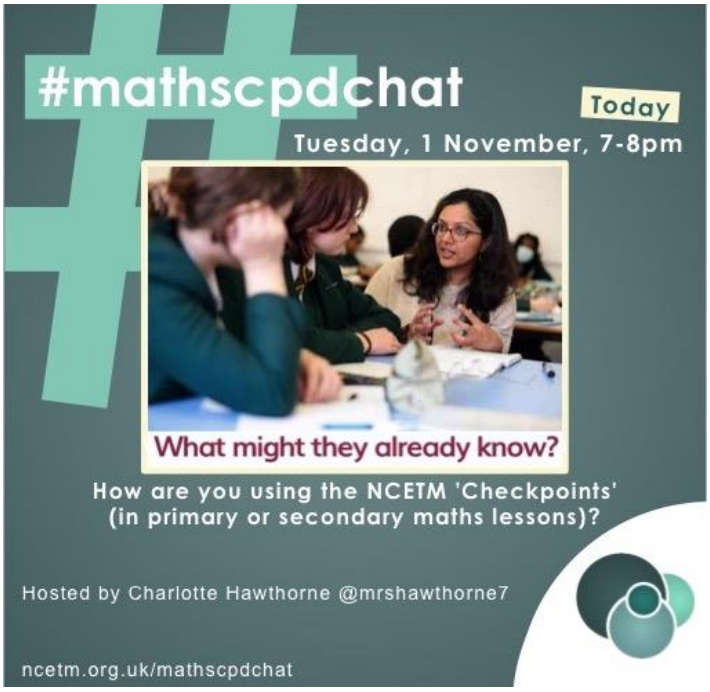
#mathscpdchat 1 November 2022

How are you using the NCETM 'Checkpoints' (in primary or secondary maths lessons)?
Hosted by Charlotte Hawthorne

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

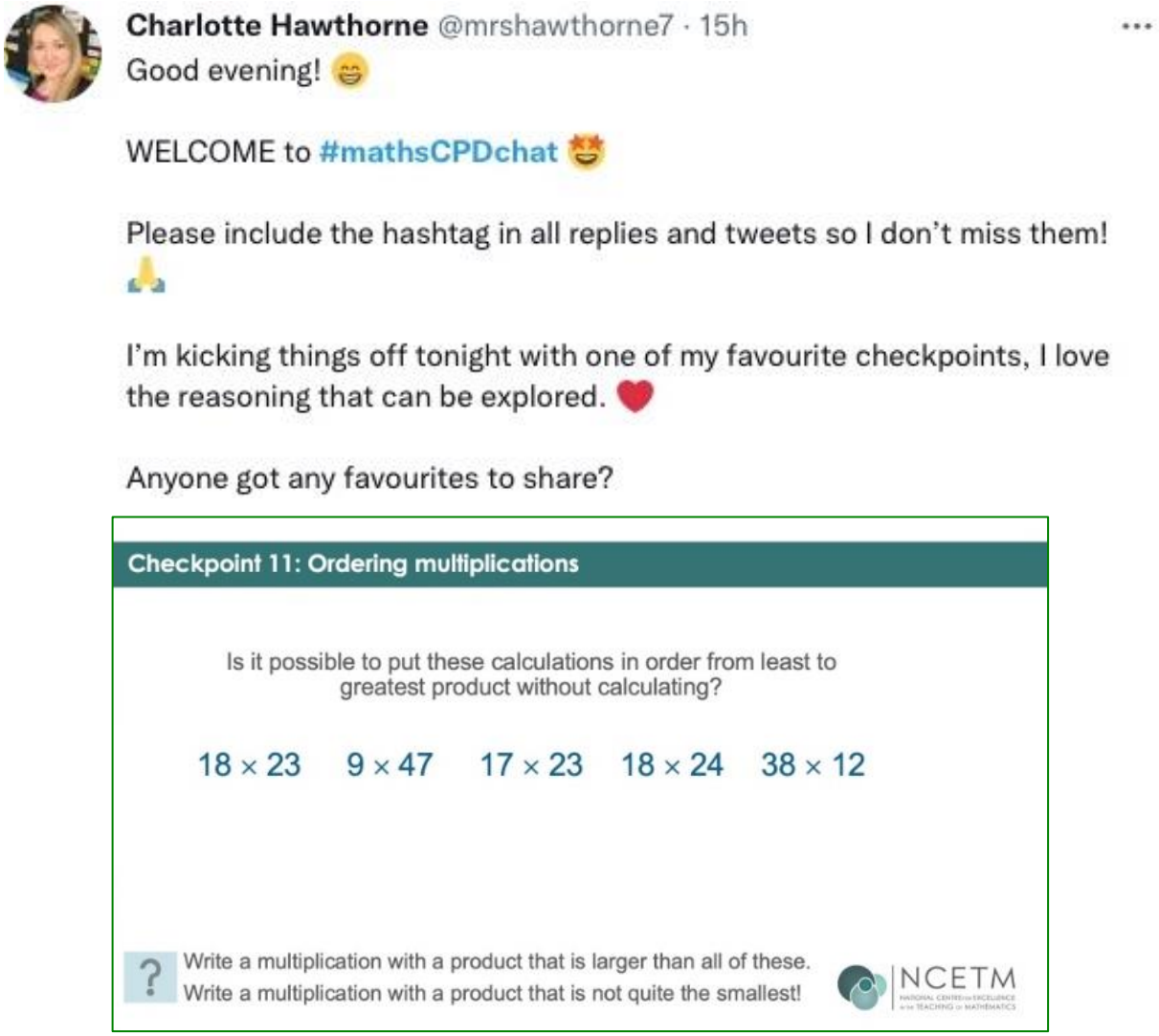


The link shared during this discussion was:

CHECKPOINTS which are diagnostic maths activities to help teachers develop their assessment of students' prior learning for KS3. Wrapped around each activity, in each set of PowerPoint slides, is comprehensive guidance and advice for teachers. This guidance has been fully explained in professional development seminars. You can watch videos of these seminars on this page. It was shared by Charlotte Hawthorne

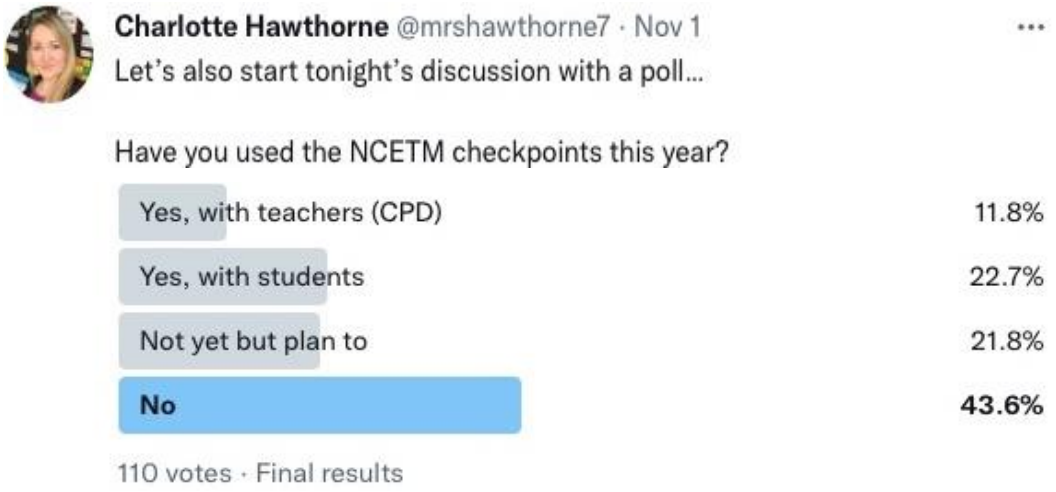
An illustrated summary of this #mathsCPDchat follows.

The host's (Charlotte Hawthorne's) opening tweet …



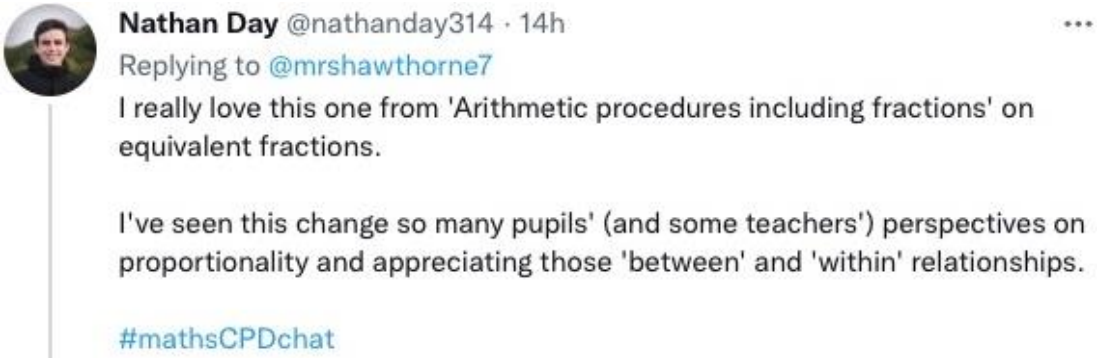
… generated responses that were tweeted throughout the whole hour, including this:

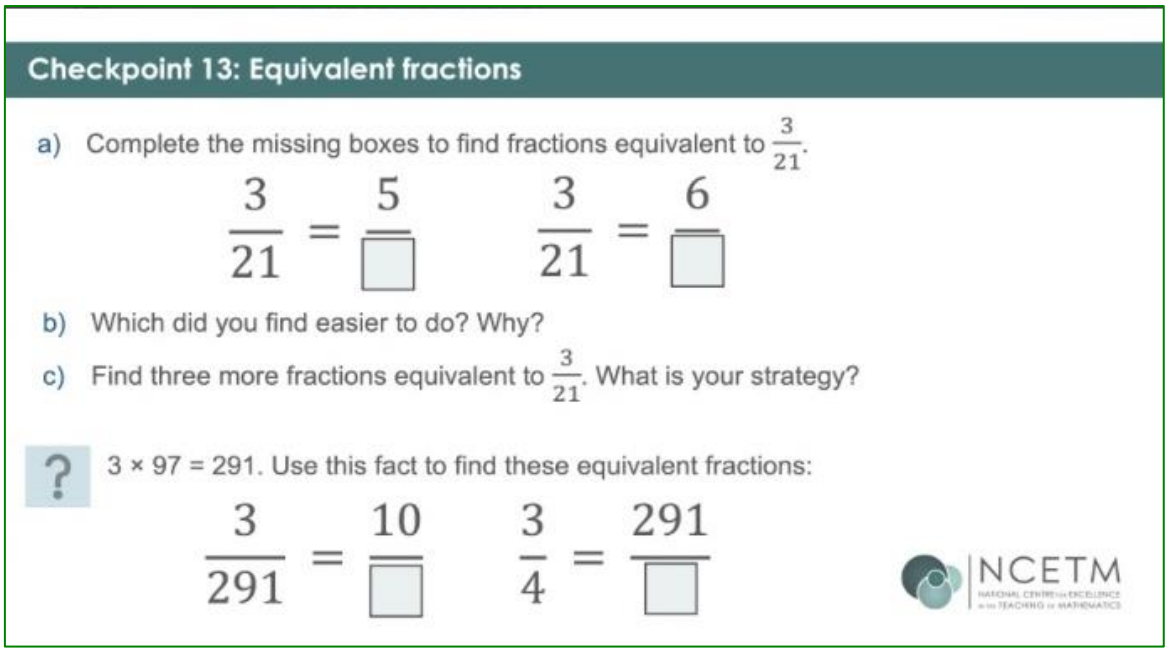
Charlotte's opening message was followed by this poll …



… the results of which can be held in mind while reading the rest of the summary.

Direct responses to Charlotte's question, 'Anyone got any favourites to share?', are shown next:





Alison Hopper @AlisonHopperMEI · 14h

Replying to @nathanday314 and @mrshawthorne7

This was a contender for my favourite too! #mathscpdchat

Charlotte Hawthorne @mrshawthorne7 · 14h

Replying to @nathanday314

Absolutely! And once you can 'see' that way of thinking, it makes things like this much easier...when you can be flexible with which relationship you can use ('between' or 'within'). #mathsCPDchat

Checkpoint 16: Greater fractions

How could you decide whether the first (red) or the second (blue) fraction is the greater in each pair?

a) $\frac{11}{17}$ or $\frac{13}{17}$

b) $\frac{11}{17}$ or $\frac{11}{19}$

c) $\frac{11}{44}$ or $\frac{101}{400}$

d) $\frac{11}{37238}$ or $\frac{1}{5}$

? Find a fraction that has a value in between the two fractions in each pair.

NCETM

Daboil @isaleemg4 · 3h

Replying to @mrshawthorne7 and @nathanday314

My favourite one. Really interesting feedback from students.

Mary Pardoe @PardoeMary · 20h

Replying to @isaleemg4 @mrshawthorne7 and @nathanday314

Can you describe, in a few words, at least one way in which the feedback was interesting?

Daboil @isaleemg4 · 12h

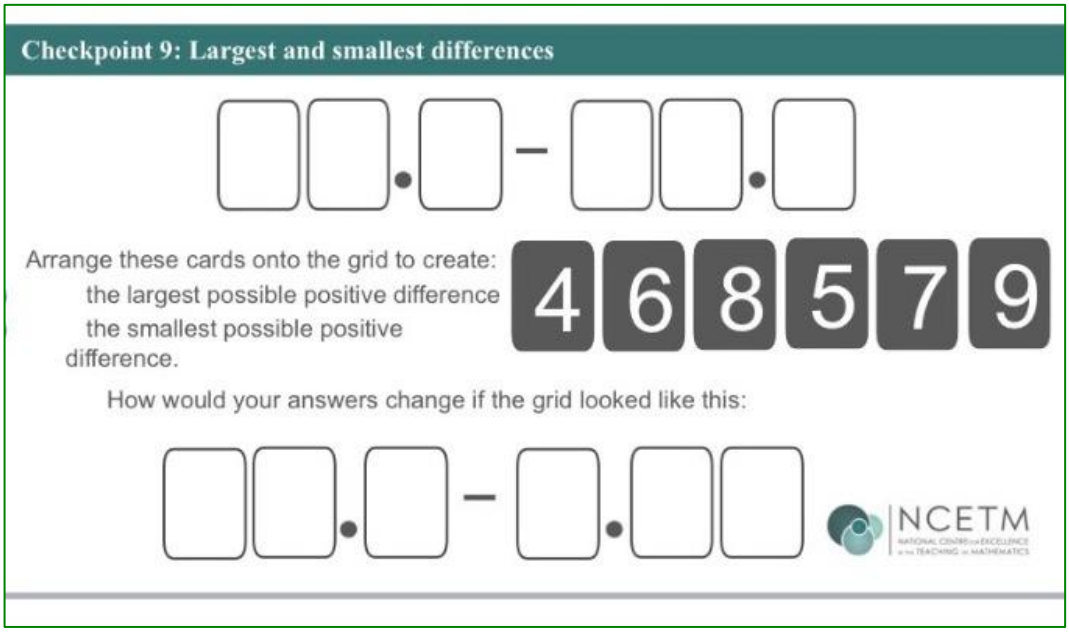
Replying to @PardoeMary @mrshawthorne7 and @nathanday314

Most of my students (given to range of abilities) had a good understanding of comparative fractions like questions a and b. Being able to explain why 11/19 for example is less than 11/17. But C and D were not as natural for them to see. D was hard for most just due to the numbers

DMaths MCCT @DeeVijayan · 13h

Replying to @nathanday314 and @mrshawthorne7

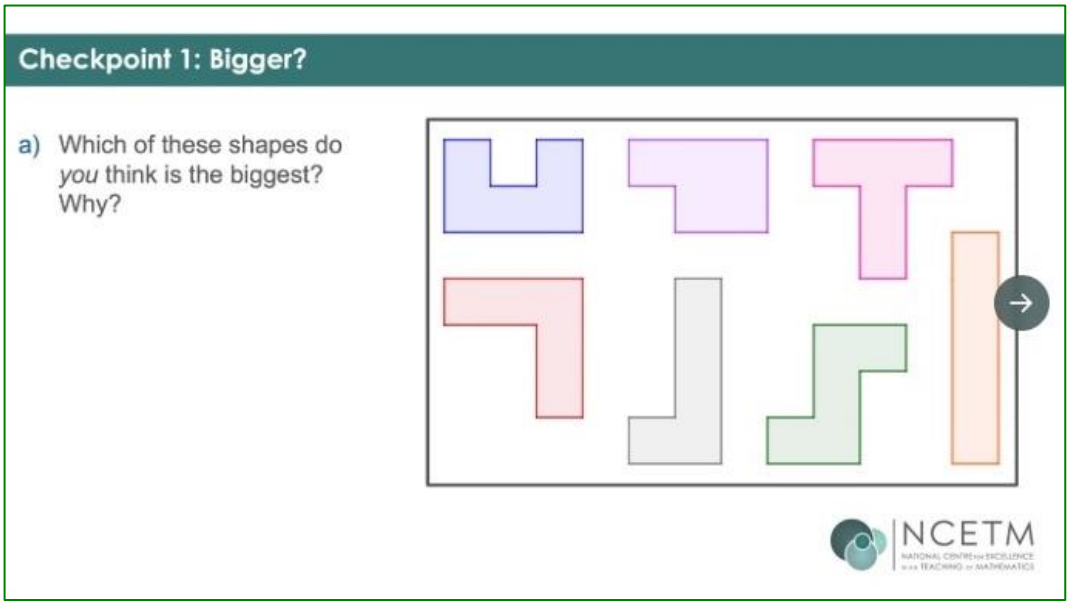
I love all checkpoints. Found this particularly good for work on decimals. Has anyone used these for a low attaining groups? Any on algebra would be particularly welcomed #mathscpdchat



The following comment (with images of four Checkpoints) prompted some observations including another Checkpoint image:

Charlotte Hawthorne @mrshawthorne7 · 15h

Not sure if this was an issue just locally or if other spotted something similar but we noticed in our usual year 7 baseline, a dip in performance in geometry, area and perimeter in particular, I plan to use some of these checkpoints as we approach the area and perimeter unit...

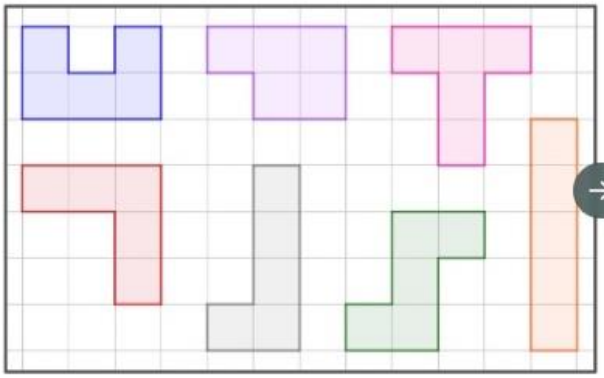


Checkpoint 1: Bigger?

a) Which of these shapes do *you* think is the biggest? Why?

b) Does including a square grid help?

