

#mathscpdchat 13 July 2021

What has been significant in your primary, secondary or post-16 maths teaching in 2020/21? Hosted by Kathryn Darwin

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



Among the links shared during the discussion were:

<u>Integral Maths</u> which is an online teaching and learning environment developed by MEI. It supports teachers and students by providing comprehensive high-quality resources for teaching and learning mathematics beyond GCSE level. It was shared by <u>Tayyub Majeed</u>

<u>Mathsbot manipulatives</u> which is a large collection of virtual manipulatives created by <u>Jonathan</u> <u>Hall</u>. It was shared by <u>Catherine Edwards</u>



<u>Teaching Math With Examples</u> which is a book by <u>Michael Pershan</u>. The author explores issues that arise when teachers aim to use worked examples effectively to support problem solving in mathematics, and offers advice. It was shared by <u>Catherine Edwards</u>

<u>GLT Book Club podcast: with Michael Pershan</u> which is an episode of the Greenshaw Learning Trust Book Club in which teachers discuss <u>Michael Pershan</u>'s book *Teaching Math With Examples* with the author himself. It was shared by <u>Karen Hancock</u>

<u>Go Teach Maths!</u> which is a website providing resources for maths teachers, such as presentations, worksheets and tasks. It was shared by <u>Katy Sherwin</u>

<u>Rounding!!</u> which is a short video in which <u>Andrew Jeffrey</u> uses a made-by-Andrew-Jeffrey 'computer' to remind Y5 pupils how to round whole numbers to multiples of ten. It was shared by <u>Andrew Jeffrey</u>

<u>The Fluency Project</u> which is a 'Mathematical 'Facts-ination' (to counteract loss of fluency)'! It contains a variety of material created by <u>Andrew Jeffrey</u>, including times-tables-flashcards, A3 Maths Mats, a *We love maths* home activity pack, *Maths Facts of the Week*, and other delights designed to help primary pupils enjoy developing fluency in doing mathematics. It was shared by <u>Andrew Jeffrey</u>

WHITEBOARD.fi which is a free online whiteboard tool for teachers and classrooms. When using it with a class you can, for example, present something interesting on your whiteboard, and wait for your students to show their responses on their own individual whiteboards. It was shared by Emmaface

<u>Miro whiteboards</u> which is an article explaining an 'Education Plan' provided by miro.com, who are makers of whiteboards that are designed to 'bring interactivity and power of visual collaboration to your classroom'. It was shared by <u>Andrew Parker</u>

<u>Maths White Board</u> which is a blog by <u>Colleen Young</u> about materials, such as tasks intended for 'retrieval practice', that were created by Matt Woodfine. It was shared by <u>Colleen Young</u>

Last lesson, last week, last topic, last term / mathswhiteboard.com which is a tool that can be used to compile sets of questions about mathematical 'topics' for people to try to answer. It was shared by Hannah



The screenshots below, of chains of tweets posted during the chat, show parts of five conversations about what teachers believe were some of their best lessons during the year. Mr Taylor's first tweet is reproduced twice because it prompted two different discussions. **Click on any of these screenshots-of-a-tweet to go to that actual tweet on Twitter.** The conversations were generated by this tweet from <u>Kathryn Darwin</u>:



Kathryn MCCT 🙋 @Arithmaticks · Jul 13 ···· Pandemic aside... what was your BEST lesson this year? Why was it so good? #mathscpdchat

and included these from <u>Mr Taylor</u>, <u>Atul Rana</u>, <u>Catherine Edwards</u>, <u>Jenny Hill Parker</u> and <u>Alice</u> Ward-Gow:



MrTaylorMaths @MrTaylorMaths2 · Jul 13 Replying to @Arithmaticks

Solving equations with algebra tiles with bottom set year 7. Some having a go at unknowns on both sides successfully.

