#mathscpdchat 15 March 2022

How do you help KS1/2 pupils become competent communicators about mathematics?
Hosted by Kate Henshall

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

The links shared during this discussion were:

Mathematics guidance: key stages 1 and 2 which is a publication (2020) providing non-statutory guidance from the Department for Education. It has been produced to help teachers and schools make effective use of the national curriculum to develop primary school pupils' mastery of mathematics. It was shared by Kate Henshall

Mastery Materials which are materials created by the NCETM working with classroom-based teachers within the Maths Hubs Network. They provide professional development and guidance to help teachers develop a mastery approach in their classrooms and schools. It was shared by Kate Henshall

Mathematics glossary for teachers in Key Stages 1 to 3 which is a glossary developed by the NCETM to support the national curriculum for mathematics. It was shared by Kate Henshall

Which One Doesn't Belong (WODB) which is a website that complements the book *Which One Doesn't Belong – A Shapes Book* by Christopher Danielson. No answers are provided for any of the many thought-provoking 'puzzles' that it contains because, for each 'puzzle', there are many different, correct ways of choosing which one doesn't belong. It was shared by Kate Henshall

Making Number Talks Matter which is a video of a YouTube discussion between Ruth Parker and Cathy Humphreys in which they offer advice, and suggest strategies and tasks, to help pupils become confident communicators in mathematics. It was shared by Kate Henshall

Stem Sentences which is a part of the Enigma Maths Hub website, providing examples of stem sentences and ways in which they might be used. It was shared by Kate Henshall

Frayer Model which is a part of the Teacher Toolkit website which contains examples of Frayer Models and guidance about ways of using them effectively. A Frayer Model is intended to clarify and exemplify the meaning of a word or phrase. It was shared by Lee Gray

It's the symbol you put before the answer which is an illustrated article by a primary school teacher, Laura Swithinbank, in the ATM's journal, *Mathematics Teaching 247*. It addresses reasons why pupils may not have acquired deep, consistent understanding of the equals sign, and suggests ways of addressing this issue. It was shared by Mary Pardoe

The Equal Sign: What it Really Means which is an illustrated blog by Marilyn Burns, author of many books and resources about teaching maths to primary-age pupils. This blog focuses on teaching and learning relevant to understanding what the equals sign means, and links to useful resources are provided. It was shared by Mary Pardoe

Simon Gregg's thoughts on lessons: Writing! which is an illustrated blog by Simon Gregg in his *Following Learning* sequence of blogs about learning and teaching in a primary school. Ways of working to help pupils understand how to use the equals sign correctly are discussed in comments at the end of the blog. It was shared by Mary Pardoe

Rhombus vs Diamond which is an illustrated blog, about using WODB examples effectively, by Kristin Gray. It was shared by Mary Pardoe

A full illustrated summary of the discussions in this #mathsCPDchat follows.

The host's first main question …

Kate Henshall @katehenshall1 · 17h

Let's begin with Q1.

"calculation", "number sentence", "equation", "sums"

What kind of maths talk would we hear in your KS1/2 classroom? #mathscpdchat

… generated more replies and conversations than any of her other four main questions. For example, discussion focussed on how the words 'equation' and 'equals', and associated mathematical ideas and meanings, feature in KS1/2 teaching and learning …

Martyn (He/Him) @martynyeouk · 17h

Replying to @katehenshall1

Use a range of these - but only sum when it is an addition #mathscpdchat

Kate Henshall @katehenshall1 · 17h

When would you start using 'equation'? #mathscpdchat

Martyn (He/Him) @martynyeouk · 17h

Replying to @katehenshall1

In order of how often I use them:
Calculation (most), number sentence, sum, equation #mathscpdchat

Kate Henshall @katehenshall1 · 17h

Do you think at primary we shy away from using 'equation'? #mathscpdchat

Martyn (He/Him) @martynyeouk · 17h

Probably - it is not one that comes up in SATs papers that Ive noticed #mathscpdchat

… with several other comments and conversations being prompted by Kate's questions that she asked in the conversation above. That is, this conversation …

Kate Henshall @katehenshall1 · 17h

When would you start using 'equation'? #mathscpdchat

Tazreen Tershanah @tershanah · 17h

Replying to @katehenshall1 and @martynyeouk

#mathscpdchat tricky one as the equals sign performs to functions as a transformation and to show the same as. Certainly using equation when teaching algebra but now thinking it could be used when balancing simple calculations e.g. 2x30=56+?

