APMC
HOT ideas

Cut two triangles

Sometimes simple ideas are more productive than complex and over-prepared lessons; perhaps because of the flexibility afforded both teachers and students. Below is a description of the basic activity and the potential mathematics associated with it. The following page gives examples of how the basic activity could be implemented with students of various stages of development, ranging from about 4 years to 12 years of age.
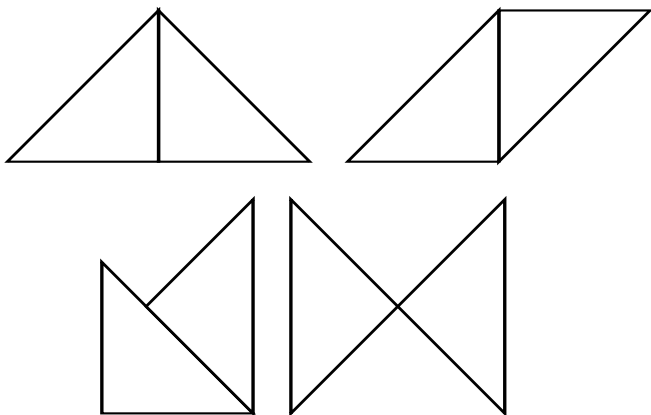
The basic activity

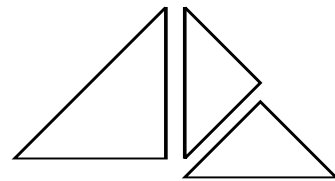Start with a square of paper. Fold it along one diagonal, then cut along the fold to create two triangles.
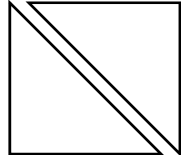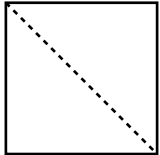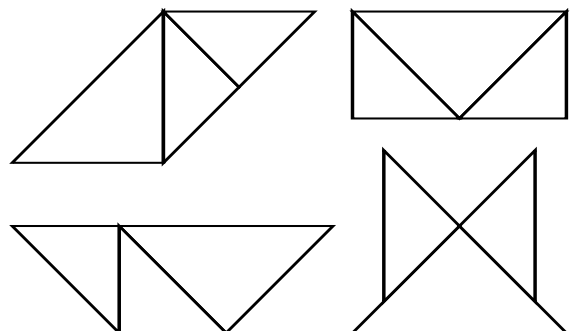

Use the triangles to make the square again, a large triangle, a parallelogram, other shapes.
For example:

Fold one of the triangles in half and cut along the fold to create two smaller triangles.

Use the 3 triangles to recreate the previous shapes, and a trapezium, and a rectangle; and other shapes.
For example

The mathematics

Depending on how the basic activity is implemented, the following geometric concepts could be encountered:

- Symmetry (folding halves)
- Congruence of shapes (two identical triangles)
- Similarity of shapes (two sizes of triangles)
- Angles (90 and 45 degrees, as well as 135 by combining the two)
- Basic properties of polygons and naming of polygons (number sides, length of sides, equality of angles)
- Movement of shapes (flip, slide, turn) and conservation of properties
- Visualisation and the manipulation of mental images
- Deduction and justification (e.g., "This angle must be 45 because I cut the right angle in half", "These sides must be the same length because they were both sides of the same square before I cut it".)

Early years

Use an invented story context (e.g., *Sam Square's Walk Through Shape Land*) to create the purpose of the children making 'things' to complete the story (e.g., As Sam walked along he saw a …). Show how to fold the square in half and ask the class to predict what shapes will be made when the fold line is cut.

Have each child cut a square to create 2 triangles (one cut) and model appropriate language (square, triangle, same, half, straight, long, short, wide pointy).

Encourage the children to remake the square, then explore other ways to put the triangles together. Ask individuals to talk about what they are doing and encourage the use of specific language.

Each child chooses one of the shapes they have created and pastes triangles in place onto a sheet of paper. Support each child in adding a label with word/s (e.g., butterfly) and put the pages together to make a class book.

Each time the book is read with the class, encourage them to talk about the shapes and how they were made.

Middle primary years

Begin with cutting the square into two triangles and asking students to find and name shapes.

Discuss similarities and differences (angles, sides, area) between the shapes and use the geometric names.

Have the students fold and cut one of the triangles in half to make a smaller pair.

Ask students to recreate the shapes using the three triangles, and to find new shapes that can be made. Ask individuals to show the class a shape they have made and see if the rest of the class can also make it.

Form small groups to pool their ideas and to create a poster of all the shapes made, with labels and statements added.

Upper primary

1. Working with 2 or 3 triangles focus on properties of shapes, challenging the students to work out each angle, find equal length sides, etc.)

   Either in pairs or individually, ask the students to choose one shape and write everything they possibly can about it. Encourage explanation and justification of the conclusions reached about the specific properties.

2. Work with 5 triangles and challenge students to remake all the shapes.

3. Pairs of students work on a computer and use the Word drawing tool bar to recreate the 3 triangles and reproduce the shapes. (Use autoshapes, flip, rotate, copy & paste, text boxes). Encourage them to have the paper shapes beside the computer as they work and to write about the process used to make each shape and to solve the difficulties encountered.