#mathscpdchat 30 March 2021

What has been particularly significant in your maths teaching this term?
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:

OneNote Class Notebook in your Microsoft Teams Class which is a blog post describing how you can use OneNote Class Notebook. Each page can be any size and can become like a classroom whiteboard. Students can access and collaborate on anything in the collaboration space. It was shared by Catherine Edwards

mote which is a YouTube video introduction to using the mote Chrome extension. It was shared by mote

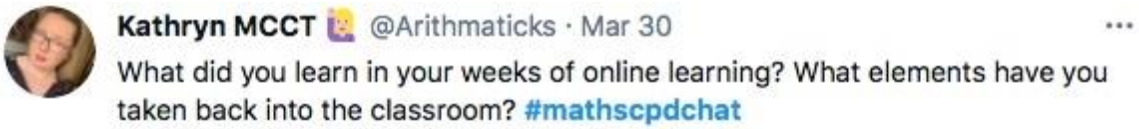
Mote Teachers which is a Facebook group for teachers using mote. Spirited debate and fresh ideas are welcome. It was shared by mote

Teaching Further Mathematics 1 (TFM1) which is a sustained professional development course from the ASMP. It covers at least the pure material common to all AS level Further Mathematics specifications, and is designed for teachers who are currently teaching AS or A level Further Mathematics or who wish to teach it at some point in the near future. It was shared by Becca

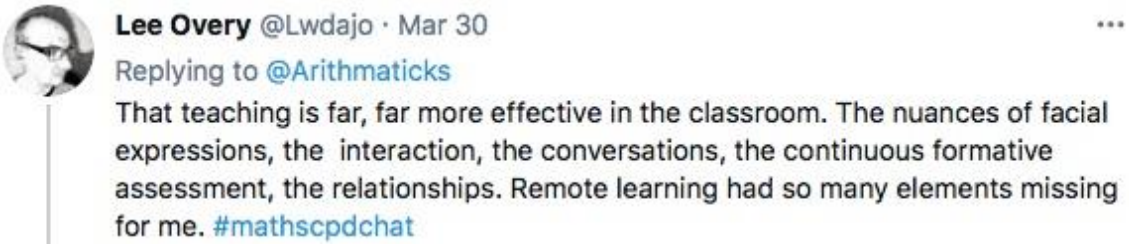
3D Modelling/Examples/Red-Green Anaglyph which is a Wikiversity page providing information relevant to the use of 3D glasses to enhance some mathematics learning! It was shared by Becca

Teaching Math With Examples which is a book by Michael Pershan. The author answers questions about teaching with examples, providing solutions arrived at through experience and trial-and-error and his own process of classroom problem solving. It was shared by Karen Hancock

The screenshots below, of chains of tweets posted during the chat, show parts of several conversations about ways of facilitating their pupils' learning that teachers discovered or developed during online teaching/learning that they intend to continue to incorporate into their practice. **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 Kathryn Darwin:



and included these from Lee Overy, Kathryn Darwin and Karen Hancock:



Kathryn MCCT @Arithmaticks · Mar 30

Replying to @Lwdajo

Definitley - are there ANY elements of online learning you think worked? Or taught you something you could take back into the classroom? #mathscpdchat

Lee Overy @Lwdajo · Mar 30

To be fair, being able to record a lesson on Teams for students to watch again later was potentially useful, though I doubt hardly anybody watched it again later, I could be wrong. #mathscpdchat

Karen @karenshancock · Mar 30

I have a Year 11 still shielding, still dials in. Because the Teams call is up and running I've taken to recording my examples. The students then play them back in class to themselves when they get stuck. #mathscpdchat

Lee Overy @Lwdajo · Mar 30

We don't have that situation, but it's certainly something I could continue doing after Easter, even if someone is just off Ill for a day. It's a great idea. Maybe I learned something from online teaching after all! #mathscodchat

these from MrHawesMaths and Kathryn Darwin:

MrHawesMaths @HawesMaths · Mar 30

Scaffolding work and picking good examples to model. Having to really think how I would present it online for students to comprehend and roll with it. Bringing this into the classroom has helped me massively and create focal talking points in class. #mathscpdchat

