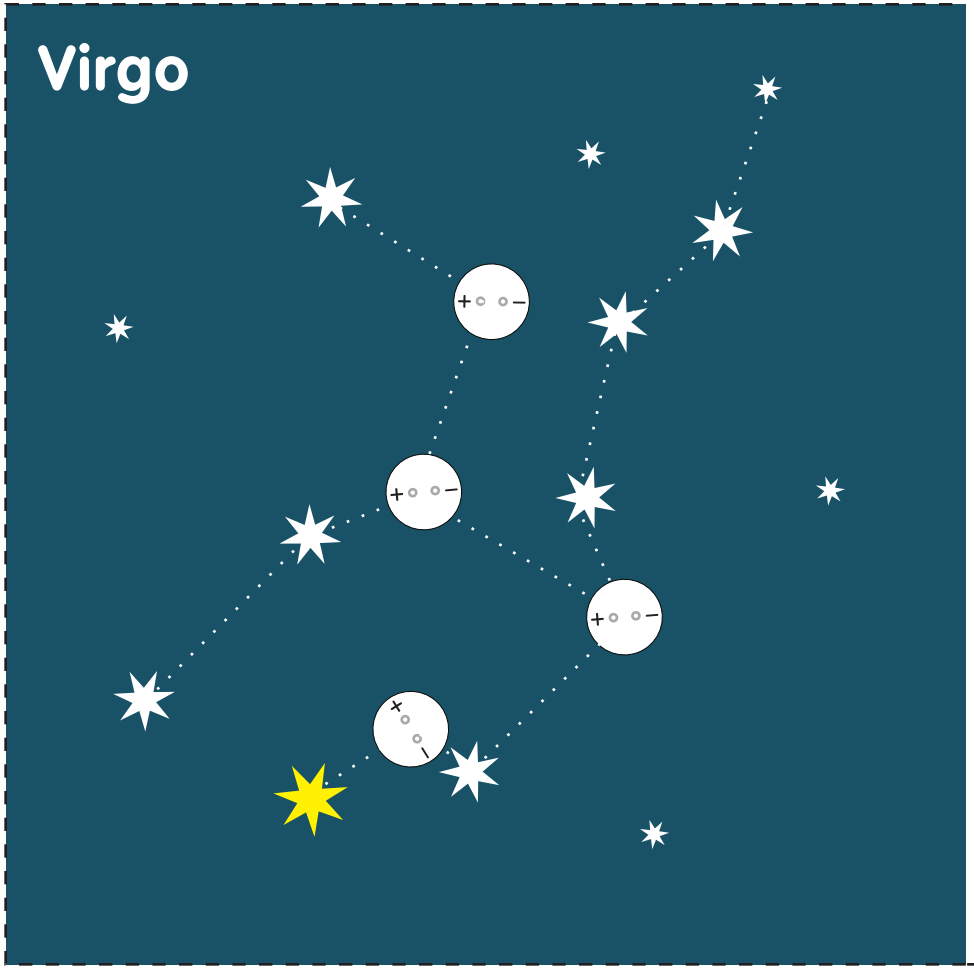

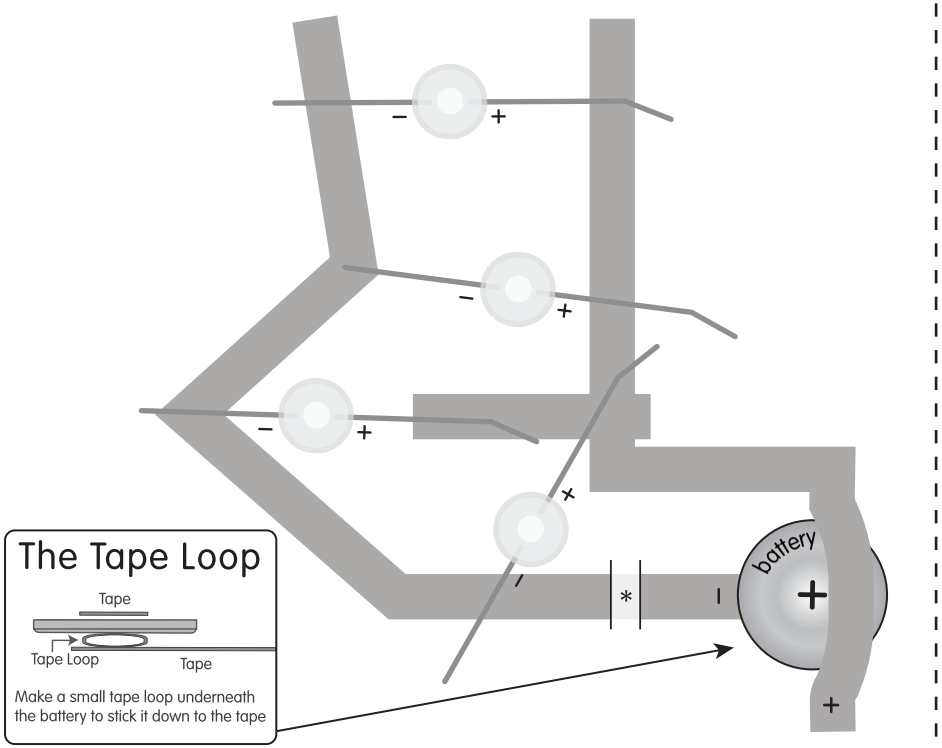

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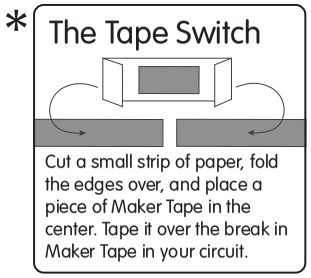

