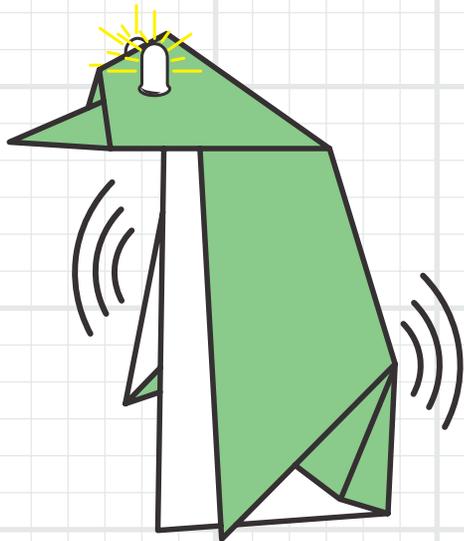


teknikio[®]

Activating Origami guidebook



CONTENTS

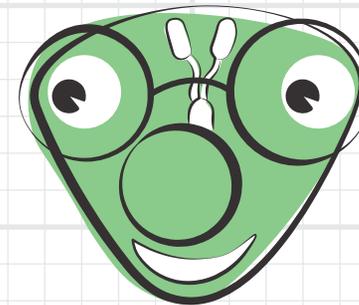
3. MATERIALS
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7. BASIC
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15. PROJECT
GUIDE

22. TROUBLESHOOTING

Are you
ready?

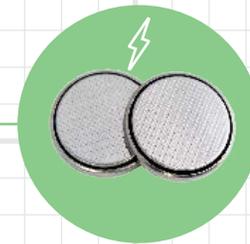


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WHAT IS INCLUDED IN YOUR KIT

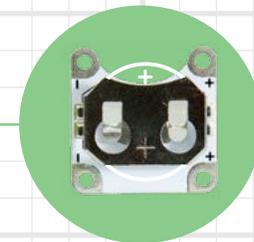
2x COINCELL BATTERIES

This small battery can provide power and fit in tight places. You can connect this to your circuit for power—just make sure that the positive side connects to the positive end and the negative side (or ground) connects to the negative end.



1x COINCELL BATTERYBOARD

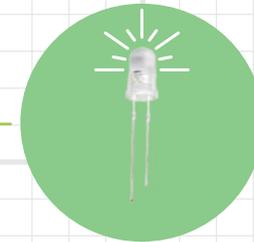
You also have a Teknikio batteryboard in your kit, with conductive holes marked as positive and negative. When inserting your battery in the board make sure the side with the “+” is facing up and the unmarked side (sometimes perforated) is facing down.



WHAT IS INCLUDED IN YOUR KIT

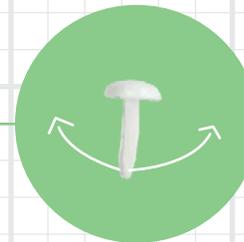
2x LEDs

LEDs are the most popular way to test a circuit. When electricity is flowing through them they turn “on” and produce light. They have a positive end (longer leg) and negative end (shorter leg).



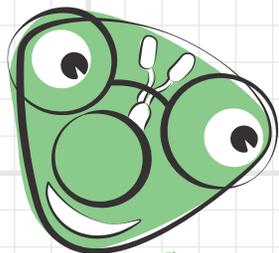
10x PAPER FASTENERS

These small fasteners bind your boards to the origami paper. They are commonly used in arts and craft for scrap-booking here we use them as connectors for our electronic circuit.



1x MOTIONBOARD

These mini motors are usually found in pagers and cell phones that have a “vibrate” feature. They have an offset weight on their shaft that makes them vibrate as the motor spins.

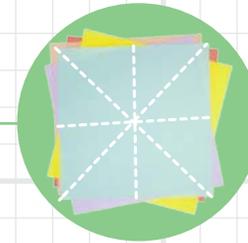


That's me!

WHAT IS INCLUDED IN YOUR KIT

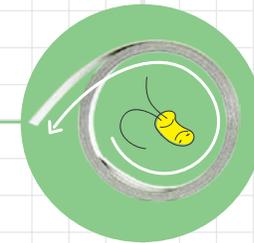
10x ORIGAMI PAPER

This is the same paper that has been traditionally used in the art of origami. It folds very well so that you can unfold and refold as much as you want.



1x PIECE OF CONDUCTIVE TAPE

The tape is made of a conductive material meaning it lets electrons pass through it. It can be used to carry or transmit power and signals through a circuit.



ADDITIONAL TOOLS AND MATERIALS

Ready to
learn?



Here is a list of tools and supplies that complement your set. We also encourage you to combine this set with other **Teknikio** sets.

MATERIALS AND TOOLS

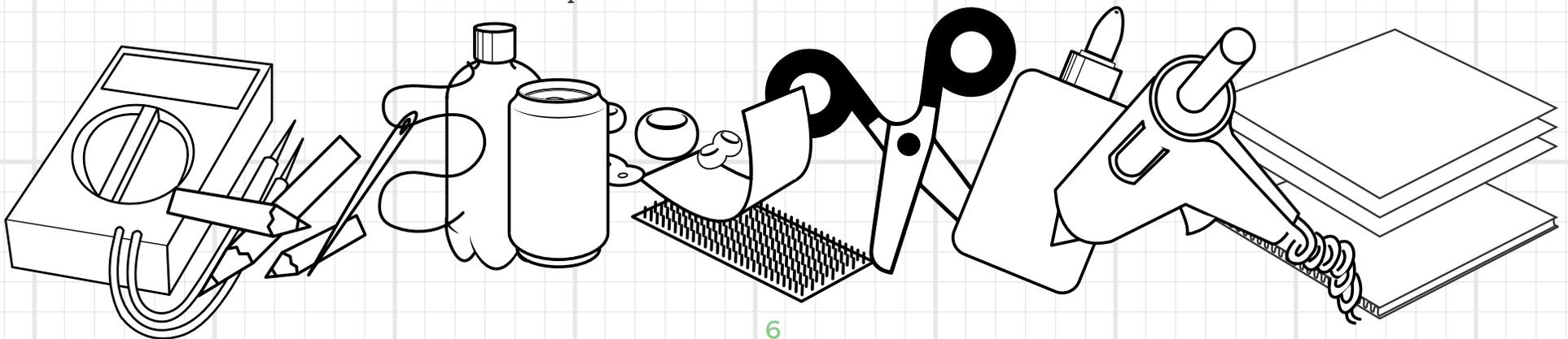
Paper
Glue/hot glue
Fabric and Thread
Cardboard
Scissors

