Sorting Cards: Common Measures

The mass, capacity, length and time cards (pages 2-3) were originally used as a starter activity in a pre-GCSE maths class (Level 1 and Level 2 numeracy), after we had done some practical work on estimating but before we had worked on converting between metric units.

Students worked in pairs and were first asked to sort the cards into four piles: time, capacity, mass and length. Do **not assume** that level 1 and 2 students can do this – we encountered a few difficulties, especially with units of capacity.

The time cards were then removed. Students were asked to split each remaining pile into metric and imperial units and finally sort each set into order of size. Finally (Level 2 only) the metric and imperial piles in each category were combined and again sorted into size order. Almost all students needed support with this and we had some discussion about the relative sizes of metric and imperial ton(ne)s, and centilitres and fluid ounces.

The picture cards were first used in an ESOL Entry 3 Numeracy class – to introduce suitable units of measure and measuring instruments. A few red herrings were inserted (compass, protractor, etc.) to promote further discussion (e.g. about two types of compass and two types of degrees!).

The card sets can be combined in various ways; further teaching ideas and suggestions on page 7.

Curriculum Links

Note: exact links will vary with how the cards are used (and which cards are used).

MSS1/E2 read, estimate, measure and compare length **(E2.5)** weight **(E2.6)** and capacity **(E2.7)** using common standard and non standard units. Know that metres and cms are metric units of length and are abbreviated to m, cm. Know that a kilogram is a metric unit of weight, and abbreviated to kilo and kg. Know that a litre is a metric unit and can be abbreviated to l.

MSS1/E3.4 read and interpret distance in everyday situations.
(a) know the units for measuring longer distance e.g. miles, kilometres.
MSS1/E3.8 choose and use appropriate units and measuring instruments.
(a) know metric units of length, weight, and capacity.
(b) know which instrument is appropriate for measuring length, weight and capacity 0f differing magnitude.

MSS1/L1.2 read, measure and record time in common date formats and in 12-hour and 24-hour clock.
(e) know units of time: millennium, century, year, month, week, day, hour, minute, second.
MSS1/L1.4 read, estimate, measure & compare length, weight, capacity & temperature using common units & instruments.
(a) know standard metric units of length, weight, capacity inc abbreviations (km, m, cm, mm, kg, g, l, ml).
MSS1/L1.5 read, estimate, measure, compare distance (a) know that distance is measured in miles or km.
MSS1/L1.7 convert units of measure in same system (a) know the relationship between metric units.

MSS1/L2.2 calculate, measure and record time in different formats.
(c) know the relationship between units of time, e.g. sec, min, hr, day, week, month, year.
MSS1/L2.3 estimate, measure and compare length, distance, weight and capacity using metric and, where appropriate, imperial units (a) know metric units of length, distance, weight, capacity (b) know the common imperial units of length, distance, weight, capacity, where appropriate, e.g. yard, feet, inches, miles, tons, pounds, ounces, pints, gallons.
MSS1/L2.6 calculate with units of measure between systems, using conversion tables and scales, and approximate conversion factors (a) know rough equivalences between common metric & imperial measures, e.g. 1 lb is about 450 grams, a litre is a bit less than 2 pints, a gallon is about 4 ½litres, a kilogram is a bit more than 2 lb, a metre is a bit more than a yard, an inch is about 2½ cm, a foot is about 30 cm.

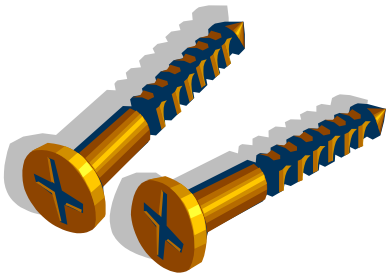
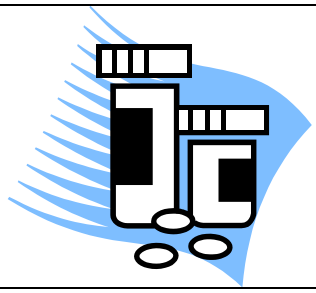
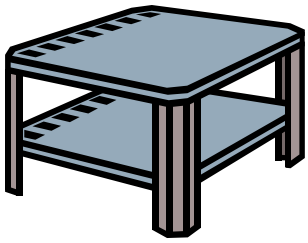
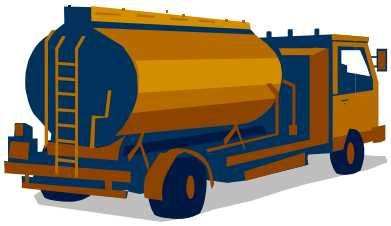
LENGTH (distance)	MASS (weight)	CAPACITY (volume)
millimetre	milligram	millilitre
centimetre	gram	centilitre
inch	ounce	fluid ounce
foot	pound	pint
yard	kilogram	litre
metre	stone	quart
kilometre	tonne	gallon
mile	ton	cubic metre
Metric	**Measures**	**Imperial**