Mary Pardoe @PardoeMary · 17h

Have you seen this @ATMMathematics article re use of the equals sign, in MT247?
atm.org.uk/write/MediaUpl...
#mathscpdchat

Mary Pardoe @PardoeMary · 17h

And this is an interesting blog by Marilyn Burns:
marilynburnsmath.com/the-equal-sign...
#mathscpdchat

… this …

Kate Henshall @katehenshall1 · 17h

When would you start using 'equation'? #mathscpdchat

Atul Rana @atulrana · 16h

Almost right at the beginning. 'Equations in colour' using cuisenaire rods for example #MathsCPDchat

… this …

Kate Henshall @katehenshall1 · 17h

When would you start using 'equation'? #mathscpdchat

Mr Morgan @MrMorgan100 · 15h

Replying to @katehenshall1

We started using equation in September (Year Two), they are confident using other mathematical language like: concrete, pictorial and abstract. They enjoy using more complex words! #mathscpdchat

Lisa @Elsie2110 · 16h

Replying to @katehenshall1

We use calculation or equation from the get go. But we make sure number sentence is heard too as it's prevalent in assessments, textbooks etc. #MathsCPDChat

Kate Henshall @katehenshall1 · 16h

I wonder if we will see a switch to 'equation' in assessments and textbooks?! #mathscpdchat

… this …

Kate Henshall @katehenshall1 · 17h

When would you start using 'equation'? #mathscpdchat

Pablo R. Mayorga @nombreneeded · 17h

Replying to @katehenshall1

Sums - only for addition. I used to use number sentence with my Year 2s but I think equation is better now...

Kate Henshall @katehenshall1 · 17h

Me too! I'm trying to be really consistent with just using equation with my Y2's. Would we use the terms interchangeably or do we think that would cause confusion? #mathscpdchat

Simon Gregg @Simon_Gregg · Mar 15

Yes, I use equation with Year 1s. Alongside a lot of word on 'equals' #mathscpdchat

Simon Gregg @Simon_Gregg · Mar 15

*work

Mary Pardoe @PardoeMary · 19h

Replying to @Simon_Gregg and @nombreneeded

Yes! You wrote this … in 2016 I think … in a reply to a comment from Marilyn Burns at the end of this blog … followinglearning.blogspot.com/2016/10/writin... #mathscpdchat

Another thing: although Gattegno and Goutard propose to teach inequalities right near the start, > and <, I'd not seen the point of this. But now I'm thinking, let's really make equality meaningful... perhaps a lesson or two, perhaps a card game, could focus which train is longer and writing that symbolically. Then equality, that special case between the > and < has another entry point, that might make sense of it in a different way.

… and this:

Kate Henshall @katehenshall1 · 17h

When would you start using 'equation'? #mathscpdchat

MrHawesMaths @HawesMaths · 17h

Replying to @katehenshall1 and @martynyeouk

Any time we have an = 'a statement that the values of two mathematical expressions are equal (indicated by the sign =).' #mathscpdchat

Kate Henshall @katehenshall1 · 17h

I was also thinking at what stage in a pupils learning - a particular age group/point in curriculum? #mathscpdchat

MrHawesMaths @HawesMaths · 17h

I have seen equation being used in year 3 when discussing number families etc.

Further discussion about the word 'sum(s)' prompted some more general observations:

Catherine Edwards @Edwards08C · 17h

Replying to @katehenshall1

Secondary here 🙋 I've started to really avoid the word sums unless I mean performing addition. #MathsCpdChat

Kate Henshall @katehenshall1 · 17h

Yes...really interesting. Would you say you have seen a shift in using 'sums' in this way? #mathscpdchat

Catherine Edwards @Edwards08C · 17h

Yes and I would also say there has been a general shift in focus towards more precise language and explicit vocabulary teaching - certainly in secondary #mathscpdchat

Martyn (He/Him) @martynyeouk · 16h

Agreed - introducing addend and subtrahend...#mathscpdchat

Kate Henshall @katehenshall1 · 17h

Replying to @Edwards08C

I agree. I would say we have seen the same at primary as well. How would you teach the vocabulary explicitly? #mathscpdchat

Catherine Edwards @Edwards08C · 17h

Knowledge organisers, working walls, Frayer models, use of etymology. Greater insistence on students using the correct vocab in their written and spoky answers. #mathscpdchat

Catherine Edwards @Edwards08C · 17h

Typo 🤣🤣🤣 spoken answers #mathscpdchat

Pablo R. Mayorga @nombreneeded · 17h

Replying to @Edwards08C and @katehenshall1

It's good that we use more precise mathematical language but we need to remind ourselves that they are just one of the many external REPRESENTATIONS of number that children must develop #mathscpdchat