OPTIONAL MATERIALS

Velcro
Fabric and Thread
Cotton Stuffing
Scrap metal and plastic
Beads and sequins

OPTIONAL TOOLS

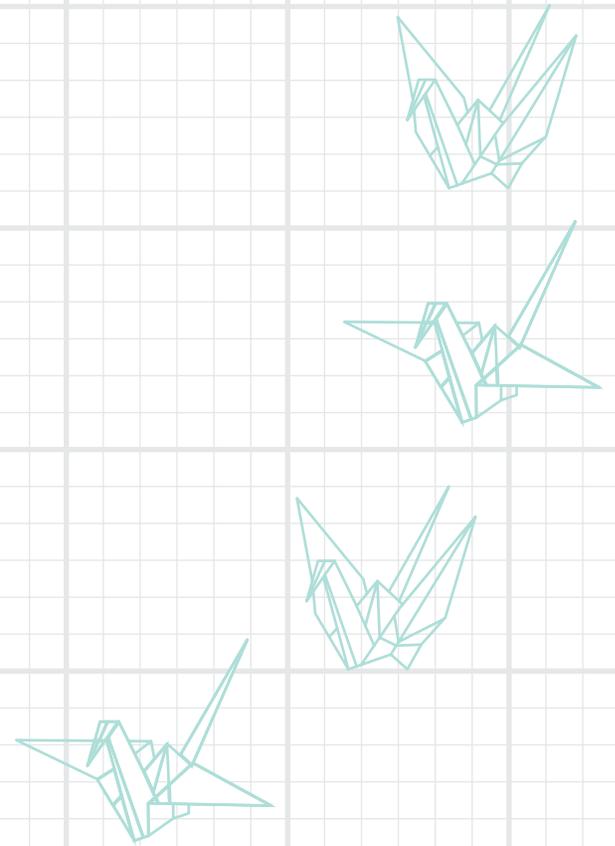
Wire cutters/strippers
Sewing needle/machine
Multimeter





This guidebook show you how
to attach circuits to paper!

Basic Origami

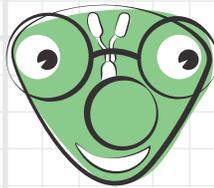


ORIGAMI VOCABULARY

1

FLIP MODEL

Turn the whole model over so that the underside now faces you. Origami paper is colored on one side, white on the other.



2

VALLEY FOLD

Fold the paper towards yourself, along the dashed line.

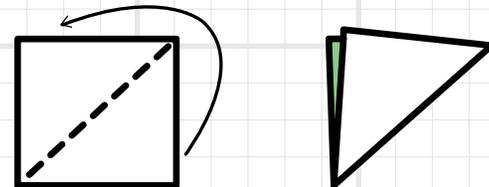
White is the inside of the paper, green is outside



3

MOUNTAIN FOLD

Fold the paper away from yourself (underneath) along the dashed line.

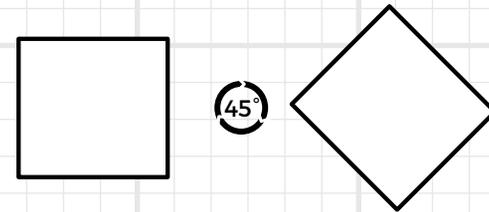


ORIGAMI VOCABULARY

4

ROTATE MODEL

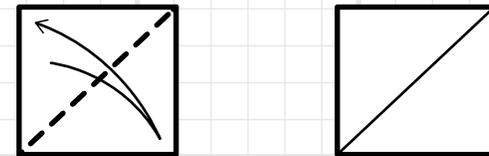
Turn the model while keeping the same side facing you. The angle of rotation is shown inside the symbol.



5

FOLD AND UNFOLD (CREASE)

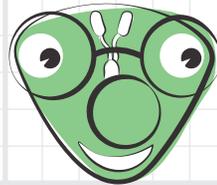
Make a fold (valley or mountains as indicated by the line style) and then unfold to leave a crease line



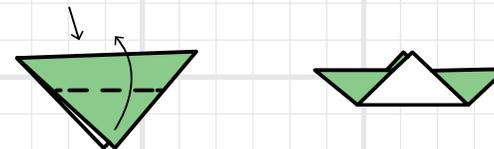
6

REPEAT BEHIND

Perform the same step on the underside of the model. The number of bars across the arrow indicates the number of times to repeat the step; in this case, once.

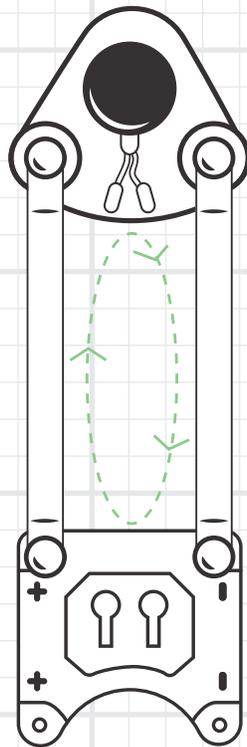


Make nice sharp folds



BASIC CIRCUITS

The next section will provide a review of basic electronics and how a circuit works.



Flow of electricity

Things to remember:

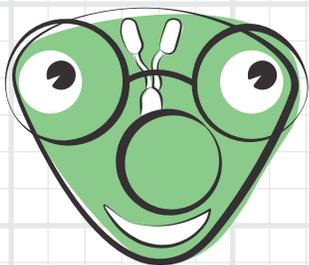
A CIRCUIT IS ALWAYS A LOOP.

ELECTRICITY FLOWS FROM POSITIVE TO NEGATIVE AROUND THE LOOP.

