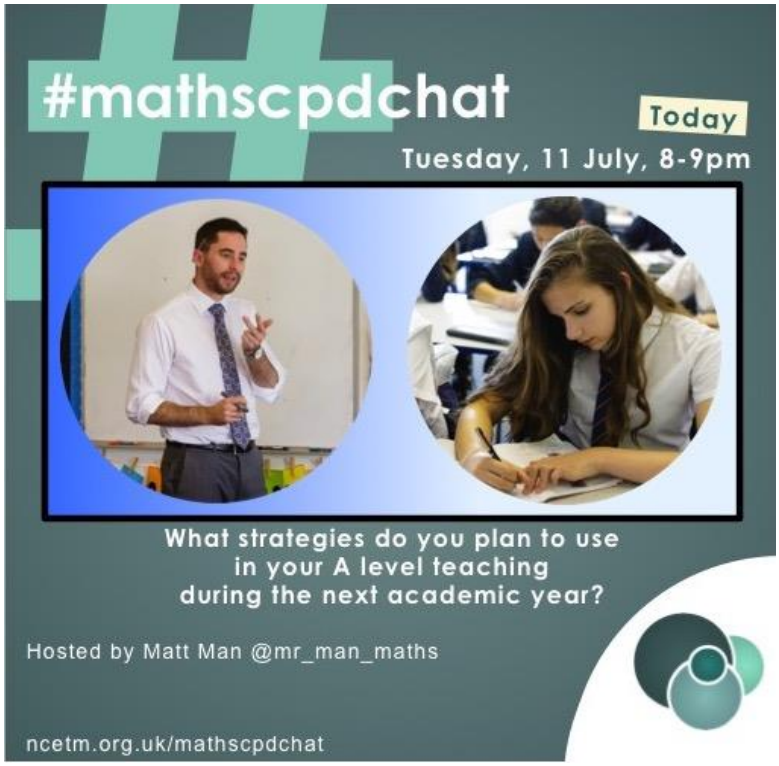
#mathscpdchat 11 July 2023

What strategies do you plan to use in your A level teaching during the next academic year?

Hosted by Matt Man

*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:

Jethwa Maths 10 Minute Tests which are sets of short tasks that can be downloaded as PDF files. On each page approximately four 'questions' are presented that address a specific topic. There is space for writing responses, and a following page provides 'Solutions'. The tests are presented/categorised under the headings Pure 1, Pure 2, Statistics 1 and Mechanics 1. It was shared by Matt Man and Danielle @ PixiMaths

Mathsnet A-level which is the part of the MathsNet website where you will find a wide variety of resources for A level teaching and learning, such as every syllabus for Pearson's Edexcel Maths GCSE, A level and Further Maths qualifications, and 'Online Tests arranged in levels'. It was shared by Matt Man

Mathematics Video Site which is where you will find many interactive GeoGebra apps created by Mark Willis to support the learning of students who are engaging with the mathematics associated with (I)GCSE, A level and Further Maths. It was shared by Mark Willis

Resources from Tayyub Majeed which are resources for A level Maths and Further Maths collected and created by Tayyub Majeed. His 'Exam Pack' contains more material that you can download freely. It was shared by Tayyub Majeed

Ideas for Sixth Form Mathematics: Pure Mathematics and Statistics which is a book by Colin Foster from the Association of Teachers of Mathematics (ATM). It offers a wealth of innovative lesson ideas for important areas of post-16 mathematics teaching, bringing variety to the Pure Mathematics and Statistics curriculum areas within AS/A2 Mathematics and IB. It was shared by Mary Pardoe

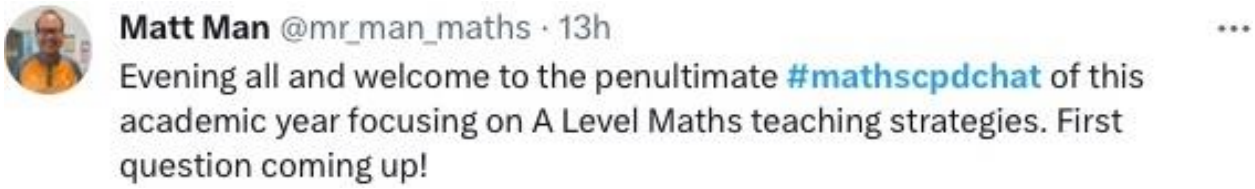
Ideas for Sixth Form Mathematics: Further Pure Mathematics and Mechanics which is another book by Colin Foster from the Association of Teachers of Mathematics (ATM). It offers a wealth of innovative lesson ideas for important areas of post-16 mathematics teaching, bringing variety to the Further Mathematics and Mechanics curriculum areas. It was shared by Mary Pardoe

