# Year 5: Week 5, Day 4
Identify, visualise, describe properties of 3-D shapes
Each day covers one maths topic. It should take you about 1 hour or just a little more.

1. If possible, watch the **PowerPoint presentation** with a teacher or another grown-up.
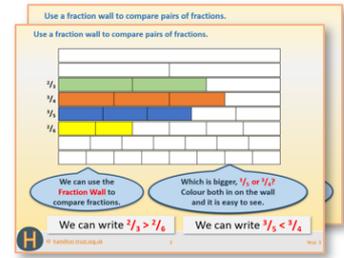
    OR start by carefully reading through the **Learning Reminders**.
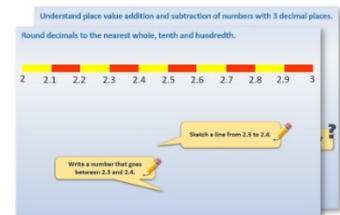
2. Tackle the questions on the **Practice Sheet**.
    There might be a choice of either Mild (easier) or Hot (harder)!
    Check the answers.
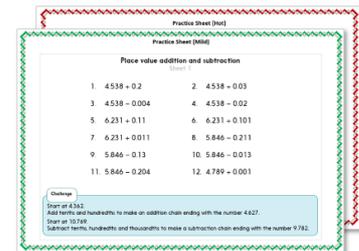
3. Finding it tricky? That's OK… have a go with a grown-up at **A Bit Stuck?**

4. Think you've cracked it? Whizzed through the Practice Sheets? Have a go at the **Investigation**…

Learning Reminders

Identify, visualise and describe properties of 3-D shapes; Sort 3-D shapes according to their properties.

? **Look at the cube and cuboid. What is the same about these two shapes and what is different?**
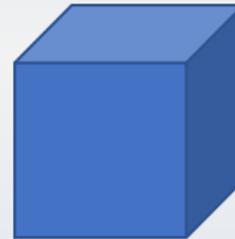
e.g.

What is different?

The cuboid has some non-square rectangular faces, it is irregular.

The cube has all squares faces, it is regular.

What is the same?

Both have the same number of faces, vertices and edges.

Both have all flat faces.

Both have 3 pairs of parallel faces.

Learning Reminders

Identify, visualise and describe properties of 3-D shapes; Sort 3-D shapes according to their properties.

How many of these 3-D shapes could you name?
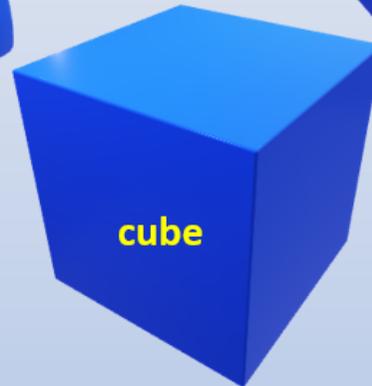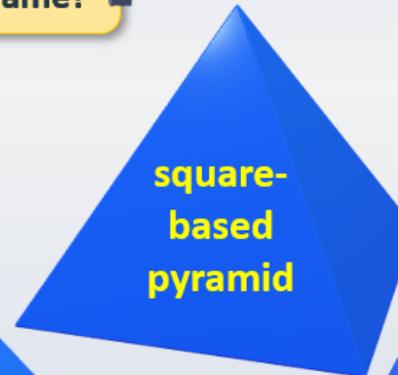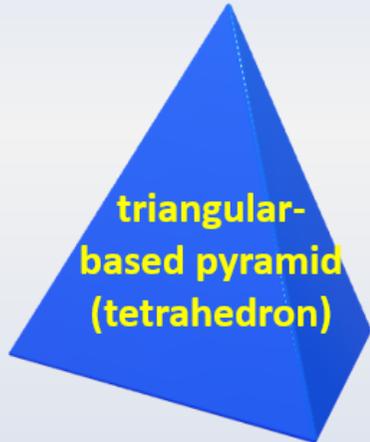
triangular-based pyramid (tetrahedron)

cuboid

square-based pyramid

cone

hemisphere

octahedron

sphere

cube

triangular prism

Identify, visualise and describe properties of 3-D shapes; Sort 3-D shapes according to their properties.