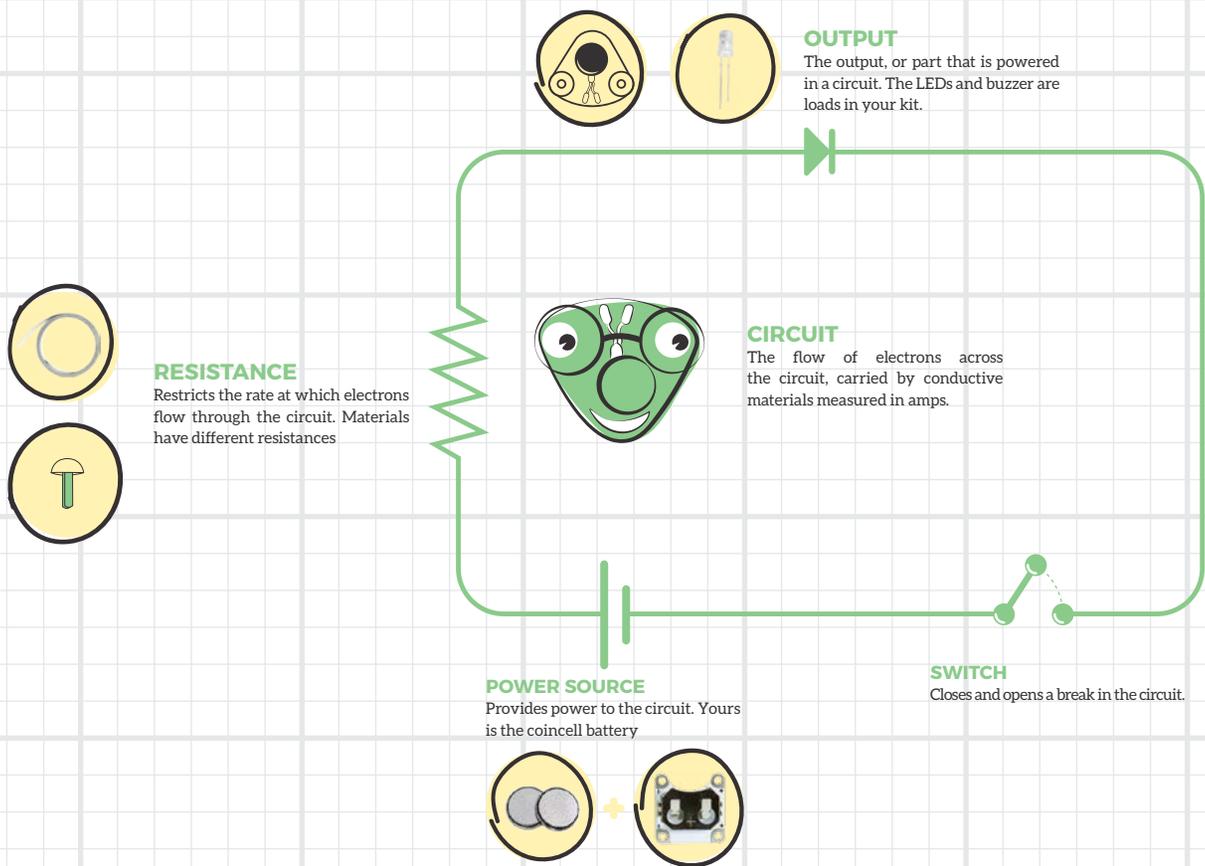
EVERYTHING IN THE CIRCUIT MUST BE ORIENTED IN THE SAME DIRECTION FOR THE CIRCUIT TO WORK.

ANYTIME A COMPONENT IS PUT INTO THE CIRCUIT BACKWARDS, IT CAUSES A BREAK IN THE CIRCUIT, MEANING IT BREAKS THE LOOP.

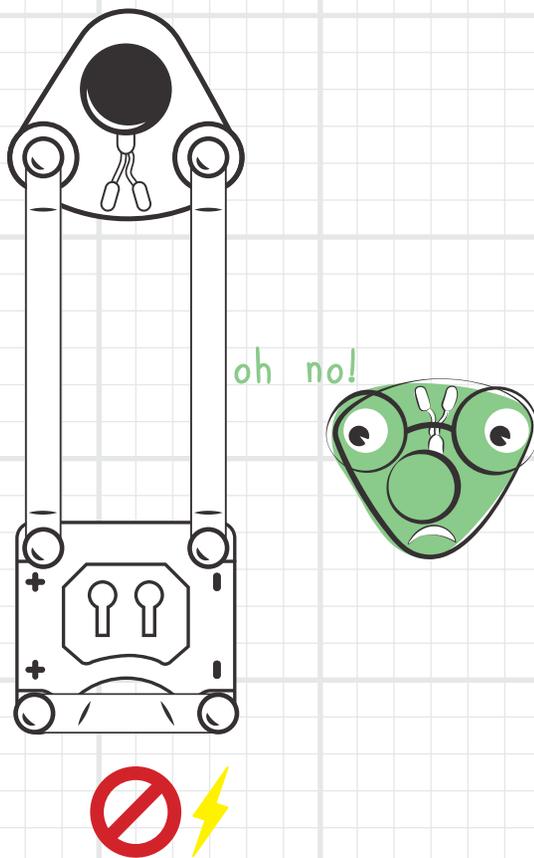
ELECTRICITY WILL ALWAYS TAKE THE PATH OF LEAST RESISTANCE.



BASIC CIRCUITS



BASIC CIRCUITS



If you were to connect the circuit line in the diagram to the left, the current will flow through the shorter (yellow) path and skip the path that connects to the LED.

This will result in a **short circuit**—a short circuit is basically equivalent to connecting from the positive end of the power source to the negative, without putting anything in between.

This will drain or “burn out” your battery very quickly. You should always make sure there are no short circuits in your design.