These Have Worked for Us at A Level which is an e-book from the Association of Teachers of Mathematics (ATM). It is a classic collection of activities for A level mathematics, by Barbara Binns, Kathleen Cross, Tansy Hardy, Gillian Hatch, Anne Haworth, Catherine Mottram and David Wilson. The tasks have been used by teachers in their A level courses and are designed to be useful to the teachers as individuals and also to be the basis of discussion with colleagues. It was shared by Mary Pardoe

These Have Also Worked for Us at A Level which is an e-book from the Association of Teachers of Mathematics (ATM). It is a classic collection of starter ideas and activities for A level mathematics, by Val Aspin, Barbara Binns, Kathleen Cross, Gillian Hatch, Anne Haworth, Catherine Mottram, Ann Shaw and David Wilson. It was shared by Mary Pardoe

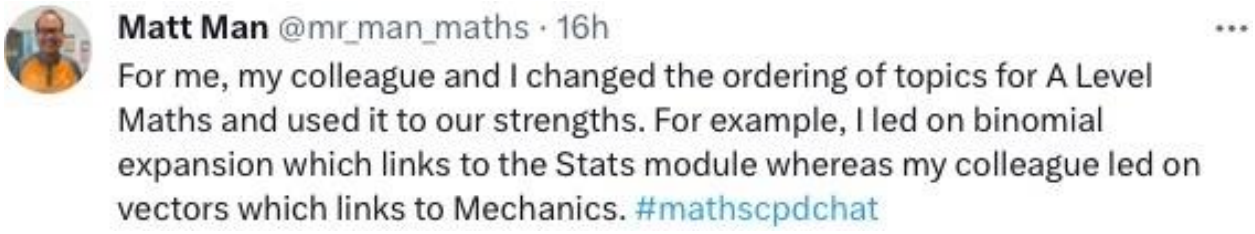
An illustrated summary of the discussions in this #mathsCPDchat follows.

The host's welcome tweet …

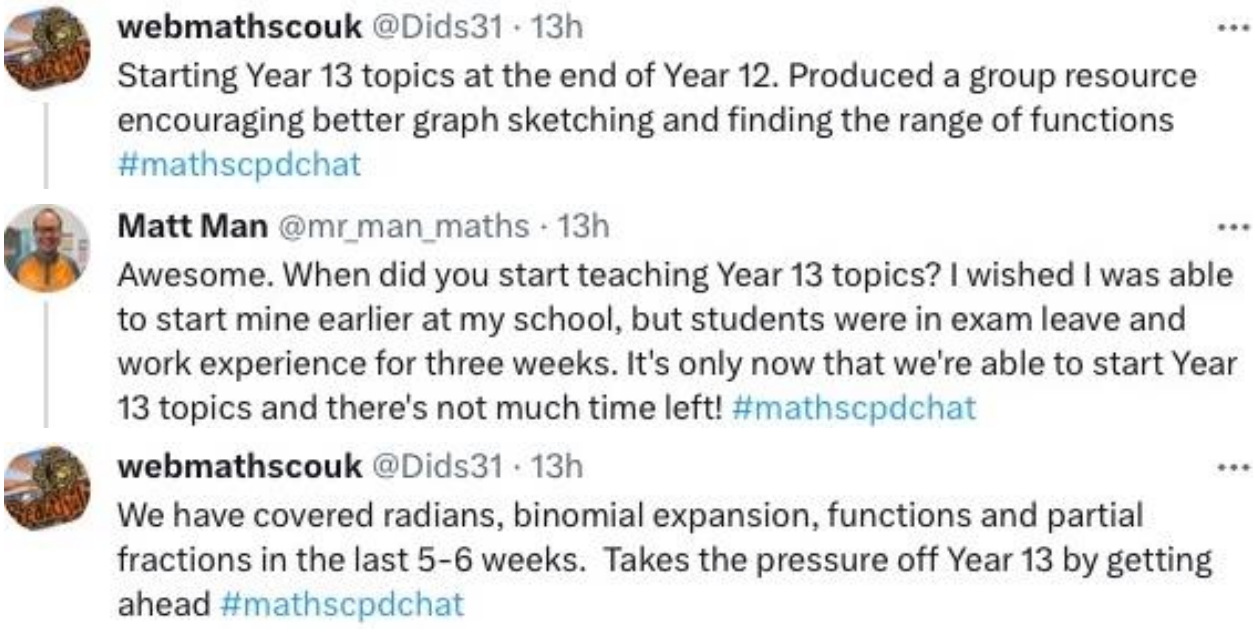


… was followed immediately by his first question …

… which generated most of the discussions of the whole #mathsCPDchat. There were more than one hundred tweets in response to this question and people's replies to it. Matt started the ball rolling with his own 'report':