Kathryn MCCT @Arithmaticks · Mar 30

Replying to @HawesMaths and @Lwdajo

Can you give us an example of this? :) #mathscpdchat

MrHawesMaths @HawesMaths · Mar 30

Replying to @HawesMaths @Arithmaticks and @Lwdajo

Using trig ratios to solve problems and why we use inverse sin/cos/tan to calculate missing angles, created some good discussion points and then working through examples together putting these points in action. Made it a seamlessly easier topic. #mathscpdchat

Kathryn MCCT @Arithmaticks · Mar 30

Oooh please elaborate. This sounds great! Any mention of trig tables? #mathscpdchat

MrHawesMaths @HawesMaths · Mar 30

We did delve into 'old school' trig tables and how it used to work. Blew their minds. #mathscpdchat

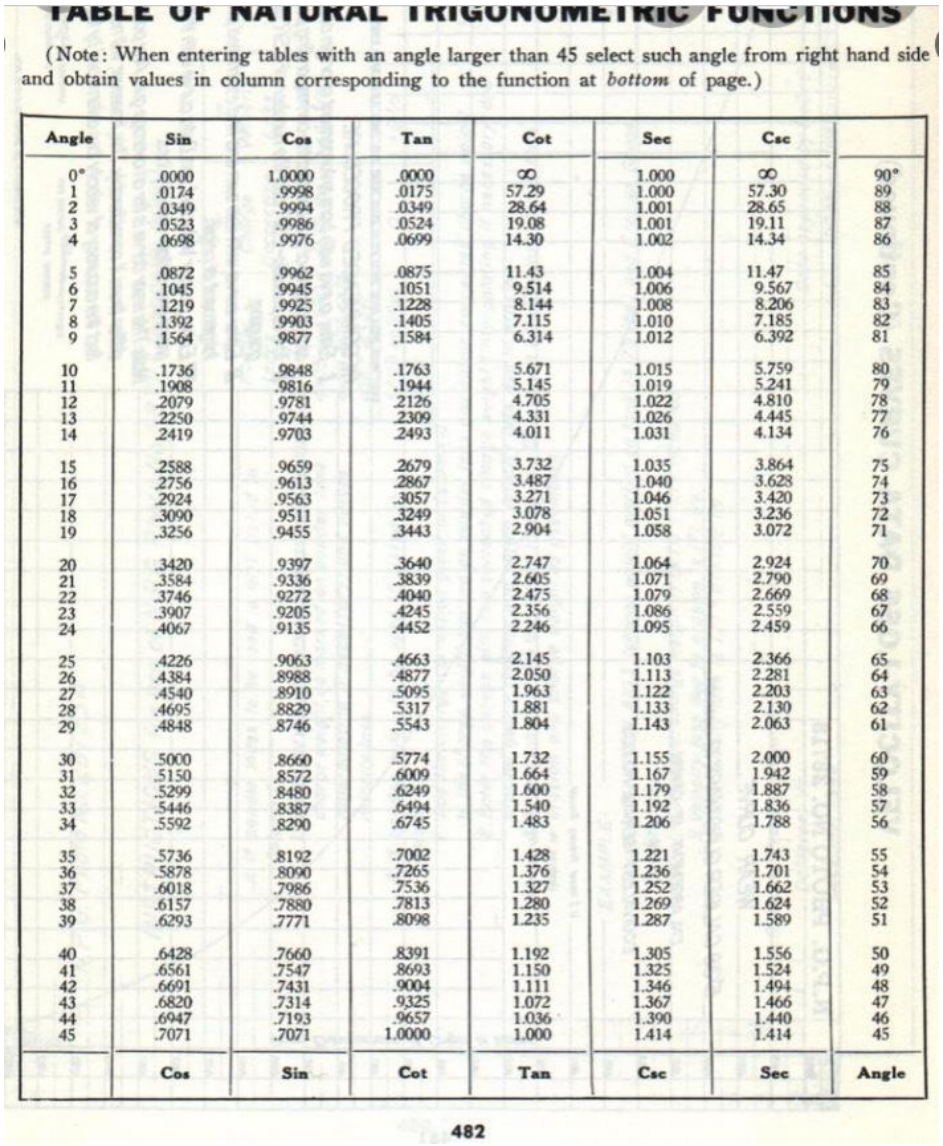


TABLE OF NATURAL TRIGONOMETRIC FUNCTIONS

(Note: When entering tables with an angle larger than 45 select such angle from right hand side and obtain values in column corresponding to the function at *bottom* of page.)