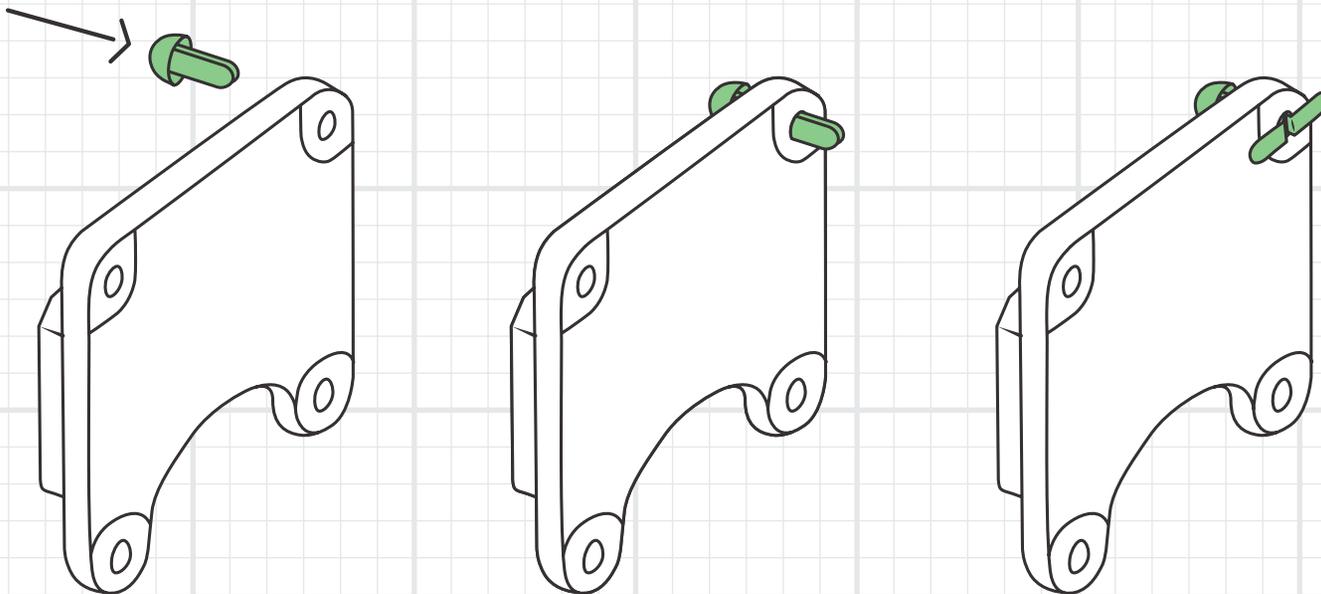
HOW TO USE PAPER FASTENERS



Make sure to push all the way through everything!

Take the paper fastener and push it straight through the hole in the Batteryboard or motionboard and through the paper. If you are using Conductive Tape, the tape should be sandwiched between the board and the paper.

To close the paper fastener after you have pushed it through everything, take the two legs and separate them until you start to feel them bend. Push them down so that they are flush to the back of the paper.

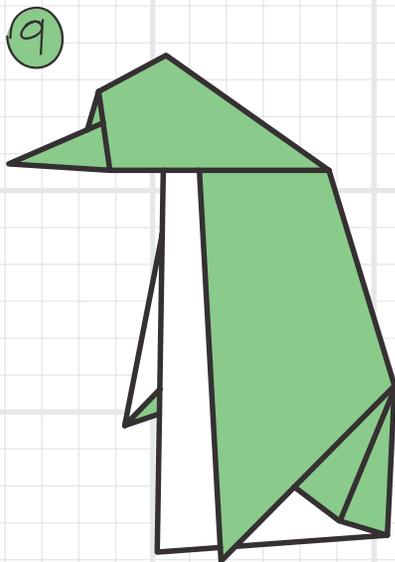
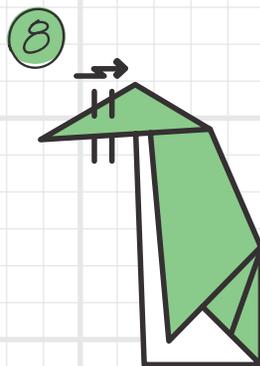
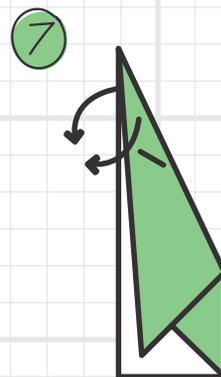
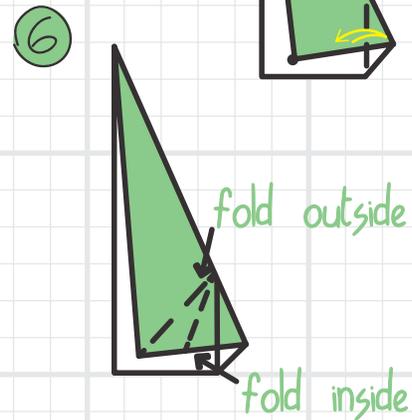
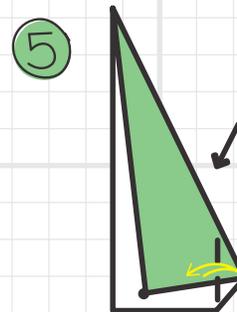
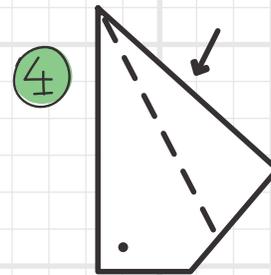
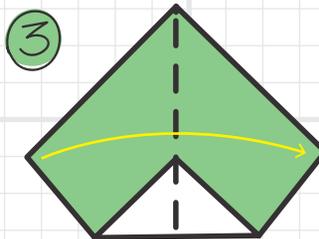
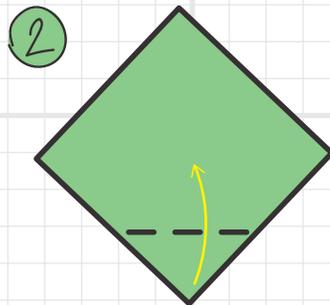
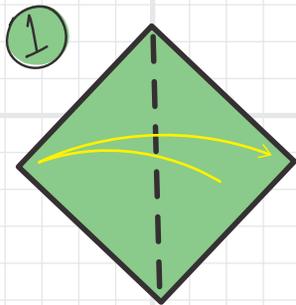




Project Guide

Want to make something else? Find more ideas and tutorials @ www.teknikio.com/learn