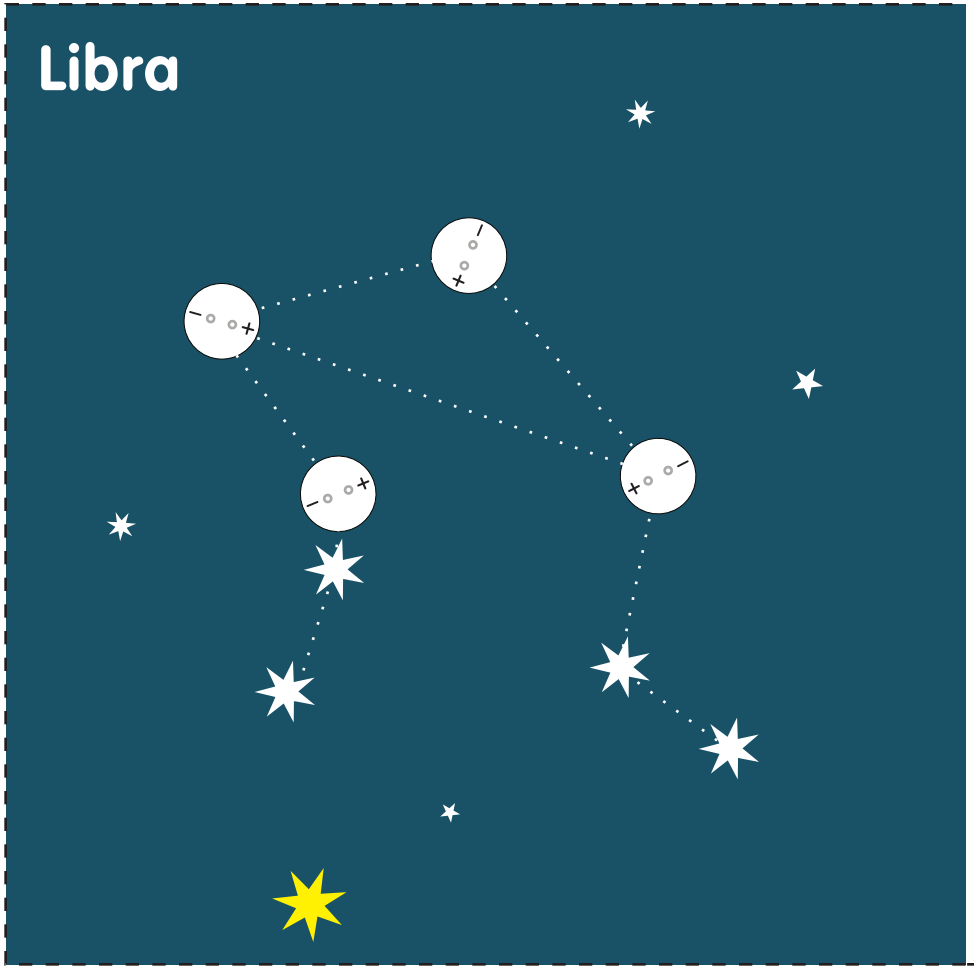

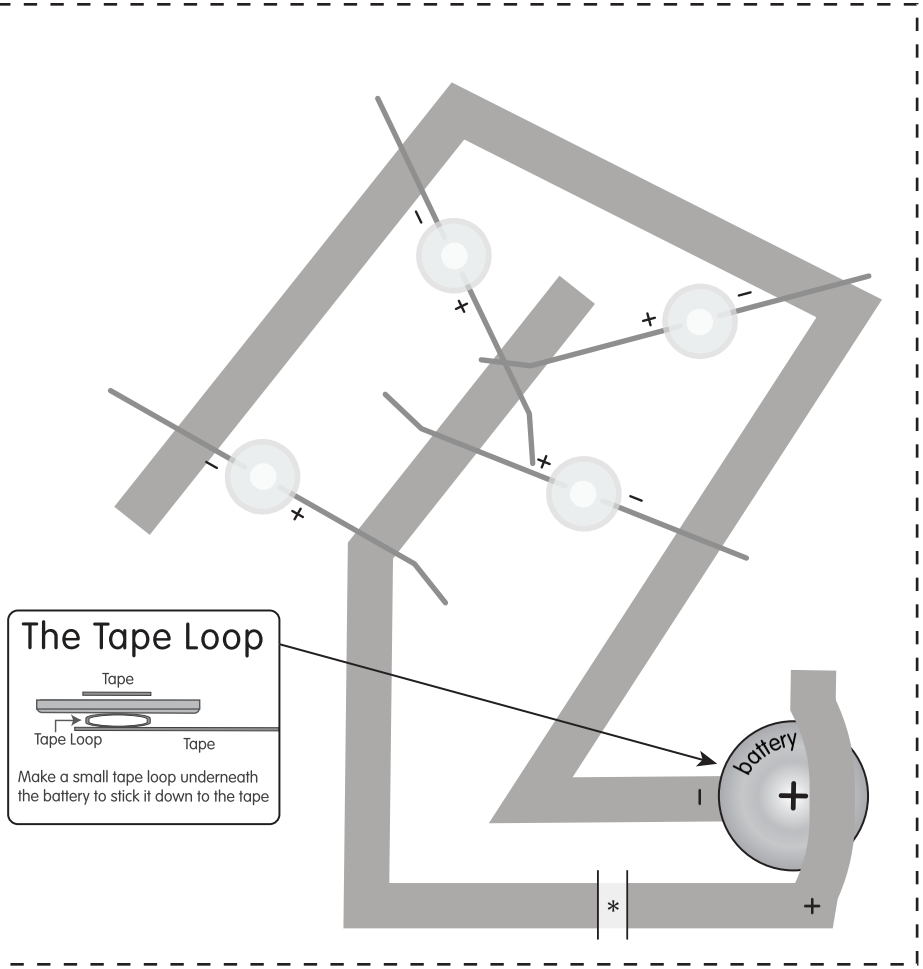

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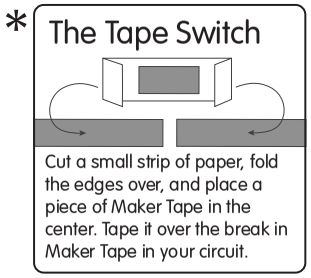
