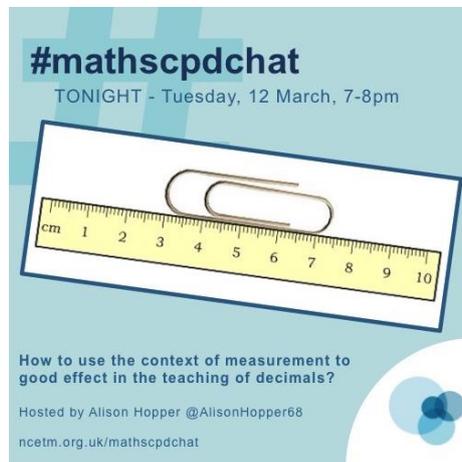


## #mathscpdchat 12 March 2019

### How to use the context of measurement to good effect in the teaching of decimals?

Hosted by [Alison Hopper](#)

*This is a brief summary of the discussion – to see all the tweets, follow the hashtag #mathscpdchat in Twitter*



Some of the areas where discussion focussed were:

- **pupils' first encounters with decimals in maths lessons** ... teaching approaches ... eg using pupils' familiarity with money notation ... eg adding new columns to the right of the units column in a place-value chart to show fractional parts of numbers;
- **linking place values to unit prefixes**, ... e.g. 'deci', 'centi', 'milli', ... eg using correspondences between relationships that connect length units (one metre, one decimetre, one centimetre, one millimetre, and so on) and relationships between the column headings (hundreds, tens, units, tenths, hundredths, ...) of a place-value chart;
- **incorrect/correct use of the digit '0' in the second decimal place** ... pupils confusing the conventions when writing amounts of money with the conventions when writing numbers (e.g. writing £3.4 instead of £3.40, and writing 'three-point-four'

as 3.40) ... correctly writing 3.40 m for a length that is 340 cm correct to the nearest cm ... incorrectly writing 'three-pounds-and-four-pence' as £3.4;

- that a **key understanding about decimals** that pupils need to acquire is the effect on any decimal of multiplying it by a power of ten;
- **addressing common misconceptions involving decimals by using the context of measures/measurement** ... for example misconceptions that are indicated by a pupil being unable to order correctly the numbers 1.2, 1.02, 1.22, might be addressed by challenging them to order the lengths 120 cm, 102 cm and 122 cm;
- **an indication that a pupil's understanding of decimals has deepened** is that the pupil no longer needs to 'interpret' a set of decimal numbers (such as 1.2, 1.02 and 1.22) as a set of measures (such as 120 cm, 102 cm and 122 cm) in order to be able to write the numbers in size order;
- challenging pupils to **select the most appropriate units** to use when measuring particular items ... e.g. not working with centimetres when measuring a playing field;
- pupils understanding **relationships between length, area and volume** measures;
- how **learning about the significance of digits in decimals** may be supported naturally during simple measurement tasks ... the conventional meaning of 'significant digits' or 'significant figures' ... using 'zoom'-type computer programs to facilitate learning about the significance of digits;
- the learning about decimals that may result from pupils' thinking, reasoning and communicating about **sports measurements** ... such as Olympic records;
- pupils' **practical skills in using measuring tools**, such as rulers and protractors;
- pupils **inventing their own measuring units** ... e.g. pupils inventing a length unit called a 'stringle' (based on a particular piece of string) and then demonstrating its application in real situations;
- that there are **good reasons for connecting measurement with decimals in teaching** ... that neither measurement nor decimals are best served by being taught as a set of simple skills ... that measurement may be neglected in maths teaching, so storing up problems for later, instead of using it to help deepen pupils' understanding of, and ability to use, decimals.

In what follows, click on any screenshot-of-a-tweet to go to that actual tweet on Twitter.

An interesting 'conversation' of tweets, about helping pupils to order decimals, followed from this tweet by [Alison Hopper](#):



**Alison Hopper** @AlisonHopper68 · 17h

What common misconceptions around the understanding of decimals does the context of measures help to address? #mathscpdchat

including these from [Kathryn](#) and [Alison Hopper](#):



**Kathryn** @Arithmatics · 17h

Replying to @AlisonHopper68

I think that comparisons without context can be hard, eg ordering things like 1.2, 1.02 and 1.22. Whereas knowing the unit conversions with the decimals as "cm" part, it's much easier to see that 102cm is smaller than 120cm and 122cm.



**Alison Hopper** @AlisonHopper68 · 17h

Is it an idea to encourage pupils to think of a context when facing this sort of question? #mathscpdchat

6 Write these numbers in order of size, starting with the smallest.

1.9      0.96      1.253      0.328

smallest 1 mark

these from [Kathryn](#) and [Heather Scott](#):



**Kathryn** @Arithmatics · 17h

I think the same kind of reasoning is needed to use the equivalent length of decimal places, as that's what really makes the conversions easier! But wouldn't advocate the use of conversions and context as the method - just a "way in" at the start perhaps #mathscpdchat



**Heather Scott** @MathsladyScott · 17h

I must admit in 'ordering sizes of decimals' I tend to ask students to turn decimals into percentages so they can see the size of the number more clearly - just a thought 😊 #mathscpdchat

and this from [Alison Hopper](#):



**Alison Hopper** @AlisonHopper68 · 17h

... or are we hoping, by this stage, that the understanding is deep enough for the numbers to be understood in the abstract? Is this an indication of deeper understanding? #mathscpdchat

(to read the discussion-sequence generated by any tweet look at the 'replies' to that tweet)

Among the links shared were:

[Learning one-digit decimal numbers by measurement and game predicting length](#) which is a paper that aims to describe how students develop understanding of one-digit decimals. It was shared by [Alison Hopper](#)

[A resource for the classroom - problems connecting measurement and decimals](#) which is an article from the NCETM Secondary Magazine 108 that is linked to the publication [Key Ideas in Teaching Mathematics](#) by Anne Watson, Keith Jones and Dave Pratt. It was shared by [Mary Pardoe](#)

[Connecting measurement and decimals](#) which is a section of *Key Ideas in Teaching Mathematics* that gives guidance about, and links to resources for teaching that connects measurement and decimals. It was shared by [Mary Pardoe](#)

[Key Ideas in Teaching Mathematics](#) which is a resource book that gives research-based guidance about teaching and learning the key ideas in school mathematics for students aged 9-19. It was shared by [Mary Pardoe](#)

[Significant Figures](#) which consists of very clear notes from Harvard University about simple measurement and significant digits in decimals. It was shared by [Mary Pardoe](#)

[Olympic Measurements](#) which is a page on NRICH where Alan Parr reflects on various measurements recorded during an Olympic Games. It was shared by [Mary Pardoe](#)

[The Olympic Museum: Teaching Resources](#) which contains materials addressing Olympic themes. It was shared by [Mary Pardoe](#)

[Zoomable Number Line](#) which is an interactive 'zoomable' number line. It was shared by [Heather Scott](#)