

# Seven Pin Polygons - Teacher's Notes

The enclosed pupil's worksheet describes the activity and has an accompanying sheet for pupils to record their work.

Seven-pin-polygons is a very worthwhile activity because it raises the important question of what we mean by 'different'. It is likely that many, if not all, pupils will duplicate at least one of the shapes, with one being a reflection or rotation of the other. They will have drawn the SAME SHAPE but in a DIFFERENT POSITION. This can be the focus of much valuable discussion with individuals and the whole class.

An alternative to doing the activity on paper is to use the excellent program *My World*. The Download of the Week for Week 7 was a *My World* screen focusing on seven-pin-polygons.

## Follow-up Activities

There are 19 different seven-pin-polygons. See the Download of the Week for Week 7, *7-pins.bmp* if you want to see them all. Once pupils have produced the complete set they can be used in various follow-up activities:

- **Names and Properties of Common Shapes** - Many of the polygons are common shapes that pupils must know by name and they must also know their basic properties. Use the polygons to explore these names and properties.
- **Line Symmetry** - ask pupils to draw the lines of symmetry on all of the polygons.
- **Rotational Symmetry** - ask pupils to identify those polygons that have rotational symmetry.
- **Angles** - ask pupils to work out (or measure) all of the internal angles in each polygon. They are all multiples of 30 degrees.
- **Area** - Tell pupils that the area of the small equilateral triangle is 1 and then ask them to work out the area of each of the other polygons (e.g. the Rhombus has an area of 2 and the Hexagon an area of 6).
- **Tessellation** - Which of the polygons will tessellate? Tessellating the polygons is far more interesting and challenging than tessellating simple regular shapes!

## Using the Logo File

The file *7-pins.lgo* is an *MSW Logo* file containing a number of procedures that can be used to support this activity. If you haven't got *MSW Logo* then you are missing out on a very good package which is completely free. It can be downloaded at

[www.softronix.com](http://www.softronix.com)

To use the file, first start *MSW Logo*. Then from the **File** menu select **Load**. Go to the location where you have saved *7-pins.lgo*, select the file and click on **Open**.

The file contains 19 procedures, named P1, P2, P3, ..., P19, corresponding to the 19 seven-pin polygons. To produce one of the polygons simply type its name (e.g. P12) in the Commander input box and press ENTER.

You will need to clear the screen before producing the next polygon, so for example, you should type instructions such as

```
CS P9  
CS P15    etc.
```

You can also rotate or move the 'turtle' before drawing the shape. For example after drawing P15 you might want to demonstrate what it looks like after a quarter turn. You could do this by typing

```
CS RT 90 P15
```

You might want to display two of the polygons side by side. You could do this by typing

```
CS P5 RT 90 FD 300 LT 90 P6
```

The commands between P5 and P6 move the 'turtle' across the screen.

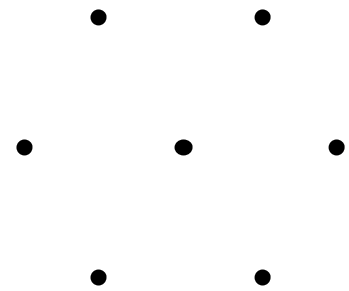
Use these procedures to introduce the activity to pupils and also when discussing all the possible polygons during the plenary.

Also use them as a teaching aid when discussing the names and properties of common 2-D shapes. Polygons P1 to P9 are important mathematical shapes that pupils must know about.

As an extension activity, older pupils could attempt to write their own logo procedures to produce the seven-pin-polygons they drew earlier.

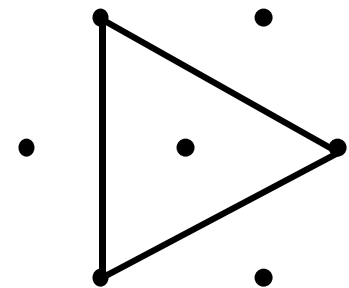
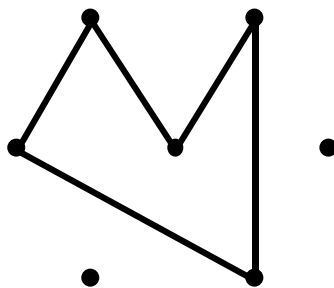
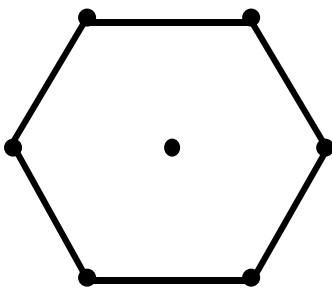
# Seven Pin Polygons

Here is a hexagonal arrangement of seven dots.

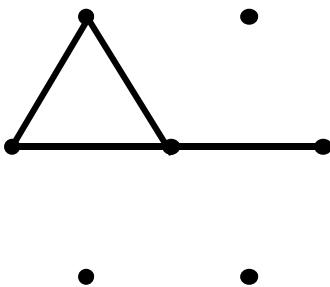


A seven-pin-polygon is a closed shape made by joining the pins with straight lines.

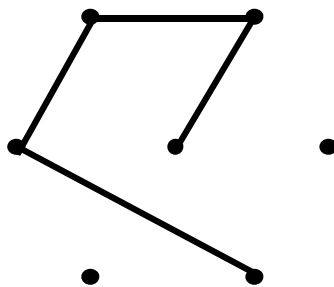
Here are three examples of seven-pin-polygons.



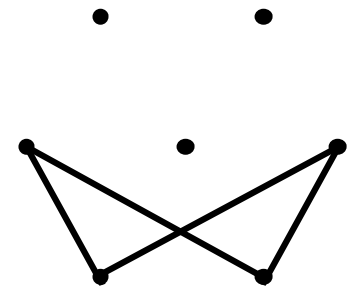
Here are three examples which are **not** seven-pin-polygons.



This one has got an extra line sticking out of it



This one is not a closed shape



This one is made from two shapes and one of the corners is not on a pin

How many different seven-pin-polygons can you make?

Record them on the sheet provided.

Name.....