Angle	Sin	Cos	Tan	Cot	Sec	Csc	
0°	.0000	1.0000	.0000	∞	1.000	∞	90°
1	.0174	.9998	.0175	57.29	1.000	57.30	89
2	.0349	.9994	.0349	28.64	1.001	28.65	88
3	.0523	.9986	.0524	19.08	1.001	19.11	87
4	.0698	.9976	.0699	14.30	1.002	14.34	86
5	.0872	.9962	.0875	11.43	1.004	11.47	85
6	.1045	.9945	.1051	9.514	1.006	9.567	84
7	.1219	.9925	.1228	8.144	1.008	8.206	83
8	.1392	.9903	.1405	7.115	1.010	7.185	82
9	.1564	.9877	.1584	6.314	1.012	6.392	81
10	.1736	.9848	.1763	5.671	1.015	5.759	80
11	.1908	.9816	.1944	5.145	1.019	5.241	79
12	.2079	.9781	.2126	4.705	1.022	4.810	78
13	.2250	.9744	.2309	4.331	1.026	4.445	77
14	.2419	.9703	.2493	4.011	1.031	4.134	76
15	.2588	.9659	.2679	3.732	1.035	3.864	75
16	.2756	.9613	.2867	3.487	1.040	3.628	74
17	.2924	.9563	.3057	3.271	1.046	3.420	73
18	.3090	.9511	.3249	3.078	1.051	3.236	72
19	.3256	.9455	.3443	2.904	1.058	3.072	71
20	.3420	.9397	.3640	2.747	1.064	2.924	70
21	.3584	.9336	.3839	2.605	1.071	2.790	69
22	.3746	.9272	.4040	2.475	1.079	2.669	68
23	.3907	.9205	.4245	2.356	1.086	2.559	67
24	.4067	.9135	.4452	2.246	1.095	2.459	66
25	.4226	.9063	.4663	2.145	1.103	2.366	65
26	.4384	.8988	.4877	2.050	1.113	2.281	64
27	.4540	.8910	.5095	1.963	1.122	2.203	63
28	.4695	.8829	.5317	1.881	1.133	2.130	62
29	.4848	.8746	.5543	1.804	1.143	2.063	61
30	.5000	.8660	.5774	1.732	1.155	2.000	60
31	.5150	.8572	.6009	1.664	1.167	1.942	59
32	.5299	.8480	.6249	1.600	1.179	1.887	58
33	.5446	.8387	.6494	1.540	1.192	1.836	57
34	.5592	.8290	.6745	1.483	1.206	1.788	56
35	.5736	.8192	.7002	1.428	1.221	1.743	55
36	.5878	.8090	.7265	1.376	1.236	1.701	54
37	.6018	.7986	.7536	1.327	1.252	1.662	53
38	.6157	.7880	.7813	1.280	1.269	1.624	52
39	.6293	.7771	.8098	1.235	1.287	1.589	51
40	.6428	.7660	.8391	1.192	1.305	1.556	50
41	.6561	.7547	.8693	1.150	1.325	1.524	49
42	.6691	.7431	.9004	1.111	1.346	1.494	48
43	.6820	.7314	.9325	1.072	1.367	1.466	47
44	.6947	.7193	.9657	1.036	1.390	1.440	46
45	.7071	.7071	1.0000	1.000	1.414	1.414	45
	Cos	Sin	Cot	Tan	Csc	Sec	Angle

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these from MrHawesMaths, Martyn Yeo and Helen Scott:

MrHawesMaths @HawesMaths · Mar 30

Replying to @Arithmaticks

Patience and waiting for an answer. #mathscpdchat

Martyn (He/Him) @martynyeouk · Mar 30

Waiting for soooooo long....#mathscpdchat

Helen Scott @HelenScott88 · Mar 30

Replying to @Arithmaticks

Wait time when questioning is also never awkward now, because it was so long online. Feels unnaturally short now! #mathscpdchat

these from Miss Ward-Gow, Kathryn Darwin and Mary Pardoe:

Miss Ward-Gow @mcwardgow · Mar 30

Replying to @Arithmaticks

That it is possible to check where students are at without "book marking" 😬 trying to suggest that we make more use of Mote when back in school but so far no luck with that #mathscpdchat

Kathryn MCCT 🙋‍♀️ @Arithmaticks · Mar 30

Tell us more about Mote? #mathscpdchat

Miss Ward-Gow @mcwardgow · Mar 30

You can use Mote to record short voicenotes. I used it to leave feedback for students on Google classroom 🙂 students seemed to respond more often when I left a voicenote rather than just a comment #mathscpdchat

Mary Pardoe @PardoeMary · Mar 30

That's so interesting ... it's their teacher's VOICE they need to hear?! #mathscpdchat

Miss Ward-Gow @mcwardgow · Mar 30

Replying to @PardoeMary and @Arithmaticks

Particularly the non-engagers - I left them a voicenote saying "I've noticed that you haven't started the work, if you need any help logging in please can you let me know" 😜 #mathscpdchat

Kathryn MCCT 🙋‍♀️ @Arithmaticks · Mar 30

Replying to @mcwardgow

Onenote has something similar! It also animates what you wrote at the same time it plays so I could 'work through' an example and explain the process! #mathscpdchat

these from Kathryn Darwin and Jess Sands:

Jess Sands @MsSandsMaths · Mar 30

Replying to @Arithmaticks

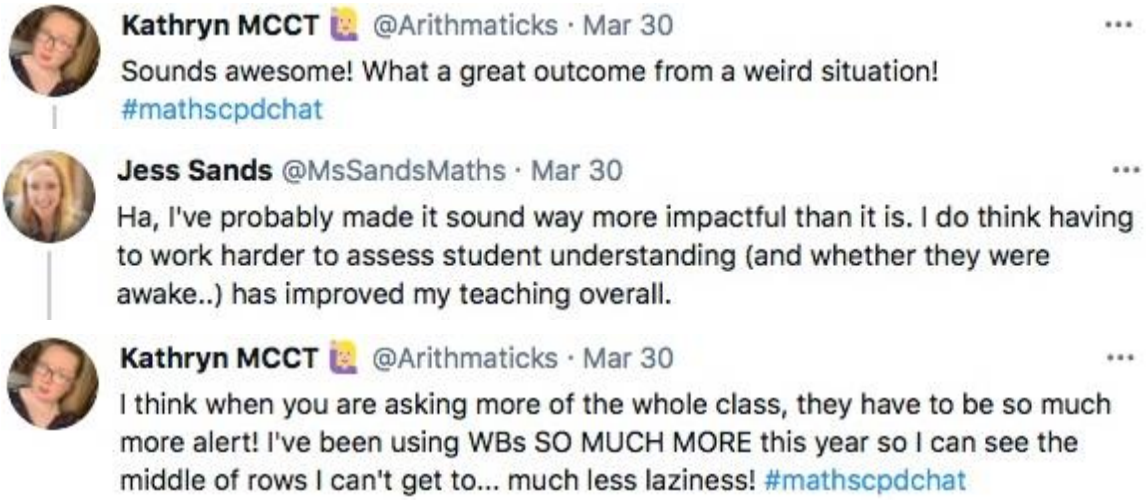
My online lessons had A LOT of whole class response questioning so I didn't feel like i was teaching into the void. This has now become a bigger part of my classroom lessons.

