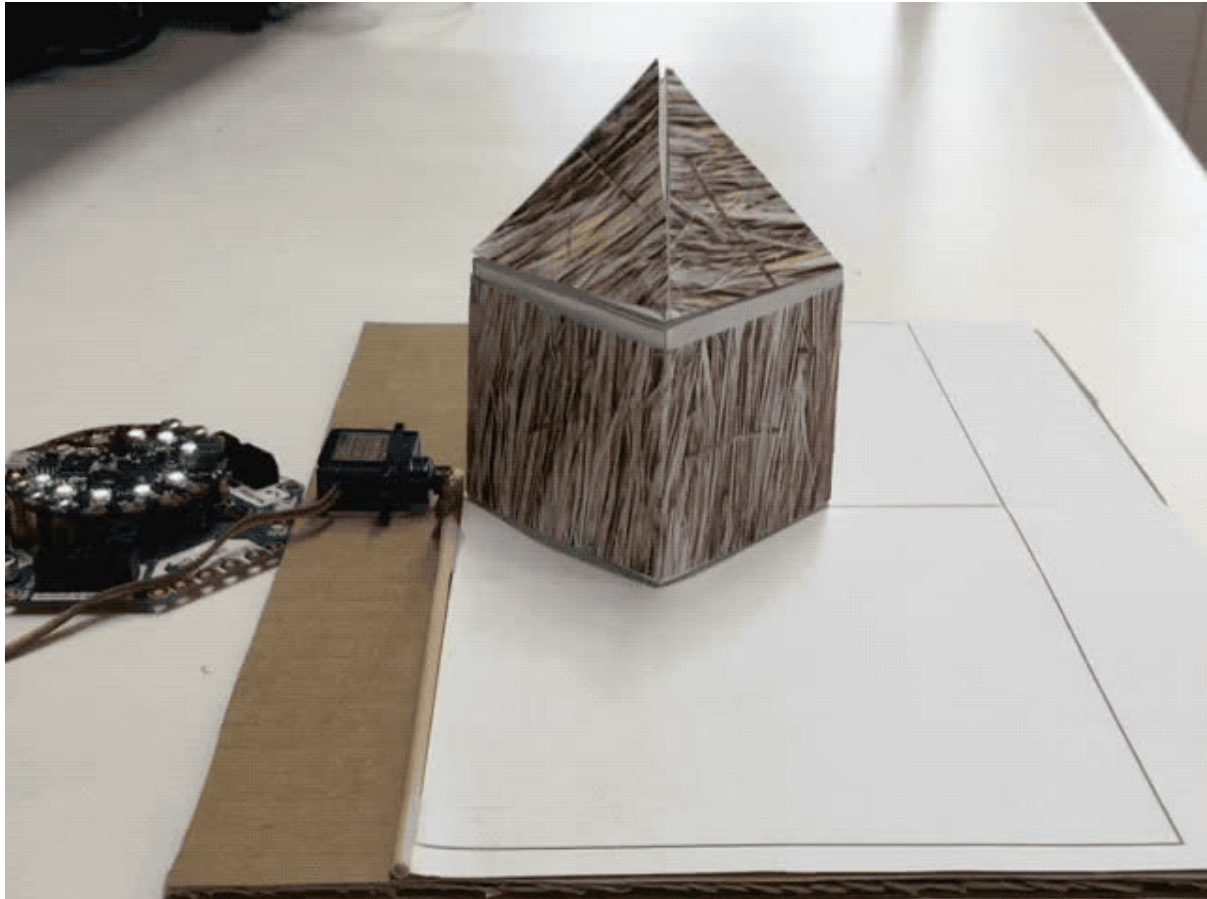




Crickit Collapsible House with MakeCode

Created by Dano Wall



<https://learn.adafruit.com/collapsible-house>

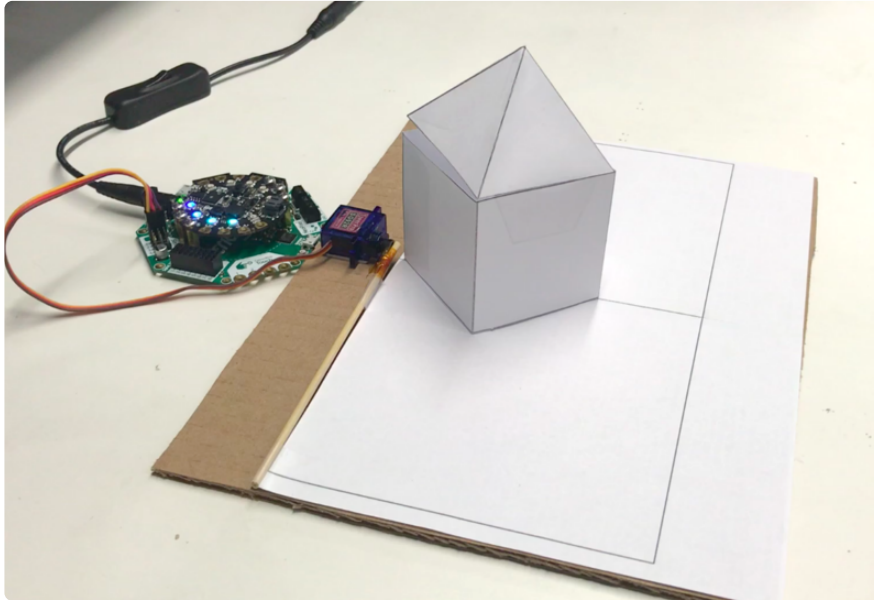
Last updated on 2024-06-03 02:22:53 PM EDT

Table of Contents

Overview	3
<hr/>	
<ul style="list-style-type: none">• Household materials you will need• Electronics• Background	
Build your House	5
<hr/>	
<ul style="list-style-type: none">• Print it!• Cut out the parts• Fold the parts• Tape it up• What beautiful little house you've built!	
Build the Foundation	13
<hr/>	
<ul style="list-style-type: none">• Attach Servo	
Upload MakeCode	20
<hr/>	
<ul style="list-style-type: none">• Before you move on...• Upload the Code	
Test the Code	21
<hr/>	
<ul style="list-style-type: none">• Straw House• Wood House• Brick House	
Huff and Puff!	25
<hr/>	

Overview

In this tutorial, we'll make a pop-up house. The project uses an Adafruit CRICKIT for Circuit Playground Express programmed in MakeCode to make the house fold flat when you blow on it, seeming to disappear before popping right back up!



Household materials you will need

- Scotch tape
- Double sided tape
- Piece of cardboard (8.5" x 11")
- 2 sheets printer paper
- Bamboo skewer (or wooden dowel or popsicle stick)
- Scissors

Electronics

1 x [Circuit Playground Express](https://www.adafruit.com/product/3333)

<https://www.adafruit.com/product/3333>

Circuit Playground Express is the perfect introduction to electronics and programming

1 x [Adafruit CRICKIT for Circuit Playground Express](https://www.adafruit.com/product/3093)

<https://www.adafruit.com/product/3093>

Creative Robotics and Interactive Construction Kit is an add-on to our popular Circuit Playground Express that lets you #MakeRobotFriend using CircuitPython

This little servo can rotate approximately 180 degrees (90 in each direction). Works just like standard servos you're used to but smaller.

1 x Micro Servo

<https://www.adafruit.com/product/169>

This little servo can rotate approximately 180 degrees (90 in each direction). Works just like standard servos you're used to but smaller.

1 x USB cable - A/MicroB - 3ft

<https://www.adafruit.com/product/592>

Standard A to micro-B USB cable

1 x 5V 2A (2000mA) switching power supply

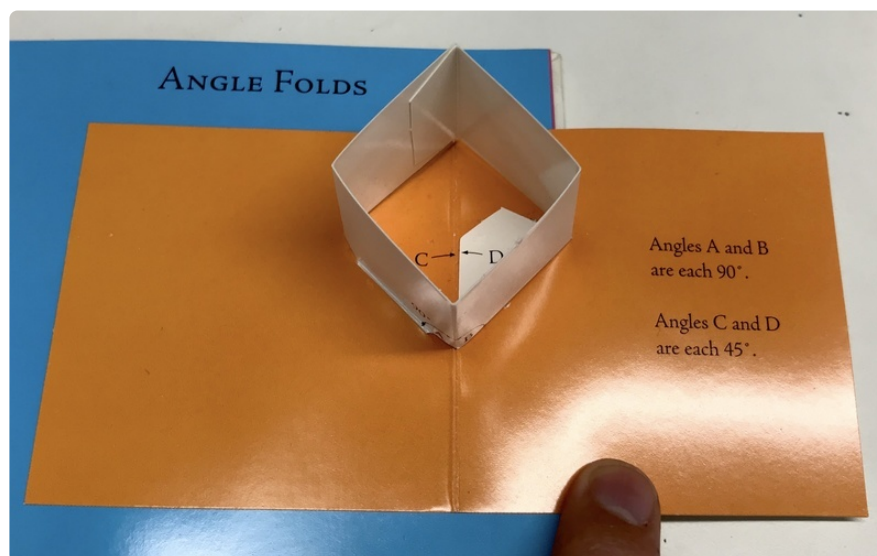
<https://www.adafruit.com/product/276>

Power supply that gives a clean regulated 5V output at up to 2000mA, 110 or 240 volt AC input

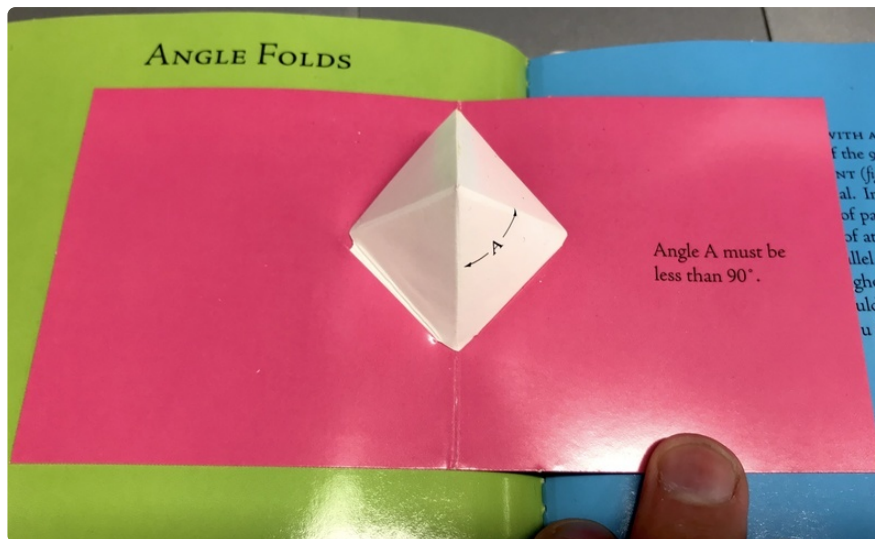
Background

This project takes its inspiration from the book [The Elements of Pop Up](https://adafru.it/Bw8) (<https://adafru.it/Bw8>) by David A. Carter and James Diaz.

