

# Reasoning and Problem Solving

## Step 11: Sort 3D Shapes

### National Curriculum Objectives:

Mathematics Year 2: (2G1b) [Compare and sort common 3D shapes and everyday objects](#)

Mathematics Year 2: (2G2b) [Identify and describe the properties of 3D shapes, including the number of edges, vertices and faces](#)

### Differentiation:

Questions 1, 4 and 7 (Reasoning)

**Developing** Explain whether 3D shapes have been sorted correctly in a Venn diagram, with reference to faces and how they will move. Includes spheres, cylinders, cones, cubes, cuboids.

**Expected** Explain whether 3D shapes have been sorted correctly in a Venn diagram, with reference to faces and vertices. Includes spheres, cylinders, cones, cubes, cuboids, square-based pyramids and triangular-based pyramids.

**Greater Depth** Explain whether 3D shapes have been sorted correctly in a Venn diagram, with reference to faces, edges and vertices. Includes spheres, cylinders, cones, cubes, cuboids, hemispheres, and pyramids and prisms with a variety of different bases.

Questions 2, 5 and 8 (Problem Solving)

**Developing** Sort four 3D shapes into 2 groups. Includes spheres, cylinders, cones, cubes, cuboids.

**Expected** Sort six 3D shapes into 2 groups. Includes spheres, cylinders, cones, cubes, cuboids, square-based pyramids and triangular-based pyramids.

**Greater Depth** Sort six 3D shapes into 2 or 3 groups. Includes spheres, cylinders, cones, cubes, cuboids, hemispheres, and pyramids and prisms with a variety of different bases.

Questions 3, 6 and 9 (Reasoning)

**Developing** Explain mistakes when sorting 3D shapes with reference to faces and edges. Includes spheres, cylinders, cones, cubes and cuboids.

**Expected** Explain mistakes when sorting 3D shapes with reference to edges and vertices. Includes spheres, cylinders, cones, cubes, cuboids, square-based pyramids and triangular-based pyramids.

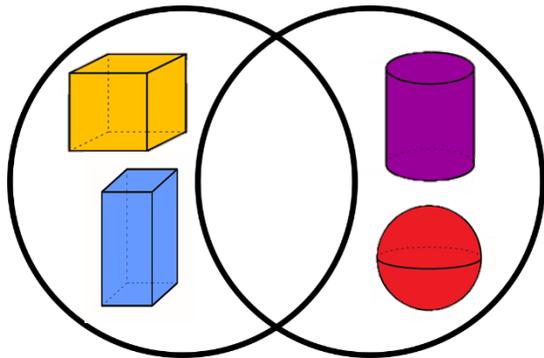
**Greater Depth** Explain mistakes when sorting 3D shapes with reference to faces, edges and vertices. Includes pyramids and prisms with a variety of different bases.

More [Year 2 Properties of Shape](#) resources.

Did you like this resource? Don't forget to [review](#) it on our website.

## Sort 3D Shapes

1a. Ben has sorted these 3D shapes.



Flat faces

Curved surfaces

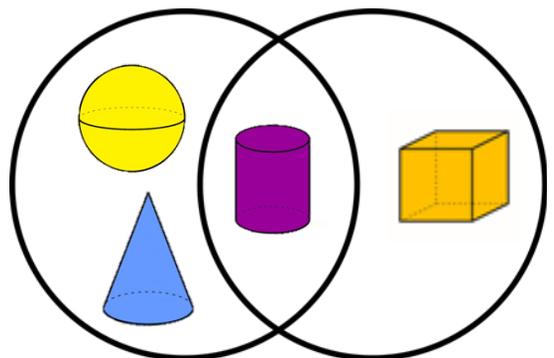
Is he correct? Explain why.



R

## Sort 3D Shapes

1b. Isha has sorted these 3D shapes.



Will roll

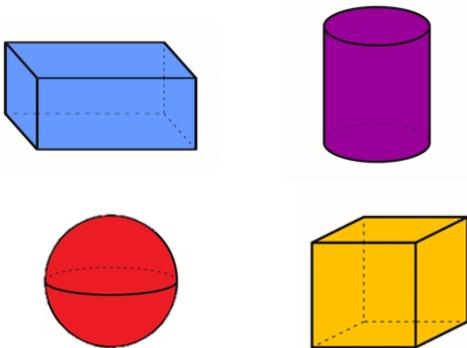
Will slide

Is she correct? Explain why.



R

2a. How could you sort these 3D shapes into 2 groups according to their faces?

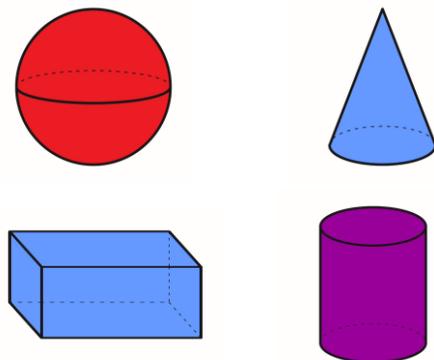


How would you label your groups?