Had a some great construction lessons as well. #mathscpdchat



Atul Rana @atulrana · Jul 13

Your use of algebra tiles and the journey of learning how to use them with your pupils has been great to watch. Keep it coming! It'll inspire others to use them and for those who already use them, to reflect on their own practice. #MathsCPDchat



MrTaylorMaths @MrTaylorMaths2 · Jul 13

Kind words Atul, I would have never had shared or even attempted manipulatives before meeting yourself and others over Twitter. Manipulatives I used to think we're a gimmick for low ability students, couldn't have been more wrong. #MathsCPDchat



Catherine Edwards @Edwards08C · Jul 13

I've been using double sided counters with set 2 y9, really helped iron out issues around negative numbers, they just moved to generalising much faster #mathscpdchat



Jenny Hill-Parker @JennyHillParker · Jul 13

This is so powerful - there are so many teachers out there who just don't have the experience of teaching with manulpuatives, or the confidence to try. The view that they are for the low ability students is a wide spread one I think #mathscpdchat



Catherine Edwards @Edwards08C · Jul 13

Using algebra tiles properly for the first time to introduce collecting terms to a 7set5. Was so lovely to teach that lesson and have all of them understand it without the usual misconceptions. #mathsCPDchat

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Miss Ward-Gow @mcwardgow · Jul 13

Replying to @Edwards08C and @Arithmaticks

With you there on the algebra tiles 😍 I finally got round to using them with my Y10s - they really liked the visual aspect and it seems to have helped with their knowledge of expanding and factorising 😄 #mathscpdchat



Atul Rana @atulrana · Jul 13

I ought to integrate manipulative use with spreadsheets! Trialling some number bond stuff with tutees on google sheets. Cell A1+ Cell A2 = 10; so what must go in the two cells? They really like having control on programming stuff into spreadsheets 0

#MathsCPDchat

these from Mr Taylor, Kathryn Darwin and Atul Rana:



MrTaylorMaths @MrTaylorMaths2 · Jul 13 Replying to @Arithmaticks Solving equations with algebra tiles with bottom set year 7.

Solving equations with algebra tiles with bottom set year 7. Some having a go at unknowns on both sides successfully.

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Kathryn MCCT 🙋 @Arithmaticks · Jul 13

Replying to @MrTaylorMaths2

Well, we all need to know more about how to do constructions lessons so well we boast about it on twitter :P do elaborate! #mathscpdchat



MrTaylorMaths @MrTaylorMaths2 · Jul 13

I love construction now, no compasses to begin with. Badly drawn circles (potatoes) are fine, build up the understanding (lots of chat about the radius being the same length), build up the process, then deal out compasses to do more accurately.



Kathryn MCCT 🗽 @Arithmaticks · Jul 13 Replying to @MrTaylorMaths2

Interesting! Why no compasses first? #mathscpdchat



MrTaylorMaths @MrTaylorMaths2 · Jul 13

Students get so caught up in the compass-use they miss all the wonderful geometric reasoning going on, and they forget what they're aiming for. #mathscpdchat



Kathryn MCCT 🗽 @Arithmaticks · Jul 13

I like that... so you'd get them to freehand draw loci first to 'feel it'? #mathscpdchat



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(0+2)+ 4 7 =	MrTaylorMaths @MrTaylorMaths2 · Jul 13	
4+4)14(1* 4+414(1*	Replying to @Arithmaticks	
	Yep, after a discussion about the radii of circles.	
	Used a radii of 2m due to social distancing which was easy for them to enga with.	age
-	Jenny Hill-Parker @JennyHillParker · Jul 13	
3	Do you start with story telling, ie a goat on a rope for a circle and so on? #mathscpdchat	
-	Kathryn MCCT 🗽 @Arithmaticks · Jul 13	
	GOOD QUESTION! I usually do a dog outside a shop, pacing for its owner! #mathscpdchat	
	Atul Rana @atulrana · Jul 13	
	I agree with this. There's incredible dynamic geometry software for construction, time to plug @autographmaths which brings the topic alive. I do it all on Bitpaper. Sort of like AutoCAD drawings vs paper ones. #MathsCPDchat	just
these fro	m <u>Karen Hancock</u> and <u>Kathryn Darwin</u> :	
8	Karen @karenshancock · Jul 13	•••
	Replying to @Arithmaticks	
	Ratio All the way Bar modelling for the first time and seeing them get a the questions! #mathscpdchat	all
	Kathryn MCCT 😥 @Arithmaticks · Jul 13	•••
	How did it go? Was it different to how you 'used to' do it? #mathscpdchat	
8	Karen @karenshancock · Jul 13	•••
4	I did it twice - once with Year 8 and once with Year 9.	
	I was also using "Teach Maths with Examples"- so gave them a full worked example. Which meant I could use the self-explanation prompts to address other types of question Will try to find a picture. #mathscpdchat	5
3	Karen @karenshancock · Jul 13	
4.5	Replying to @karenshancock and @Arithmaticks	
-	Here's lesson 1 and then lesson 2:	

#mathscpdchat





- How can I quickly check whether I have made a mistake?
- What if I was told that altogether Ken and Lenny received £20, how would that make the question (and answer different)?