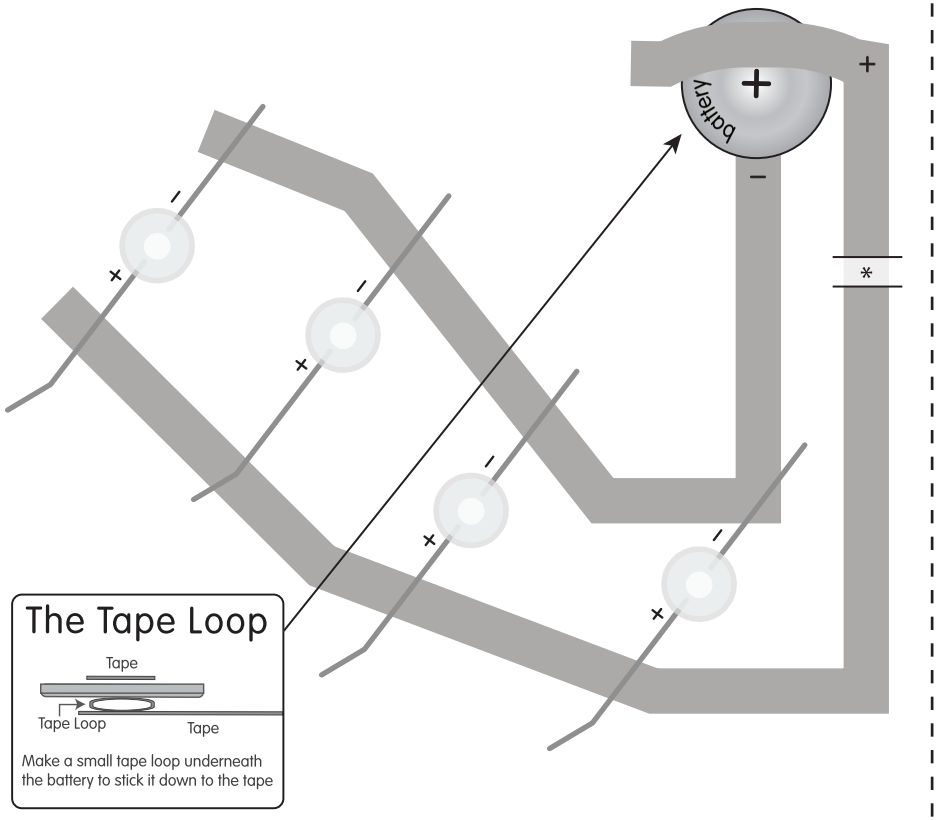


Scorpio



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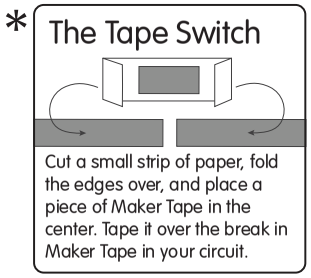

