Reasoning and Problem Solving
Step 12: Make Patterns with 3D Shapes

National Curriculum Objectives:

Mathematics Year 2: (2G1b) Compare and sort common 3-D shapes and everyday objects
Mathematics Year 2: (2G2b) Identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces

Differentiation:

Questions 1, 4 and 7 (Reasoning)
Developing Explain whether a statement about the properties of a repeating 3D shape pattern is correct. Including cylinders, cones and cubes.
Expected Explain whether a statement about the properties of a repeating 3D shape pattern is correct. Including shapes with square, circular and a curved surface.
Greater Depth Explain which statement about the properties of a repeating 3D shape pattern is correct. Including spheres, cylinders, cones, cubes, cuboids, square based and triangular based pyramids, hemispheres and different prisms.

Questions 2, 5 and 8 (Problem Solving)
Developing Use clues to create a 2 or 3-step repeating pattern using 3D shapes including spheres, cylinders, cones, cubes and cuboids.
Expected Use clues to create a 3-step repeating pattern using 3D shapes including spheres, cylinders, cones, cubes, cuboids, square based and triangular based pyramids.
Greater Depth Use clues to create a 4-step repeating pattern using 3D shapes including spheres, cylinders, cones, cubes, cuboids, square based and triangular based pyramids, hemispheres and different prisms.

Questions 3, 6 and 9 (Reasoning)
Developing Explain whether a statement about a 3-step repeating 3D pattern including spheres, cylinders, cones, cubes and cuboids is correct.
Expected Explain whether a statement about a 3-step repeating 3D pattern including spheres, cylinders, cones, cubes, cuboids, square based and triangular based pyramids is correct.
Greater Depth Explain whether a statement about a 4-step repeating 3D pattern spheres, cylinders, cones, cubes, cuboids, square based and triangular based pyramids, hemispheres and different prisms is correct.

More Year 2 Properties of Shape resources.

Did you like this resource? Don't forget to review it on our website.

Make Patterns with 3D Shapes

1a. Faith wants to make a 2-step pattern using shapes with circular faces.

I can use a cuboid and a cone to make a pattern.

Faith

Is she correct? Explain why.

D R

Make Patterns with 3D Shapes

1b. Sam is trying to make a 2-step pattern using shapes with circular faces.

I can use a cylinder and a cone to make a pattern.

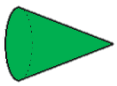
Sam

Is he correct? Explain why.

D R

2a. Tom is making the following 2-step pattern:

1 

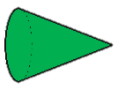
2 

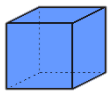
3 

What will the 4th shape be?

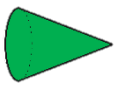
D PS

2b. Kara is making the following 3-step pattern:

1 

2 

3 

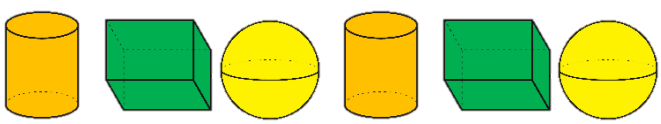
4 

What will the 5th shape be?

D PS

3a. Meg says,

My pattern is made from two different 3D shapes.

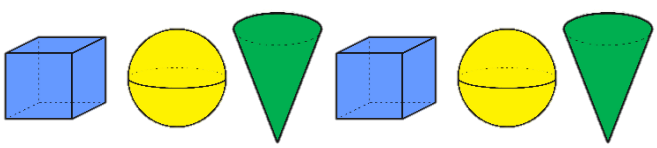


Is she correct? Explain why.

D R

3b. Ben says,

My pattern is made from a cuboid, a sphere and a cone.



Is he correct? Explain why.

D R

Make Patterns with 3D Shapes

4a. Stan is trying to make a 3-step pattern using shapes with a square face.

Stan

I can use a cube, a square-based pyramid and a cuboid to make a 3-step pattern.

Is he correct? Explain why.

E R

4b. Jacob is trying to make a 3-step pattern using shapes with circular faces.

I can use a cylinder, a sphere and a cube to make a 3-step pattern.

Jacob

Is he correct? Explain why.

E R

5a. Zac is making the following 3-step pattern:

1 

2 

3 

4

5

6

7

8 ?

What will the 8th shape be?

E PS

5b. Lola is making the following 3-step pattern:

1 

2 

3 

4

5

6

7

8

9

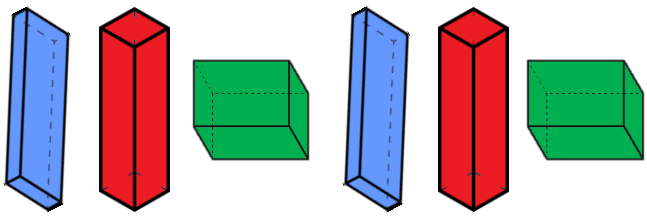
10 ?