Your turn:

Divide £240 between Anna. Bess and Charlie in the ratio 5:2:1



Worked Exa	imple:	Your Turn
Ben and Free	d share some money in the ratio 2:3.	In a recipe the ratio of butter to sugar to flour is 2:1:4.
Fred gets £1 Draws	5, how much does Ben get? Hue, quashion .	I use 25g of butter, how much flour and sugar do I need?
BEN FRED	£15	
Do the BEN FRED	Matha 55 556 416	
Ben	gets $2x5 = \underline{F10}$ Ben out the F15 how much would Fred get?	F-
• what if i	sen got the £15, now much would Fred get? FRED	
What if I	Pred got £8 more than Ben? BEN	
• What If a BEN FRED	litogether they got £30?	
	Kathryn MCCT 📄 @Arithmaticks · Jul 13 This sounds awesome! I know you have do work what are your biggest takeaways?	•••• one a lot of work using @mpershan's #mathscpdchat
	Karen @karenshancock · Jul 13 That the students talk a lot more about the even those who wouldn't normally engage That "What if" "What happens" are better "Why" #mathscpdchat	••• e Maths happening in the examples - self explanation questions that
	Kathryn MCCT 🙋 @Arithmaticks · Jul 13 Can you give an example (ha!) of how you picture? #mathscpdchat	use those perhaps alongside a
	Karen @karenshancock · Jul 13 This is a good one. I think the "Why" is useful, but not as usef #mathscpdchat	··· ul as teh the two "What" questions



Worked example:

Calculate the area of the following circle:







these from Sudeep and Kathryn Darwin:



Sudeep @boss_maths · Jul 13 Replying to @Arithmaticks

This activity (following a previous look at the mean) went really well. Compared to showing animations and towers, I found that playing with paper folding really made the concept "stick" for them. #mathscpdchat

🞯 Sudeep @boss_maths · Jan 11

Thinking about the mean, and what can be explored *without* numerical computation.

(I think the latter Qs would ideally be explored in person with real objects & paper strips, rather than just presented on screen as shown.)

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Mean

Here are two sets of pencils, set A and set B, each with three pencils. In which set is the mean length of pencil greater? Explain how you know.



Here are two more sets of pencils.

You don't have a ruler or tape measure, but you are given a strip of paper whose length is equal to the total length of the two pencils in set D.

Using no other equipment, how could you determine which set has the greater mean pencil length?



Here are another two sets of pencils.

You still don't have a ruler or tape measure, but you now have a strip of paper whose length is equal to the total length of the pencils in set E.

Using no other equipment, how could you determine which set has the greater mean pencil length?





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Kathryn MCCT 2 @Arithmaticks · Jul 13 Oooh this looks interesting! Tell us more! #mathscpdchat



Sudeep @boss_maths · Jul 13

I think folding a real life paper strip the length of eg 4 pencils into quarters was a more visceral way for them to appreciate the mean compared to seeing me draw a model or watching a geogebra on a screen. #mathscpdchat



Kathryn MCCT 🙋 @Arithmaticks · Jul 13

Something to be said for letting students really 'feel' the maths... I think @mrshawthorne7 and @giftedHKO would agree after our similarity lesson we planned! #mathscpdchat

and these from Andrew Jeffrey and Kathryn Darwin:



Andrew Jeffrey @AJMagicMessage · Jul 13 ···· Replying to @Arithmaticks I think my favourite was making a rollercoaster out of trunking and a marble to explain rounding! #mathscpdchat



Kathryn MCCT 12 @Arithmaticks · Jul 13 Right. I need more details on this please! #mathscpdchat