In what way/s is the shape you chose bigger than the others? In what way/s is it the same?

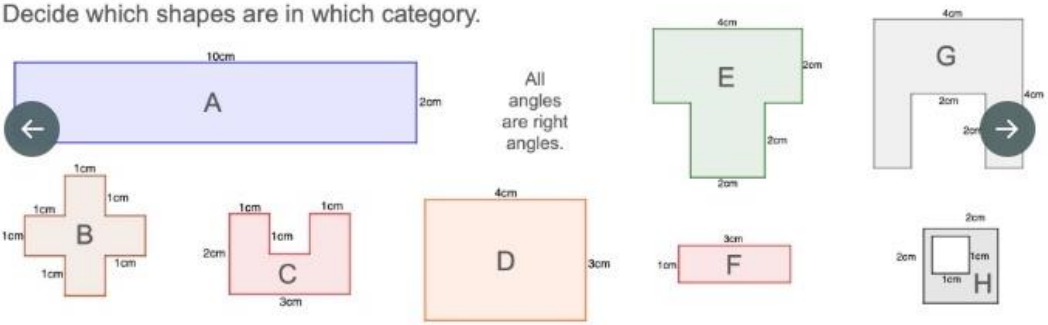


? Can you create shapes with this same area? How many possibilities are there?

NCETM

Checkpoint 14: Dozen or doesn't?

Some of these shapes have an area of 12 cm^2. Some have a perimeter of 12 cm.
Some have neither.
Decide which shapes are in which category.



? Design your own shapes with an area of 12 cm^2 or perimeter of 12 cm.

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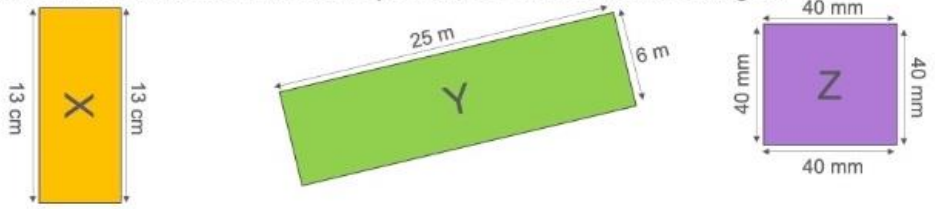
Checkpoint 9: Goldilocks and the three rectangles

Goldilocks wants to work out the area and perimeter of each of these rectangles.



a) When is there too much, not enough or just the right amount of information?

b) Find the area and perimeter of the rectangles where it is possible.

c) Goldilocks works out the area of Z using the calculation 40 × 40 × 40 × 40. What has she done wrong?

? For the rectangle that had not enough information, the perimeter is between 41 and 44. What might the area be?

NCETM

Charlotte Hawthorne @mrshawthorne7 · 15h

...Has anyone else noticed similar weak areas for their cohorts? #mathsCPDchat

Sharon Malley @mathsmumof2 · 15h

Replying to @mrshawthorne7

We noticed the same with y7 geometry and data we're than number #mathscpdchat

Charlotte Hawthorne @mrshawthorne7 · 15h

Replying to @mathsmumof2

Yes, number seemed strong although decimal place value came out to be a weak area even for some 'higher achievers' (SATs-wise) not necessarily calculating but just understanding what the place value meant...I.e how many 0.01s in 0.1 #mathsCPDchat

Karen @karenshancock · 15h

Replying to @mrshawthorne7

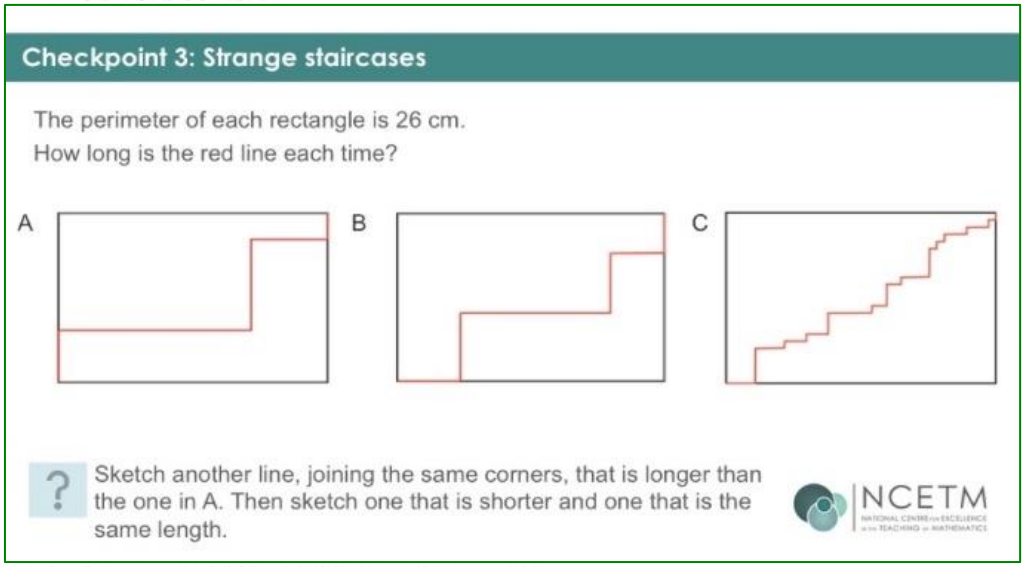
Wow - I need to check these out properly... Can I have a half term to do this... #ohwait.

There's some lovely questions here. #mathsCPDchat

Mary Pardoe @PardoeMary · 17h

Replying to @PardoeMary

How do people think students will respond to this one (which I like)? #mathscpdchat



Kathryn MCCT @Arithmaticks · 17h

Replying to @PardoeMary

I looooove this one 😍 I love the idea of taking the very left and rightmost lines away and asking something like "which is longest?" too #mathscpdchat

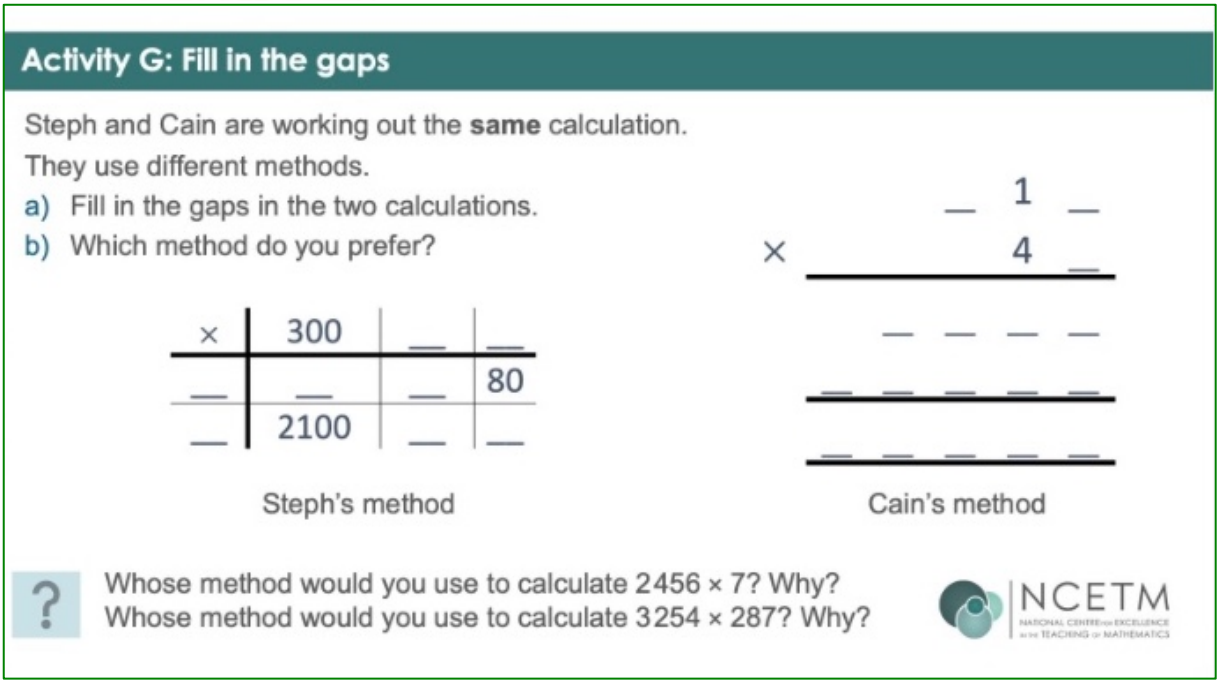
This question, with another Checkpoint example, from the host …

Charlotte Hawthorne @mrshawthorne7 · 15h

This one is in the 'Additional activities' section of the PPT but I really like it to compare written methods.

What do you do to address any issues with written methods of multiplication (or other operations) in year 7?

#mathsCPDchat



Activity G: Fill in the gaps

Steph and Cain are working out the **same** calculation.
They use different methods.

a) Fill in the gaps in the two calculations.
b) Which method do you prefer?