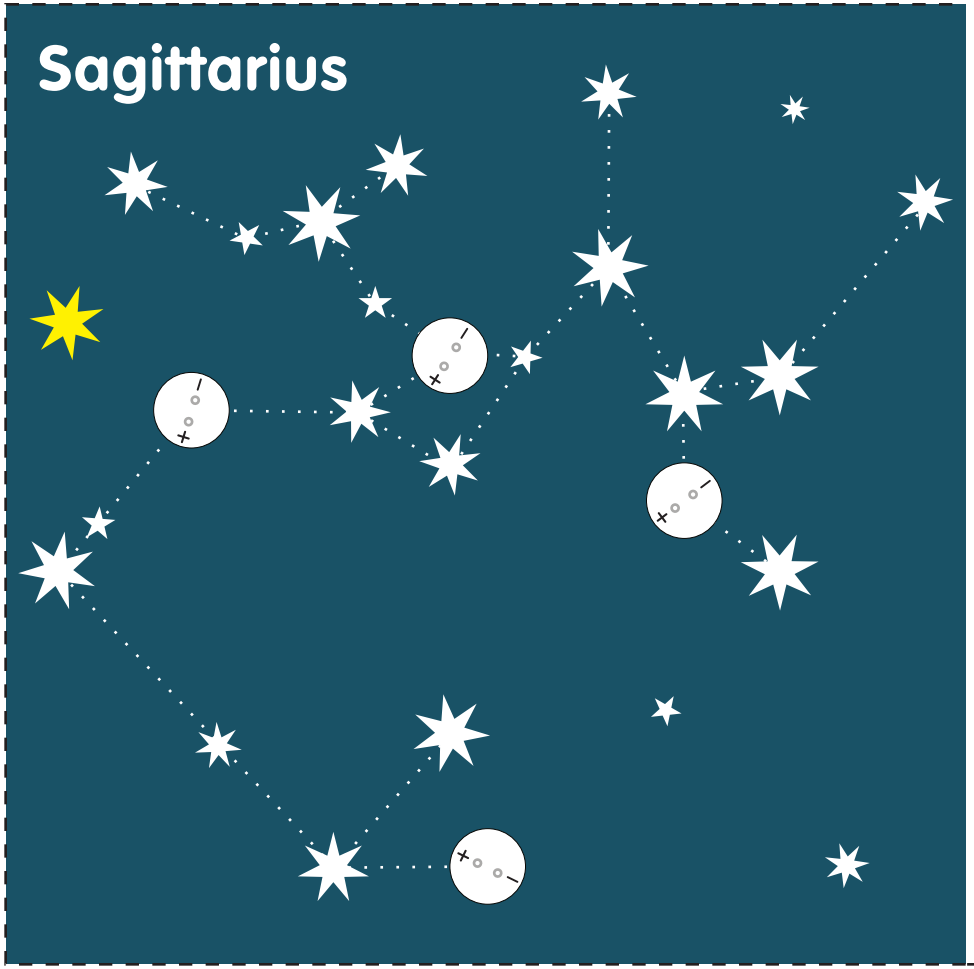

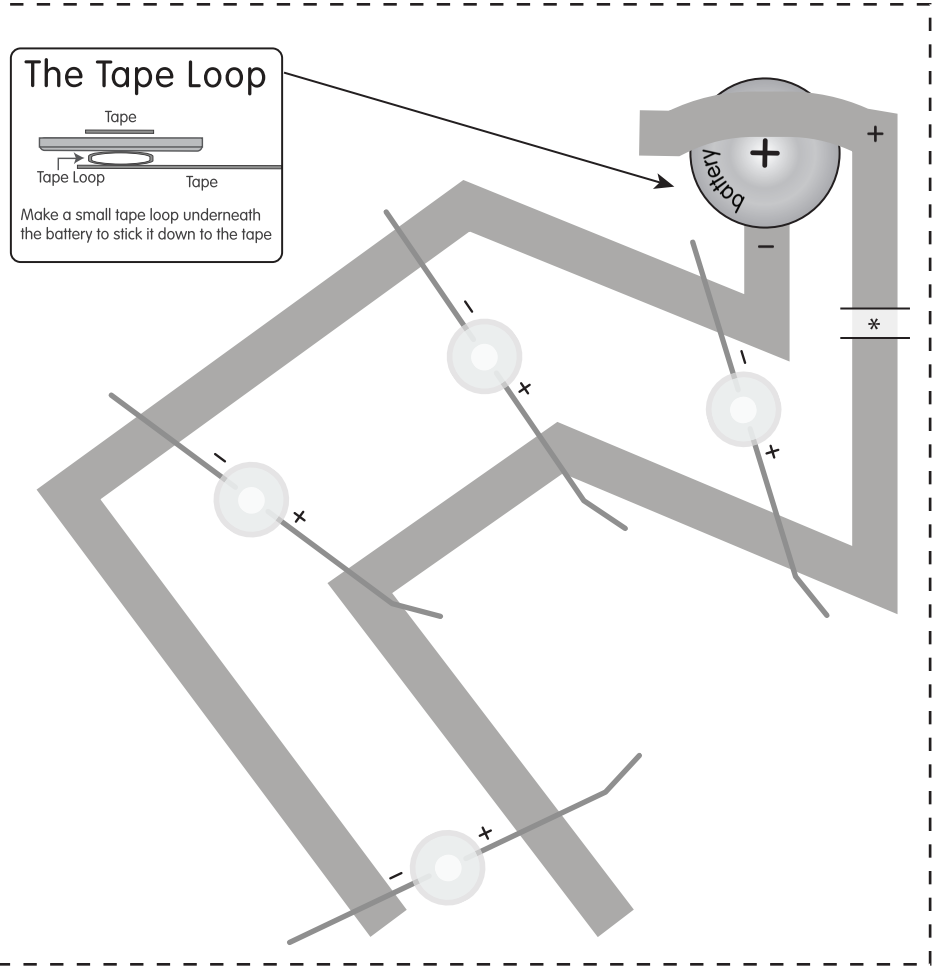

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