#mathscpdchat 15 December 2020

What has your maths teaching been like this term? How are you hoping it will be next term?

Hosted by Kathryn Darwin

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

Some of the areas where discussion focused were:

improvements in their teaching that people have made during the term, and impacts of those improvements on pupils' learning:

- teachers' **knowledge about ways of facilitating online learning has improved** … for example some teachers are now able to deliver 'Teams lessons' confidently … some teachers have developed greater expertise in 'giving good explanations online';
- developing a better understanding of the KS1/2 maths curriculum has **helped some teachers assess pupils' learning more effectively**;

- some teachers have **improved their skills that are related to 'visual' presentation of mathematical reasoning** in teaching and learning … for example, when students are learning about finding the HCF or LCM of numbers;
- at least one teacher has '**developed a greater range of strategies to help pupils understand operations with negative numbers**' … for example, for the first time, students are using double-sided counters to aid their learning … using a 'double-sided-counters' online manipulative (link provided below) … helping students to deepen understanding of what they were taught previously with the aid of various representations other than double-sided counters;
- prompted by teaching mixed-attainment groups for the first time this term, many teachers have **acquired the ability to use effectively 'new-to-them' teaching approaches** … cementing commitment to mixed-attainment teaching and equality of opportunity;

ways in which pedagogic changes that are consequences of the pandemic may have caused students and/or teachers to struggle:

- that **the pace of work has slowed** … this has been caused partly by having to go 'quite slowly during the first half term when we did blended learning' … for example, 'I was bang up-to-date at the start of the term, but now I will be up to two weeks behind with all my A level maths classes (one Y13, two Y12)' … that although 'most of the work has settled in students' minds now', it has taken efforts of both students and teachers to get there … that support sessions can no longer be provided during lunchtimes owing to the school having moved to staggered, shorter lunches (so that 'bubbles' don't mix);
- teachers have **greatly missed being able to walk freely around the classroom to discuss the maths with every student**, to look at their books and so to gain and provide instant feedback on what students are doing … 'I used to spend a minute or two sat talking through something we're working on with every student at least once a fortnight in the lesson' … now 'we have been advised to get students to self-assess';
- that **several students being absent on different days** ('they return, and a different lot are out') **makes it 'hard to teach a normal sequence of lessons'** … having to start every lesson with a 'recap' … getting students who were present in the last lesson to talk through, for the benefit of those that weren't present, what they learnt in the previous lesson(s);
- that it is hard to adapt teaching 'so those in isolation can learn at the same pace as those who are present' … that **trying to provide adequate support for students who are working at home is very challenging** … that it is much harder to support effectively 'the ones without internet access' … 'but we try to touch base with them while off and when back in' … that teachers have had students working at home from five year groups at a time, therefore providing extra support is very time consuming;

- that **being unable (owing to Covid precautions) to apply 'small behaviour management techniques' is frustrating** … 'e.g. standing next to a student who is distracted while I speak to the whole class, or sitting with one to re-focus' … that calling a name across the room can cause a student to react inappropriately (e.g. to 'answer back');
- many teachers are 'feeling impotent' because they **cannot prevent the widening of attainment gaps** … for example 'those who didn't do homework (before the pandemic) now don't do classwork either';
- that on-going assessment-for-learning (AfL) is being hampered in some schools because not every class(room) has managed to maintain a full set of mini-whiteboards on which students can show responses to questions, prompts and challenges … that **trying to ensure that all equipment is there in the classroom when it needs to be 'is a logistical nightmare'**;

achievements during this term of which teachers are most proud include:

- **still being there (in the classroom) despite being exhausted** … 'just keeping at it';
- **getting to grips with teaching online** … for example learning how to use Teams in as effective a way as possible … and 'getting pretty nifty with the old visualiser';
- **adapting to not being able to move about the classroom** in a normal way;
- **learning how to teach the same lesson at the same time to students who are at home and to students who are in the classroom** … but that 'it's making my sixth formers more independent as learners';
- learning to **'record the screen as I teach a lesson in order to create a video which I can send to students on Google Classroom'** … students at home can refer to the video at the present time, and all students have the video to use as a revision aid at a later date;

parts of mathematics that teachers believe they taught particularly well during the term include:

- **using bar models** to help students understand and use **ratios** (see chat extract below);
- **circle theorems** … looking first to (re-)establish familiarity with what words such as 'arc' and 'chord' denote, then moving-on to investigating increasingly complex images (see chat extract below);
- **probability in Y13** … 'spent a long time planning and sequencing examples' (see chat extract below);
- **median from a frequency table** (link to blog provided below);
- **related rates of change** … 'which I now teach without sticking so closely to the chain rule';

