Year 6 ratio and proportion

Prior Knowledge
- This topic is first introduced in Year 6 but it has strong links to cooking and other real life activities. - Links with percentages (Y5/6) - Links to shape knowledge (all years) - Links to division(sharing), fractions and multiples (all years) - Links with bar model

Ratio and proportion		Working Towards	Within	Expected	Above
	Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts				
	Solve problems involving the calculation of percentages and the use of percentages for comparison				
	Solve problems involving similar shapes where the scale factor is known or can be found				
	Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples.				

Highlights: ____

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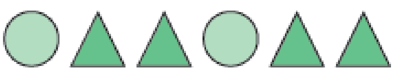
Glossary

vocabulary	word class	definition
integer	noun	a number which is not a fraction; a whole number
relative	adjective	considered in relation or in proportion to something else
scale factor		The scale factor is the ratio of the length of a side of one figure to the length of the corresponding side of the other figure

Ratio Language

For every 1 circle, there are 2 triangles.



For every 2 bananas, there are 3 apples.

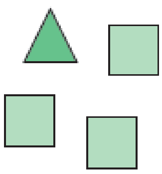
For every 1 football, there are 3 rugby balls.

Ratio and Fractions

For every 1 rugby ball, there are 2 footballs.

Ratio of rugby balls to footballs: 1:2

$\frac{1}{3}$ of the balls are rugby balls.



For every 1 triangle, there are 3 squares.

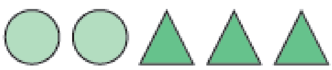
Ratio of triangles to squares: 1:3

$\frac{1}{4}$ of the shapes are triangles.

The Ratio Symbol

The ratio of footballs to rugby balls: 1:4

The ratio of rugby balls to footballs: 4:1



The ratio of circles to triangles: 2:3

The ratio of triangles to circles: 3:2

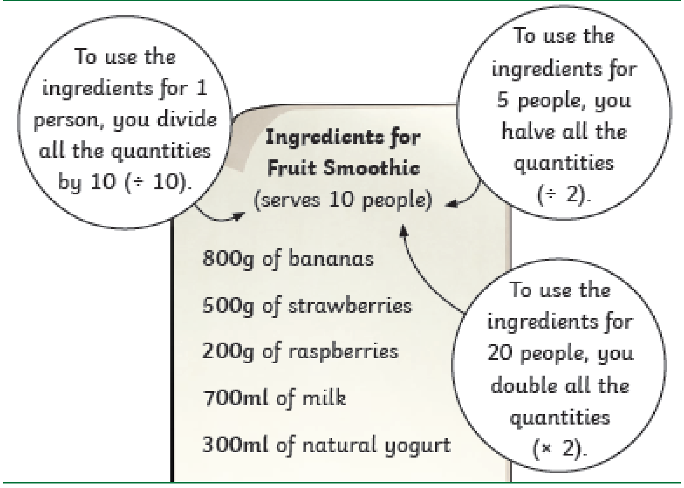
The ratio of apples to bananas: 1:2

The ratio of bananas to oranges: 2:3

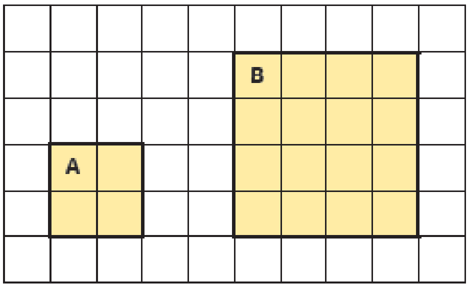
The ratio of apples to bananas to oranges: 1:2:3

The ratio of oranges to bananas to apples: 3:2:1

Ratio and Proportion Problem-Solving



Scale Factors

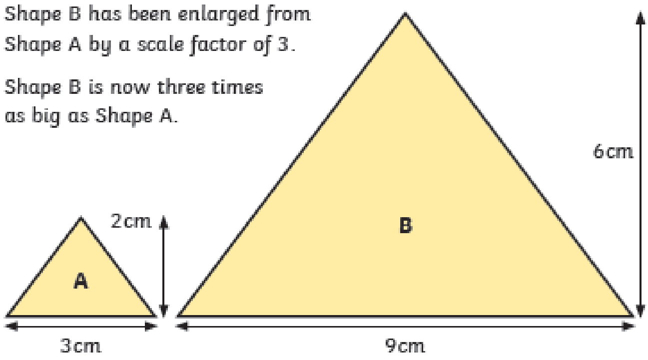


Shape A has been enlarged by a scale factor of 2 to make Shape B.

Shape B is now two times as big as Shape A.

Shape B has been enlarged from Shape A by a scale factor of 3.

Shape B is now three times as big as Shape A.



Future Learning

Key Stage 3
• change freely between related standard units [for example time, length, area, volume/capacity, mass] • use scale factors, scale diagrams and maps • express one quantity as a fraction of another, where the fraction is less than 1 and greater than 1 • use ratio notation, including reduction to simplest form • divide a given quantity into two parts in a given part:part or part:whole ratio; express the division of a quantity into two parts as a ratio • understand that a multiplicative relationship between two quantities can be expressed as a ratio or a fraction • relate the language of ratios and the associated calculations to the arithmetic of fractions and to linear functions • solve problems involving percentage change, including: percentage increase, decrease and original value problems and simple interest in financial mathematics • solve problems involving direct and inverse proportion, including graphical and algebraic representations • use compound units such as speed, unit pricing and density to solve problems.

Key Stage 4
In addition to consolidating subject content from key stage 3, pupils should be taught to: • compare lengths, areas and volumes using ratio notation and/or scale factors; make links to similarity (including trigonometric ratios) • convert between related compound units (speed, rates of pay, prices, density, pressure) in numerical and algebraic contexts • understand that X is inversely proportional to Y is equivalent to X is proportional to $1Y$ • {**construct and**} interpret equations that describe direct and inverse proportion • interpret the gradient of a straight line graph as a rate of change; recognise and interpret graphs that illustrate direct and inverse proportion • {**interpret the gradient at a point on a curve as the instantaneous rate of change; apply the concepts of instantaneous and average rate of change (gradients of tangents and chords) in numerical, algebraic and graphical contexts**} • set up, solve and interpret the answers in growth and decay problems, including compound interest {**and work with general iterative processes**}.