×	300	__	__
__	__	__	80
__	2100	__	__

Steph's method

Cain's method

Whose method would you use to calculate 2456 × 7? Why?
Whose method would you use to calculate 3254 × 287? Why?

… generated the following conversation:

Mr B Maths @MrBMaths3 · 15h

Replying to @mrshawthorne7

We are aiming to move towards grid method (area model) as it links so well into algebra. Some students very resistant who are confident with the column method from primary #mathsCPDchat

Brooke Hunter @BrookeEHunter · 15h

Replying to @MrBMaths3 and @mrshawthorne7

I'm having this feeling too! Introduced the grid model using some of @ChrisMcGrane84 tasks today. They loved it.

Mr B Maths @MrBMaths3 · 15h

Replying to @BrookeEHunter @mrshawthorne7 and @ChrisMcGrane84

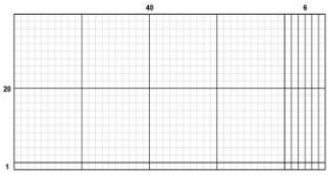
Think I will look to introduce some of these for the team to explore / use. I've always been more confident with the grid method since teaching as its how I would do it mentally too #mathsCPDchat

Charlotte Hawthorne @mrshawthorne7 · 14h

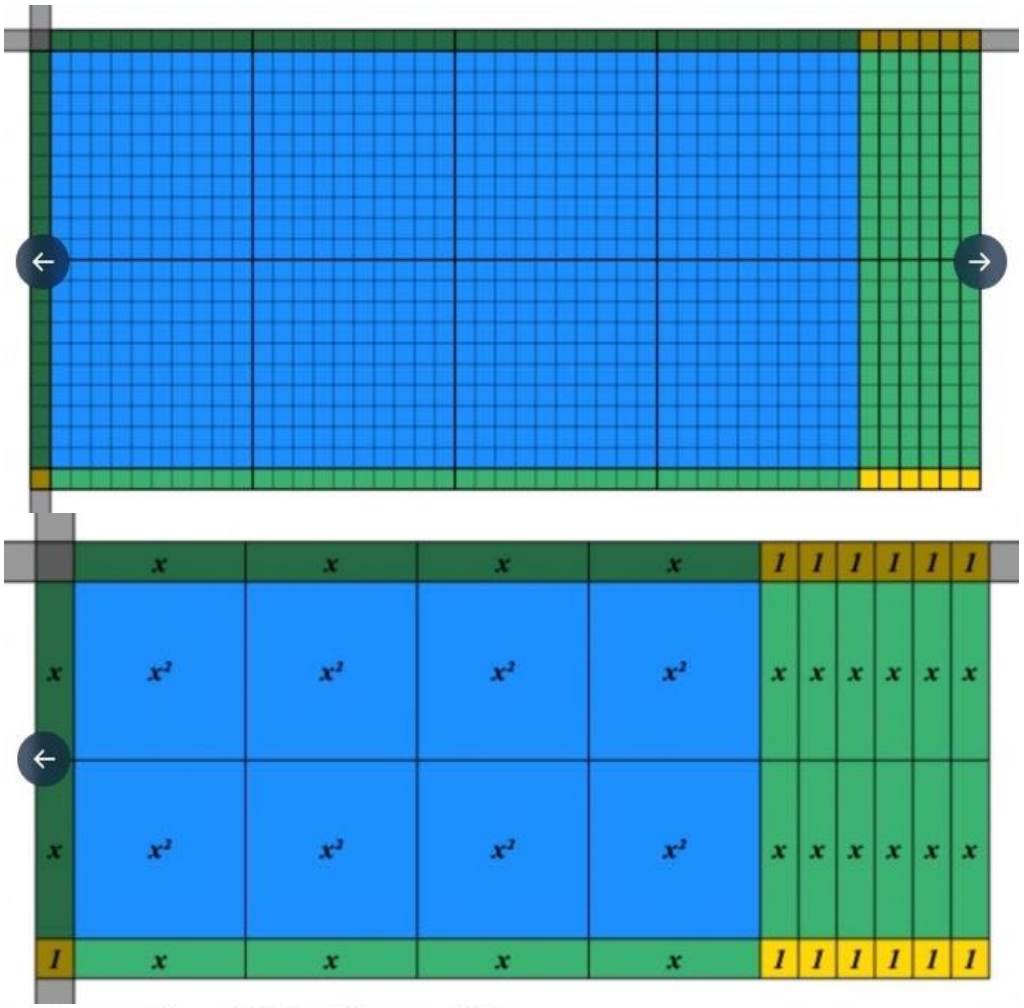
Replying to @MrBMaths3 @BrookeEHunter and @ChrisMcGrane84

The power of the area model and then abstracting to the grid method, for me, is so that you can use it for algebraic multiplication/division later on. I do get some resistance though, though this tends to be less once they've met some algebra! #mathsCPDchat

21×46



×	40	6
20		
1		



Darren Elgar @ElgarDarren · 13h

Replying to @mrshawthorne7 @MrBMaths3 and 2 others

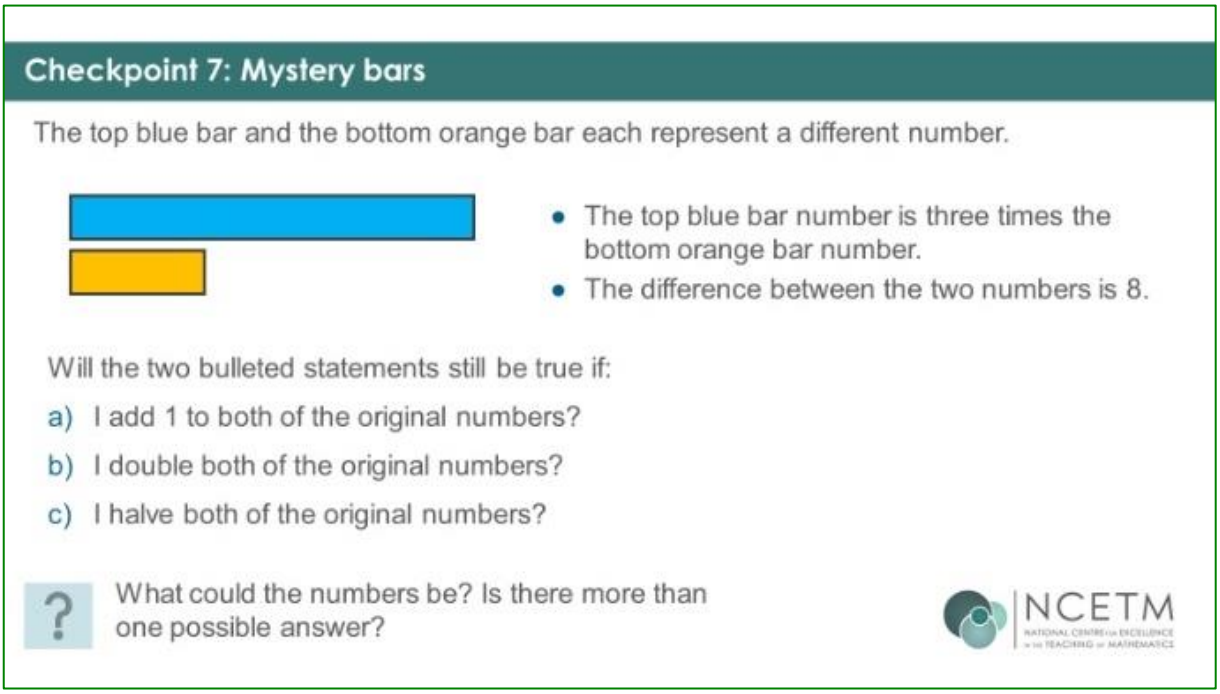
It also makes more sense of multiplying fractions and decimals.

It is a shame it is not emphasised more in primary.

Charlotte's question, 'Anyone got any favourites to share?' (in her opening tweet) prompted this note from Alison about some of her experiences …

Alison Hopper @AlisonHopperMEI · 16h

I've used this in PD and seen it used with Y7 and 8. It promotes great discussion too and reveals some interesting (mis)conceptions #mathscpdchat



Checkpoint 7: Mystery bars

The top blue bar and the bottom orange bar each represent a different number.

- The top blue bar number is three times the bottom orange bar number.
- The difference between the two numbers is 8.

Will the two bulleted statements still be true if:

a) I add 1 to both of the original numbers?

b) I double both of the original numbers?

c) I halve both of the original numbers?

? What could the numbers be? Is there more than one possible answer?

