Percentages

Key Knowledge/Prior Learning KS2/3 and Retrieval and Suggested Starters
- Division   - Decimal calculations   - FDP conversions   - BIDMAS   - Indices (inc indices calculations)   - Comparing ratios and fractions (FDPR)   - Time and Money calculations

| **KS3 National Curriculum – what students will be practicing and Key Questions** |
|---|
| Proportional Reasoning:
Percentages inc Growth and Decay: Representing and comparing percentages Percentages of amounts Percentage increase/decrease Reverse percentages Percentage change Simple interest Repeated percentage change. |

Specific Ambitious Knowledge

Key Vocabulary/Literacy Opportunities
- Proportion   - Percent   - Increase & decrease   - Original amount   - Interest   - Simple Vs Compound Interest   - Annum   - Multiplier   - Indices/Powers   - Depreciation   - Profit   - Loss

Key Formulae/Knowledge and Misconceptions

FDP Conversions
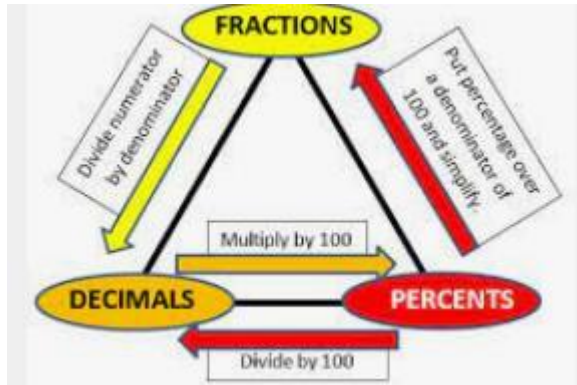
Multipliers

40%	b	55%	c	96%
0.4		0.55		0.96
9%	e	3.2%	f	62.5%
0.09		0.032		0.625
123%	h	0.68%	i	625.9%
1.23		0.0068		6.259

Multiplication making numbers bigger – so reluctance to use these to find percentages

Percentage Change

Percentage Change Formula $= \dfrac{\text{New Value - Original Value}}{\text{Original Value}} \times 100$

Reverse percentages

David's pay increases by 20% to £10.80 an hour.
What was his pay before the increase?

$\div 120$ { 120% → £10.80 } $\div 120$

1% → £0.09 } $\times 100$

$\times 100$ { 100% → £9

Simple Interest

Simple interest: $I = p \times r \times t$

$I =$ interest earned after t years

$p =$ money borrowed or invested

$r =$ annual rate of interest

$t =$ the length of time you borrow or invest

£2000 is invested at 10% **simple** interest.

What is the value at the end of year 1?

10% = 200
=2000 + 200
=2200

What is the value at the end of year 2?

10% = 200
=2000 + (200 x 2)
=2400

What is the value at the end of year 20?

10% = 200
=2000 + (200 x 20)
=6000

Repeated Percentage Change

Repeated Percentage Change

Sally invested **£220** in a company.
She lost **15%** every year!

How much was her investment worth after **3 years**?

Multiplier:
= 100% − 15%
= 1.0 − 0.15
= 0.85

1st Year = 220×0.85

2nd Year = $(220 \times 0.85) \times 0.85$

3rd Year = $((220 \times 0.85) \times 0.85) \times 0.85$ = £135.11

SIMPLIFY

n^{th} Year = 220×0.85^n

Formula:
Quantity × Multiplier^{Years}

A 10% loss each year for 2 years, equals a 20% loss is a common misconception. Students fail to realise the percentage is based on a new amount after year 1.

Maths in Context (Historical, Real Life and Student Thinking Points)

Projects/Enrichment/Investigations
- Percentage CrossNumber
- Percentages of percentages of amounts
- Repeated percentage change number search
- Percentages Treasure Hunt

Project Ideas:
Car hunting: https://www.tes.com/teaching-resource/functional-percentages-ks3-gcse-6229469