PDFs of their templates are also [available online](https://adafru.it/Bw9) (<https://adafru.it/Bw9>) for reference.



We will use two pop-up concepts in the project: the Angle Fold Open Box and the Angle Fold Pyramid (figures 24 and 27 in the book, respectively).



Build your House

Print it!

Download the two PDFs below, or [download the vector files from Thingiverse \(https://adafru.it/Bw4\)](https://adafru.it/Bw4)

Print out the first image with the two smaller parts on one piece of paper. This will become the house and roof.

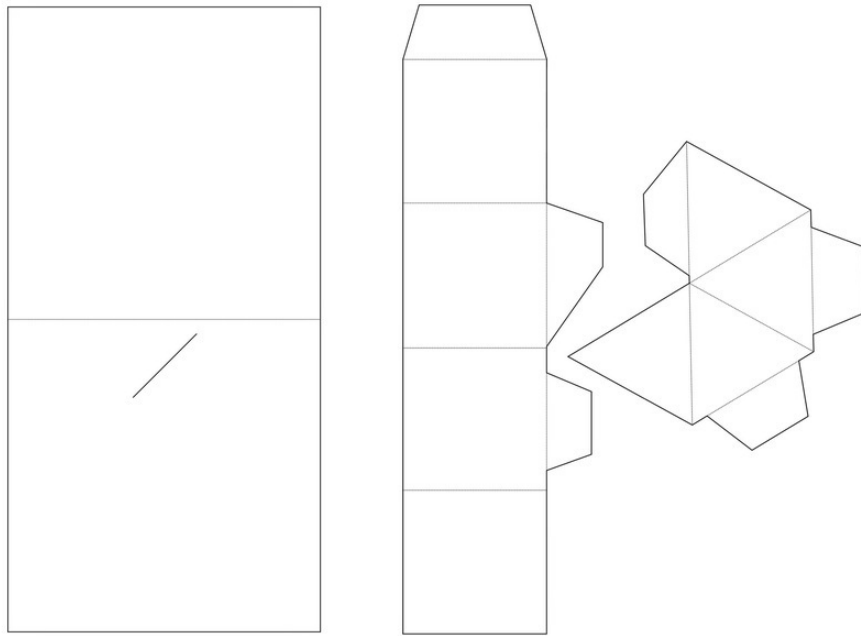
Print the second image, the base, on a second piece of paper. The assembled house will be mounted to the base.

Pop_up_house.pdf

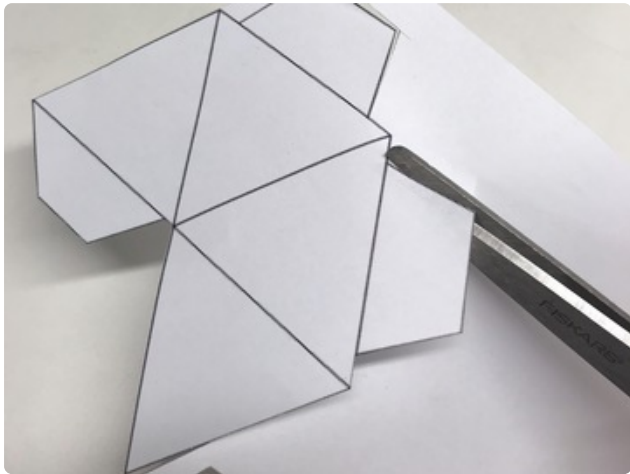
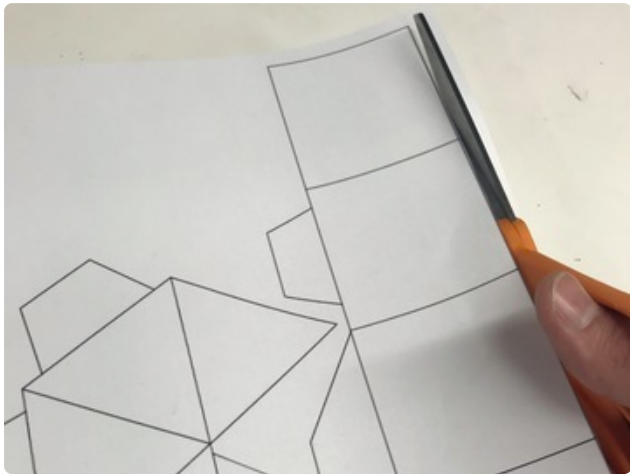
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Pop_up_base.pdf

<https://adafru.it/BRq>

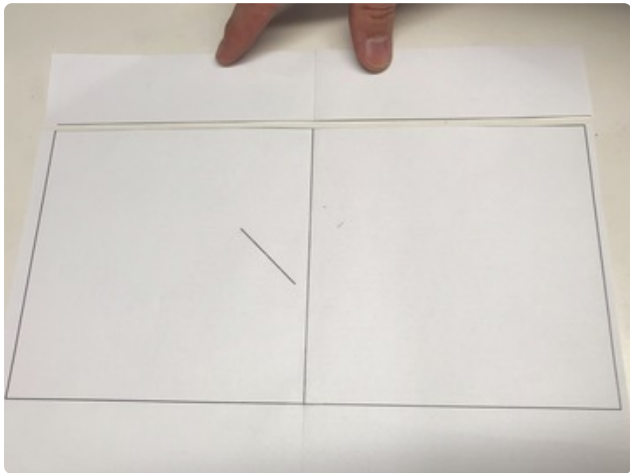


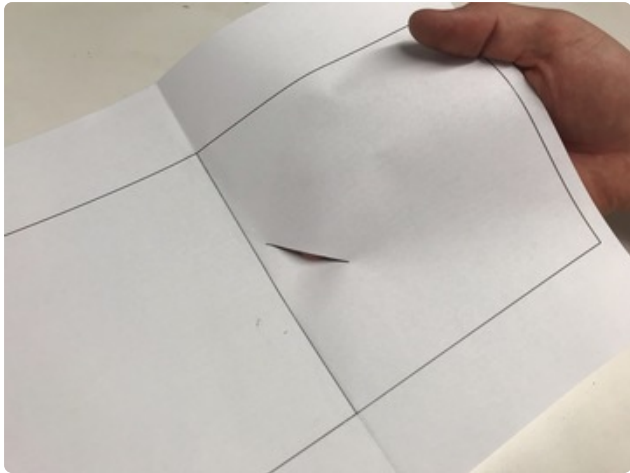
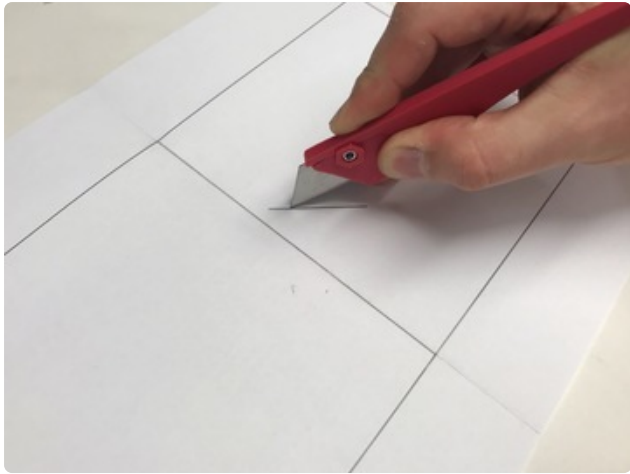
Cut out the parts



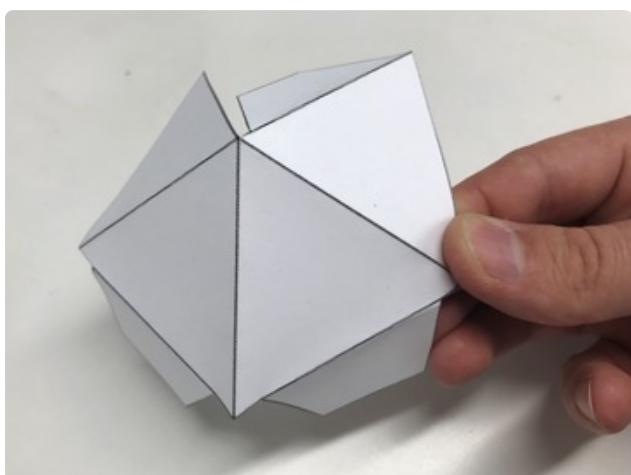
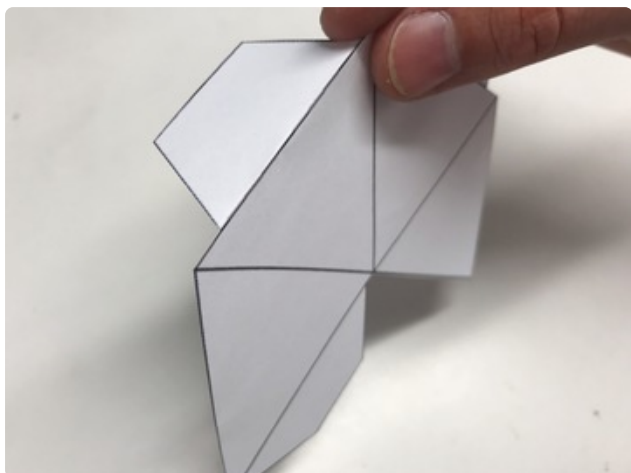
Cut around the outlines of the house and roof.

Use a knife or razor blade to slice along the diagonal line in the base.

