## Fold and Cut.

We have a piece of paper. How many straight line cuts do you need to cut a square out in the middle of a piece of paper? 5 cuts? 4 cuts? 2 cuts? Who can do it in the fewest cuts?

How we can do it in 2 cuts? Maybe if we fold it along the diagonal?

Can we do it in even fewer cuts? If a square has 4 sides, how can we cut all of them out in a single cut? Maybe we should join them together somehow.

Let us fold the paper along the diagonal to join 2 sides of a square into 1. This will give us 2 lines to cut. But we can repeat this and join the remaining 2 sides in a single side, which will require only a single straight line cut. So it is after all possible to cut a square in the middle of a paper with a single cut.

Is this feature only true for the square, or can it be done for some other shapes as well? What kind of shapes?

We will do only one type of activity today - fold up a piece of paper, make one straight cut, then unfold the paper.
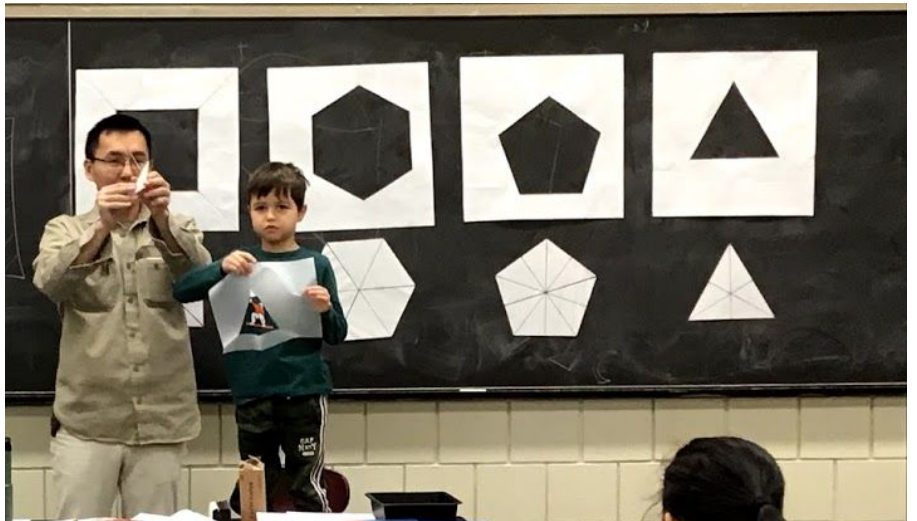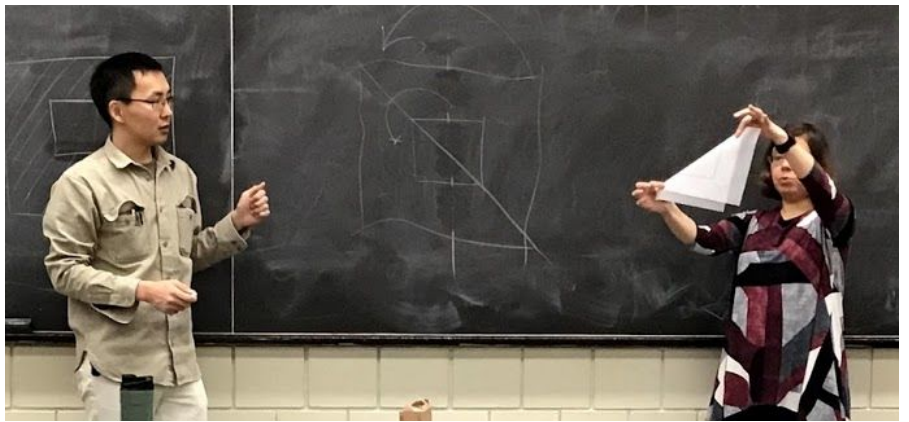
Recently, mathematicians have shown that any shape made of straight lines can be cut from a sheet of paper by folding it beforehand and making a single straight line cut.

Let us start with some simpler shapes. We will trace the shape on a patty paper, which is transparent and start folding. Make sure you try to align the sides of the shape as much as possible when you fold it.

How do we fold and cut the paper to get a triangle? Is it even possible? Let us take a triangle with all sides equal and fold it in half, right down the midline. We now have 2 straight lines left instead of 3. How do we combine them? We can simply fold the paper along a straight line going right through the middle of those lines. This is called the bisector of an angle and we will be using it a lot from now on!
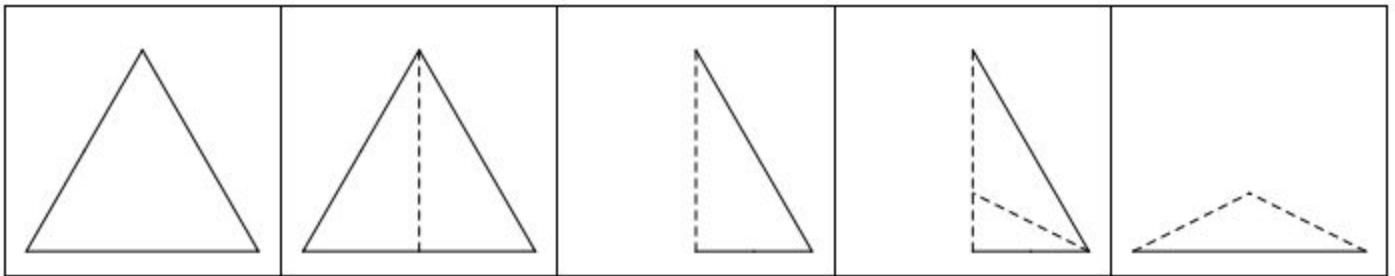
In the row of pictures with triangles, the bisectors are shown in dashed line and they are in fact dividing the angle into two equal parts.