teknikio®

ACTIVATING ORIGAMI INVENTION GUIDE

TABLE OF CONTENTS

YOUR MATERIALS

1X BATTERYBOARD
When inserting your battery in the board make sure the smooth side with the "+" is facing up. The conductive pads on the corners are labeled as positive and negative.

2X COINCELL BATTERIES
This small battery can provide power and fit in tight places. Make sure that the positive side connects to the positive end and the negative side (or ground) connects to the negative end.

1X CONDUCTIVE TAPE
They tape is made of a conductive material meaning it let electrons pass through it. It can be used to carry or transmit power and signals through a circuit.

10X ORIGAMI PAPER
This type of paper is used for the traditional art of origami. It folds very well so that you can fold and unfold easily.

4X LEDS
LEDs are the most popular way to test a circuit. When electricity is flowing through them they produce light. They have a positive end (longer leg) and negative end (shorter leg).

HERE IS A LIST OF TOOLS AND SUPPLIES THAT COMPLIMENT YOUR SET. WE ALSO ENCOURAGE YOU TO COMBINE THIS SET WITH OTHER TEKNIKIO SETS + PARTS.

10X PAPER FASTENERS
These small fasteners bind your boards to the origami paper.

1X MOTIONBOARD
These mini motors are usually found in phones that have a "vibrate" feature. They have an offset weight that makes them vibrate as the motor spins.

OPTIONAL TOOLS	OPTIONAL MATERIALS
Wire cutters/Strippers	Paper
Sewing needle/Machine	Googley eyes
Multimeter	Fabric and thread
Scissors	Cardboard
Awl	Velcro
Pen	Fabric and thread
Glue/ Hot glue	Cotton stuffing
	Beads and Sequins

ORIGAMI VOCABULARY

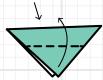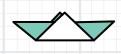**WHITE IS THE INSIDE OF THE PAPER, GREEN IS OUTSIDE!**

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.

VALLEY FOLD
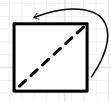Fold the paper towards yourself, along the dashed line.

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.

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

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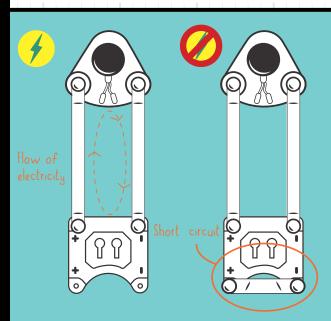Make a fold (valley or mountains as indicated by the line style) and then unfold to leave a crease line.

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

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.**

Flow of electricity

Short circuit

If you were to connect the circuit line in the diagram to the right, 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.

OUTPUT
The output, or part that is powered in a circuit. The LEDs and buzzer are loads in your kit.

CIRCUIT
The flow of electrons across the circuit, carried by conductive materials.

RESISTANCE
Restricts the rate at which electrons flow through the circuit. Materials have different resistances.

POWER SOURCE
Provides power to the circuit. Yours is the coincell battery.
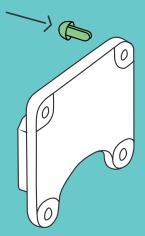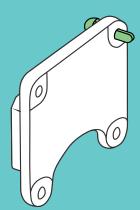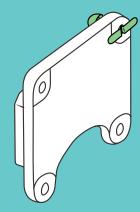
SWITCH
Closes and opens a break in the circuit.

HOW TO USE PAPER FASTENERS

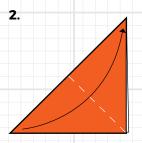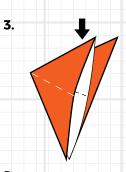**MAKE SURE TO PUSH ALL THE WAY THROUGH EVERYTHING!**

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.
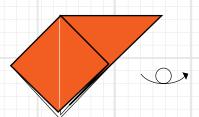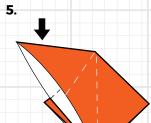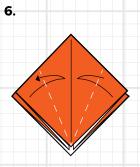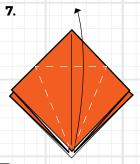
HOW TO FOLD A CRANE

1.

2.

3.

4.

5.

6.

7.

8.
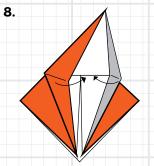
9.

10.

11.

12.

13.

14.

15.

16.

17.
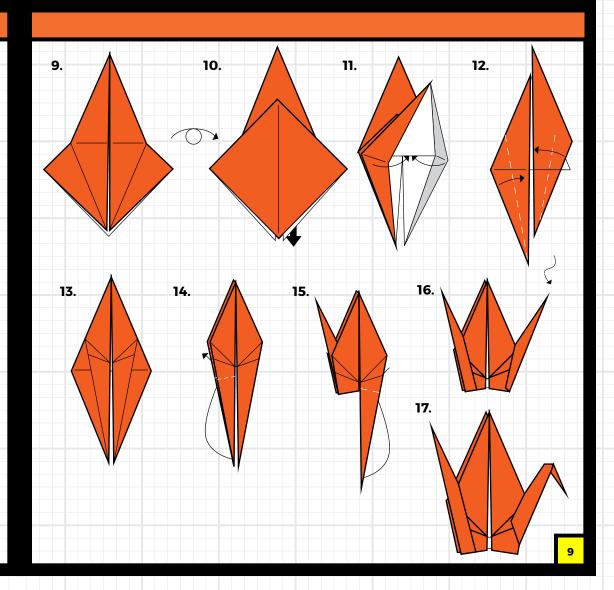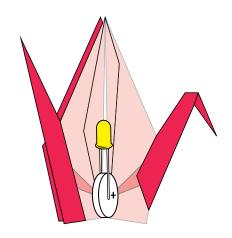
In your kit, you have four LED lights.