Carroll diagrams use two headings that are the **opposite** of one another (mutually exclusive), e.g. 'has at least one triangular face' and 'has no triangular faces'; 'is a prism' and 'is not a prism'; 'is regular' and 'is irregular', 'has at least one pair of parallel faces' and 'has no pairs of parallel faces'.

| Has at least one triangular face	Has no triangular faces

Remember that the faces are made from 2-D shapes (two dimensions) and solids are called 3-D shapes (three dimensions).

Could *you* sort the 9 shapes on the previous page into this diagram?

Practice Sheet Mild
Sorting shapes

The 3-D shapes go on holiday to Sortington! Work out which houses they all live in.
Write the letter and the shape's name.

Sortington

Start
How many curved surfaces?

How many flat surfaces?

A

0

1

0

How many faces?

M

8

Is it a prism?

No

Yes

L

K

Pointed Top Lane

1

2

7

Is it a pyramid?

J

B

Pointed Top

D

6

Yes

Curved Top

Curved Top Lane

E

4

5

How many square faces?

No

3 pairs

1 pair

I

C

How many parallel faces?

F

0

2

G

H
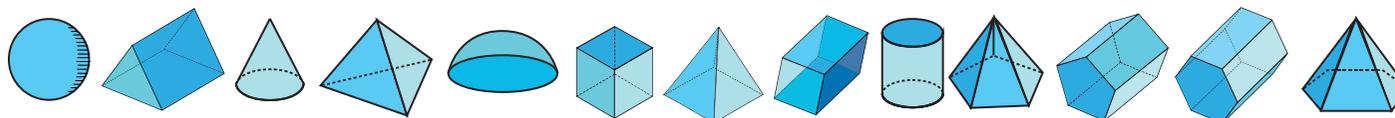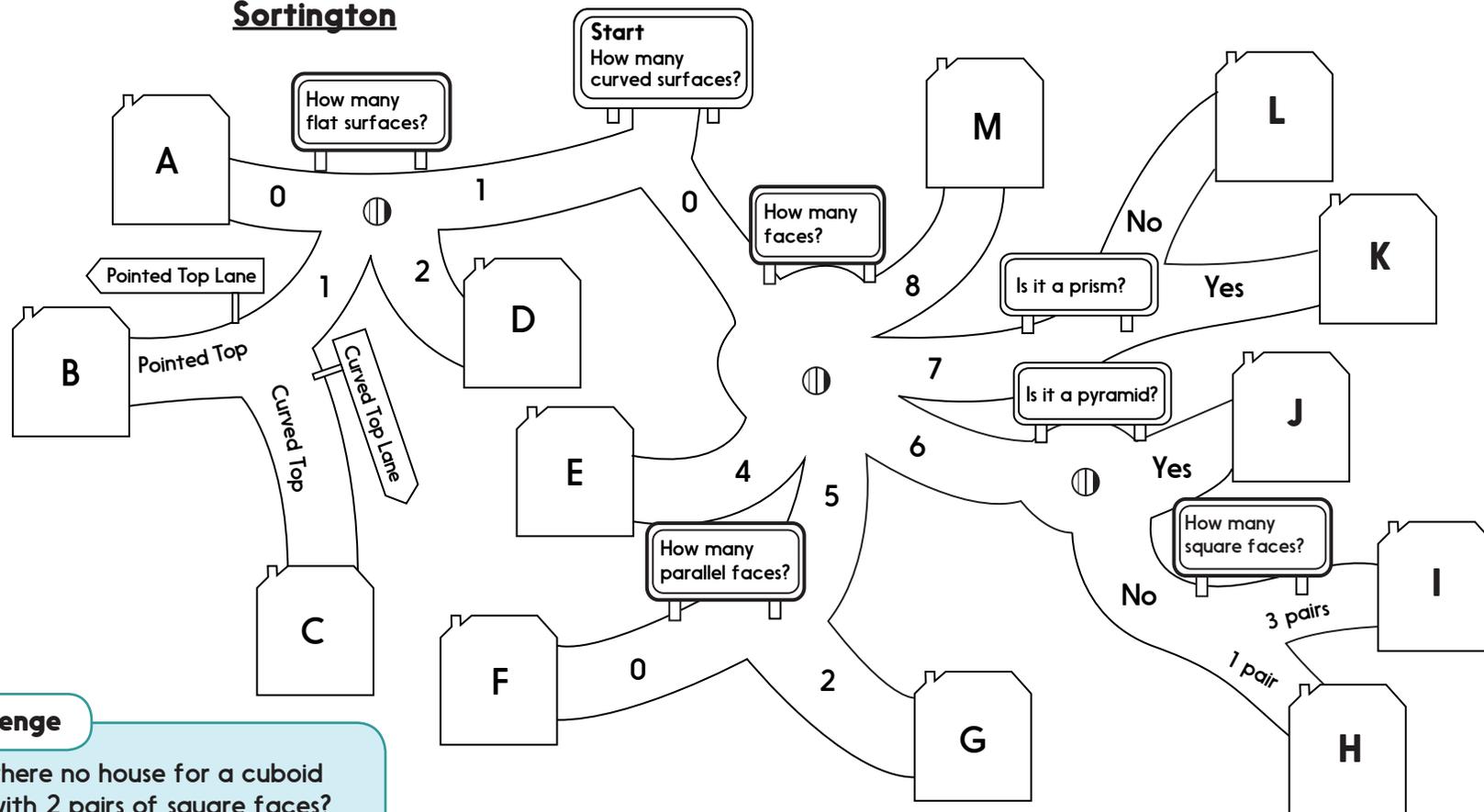
Challenge

