Year 8 Knowledge Organiser –
Fractions, decimals and percentages

Objectives

Calculate exactly with fractions

Work with percentages greater than 100

Solve problems involving percentage change, including original value problems, and simple interest including in financial mathematics

Work interchangeably with terminating decimals and their corresponding fractions (such as 3.5 and 7/2 or 0.375 or 3/8)

Interpret fractions and percentages as operators

Key Vocabulary

Multiplier - a more efficient method for calculating a percentage increase or decrease. It involves finding a number you can multiply by that represents the percentage change.

Terminating - a decimal number that has digits that end

Recurring - a decimal number with a digit (or group of digits) that repeats forever

Interest – a process in which an amount of money borrowed or lent increases over time

Simple interest – the interest percentage added yearly based on the original sum of money only.

+ and – fractions

1) Convert mixed numbers to improper
2) Find the LCM of the denominators
3) + or – the numerators (denominator stays the same)
4) Simplify and convert back to mixed number where possible

Dividing fractions

$$\frac{2}{5} \div \frac{3}{4}$$

$$\frac{2}{5} \times \frac{4}{3}$$

Multiplying by a reciprocal gives the same outcome

Tip: Convert mixed number fractions to improper fractions first!

Multiplying fractions

$$2\frac{2}{5} \times 1\frac{7}{9}$$

$$\frac{12}{5} \times \frac{16}{9} = \frac{192}{45}$$

Simplify and convert back to mixed number where possible

$$\frac{192}{45} = \frac{64}{15} = 4\frac{4}{15}$$

Fraction	Decimal	Percentage
1	1	100%
1/2	0.5	50%
1/4	0.25	25%
1/8	0.125	12.5%
1/10	0.1	10%
1/5	0.2	20%
1/3	0.33...	33.3...%

Fraction	Decimal	Percentage
2	2	200%
3/2	1.5	150%
7/2	3.5	350%
5/3	1.66...	166.66...%

Percentages greater than 100% are seen as improper fractions or decimals greater than 1

Calculating Percentages

Non-Calculator

$$\frac{3}{4} \text{ of } 32 = 32 \div 4 \times 3 = 24$$

16% of 240
10% = 24
5% = 12
1% = 2.4
= 24 + 12 + 2.4
= 38.4

Calculator

Find **32%** of 54.60 = **0.32** × 54.60 = 17.472

Increase 45 by **12%** = 45 × **1.12** = 50.4

Percentage decrease: Multipliers

100%

42% Decrease by 58%
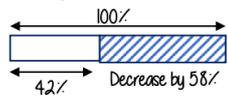
100% - 58% = 42%

100 – 0.58 = 0.42 ← Multiplier Less than 1

Percentage increase: Multipliers

100% 12%

Increase by 12%
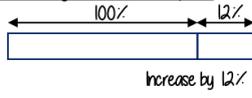
100% + 12% = 112%

100 + 0.12 = 1.12 ← Multiplier More than 1

Reverse Percentages

e.g. A coat was reduced in a sale by 20% to £60. How much was it before the sale?

1) Find new percentage left = 80%

2) Divide the value by the percentage to find 1%
£60 ÷ 80 = 0.75

3) Multiply your answer by 100 to find the original amount
0.75 × 100 = £75.00

Simple Interest

With simple interest the amount of interest is fixed over a period of time. For example if you were to save £200 at 3% simple interest you would earn £6 per year, every year.

It's important to note with simple interest the amount earned will stay the same every year.

Multipliers

Find 15%	× 0.15
Increase by 15%	× 1.15
Decrease by 15%	× 0.85

For **reverse percentage** problems you can divide by the multiplier to find the original amount.

Percentage change

I bought a phone for £200. A year later sold it for £125.

100%

£200
£125

All values of change compare to the ORIGINAL value

Percentage loss

$$\frac{75}{200} \times 100 = 37.5\%$$
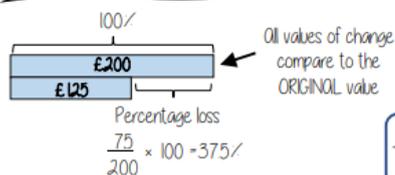
$$\frac{\text{Difference in value}}{\text{Original value}} \times 100$$

I bought a house for £180,000, I later sold it for £216,000

100%

£180,000

Percentage profit

Money made (profit value)

$$\frac{36000}{180000} \times 100 = 20\%$$