NCETM

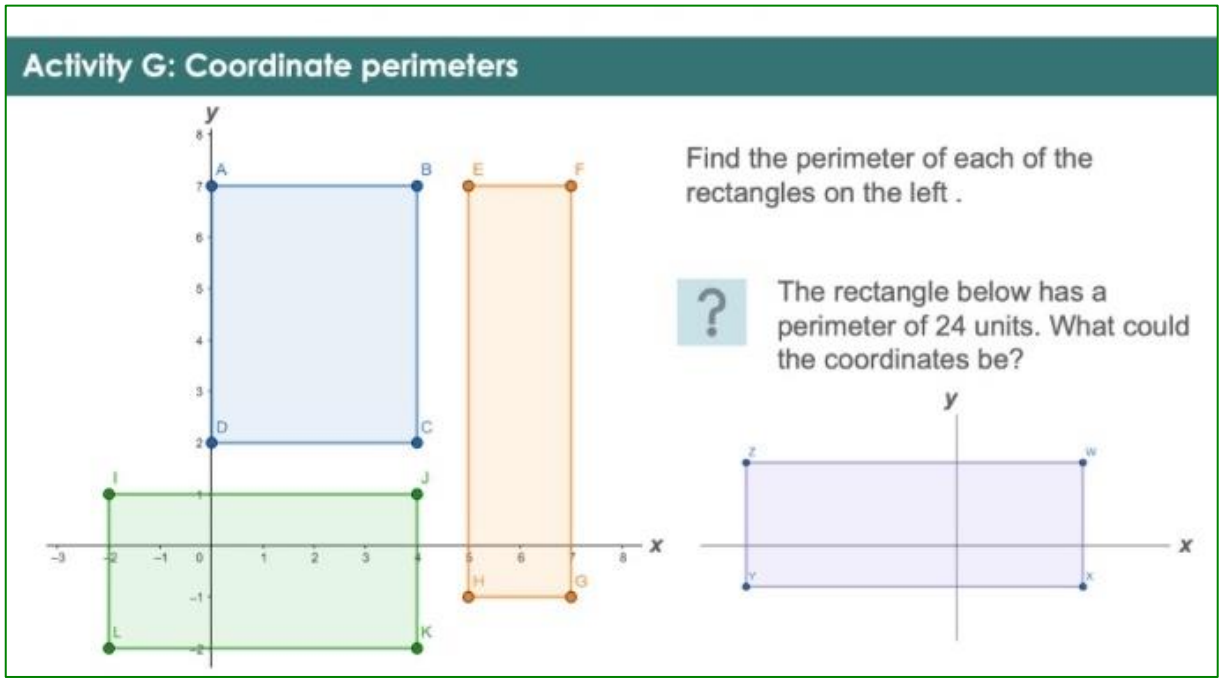
Charlotte Hawthorne @mrshawthorne7 · 16h

Ooo, I love this one too. I've used it with Y7 last year. I gave them paper strips, and we talked about how we could make sure one strip was 3 times longer too and how if we folded into quarters and ripped off one of them we could use those as the two strips. #mathsCPDchat

… and the following example of a Checkpoint was in a reply from the host to her own question:

Charlotte Hawthorne @mrshawthorne7 · 17h

This is another 'hidden gem' for me. It's in the 'additional activities' section.
Great for checking their coordinate reading as well as perimeter
#mathsCPDchat



The 40 Year Old ECT @MrWarnerMaths · 15h

Replying to @mrshawthorne7
These look great, where are they from, please?

Mary Pardoe @PardoeMary · Nov 2

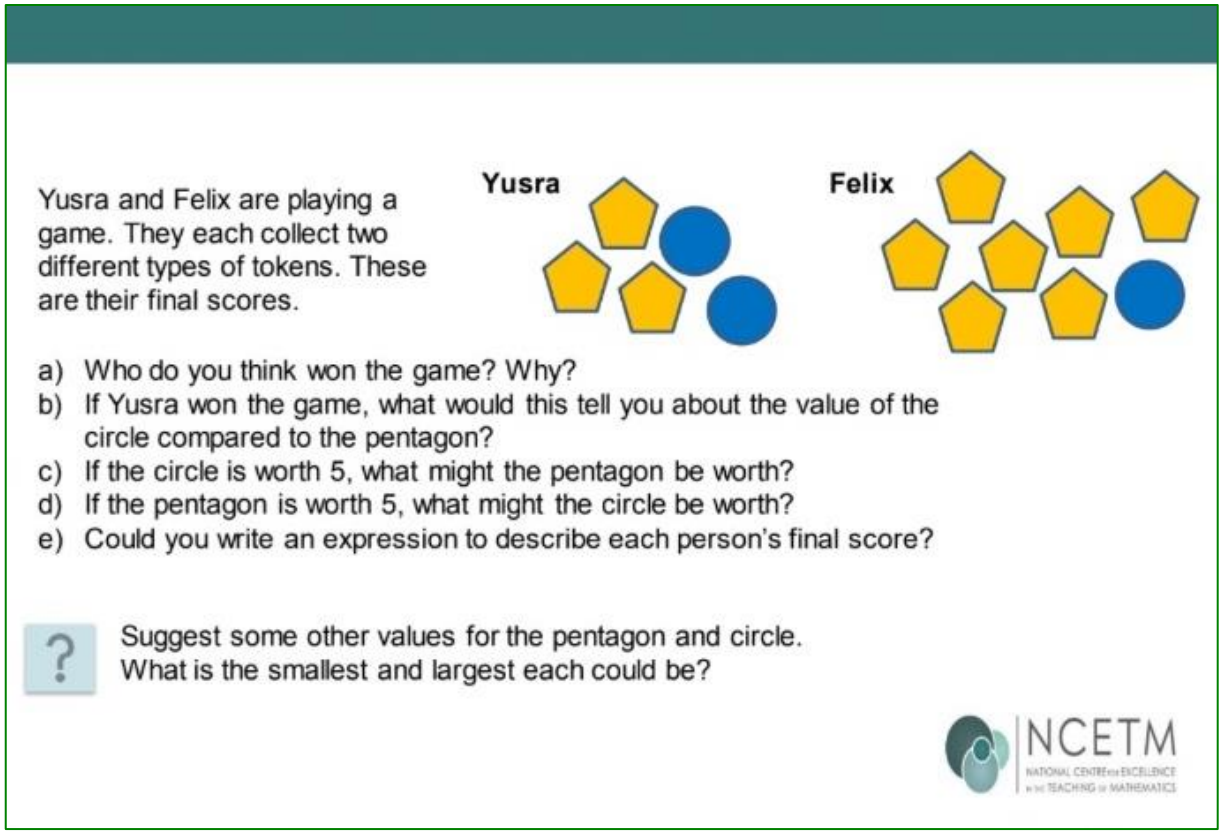
Replying to @MrWarnerMaths and @mrshawthorne7
Here:

ncetm.org.uk
Checkpoints
Information about diagnostic maths activities to help teachers assess understanding and lay ...

Three more Checkpoints were shown in response to the question, 'Anyone got any favourites to share?' … this one …

Laura @mathsteacher09 · 19h

@mrshawthorne7 I enjoyed using this one today. Some heated debates over who won with some superb reasoning going on! #mathschatcpd



Charlotte Hawthorne @mrshawthorne7 · 19h

Replying to @mathsteacher09

Yes, love this one as it generates so much discussion! I love that I can talk about different bases too :) #mathsCPDchat

Charlotte Hawthorne @mrshawthorne7 · 19h

Another great one! **#mathsCPDchat**

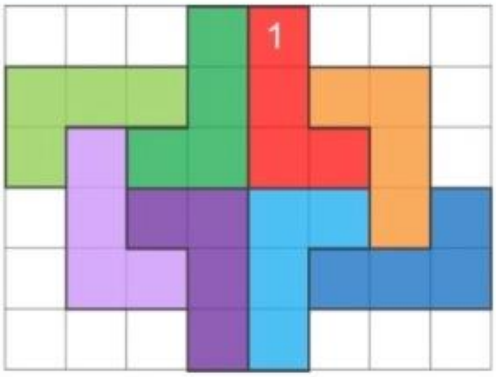
… and these two:

Mary Pardoe @PardoeMary · 18h

I love this one because it draws/builds on experience … that doesn't depend on what they've been 'taught'. **#mathscpdchat**

Checkpoint 2: Tess-ellation

Tessa made this pattern by drawing around an L-shaped stencil. She started with the red shape, labelled 1.



a) Choose an L shape where she could have slid the stencil **along** the page.
b) Choose an L shape where she could have **flipped** the stencil over.
c) Choose an L shape where she could have **turned/spun** the stencil.

? Tessa adds another shape by both flipping **and** spinning the stencil. What might this shape look like? Could any of the possible shapes fit on this grid?

NCETM

Mary Pardoe @PardoeMary · 18h

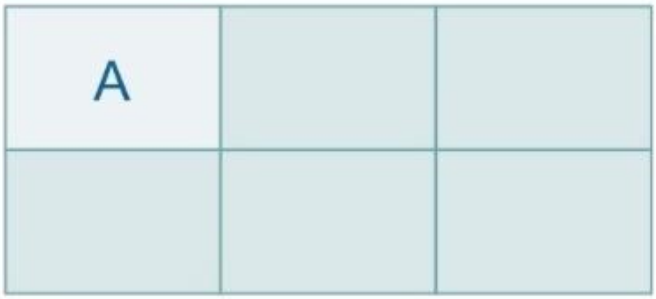
I love this one too!
#mathscpdchat

Checkpoint 24: Rectangles

The small rectangle, A, is 2 cm by 3 cm.

Caroline arranges six of these to make another rectangle.

a) Is the large rectangle just a larger version of rectangle A?
b) If it isn't, how is it different? If it is, how do you know?



? Is it possible to arrange 10 of rectangle A so they they make a larger version of A? How about 12 of rectangle A? What's the smallest number of tiles you'd need?