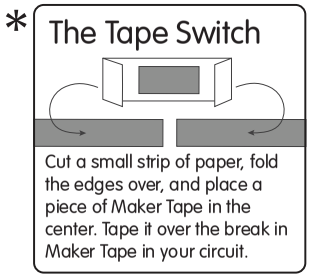
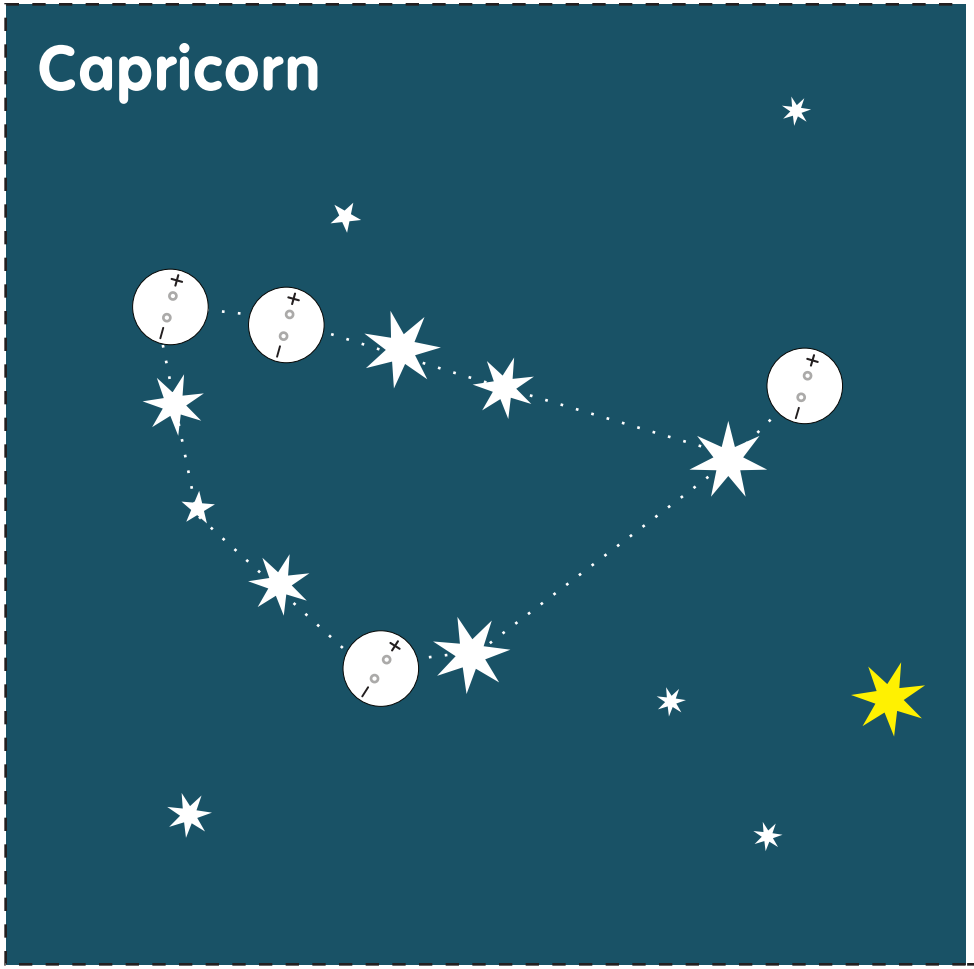
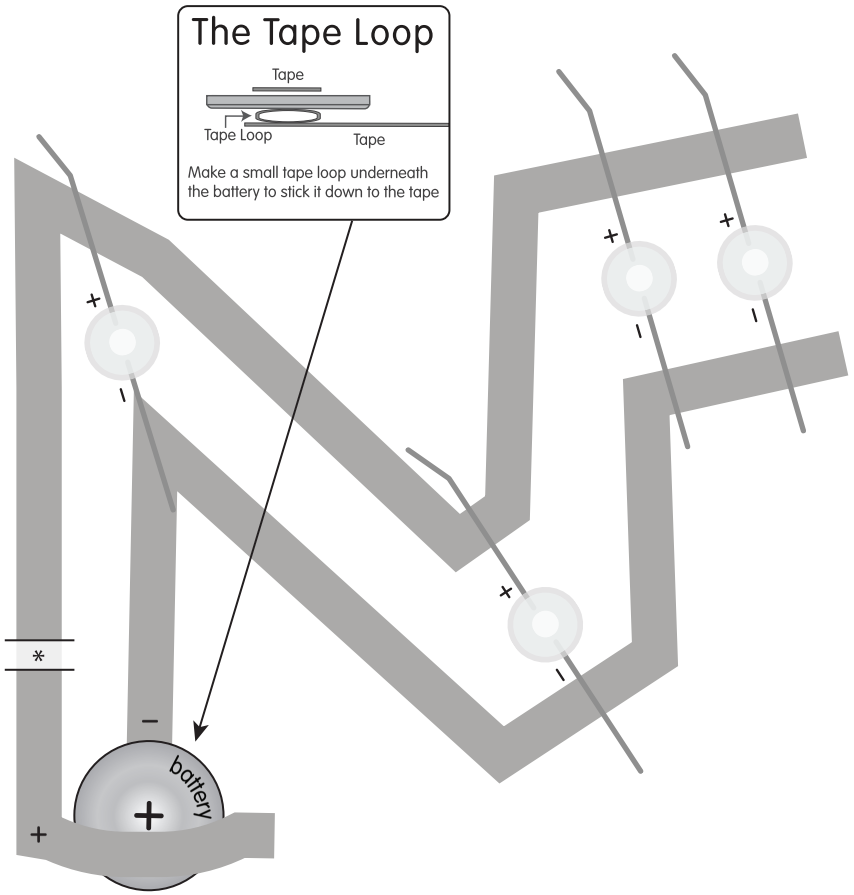


Capricorn





Instructions:

1. Place Maker Tape over the negative (-) lines.
2. Make a loop of tape (see "The Tape Loop" diagram) and connect the battery.
3. Place Maker Tape over the battery and along the positive lines. Optional: Add the switch by creating a break in the Maker Tape and a patch with a scrap of paper (see "The Tape Switch" diagram).
4. Cut out the project rectangle and fold it in half where shown with the design facing out.
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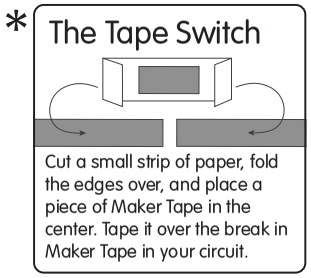
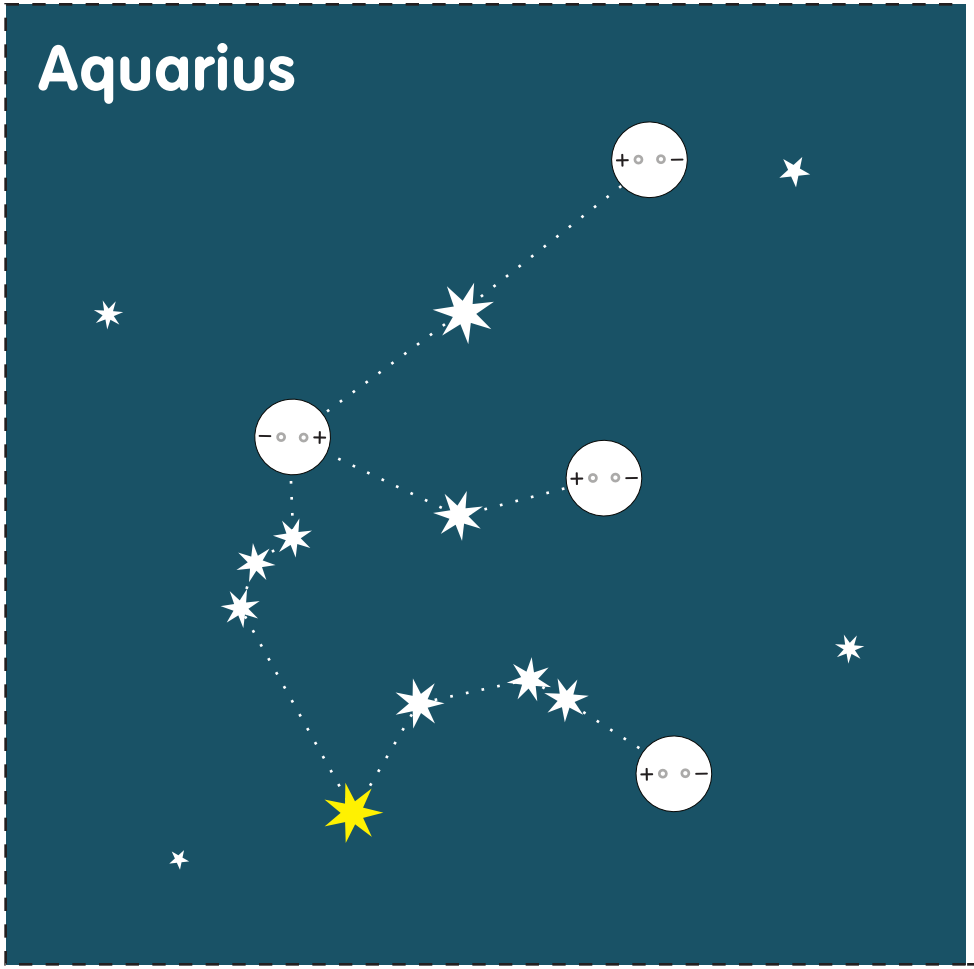
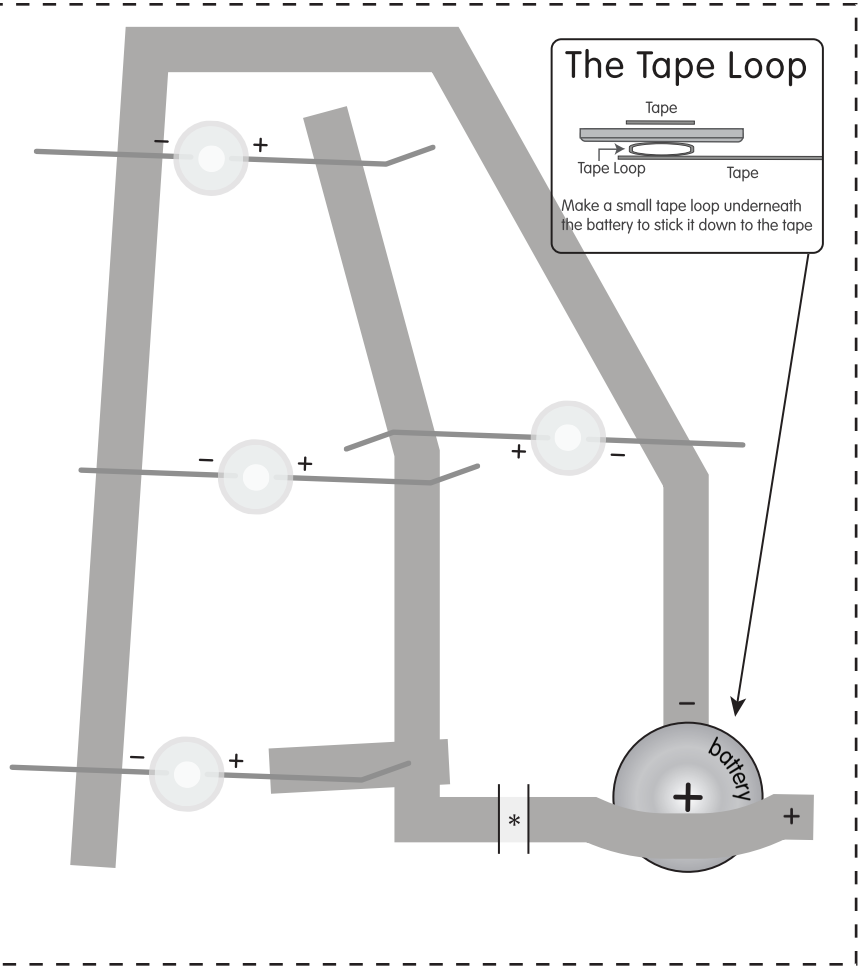


