Estimation and rounding

Terms	Illustrations	Definitions
Actual		The correct answer.
Approximate/ Approximating		To give a 'rough answer' that may be slightly more or less than the actual answer.
Degree of accuracy		The level of accuracy to round a number to e.g. • to the nearest 10, 100, 1000. • to 1 decimal place • to 3 significant figures
Estimation		Comparing different sizes and amounts (quantities) using appropriate vocabulary to describe them in relation to each other *e.g. longer/shorter, lightest/heaviest* A 'reasonable' guess. Predicting solutions and checking the accuracy of calculations *e.g. estimating 317 + 498 as approximately 300 + 500 = 800 and comparing estimate to actual solution.*
Rounding		Rounding can make numbers easier to work with e.g. • round a number to the nearest 10 (or multiple of 10) • *when adding 42 and 98, round down 42 to 40 and round up 98 to 100 to get an approximate answer.* • *In context of decimal places, e.g. 5.634 = 5.6 (round up to 1 decimal place) or 5.63 (to 2 decimal places).* • In context of significant figures, *e.g. 0.00421 = 0.0042 (to 2 significant figures).*

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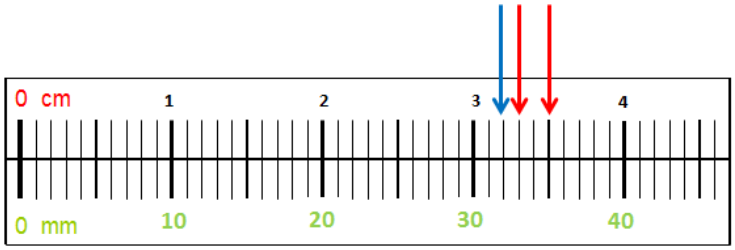
Rounding rules		General rules of rounding are: • If the number you are rounding is followed by 5, 6, 7, 8, or 9, round the number up. Example: 38 rounded to the nearest ten is 40, or 8.6 is rounded to the nearest whole number is 9 or 3.063 is rounded to 3.1 (to 1 decimal place). • If the number you are rounding is followed by 0, 1, 2, 3, or 4, round the number down. Example: 33 rounded to the nearest ten is 30, 5.4 is rounded to the nearest whole number is 5 or 6.324 is rounded to 6.3 (to 1 decimal place)
Significant figures		With the number 368249, the 3 is the most significant digit, because it tells us that the number is 3 hundred thousand and something. It follows that the 6 is the next most significant, and so on. With the number 0.0000058763, the 5 is the most significant digit, because it tells us that the number is 5 millionths and something. The 8 is the next most significant, and so on.

Tolerance	If the task was to mark 3.4cm on this ruler and the tolerance accepted in the measurement was plus or minus 0.1cm (1mm) – **both red arrows** would be correct as they measure 3.3cm and 3.5cm. They are within 0.1cm (1mm) of the actual required measurement. The **blue arrow** would not be accepted as it measures 3.2cm, which is more than 0.1cm (1mm) out with the actual required measurement. It is 0.2cm (or 2mm) out. 	Tolerance is an allowance for error. It is the maximum range of variation in the accuracy of calculations allowed within particular situations and contexts *e.g. in construction, acceptable levels of tolerance will be very small.* *For example;* You may be given a measurement of 3.4 cm with a tolerance of plus or minus 0.1 cm (1 mm). The measurement you make will be acceptable if it is anything from 0.1 cm less than 3.4 cm to 0.1 cm more than 3.4 cm. Any measurement from 3.3 cm to 3.5 cm would be acceptable in this case.