NCETM

There were no replies to Charlotte's next two questions … with which she shared a Checkpoint about grouping and sharing:

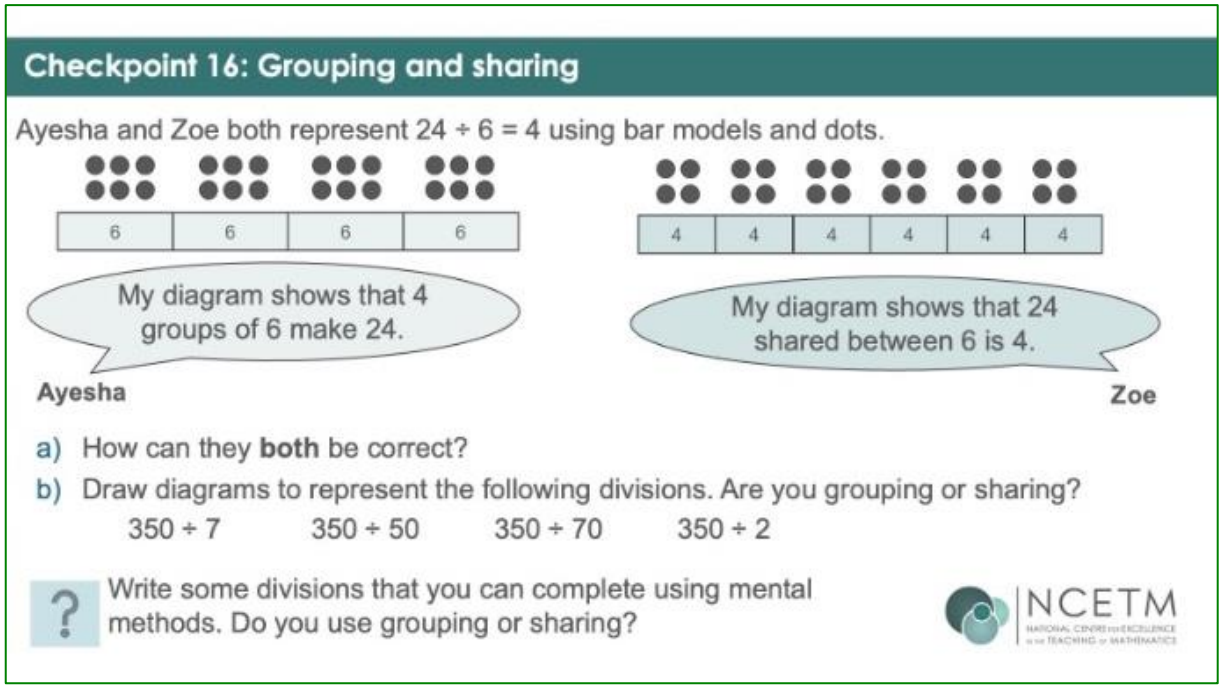
Charlotte Hawthorne @mrshawthorne7 · 16h

Do you talk to students about the difference between sharing and grouping?

I've found some learners who say they 'struggle' with division have often felt much better after explicitly exploring this!

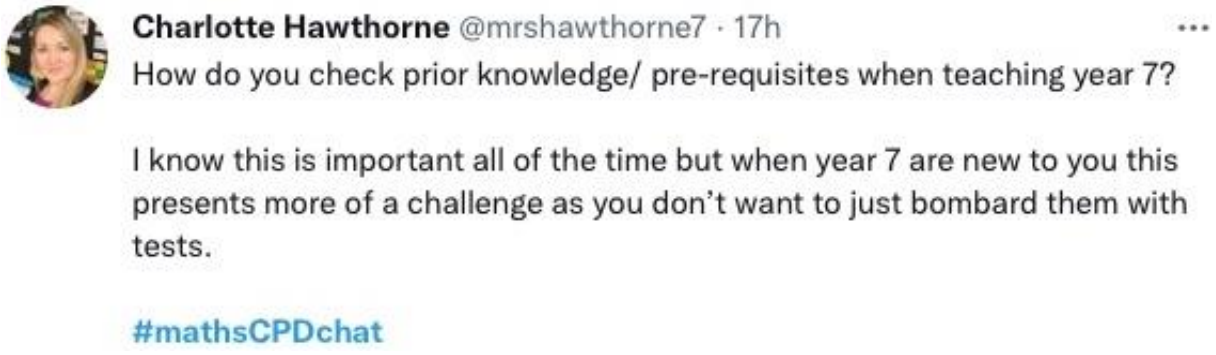
How do you develop student's mental strategies?

#mathsCPDchat

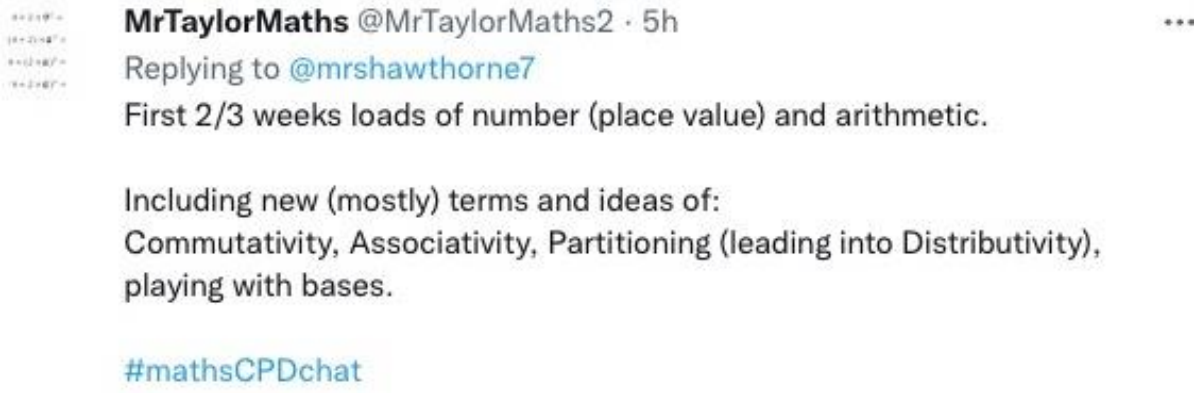


The (linked to Twitter) screenshots below show the replies to Charlotte's next question, and the discussions that it generated.

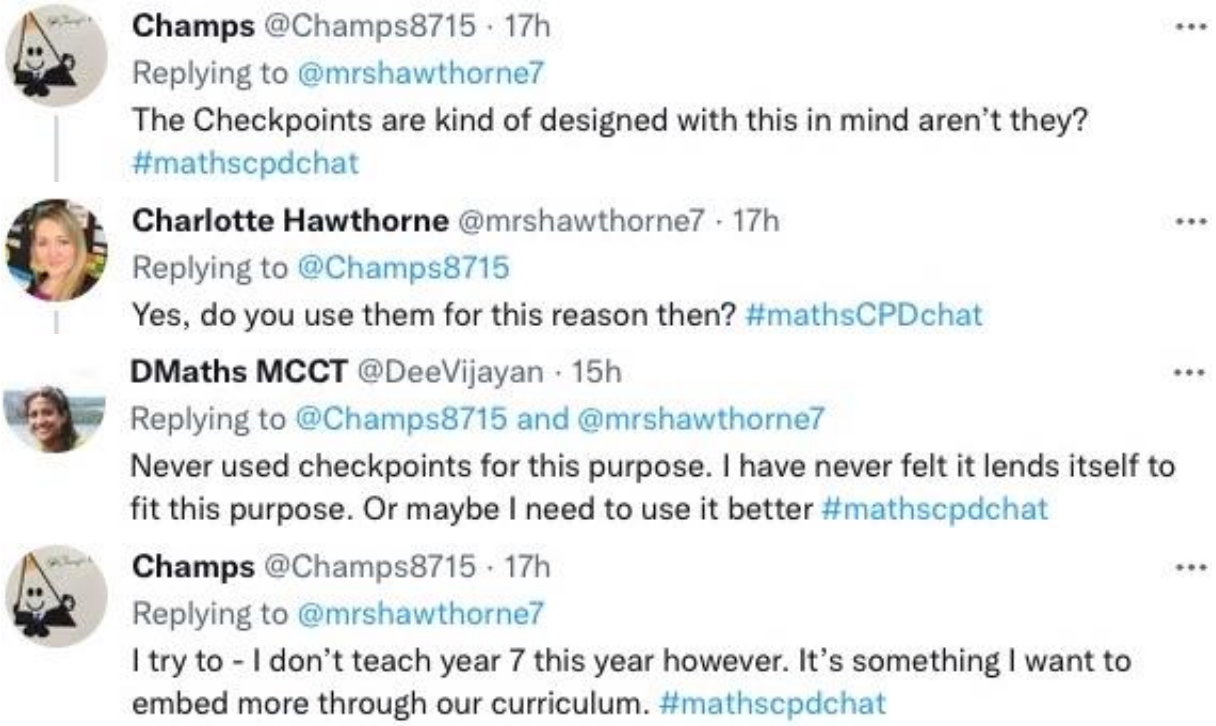
In the following part of the summary **only**, you can **click on any screenshot-of-a-tweet to go to that actual tweet on Twitter.** This was the question from Charlotte Hawthorne:



There was this single reply from Mr Taylor …



… and a conversation about ways of enabling a team to work together to make the best possible use of the Checkpoints, initiated by a reply from Champs, and also involving Charlotte Hawthorne, Dee, Simon Ball, Anthony Shaw, Lyndsey, Brooke Hunter and N Escudero:



Charlotte Hawthorne @mrshawthorne7 · 17h

I've put links to the PPTs and suggested which checkpoints to use and roughly when.

What are others doing to try and encourage their use throughout their departments? **#mathsCPDchat**

Anthony Shaw @ShawMaths · 17h

Replying to @mrshawthorne7

I'm thinking about making some of them non-negotiables. They're so powerful when done well.