Andrew Jeffrey @AJMagicMessage · Jul 13 Here it is @Arithmaticks ! #mathscpdchat

Andrew Jeffrey @AJMagicMessage · Mar 9

Made a computer today to help remind Y5 how rounding looks. (It's just a piece of trunking!) #EduTwitter #RecoveryNotCatchup





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

Other areas where discussion focussed were:

a teacher posted a tweet in response to the host's greeting-tweet at the start of the chat:



tanya davie @davie_tanya · Jul 13 Replying to @Arithmaticks

Last lesson with Yr 7 maths. Made paper aeroplanes. It was pure problem solving. Some didn't know how to make them- the quietest boy stood up in front and showed them how. Saw him grow in stature. Then threw them out windows. Moved onto the playground and discussed speed etc **e**it

the host's first question was:



Kathryn MCCT 😥 @Arithmaticks · Jul 13

So let's get the inevitable COVID-19 related bit out of the way... How has teaching in the pandemic been for you? What have you learned? #mathscpdchat

 teachers agreed that the year had 'been a coronacoaster, some real ups, some downs and some long hard slogs' ... many also said that interacting with other maths teachers on Twitter had been helpful and sometimes inspirational ... the consequent feeling of 'togetherness' is valued, for example:

Karen @karenshancock · Jul 13 Replying to @Arithmaticks

So much so - and still improving. Honestly just starting to talk to teachers from other schools has much such an impact on my teaching this year. My Twitter crew have really made me think more about how I teach stuff. #mathscpdchat



Laura @mathsteacher09 · Jul 13 Replying to @Arithmaticks

I discovered Twitter! Absolutely revolutionary. From an insular classroom teacher view to endless debate with other maths teachers about thoughts buzzing round my head.

- teachers tweeted about how 'teaching between the desks' is important to them, and that they feel they are 'better teachers' when they can do that ... there were comments about how the circumstances of their teaching this year 'have made us more inventive', for example 'with our use of mini-whiteboards and questioning techniques';
- admiration of the resilience of both students and fellow teachers was expressed;

the host asked whether having to teach in pandemic-conditions had changed teachers' practice for the better, and if so in what ways:



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- several teachers commented that during remote teaching they asked diagnostic questions more frequently than ever before, and that they had carried this custom on into classroom teaching;
- teachers mentioned that they would continue to use most of the hardware and software that they had learnt to use during the year ... such as OneNote, Desmos, Whiteboardfi, a graphics tablet, a visualiser, ...;
- some teachers, as a result of their practice during the lockdowns, have now established procedures in which after every lesson they post, for the benefit of absent students or as revision material for all students, a recording of the lesson or PDF versions of slides used during the lesson ... at least one teacher sends slides containing the questions/problems/tasks worked on during the lesson together with more slides containing the teacher's 'hints' and other notes on them;
- this was a typical comment ...



Miss Ward-Gow @mcwardgow · Jul 13 Replying to @Arithmaticks

Having to carefully consider how teach via Google meet has meant that we've had to carefully consider tasks/stages of a lesson/AFL and I think we can learn from this and bring it back to the classroom 2 #mathscpdchat

- other teachers wrote comments such as 'online lessons made me think so carefully about clarity of exposition and quick checks of understanding';
- many teachers mentioned that a consequence of teaching through the pandemic is that they can now create/edit their own videos ...



Karen @karenshancock · Jul 13 Replying to @AJMagicMessage and @Arithmaticks

Oh, yes, a dab hand with video editing these days... #mathscpdchat

• the host asked whether they will continue to create video 'lessons' ...



Emmaface @emmaemma53 · Jul 13

At times yes; e.g. today had to leave cover for class due to interviews and made a video explaining what I needed them to do. Never would have done that in the past! I've stopped obsessing over perfecting them - my classes are used to seeing me stumble in person 😆 #matchcpdchat

the host's third question invited teachers to describe their 'best lesson this year', and most of the replies, with any discussion generated, is shown in the sequence-ofscreenshots-of-tweets given above, but there were a few other comments:

- a teacher described what happened during a Zoom lesson when her internet connection went down ... when eventually she got back into the lesson she discovered that 'one of the kids has screen shared the example slides from the VLE and they're teaching each other';
- a teacher added this tweet after the chat was over ...