Kathryn MCCT 🙋‍♀️ @Arithmaticks · Mar 30

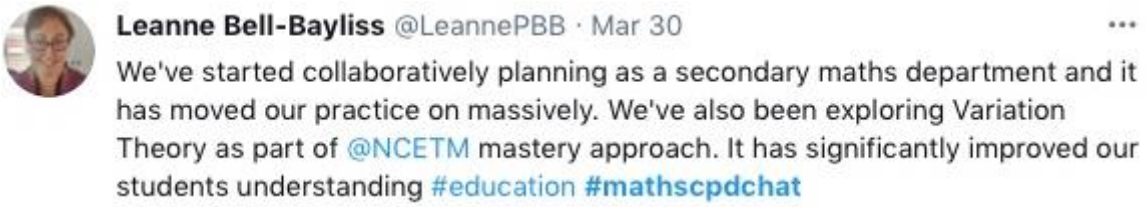
How do you think this is changing the learning in the room? #mathscpdchat

Jess Sands @MsSandsMaths · Mar 30

I'd like to think my teaching is more responsive within individual lessons, and classrooms are safer environments for making mistakes as we discuss them so much. Independent practice is done in shorter bursts for most classes which keeps them more focused.



and this from Leanne Bell-Bayliss:



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

Some of the areas where discussion focused were:

significant learning by contributors that is a direct consequence of their recent online and classroom teaching experiences:

- that both **teachers and pupils are able to adapt quickly to changes in circumstances** … 'students and teachers are incredibly resilient';
- several teachers mentioned discovering that **OneNote (link provided above) is a useful tool** that can aid significantly both online and classroom teaching … it aids teaching because 'I can plan an entire learning episode on one page, and move through it at the pace of the class. Also really easy to add in and take out' … 'It is now part of my regular classroom practice and has really enhanced learning';
- some teachers have become very aware of '**the importance of two-way conversations in teaching and learning maths**' between teachers and students, and between students and students … that, in some ways, communication between staff 'has become more efficient' … new opportunities for professional development have been seen and taken up;
- remote teaching/learning has 'highlighted' for some teachers '**just how important it is to check understanding throughout a lesson**' … it has also helped 'to identify which students often need more help but won't ask';

- some teachers have **learned by, for the first time, watching videos of themselves teaching** … 'I've since changed the way I teach something or considered it more carefully' … for example 'I looked more closely at the opportunities for deeper thinking';
- several teachers have missed students being able to use real **individual mini-whiteboards** in lessons … but '**the digital ones have been so useful, and I will continue to use them now we are back in school** until we can use them (real ones) again safely';
- some teachers commented that **teaching is far more effective in the classroom than when it has to be online** … for example, in classroom teaching the teacher's role is aided by observing students' facial expressions, observing and participating in conversations, thereby having better opportunities for continuous formative assessment;
- at least one teacher learnt 'that we generally have a lot of **parental support**', and that 'harnessing that will be a challenge moving forward';
- another teacher commented that she became aware during online teaching/learning of '**how much feedback I give verbally in the classroom**' … she missed 'being able to just glance at their work and pick up issues promptly';
- for some teachers online teaching created a **greater-than-in-the-past need to 'pick good examples to model'** … and to **think deeply** about 'how I would present it online for students to comprehend' … 'bringing this (discipline) into the classroom has helped me massively' … in particular it has helped the teacher to 'create focal talking points in class';
- **teaching remotely with the aid of a graphics tablet and visualiser** has caused at least one teacher to become determined to 'never stand with my back to a class again';
- there was a short discussion about whether or not secondary teachers are presently choosing to, or are obliged to, **wear a mask while teaching** … some consequences of wearing a mask were mentioned, such as teachers' glasses fogging, and the 'need to enunciate clearly';
- there was another brief discussion about the desirability of being able to **walk around the classroom while still being able to project writing and drawing wirelessly** to the classroom projector via a Microsoft receiver;
- several teachers commented that **online teaching has taught them patience**, and how effective teaching is enhanced by **extending the average 'wait time' for pupils' responses** … 'a long wait time when questioning is also never awkward now because it was so long online';
- some teachers have been reminded by their experiences during remote teaching/learning 'that it is possible to check where students are without 'book marking' … consequently they **want to make more use of mote (link provided above) in classroom teaching** … 'you can use mote to record short **voicenotes** … students (during remote teaching) seemed to respond more often when I left a voicenote rather than just a written comment' … **'it's their teacher's voice they need to hear'** … 'certainly helped my lot' … 'particularly the non-

engagers, who became engaged after leaving 'I've noticed you haven't yet started the work' voice messages' … that this can also be done on OneNote;