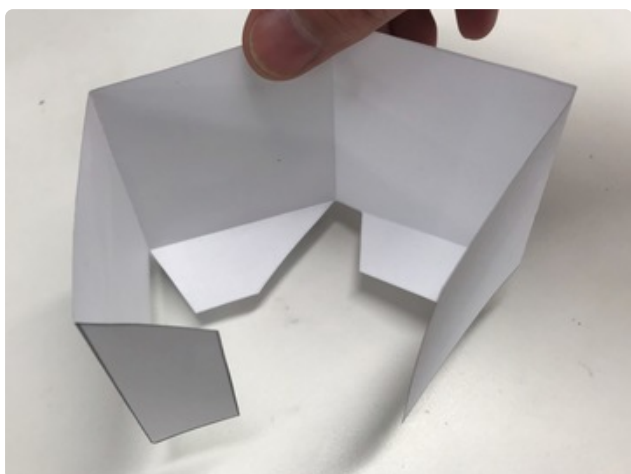




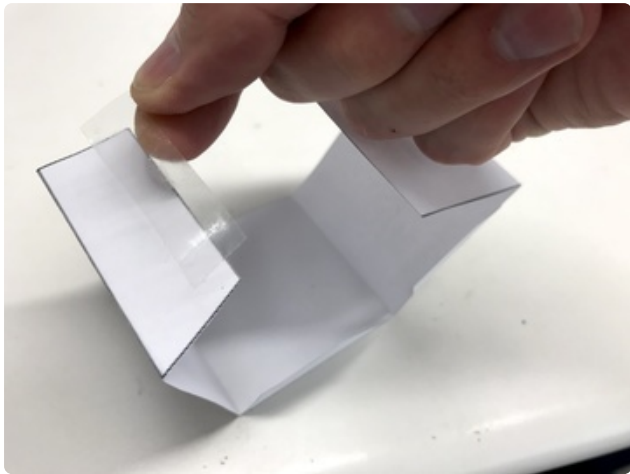
Fold the parts



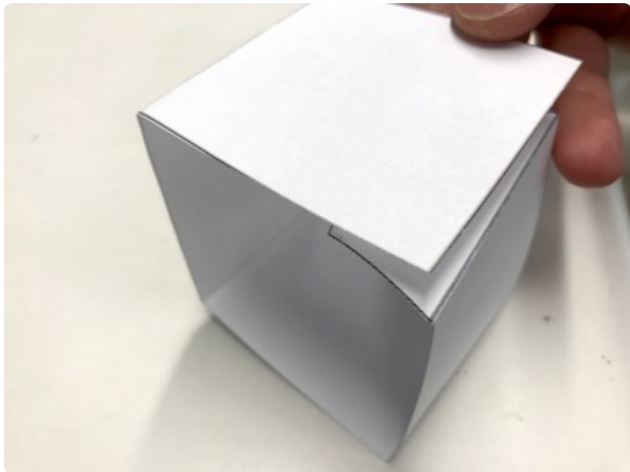
Fold the parts along the dotted lines.



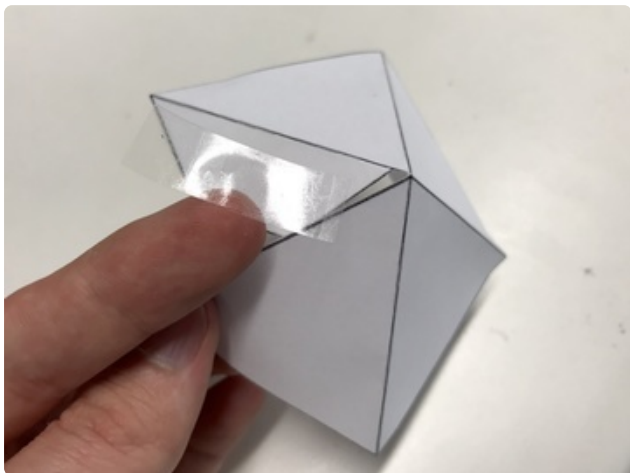
Tape it up



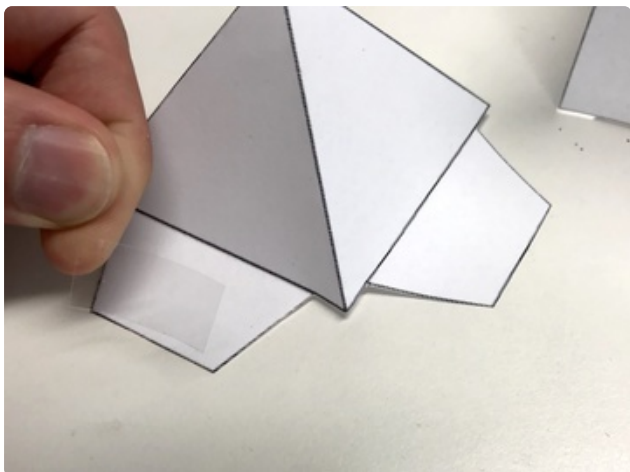
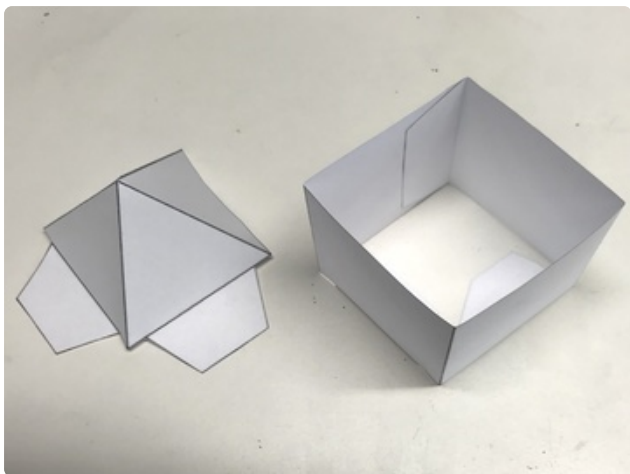
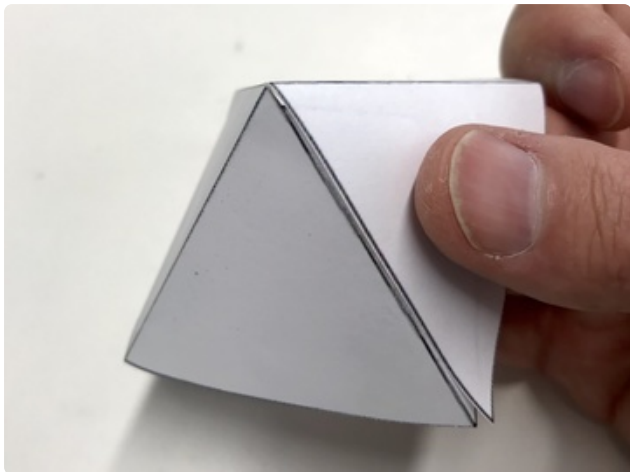
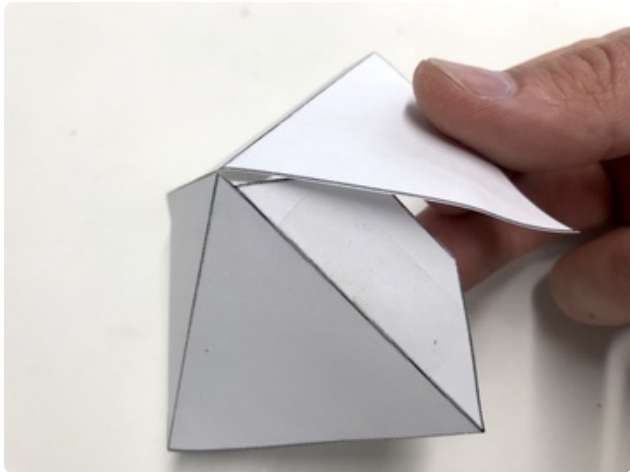
Use small strips of double sided tape to hold the parts together. Glue stick also works well for this if you don't have double-sided tape.

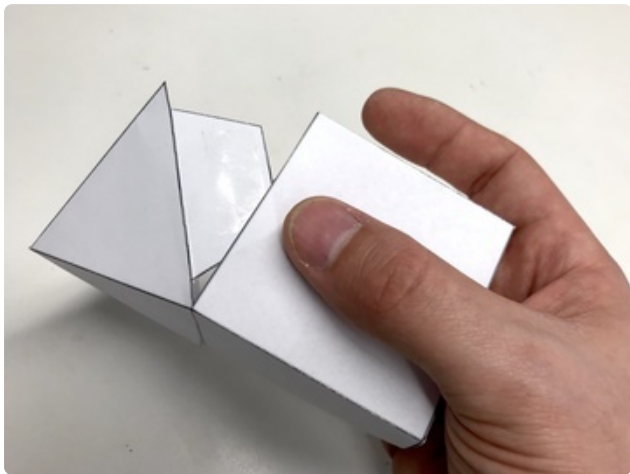
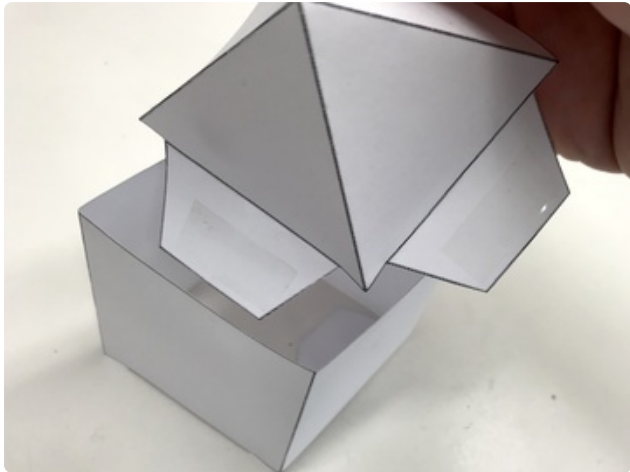
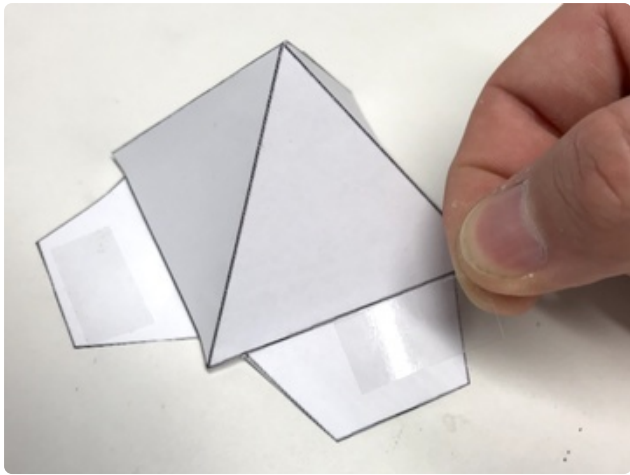


Start with the square box, then tape together the pyramid.

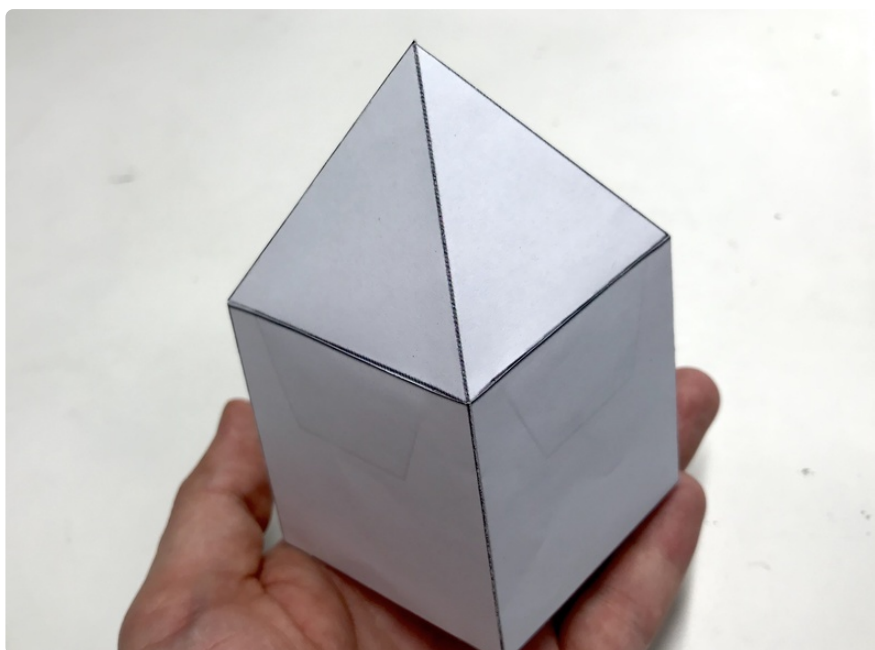


Stick the roof on top of the house with the two tabs provided.





