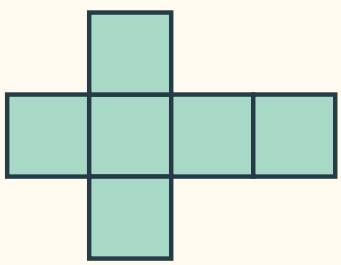
MATHS FIELD GUIDE · GRADE 5

A net unfolds a solid’s surface

OPENING PROBLEM

A strip of four makes the sides. What do the two spare squares cover?



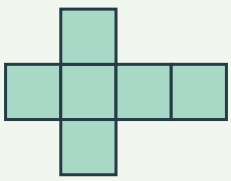
02 Follow the faces through a fold
03 Rules and worked cases
04 Build a cube from paper
05 Compare the models
06 Predict how a solid will move
07 Check your reasoning

ILLUSTRATED PROBLEM SHEET

Follow the faces through a fold

Six squares make a cube net only when the fold covers each face once.

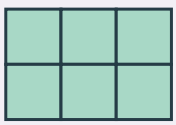
1



A strip of four makes the sides. What do the two spare squares cover?

One closes the top and one closes the bottom.

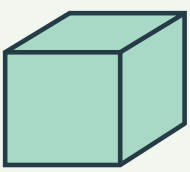
2



Can this two-by-three rectangle close into a cube?

No. Four squares meet at an interior corner, but only three cube faces meet at a vertex.

3

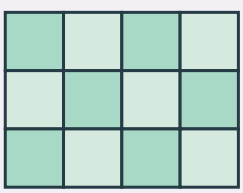


6 faces

How many edges does a cube have?

Six faces have four edges each. Each edge belongs to two faces, so 24 ÷ 2 = 12.

4



Cut a 4 by 3 rectangular face from card. Is this one face of a cube?

No. Cube faces are squares. It can be a face of a cuboid.

One square face
four edges.

Six cube faces
twelve distinct edges, as each edge is shared.

CHAPTER PROBLEM

How many equal square faces does a cube have?

Six.

MATHS REFERENCE · GRADE 5

A net unfolds a solid's surface

A net is a flat arrangement of faces that can fold into a solid.

A valid net must close the solid without overlapping faces or leaving gaps.

Cases to recognise

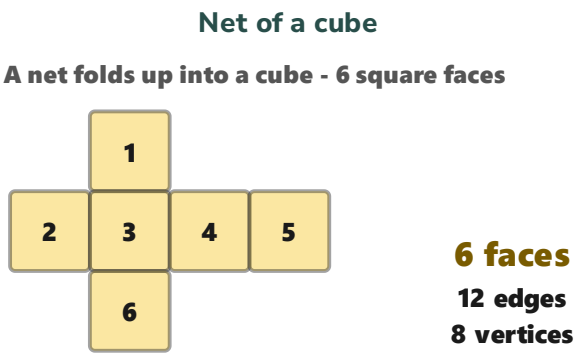
Situation	What to do and why
A cube net has six squares of side 2 cm	Its surface area is $6 \times 4 = 24$ cm².
Four square faces form a strip around the walls	Opposite strip faces are two places apart when wrapped.

Read the model

Open a cube

A cube has six equal square faces.

The shown arrangement folds into a cube. Adjacent squares hinge along shared edges.

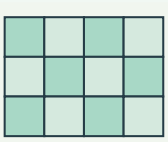


Count faces separately from edges

The six squares are faces. When folded, the cube has twelve edges and eight vertices.

Two face edges can meet to become one edge of the solid; do not simply add all the flat square edges.

net A flat arrangement of a solid's faces that folds closed.
face A flat surface of a solid.
edge Where two faces meet.
vertex A corner where edges meet.



One layer of unit cubes forms this grid. How many cubes?

Three rows of four make 12 cubes.

WORKED INVESTIGATION

Build a cube from paper

Draw four equal squares in a horizontal strip. Attach one square above the second and one below it. Fold the strip into four side walls.

Look at this part	What it tells you
Strip of four	four walls
Upper square	lid
Lower square	base

Work it through

Imagine holding the second square still. The first and third fold onto opposite sides of it; the fourth wraps around to face the second.

Catch the mistake

Six equal squares are necessary for a cube net, but a 2 by 3 rectangle folds with faces trying to occupy the same space.

