

### **Constructing the Pop Up Card.**

-Fold a piece of paper ( 8.5in by 11in) in half. Hamburger style!

-In the crease draw a 16cm line segment. This is our initial segment. Center it as best you can.

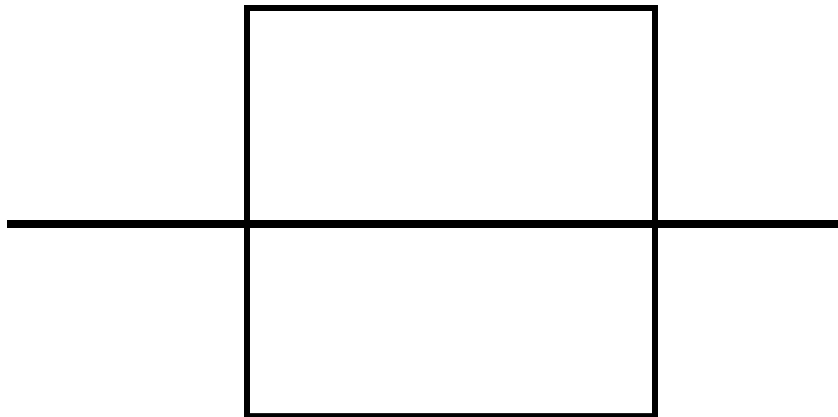
-Break this segment up into 3 pieces using the ratio 1:2:1

Your pieces will be 4cm , 8cm, 4cm

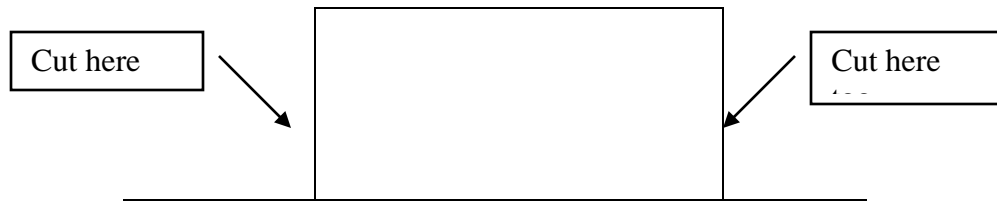
(Metric units are easier to break up into the ratios than custom units.)

-On the middle segment draw a square. I start from the first 4cm mark and draw a segment 4cm up and 4cm down from this mark. Be sure your ruler is at a right angle to your initial segment. Move the ruler to the next mark and do the same thing. Connect across the top and bottom. You should see the square on the middle segment.

-You should see the following below. We will call this our original motif.

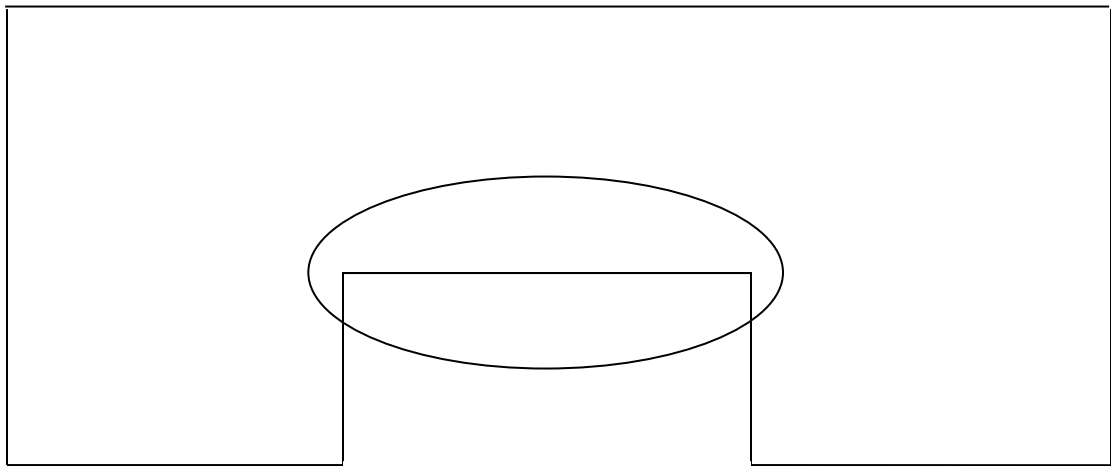


-Fold the paper over on the original crease with the square now facing you- actually it's a rectangle .