This next interchange was a timely reminder that towards the end of the summer term some teachers start to focus the attention of Y12 students on some A-level topics that are normally regarded as 'Y13 topics':



The following dialogue was about a strategy that enables/encourages students to work together in such a way that the teacher can observe, engage with, and assess what they do easily and naturally:

webmathscouk @Dids31 · 13h

Also use of magic whiteboard around the walls. Group problem solving at the start of every lesson #mathscpdchat

Matt Man @mr_man_maths · 13h

Lovely! How big are your groups? #mathscpdchat

webmathscouk @Dids31 · 13h

22 in my group. Working in pairs, mixing up the pairs, encouraging discussion and teaching of each other. Benefit of being able to see everything that they are writing #mathscpdchat

Matt Man @mr_man_maths · 13h

Big groups then! Nice to mix up the pairs too. How do they log the work that they have done? Would photos then be taken? #mathscpdchat

webmathscouk @Dids31 · 13h

They can take photos if they want to, but the main point is the trying the question, discussing, finding the misconceptions and errors. I then follow up with more starters and exit tickets at a later date where needed. #mathscpdchat

Matt Man @mr_man_maths · 13h

Lovely, starters being like the "3 a day" or something different? How do you do your exit tickets? Would it be part of an exam question? #mathscpdchat

webmathscouk @Dids31 · 13h

Starters are built into our SOW. I also use mathsnetalevel.com regularly, selecting relevant exam questions as prior knowledge check, review, follow up on AFIs. Exit tickets are 2-3 questions that I mark and feedback #mathscpdchat

Matt Man @mr_man_maths · 13h

Haven't heard of this and having a quick look. Thanks for sharing #mathscpdchat

In the next short conversation the focus was on the teachers' own subject knowledge (about the maths they are teaching):

Adam Goodridge @AdamGoodridge18 · 17h

Felt much more confident as taught the lesson examples many times now, uninterrupted (lockdowns), and have a clearer understanding of what the 'new' spec exam papers look like etc and common misconceptions #mathscpdchat

Matt Man @mr_man_maths · 17h

Yes, it definitely felt more normal this year? It helps that the current Year 12s have done external GCSE papers which meant that we were able to detect misconceptions using ResultsPlus as an example. #mathscpdchat

Matt Man @mr_man_maths · 17h

Did you do any CPD courses which have helped with a clearer understanding of the "new" spec, even though that is six years old now! #mathscpdchat

Adam Goodridge @AdamGoodridge18 · 17h

I personally haven't, but my year 12 teaching partner has. The students have benefitted from my teaching partner delivering lessons following this CPD and I have loved seeing what she has learnt too #mathscpdchat

Matt Man @mr_man_maths · 17h

Ohhh, what kind? Personally, I have done TFM1 and am about to complete TFM2 from @Advanced_Maths which helps not only my subject knowledge of Further Maths but also showing confidence to the students. #mathscpdchat

The reply shown next to Matt's first main question generated a very long 'discussion' (58 tweets). Within that long discussion were several 'sub-discussions' (that developed when two or more people responded in slightly different ways to the same tweet, thereby initiating 'branching' threads). We have indicated that (in this 'linear' record) by re-showing and outlining those tweets that prompted more than one sub-discussion.

Sheena @Sheena2907 · 13h

I've thought a lot about sequencing and created a new year 12 sow to test out next year #mathscpdchat

Matt Man @mr_man_maths · 13h

Awesome! How are you going to change the sequencing of topics for next year? What are you keeping the same and how is it different? #mathscpdchat

Sheena @Sheena2907 · 13h

I've done it for 2 teachers one stats one mech. I put topics together like you said with the binomial, that's now on the stats side. It's more logical and supports further with topics for further done earlier. Radians is in there too as a year 12 topic #mathscpdchat

Matt Man @mr_man_maths · 13h

Awesome! Really helps with the Further Maths students as they are introduced very early on with complex numbers and Argand diagrams. Radians was part of C2 I think in the 2008 Spec. Wondering why that was shifted to year 13 in the "new" spec. #mathscpdchat

Sheena @Sheena2907 · 13h

It was a ridiculous decision and really unhelpful because it just feels like an add on and not embedded properly #mathscpdchat

Adam Goodridge @AdamGoodridge18 · 13h

We cover the first 4 Year 2 pure textbook chapters (Pearson) during Year 12 which means we can focus on those harder chapters immediately in Year 13 #mathscpdchat