PS

2b. How could you sort these 3D shapes into 2 groups according to their faces?



How would you label your groups?



PS

3a. Charlie is sorting some 3D shapes. He says,



I have 2 shapes. They both have the same number of faces and edges, so they must be the same shape.

Is he correct? Explain why.



R

3b. Erik is sorting some 3D shapes. He says,



A cube and a cuboid must always go in the same group because they have the same number of edges.

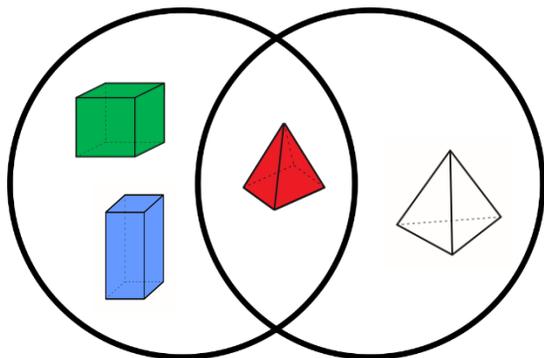
Is he correct? Explain why.



R

## Sort 3D Shapes

4a. Harvey has sorted these 3D shapes.



Rectangular  
faces

Triangular  
faces

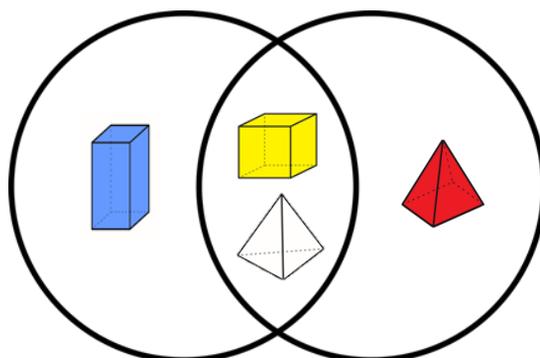
Is he correct? Explain why.



R

## Sort 3D Shapes

4b. Jessica has sorted these 3D shapes.



Even number  
of faces

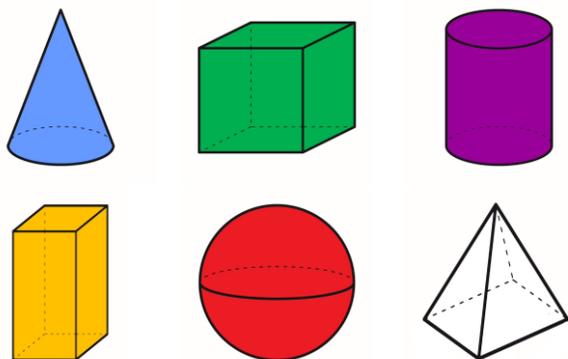
Even number  
of vertices

Is she correct? Explain why.



R

5a. How could you sort these 3D shapes into 2 groups?

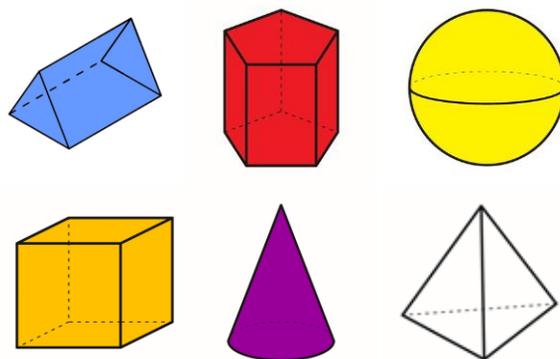


How would you label your groups?



PS

5b. How could you sort these 3D shapes into 2 groups?



How would you label your groups?



PS

6a. Anya is sorting some 3D shapes. She says,



All 3D shapes have an even number of vertices.

Is she correct? Explain why.



R

6b. Adam is sorting some 3D shapes. He says,



All 3D shapes have at least 4 vertices.

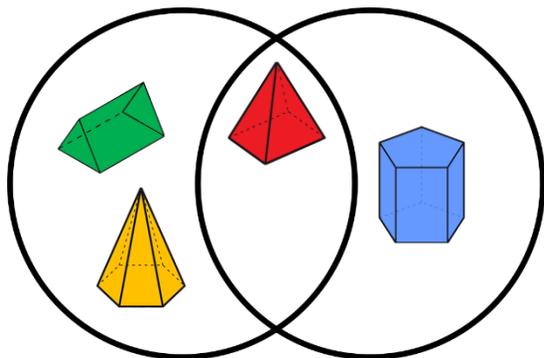
Is he correct? Explain why.



R

## Sort 3D Shapes

7a. Alina has sorted these 3D shapes.



