Reasoning and Problem Solving
Step 9: Reasoning about 3D Shapes

National Curriculum Objectives:

Mathematics Year 5: (5G3b) Identify 3-D shapes, including cubes and other cuboids, from 2-D representations

Differentiation:

Questions 1, 4 and 7 (Problem Solving)
Developing Using one 2D shape from a net, name the 3D shapes that could be made. Including cubes, cuboids and triangular or square based pyramids. Names of shapes given.
Expected Using one 2D shape from a net, name the 3D shapes that could be made. Including pyramids and prisms. No names given.
Greater Depth Using one 2D shape from a net, name the 3D shapes that could be made. Including pyramids, prisms and polyhedrons. No names given.

Questions 2, 5 and 8 (Reasoning)
Developing Identify a 3D shape based on the shadow it has cast. Includes cubes, cuboids and triangular or square based pyramids. Images of 3D shapes given.
Expected Identify a 3D shape based on the shadow it has cast. Including pyramids and prisms. Names of 3D shapes given.
Greater Depth Identify a 3D shape based on the shadow it has cast. Including pyramids, prisms and polyhedrons. No shape names or images given.

Questions 3, 6 and 9 (Reasoning)
Developing Use knowledge of the properties of 3D shapes to identify the odd one out. Including cubes, cuboids and triangular or square based pyramids.
Expected Use knowledge of the properties of 3D shapes to identify the odd one out. Including pyramids and prisms.
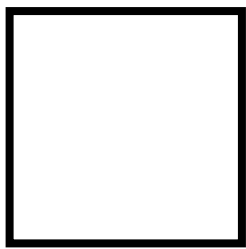**Greater Depth** Use knowledge of the properties of 3D shapes to identify the odd one out. Including pyramids, prisms and polyhedrons.

More Year 4 and Year 5 Properties of Shapes resources.

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

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Reasoning about 3D Shapes

1a. Below is one shape from the net of a 3D shape.

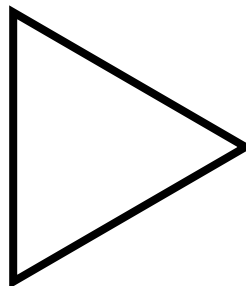| triangular based pyramid |
| cube |
| square based pyramid |

Which 3D shapes could you create? Name the other 2D shapes you would need to complete the shape.

D   5 PS

1b. Below is one shape from the net of a 3D shape.
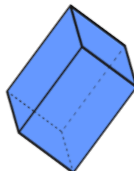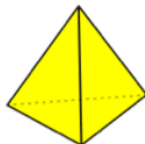
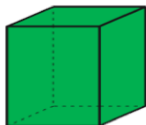| cuboid |
| square based pyramid |
| triangular based pyramid |

Which 3D shapes could you create? Name the other 2D shapes you would need to complete the shape.

D   5 PS

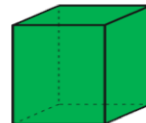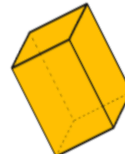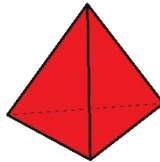**2a.** Which of these 3D shapes could cast this shadow?

Explain your answer.

D   5 R

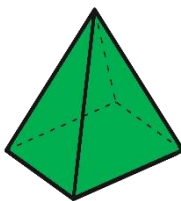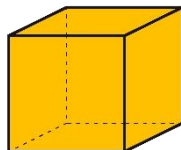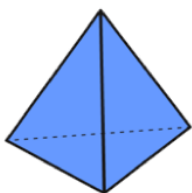**2b.** Which of these 3D shapes could cast this shadow?

Explain your answer.

D   5 R

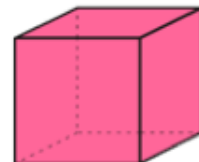**3a.** Considering the properties of the shapes below, which is the odd one out?

Explain your answer.

D   5 R

3b. Considering the properties of the shapes below, which is the odd one out?

Explain your answer.

D   5 R

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Reasoning and Problem Solving – Reasoning about 3D Shapes – Year 5 Developing
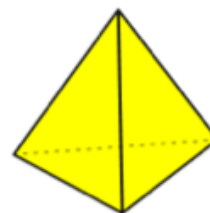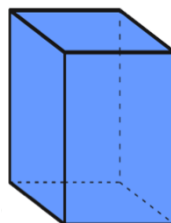
Reasoning about 3D Shapes

Reasoning about 3D Shapes

4a. Below is one shape from the net of a 3D shape.

Name three 3D shapes that include this shape. List the other 2D shapes you would need to complete the net.

E
5 PS

4b. Below is one shape from the net of a 3D shape.

Name three 3D shapes that include this shape. List the other 2D shapes you would need to complete the net.

E
5 PS

5a. Which of these 3D shapes could cast this shadow?

octagonal based pyramid

hexagonal prism

pentagonal prism

Explain your answer.

E
5 R

5b. Which of these 3D shapes could cast this shadow?

triangular based pyramid

pentagonal prism

cube

Explain your answer.

E
5 R

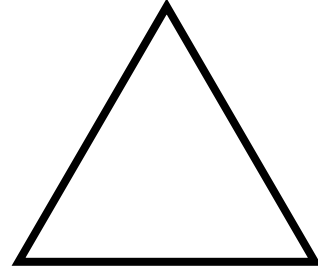**6a.** Considering the properties of the shapes below, which is the odd one out?

Explain your answer.

E
5 R

6b. Considering the properties of the shapes below, which is the odd one out?

Explain your answer.

E
5 R

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Reasoning and Problem Solving – Reasoning about 3D Shapes – Year 5 Expected

Reasoning about 3D Shapes	Reasoning about 3D Shapes

7a. Below is one shape from the net of a 3D shape.