Tazreen Tershanah @tershanah · 17h

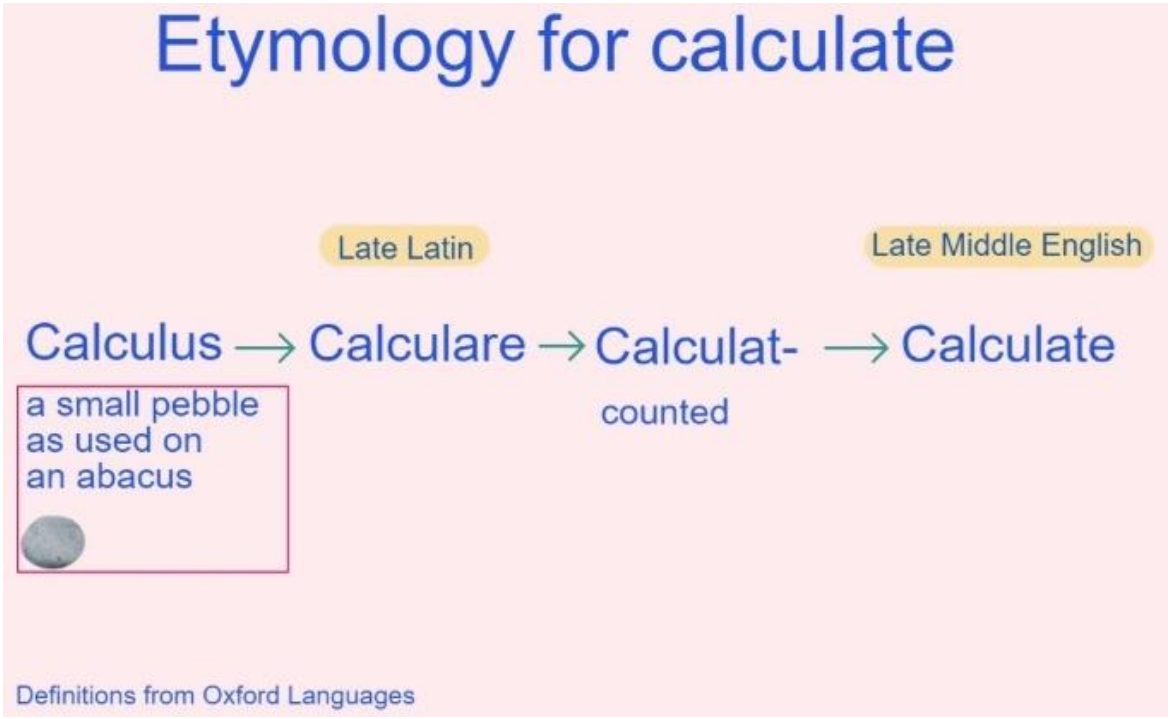
#mathscpdchat agreed language is a signifier of meaning and should be demonstrated alongside other representations.

Thinking about mathematical vocabulary prompted some discussion about using etymology to support learning …

Atul Rana @atulrana · 16h

Replying to @katehenshall1

I use Etymology and historical references a lot…makes for good stories too! A calculus is a tiny stone that was used on a Roman abacus (called a Tabula). So whenever you are calculating, you are moving tiny pebbles about on an ancient roman place-value abacus! #MathsCPDchat



Kate Henshall @katehenshall1 · 16h

I really like this...do you research the etymology yourself? Is there a 'go-to' place you can recommend for others? #mathscpdchat

Atul Rana @atulrana · 16h

I just Google it and see what pops up!
E.g "Etymology of equals" throws up:
"The etymology of the word "equal" is from the Latin word "æqualis", as meaning "uniform", "identical", or "equal", from aequus ("level", "even", or "just")."
#MathsCPDchat

Atul Rana @atulrana · 16h

Although I have read books that give me wider context. Paul Lockhart's Arithmetic is really good to explain the Roman Tabula and the calx stone, calculi, calculus etc. in more depth #MathsCPDchat

… and using conventionally-correct mathematical vocabulary in teaching was the focus in this conversation:

Rachael Poole @MrsExtraPoole · 16h

Replying to @katehenshall1

Year 6 love using mathematical vocabulary to explain what they have noticed! Vocabulary is definitely a tool for learning with my Year 6 class #mathscpdchat