Matt Man @mr_man_maths · 13h

Just to clarify for those that don't do Pearson. That is, proof by contradiction, partial fractions, functions (inverse, composite, etc.), modulus, sequences and series and binomial expansion (fractional and negative powers) #mathscpdchat

Matt Man @mr_man_maths · 13h

I assume that this year's Year 12 - when they started, you started quite late on the Pure Year 1 book? As the first four chapters or so is effectively "crossover" from GCSE to A Level? #mathscpdchat

Adam Goodridge @AdamGoodridge18 · 13h

Sort of. We tried one year racing through the first 4 chapters of yr 1 tb but realised students just didn't cope well. I've included slightly more time dedicated to chapters 1-4 during lesson time but emphasised the importance of completing work as homework #mathscpdchat

Adam Goodridge @AdamGoodridge18 · 13h

We complete chapters 1-4 during the first 3 weeks then move straight to differentiation whilst the other teacher starts mechanics. We also have a maths specific form group so spend 3x20 mins each week doing maths in this time #mathscpdchat

Adam Goodridge @AdamGoodridge18 · 13h

Now we don't do the external AS exams, I've been able to bring forward certain Year 2 content so that students cover it sooner to give them longer to learn this more challenging content. There were only a couple of minor issues that we needed to address throughout #mathscpdchat

Matt Man @mr_man_maths · 13h

Hear hear, though they are still useful for those that are at risk of not being able to complete the A Level with confidence. For me, I personally still like them - it's really useful for mock exam papers especially for end of year. How many of you used these? #mathscpdchat

Adam Goodridge @AdamGoodridge18 · 13h

We do internal exams at the end of the year 12 but I have to write these as we need a combination of Yr12&13 topics. In my experience students performance on these internal exams are a good indicator of final A level outcomes #mathscpdchat

Matt Man @mr_man_maths · 13h

Yep, in essence, for my school, that is for our winter mocks for Year 13 for both Maths and Further Maths. Though AS papers give a good indication too. #mathscpdchat

Sheena @Sheena2907 · 15h

I think using AS papers for mocks is really useful. I just wish the exam boards would release the markschemes sooner. I get why they don't but just a skeleton one would help #mathscpdchat

Adam Goodridge @AdamGoodridge18 · 13h

Sort of. We tried one year racing through the first 4 chapters of yr 1 tb but realised students just didn't cope well. I've included slightly more time dedicated to chapters 1-4 during lesson time but emphasised the importance of completing work as homework #mathscpdchat

Matt Man @mr_man_maths · 14h

Definitely, independent study is such a key thing in A Level in general. #mathscpdchat

Matt Man @mr_man_maths · 14h

This reminds me actually of something that @Yorkshire_Steve shared about how we assume too quickly that our Year 12s are in their A Level mindset where in reality we still need to treat them as those who have just finished Year 11. #mathscpdchat

Matt Man @mr_man_maths · 14h

Effectively this meant that too many students simply think that because they cruised over GCSEs, they can do this for A Level. I had experience of those who were high scorers, but then crashed during Year 12 and learnt a valuable lesson. #mathscpdchat

Sheena @Sheena2907 · 13h

Agreed! They come in year 12 with their new clothes looking all grown up but actually they are still year 11s and a bit. You have to teach them how to be year 12s and what we expect of them and that takes time #mathscpdchat