Like everything though, the task alone isn't enough which is why the teacher notes are so useful too! Thanks @NCETM

#mathscpdchat

Charlotte Hawthorne @mrshawthorne7 · 17h

Replying to @ShawMaths and @NCETM

So true, it's not the task it's the way it's used :) the teacher notes are great for getting the most from them!
#mathsCPDchat

Anthony Shaw @ShawMaths · 16h

Replying to @mrshawthorne7 and @NCETM

Still might make them more than a suggestion though. Tasks like these are amazing to make me (and other teachers?) think about how I deliver other tasks too.

#mathscpdchat

Lyndsey @MathsLyndsey · 16h

Replying to @ShawMaths @mrshawthorne7 and @NCETM

How about asking everyone to use a certain one and bring pupil responses to the next dept meeting/CPD. Like the gap tasks you get from maths hub working groups. Start small

Anthony Shaw @ShawMaths · 16h

Replying to @MathsLyndsey @mrshawthorne7 and @NCETM

That's a nice idea!

Always need more department time! 🤣

Charlotte Hawthorne @mrshawthorne7 · 18h
#mathscpdchat great idea to get checkpoints used in the department

Brooke Hunter @BrookeEHunter · 17h
Replying to @mrshawthorne7
Linked throughout the SOW for Y7. Really pleased @NCETM have just released Y8 and Y9 checkpoints

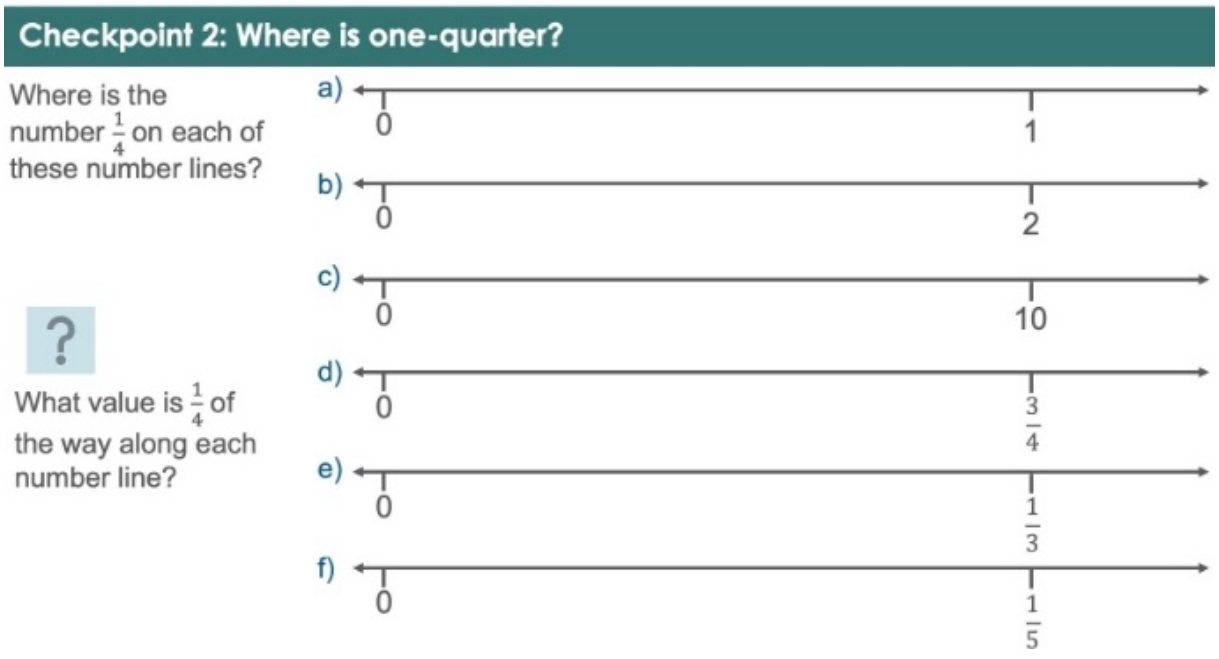
N Escudero @NEscuVila · 16h
Replying to @BrookeEHunter @mrshawthorne7 and @NCETM
We have linked them throughout the SoW and discuss them in Learning Area meetings whenever possible to look at the topics ahead. If not we discussed what we have learned after using them. Such a great tool!!
#mathscpdchat

Anthony Shaw replied to this question about a particular Checkpoints task:

Charlotte Hawthorne @mrshawthorne7 · 17h
How might your students respond to this task?

What do you think their responses might tell you?

What misconceptions might be exposed and how could you plan to address them?
Might you need to have any resources to hand to help students who were struggling? #mathsCPDchat



Anthony Shaw @ShawMaths · 17h

Replying to @mrshawthorne7

I did this with Year 7s last year. They found the 10 line the hardest to guess.

They surprised me how well they coped with the unit fractions though. Our primary colleagues are doing great work!

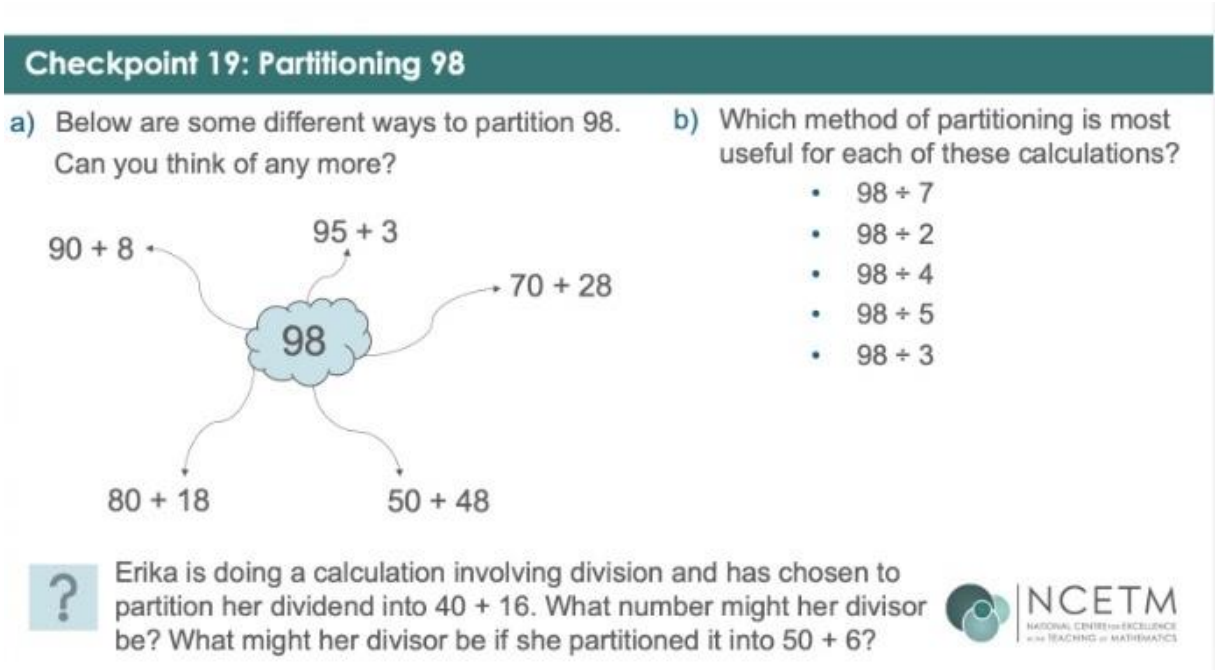
#mathscpdchat #5to8

This last question from the host, about another Checkpoint …

Charlotte Hawthorne @mrshawthorne7 · 18h

Confession… I'm not the best at mental maths (especially under pressure) so I use strategies like this all the time.
I try to make these clear to my students by modelling my thinking like this checkpoint.

How do you model your mental strategies to students?
#mathsCPDchat



Checkpoint 19: Partitioning 98

a) Below are some different ways to partition 98. Can you think of any more?

b) Which method of partitioning is most useful for each of these calculations?

- 98 ÷ 7
- 98 ÷ 2
- 98 ÷ 4
- 98 ÷ 5
- 98 ÷ 3

? Erika is doing a calculation involving division and has chosen to partition her dividend into 40 + 16. What number might her divisor be? What might her divisor be if she partitioned it into 50 + 6?

