Lengths, Areas, Weights, Liquids

Practical sessions

These worksheets can be used as the core of 4 *practical* sessions in estimating, measuring, recording and calculating with lengths, areas, weights and liquid capacity.

The idea and format are quite simple. For each type of measurement, you have two worksheets: a blank table (pp 7-10) and a sheet of calculations (pp 2-5). The students need to list 4-6 items; then estimate the measurements; then measure and record; and then evaluate their estimates. On the second sheet they calculate with the measurements they have just made.

With a "top and a tail" this makes a complete lesson for each type of measurement. For example, you could pre-teach contexts, units, scales & tools; and follow up with further practice for homework, such as some worksheet exercises or scaling a recipe. There are good resources on www.skillsworkshop.org for this.

And that's it. The idea of these activities isn't unique, but I've made a simple version that seems to work OK. Here are a few points I've found in class:

1. This can be a light activity, done in pairs if students prefer, with plenty of dialogue and exploration. It gets students on their feet. It can take from an hour to 2 hours in all, for one type of measurement.

2. The topics are nominally E3 and L1, but can benefit any level E2 to L2. You can adapt by accepting rounded measurements; and asking "was it a good guess or a bad guess?" instead of "how far out were you?" Or you can follow up with more demanding questions, such as converting from metric to imperial.

3. In the case of liquid capacity, there is a third sheet (p6) where students mix coloured liquids in given ratios. This makes a nice lead-in to the topic of ratios.

4. You need to provide objects for students to measure, plus measuring tools such as tapes, scales and jugs. For weights, it's really worth bringing in food items rather than using things lying around the room; students seem to take more interest. For liquids you need some vessels such as the ones I've listed. You can include two ex-mayonnaise buckets filled with red and yellow water; this raises interest as well as leading into the ratios activity. For lengths and areas, you'll probably have the objects you need in the room already.

5. Be strict about the order of activities! Students can be reluctant to make *estimates*. I keep the measuring tools to one side until the items are listed and estimated.

This resource kindly contributed by Tim Goldstein. MSS1 read, estimate, measure & compare length **(E3.5)** weight **(E3.6)** & capacity **(E3.7)** using common standard & non standard units. **MSS1/E3.8** choose & use appropriate units and measuring instruments. **MSS1/L1.4** read, estimate, measure & compare length, weight, capacity using common units & instruments. **MSS1/L1.8/1.9** Work out the perimeter / area of a rectangles.

Use your table of lengths to answer these questions.

1. Write the objects in ascending order of actual length.

2. What is the difference in length between the longest object and the shortest?

   (Actual lengths)

3. What is the total length of the longest three objects?

4. What is the total length of the shortest three objects?

5. What is the total length of all six objects?

6. Take the longest object. What is twice its length?

7. What is three times its length?

8. What is half its length?

9. What is a third of its length?

10. What is the average length of all the objects? Any ideas?

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Use your table of lengths & widths to answer these questions.

1. Write the four objects in ascending order of actual length.

2. Calculate the perimeter of each object (m or cm).

3. Calculate the area of each object (m^2 or cm^2).

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Use your table of weight measurements to answer these questions.

1. Write the items in ascending order of actual weight.

2. What is the difference in weight between the heaviest item and the lightest?

   (Actual weights)

3. What is the total weight of the heaviest three items?

4. What is the total weight of the lightest three items?

5. What is the total weight of all six items?

6. Take the heaviest item. What would two of them weigh?

7. What would three of them weigh?

8. What is half its weight?

9. What is a third of its weight?

10. What is the average of all the items you weighed? Any ideas?

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Use your table of liquid measurements to answer these questions.

1. If you fill a big bottle & small bottle from the bucket, what's left in the bucket?

2. If you fill a square tub from the big bottle, what will you have left?

3. If you fill 2 round tubs from the big bottle, what will you have left?

4. How much do 3 cups hold?

5. How much do 4 cups hold?

6. How many cups can you fill from a big bottle?

7. What does a $^{1}/_{4}$ of a big bottle hold?

8. How many square tubs can you fill from a big bottle?

9. What is a $^{1}/_{10}$ of a big bottle?

10. How many times can you pour 50 ml from a big bottle?

11. What is a $^{1}/_{10}$ of a small bottle?

12. What is a $^{1}/_{3}$ of a big bottle?

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Liquid Ratios

Make the colour mixes listed below.

You need 2 lots of coloured water (eg Red and Yellow), a measuring jug, and a vessel to put the mix into.

1R : 1Y → 300 ml

1R : 1Y → 450 ml

1R : 2Y → 450 ml

1R : 3Y → 600 ml

2R : 3Y → 600 ml

For example, for the first mix you want equal parts of Red and Yellow (ie 1:1), to get 300 ml altogether. How big is each “part” going to be?

Alternatively, mix smaller quantities. For this, you need 2 lots of coloured water (eg Red and Yellow), a medicine measure, and a vessel to put the mix into.

1R : 1Y → 50 ml

1R : 1Y → 60 ml

1R : 2Y → 75 ml

1R : 3Y → 100 ml

2R : 3Y → 100 ml

For example, for the first mix you want equal parts of Red and Yellow (ie 1:1), to get 50 ml altogether. How big is each “part” going to be?

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How long is each object?

List six objects	Guess the length m or cm	Measure the actual length	How far out were you?
1.			
2.			
3.			
4.			
5.			
6.			

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How long and wide is each object?

List four objects	Estimate the length & width m or cm	Measure the actual length & width	How far out were you?
1.	Length Width		
2.	Length Width		
3.	Length Width		
4.	Length Width		

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How much does each item weigh?

List six items	Estimate the weight kg or g	Measure the actual weight	How far out were you?
1.			
2.			
3.			
4.			
5.			
6.			

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How much does each vessel hold?

litre = 1000 ml

E.g. bucket, square tub, big bottle, cup, small bottle, round tub

Vessel	Estimate the volume	Measure the actual volume	How far out were you?
1.			
2.			
3.			
4.			
5.			
6.			

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