Carl Horwitz @Mathowitz · Jul 14 Replying to @Arithmaticks

Honestly, I love how I introduce log notation. They've done powers, then just as them to solve a series of exponential equations: $5^x=125$, $8^x=1/2$, $9^x=27$... That's all this strange format is saying. They have a solid basic understanding in minutes.

the host invited teachers to describe what they had learnt from any 'failures' during the year:

- a teacher wrote that he had wrongly assumed that his Year 4 students had previously acquired understanding of, and knowledge about, 'telling the time' that they did not actually display when he began to work with them on it ... so he 'changed course' to work with them on this topic as if they were KS1 students ... he learnt not to make such assumptions in the future ... a teacher responded by describing an incident in which her own five year old child had behaved in front of a new teacher as if he couldn't do something (when he could) because he 'didn't want to read to a stranger';
- a teacher mentioned that an online lesson about multiplying fractions had left her students in a state of confusion ... she started again using a Desmos presentation in which every numerator and dominator of the fractions being multiplied was a two-digit number with 'obvious' factors ... so that students could more-easily think about and discuss ways of simplifying the numerical expressions (the products);
- a teacher had trouble trying to help KS3 students reason about angles ...



Catherine Edwards @Edwards08C · Jul 13 Replying to @Arithmaticks and @mrbartonmaths

Trying, and emphasise the trying, to teach Y8 angle chasing. They just were not getting it, and then refused to try. I learnt that talking through the model isn't always the best way. In the end I used a written worked example as suggested by @mpershan in his book. #mathscpdchat

- several teachers described difficulties they experienced when they were trying to
 explain remotely to KS4 students how they should submit their work online using
 Google Classroom or OneNote ... they learnt that with most students 'online submission
 needs REAL LIFE training first';
- as a consequence of struggling from the start of the year to teach a Year 7 'bottom set' containing students from various different primary schools, a teacher concluded that effective strategies when working with this group included 'keeping content 'simple' but challenging thinking' and 'making the gap between (concrete?/existing?) knowledge and abstract more explicit', for example by means of manipulatives such as algebra tiles;
- another teacher mentioned that he has 'struggled to challenge the top end students' in 'a mixed ability Year 9 group with a lot of challenging kids and a few more able students' ... 'still haven't got an idea of what to do if I get a similar class again';

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- a teacher commented that this year she has been 'attempting to work on too many things at once and expecting too much too soon (with regards to my own CPD)' ... so in future she will 'focus on one thing at a time';
- there was a derivative discussion about 'teaching maths with examples' during which a teacher posted an image of a page of her sketchnotes ... on Twitter it is difficult to read what is written on her whole image, so we have enlarged and reproduced a few parts of it here:

WHAT MATTERS FOR LEARNING EACHING IS WHAT IS MICHIEL GOING ON IN A STUDENTS MEAD People don't like feeling hopeless and many peop experience M as a hopless ventur "I'd like everyone to notice something about this, the more use partner talk to deepen specific the better self explaination. TCALT vertical > horizon · consider segmenting. wordo remagua " TO READ MATHEMATICS unk about miscingition UEL IS TO PROVIDE YOUR OWN COMMENTARY ax two examply AS YOU GO. "



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the host asked what teachers thought is the best resource that they have used this year; links to most of the resources that were mentioned are provided above:

• a teacher described a task that she created:



Rute Castro Silva @RuteCastroSilva · Jul 13 Replying to @Arithmaticks

I always enjoy my "guess who" to teach time distance graphs interpretation 😇



Rute Castro Silva @RuteCastroSilva · Jul 13

Students really enjoy it (so do I).

Some elements from @twinklresources but I can claim being an original

Guess Who by their journey? Game ____



Muhammad's journey





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• other teachers mentioned online platforms ... for example:



Jo Leighton 🙋 @Jo_Leighton · Jul 14

Replying to @Arithmaticks

OneNoteEDU without a shadow of a doubt. I ditched exercise books and meant that home/school was seamless and I could see live what children were doing on the lesson.

the host tweeted these questions ...



Kathryn MCCT (Arithmaticks · Jul 13
Right, we're leading up to the end of the hour now... so as always, in 2021/22 what are you going to:
1) Keep?
2) Bin?
3) Develop?