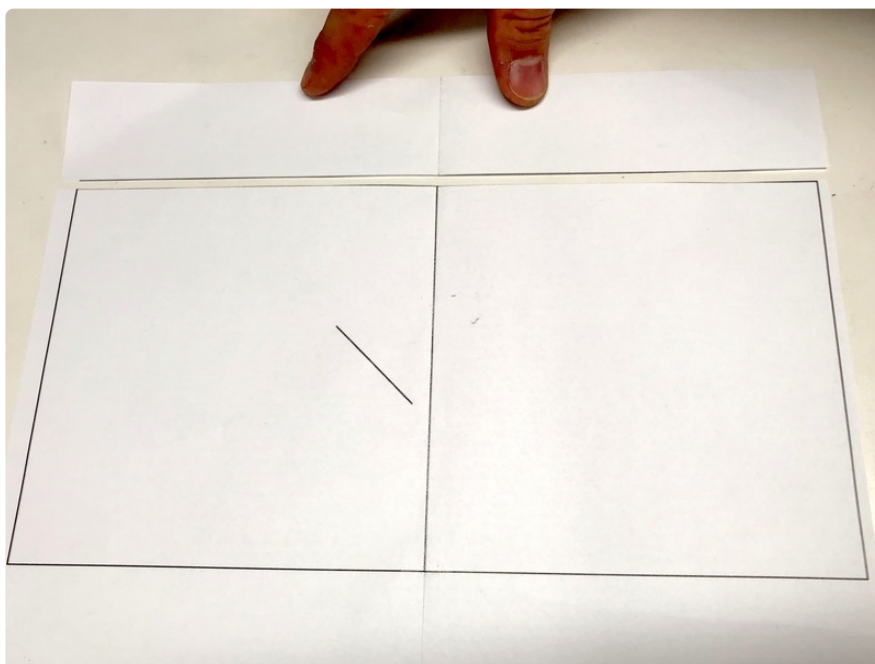
What beautiful little house you've built!

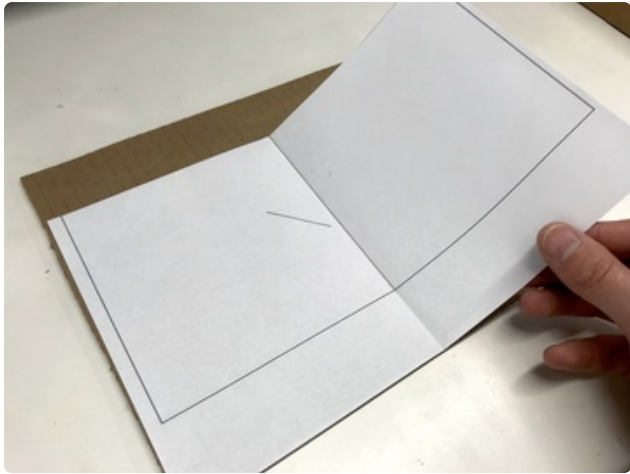


Build the Foundation

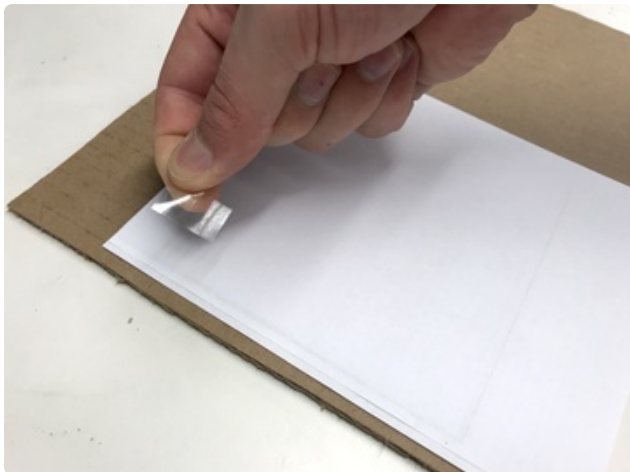
For this you will need a piece of scrap cardboard about 8.5" x 11" (letter or A4)

First, take the piece of paper with the base printed on it and trim the back edge off.



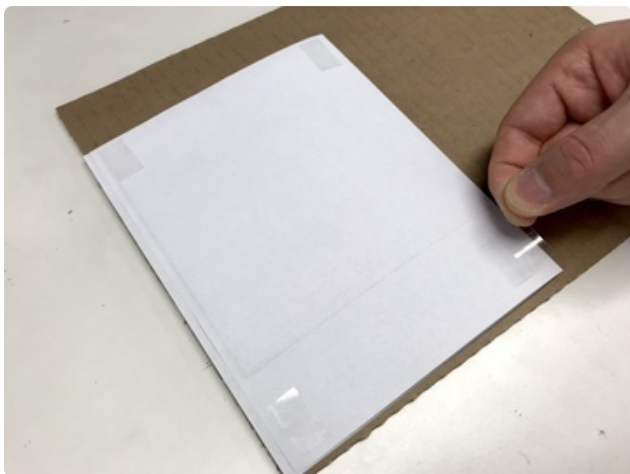


If necessary, trim your piece of cardboard down until it's about the same size as a full sheet of printer paper.

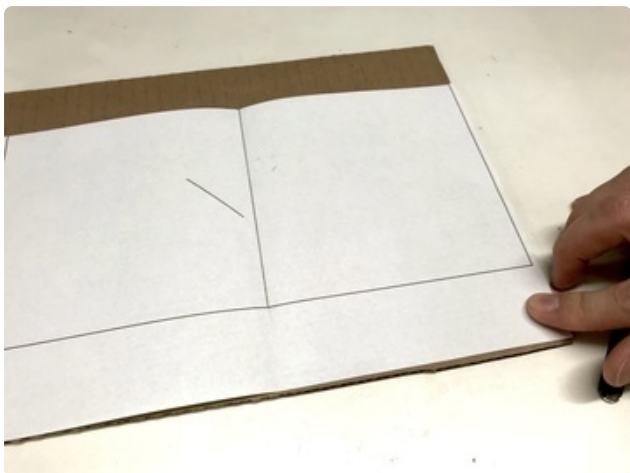


Place the base of the house on the cardboard, aligning the front edges. Fold the paper over, leaving the side with diagonal slit on bottom.

On the back side, place some strips of double-sided tape.

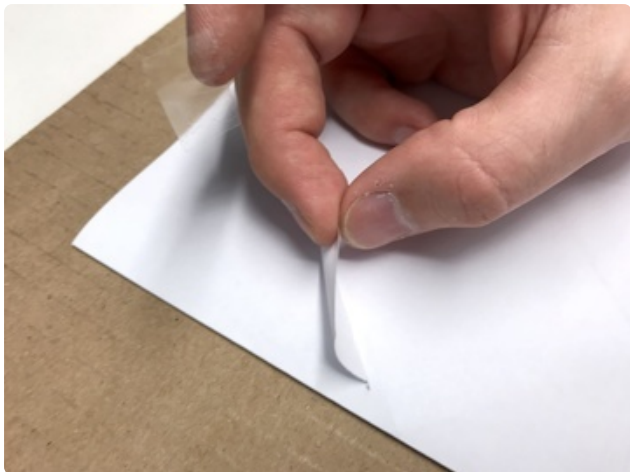


Affix one side of base to cardboard foundation. This half will stay in place, while the other side will fold over back and forth.



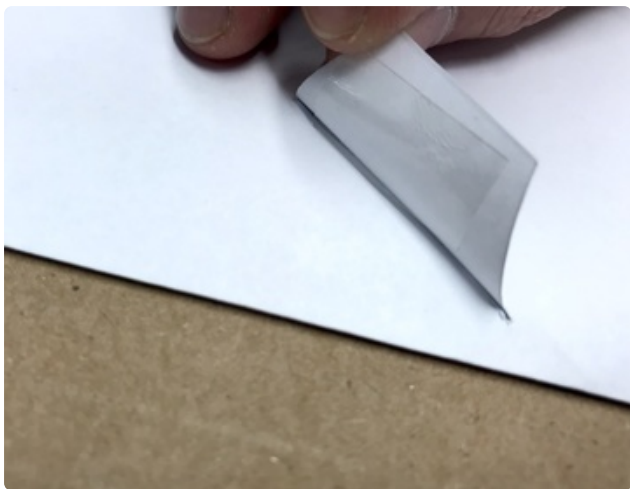


Take the house and slide the smaller of the two tabs through the slit in the base.