NCETM

… prompted a discussion about the teacher working through checkpoint tasks before using them with students, and some information about guidance provided with every Checkpoint …

Mr B Maths @MrBMaths3 · 18h

Replying to @mrshawthorne7

This looks a great checkpoint for when we look at division and mental methods of division. I think the obstacle for me currently is sorting through where they would all fit in our curriculum #mathsCPDchat

Charlotte Hawthorne @mrshawthorne7 · 18h

Replying to @MrBMaths3

That's it, there are so many great ones! I think using them in department meetings/CPD just before a topic will be taught is a great way to encourage people to use them. I'm much more inclined to use a task I've had chance to try myself. #mathsCPDchat

Mr B Maths @MrBMaths3 · 18h

Replying to @mrshawthorne7

With these kind of tasks, staff really need to engage before hand to see where the students might go with them. Is this potentially a barrier for use? 🤔 #mathsCPDchat

Alison Hopper @AlisonHopperMEI · 18h

Replying to @MrBMaths3 and @mrshawthorne7

There are detailed notes included in the slides and guidance (and answers) in the notes #mathscpdchat

Checkpoint 7: Guidance

Adaptations	Assessing understanding
Support Remove the statement 'The difference between the two numbers is 8', so students only consider the first statement when deciding whether the changes affect them. The activity could then be repeated for the second statement. **Challenge** Challenge students to create their own statements to describe two unknown numbers. Can they think of any statements that will stay true for a, b and c? How about statements that will not? **Representations** Here, a bar model is used as a representation of unknown numbers, so that the focus is on the algebraic thinking rather than notation. A number line may also be a useful visual for explaining, for example, why the difference is unchanged for part a, but not for parts b and c.	Assess whether students can appreciate how multiplicative and additive relationships between numbers are affected by changes. Students may be more comfortable working with numbers rather than unknowns in their explanations. However, in order to assess their starting points for algebraic thinking, try to explore whether students can reason about whether the statements are true or false **before** asking them to suggest values for the bars.
Additional resources • Similar problems can be found within 6AS/MD–4 Solve problems with 2 unknowns (pp308–12 of Teaching mathematics in primary schools). • Additional activity I uses a similar premise, but without the support of the bar model representation.	

Charlotte Hawthorne @mrshawthorne7 · 18h

Replying to @AlisonHopperMEI and @MrBMaths3

Yes, and some with animated solutions! Which I'm guessing @LearningMaths is responsible for? 😂 #mathsCPDchat

… and another reply to Charlotte's 'confession' and question:

Charlotte Hawthorne @mrshawthorne7 · 18h

Confession… I'm not the best at mental maths (especially under pressure) so I use strategies like this all the time.
I try to make these clear to my students by modelling my thinking like this checkpoint.

How do you model your mental strategies to students?
#mathsCPDchat

Dr Chris Baker @DrChris_Baker · 18h

Replying to @mrshawthorne7

Same. I always do tricks like if multiplying by 7, multiply by 10, half it and add double the original. I tend to show as many of these as possible (Inc div by 32 by repeated halving, partitioning for addition) as they tend to forget about all the vital foundational work in KS1

Charlotte ended this #mathsCPDchat with this message …

Charlotte Hawthorne @mrshawthorne7 · 18h

Thank you SO MUCH to everyone for tonight's #mathsCPDchat

I've really enjoyed seeing people's favourite checkpoints. Do keep sharing and chatting!

I'll leave you with some more of my favourites. Have a lovely evening everyone :)

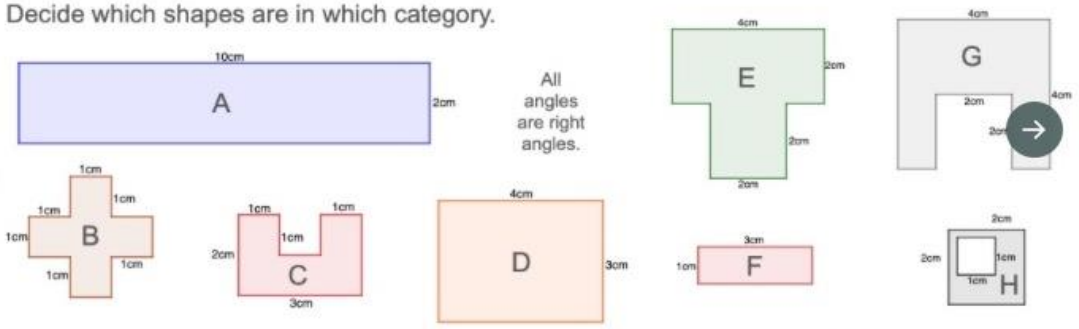
… and shared four more Checkpoints (shown below). This message appeared on the morning after the chat:

Bekah Gear @mrs_gearr · 7h

An absolutely wonderful and insightful @NCETM #mathscpdchat last night…. 👇

Checkpoint 14: Dozen or doesn't?

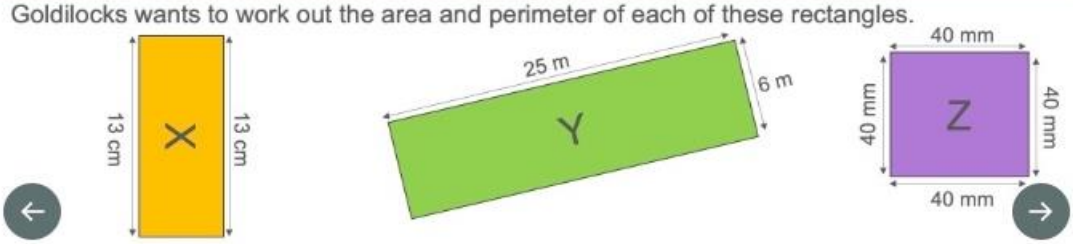
Some of these shapes have an area of 12 cm^2. Some have a perimeter of 12 cm.
Some have neither.
Decide which shapes are in which category.



? Design your own shapes with an area of 12 cm^2 or perimeter of 12 cm.

Checkpoint 9: Goldilocks and the three rectangles

Goldilocks wants to work out the area and perimeter of each of these rectangles.

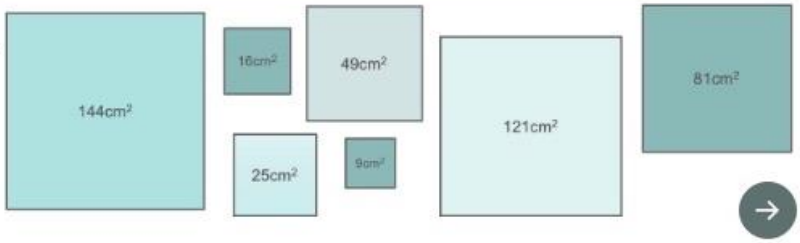


a) When is there too much, not enough or just the right amount of information?
b) Find the area and perimeter of the rectangles where it is possible.
c) Goldilocks works out the area of Z using the calculation 40 × 40 × 40 × 40. What has she done wrong?

? For the rectangle that had not enough information, the perimeter is between 41 and 44. What might the area be?

Activity F: More squares and lines

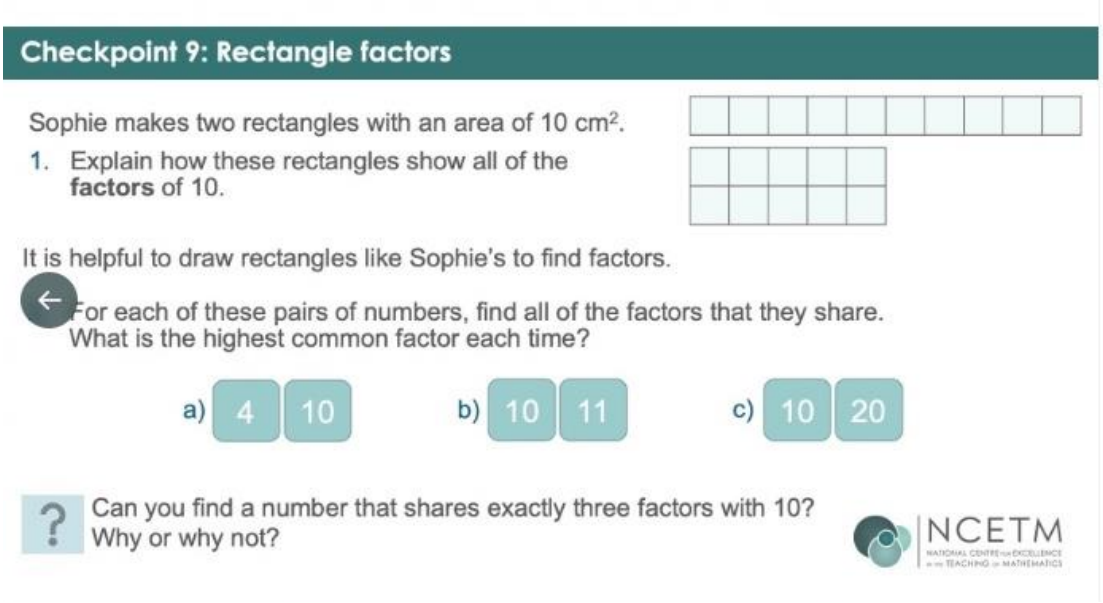
Here are seven squares.



Here are three lines.

Can you arrange the seven squares on the three lines, so that they fit exactly, with no gaps?

? If this question was impossible, change one thing to make it possible. If it was possible, change one thing to make it impossible. Is there more than one way to do this?



Checkpoint 9: Rectangle factors

Sophie makes two rectangles with an area of 10 cm².

1. Explain how these rectangles show all of the **factors** of 10.

It is helpful to draw rectangles like Sophie's to find factors.

For each of these pairs of numbers, find all of the factors that they share. What is the highest common factor each time?

a) 4 10 b) 10 11 c) 10 20

Can you find a number that shares exactly three factors with 10? Why or why not?

NCETM

Lastly, there were two more comments:

Becky Donaldson @donaldson_maths · 18h

Fell asleep in the 4yo's bed and missed #mathscpdchat 😳

But it's been a real pleasure reading about how people have been using #ncetmcheckpoints...and as good a time as any to mention the BRAND NEW DECKS that are out now. More to come - watch this space!

ncetm.org.uk/classroom-reso...

Gemma Heald @GemmaHeald · 18h

Just catching up on #mathscpdchat , I flipping love the NCETM check points ❤️ I'll be linking them to the TTCT default curriculum as it develops.