#mathscpdchat

... to which she received these responses:



Karen @karenshancock · Jul 13

Replying to @Arithmaticks

Catching up with teachers from around the country (s that presumptuous?)
 Uploading work before it is marked (assuming I'm in school to check it's done)
 Using worked examples

#mathscpdchat



Andrew Parker @ParkerMaths · Jul 13

Replying to @Arithmaticks

- 1) DrFostMaths key skills.
- 2) Teams assignments
- 3) Miro online whiteboard



Michelle Cole @CNE98MFC · Jul 13

Replying to @Arithmaticks

1) google classroom. 2) 48 hr quarantine on student work before marking. 3) properly implemented skills retrieval in starters. #mathscpdchat probably a bit late submitting though. 😂



Andrew Jeffrey @AJMagicMessage · Jul 13

Replying to @Arithmaticks

- video resources
 the word 'mastery'
- 3) support for Y3



Rute Castro Silva @RuteCastroSilva · Jul 13

Replying to @Arithmaticks

#mathscpdchat
1) keep using manipulatives, visualise and drawing tablet
2) bin the idea of "catch up" due to lockdown (and focus on general learning gaps widened by lockdown but there previously too)
3) develop gamification in class

ncetm.org.uk | 17





Catherine Edwards @Edwards08C · Jul 13 Replying to @Arithmaticks 1) keep booklets (I am now an evangelical convert) 2) bin 🤞 blended learning 3) develop manipulatives, I've requested nurture group y7 and we're going to try and really embed their use in our SoW. Also graphic organisers is my other



Hannah @missradders · Jul 13 Replying to @Arithmaticks

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1) HegartyMaths

project.

2) the 👧 tape on the classroom floor 🚲

3) the use of manipulatives across the team.

Catherine explained that she has written her booklets herself 'although a lot of the tasks have come from @mrbartonmaths variation theory', and that, although her department has a set of Dienes blocks, a set of Numicon, counters, and a set of algebra tiles, they are 'hoping to get funding for some more bits';

Hannah, when asked how she intended to 'embed the manipulatives', replied that she would use 'regular slots in department time to show how they could be used with upcoming topics' and 'use of my weekly bulletin, maybe focussing some learning walks on them' ... she tweeted an image of one issue ...

Week commencing: 19th April				
Resources of the Week	This Week			
Fractions				
Lovely activities for Year 7:	KS3			
Mixed and improper	Please ensure you continue to set homework at the end of each SoL			
Equivalent fractions 25	block for years 7-9. These are in the drawers.			
Addition of fractions	KS4			
Dan Drapar's blog is amazing, he's published loads of really reat tacking resources over the past few months. Thinking thout the chat the H group had in DDT, I really like these traight line graphs takks as refersher activities.	All Y10 teachers should now have a Hegarty leaderboard displayed in their classroom. This week you should set your first Hegarty Task KS5 Please ensure all quitzes are returned to SCI.			
Averages iome nice activities on averages for 10 haze	AOB Please ensure that pupils ARE NOT annotating quizzes' assessments in feedback lessons for Y11/13.			



finally the host invited people to describe their 'biggest goals' for the next academic year:

- one teacher hopes to 'work with experienced colleagues to perfect the things we're good at and make us great at them ... Job one – find a critical friend!';
- a teacher is aiming to 'create a package of support materials for Year 3 teachers by the start of September';
- another teacher's 'maths goal is manipulatives embedded ... read the book 'Visible Maths' and watch videos on complete maths';
- a similar aim of another teacher is 'planning to use manipulatives other than algebratiles/counters' ... she hopes to look at 'using Cuisenaire[®] rods for fractions';
- this was another reply involving manipulatives:



Miss W @SueWill2345 · Jul 13 Replying to @Edwards08C and @Arithmaticks

Manipulatives use for us too. Starting with neetm publication on algebra tiles

- one of the host's aims for next year is 'step one in some sort of coaching programme';
- and this tweet completes the last #mathsCPDchat summary of 2020/21:



Miss Ward-Gow @mcwardgow · Jul 13 Replying to @Arithmaticks

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Striving to become a better teacher/leader than I am at the moment will do this by taking feedback on board and making time for reflection emission #mathscpdchat