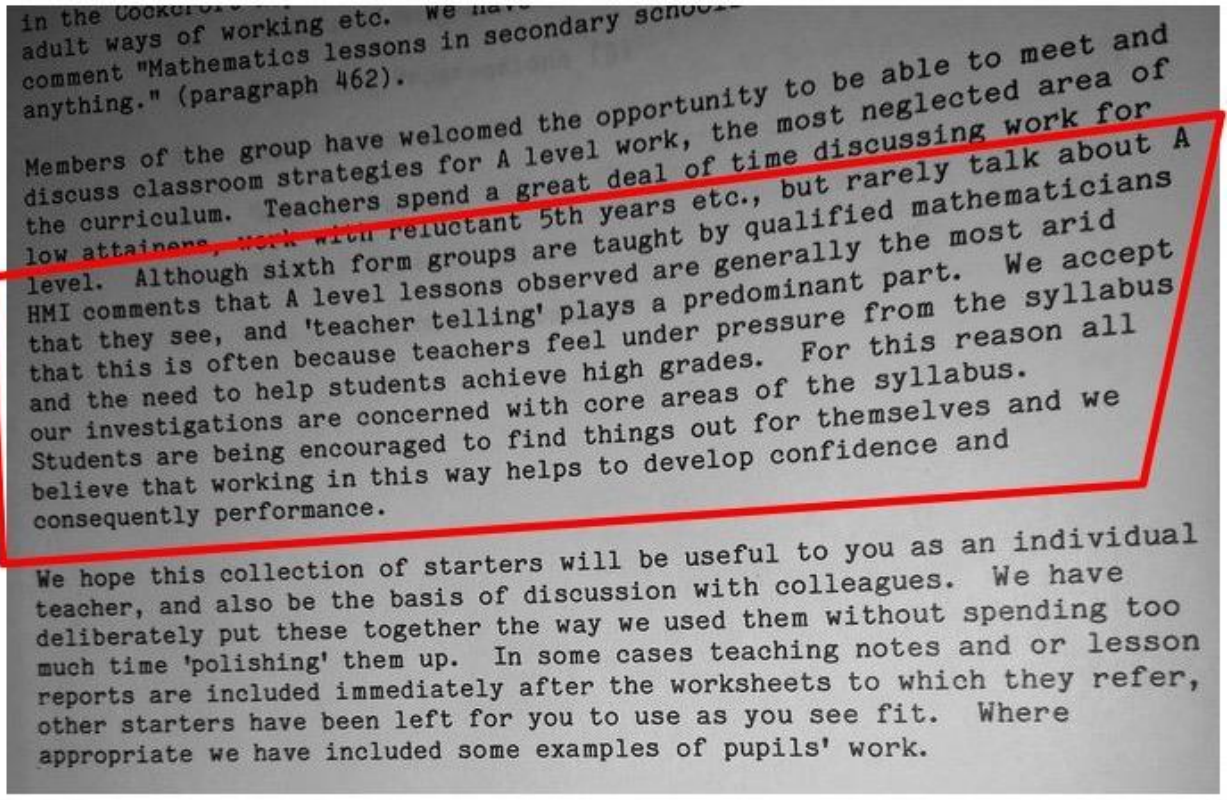
Adam Goodridge @AdamGoodridge18 · 20h

Replying to @Sheena2907 @mr_man_maths and @Yorkshire_Steve

Quite a long time in my experience and it takes a lot of our effort too! **#mathscpdchat**

Mary Pardoe @PardoeMary · 13h

This is from the intro to the ATM's 'These have worked for us at A level' (here: atm.org.uk/Shop/These-Hav..) ... written some years ago, but still may be relevant? #mathscpdchat



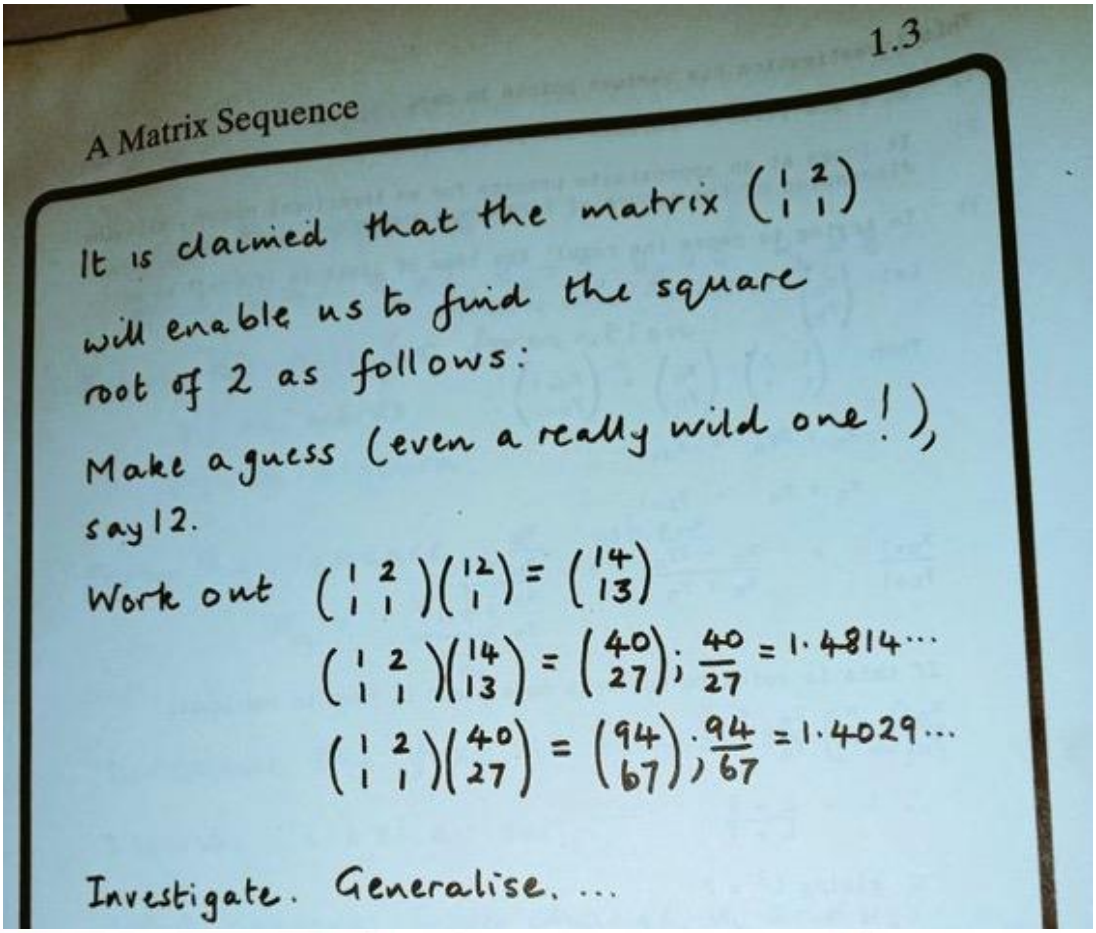
adult ways of working etc. We ha...
comment "Mathematics lessons in secondary schools...
anything." (paragraph 462).

