Representing and constructing 3D shapes

Mana Maths

Te reo Māori terms

kupenga
net
Open in Te Aka

poro-tapawhā hāngai
rectangular prism
Open in Te Aka

koeko hōtiu
pyramid
Open in Te Aka

koi
vertex
Open in Te Aka

Representing and constructing 3D shapes — Foundation

1. Name the solid with 6 rectangular faces.

2. Name the solid with 2 triangular faces and 3 rectangular faces.

3. Name the solid with 1 square base and 4 triangular faces.

4. How many faces does a rectangular prism have?

5. How many edges does a triangular prism have?

6. How many vertices does a square-based pyramid have?

7. Which solid has exactly 5 faces: a rectangular prism, a triangular prism, or a square-based pyramid?

8. Which solid has exactly 8 vertices: a rectangular prism, a triangular prism, or a square-based pyramid?

9. Draw one valid net for a rectangular prism.

10. Draw one valid net for a triangular prism.

11. Draw one valid net for a square-based pyramid.

12. A rectangular prism has length 6 cm, width 4 cm, and height 3 cm. Draw and label one net.

13. A triangular prism has triangular ends and 3 rectangular side faces. Which faces in the net must be congruent?

14. Explain what a net shows about a 3D shape.

Representing and constructing 3D shapes — Proficient

1. A solid has 6 faces, 12 edges, and 8 vertices. Name the solid.

2. A solid has 5 faces, 9 edges, and 6 vertices. Name the solid.

3. A solid has 5 faces, 8 edges, and 5 vertices. Name the solid.

4. Draw two different valid nets for a rectangular prism.

5. Draw a net for a triangular prism whose triangular ends are right triangles with sides 3 cm, 4 cm, and 5 cm.

6. Draw a net for a square-based pyramid with base side 6 cm.

7. A student draws a “net” for a rectangular prism using only 5 rectangles. Explain what is wrong.

8. A student draws a triangular prism net with only 2 rectangles. Explain what is missing.

9. Why does a row of 6 joined squares not fold to make a cube?

10. Describe the plan view of a rectangular prism with a 7 cm by 3 cm top face.

11. A square-based pyramid stands on its base. Describe its plan view and front view.

12. Explain one way to check whether a net will fold without faces overlapping.

Representing and constructing 3D shapes — Excellence

1. A solid has 5 faces, 9 edges, and 6 vertices. Explain why it cannot be a square-based pyramid.

2. A solid has 6 faces, 12 edges, and 8 vertices. Give two different ways to recognise it from those facts.

3. Draw two different valid nets for the same rectangular prism. Explain why both fold to the same solid.

4. A student says, “Any arrangement of 6 rectangles can be a rectangular prism net.” Give a counterexample and explain it.

5. A triangular prism has equilateral triangular ends of side 5 cm and prism length 9 cm. Draw a correct net and label all face dimensions.

6. State which faces in your triangular prism net are congruent.

7. A square-based pyramid has base side 8 cm. Draw a net and describe what must be true about the 4 triangular faces.

8. Explain why the plan view of a standing square-based pyramid is a square but the front view is a triangle.

9. A rectangular prism measures 10 cm by 6 cm by 4 cm. Describe its plan view, front view, and side view.

10. A student draws a net for a triangular prism but attaches both triangles to the same long rectangle in a way that causes overlap when folded. What needs to change?

11. Why can a correct net show all faces of a solid at once, but a plan view cannot?

12. Design a net for a solid with 5 faces and 8 edges. Name the solid and explain how you know your net is correct.

13. Compare a rectangular prism and a triangular prism. Give one similarity and two differences in faces, edges, or vertices.

14. Compare a triangular prism and a square-based pyramid. Give one similarity and two differences in faces, edges, or vertices.

15. Explain why opposite faces of a rectangular prism are congruent.

16. A solid has a rectangular plan view and a rectangular front view. Could it be a square-based pyramid? Explain your answer.