Why is there no house for a cuboid shape with 2 pairs of square faces?

© Hamilton Trust

Explore more Hamilton Trust Learning Materials at https://wrht.org.uk/hamilton

Practice Sheet Hot
Sorting shapes

The 3-D shapes go on holiday to Sortborough! Work out which houses they all stay in.
Match each shape to a letter. Do you know their names?

Sortborough

Start How many straight edges?

How many curved edges?

- 0 — N
- 0 — (striped circle)
- Pointed "Top" (Apex) — O
- Curved upper surface — P
- 1 — (striped circle)
- 2 — Q
- 10 or fewer — (striped circle)
  - 10 — U
  - 9 — T
  - 6 — R
  - 8 — S
- More than 10
  - 18 — Z
  - 15 — Y
  - 12 — How many square faces? (striped circle)
    - 0 pairs — V
    - 1 pair — W
    - 3 pairs — X
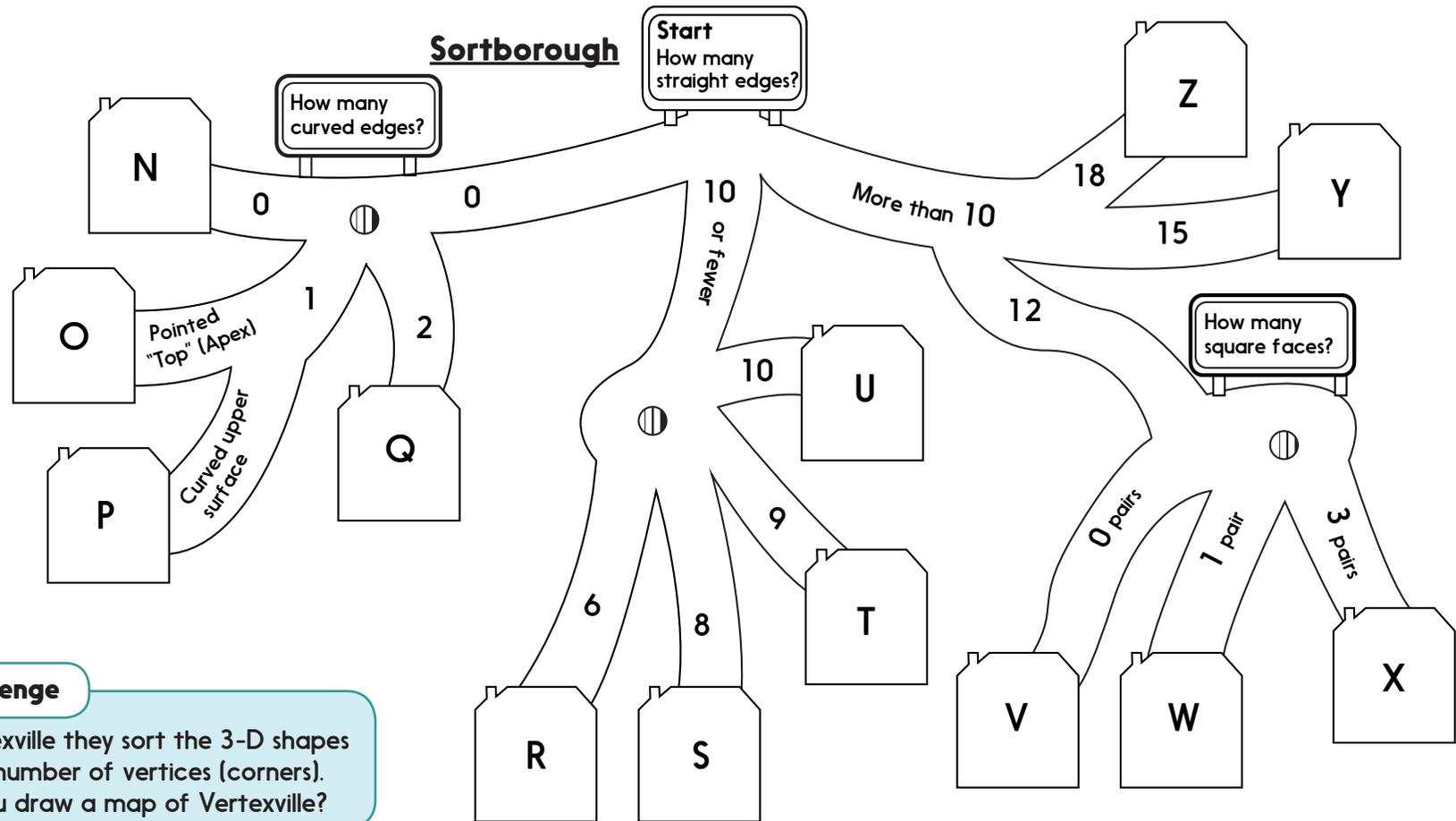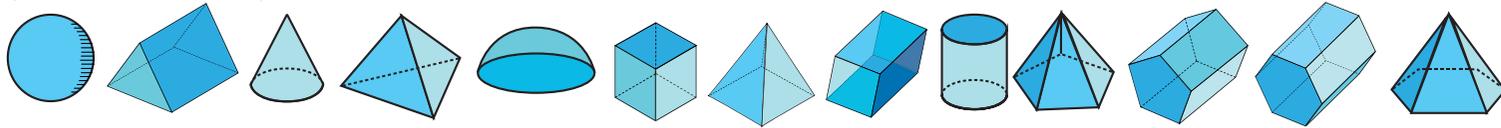
Challenge