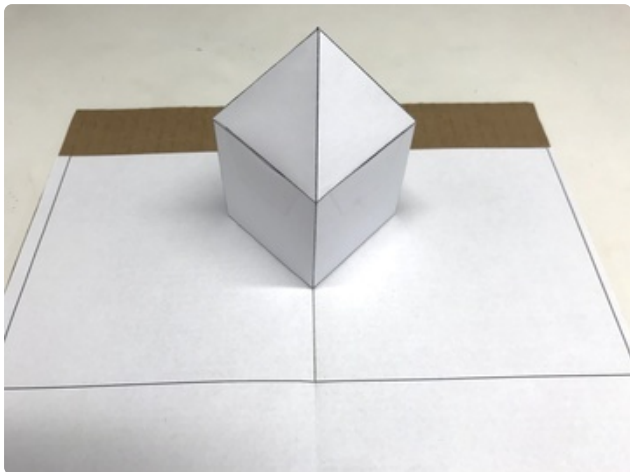
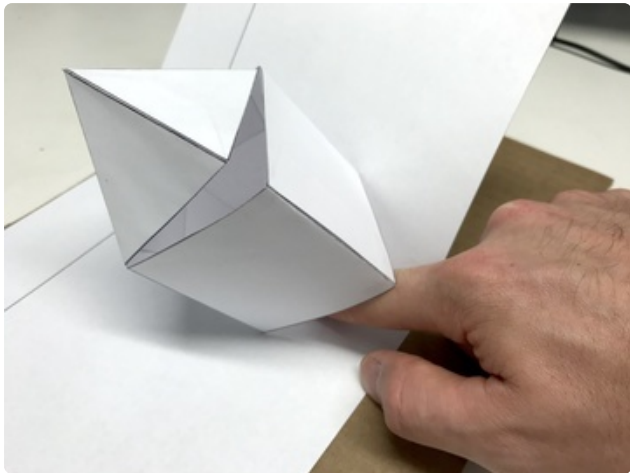
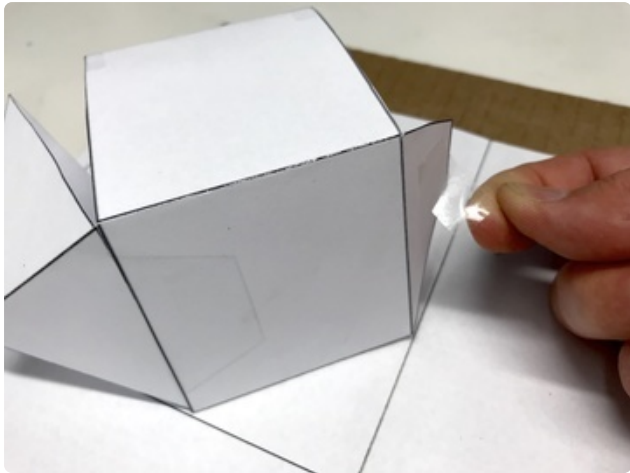
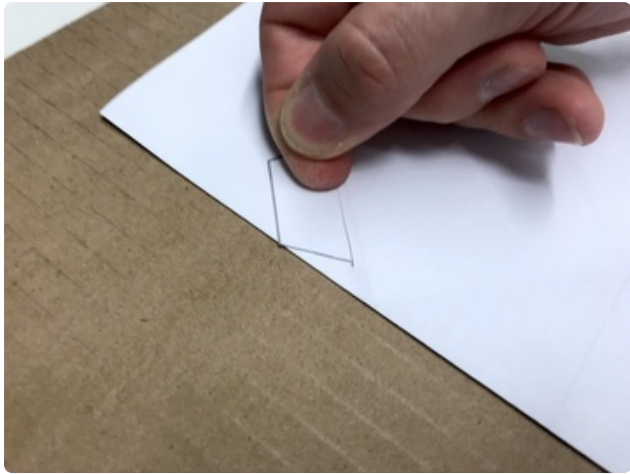


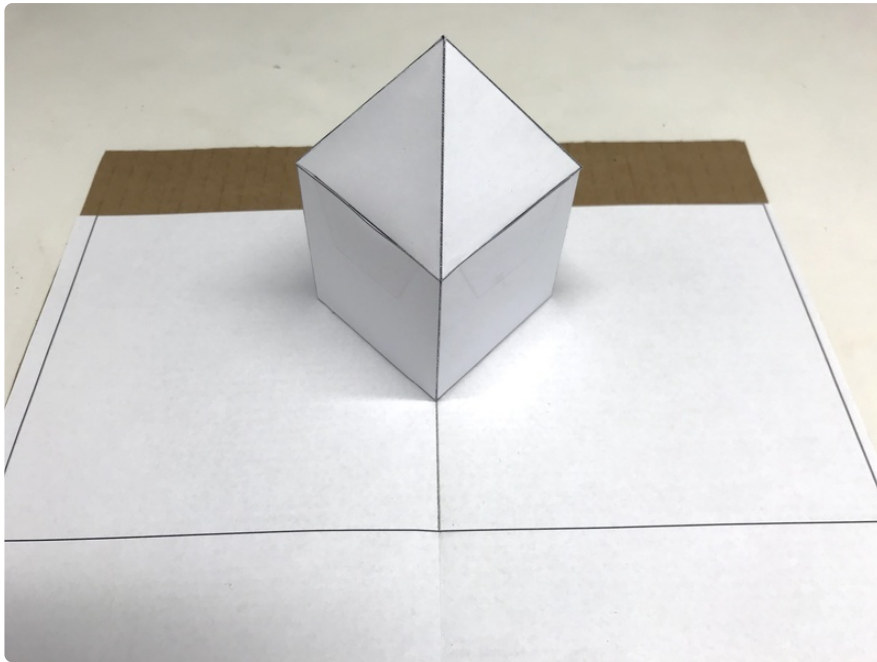
Place short strips of double-sided tape on the tabs hanging off the house.

Press down on tabs to stick tape in place.

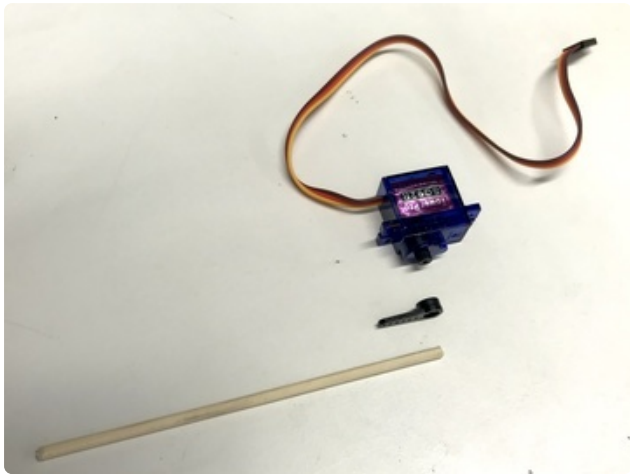


Your house is now ready!





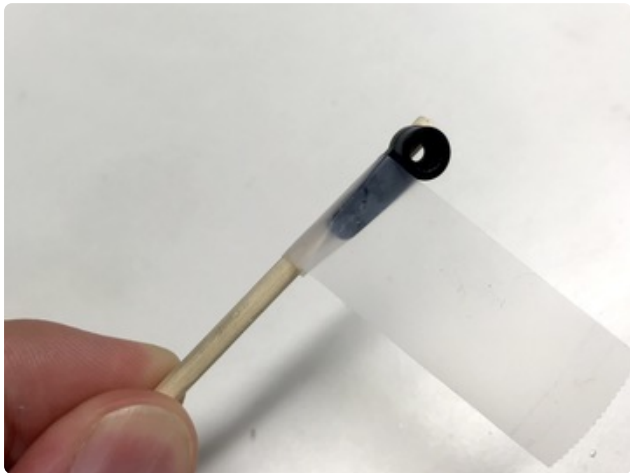
Attach Servo



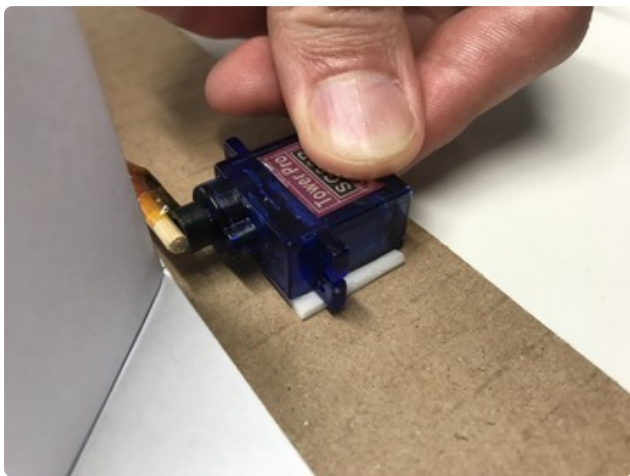
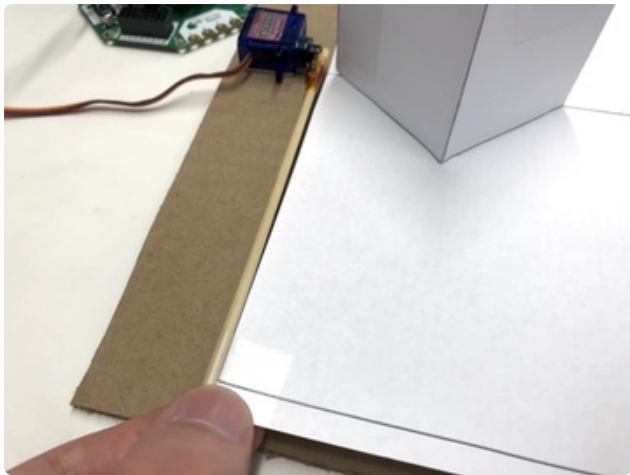
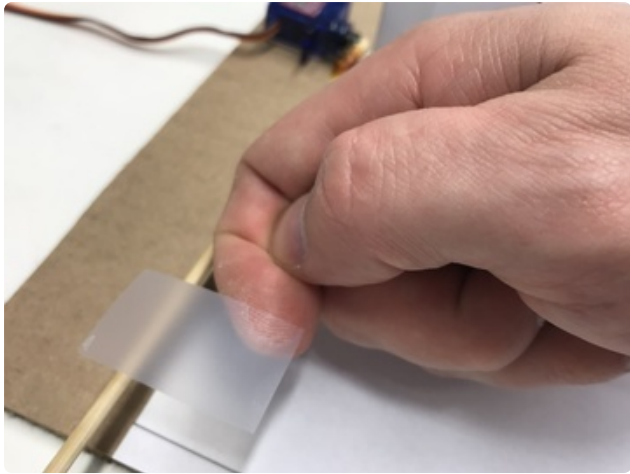
Tape the wooden arm/skewer to a single-sided servo hub.



Tape the end of the arm to the edge of the paper.



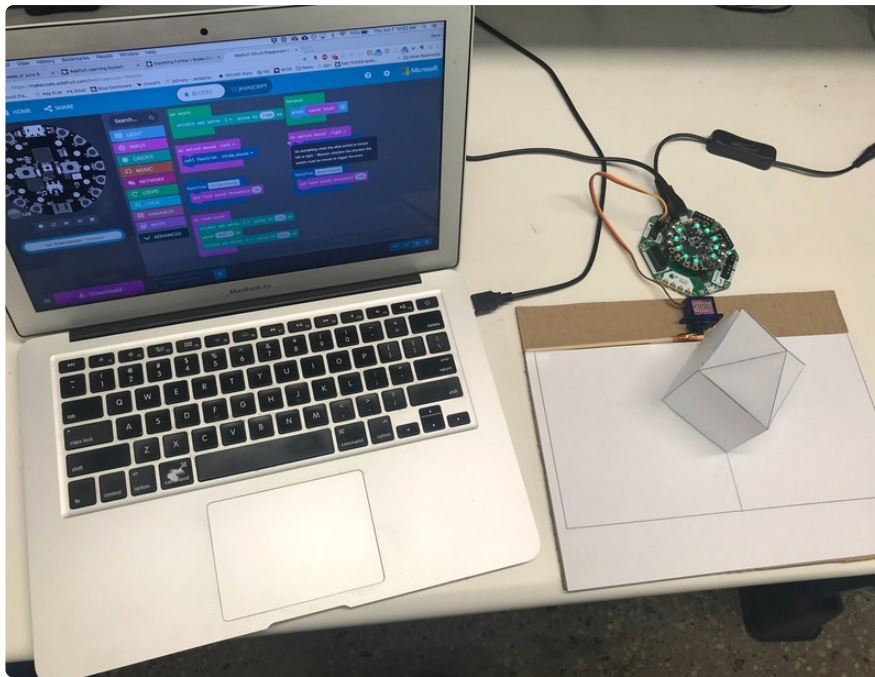
Tape the servo motor to the house foundation.