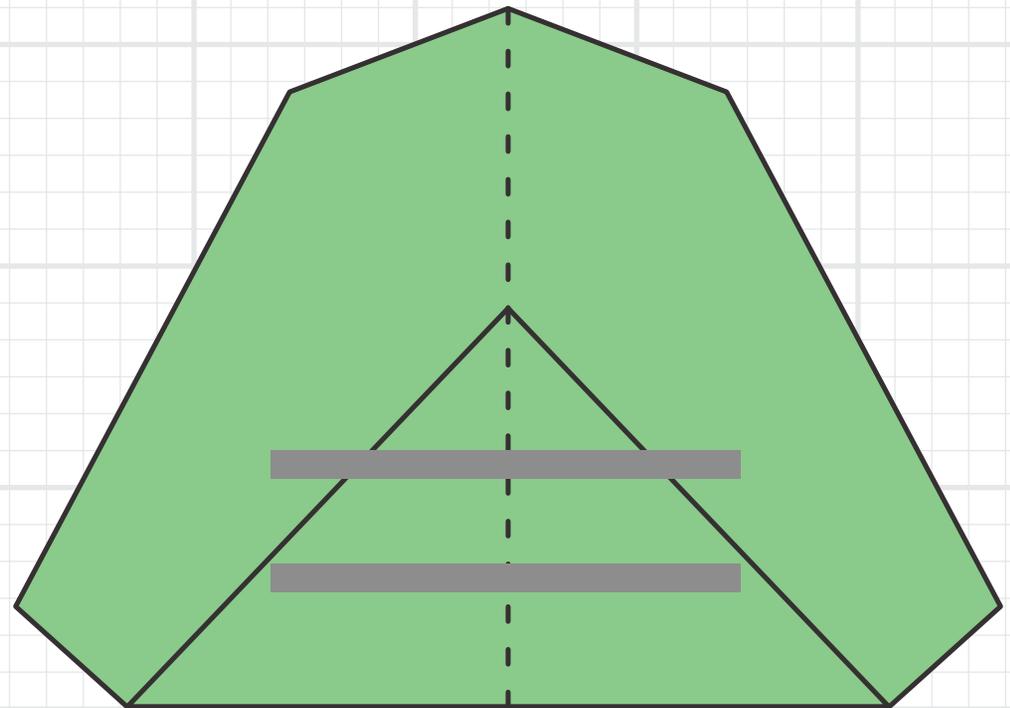
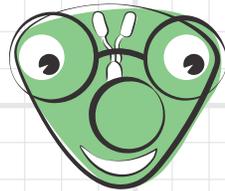
HOW TO FOLD YOUR PENGUIN



ATTACHING THE PIECES



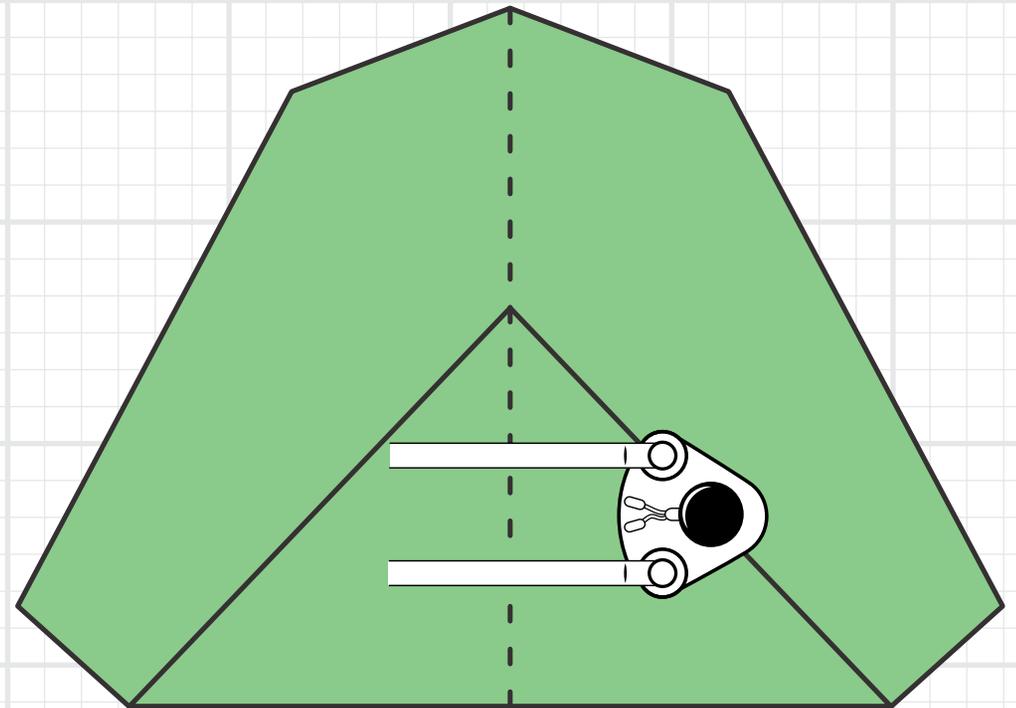
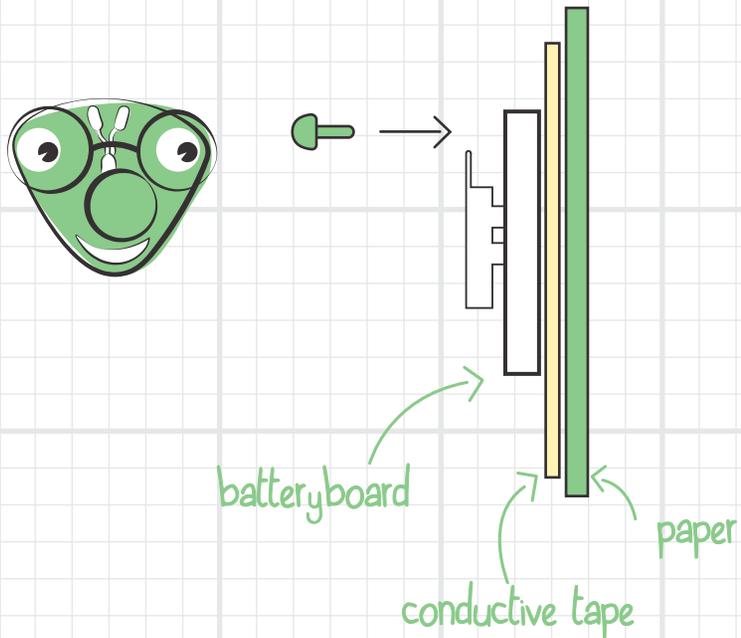
Once you have folded your origami penguin, figure out where you want to place your Motionboard and place 2 parallel pieces of conductive tape on your penguin, about 2 inches in length. Align the tape so that one piece starts under one of the conductive silver holes on the motor board, and the second piece is under the other hole.



