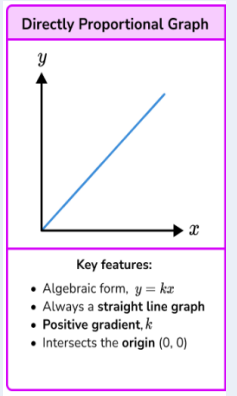
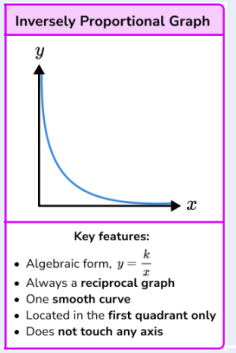
Toynbee Curriculum
Knowledge Maps

MATHS (Ratio)

Toynbee School

DIRECT AND INVERSE PROPORTION

Keywords:	Constant / Variable / Inverse / Proportionality				
Definition / Description :	**Constant:** An unvarying number or quantity	**Variable:** A quantity that can take a range of values	**Inverse:** The reverse or opposite	**Proportionality:** Quantities varying in a ratio	
Knowledge points:	**Direct proportion:** When one variable decreases the other increases	**Inverse Proportion:** When one variable increases the other decreases	**Algebraic Direct proportion:** $y = \frac{k}{x}$	**Algebraic Inverse Proportion:** $y = kx$	**Graphical representations**
Knowledge point examples:	Keith buys 6 pencils for 90p How much would 11 pencils cost? 6 pencils : 90p 1 pencil: 15p ÷ 6 11penciels : 165p x 15	If 6 men take 24 days to build a house, how long will it take 4 men to build the house? 6 men: 24 days 1 man : 144 days x 6 4 men : 36 days ÷ 4	The amount of paint required to paint a wall is directly proportional to the area of the wall. 2 litres of paint are required for a wall of 15m^2 Work out a formula for p paint required for a wall with an area of a m^2 $A = k \times p$ $K = 15 \div 2 = 7.5$ $A = 7.5p$ How much wall could I cover with 6 litres of paint? $A = 7.5 \times 6$ $A = 45m^2$	H is inversely proportional to the cube of f. When $h = 12.5$, $f = 2$ Find the value of h when $f = 5$. $h = k \div f^3$ $K = h \times f^3$ $K = 12.5 \times 2^3 = 100$ $h = 100 \div f^3$ When $f = 5$ $h = 100 \div 5^3 = 0.8$	 
Linked Knowledge Maps	Notation and manipulation Solving Linear Equations Measures Ratio				

RATIO

Keywords:	Ratio, Sharing, Denominator / Unit form			
Definition / Description:	Ratio: A ratio gives a part – to – part comparison.	Sharing: To share is to equally divide an amount into parts.	Denominator: The bottom number in a fraction, it shows what we are dividing by	Unit form:
Knowledge points:	Sharing in a Ratio	Simplifying a Ratio	Writing a Ratio as a Fraction	Write a Ratio in the for of 1 : n
Knowledge point examples:	A ratio tells us how many equal parts an amount has been split into, and how many equal parts are given to each person. £100 is split into the ratio 2 : 3 and given to John and Hannah. There are 5 equal parts in the ratio (2 + 3), John will get 2 parts and Hannah will get 3. £100 ÷ 5 = £20 (Each part is worth £20) John gets 2 parts (£20 x 2) £40 Hannah gets 3 parts (£20 x 3) £60	To simplify a ratio, all parts in the ratio must be divided by the same amount, so we look for the Highest Common Factor. Simplify the Ratio 33 : 72 The HCF of 33 and 72 is 3, so we can divide both by 3. 33 ÷ 3 = 11 72 ÷ 3 = 24 So the ratio becomes 11 : 24	To write a ratio as a fraction, we need to find out how many parts the ratio contains, this will be the denominator of our fraction. The part of the ratio we look at will be the denominator.  Ratio of Circles to Triangles is 1 : 3 We have 4 shapes, so our denominator will be 4. What fraction of the shapes are triangles? We have 4 shapes, 3 of which are triangles so the fraction would be $\frac{3}{4}$	To write a Fraction in the for of 1 : n or n : 1, we must make the correct part of the ratio equal to 1. To do this we can divide that part of the ratio by itself. We also need to remember if we divide part of the ratio by a number, all parts much be divided by the same number. Write the ratio 6 : 18 in the for 1 : n Here, the first part of the ratio must equal 1, so we can divide both parts by 6. 6 ÷ 6 = 1 18 ÷ 6 = 3 So the ratio becomes 1 : 3
Linked Knowledge Maps	Fractions, Factors , Scale			

SCALE

Keywords:	Scale, Ratio, Simplify		
Definition / Description:	Scale: A scale for a drawing or map is the ratio between the drawn distance to its true value	Ratio: A ratio gives a part – to – part comparison.	Simplify: Simplify means to make it simple. In mathematics, simplification is reducing the expression/fraction/problem in a simpler form. It makes the problem easy with calculations and solving.
Knowledge points:	Convert a measurement with a scale	Simplify a Ratio / Scale with units	
Knowledge point examples:	Scales are used to make it possible to work out real distances on a small diagram. A map uses the scale 1cm : 2km This tells us for every 1cm we measure, the real life distance would be 2km. If we measure 3.5cm, we can multiply the real life measurement by what we have measured to find the correct distance. 2(km) x 3.5 = 7km So 3.5cm on the diagram would represent 7km.	Ratios and scales with units can be simplified. First all parts of the ratio or scale must be converted to the same units. Once all the parts have matching units, we can divide all parts by the same amount. Simplify the Scale 4cm : 2km 1. Convert to the same unit 2km = 200,000cm 4cm : 200,000cm 4: 200,000 ↓ Simplify ÷4 1: 50,000 The units are removed as this scale will now work with any units as it was simplified with matching units.	
Linked Knowledge Maps	Ratio, Measurements / Units, Unit Conversion		