Members of the group have welcomed the opportunity to be able to meet and discuss classroom strategies for A level work, the most neglected area of the curriculum. Teachers spend a great deal of time discussing work for low attainers, work with reluctant 5th years etc., but rarely talk about A level. Although sixth form groups are taught by qualified mathematicians HMI comments that A level lessons observed are generally the most arid that they see, and 'teacher telling' plays a predominant part. We accept that this is often because teachers feel under pressure from the syllabus and the need to help students achieve high grades. For this reason all our investigations are concerned with core areas of the syllabus. Students are being encouraged to find things out for themselves and we believe that working in this way helps to develop confidence and consequently performance.

We hope this collection of starters will be useful to you as an individual teacher, and also be the basis of discussion with colleagues. We have deliberately put these together the way we used them without spending too much time 'polishing' them up. In some cases teaching notes and or lesson reports are included immediately after the worksheets to which they refer, other starters have been left for you to use as you see fit. Where appropriate we have included some examples of pupils' work.

Mary Pardoe @PardoeMary · 13h

This is a task from it (here: atm.org.uk/Shop/These-Hav..) #mathscpdchat



1.3

A Matrix Sequence

It is claimed that the matrix $\begin{pmatrix}1&2\\1&1\end{pmatrix}$ will enable us to find the square root of 2 as follows:

Make a guess (even a really wild one!), say 12.

Work out $\begin{pmatrix}1&2\\1&1\end{pmatrix}\begin{pmatrix}12\\1\end{pmatrix} = \begin{pmatrix}14\\13\end{pmatrix}$

$\begin{pmatrix}1&2\\1&1\end{pmatrix}\begin{pmatrix}14\\13\end{pmatrix} = \begin{pmatrix}40\\27\end{pmatrix}; \frac{40}{27} = 1.4814\ldots$

$\begin{pmatrix}1&2\\1&1\end{pmatrix}\begin{pmatrix}40\\27\end{pmatrix} = \begin{pmatrix}94\\67\end{pmatrix}; \frac{94}{67} = 1.4029\ldots$

Investigate. Generalise. ...

These Have Worked for Us at A Level, e-book

Excellent starter ideas and activities for A Level - a classic e-book collection of activities by Barbara Binns, Kathleen Cross, Tansy Hardy,Gillian Hatch, Anne Haworth, Catherine Mottram and David Wilson

Non-Member Price: £6.00
Member Price: £4.50

Quantity 1 Add to cart

A collection of ideas and starters that have been used by teachers in their A Level courses and are designed to be useful to the teachers as individuals and also to be the basis of discussion with colleagues. Much of the material has also been used for initial teacher training and for in-service/CPD courses. The authors of the books deliberately put them together in a way they originally used them in their classrooms. In some cases teaching notes and/or lesson reports are included and they appear immediately after the worksheets to which they refer. Other starters have been left for

Matt Man @mr_man_maths · Jul 11
Lovely! #mathscpdchat

Mary Pardoe @PardoeMary · 13h
#mathscpdchat There is ALSO this: atm.org.uk/Shop/Post-16-...