- that becoming able during online teaching to **record a lesson on Teams for students to watch again** when they need/want to is 'certainly something I could (will) continue doing in the classroom … it's a great idea';
- for some teachers **'whole-class response questioning' became a more frequently used strategy during online teaching**, and consequently 'this has become a bigger part of my classroom lessons' … as a result teaching is now more responsive to the contributions of individual students … the classroom 'is a safer environment for making mistakes, as we discuss them so much';
- during online teaching **having to 'work harder to assess student understanding has improved my teaching overall**' … this has resulted in many teachers using individual student mini-whiteboards much more;
- several teachers commented that they **were able to build closer/better relationships with some pupils**, and that this has 'translated back to the classroom and has made a difference';
- many teachers who started to use **Google Classroom** in their online teaching intend to continue to use it during classroom teaching … 'at least for planning or keeping a record of what happens each week';
- some departments have been prompted by the need to teach effectively online, to **start to plan collaboratively … 'and it has moved our practice on massively'**;
- having to teach online has prompted many teachers to think harder about '**what is necessary and what is extraneous** to my teaching';
- many teachers, having during online teaching discovered websites that provide virtual manipulatives, are **now using both virtual and real manipulatives for the first time, or to a greater extent, in their classroom teaching** … 'the doors it has opened for their ability to articulate and explain the maths has been outstanding', particularly for previously lower-attaining students;
- some teachers who, owing to suspected consequences of home learning, have started to teach KS3 students in **mixed-attainment classes**, are considering/have-decided to continue with not setting students in KS3 … 'Covid forced our hand, but I'm glad it did';
- some teachers mentioned that recent experiences, and reading about 'intelligent practice', have 'made me revisit my slides I shared when remote teaching and stripped it right back' … 'also the same **with the amount of talk I do - less is more**';

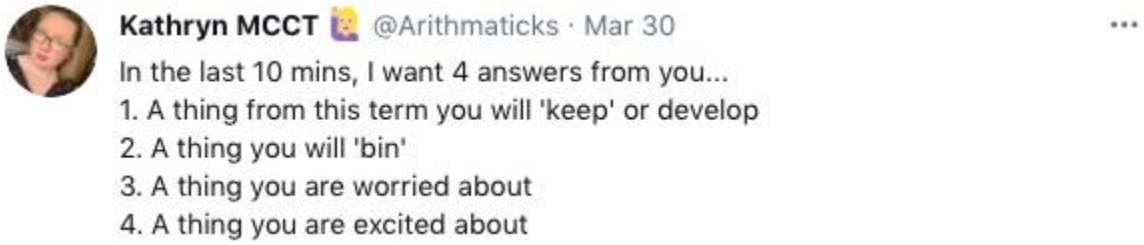
the host asked what has surprised teachers most this term:

- that some students who never ask questions in the classroom, frequently asked questions online … 'the pressure/anxiety of asking in the classroom did not manifest online, quite the opposite';

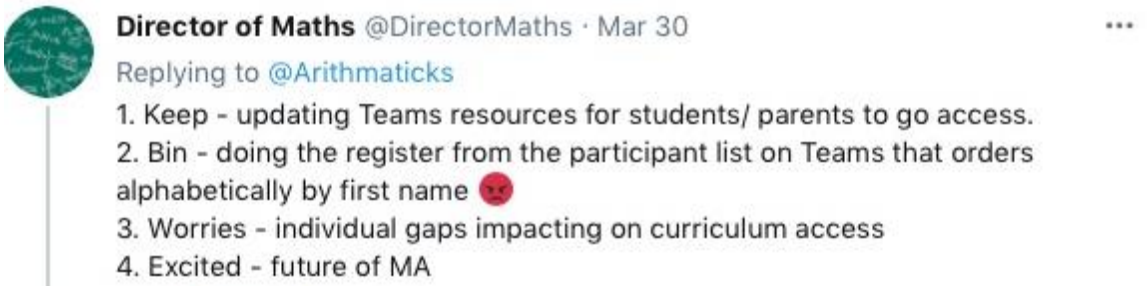
the host asked what teachers thought their best lesson this term had been, and why they thought it was so good:

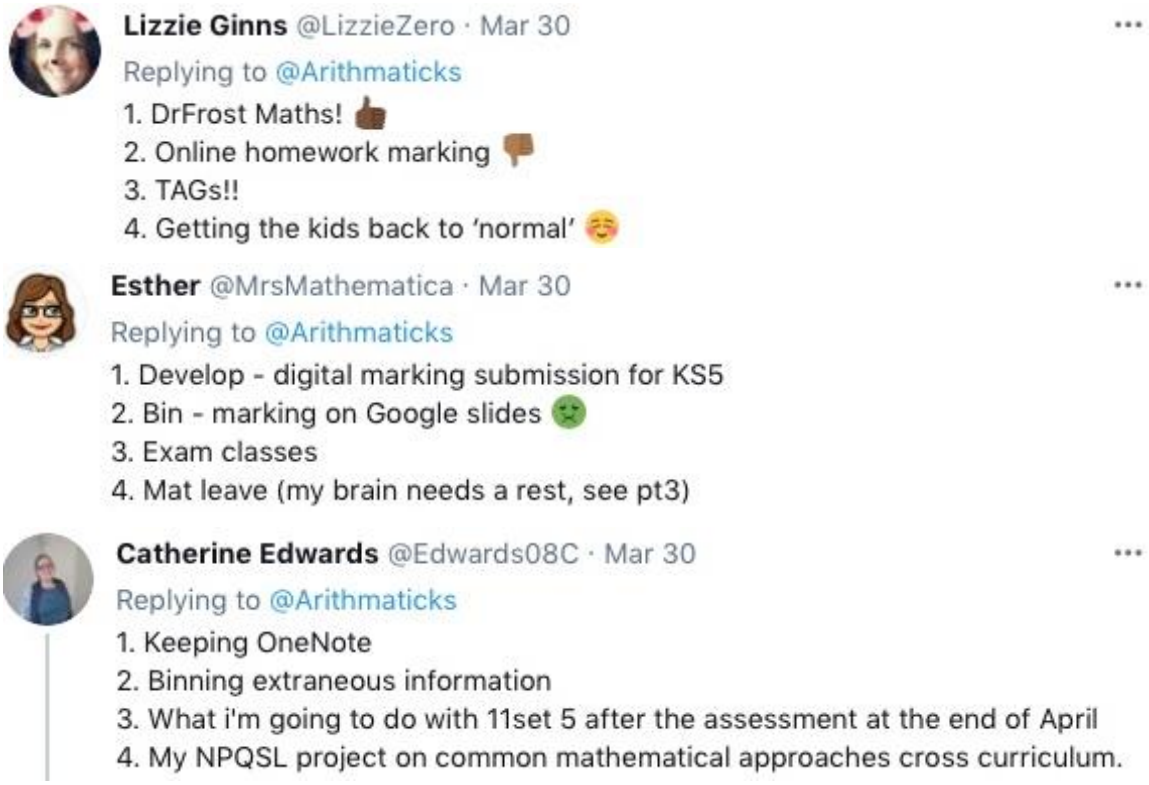
- a short discussion resulted from a teacher's description of **a Further Mathematics lesson in which the students were 'treated to 3D glasses when we were looking at intersection of planes'** … 'we struggled so much with transformation matrices in 3D because all the visualisations were 2D' … 'I stole the idea from the AMSP's Teaching FM course' (link provided above) … 'when I first did the course I ordered a class set of 3D glasses';
- **a lesson in which reverse percentages were explored using bar modelling** … 'the bar modelling suited my class so much better (than teaching reverse percentages by inverse operations) so I left inverse operations as the extension';

the host tweeted this invitation:



- responses included:





- Catherine's last (fourth) response prompted some discussion … 'a lot of the initial focus is going to be on graphs and percentages as that hits a lot of subject areas' … other departments seem excited too' … there was some discussion about whether or not there might be opportunities to convince science teachers 'to abandon formula triangles';
- Kathryn's own response was requested, and she responded with: