

Straight Cut Origami

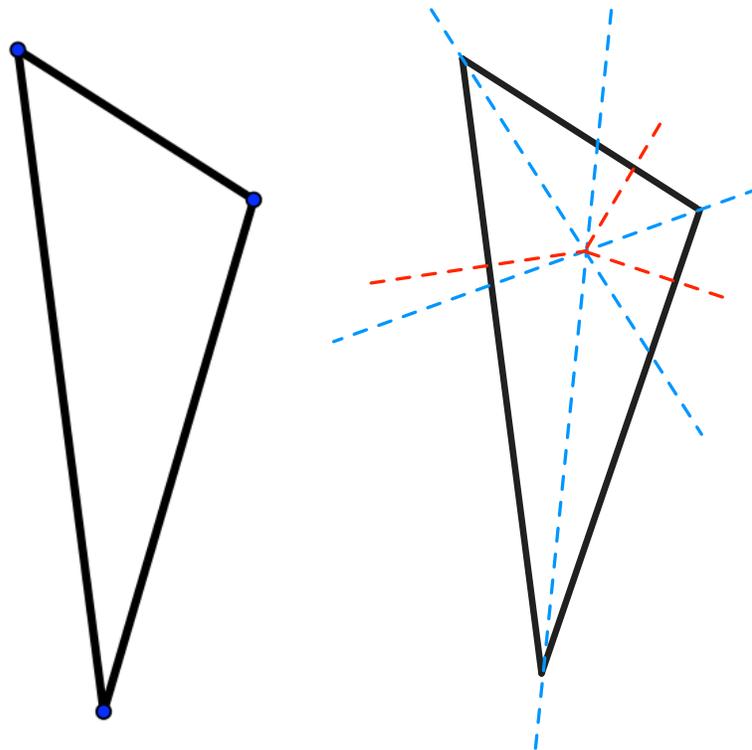
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1 Introduction

This activity involves geometry and straight cut origami. Straight cut origami is a concept where we have a shape outlined on a piece of paper and we fold that paper in such a way so that with one cut with scissors we can cut out the shape precisely.

I suggest starting out simply with the shapes in the handout found in [3]. The shapes get complicated quickly and more can be found [1]. The handout also has questions and class discussion topics.

The question is can we fold the paper so that we can cut out the shape precisely with only one cut of the scissors. The answer is yes. The solution is to fold along the angle bisectors and perpendicular bisectors. For the triangle below we fold along the bisectors given below. Angle bisectors are in blue and perpendicular bisectors are in red.



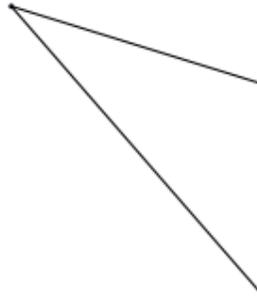
2 Materials Required

Thin paper or tracing paper would be ideal for printing out the shapes. Paper such that the lines can be see through the paper will help with proper folding.

1. shapes
2. scissors
3. protractor
4. pencil

3 Lesson Plan

1. Explain the goal of the activity. Having an example of a harder shaper already cut out would be a great motivational tool. There are examples with folding lines already made out in [1].
2. Give the students an easy shape to start with. Let them attempt to fold the shape and cut it out.



3. After they've tried ask if anyone had a good idea and explain why. If no one figured it out show them the solution. Review measuring angles and the definition of angle bisector. **Angle bisector** is the line that divides the angle into two equal parts.
4. Give the students the more shapes to try on their own.
5. Review perpendicular bisectors and ask them if they can find any in their folds. In order to fold the edges properly we fold along perpendicular bisectors as well.

4 References

1. <http://erikdemaine.org/foldcut/>
2. <http://artofmathematics.wsc.ma.edu/>
3. http://docs.google.com/viewer?a=v&q=cache:K1-Gg_BIxdJ:artofmathematics.wsc.ma.edu/status_updates/Handout-JMM-2011.pdf+straight+cut+origami&hl=en&gl=us&pid=bl&srcid=ADGEESiCarZbicADON0ewc_ji-VUZ5zyYPSelvjir3LaUt4nzGSjAGrMA6bPuA-nwRmAHIEtbR0b0G5984hnzIKmFpB1Sx_k5tkNQ