Kate Henshall @katehenshall1 · 16h

Do you have any particular ways you introduce or set expectations for using mathematical language? #mathscpdchat

Rachael Poole @MrsExtraPoole · 16h

I am experimenting with introducing the vocab up front before teaching the concept and teaching it after we have coloured the concept. I think which is better depends on the domain #mathscpdchat

Rachael Poole @MrsExtraPoole · 20h

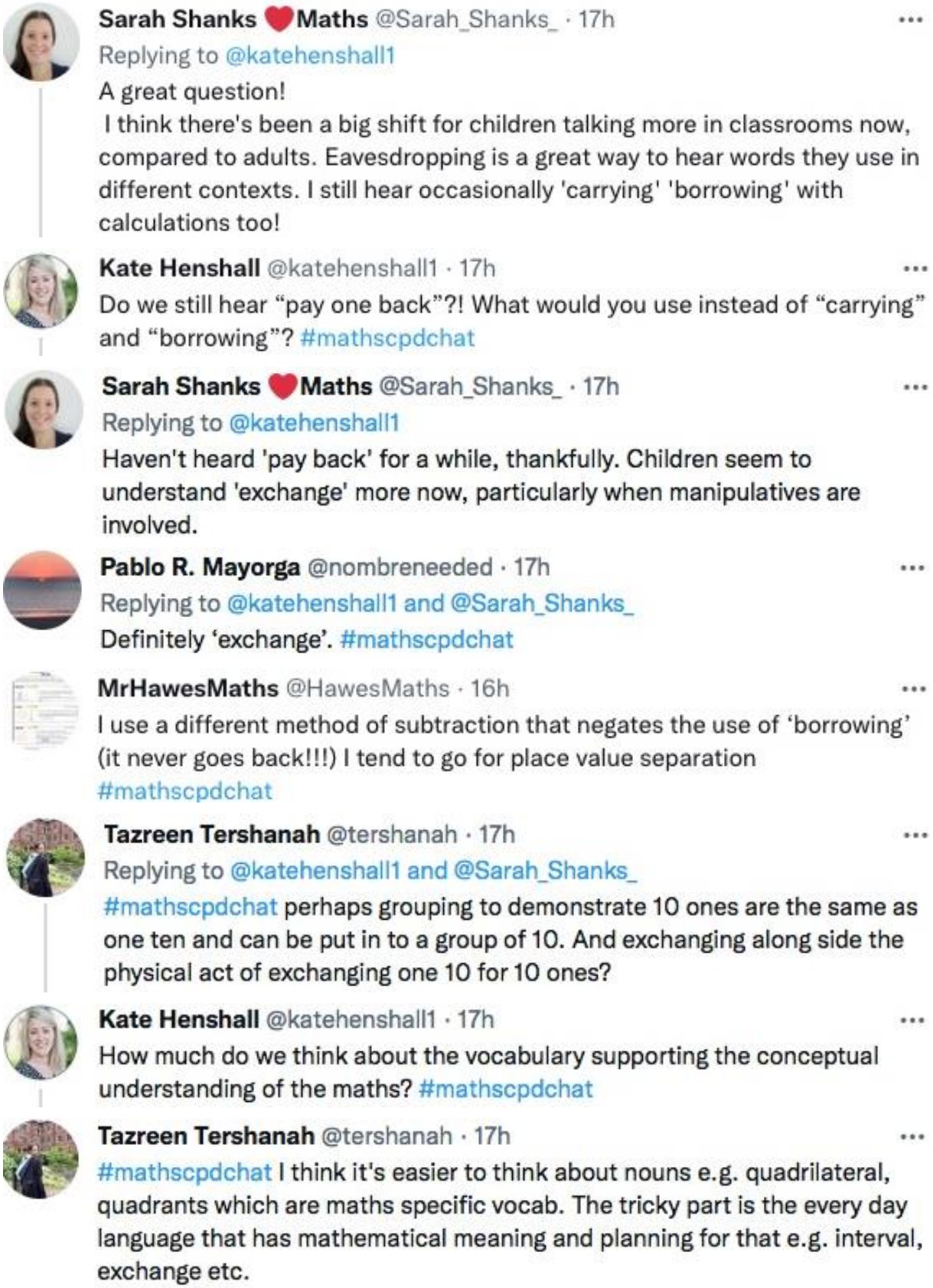
Replying to @katehenshall1

In terms of expectations, lots of modelling from me, praise when children use it correctly and sharing stem sentences **#mathscpdchat**

Lisa @Elsie2110 · 16h

I like that. I like to intro before so chn can get used to 'how it feels to say it' especially if a word is going to get used a lot! #MathsCPDChat

A reference to 'eavesdropping' on pupil-pupil talk generated a great deal of discussion about words used in connection with subtraction …



Sarah Shanks ❤️Maths @Sarah_Shanks_ · 19h

Replying to @katehenshall1 and @tershanah

Conceptual understanding is so important. Great point about nouns, it really helps the children. The idea of unitising can help children understand abstract calculations too.