Connect your servo to CRICKIT on the Servo group of pins position 1. The orange wire towards the front, the brown or black wire towards the Circuit Playground Express.

Make sure 5V power is supplied via the DC jack on CRICKIT and the Circuit Playground Express is connected to your computer with the micro USB cable.

Now we're ready for some code!



Upload MakeCode

Now it's time to upload some code!

Microsoft MakeCode for Adafruit is a web-based code editor for physical computing. It provides a block editor, similar to Scratch or Code.org, and also a JavaScript editor for more advanced users.

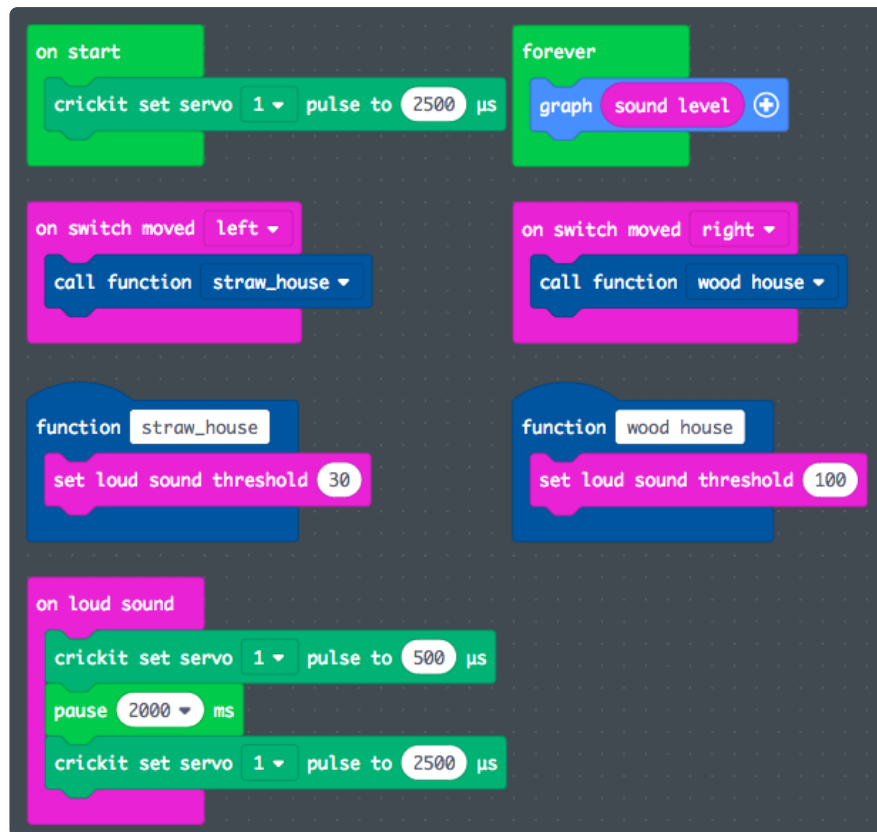
If you haven't used MakeCode before, [this guide is a good place to start \(https://adafru.it/BDk\)](https://adafru.it/BDk).

Before you move on...

...you will need to make sure you have the CRICKIT extension installed in MakeCode. Detailed instructions on how to do that can be [found in this guide \(https://adafru.it/Bwa\)](https://adafru.it/Bwa).

Once you've got that taken care of, get the Makecode below or via [this link \(https://adafru.it/Bwb\)](https://adafru.it/Bwb).

This code tells CRICKIT to move the servo motor 180 degrees if it hears a loud sound, and allows you to change the sensitivity to sound by changing the position of the slide switch.



Be sure you use the green Servo blocks under the CRICKIT group and NOT the red Servo blocks under the PINS block group!

Upload the Code

Connect the Circuit Playground Express to your computer with a micro USB cable.

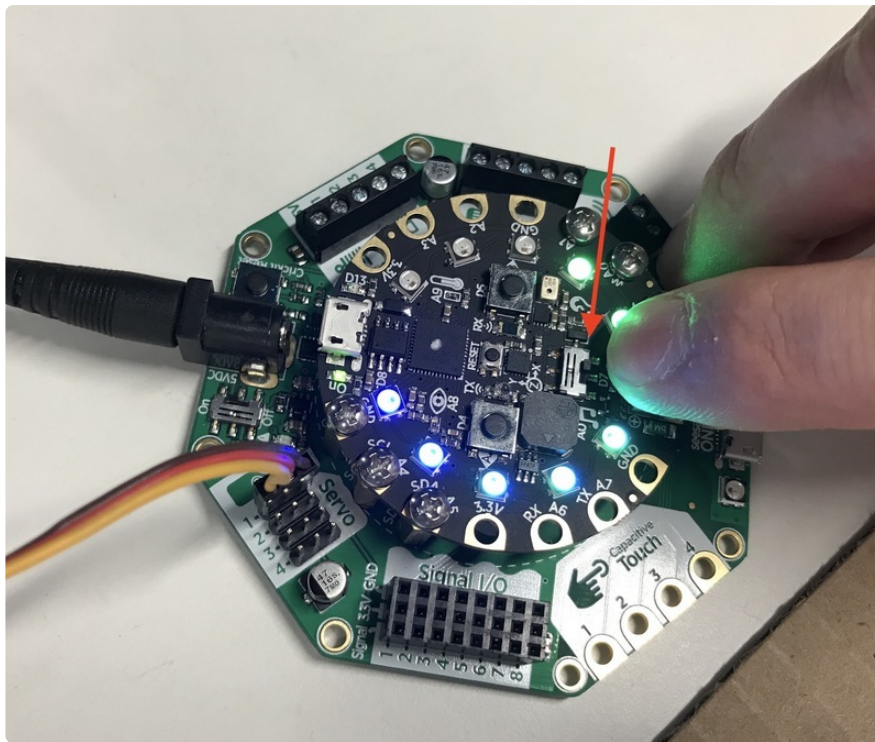
If your CPX doesn't show up like a thumb drive on your computer within a few seconds, give the reset button in the middle a firm press. The LEDs should flash red and then go green. Voila! Check your Devices for a flash drive named **CPLAYBOOT**

Click **Download** in the MakeCode window, then navigate to the downloaded .uf2 file.

Drag and drop your .uf2 file onto the **CPLAYBOOT** drive. Like magic it will automatically update & eject itself. Your code is now on the Circuit Playground Express.

Test the Code

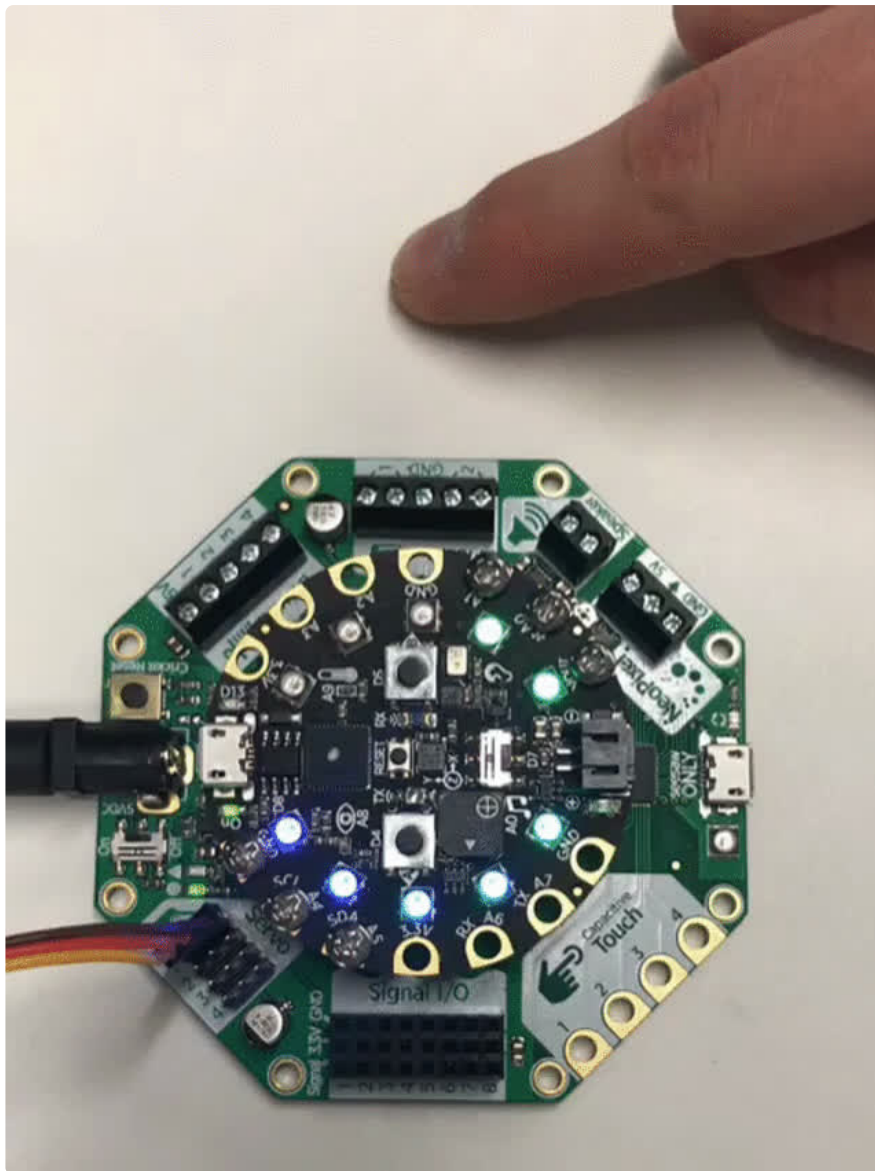
You will notice that your house will be more or less sensitive to sound depending on the position of the slide switch on the board.



Straw House

Slide the switch to the left. This is the sensitive setting.