Which 3D shapes include this shape? List the other 2D shapes you would need to complete the net.

5 PS

7b. Below is one shape from the net of a 3D shape.
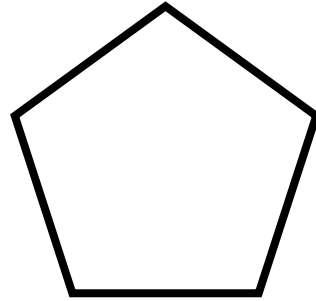
Which 3D shapes include this shape? List the other 2D shapes you would need to complete the net.

5 PS

8a. Which 3D shape could cast this shadow?

Explain your answer.

5 R
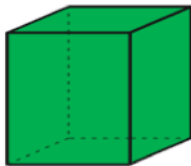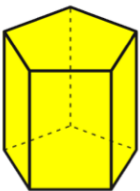
8b. Which 3D shape could cast this shadow?

Explain your answer.

5 R

9a. Considering the properties of the shapes below, which is the odd one out?
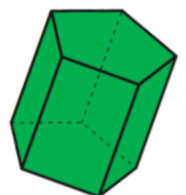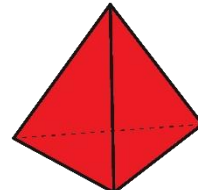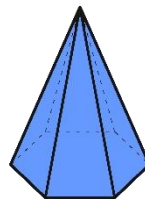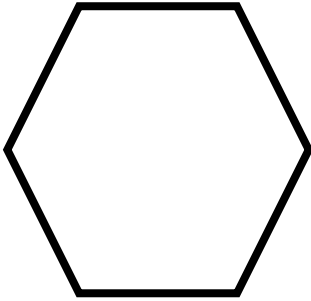
Explain your answer.

5 R

9b. Considering the properties of the shapes below, which is the odd one out?

Explain your answer.

5 R

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Reasoning and Problem Solving – Reasoning about 3D Shapes – Year 5 Greater Depth

Reasoning and Problem Solving
Reasoning about 3D Shapes

Developing

1a. Various possible answers including: a cube. The net would need 5 more squares; a square based pyramid. The net would need 4 triangles.
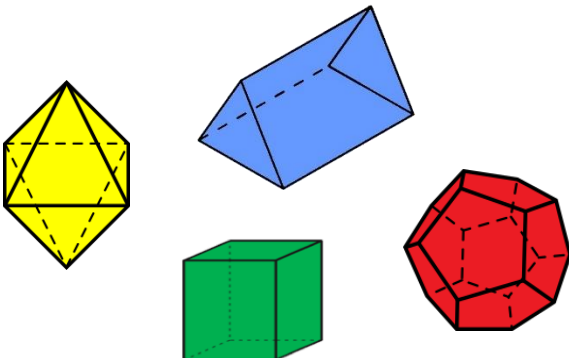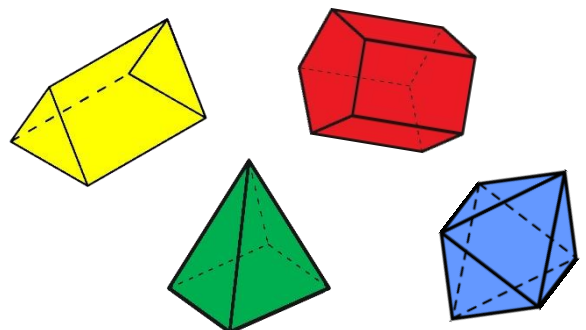
2a. Triangular based pyramid because it is the only shape that has a triangular face.

3a. Various possible answers, including: the triangular based pyramid because the other shapes have a square face; the cube because the other two shapes have triangular faces.

Expected

4a. Various possible answers including: a cuboid. The net would need 3 more rectangles and 2 squares; a triangular prism. The net would need 2 more rectangles and 2 triangles.

5a. Hexagonal prism because it is the only shape that has a hexagonal face.

6a. Various possible answers, including: the cube because the other shapes have rectangular faces; the cube because the other shapes have an odd number of faces.

Greater Depth

7a. Various possible answers including: a hexagonal based pyramid. The net would need 6 triangles; a hexagonal prism. The net would need an identical hexagon and 6 rectangles or squares.

8a. Various answers, for example: It could be a pentagonal based pyramid or a pentagonal prism because both shapes have a pentagonal face.

9a. Various possible answers, including: the triangular prism because it is the only shape that has different faces; the dodecahedron because it is the only shape that has more than 10 faces.

Developing

1b. Various possible answers including: a square based pyramid. The net would need 3 more triangles and 1 square; a triangular based pyramid. The net would need 3 more triangles.

2b. The cuboid because it is the only shape that has rectangular faces.

3b. Various possible answers, including: the triangular based pyramid because the other shapes have a square face; the cuboid because the other shapes have faces with only 1 shape.

Expected

4b. Various possible answers including; a triangular based pyramid. The net would need 3 more triangles; a triangular prism. The net would need 1 more triangle and 3 rectangles.

5b. Pentagonal prism because it is the only shape that has rectangular faces.

6b. Various possible answers, including: the pentagonal prism because the other shapes are pyramids; the pentagonal prism because the other shapes have an even number of edges.

Greater Depth

7b. Various possible answers including: a dodecahedron. The net would need 11 more pentagons; a pentagonal prism. The net would need an identical pentagon and 5 rectangles or squares.

8b. Various answers, for example: It could be a square based pyramid or a tetrahedron because they both have triangular faces.

9b. Various possible answers, including: the octahedron because it is the only shape with an even number of faces; the pentagonal prism because it is the only shape that does not have a triangular face.