

Shapes, Arrays and Equal Parts: math lesson, Grade 2 – download the PDF

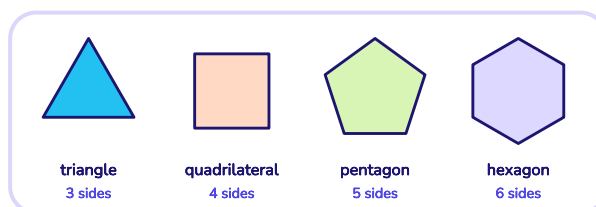
Look around you! A window, a pizza box, a dice, a chocolate bar. Shapes are everywhere. In this chapter you will learn to describe shapes, count things in neat rows and columns, and cut shapes into equal parts like a real math chef.

1. Polygons and their sides

D Polygon

A polygon is a flat, closed shape made only of straight sides. The sides do not cross, and there are no gaps.

Polygons have names that tell you how many sides they have. Every polygon has the same number of sides and vertices.



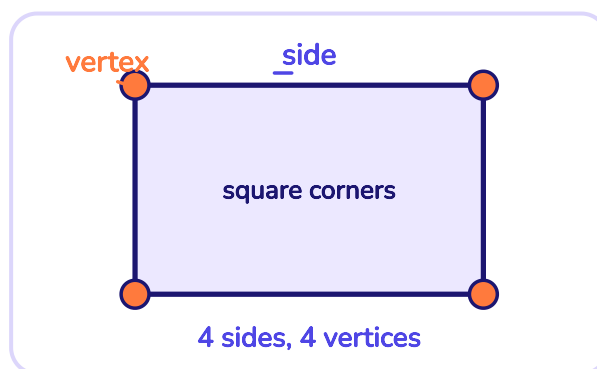
Shape	Sides	Vertices
Triangle	3	3
Quadrilateral	4	4
Pentagon	5	5
Hexagon	6	6

A **quadrilateral** is any polygon with 4 sides. Squares, rectangles and other four-sided shapes are all quadrilaterals. A circle is not a polygon, because it has no straight sides.

E Example 1 A stop sign has 8 sides, so it is not on our list yet, but a honeycomb cell has 6 sides. That makes it a hexagon.

2. Sides, vertices and angles

A **side** is a straight line segment of a polygon. A **vertex** is a corner where two sides meet (the plural is **vertices**). An **angle** is the opening made at a vertex.



Some angles are *square corners*, like the corner of a sheet of paper. A rectangle has 4 square corners. You can check a square corner by fitting the corner of a sheet of paper into it.

M**How to name a polygon**

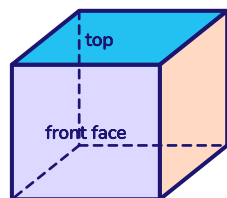
- Count the sides by putting a finger on one side and moving around the shape.
- Stop when you are back at your start.
- Use the number to pick the name: 3 triangle, 4 quadrilateral, 5 pentagon, 6 hexagon.



Careful! Do not count a vertex twice. Mark your starting side, so you know when to stop.

3. Cubes and other solids

Flat shapes live on paper. **Solids** are shapes you can hold, like boxes and balls. A **cube** is a solid with 6 faces that are all squares of the same size.



6 square faces
12 edges
8 vertices

A **face** is a flat side of a solid. An **edge** is where two faces meet. A **vertex** is a corner where edges meet. A game die and a sugar cube are good cube models.

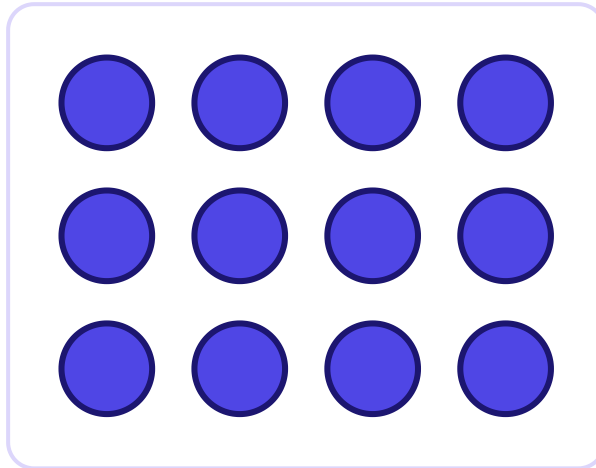
E

Example 2 A cube has 6 faces. The faces are squares, and a square has 4 sides. A tissue box is not a cube if its faces are rectangles of different sizes.

4. Arrays: rows and columns

D Array

An array shows objects in equal **rows** (going across) and **columns** (going down).



This array has 3 rows and 4 columns. Each row has 4 dots, so you can add $4 + 4 + 4 = 12$. You can also count by columns: there are 4 columns of 3, and $3 + 3 + 3 + 3 = 12$. Both ways give the same total.

P Repeated addition

The total of an array is the sum of all equal rows (or all equal columns).

5. Repeated addition up to 25

Arrays are a great way to practice adding the same number again and again. The biggest array in this chapter has 5 rows of 5, so the total is 25.

E Example 3 A gardener plants 5 rows of tomato seedlings with 5 seedlings in each row.

$5 + 5 + 5 + 5 + 5 = 25$. The gardener has 25 seedlings.

