Angles and Triangles

Mathematics | Year 5 | Lesson 5 of 5

Learning Objective	Resources
To identify angles around a point which total 360°.	Slides Worksheet 5A/5B/5C Protractors Rotating Shapes 5A/5B (FSD? activity only)

Teaching Input

- Did you know that you can make interesting patterns using triangles because of their special properties? Because the angles inside a triangle equal 180°, you can always fit six of the same triangle around a point. The slide shows an example of this. You can always fit six copies of a triangle around a point, but what have I had to do to make them fit? Allow some time for children to discuss and respond to this. The following slide explains that patterns like those shown can be made with any shape of triangle by rotating alternating triangles by 180°.
- I'm making patterns by rotating a triangle around one point and tracing round it. I've managed to make a flower pattern with these two triangles (with 72° and 36° degree angles, respectively). I've got a problem! This triangle (with a 50° angle) doesn't rotate exactly–I end up with a gap or with an overlapping pattern! Why is this happening? Again, allow time for children to discuss and respond.
- Following some discussion, show the slide with an explanation: I think it's got something to do with 72 and 36 going exactly into 360! I know that there are 360° in a full turn. I also know that 72 and 36 are factors of 360. 50 is not a factor of 360; I think that's why this triangle won't rotate exactly around its 50° angle! I wonder if other triangles with angles which are factors of 360 will rotate exactly? Can you find out for me?

**Slide 9 shows an explanation about factors and reveals that there are 22 factors of 360. Optionally, show this slide if you wish to recap what factors are.*

Main Activity

Lower ability:	Middle ability:	Higher ability:
On Worksheet 5A, children are given instructions to cut out and draw round the triangles given, rotating them to make flower patterns. They are then to colour in the flowers and write × and ÷ number sentences for them as shown in the example.	On Worksheet 5B, children are instructed to draw and cut out triangles with angles that are factors of 360 (given on the sheet). They will need protractors to do this. Children are then to make flower patterns by rotating them, writing × and ÷ number sentences as shown in the example.	On Worksheet 5C, children are instructed to find some more factors of 360, then draw and cut out triangles with angles of the factors they found. They will need protractors to do this. Children are then to make flower patterns by rotating them, writing × and ÷ number sentences as shown in the example.

Fancy something different...?

- Provide the Rotating Shapes 5A/5B sheets, ideally printed on card. Each of the shapes shown has at least one angle that is a factor of 360, meaning it can be rotated around that angle to make a pattern without gaps or overlaps. In fact, combinations of the shapes can be used to make patterns where the angles around a central point total 360° exactly. Challenge children to create works of art by cutting out the shapes and drawing around them to create rotating patterns. Provide a variety of art materials such as felt pens, coloured pencils, gel pens for children to decorate their patterns as they wish.

Plenary	Assessment Questions
Allow some time for children to either share their findings (if they did the main activity) or visit other tables to look at each other's art work.	• Can children rotate triangles around a point? • Can children find angles around a point which total 360°? • Can children identify patterns and rules about triangles according to their properties?