In Vertexville they sort the 3-D shapes by the number of vertices (corners). Can you draw a map of Vertexville?

© Hamilton Trust

Explore more Hamilton Trust Learning Materials at https://wrht.org.uk/hamilton

Practice Sheets Answers

Sorting shapes (mild)

A   Sphere
B   Cone
C   Hemisphere
D   Cylinder
E   Tetrahedron / Triangle-based pyramid
F   Square-based pyramid
G   Triangular prism
H   Cuboid
I   Cube
J   Pentagon-based pyramid
K   Pentagonal prism
L   Hexagon-based pyramid
M   Hexagonal prism

Challenge

There is no house for a cuboid shape with 2 pairs of square faces because if a cuboid shape had 2 pairs of square faces the third pair of faces would also have to be square. It would then be sorted into house I.

Sorting shapes (hot)

N   Sphere
O   Cone
P   Hemisphere
Q   Cylinder
R   Triangle-based pyramid
S   Square-based pyramid
T   Triangular prism
U   Pentagon-based pyramid
V   Hexagon-based pyramid
W   Cuboid
X   Cube
Y   Pentagonal prism
Z   Hexagonal prism

Challenge

The map should reflect the shapes having the following number of vertices:

Shape	Number of vertices	Shape	Number of vertices
Sphere	0	Cuboid	8
Triangular prism	6	Cylinder	0
Cone	1	Pentagon-based pyramid	6
Triangle-based pyramid	4	Pentagonal prism	10
Hemisphere	0	Hexagonal prism	12
Cube	8	Hexagon-based pyramid	7
Square-based pyramid	5		

Work in pairs

Things you will need:
- A sheet of triangles
- Scissors
- Ruler
- Right angle measurer (e.g. the corner of a piece of paper or book)
- A Carroll diagram sheet
- Glue stick
- A pencil

What to do:

- Cut out the triangles.