M**How to write an array sentence**

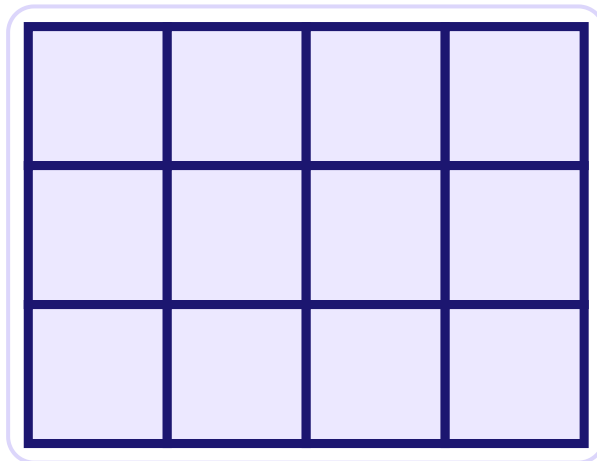
- Count the rows, and count how many are in one row.
- Write the same number for every row, with plus signs.
- Add. Then write the total with a unit.

!

Zyro says Skip count to go faster! For rows of 5, say 5, 10, 15, 20, 25. For rows of 2, say 2, 4, 6, 8, 10.

6. Partitioning a rectangle into squares

To **partition** a shape means to cut it into smaller pieces. A rectangle can be partitioned into rows and columns of squares that are all the same size. This is how a bar of chocolate or a tile floor is made.



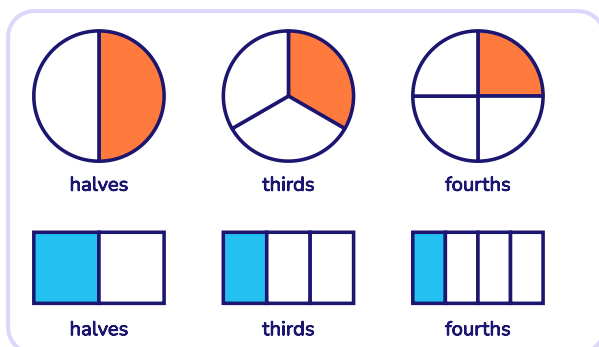
This rectangle has 3 rows with 4 squares in each row. Count the squares row by row:
 $4 + 4 + 4 = 12$. The squares must have no gaps and no overlaps.

E

Example 4 A rectangle tile pattern has 2 rows of 5 squares. Then $5 + 5 = 10$, so there are 10 squares.

7. Halves, thirds and fourths

When you cut a whole into **equal shares**, each share has a special name that depends on how many shares there are.

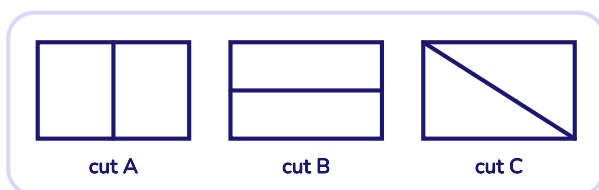


Equal parts	Name of each part	Written as
2	a half	$\frac{1}{2}$
3	a third	$\frac{1}{3}$
4	a fourth (or a quarter)	$\frac{1}{4}$

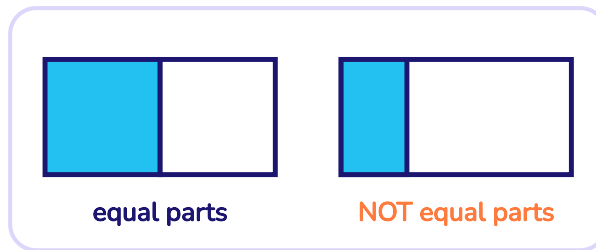
Two halves make a whole. Three thirds make a whole. Four fourths make a whole. You can say “half of the pizza”, “a third of the sandwich” or “a fourth of the circle”.

8. Equal shares, different shapes

Equal shares must be the *same size*, but they do not always have the same shape. Look at three ways to cut identical rectangles in two.



In all three pictures, the two pieces cover the same amount, so each piece is one half. Cut C makes triangles and A and B make rectangles, yet every piece is a half.



Careful! Two parts are not halves if one is bigger than the other. For thirds and fourths, every part has to match. Also, the more equal parts you make, the smaller each part gets: a fourth is smaller than a half of the same whole.

Key takeaways

- A polygon has straight sides. Triangle 3, quadrilateral 4, pentagon 5, hexagon 6.
- A vertex is a corner. A cube has 6 square faces, 12 edges and 8 vertices.
- An array has equal rows and columns. Add the rows to find the total.
- A rectangle can be partitioned into rows and columns of equal squares.
- Halves, thirds and fourths are equal shares of a whole.
- Equal shares have the same size, even if the shapes differ.



Test yourself: quick challenge for Grade 2

[Change level](#)

Level : **Grade 2**

6 random questions, instant feedback.

 **Start the challenge**

 **Speed drill for Grade 2: how many in 60 seconds?**

 **Keep exploring with Zyro**

 **Math practice**

Shapes, Arrays and Equal Parts: math practice, Grade 2

 **Math tests**

Shapes, Arrays and Equal Parts: math test, Grade 2

 Math quizzes

Shapes, Arrays and Equal Parts: math quiz, Grade 2

 Math practice

Addition and Subtraction Fluency Within 20: math practice, Grade 2

 Math practice

Place Value to 1,000: math practice, Grade 2

 Math tests

Addition and Subtraction Fluency Within 20: math test, Grade 2

Zyro vous emmène sur nos sites partenaires

Embarquez pour d'autres planètes du savoir et leurs applis.

Décollage