These Have Also Worked for Us at A Level, e-book

These Have Also Worked for Us at A Level - PDF Excellent starter ideas and activities for A Level is a classic e-book collection of activities by Val Aspin, Barbara Binns, Kathleen Cross, Gillian Hatch, Anne Haworth, Catherine Mottram, Ann Shaw and David Wilson

Non-Member Price: £6.00
Member Price: £4.50

Matt Man @mr_man_maths · 13h
Wow, lots of wonderful resources from @ATMMathematics #mathscpdchat

Adam Goodridge @AdamGoodridge18 · 13h
Sort of. We tried one year racing through the first 4 chapters of yr 1 tb but realised students just didn't cope well. I've included slightly more time dedicated to chapters 1-4 during lesson time but emphasised the importance of completing work as homework #mathscpdchat

Sheena @Sheena2907 · 14h
I would rather spend more time on the algebra, surds and indices as so many other topics rely on them. If the students are secure it impacts on everything else for the 2 years. Algebra skills seem to be getting worse imo #mathscpdchat

Matt Man @mr_man_maths · 14h
Agreed - they get the difficult concepts but masking over the cracks of their not so fluent basic algebra skills. #mathscpdchat

Matt Man @mr_man_maths · 14h
This reminds me of what @AlfColes' book on "I can't do Maths" which describes about whether to keep banging on say adding numerical fractions but instead doing something like adding algebraic fractions which might be easier? #mathscpdchat

Sheena @Sheena2907 · 14h
Using the skill in a different way can be helpful in embedding it without it feeling the same. Not A level but ordering fractions but doing that to find the median and range can cover more skills without it feeling the same #mathscpdchat

Adam Goodridge @AdamGoodridge18 · 14h
Agreed! I generally pick these skills up during form time in the first few weeks

Matt Man @mr_man_maths · 14h
Awesome to see form time being used so effectively this way. #mathscpdchat

Sheena @Sheena2907 · 14h
How does that work? Do you just have maths students in your form? #mathscpdchat

Adam Goodridge @AdamGoodridge18 · 14h
Yes. We generally have between 10-15 students doing maths in each year. All other forms are mixed #mathscpdchat

Sheena @Sheena2907 · 14h
That is brilliant. How do the other subjects feel about that? #mathscpdchat

Adam Goodridge @AdamGoodridge18 · 14h
Not sure... 🤷

Sheena @Sheena2907 · 14h
🤣🤣 Love it

Adam Goodridge @AdamGoodridge18 · 14h
Should have mentioned, we also have a year 13 maths only form too... #mathscpdchat

Sheena @Sheena2907 · 14h

No idea how you've managed to wangle that (is that even a word? I'm going with it...) that is so useful, it's like additional lesson time I bet you do so much with it!

Adam Goodridge @AdamGoodridge18 · 14h

Yeah, I have produced form time booklets that's students work through in their own pace and mix it up with DIRT and exam questions. One limitation is that not all students need to attend each morning though (depending on their TT) #mathscpdchat

Matt Man @mr_man_maths · 14h

Nice, would you be kind to share say one topic so that others see how this is done? #mathscpdchat

Adam Goodridge @AdamGoodridge18 · 14h

Not sure if this is what you mean but at the start of the year, I produce a booklet using @DrFrostMaths for the first 4 chapters of Yr12 content with some Add Maths content in too. QR codes linked to the content are included that students can use during form time #mathscpdchat

Matt Man @mr_man_maths · 14h

Oh yes, the booklets from @DrFrostMaths. I forgot about those so a useful reminder. Thank you. #mathscpdchat

Matt Man @mr_man_maths · 14h

Guessing Maths is the biggest A Level subject at your school @AdamGoodridge18? #mathscpdchat

Adam Goodridge @AdamGoodridge18 · 14h

No. It was the most popular (about 26) the first year when I asked for a maths form but since then we get mid teens numbers continuing the course after the first few weeks #mathscpdchat

Matt Man @mr_man_maths · 14h

Nice size, and good for you to be able to continue to push for the Maths form and seeing the fruits of success. #mathscpdchat

Sheena @Sheena2907 · 14h

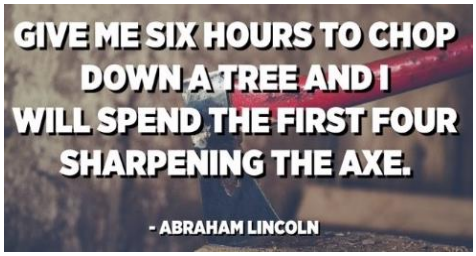
No idea how you've managed to wangle that (is that even a word? I'm going with it...) that is so useful, it's like additional lesson time I bet you do so much with it!