Martyn (He/Him) @martynyeouk · 17h

Replying to @katehenshall1 and @Sarah_Shanks_

It's all about "renaming" for me #mathscpdchat

Lisa 🐢 @Elsie2110 · 17h

I've never understood renaming. I find it tricky because a different name, to me, suggests it's something different, not a regrouping into a unit. #MathsCPDChat

Martyn (He/Him) @martynyeouk · 17h

Ohhh - I like regrouping - it is the terminology that @mathsnoproblem uses #mathscpdchat

Lisa 🐢 @Elsie2110 · 20h

Replying to @martynyeouk @katehenshall1 and 2 others

Regrouping I am fine with... It's renaming I find hard. I am unsure what it means and suggests and... It's complicated!! I can't explain what I mean. **#MathsCPDChat**

Kate Henshall @katehenshall1 · 20h

Replying to @Elsie2110 @martynyeouk and 2 others

I am with you - I find renaming difficult too. Do we think it is important to have consistency with the terms we use throughout school? #mathscpdchat

Lisa 🐢 @Elsie2110 · 20h

Yes! I think it's OK to add additional words but if we use equals / equation / regroup etc all the way through it can emphasise the underlying structure so chn can think about its application to things like fractions. #MathsCPDChat

Kate Henshall @katehenshall1 · 17h

Does @mathsnoproblem provide a glossary of terms? I often use @NCETM glossary.
ncetm.org.uk/media/hpihrj3s...
#mathscpdchat

Atul Rana @atulrana · 17h

Excellent resource! I use the complete maths or mathsisfun website definitions as reference #MathsCPDchat

Kate Henshall @katehenshall1 · 17h

I am also a fan of @OUPPrimary Oxford Primary Illustrated Maths Dictionary and the 'Language Focus' box from the Mathematics Guidance @educationgovuk gov.uk/government/pub... #mathscpdchat

… and words that have both a 'mathematical' and a different 'ordinary language' meaning were mentioned:

Etak Airotciv @etaknipsa · 16h

Replying to @katehenshall1

teach trainees all of the above but sums are only addition and, personally I dislike takeaway - that is a pizza not a function, also suggests subtraction is counting back, not on…

Kate Henshall @katehenshall1 · 16h

What would use use for 'takeaway' instead? I wonder how many maths words we use that have other meanings outside of the maths lesson - 'takeaway', 'ruler', 'mean'... #mathscpdchat

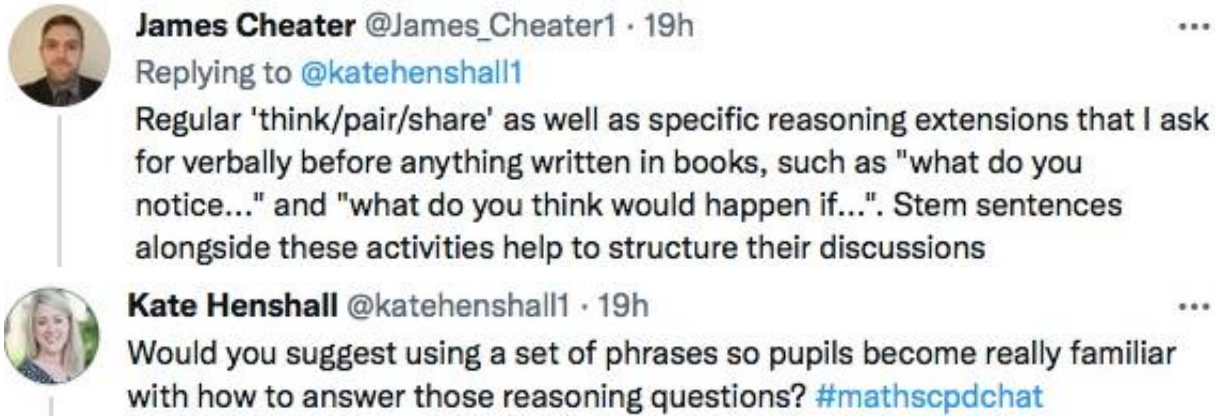
Etak Airotciv @etaknipsa · 16h

difference!