Measures in each column are listed in order of size. Concentrate on metric measures for Entry 3 and Level 1. At Level 2 students are expected to be able to convert between metric and *common* imperial measures so it can be useful to order all the units in a single column. Interest and knowledge of imperial units will depend upon the age of your students. See pages 1 and 7 for more teaching ideas.

TIME	week	decade
millisecond	fortnight	century
minute	month	millennium
hour	year	season
day	leap year	second

Abbreviations for metric measures		
mm	ml	mg
cm	cl	g
m	l	kg
km	m^3	kilo

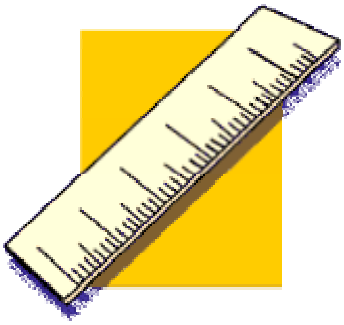
Units of time: ask students to order and then discuss. For lower levels omit milliseconds, etc.
Abbreviations: match abbreviations to appropriate metric units on page 2.

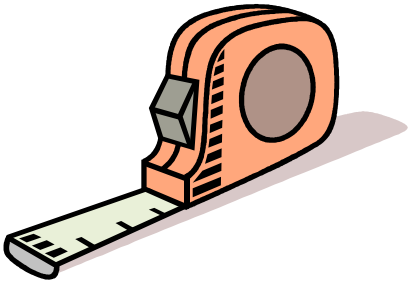
LENGTH	MASS	CAPACITY
		
		
		
		
		

Suitable units? Ask students which units they would use to measure the objects above and match pictures with suitable measure cards from page 2 or some to suitable measuring instruments on pages 6-7. Some pictures can be used in more than one category, e.g. petrol tanker – capacity of petrol in tank measured in litres or m^3, weight of tanker in tonnes, length of tanker in metres. Stress that many cards will have more than one 'correct' answer e.g. water in a pool could be measured in gallons, litres or cubic metres.

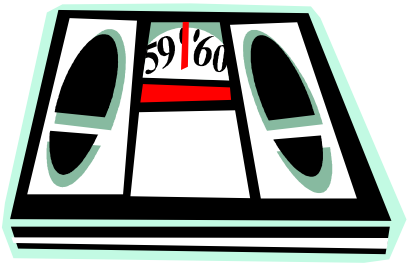
Key: Drugs, pills – mg; crisps – g; potatoes – kg, lb; people – kg, lbs, stones; dumper truck – tons, tonnes. Screws – mm; furniture – cm, carpets – cm, m; mountains – feet, metres; distances between towns – miles, km. Medicines, eye drops, etc. – ml; soft drinks – ml; wine – ml, cl; petrol – l, gallons; water – as above.

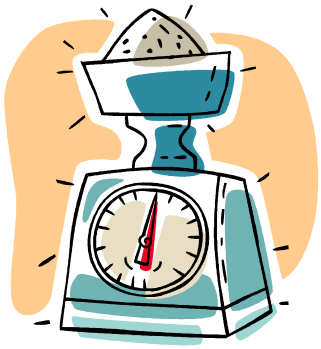
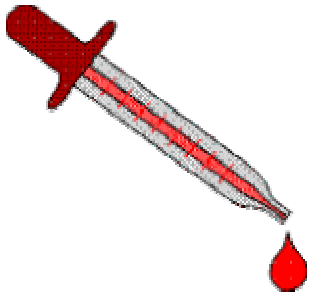
Suitable measuring instruments