ATTACHING THE PIECES

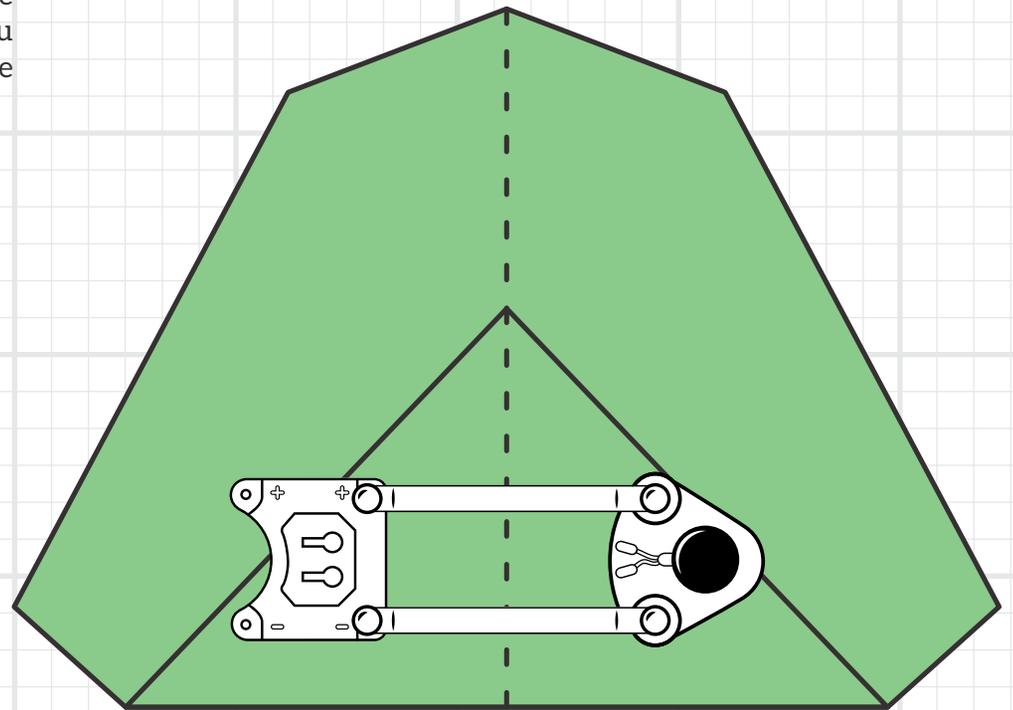
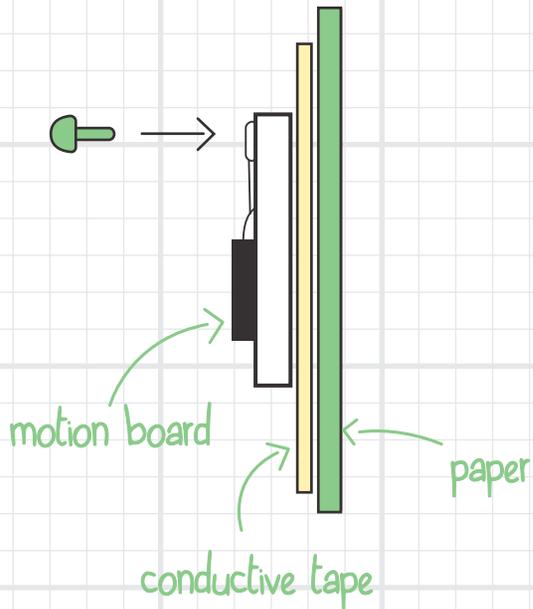
2

Using the paper fasteners, attach Motionboard to your Penguin. Poke the fasteners through the hole on the board, then the tape, and finally through the paper. Then turn your penguin over and fold the legs open as shown on page 13, to lock the fastener in place.



3

Now place your battery board on the other ends of the tape like in the diagram. Make sure one piece of tape is under the hole marked positive and the other piece is under the hole marked negative on the batteryboard. Take 2 more pushpins and secure that batteryboard in place the same way you did for the motionboard. If you'd like you can use additional pushpins in the other 2 holes of the batteryboard.

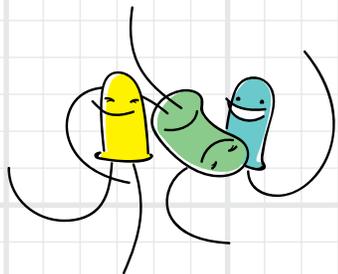
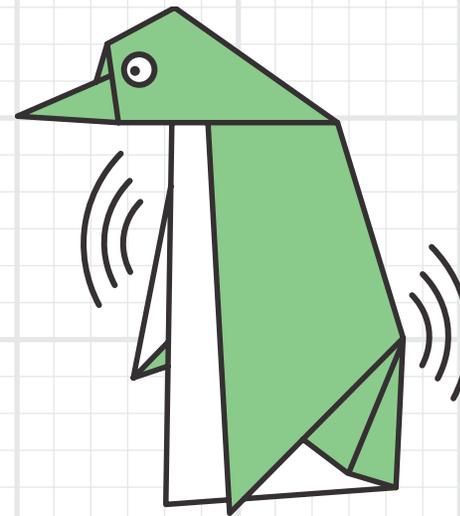


MAKING YOUR PENGUIN MOVE

4

Fold your penguin back up. You can place googly eyes or draw eyes onto his head if you want. Place the Battery into the Batteryboard (side marked with "+" facing up). If your penguin is vibrating, you're all done! Place your penguin on a table or flat surface and watch him move around!