The screenshots below show conversations and single replies generated by Kate's second and third main questions. Teachers shared/suggested strategies that may help pupils learn to talk about maths, and their mathematical thinking/reasoning, rather than merely provide one-word or one-phrase answers to closed questions. **Click on any of the following screenshots of a tweet to go to that actual tweet on Twitter.** The following conversations and single replies were generated by two questions from Kate Henshall, the first sequence of conversations being responses to her second question:

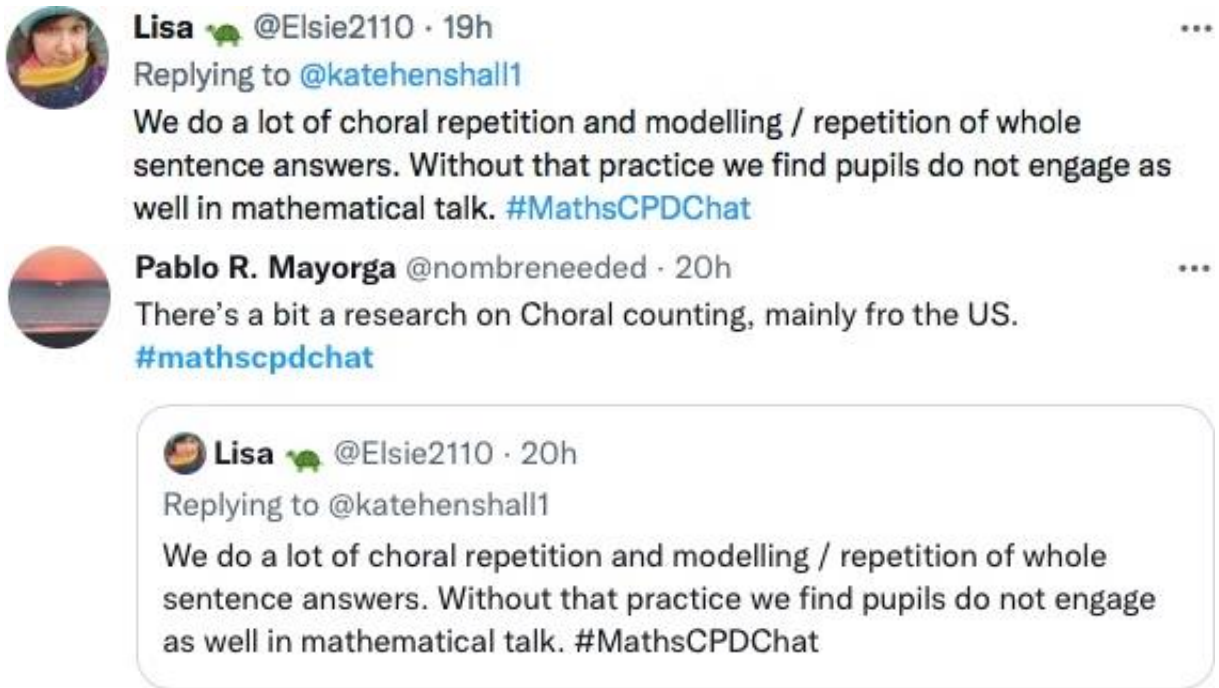
Q2 generated three short conversations and four 'single' replies. This conversation was between Martyn Yeo and Kate Henshall …

… this was between James Cheater and Kate Henshall …



… and the following comment from Rachael Poole prompted tweets from Tazreen Tershanah and then Kate Henshall:

The four ‘single’ tweets in response to Q2 were from Lisa (whose reply was ‘quoted’ by Pablo R. Mayorga), Sarah Shanks and Mr Hawes:



Longer conversations were generated by the third 'main' question from the host, Kate Henshall:

This conversation between Martyn Yeo, Kate Henshall, Mr Morgan and Pablo R. Mayorga included discussion about 'sentence starters' and 'stem sentences'…

… 'full sentence responses' featured in this discussion between Lisa and Kate Henshall:

… and 'choral rehearsal' was the topic in this conversation involving Rachael Poole, Kate Henshall and Lesley Muriss:

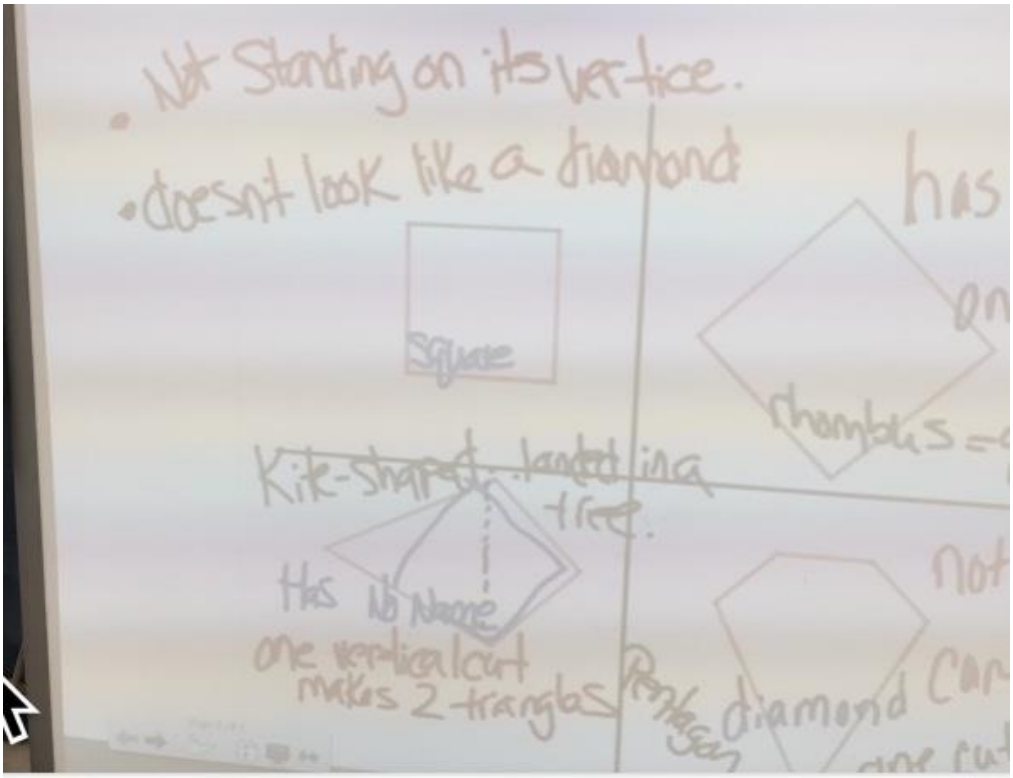
The focus of 'discussion' is different (to the focus in the previous conversations) in the following three 'conversations' generated by Kate's third main question. This reply-and-response was between Mary Pardoe and Kate Henshall …

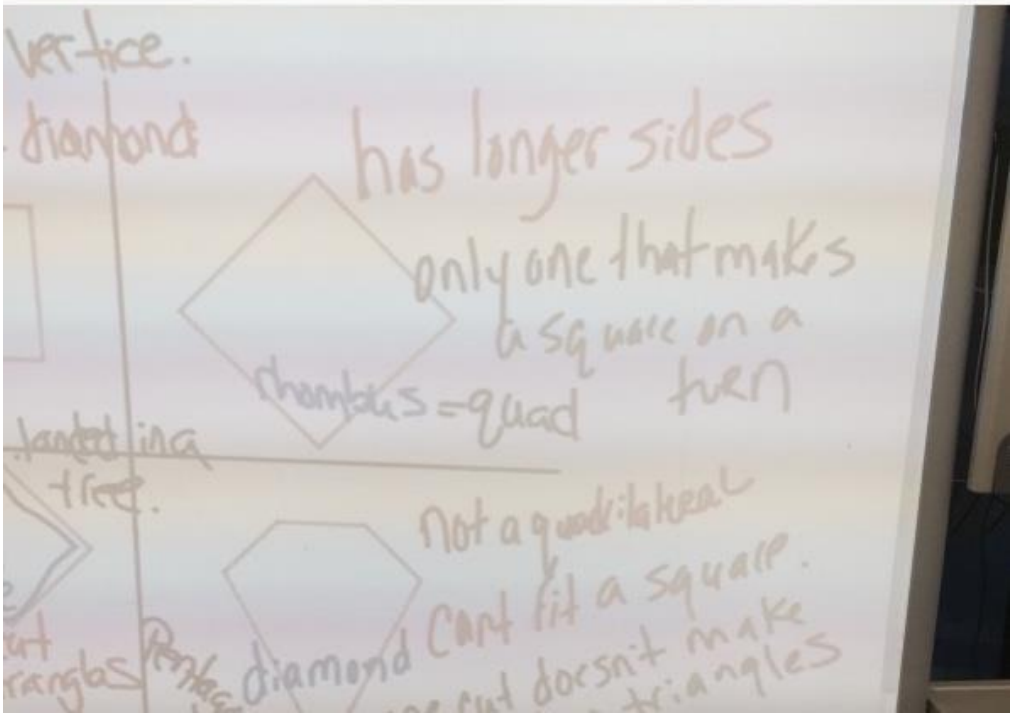
Mary Pardoe @PardoeMary · 19h

Replying to @katehenshall1

Perhaps jotting down what pupils say, as they say it, helps?

