

Reasoning and Problem Solving

Step 4: Making Patterns with Shapes

National Curriculum Objectives:

Mathematics Year 2: (2P2) [Use mathematical vocabulary to describe position, direction and movement, including movement in a straight line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns \(clockwise and anticlockwise\)](#)

Differentiation:

Questions 1, 4 and 7 (Reasoning)

Developing Decide which shape in a pattern is incorrect and why. One shape making a quarter or a half turn.

Expected Decide which shape in a pattern is incorrect and why. Two shapes making a quarter, half, three-quarter or full turn.

Greater Depth Decide which shape in a pattern is incorrect and why. Up to three shapes making a quarter, half, three-quarter or whole turn in a clockwise or anti-clockwise direction.

Questions 2, 5 and 8 (Reasoning)

Developing Explain whether a statement about a pattern of up to two shapes making a quarter or half turn in a clockwise or anti-clockwise direction is correct or incorrect and explain how you know.

Expected Explain whether a statement about a pattern of up to two shapes making a quarter, half, three-quarter or whole turn in a clockwise or anti-clockwise direction is correct or incorrect and explain how you know.

Greater Depth Explain whether a statement about a pattern of up to three shapes making a quarter, half, three-quarter or whole turn in a clockwise or anti-clockwise direction is correct or incorrect and explain how you know.

Questions 3, 6 and 9 (Problem Solving)

Developing Make patterns using given shapes including one turn in either a clockwise or anti-clockwise direction.

Expected Make patterns using two given shapes including at least one turn in a clockwise or anti-clockwise direction.

Greater Depth Make patterns using three given shapes including at least two turns in either a clockwise or anti-clockwise direction.

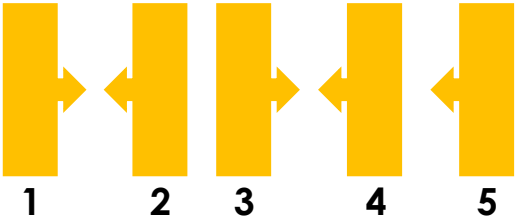
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Making Patterns with Shapes

Making Patterns with Shapes

1a. Which shape in this pattern is incorrect?

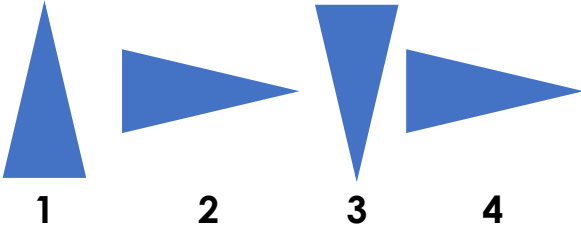


How do you know?



R

1b. Which shape in this pattern is incorrect?



How do you know?



R

2a. Sam says, “The pattern here is that the shape is making a quarter turn in a clockwise direction each time.”



Is he correct? Explain how you know.



R

2b. Aisha says, “The pattern here is that the heart is making a quarter turn each time in an anti-clockwise direction.”

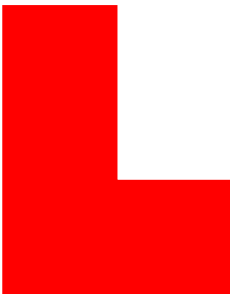


Is she correct? Explain how you know.



R

3a. What patterns could be made using the shape below?



Include a quarter or half turn in either a clockwise or anti-clockwise direction.



PS

3b. What patterns could be made using the shapes below?



Include a quarter or half turn in either a clockwise or anti-clockwise direction.

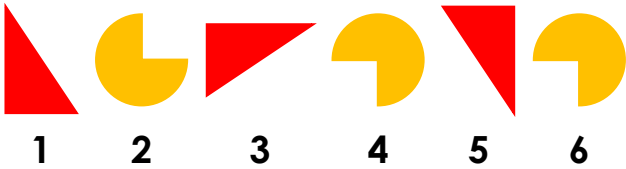


PS

Making Patterns with Shapes

Making Patterns with Shapes

4a. Which shape in this pattern is incorrect?

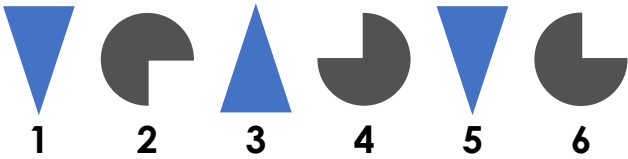


How do you know?



R

4b. Which shape in this pattern is incorrect?



How do you know?



R

5a. Kyle says, "The pattern here is that the triangle is making a half turn each time and the rectangle is staying the same."



Is he correct? Explain how you know.



R

5b. Lucy says, "The pattern here is that the rectangle is making a quarter turn in a clockwise direction each time but the triangle is staying the same."