If your penguin is not moving, refer to page 21 for troubleshooting tips.



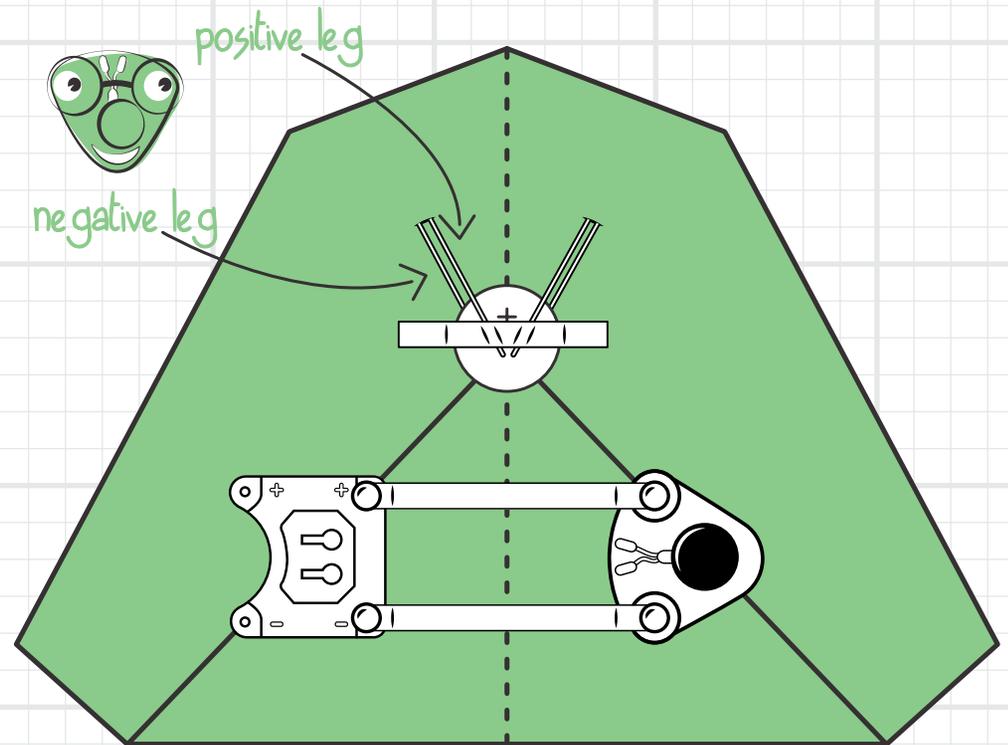
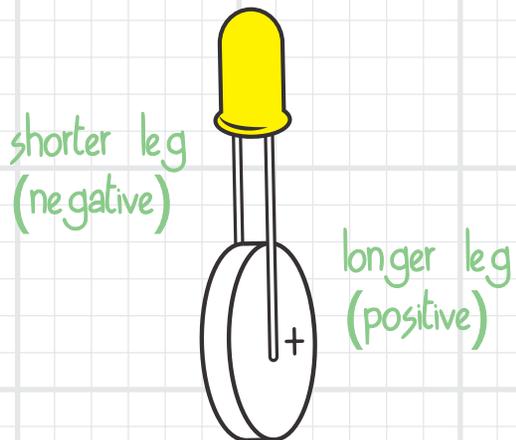
yay! let's dance!

ATTACHING THE EYES

In your kit, you have two LED lights. You can use these for the eyes if you want.

The LED lights have one short leg and one long leg. The long leg is the positive side and the short leg is the negative side. Punch the legs of the LED through the paper so that the light is on the outside and the legs are on the inside.

To attach the lights, use the conductive tape to connect to the batteryboard than the motion board. Make sure to connect the positive side of the batteryboard to the positive leg of the LED.



ATTACHING THE EYES

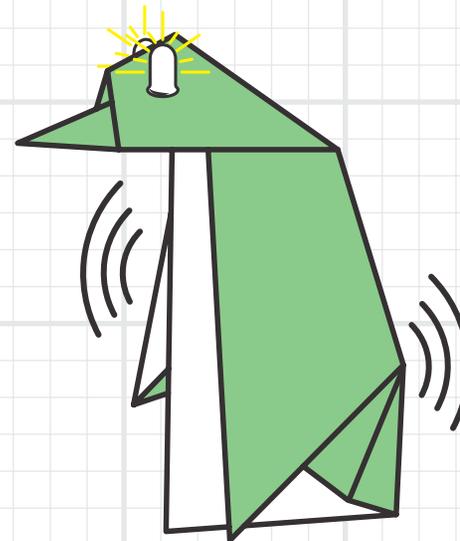
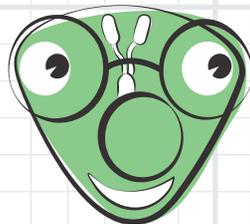
5

If your LEDs light up when you put the battery into the Batteryboard, you're all done!

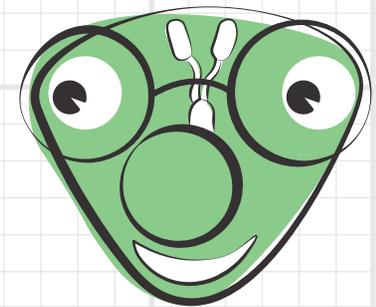
Using both the Motion Board and the LEDs at the same time on the same battery will kill your battery very quickly. If you do not want to kill your battery but want both lights and motion, use another battery to connect the LEDs.

In your kit, you only have one Batteryboard. If you want two batteries on your penguin, you can tape the battery straight onto the penguin with the plus side facing up.