Compare the cases

A cuboid uses matching rectangles

A cuboid has three pairs of opposite faces.

For a 4 by 3 by 2 cuboid, those pairs measure 4 by 3, 4 by 2, and 3 by 2.

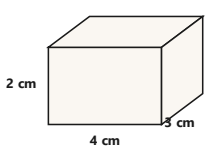


Diagram not to scale

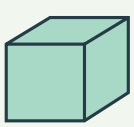
Six squares are not automatically a cube net

A straight row of six squares cannot close into a cube without overlap or a missing face.

The number of faces is necessary, but their arrangement also matters.

Change one condition

Label the strip A, B, C, D from left to right. A faces C and B faces D. The two extra squares face each other.



side 3 cm

How many 1 cm cubes fill this cube?

Nine fit in a layer. Three layers give 27 cm^3.

A NET UNFOLDS A SOLID'S SURFACE

Compare the models

Follow opposite faces

Imagine one square as the base and fold its neighbours upward.

Track which face becomes the lid. Faces touching in the flat drawing need not become opposite faces.

Check by building

Sketch the valid cube net and label its faces. Ask an adult to help cut it out.

Fold along edges to check the prediction. Paper tabs help join faces but are not extra faces.

Use a net for packaging

A net helps plan the cardboard surface of a box.

It describes the surface. It does not directly give the volume inside.

Explain your reasoning

Why are six squares alone not enough to prove a valid cube net?

Their arrangement must fold into six different faces without overlap or gaps.

Two more worked cases

Situation	Reasoning
Six squares arranged in a straight line	Folding gives no two faces to close the top and bottom. Face count alone is insufficient.
A 2 × 3 × 4 cuboid net	Pair opposite rectangles. Areas are 6, 8 and 12 twice each, totalling 52 square units.

Layers	Volume (cm³)
1	12
2	24
5	60

Which box has volume 60 cm³ if its base is 12 cm²?

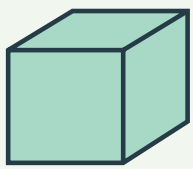
The height is 5 cm. Divide the volume by the base area.

ILLUSTRATED PROBLEM SHEET

Predict how a solid will move

A flat face can rest on a table. A curved surface can roll.

1

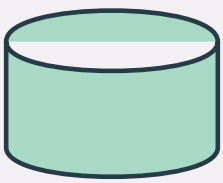


cube

Can a face sit flat?

Yes. Each face is a square. The cube can slide across a flat face.

2

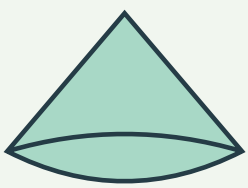


cylinder

How can one solid both stand and roll?

Stand it on a circular end. Lay it on its curved side to roll.

3

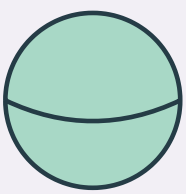


cone

Trace around the base. What shape is left?

A circle. The pointed tip is above the circular base.

4



sphere

Which face can lie flat?

It has no flat face. Its surface curves all around.

Cube balanced on a face
flat contact.

Ball on a tabletop
curved contact.

CHAPTER PROBLEM

Are joining tabs extra faces of the box?

No. They attach faces together; they do not form additional surface faces.

QUESTION BANK · FOLD OR COVER THE RIGHT COLUMN

Check your reasoning

Try the problem	Solution and reasoning
01 In a cube net two squares share a full edge. Can they end up as opposite faces?	No. They meet along that same edge after folding.
02 Does a circular print from a base identify just one solid?	No. A cone and a cylinder can both leave a circle.
03 Colour the square above B red. In this net which square can never share an edge with the red face after folding?	The square below B becomes its opposite face. Opposite cube faces never share an edge.
04 A cuboid has six faces. How many rectangles of size 3 by 5 in a 2 by 3 by 5 cuboid net? 	Two faces have that size and fold to opposite sides.
05 Can two faces that share an edge in a net become opposite faces when folded?	No. Their shared edge acts as a hinge, so they stay adjacent.

240 cm³
↓
240 mL
↓
0.24 L

How does water help compare capacity and volume?

One cubic centimetre of internal space holds one millilitre.

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