Aquarius





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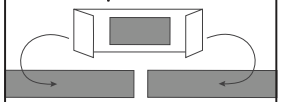
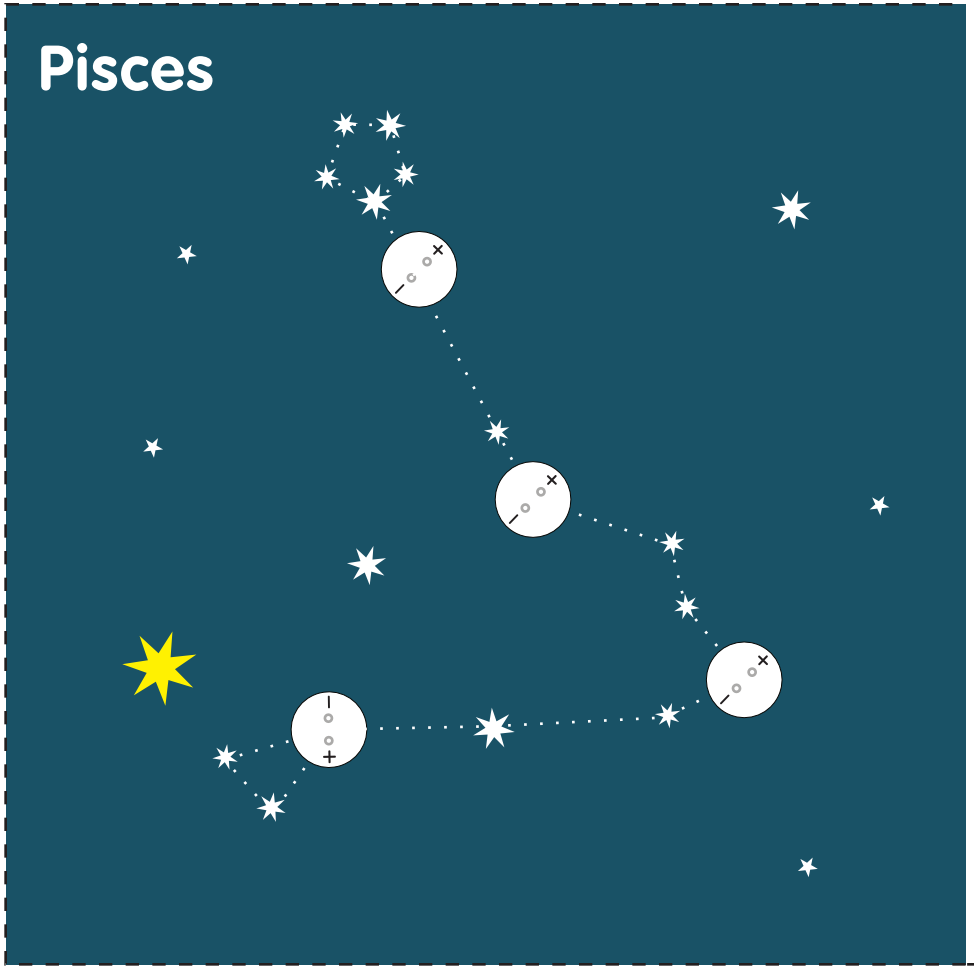
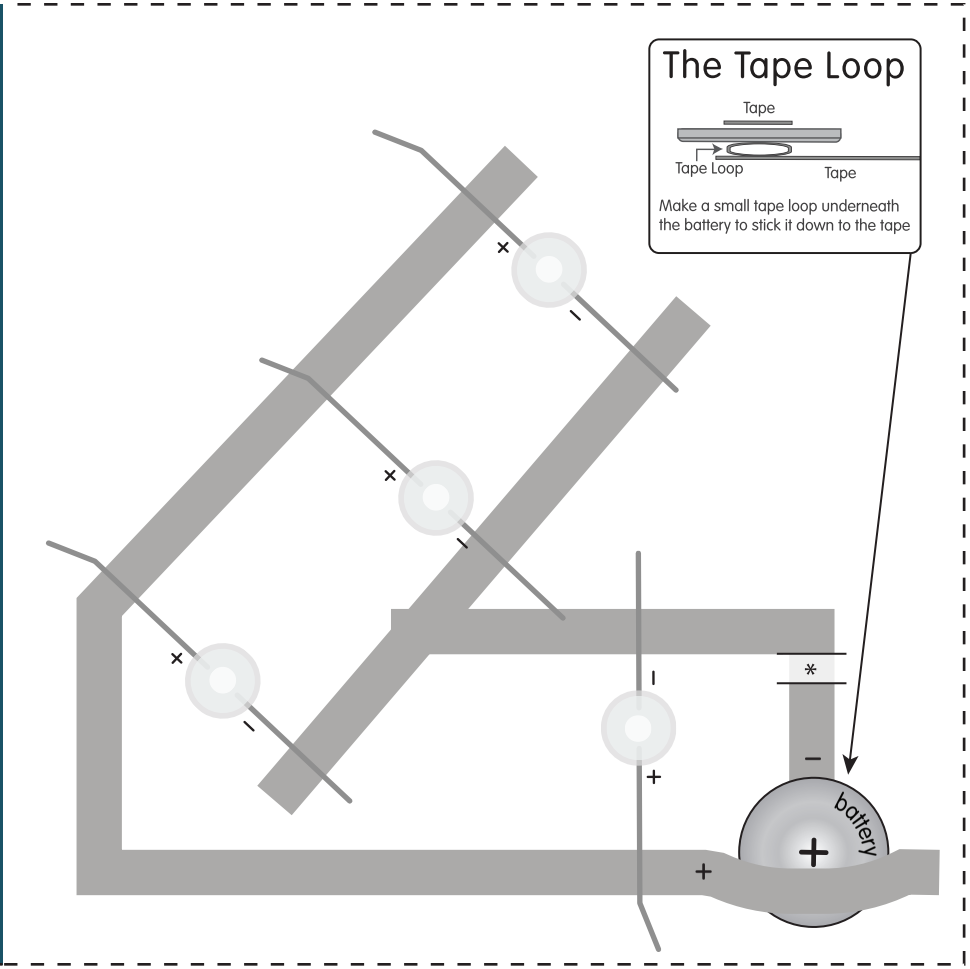
* The Tape Switch