What will the 10th shape be?

E PS

6a. Max says,

My pattern is made from different 3D shapes.

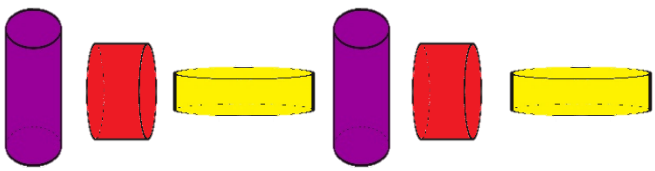


Is he correct? Explain why.

E R

6b. Milly says,

My pattern is made from two different 3D shapes.



Is she correct? Explain why.

E R

Make Patterns with 3D Shapes

7a. Alex and Etta are trying to make a 3-step pattern using shapes with triangular faces.

Alex: I can use three 3d shapes to make a 3-step pattern.

Etta: I can only use a pyramid so I can't make a 3-step pattern.

Who is correct? Explain why.

GD

R

7b. Isla and Kian are trying to make a 3-step pattern using shapes with rectangular faces.

Isla: I can only use a cuboid so I can't make a 3-step pattern.

Kian: I can use a triangular prism and change the orientation to make a 3-step pattern.

Who is correct? Explain why.

GD

R

8a. Nell is making the following pattern:

The second shape is a cuboid.

The fourth shape is a prism.

The third shape is a sphere.

The first shape is a cube.

What will the tenth shape be?

GD

PS

8b. Sam is making the following pattern:

The fourth shape is a cone.

The first shape is a hemisphere.

The second shape is a cube.

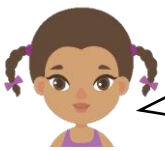
The third shape is a sphere.

What will the eighth shape be?

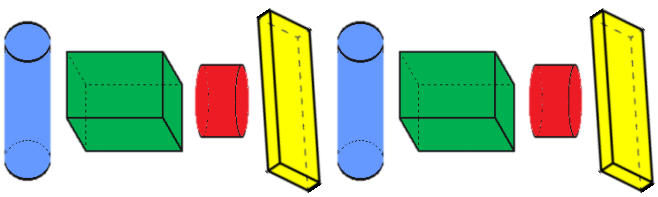
GD

PS

9a. Liv says,



My pattern is made from two different 3D shapes.



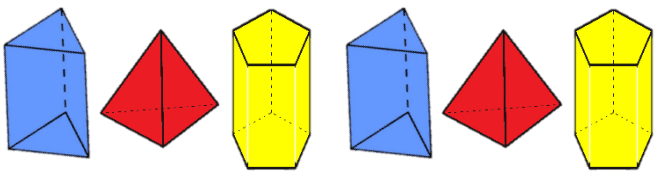
Is she correct? Explain why.

GD

R

9b. Zane says,

My 3-step pattern is made from different prisms.



Is he correct? Explain why.

GD

R

Reasoning and Problem Solving
Make Patterns with 3D Shapes

Developing

1a. Faith is incorrect because a cuboid does not have a circular face.
2a. The fourth shape will be a cone.
3a. Meg is incorrect because she has used 3 3D shapes; cylinders, spheres and cuboids.

Expected

4a. Stan is correct because you can use a cube, cuboid and a square based pyramid. Stan is also correct if he changes the orientation or colour of one of the shapes in the 3-step pattern.
5a. The eighth shape will be a sphere.
6a. Max is incorrect because he has created a 3-step pattern using different cuboids.

Greater Depth

7a. Alex is correct because he can use a triangular based pyramid, a square based pyramid and a triangular prism.
8a. The tenth shape will be a cuboid.
9a. Liv is correct because she has used different sized cylinders and cuboids.

Reasoning and Problem Solving
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Developing

1b. Sam is correct because you can change the orientation of a shape to create a pattern.
2b. The fifth shape will be a cube
3b. Ben is incorrect because he has used a cube not a cuboid in his 3-step pattern.

Expected

4b. Esme is incorrect because a cube does not have a circular face. A sphere has a curved surface rather than a circular face.
5b. The tenth shape will be a cube.
6b. Milly is incorrect because she has created a 3-step pattern using different cylinders.

Greater Depth

7b. Kian is correct because a triangular prism has rectangular faces and you can change the orientation of a shape to make different patterns.
8b. The eighth shape will be a cone.
9b. Zane is incorrect because he has used a triangular based pyramid which is not a prism.