

This idea requires some students to sit in a circle with their chairs equally spaced around a circle, a ball of string and a range of grid papers for recording purposes. These grids have different numbers of equally spaced dots arranged on the circumferences of circles.

The idea develops by holding onto the loose end of the ball of string then passing the ball a fixed number of spaces to someone else in the circle (this is the pass size). This person wraps the string around a finger then passes the ball to another person using the same pass size. This routine continues until the ball of string returns to the first person. At this point a shape, either a polygon, a straight line or a star shape will have been formed.

The outcome depends upon the number of people in the circle and the pass size rule applied. Clearly if there are 12 people in the circle and a pass size of four is used, the shape will be an equilateral triangle. If there are 12 people and a pass size of five is used, a 12-pointed star will be made.

The idea is to find what different shapes are made and how these relate to the number of people in the circle and the pass size used. Students might be encouraged to draw up a two-way table to explain what happens for different numbers of dots on the perimeter and the size of the pass rule.

The idea could be developed by asking students to calculate the angles of the vertices of the shapes produced (including star shapes).

Another development could be to calculate perimeters of the shapes (or the lengths of the lines forming star shapes).

One of the PGCE students I had the pleasure to work with last year, Jo Jeffrey, taught a lesson based upon loci I am keen to share. What was valuable about the lesson was how she adapted a people-loci approach (see *Getting the Buggers to Add Up*, Continuum 2004, pp. 53–54) to develop the basic concept of loci to one of using magnetic counters distributed to various students/volunteers throughout the lesson.

Jo asked each person holding a magnetic counter to come to the whiteboard and place their counters according to different conditions. Some of these were:

- Place your counter 20 cm away from the edge of the board (producing the loci of a pair of parallel lines).
- Place your counter an equal distance between two adjacent sides of the board (producing the loci of an angle bisector).
- Place your counter 20 cm away from a marked point on the board (producing the loci of a circle).
- Place your counter an equal distance between a given pair of points (producing the loci of a perpendicular bisector to a line joining the two initial points).

As students completed each task Jo asked them to make a sketch of the situation, ensuring they had access to the mathematical vocabulary associated with each loci produced, for example parallel lines, angle bisector, circle and perpendicular bisector.

Once students have gained the basic idea of what a loci is they can be challenged to construct other more complex loci, such as finding the set of points that are equidistant between:

- A line and a point (producing a parabola).
- A circle and a point (there are various scenarios here depending upon the position of the point both outside and inside the circle).