Cut a small strip of paper, fold the edges over, and place a piece of Maker Tape in the center. Tape it over the break in Maker Tape in your circuit.





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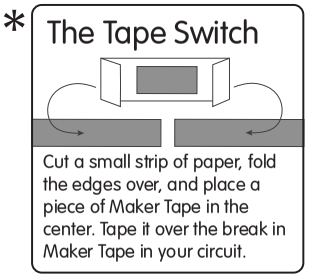
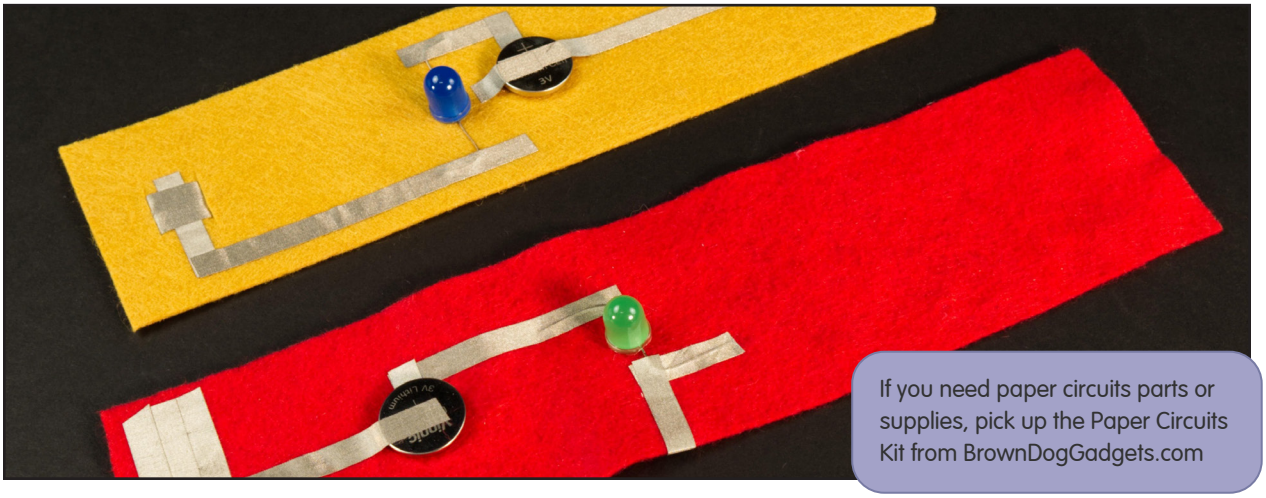


More Projects & Inspiration

Other Materials
You can use Maker Tape on more than just paper. In fact, any flat surface will do!

This makes it a great material to design circuits on top of felt or other craft materials, like the LED bracelet below. With the same paper circuit techniques, you can build all kinds of projects! The possibilities are endless.



If you need paper circuits parts or supplies, pick up the Paper Circuits Kit from BrownDogGadgets.com

Light-Up Cards (Maker Tape, LEDs, Batteries, and Paper)

Light-Up Heart

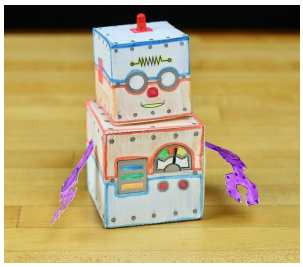
Laser Cat

Birthday Candles

Light-Up Tree

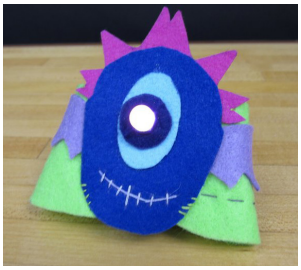
Robots and Wearables (Maker Tape, LEDs, Motors, Batteries, Paper, Felt)

Tree Bracelet



Motor Robot Buddy

Motor Robot Vacuum



Monster Bracelet

These are just some of the projects to try next! Check out all of our free project templates and guides available to download at www.BrownDogGadgets.com

Kits from Brown Dog Gadgets

You don't need to buy our kits to make these projects, but they do have everything you need for your convenience.

The Wearable Circuits Kit

The Sewing Circuits Kit

BROWN DOG Gadgets

Learn, Create, and Inspire–Even on a Budget

Creating a project from scratch can be difficult for the casual builder. Finding the right directions, the right parts, and the right tools—all at the right price—can be a major hurdle.

At Brown Dog Gadgets, we've created kits and projects for creators of all ages and budgets. Follow our step-by-step project directions and learn more with our classroom resources or find individual parts to dream up your own creations. No matter how or what you create, our products can help you learn the basics of electronics, circuitry, and solar energy.

Find additional eBooks, crafting guides, videos, directions, and educational resources at BrownDogGadgets.com. Contact us for educational discounts and free professional development classes.

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