e.g. as shown in this blog about working with a WODB ...
kgmathminds.com/2016/02/11/rho...
#mathscpdchat





Kate Henshall @katehenshall1 · 19h

Love a WODB activity wodb.ca

#mathscpdchat

… this reply-and-response was between Piers Young and Kate Henshall …

Piers Young 💙🇺🇦 @piersyoung · 19h

Replying to @katehenshall1 and @PardoeMary

#mathscpdchat

A3 often try a double question
Eg What and why? Why and how?

Often try to make it third person so easier for quieter students (What might some think and why etc)

But mainly involve other students - "did anyone get that answer another way? How? Which is easier?"

Kate Henshall @katehenshall1 · 19h

Really interesting point about the double question. I try and encourage others to share their way/method…even if it is the same

#mathscpdchat

… and these replies were from Lee Gray:

Lee Gray @mrgraymath · 19h

Replying to @katehenshall1

Create opportunities to discuss something other than answers. Classifying/comparing objects is a nice way in here as there's an inherent need to justify/reason as to where things go and a subsequent opportunity for others to agree or, even better, be sceptical.

Lee Gray @mrgraymath · 19h

Comparing includes ordering, of course. E.g. Order these products (WITHOUT PROCESSING)

18 x 6
18 x 12
18 x 7
1.8 x 60
17 x 6
9 x 12
180 x 1.2

Lee Gray @mrgraymath · 19h

Or, order these quantities (without changing to % or using common denominators)

19/20
75%
1/2
11/9
50%
13/28
0.3
49/50

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

To Kate's fourth main question …

Kate Henshall @katehenshall1 · 21h

Lots of talk about stem sentences! So for Q4. How does maths talk support pupils to write clearly about maths?
#mathscpdchat

… there was one reply:

James Cheater @James_Cheater1 · 20h

Replying to @katehenshall1

I find some children need support with what actually answers a question, especially when an explanation is needed. Modelling an answer through discussion (especially looking at why some examples don't answer the question) helps with this.

Kate's last main question …

Kate Henshall @katehenshall1 · 21h

Q5. What advice would you give to others who are wanting to develop maths talk and vocabulary in their maths class? Where do we start...?
#mathscpdchat

… generated two short 'conversations', this …

Lee Gray @mrgraymath · 20h

Replying to @katehenshall1

Assessing extent to which the learner's definition aligns with the teacher's (and class') is so important... beyond just parroting the words. Have found the Frayer Model a powerful tool for this. Has helped me assess current understanding and tighten the precision of language.

Lee Gray @mrgraymath · 20h

theteachertoolkit.com/index.php/tool...

Lee Gray @mrgraymath · 20h

Most inspired use of this I saw was from @frankiemckay75 who had used it at the beginning of a topic to assess prior knowledge then again at the end to help children reflect on their learning and the progression of the concept they were working with.

… this …

James Cheater @James_Cheater1 · 20h

Replying to @katehenshall1

Consider the vocabulary that the children will come across over the course of the topic/year in advance and plan when you will teach it. Especially important for children with English as an additional language. Exposure to a range of vocabulary throughout a lesson/topic is key.

Kate Henshall @katehenshall1 · 20h

I agree...I like to actively plan the language/vocabulary/stem sentences I will use before each topic and consider what words would be tier 1/tier 2/tier 3. #mathscpdchat

… and two 'single' replies, this …

Mr Morgan @MrMorgan100 · 19h

Replying to @katehenshall1

Someone I observed as part of a maths TRG used to do this with a big question "What can you tell me about this number?"
He then introduced new mathematical language through this weekly. #mathscpdchat

… and this:

Atul Rana @atulrana · 20h

Replying to @katehenshall1

The language of maths is beautiful. Do not shy away from the technical terms even if they seem daunting to explain at first. Research the meanings, show examples and non-examples in context, try simpler definitions but aim for the technical one in the end

#MathsCPDchat