- **HCF and LCM** … teaching this to a GCSE maths 'resit' class using a method from *A Compendium of Mathematical Methods* (link provided below);
- **teaching subtraction 'differently' to a GCSE maths 'resit' class,** having found that 'students like addition, but are not fans of subtraction' … counting up from the subtrahend to the minuend, slowly, keeping a running total of what is being added on … another method (specifically using place-value) was also discussed in which the person performing the operation works separately with the numbers represented by the digits in each corresponding place before combining the separate place-value-specific results to get the final result of the subtraction;
- using **'pictorial representations'** to help Y9 students of low prior attainment learn to **solve equations**;
- teaching high-attaining Y9 students to work effectively with **similarity and scale factors**;

topics that teachers may want to 'rework' for the next time:

- that it has been **difficult this term to help students when they are trying to construct loci** … because the teacher was not able to go close to individual students (for example, in order to help them hold a pair of compasses effectively) … another teacher had encountered similar obstacles when being unable fully to assist students who were trying to represent rotations by drawing diagrams;
- at least one teacher felt that he **made the solving of a particular kind of A-level problem appear to be 'more complicated for the students than it needed to be**';

'lessons' teachers have learnt by endeavouring to continue to teach well in the present circumstances:

- **'that I am more adaptable than I thought'**;
- that **visualisers can be amazing tools for teaching**;
- that in order to teach effectively **'I don't need to run around the classroom'** … that having whiteboards on three sides of the classroom helps … other teachers have learnt the 'opposite' lesson … 'that **I am more comfortable teaching from around the room than being static and stuck at the front**';

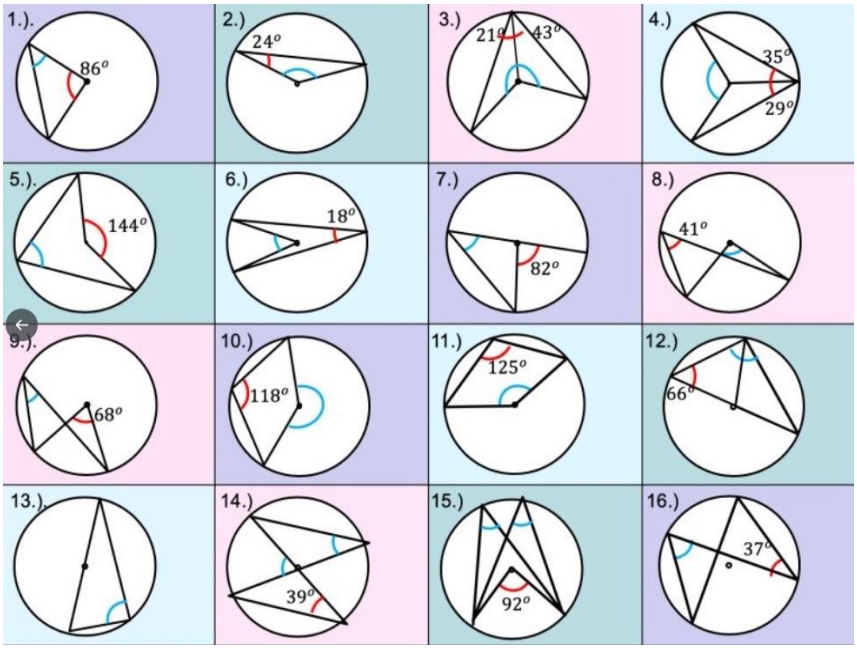
resolutions, derived from teaching experiences this term, that teachers intend to make an effort to carry forward into 2021:

- to **make even better use of every student's having their own mini-whiteboard** with which to communicate;
- to **work hard towards closing existing attainment gaps**.

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

This is a part of a conversation about what teachers feel that they taught particularly well this term, in spite of the unusually challenging circumstances. The conversation was generated by this tweet from Kathryn Darwin:

and included these from Charlotte Hawthorne, Helen Konstantine and Kathryn Darwin:



these from [Jonathan Hall](#) and [Helen Konstantine](#):

these from Sam Blatherwick, Ms Soto and Kathryn Darwin:

Sam Blatherwick @blatherwick_sam · Dec 15

Replying to @Arithmaticks

Probability (yr 13) - spent a long time planning out and sequencing the examples (sorry really dull answer but it's the truth) #mathscpdchat

Ms Soto @MsSoto8 · Dec 15

Replying to @blatherwick_sam and @Arithmaticks

Not dull at all! I am a Calculus fan but Probability is not really my thing 😅 I want to improve my teaching of Probability and Stats. I want to enjoy that part as much as I enjoy Calculus. Any recommendations?