Is she correct? Explain how you know.



R

6a. What patterns could be made using the shapes below?



Include at least one turn in either a clockwise or an anti-clockwise direction.



PS

6b. What patterns could be made using the shapes below?



Include at least one turn in either a clockwise or an anti-clockwise direction.

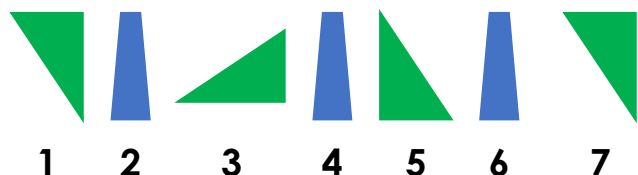


PS

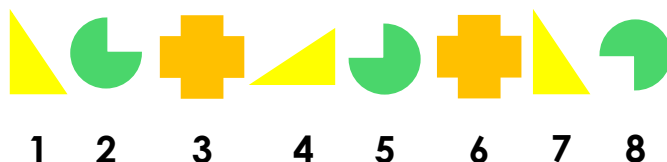
Making Patterns with Shapes

Making Patterns with Shapes

7a. Which shape in this pattern is incorrect?



7b. Which shape in this pattern is incorrect?



How do you know?



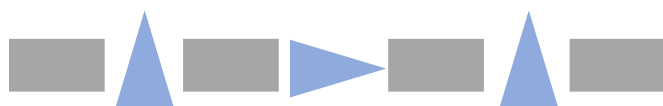
R

How do you know?



R

8a. Ian says, "The pattern here is that the triangle is making a quarter turn in a clockwise direction each time."



8b. Leah says, "The pattern here is that the rectangle and star stay the same and the pentagon makes a half turn in a clockwise direction each time."



Is he correct? Explain how you know.



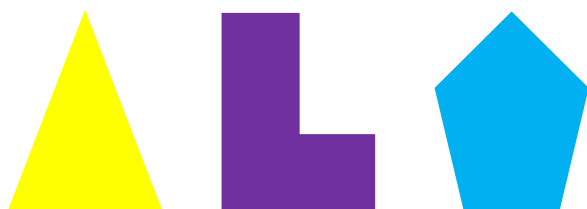
R

Is she correct? Explain how you know.



R

9a. What patterns could be made using the shapes below?



Include all of the shapes and at least 2 turns in either a clockwise or an anti-clockwise direction.



PS

9b. What patterns could be made using the shapes below?



Include all of the shapes and at least 2 turns in either a clockwise or an anti-clockwise direction.



PS

Reasoning and Problem Solving

Making Patterns with Shapes

Developing

- 1a. Example answer: 5 is incorrect because the pattern is making a half turn each time.
- 2a. Sam is incorrect. The shape makes a half turn clockwise or anti-clockwise each time.
- 3a. Any combination/pattern of the given shape which includes one turn in either a clockwise or anti-clockwise direction.

Expected

- 4a. Example answer: 4 is incorrect because the pattern is both shapes make a quarter turn clockwise each time.
- 5a. Kyle is correct. The triangle makes a half turn in either direction and the rectangle stays the same each time.
- 6a. Any combination/pattern of the given shapes which includes 1 turn in either a clockwise or anti-clockwise direction.

Greater Depth

- 7a. Example answer: 7 is incorrect because the pattern is the triangle makes a quarter turn clockwise and the quadrilateral makes a full turn clockwise each time.
- 8a. Ian is incorrect. The triangle makes a quarter turn in a clockwise direction, but then makes a quarter turn in an anti-clockwise direction.
- 9a. Any combination/pattern of the given shapes which includes 2 turns in either direction.

Reasoning and Problem Solving

Making Patterns with Shapes

Developing

- 1b. Example answer: 4 is incorrect because the pattern is making a quarter turn clockwise/three-quarter turn anti-clockwise each time.
- 2b. Aisha is incorrect. The heart makes a quarter turn clockwise each time.
- 3b. Any combination/pattern of the given shapes which includes one turn in either a clockwise or anti-clockwise direction.

Expected

- 4b. Example answer: 6 is incorrect because the pattern is both shapes make a half turn each time.
- 5b. Lucy is incorrect. The rectangle is making a quarter turn each time in a clockwise or an anti-clockwise direction and the triangle is making a half turn each time.
- 6b. Any combination/pattern of the given shapes which includes 1 turn in either a clockwise or anti-clockwise direction.

Greater Depth

- 7b. Example answer: 7 is incorrect because the pattern is each shape makes a three-quarter turn clockwise each time.
- 8b. Leah could be correct. The rectangle and star appear to stay the same but could be making a full turn. The pentagon could be turning in a clockwise or an anti-clockwise direction.
- 9b. Any combination/pattern of the given shapes which includes 2 turns in either direction.