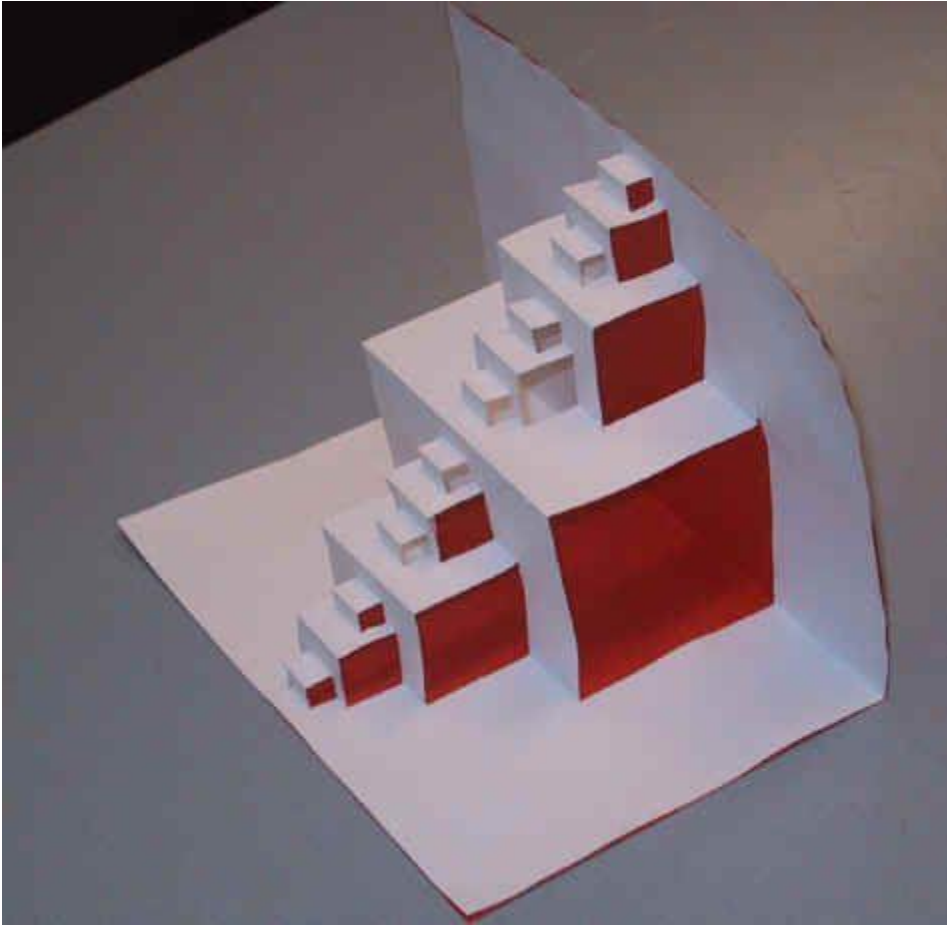


Fold back the flap. You have just completed the first iteration. Repeat this on the new segment which is the folded flap. It is 8 cm. **KEEP IT FOLDED.**

STAGE 1- first iteration



The segment in the oval is 8 cm. This is where you will start iteration 2. Divide this segment into 3 pieces using the ratio 1:2:1. So your pieces will be 2cm , 4cm , 2cm. On the middle piece draw your rectangle – so just draw using a ruler two segments 2 cm. Cut up on those pieces, fold back and now you have segment 3 which is 4cm. Repeat the process. Remember to score the folds. **ALWAYS KEEP IT FOLDED.** I press down very hard with the ruler to really compress the folds. This makes the final step easier. Now carefully unfold each piece. And pop out the folds in the opposite direction. Keep the paper folded at an angle of say 45 degrees. This is the hardest step because kids will want to try to keep the paper flat, but it will not pop up if they do.



End result!

I have students do four pop ups and then attach all four. They hang a string before they attach so that we can display in the classroom.

Here are several links to websites you may find interesting:

Fractal foundation- an alternate template to produce Sierpinski's Gasket

<http://fractalfoundation.org/resources/fractivities/fractal-cutout/>

The book I originally got the idea from is by Diego Uribe. Fractal Cut outs

<https://www.amazon.com/Fractal-Cuts-Diego-Uribe/dp/090621288X>