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. Take on LED and sandwich the legs around the battery so that the longer leg is touching th positive side of the battery and shorter leg is touching the negative (rough) side, like in the diagram to the right. This LED shoud light up!
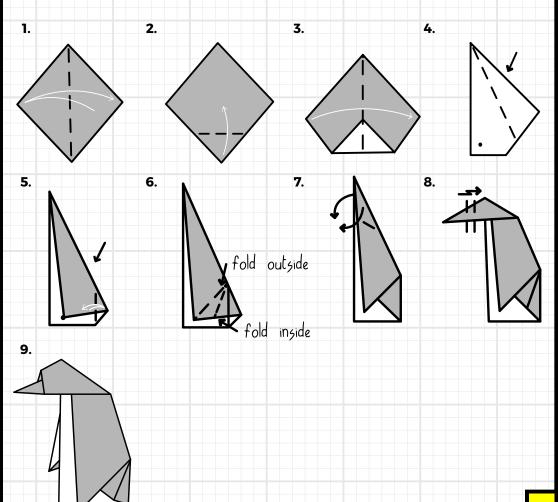
Taks some non-conductive (scotch or similar) tape and wrap around the legs and battery to secure them.
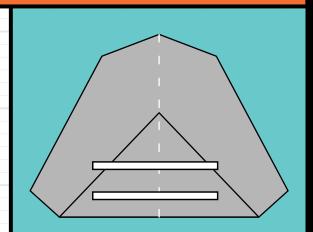

shorter leg (negative)

longer leg (positive)

Push the LED through the gap in the bottom of the crane (where the wings meet) so that the light is on the inside and the legs and battery are on the outside. You may need to widen the gap with scissors if you cannot fit the LED through.

1.

2.

3.

4.

5.

6.

fold outside

fold inside

7.

8.
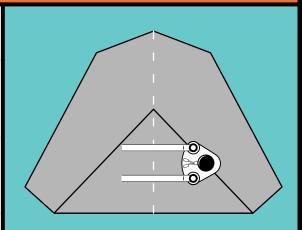
9.

STEP 1: ATTACHING THE TAPE

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.

STEP 2: ATTACHING THE MOTIONBOARD

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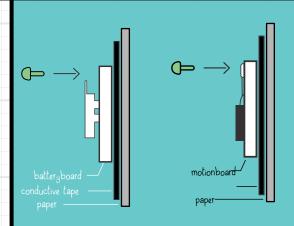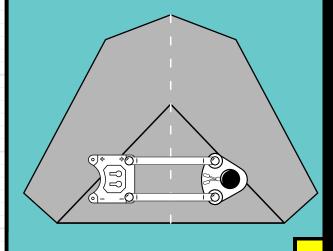
Now place your battery board on the other ends of the tape like in the diagram. Make sure one piece of tape is under the hole marked positive and the other piece is under the hole marked negative on the batteryboard. Take 2 more pushpins and secure that batteryboard in place the same way you did for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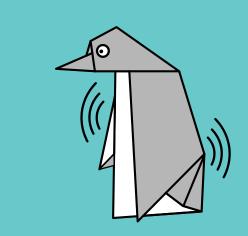

batteryboard
conductive tape
paper

motionboard
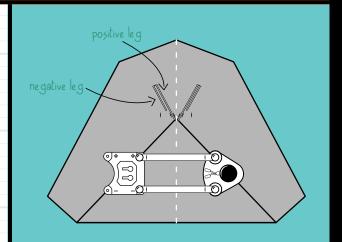paper

STEP 4: MAKING YOUR PENGUIN MOVE

Fold your penguin back up. You can place googley 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!
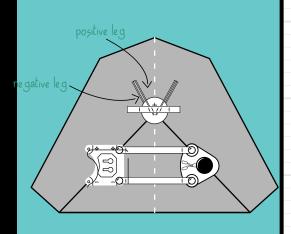
If your penguin is not moving, refer to th back cover for troubleshooting tips.
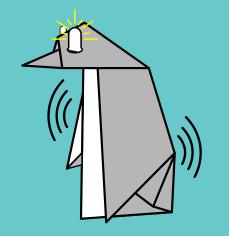

STEP 5: ATTACHING EYES

To attach the lights, you will use a similar technique as you did with the crane, but this time you will use 2 of the LED lights. First punch the legs of the LED on eight side of the penguin's head and pull the legs through to the back.

positive leg

negative leg

positive leg

negative leg

Then place a battery between the 2 sets of legs so the the positive side is sandwiched by the longer legs and the negative by the shorter legs, like in the diagram.

Place some non-conductive tape ove the battery to secure it in place.
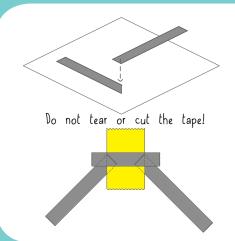

If your LEDs light up when you put the battery into the Batteryboard, you're all done!

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.
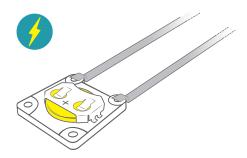
Do not tear or cut the tape!

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.