9.1 Lines of symmetry in 2D shapes

Presentation – Teaching notes

Slide 2:

This intervention covers lines of symmetry in 2D shapes. Students are encouraged to identify where lines of symmetry are on 2D shapes, initially using physical manipulatives, if possible (folding paper and using mirrors), and latterly by visualising the lines of symmetry.

Slide 3:

On this slide, students consider an isosceles trapezium. A line of symmetry is identified, and students are shown how the shape can fold along the line of symmetry and the two halves fit exactly on top of one another. The slide notes suggest that students are provided with a paper isosceles trapezium to try folding for themselves.

Slide 4:

This slide illustrates how a mirror can be used to find a line of symmetry. Again, it is suggested in the slide notes that teachers may wish to use mirrors, and encourage students to experiment for themselves with the lines of symmetry on different shapes, to enhance understanding.

Slide 5:

Next, the idea of zero lines or one line of symmetry is introduced. Students are shown a variety of shapes and asked to decide whether the shapes have a line of symmetry or not. The common misconception that all shapes have a line of symmetry is tackled early on in the intervention, with students being expected to explain why some shapes have zero lines of symmetry.

Slide 6:

Now, students are shown a variety of road signs and asked to decide whether they have a line of symmetry. Two of the signs have rotational symmetry, but not line symmetry. Although rotational symmetry is beyond the scope of this intervention, and not explicitly explained, these road signs are used deliberately to draw out the common misconception and offer opportunities for discussion.

Slide 7:

In this slide, students are shown a square, and attention is drawn to the fact that it has more than one line of symmetry. Again, the slide notes suggest using a paper square and folding it, to help students consolidate their understanding of lines of symmetry.

Slide 8:

This opinion slide picks up on the common misconception that a parallelogram has a line of symmetry. Diagrams of a parallelogram folded along a horizontal and vertical line are shown to illustrate the point, but again, a suggestion is made in the slide notes to use a mirror if required. Students often think that a parallelogram has line symmetry because opposite sides have equal length. It is important that students' attention is drawn to shapes like these, which have rotational symmetry but not line symmetry. However, as mentioned earlier, the language of rotation is avoided, to allow students to focus exclusively on the principle of line symmetry.

Slide 9:

In this activity, students are invited to consider different types of quadrilaterals and identify the number of lines of symmetry for each. A more challenging question, showing a variety of trapezia, is also included, drawing students' attention to the fact that some shapes may have a different number of lines of symmetry dependent on their properties. Again, however, the focus is not on the properties of shapes, but instead on finding lines of symmetry.

Slide 10:

On this slide, attention is drawn to the common misconceptions students have when identifying lines of symmetry. A diagonal line joining opposite vertices on a rectangle is shown, and students are challenged to explain why it is not a line of symmetry. Next, a line is drawn across a pentagon, splitting the shape into two unequal sized parts; again, students are asked to explain why this is not a line of symmetry. Finally, a shape with rotational, but not reflective, symmetry is shown, with an incorrectly identified line of symmetry, and a discussion is encouraged on why the shape has no lines of symmetry.

Slide 11:

For students who are confident, there is a final activity, where students identify the relationship between the number of lines of symmetry and the number of sides of a regular polygon. Furthermore, there is a suggestion in the slide notes that students could be challenged to discuss the number of lines of symmetry of a circle.