Odd number  
of faces

Odd number  
of vertices

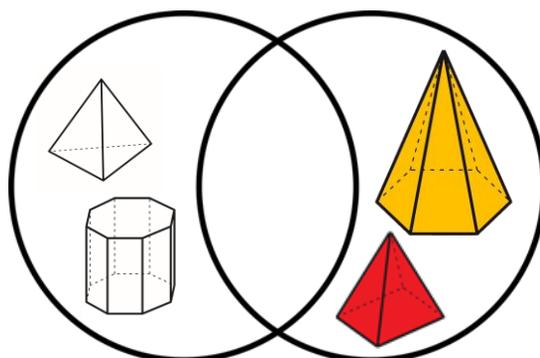
Is she correct? Explain why.



R

## Sort 3D Shapes

7b. Kai has sorted these 3D shapes.



Even number  
of edges

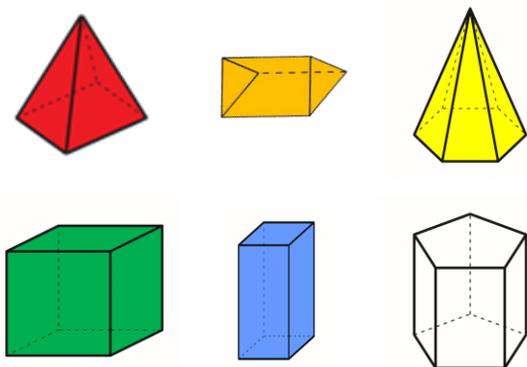
Odd number  
of vertices

Is he correct? Explain why.



R

8a. How could you sort these 3D shapes into 3 groups according to their faces?

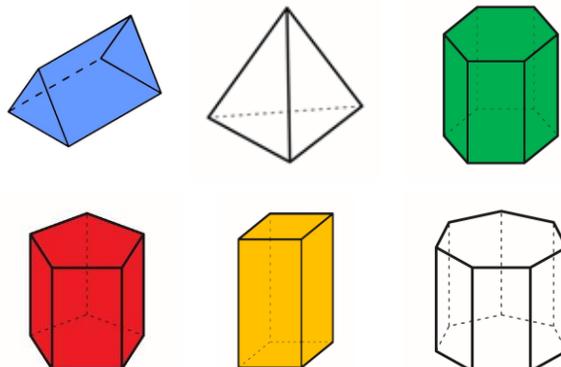


How would you label your groups?



PS

8b. How could you sort these 3D shapes into 2 groups according to their faces?



How would you label your groups?



PS

9a. Jasper is sorting some 3D shapes. He says,



All pyramids have an equal number of faces and vertices.

Is he correct? Explain why.



R

9b. Kamran is sorting some 3D shapes. He says,



All prisms have rectangular faces.

Is he correct? Explain why.



R

## Reasoning and Problem Solving Sort 3D Shapes

### Developing

- 1a. No. The cylinder has flat faces and a curved surface. It belongs in the intersection.
- 2a. Various answers, for example: circular faces/rectangular faces; flat/curved surfaces.
- 3a. Charlie is incorrect. He could have a cube and a cuboid, which have the same number of faces and edges, but are different shapes.

### Expected

- 4a. Yes. The square-based pyramid has both rectangular and triangular faces but the other shapes have one or the other.
- 5a. Various answers, for example: curved surfaces/no curved surfaces; rectangular faces/no rectangular faces; 8 vertices/less than 8 vertices.
- 6a. No. Anya is incorrect because a square-based pyramid has 5 vertices.

### Greater Depth

- 7a. No. The hexagonal prism has both an odd number of faces and an odd number of vertices so belongs in the intersection.
- 8a. Various answers, for example: 5 faces/6 faces/7 faces.
- 9a. Jasper is correct. A triangular-based pyramid has 4 faces and 4 vertices, a square-based pyramid has 5 faces and 5 vertices, and a pentagon-based pyramid has 6 faces and 6 vertices, etc.

## Reasoning and Problem Solving Sort 3D Shapes

### Developing

- 1b. No. The cone will roll on its curved surface, but slide on its base. It belongs in the intersection.
- 2b. Various answers, for example: curved surfaces/flat faces; will roll/will slide.
- 3b. Erik is incorrect because a cube and a cuboid could be sorted according to the shape of their faces. A cube has square faces where cuboids have rectangular faces.

### Expected

- 4b. No. The cuboid belongs in the intersection as it has an even number of faces and vertices and the square-based pyramid has 5 vertices and 5 faces.
- 5b. Various answers, for example: curved surfaces/no curved surfaces; odd/even number of faces, edges or vertices.
- 6b. Adam is incorrect. Some 3D shapes have less than 4 vertices e.g. a sphere.

### Greater Depth

- 7b. No. The square-based pyramid has an even number of edges and an odd number of faces so belongs in the intersection.
- 8b. Various answers, for example: odd number of faces/even number of faces; triangular faces/ no triangular faces.
- 9b. Kamran is correct, all prisms have rectangular faces between the two end faces.