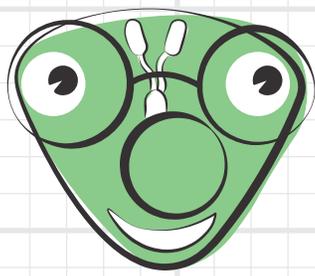
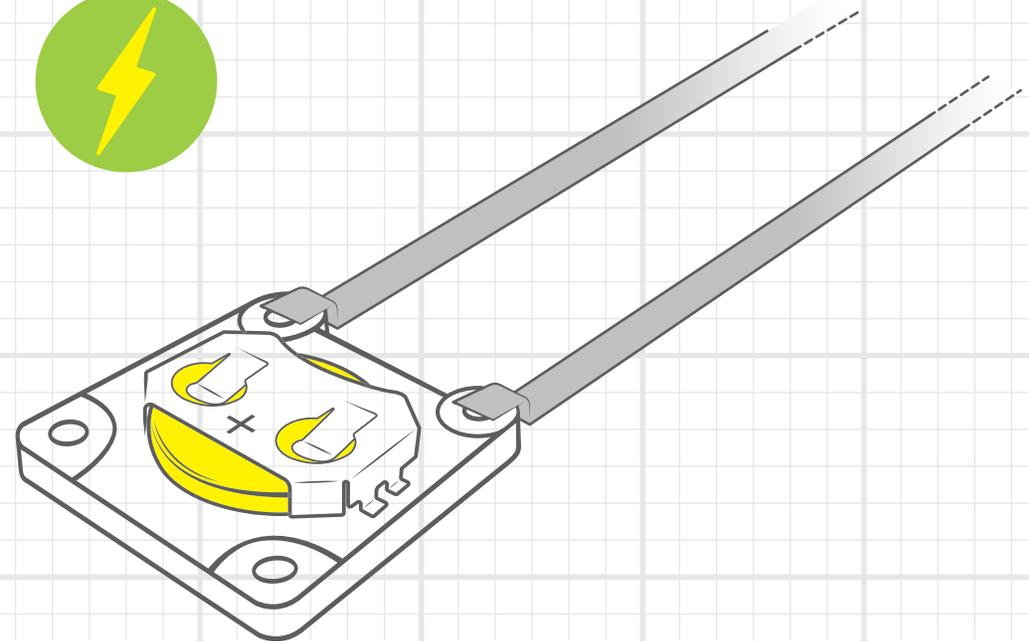
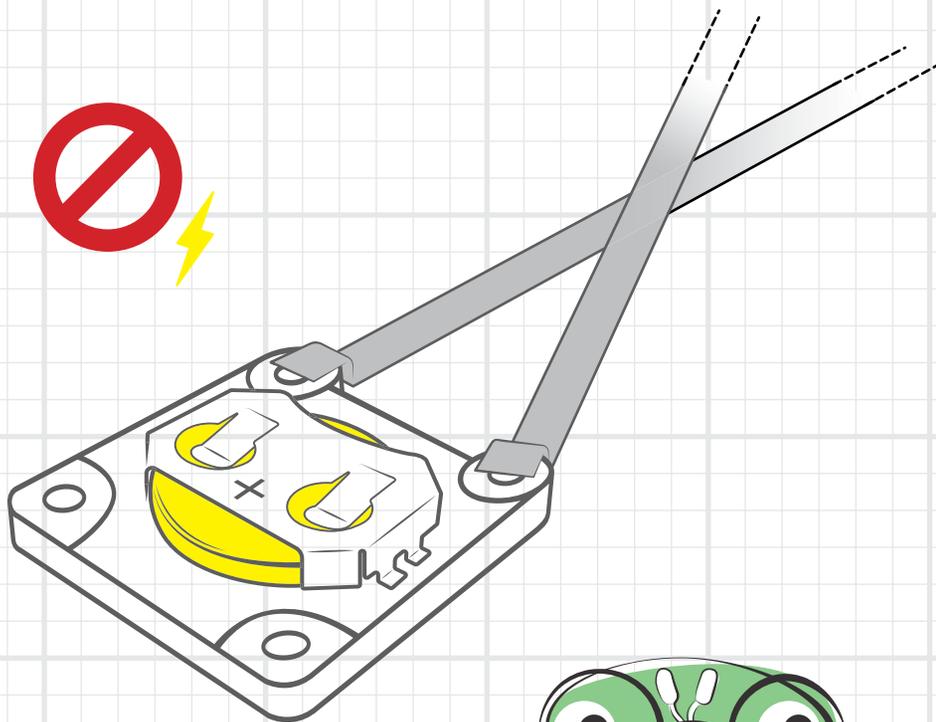
The smooth side is positive and the bottom is textured



Troubleshooting

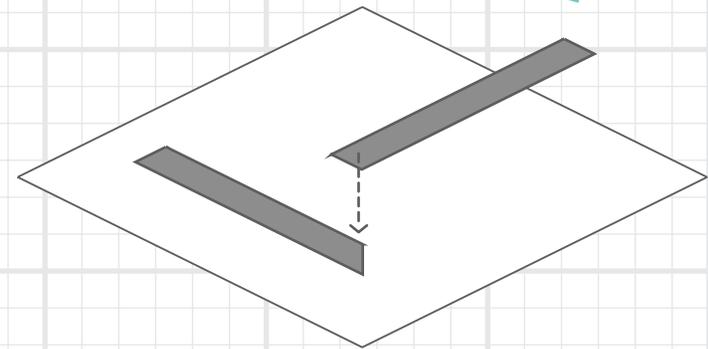


TROUBLESHOOTING

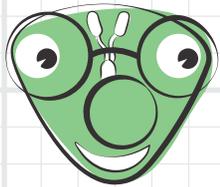
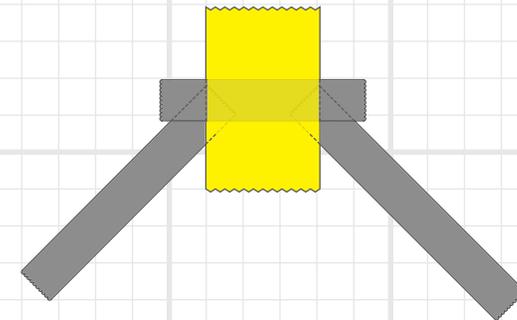


TROUBLESHOOTING

To make a corner pinch the tape at a 45 degree angle and turn the other side of the tape perpendicular like in the diagram above.



To "patch" 2 paths of tape you can take another piece of copper tape and place the non-sticky side across the gap you want to patch and then stick another piece over the top of it.



Do not tear or cut the tape!