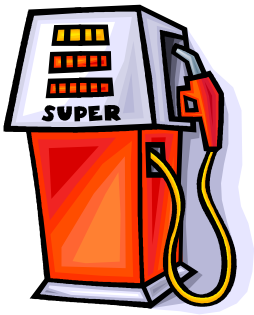




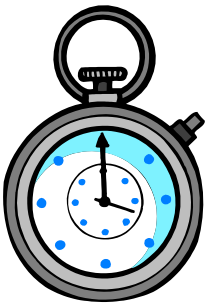
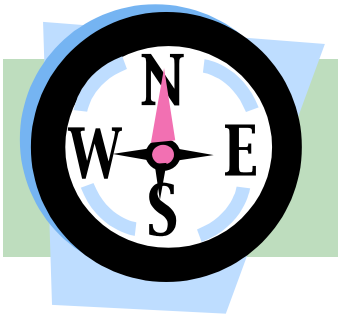
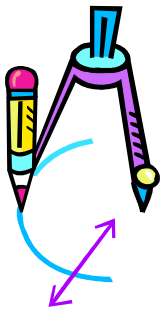




At Entry Level 3 students must choose and use appropriate units and measuring instruments. These pictures can be matched to the equivalent word cards on the next page or to *some* of the picture cards on the previous page. More ideas on pages 1 and 7.

Word cards to match with instruments p5&6		
length	**length (distance)**	**length**
temperature	**temperature**	**temperature**
weight	**weight**	**weight**
capacity	**capacity**	**capacity**
mass	**angles**	**time**
time	**to show direction**	**to draw circles**

Teaching Ideas

General Instructions: print on card (best in colour) or print on paper and laminate (for easy sorting at the end of a class – use a different pastel paper for each set of cards). Cut out cards.

These instructions are rather convoluted. Just use your imagination!

Entry 2 (students to work in pairs).
1a) Use the following cards only: Metric abbreviations (page 3) - l, kg, kilo, m, cm and ask students to match to corresponding word cards on page 2.
1b) Now give students the following pictures from page 5: ruler or tape (or both!), scales, measuring jug and the following pictures from page 4: carpet fitter, table, potatoes, someone on scales, wine and soft drinks. Match pictures on page 4 to those on page 5 and discuss (to avoid introduction of millilitres, the soft drink can be described as ½ litre, wine bottle a litre or ¾ litre).
1c) Finally, link the cards sorted in part 1a with those in part 1b. Discuss.

Entry 3 (students to work in pairs).
1a) As Entry 2 (1a) but include all metric abbreviation cards *except* cubic metres and milligrams (and their matching word cards).
1b) As E2 (1b) but add extra picture cards as appropriate (e.g. signpost, medicines from page 4; dropper, trundle wheel from page 5).
1c) As E2 (1c) above.

2) Give out all cards on pages 5 and 6, match instruments (Picture cards) to what they measure (word cards). You may want to remove the protractor, spring balance and compasses.

Level 1 (paired or individual work).
1) As previous levels 1a but use all the metric cards on page 2 and all the abbreviations on 3.

2) Give out all cards on page 2 – ask students to sort into metric and imperial. Remove imperial units and then ask them to match all the metric units to the correct abbreviation cards (page 3).

3) Distribute all pictures on page 4 and all the *metric* units on page 2. Match up. Some can match to more then one possible unit – discuss.

4) Give out all cards on page 2, ask students to sort under the three heading cards – capacity, length and mass. Now ask them to split each pile into metric and imperial (should now have six piles). Final stage is to order each pile. For example the metric length pile would go in this order: mm cm m km. The imperial pile: inch, foot, yard, mile.

5) Give out all cards on page 5 and 6, match the instruments to what they measure.

6) Use time cards on page 3. Ask students to put in order.

Level 2 (paired or individual work).
1) Give out all cards on page 2, ask students to sort under three headings – capacity, length and mass. Now ask them to order each pile (see page 1) for example the length pile would go in this order: mm cm inch foot yard metre km mile.

2) Give out all *picture cards* on pages 4, 5 & 6. Group items to instruments – discuss what's left over. i.e. the clock and stop watch (we can measure milliseconds with some stop watches, etc.), thermometers (digital and analogue, accuracy of the mouth thermometer compared to the room thermometer, etc.), the protractor (what does it measure?), compasses (not measuring instruments, but what are they for?). Some items will not match to any instrument - how do we measure water in a pool, petrol in a tank, mountain height, etc.?

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