**Density of glass block**

A student attempts to measure the density of a rectangular glass block, like the one used in the refractive index practical.

Using Vernier Callipers (which read to the nearest 0.02 mm), she measures the length of the block to be 114.78 mm. Calculate the percentage uncertainty in this single measurement.

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She now takes two more readings and obtains 114.80 mm and 114.64 mm. Calculate the average from all three readings.

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Estimate the uncertainty based on the spread of results and calculate the new percentage uncertainty.

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The student now measures the width of the block and obtains 3 readings of 64.10 mm, 63.70 mm and 63.78 mm. Calculate the average width and estimate the uncertainty in this reading. Use these values to calculate the percentage uncertainty in this measurement.

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Repeat the above stages to calculate the average value and the percentage uncertainty in three height readings of 19.50 mm, 19.48 mm and 19.38 mm.

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Using the average values of length, width and height, calculate the volume of the block in m3.

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The student measures the mass of the glass block as 353.25 g using a recently calibrated 2 decimal place balance. She decides to ignore the uncertainty in this value. Explain why this is reasonable.

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Now calculate the density of the glass block in kg m-3.

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Using the percentage uncertainty in the length, width and height, work out the total percentage uncertainty in the density value.

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Use this to calculate the possible range of values for the density of the glass block.

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A student in another college does a similar experiment with a different glass block and obtains a value of 2450 kg m-3. Assuming the same percentage uncertainties in his measurements, discuss how likely it is that both blocks are made of the same type of glass.

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