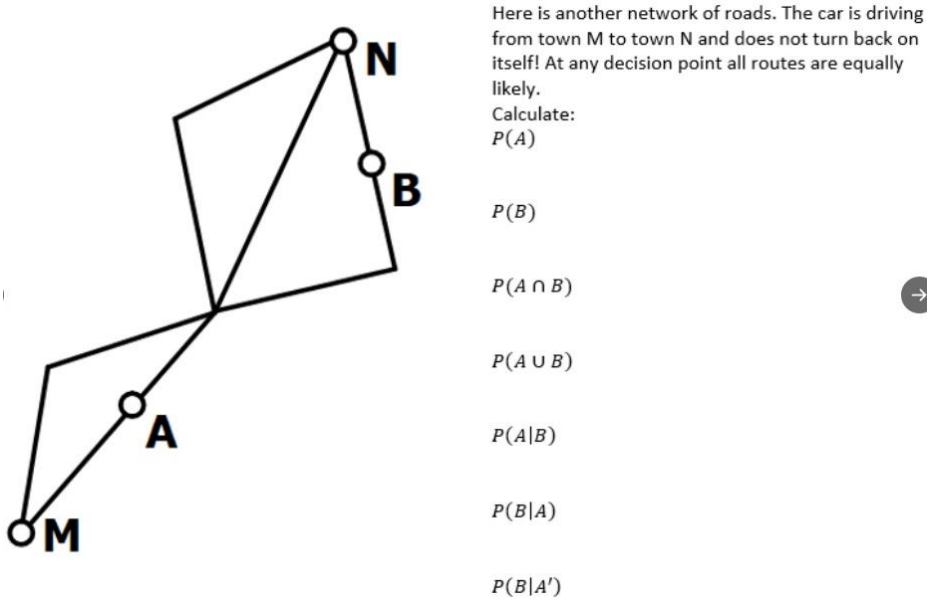
Sam Blatherwick @blatherwick_sam · Dec 15

George Pólya's "Patterns of Plausible Inference" (which is actually volume 2 of a two part series) has a long long chapter on probability and the structures of probability which really got me thinking hard about how to teach ot effectively!

Sam Blatherwick @blatherwick_sam · Dec 15

These models for conditional probability, mutual exclusivity and independence were some of my favourite things to teach this year. I felt like the model I was teaching was tangible and relatable twitter.com/blatherwick_sa... #mathscpdchat

> **Sam Blatherwick** @blatherwick_sam · Nov 6
>
> Got this idea from a Pólya book, using a road network to demonstrate big ideas in Probability (did this with yr 13 this week, I think it is AS course but we pay no regard to that) #mathschat #mathscpdchat



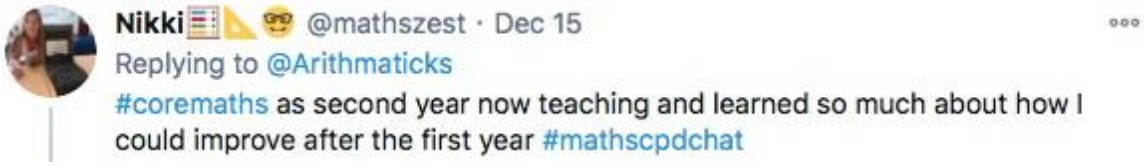
Kathryn MCCT 🙋 @Arithmaticks · Dec 15

Replying to @blatherwick_sam

Not dull at all! Its one of my favourite things to do! #mathscpdchat

these from Jshm and Kathryn Darwin:

and this from Nikki:



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

Among the links shared were:

Double Sided Counters which is one of Jonathan Hall's very useful online manipulatives. Users can create as many counters as they like, move them about, flip and delete them. It was shared by Kathryn Darwin

Pie Chart Templates which is another one of Jonathan Hall's resources. This manipulative can be used to create and explore pie charts. The circles can be printed out for students to use when working on other mathematical areas, such as circle theorems. It was shared Jonathan Hall

Median from a table - the little bits which is a blog by Jshm that he linked to during the chat when the host requested an example related to his teaching that he felt had gone particularly well during the term. You can download copies of his tasks. It was shared by Jshm

Circle Theorems which is a blog by Helen Konstantine in which she describes how she planned and taught a sequence of lessons during the past term. As with all Helen's blogposts, it includes imaginatively-presented and well-thought resource material that other teachers are free to use. It was shared by Helen Konstantine

Patterns of Plausible Inference which is a book by George Polya in which the author shows how techniques of guessing, inductive reasoning, and reasoning by analogy are important aspect of mathematical reasoning. It was shared by Sam Blatherwick who found the book to be very helpful in his planning to teach A level probability.

A Compendium Of Mathematical Methods: A handbook for school teachers which is a book by Jo Morgan in which she describes more than 100 fascinating mathematical procedures from ancient times and far-away lands. It was shared by Simon Ball who described during the chat how his pupils enjoyed learning to use a subtraction method that he found in the book.