Numeracy

Level 4
Indicators

Creating a Standard Together

Indicators	Exemplars
Estimation and Rounding Has investigated the practical impact of inaccuracy and error through a range of contexts. Is able write and interpret tolerance notation (eg 25°C ±1°C) and comment on its significance in unfamiliar real life contexts. Uses the knowledge of number processes to convert units (eg grams to milligrams) and to calculate % error in order to help comment on significance.	**Estimation and Rounding** Contextualised in real-life, ie use of inches/cm, ie discussion re error when building space station, parts not matching; HE - ie ounces or g? mixing measures may result in recipe not working etc. Tolerance use of ± in Science, Technology errors in measurement, HE packet weights. % error, ie in opinion polls, weights in lifts or aeroplanes, safety in medicine, etc. Use should be made of news articles where numbers have been rounded.
Number and Number Processes Is able to carry out the necessary calculations to solve problems set in unfamiliar contexts by applying knowledge of previous types of calculations.	**Number and Number Processes** Pupils should be able to add, subtract, multiply and divide in whole number, decimal, percentage calculations in both contextualised learning and problem solving.
Fractions and Decimals Draws on their knowledge of interrelationships between fractions, decimal fractions and percentages to choose an elegant route to the solution, eg when asked to evaluate a discount of 12.5% on an item costing £800, an elegant solution would involve the understanding that 12.5% is 1/8, and that calculating 1/8 of £800 will provide the size of the discount. Calculates the change in related quantities using inverse proportion in unfamiliar but real life contexts. Can use skills from data analysis to identify direct proportion from a graph.	**Fractions and Decimals** Can increase or decrease percentages in most efficient manner ie to increase by 8%, multiply by 1.08 rather than find 8% and add it on etc. Can calculate a percentage change, ie a plant grows from 120cm to 148cm. Calculate the percentage increase. Can work with inverse proportion, ie the cook at a scout camp has enough food for 5 days for 12 scouts. If 20 scouts arrive, how long will the food last? Contextualised problems, ie foreign exchange, cost of hiring equipment etc.
Money Recognises and understands vocabulary associated with money and Financial Understanding. Using this vocabulary, learners can calculate associated costs for different products or services, both short and long-term where appropriate, in order to budget effectively for a number of debits and credits. Net pay can be deducted and process explained using the key vocabulary.	**Money** Understands and uses PAYE, APR, AER, SUPERANNUATION, TAX ALLOWANCES, INSURANCE, PREMIUMS, etc. Can work with contextualised problems, ie compare annual holiday insurance with single trip, house or contents insurance, compare mobile phone insurances etc. Can use and understand words and calculations involving wages, salaries, overtime, net pay etc.

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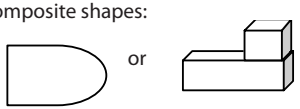
Time Estimates how long different tasks will take and then build a programme of sequential tasks in order to effectively time manage. Can calculate speed, distance or time from the formula. Can write appropriate units for the values given (ie cm/s, km/h). Can use knowledge of number process in order to convert units for use in the formula.	**Time** Time management - ie study revision timetable, planning a journey involving more than one mode of transport. Can calculate T, D and S involving more complex values, ie T = 2 hours 6 min etc. Can convert from km/h to m/min etc and vice versa.
Measure Selects an appropriate measuring tool and uses it correctly to measure a quantity to an appropriate degree of accuracy. Appropriate to: • *degree of complexity of the equipment given;* • *complexity of data being used;* • *complexity of form.*	**Measure** **Similar to Level 3 but more sophisticated examples and language.** Can work with more sophisticated scales - in science and technology, ie callipers, micrometer etc. Can realistically estimate heights, lengths and weights etc, ie how far to the local shop?, what is the height of the building? etc. Can use formulae for perimeter, area and volume including simple composite shapes, prisms - extending into sphere and pyramids/cones. Formulae - $C = \pi d$, $A = lb$, $V = lbh$, $A = \pi r^2$, $V = Ah$ etc. Composite shapes:  or
Data and Analysis Interprets a data set or the information contained in, for example, dot plots, stem and leaf diagrams, line graphs, bar graphs, histograms and pie charts, correlation and scattergraphs. Understands key features of these different ways of presenting information in order to be able to select appropriate forms and communicate findings to others.	**Data and Analysis** **NB: histograms** (bar graph with NO spaces - continuous and discrete data). Can work and understand discrete and continuous data, correlation (positive, negative and no correlation), 'skew' on dot plots etc. Data comparison table/chart etc. *PLEASE NOTE: In numeracy the emphasis is on the interpretation of statistical information etc. The drawing of dot plots, stem-and-leaf diagrams etc is taught in the maths outcomes.*
Ideas of Chance and Uncertainty Converts between simple probability and expected frequency, eg calculate the probability of rolling a 5 on a 6 sided die then calculating how many times you would expect a 5 to appear in a set number of rolls. Can assess the impact of a particular course of action based on risks and benefits.	**Ideas of Chance and Uncertainty** Extending level 3 to deal with more complex probabilities, ie coin + dice, two dice, Expectation = P(event) x number of events. Real-life risk - ie Comparison of safety of flying versus going by car, safe distances when lighting fireworks etc, weather in July for planning a Highland Games etc - relating to relative frequencies, probabilities etc - real-life data can be found via the internet.

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