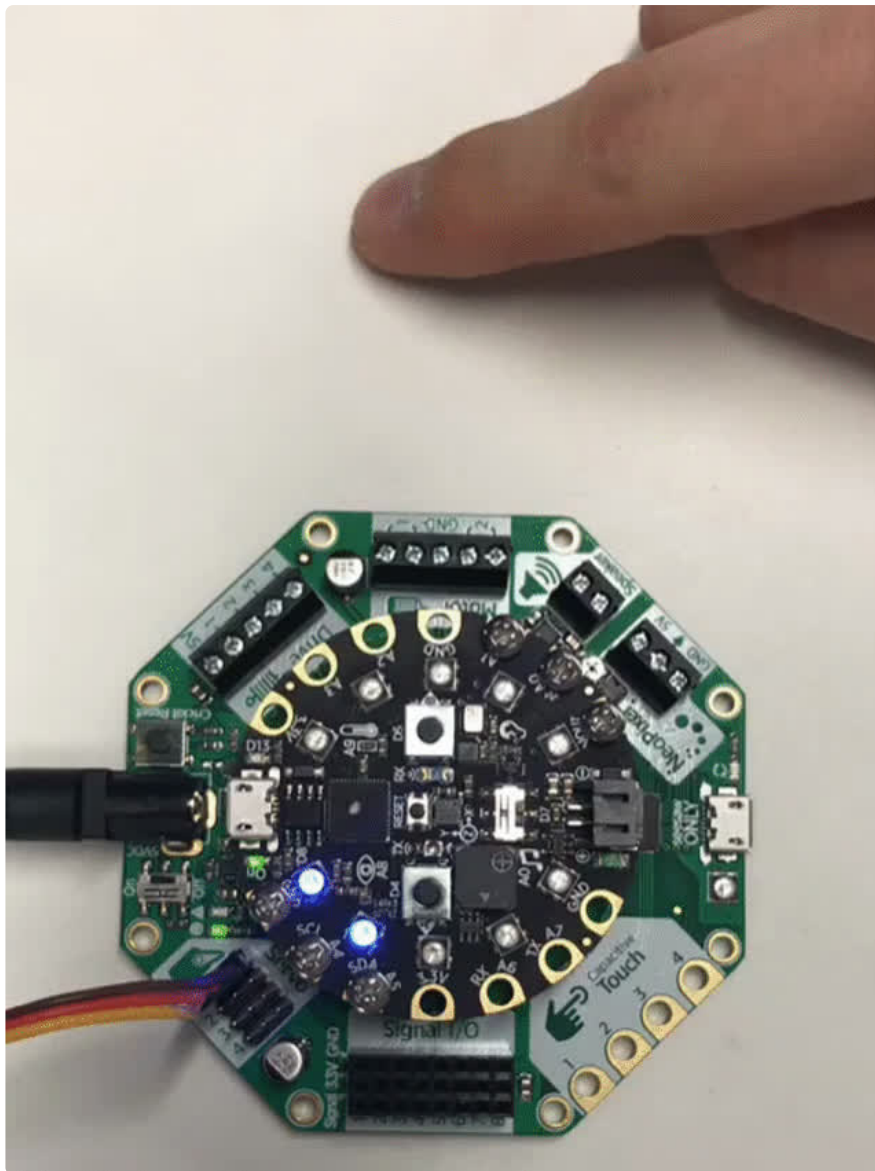
Now any small sound (or light breeze) will trigger the house to fall over. You can see how sensitive it is by gently tapping near the board and watching the NeoPixels graph the sound level.



Wood House

Now slide the switch to the right.

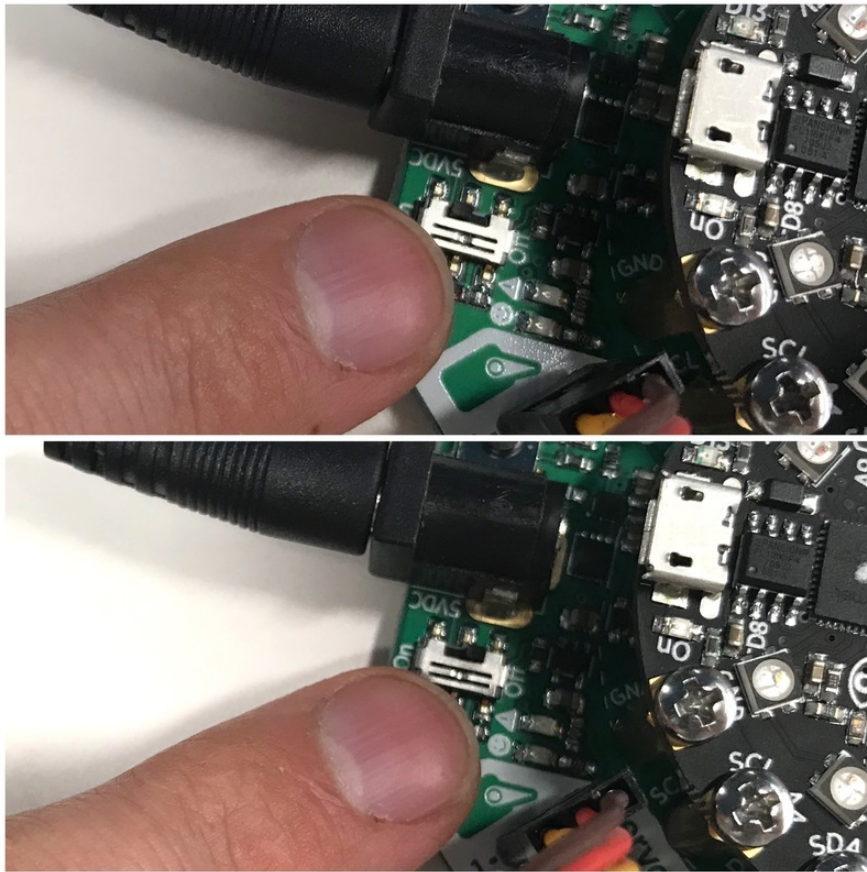
Suddenly the house is harder to blow over. You will also notice the NeoPixels are less sensitive as well. Tapping may not be enough to trigger the board anymore, only knocking hard (or a strong gust of air) can blow this house over.



Brick House

Turn power switch off.

Now nothing can knock this house down.



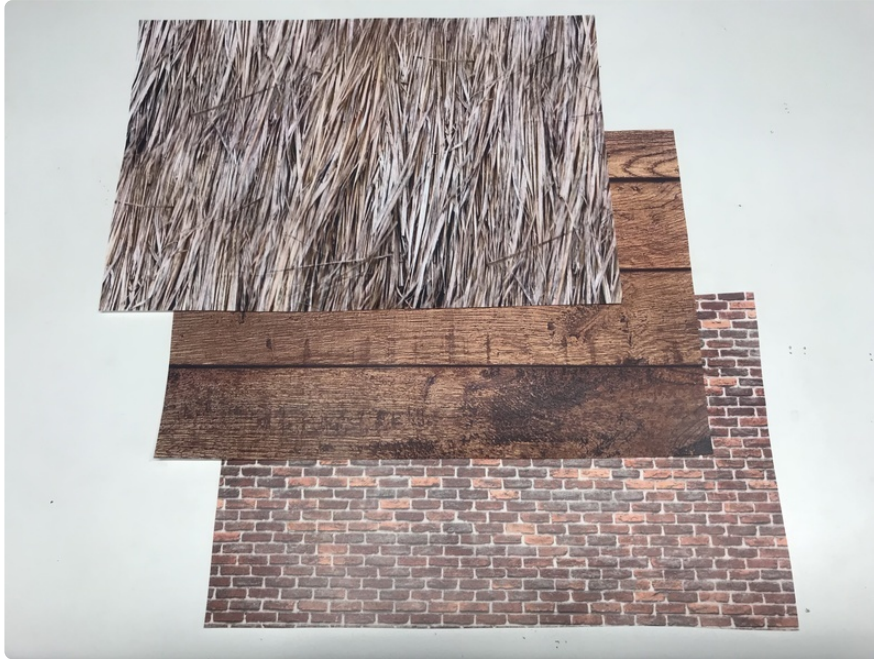
Enjoy experimenting with the settings for this collapsible house!

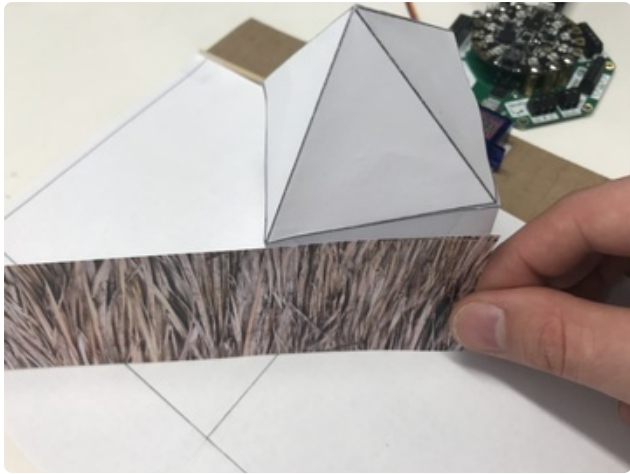
Huff and Puff!

Now it's time to add some cladding. Appropriate textures can be found by following these links:

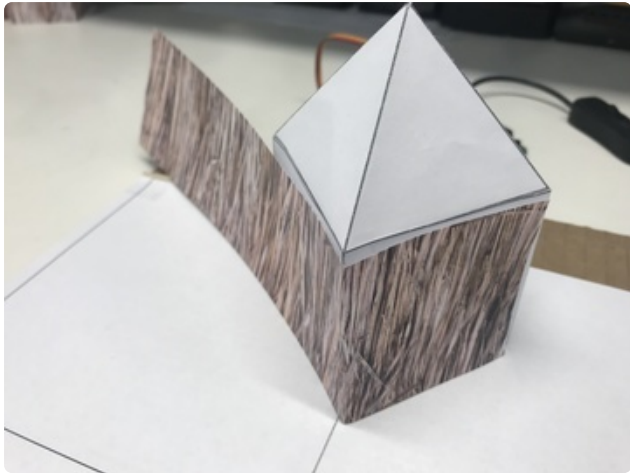
[Straw](https://adafru.it/BwD) (<https://adafru.it/BwD>) / [Wood](https://adafru.it/BwE) (<https://adafru.it/BwE>) / [Brick](https://adafru.it/BwF) (<https://adafru.it/BwF>)

Print out a copy of each.





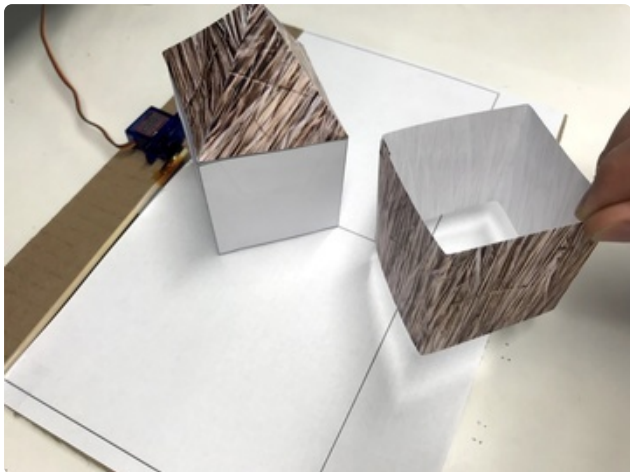
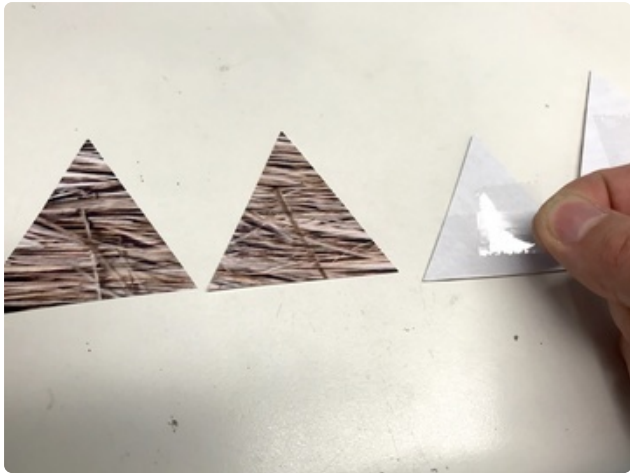
Cut a strip of texture the same height as your house.