- Take one and discuss where it belongs in the diagram.

- Once you are agreed, stick it in the correct place on the sheet.

- Repeat with each triangle, one at a time.

S-t-r-e-t-c-h:
Choose a different way to sort the triangles.

Learning outcomes:
- I can identify and describe properties of triangles.
- I can sort triangles according to their properties.
- I am beginning to find my own way to sort triangles.

Explore more Hamilton Trust Learning Materials at https://wrht.org.uk/hamilton

Explore more Hamilton Trust Learning Materials at https://wrht.org.uk/hamilton
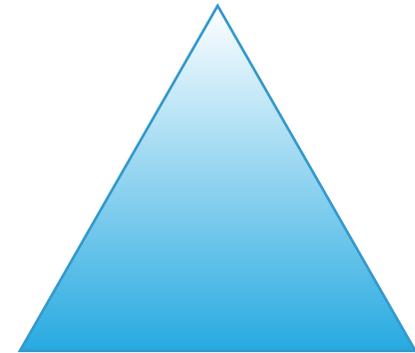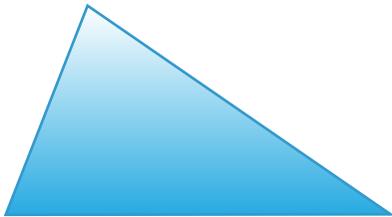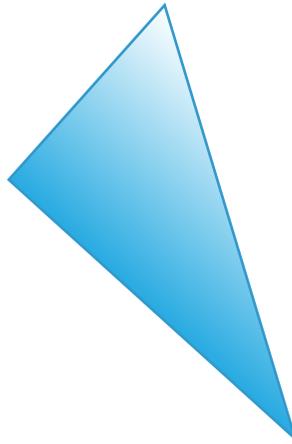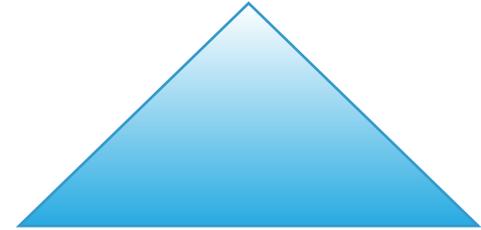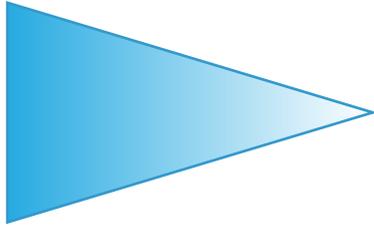
	Symmetrical	Not symmetrical
Has a right angle		
Does not have a right angle		

Investigation
Pyramid net

This is the net for a square-based pyramid:
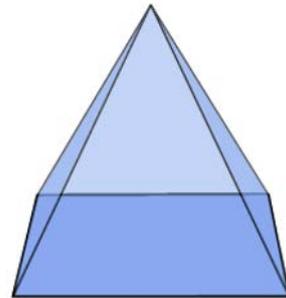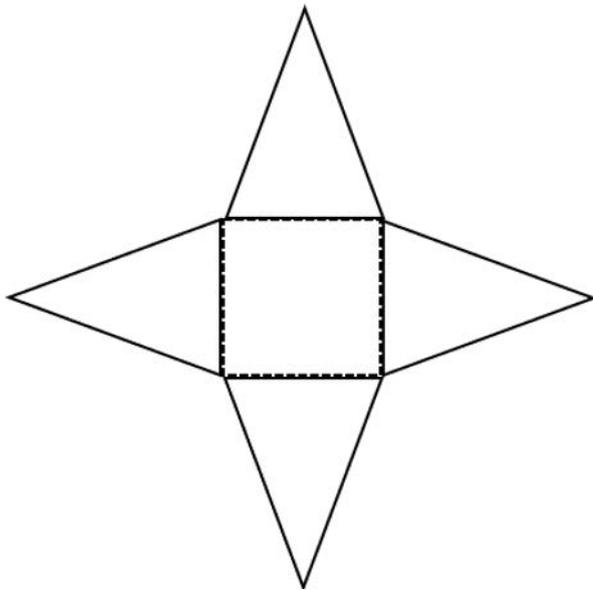
Can you visualise and draw any other different nets that fold to give the same pyramid?