Volume – counting cubes

Notes and guidance

In Year 5, children began to explore volume as the amount of space that a solid object takes up. They started by counting cubes, before being introduced to cubic centimetres (cm^3) as a unit of measure for volume. This learning is recapped at the beginning of this small step.

Children then explore shapes where they can find the volume by multiplying the volume of a single layer by the number of equal layers. This can include cuboids and other prisms. Encourage children to explore the relationship between the total volume of a cuboid and its length, width and height, although there is no need to explicitly introduce the formula for finding the volume of a cuboid, as this will be covered in more detail in the next step.

Things to look out for

- Children may believe that shapes that look different visually must have different volumes.
- Children may ignore cubes that cannot be "seen" in an image, so it is important to discuss the possibility of hidden cubes and how children might know for certain that more cubes exist even if they cannot see them.

Key questions

- What is volume?
- How is volume different from area?
- How can you count the number of cubes efficiently?
- If each cube has a volume of 1 cubic centimetre (cm^3), what is the volume of the shape?
- How many cubes are there in this layer? How many equal layers are there? So how can you find the volume?
- What is the length/width/depth of this cuboid?

Possible sentence stems

- The volume of the shape is _____ cubes.
- The volume of the shape is _____ cm^3
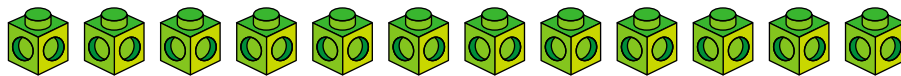- There are _____ cubes in each layer and _____ equal layers, so the volume is _____ cubes.

National Curriculum links

- Calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm^3) and cubic metres (m^3), and extending to other units
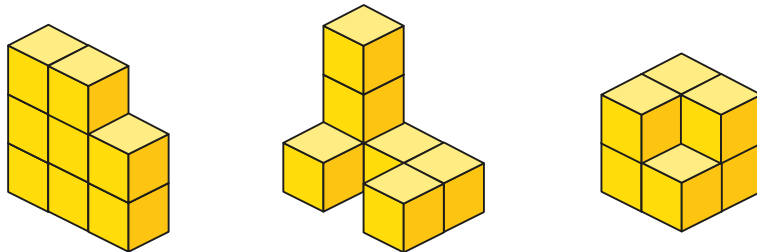
Volume – counting cubes

Key learning

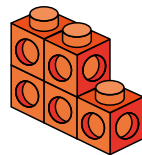- Using 12 cubes, how many different shapes can you make?

- How many cubes are used to make each shape?
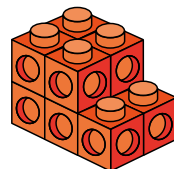

- Brett makes this shape using cubes.

  What is the volume of the shape in cubes?

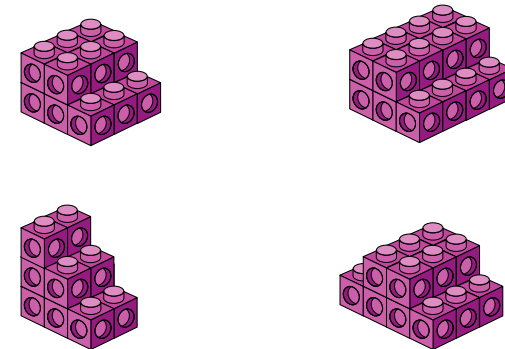 Mo makes an identical shape and attaches the shapes together like this.

  What is the volume of the shape in cubes?

  What do you notice?
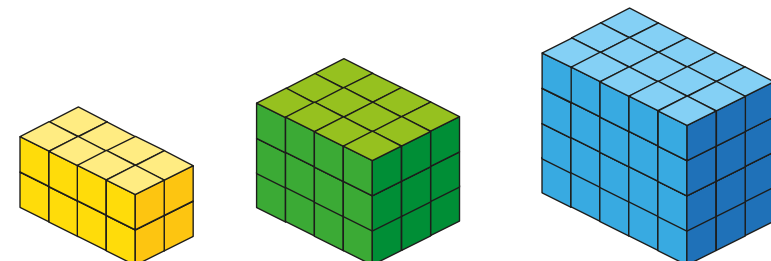
- Each shape is made using centimetre cubes.

  Work out the volume of each shape in cm^3

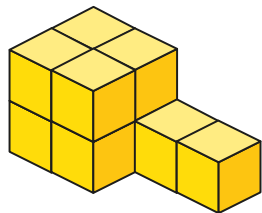 What is the quickest way of finding the volumes?

- Each cuboid is made using centimetre cubes.

  Find the volumes of the cuboids.

Volume – counting cubes
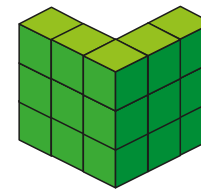
Reasoning and problem solving

I only need 8 cubes to make this shape.

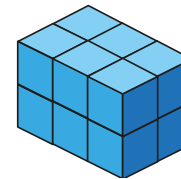Do you agree with Tiny?

Explain your reasons.

No

Make a cuboid using 24 cubes.

What are the dimensions of your cuboid?

How many different cuboids can you make with this number of cubes?

multiple possible answers, e.g. 6 cubes, 2 cubes and 2 cubes

What could the volume of this shape be?

Compare answers with a partner.

between 15 and 23 cubes

Dani makes this cuboid.

She makes another cuboid by increasing the height, width and depth by 1 cube.

What is the difference in the volumes of the cuboids?

24 cubes