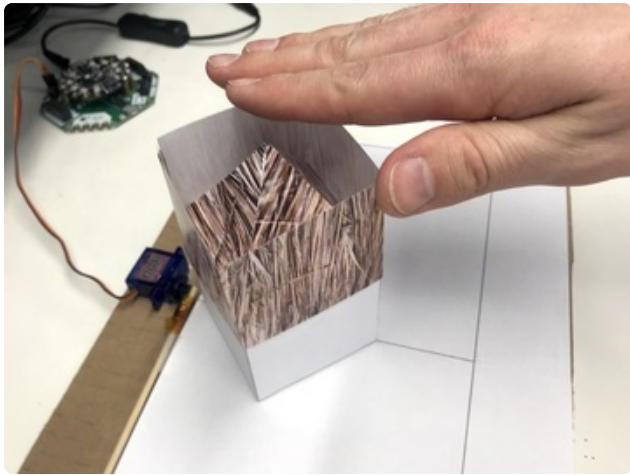


Wrap it around the house, taping the ends together.

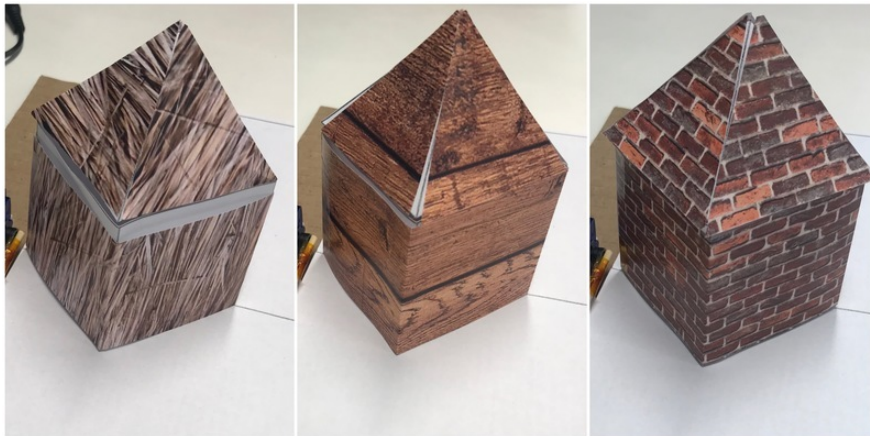
Cut another strip the same width, and cut this into squares. Trim these squares into triangles. These will be used to thatch the roof of the house.







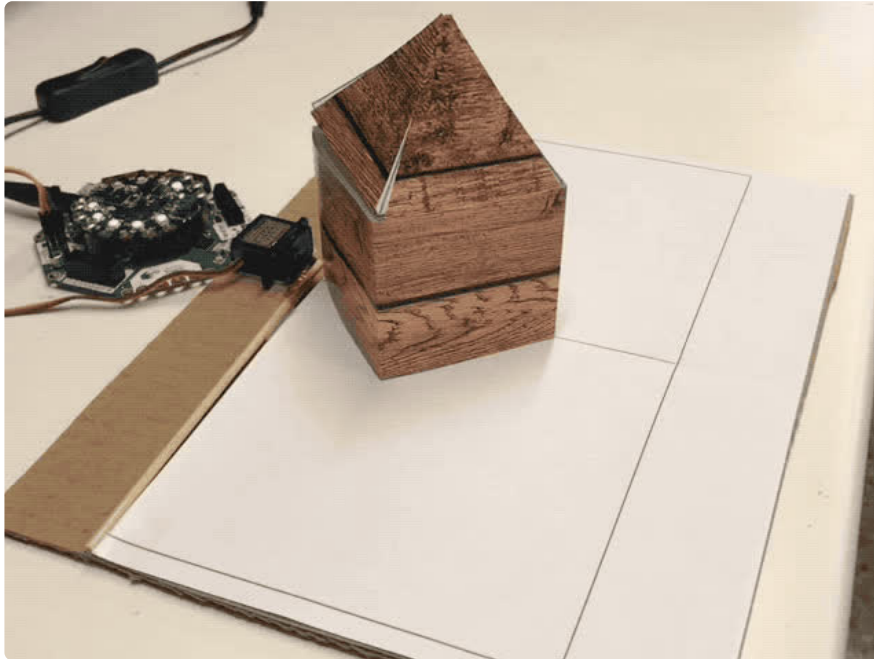
Repeat these steps for each texture. You can remove and replace each texture depending on which mode the house is in.



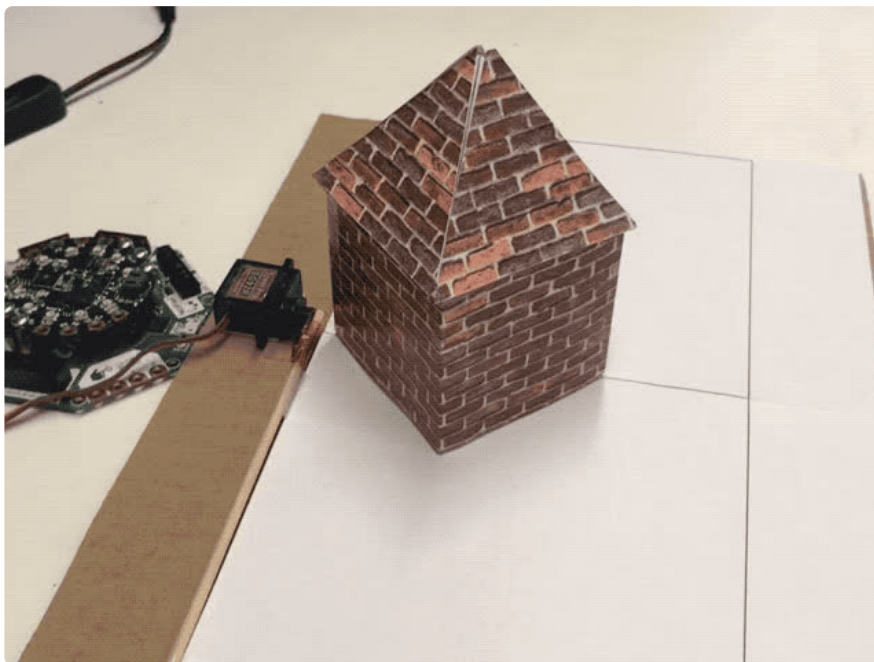
The **Straw House** (switch flipped left) blows over even in the slightest breeze. It's so sensitive it may not pop back up unless it's **very quiet**.



The **Wood House** (switch flipped right) takes a stronger breeze to blow over, but it pops right back up.



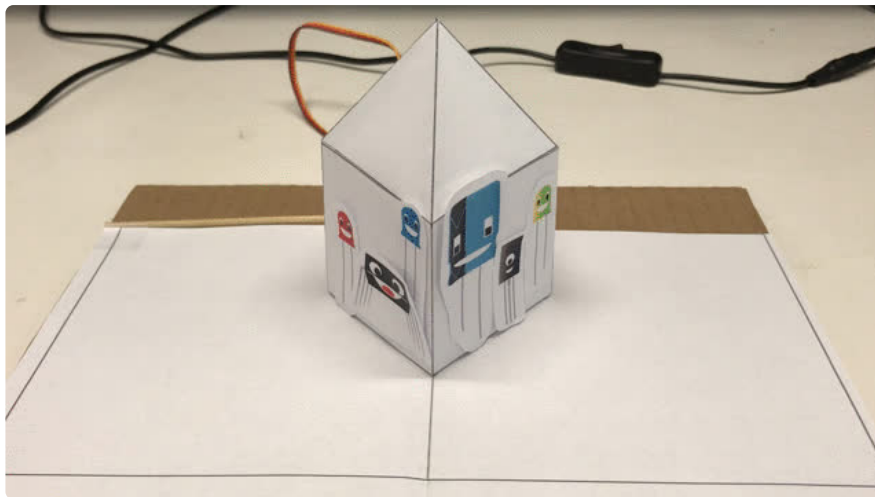
The **Brick House** (power off) can withstand even gale force winds without collapsing.



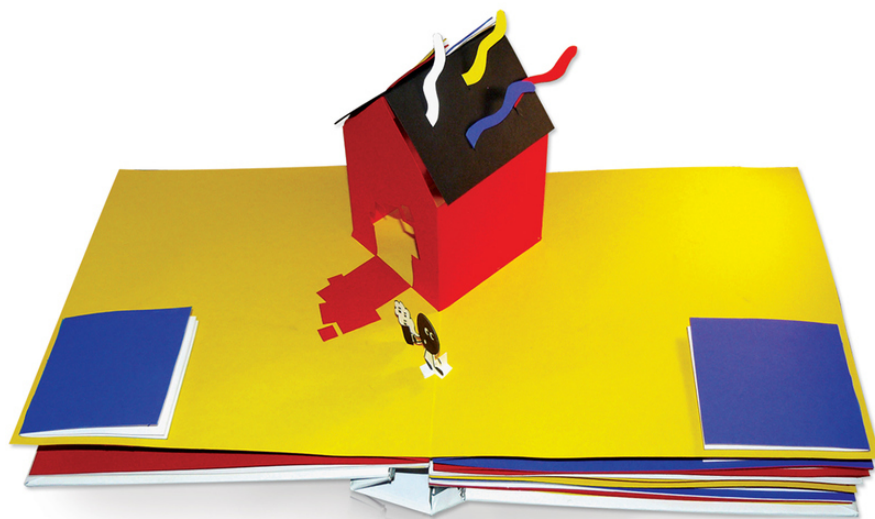
This was built with the intention of being a prop in the re-telling of the "Three Little Pigs" fairy tale, but it is suited to being adapted into other things like a notification system, or expanding upon the pop-up house to fit different stories.

You can decorate or add on to your house in all sorts of ways.

The characters from Circuit Playground made an appearance on this house.



Add a chimney, smoke, windows or doors...



There are many more techniques for creating pop-up art the try out, get as creative or ambitious as you want!



If you want to continue exploring you can check out [lots more MakeCode projects on the Adafruit Learn System \(https://adafru.it/Bwv\)](https://adafru.it/Bwv).