

In a Cloud

Grade Levels

This activity is intended for students grades 2 – 5.

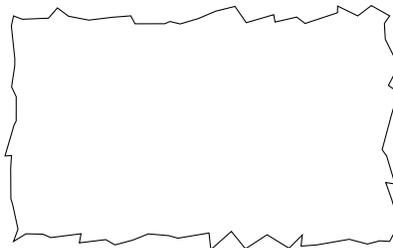
Objectives and Topics

The purpose of this activity is to produce different polygons from two cuts on a folded "cloud". This lesson will take one period for completion (approximately 45 minutes). Students will be introduced to notions such as

- Perpendicular
- Axes of symmetry
- Isosceles triangles
- Quadrilaterals
- Diagonals

Materials and Resources

- Paper cut or torn into "cloud" shapes

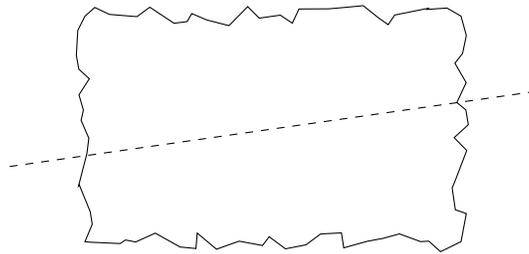


- Scissors

Outline

Give every student a “cloud”. Start by having the students try to make a triangle by folding the cloud and making two cuts. After comparing their results, examine what shapes they made and how different cuts affected the resulting shape. If nobody has obtained a triangle yet, have the students try again until a solution is found.

If the students produce what appears to be a square or a rhombus, have them develop a way to check to see if their shape truly satisfies the requirements for a square and/or rhombus. See if they can create a method for creating a square and/or rhombus with two cuts.



- What other shapes can you make from two cuts along the folded edge?

Prior Analysis

Often students will try to cut a triangle on the folded paper and end up with a kite or a rhombus. After several attempts they will realize they need to make a cut perpendicular to the fold to get a straight edge.

2nd part: have the students compare the shapes they made and group like shapes together. Review how each kind of shape was obtained. This will help guide their thinking about how to create a rhombus and/or square.

Discussion

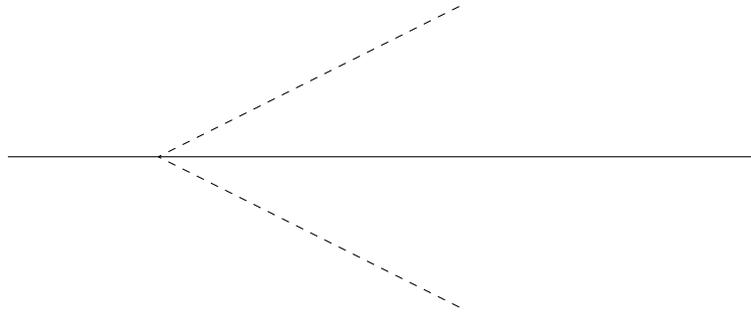
If the paper is folded a second time (whether perpendicular to the first fold or not), what kinds of shapes can be made with two cuts? With only one cut?

Activity: A Cut of Scissors

http://superm.math.hawaii.edu/_lessons/k_five/one_cut_pone

Elements for Synthesis

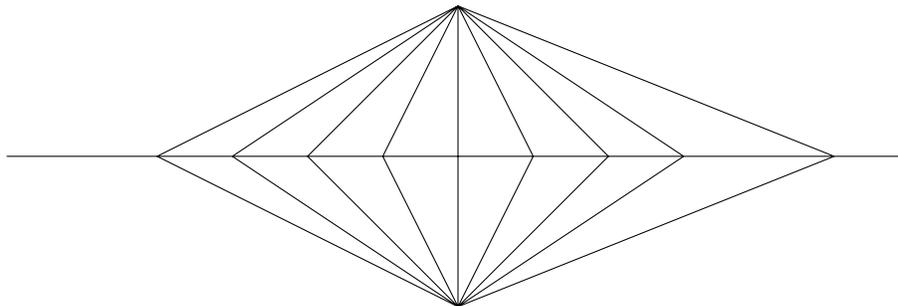
When the students study the shapes they make, they will notice that they are symmetric along the fold in the paper. The first cut, when slanted, determines two adjacent sides of the resulting polygon (see below).



Dashed line represents first cut.

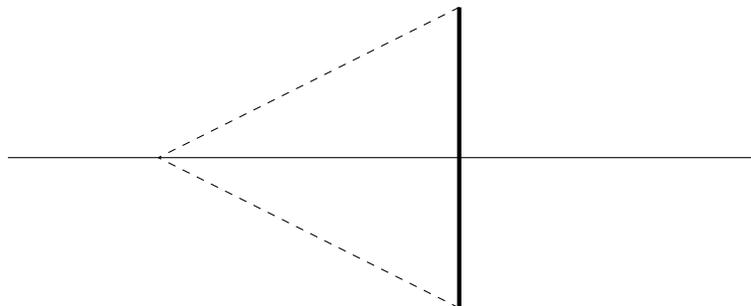
Depending on the second cut, the students can make:

- A kite
- An "arrowhead"
- A rhombus (diamond)
- A triangle



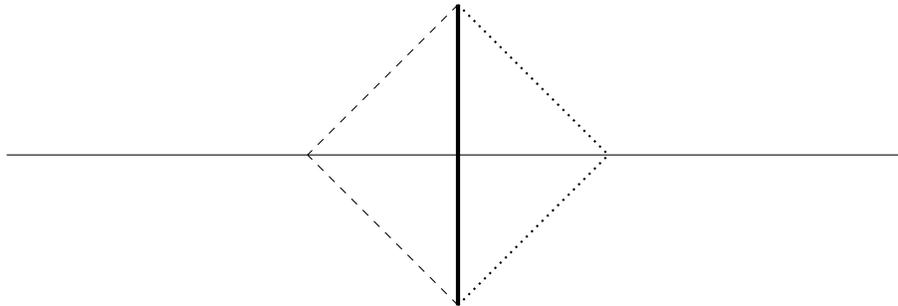
Can you find the four shapes?

To make a triangle, the second cut must be perpendicular to the fold: this is how the straight edge is made.



Dashed line represents first cut. Thick black line represents the second cut.

To make a rhombus, the second cut must be symmetrical to the first about the perpendicular to the fold (one method: after the first cut pull the "triangle" created to make a perpendicular line to the fold and cut along the resulting edge). To create a rhombus that is also a square, the first cut must be at 45° to the fold (one method: make a perpendicular by folding the creased edge upward, then fold again to mark the bisector of the resulting right angle).



Dashed line represents first cut. Dotted line represents the second cut. Thick black line is the perpendicular axis (not to be cut on).

To prove one of the shapes created is a rhombus; it suffices to fold it along its second diagonal. The edges must meet precisely. Making creases along the diagonals is not enough to prove one of the shapes made is a square. It is also necessary that the edges meet precisely when folded along the bisectors of both sets of parallel sides.

Adapted from "Dans un Nuage," available at <http://icp.ge.ch/dip/maths/spip.php?rubrique61>