Adam Goodridge @AdamGoodridge18 · 14h

The first few weeks is mostly organisation. Ensuring they have folders, doing homework etc but it means lesson time is freed up to learn new maths #mathscpdchat

Matt Man @mr_man_maths · 14h
And building up routines. That is so crucial. That has been an improving thing for me with all my A Level groups this year and planning to embed this for 2023/24. #mathscpdchat

Adam Goodridge @AdamGoodridge18 · 14h
Takes a lot of time and dedication but supports long term. But we all know the importance of preparation. This is one of my favourite quotes (I always link this to planning lessons!) #mathscpdchat



Matt Man @mr_man_maths · 14h
Wonderful quote Adam, thank you! #mathscpdchat

Sheena @Sheena2907 · 14h
This is so true. All of a sudden we expect students to be able to discipline themselves to do a significant amount of work outside of lessons and be mature enough to stick to it. It ramps up fast and students need guidance (and nagging!) #mathscpdchat

Adam Goodridge @AdamGoodridge18 · 14h
It really helps to timetable Yr 12 students into yr 13 lessons from the first week to provide them with that time needed to complete the independent work. Sets a nice tone in terms of work outside of lessons needed to be completed #mathscpdchat

Sheena @Sheena2907 · 14h
That's really interesting! I've timetabled 13s into 12s for extra work but doing it this way round gives the 12s established role models and mentors too as well as setting the tone. Love it! #mathscpdchat

Adam Goodridge @AdamGoodridge18 · 14h
I might save the fact I have commandeered a mini classroom which is now an 'A-level maths study room' with a PC, desks, whiteboard, maths library etc for the next #mathscpdchat 😜

Matt Man @mr_man_maths · Jul 11

Awesome @AdamGoodridge18! And thank you so much for sharing your wisdom. It's been valuable for me and to all A Level Maths teachers that are viewing and joining in this discussion. #mathscpdchat

Adam Goodridge @AdamGoodridge18 · Jul 11

Been a pleasure discussing this with so many others this evening. Thanks for hosting!

The conversation (thread of tweets) shown next includes references to some teaching resources:

Rob Southern @mrsouthernmaths · 17h

I've had a lovely time teaching A level Maths this year. Nice to have an uninterrupted year. Great students, lots of nice activities. #mathscpdchat

Matt Man @mr_man_maths · 17h

Awesome! Me too - and have taught Further Maths properly for the first time, despite time limitations. I have though managed to negotiate a bit more time next year as they go to Year 13. #mathscpdchat

Matt Man @mr_man_maths · 17h

What kinds of nice activities did you do which were successful this year? #mathscpdchat

Rob Southern @mrsouthernmaths · 17h

Mostly stuff from Underground Maths and Susan Wall, plus some of my own stuff. I've picked up some great ideas from conferences as well, especially Catriona Agg's session on hypothesis testing. I've also got much better on Desmos! #mathscpdchat

Tayyub Majeed @tm_maths · 16h

Also my stuff on second order DEs!

Matt Man @mr_man_maths · 16h

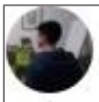
Yes, @tm_maths! Thank you. #mathscpdchat

Matt Man @mr_man_maths · 17h

And yes, huge credit to @UndergroundMath and @Cshearer41! #mathscpdchat

Matt Man @mr_man_maths · 17h

Awesome to see the increasing use of technology in A Level Maths lessons. That is something for me to consider too as I know I haven't been using this enough. Time to prep though has always been the barrier. #mathscpdchat



Rob Southern @mrsouthernmaths · 17h

Mostly stuff from Underground Maths and Susan Wall, plus some of my own stuff. I've picked up some great ideas from conferences as well, especially Catriona Agg's session on hypothesis testing. I've also got much better on Desmos! #mathscpdchat

Mary Pardoe @PardoeMary · 17h

I expect you have continued in your A level teaching to use teaching strategies that were effective in your KS4 teaching ... why 'drop' effective strategies for supporting learning-and-doing maths just because they're Y12/13 students? #mathscpdchat Tasks you mention give opps!

Matt Man @mr_man_maths · 16h

Absolutely! I admit that I can be guilty of doing exactly what you mentioned @PardoeMary #mathscpdchat

Mary Pardoe @PardoeMary · 17h

I suspect you may have had in mind this from @colinfoster77 in one of these sources of lovely tasks by him? atm.org.uk/Shop/Ideas-for... atm.org.uk/Shop/Ideas-for... #mathscpdchat

Introduction

When they reach the sixth form, many students find that their mathematics lessons take on a different style from what they are used to. Their class may be smaller and may work in less formal ways, giving students greater opportunity to be independent. However, sometimes students also comment that they no longer do the 'fun stuff' that they did in lower school. Now that they are treated as grown-ups, it is assumed that they merely want to make notes, do exercises and practise examination papers – that is apparently how adults are supposed to learn. Teachers may argue that this is likely to be the format at university, so it is their responsibility to prepare students for it now.

Matt Man @mr_man_maths · 17h

An awesome resource by @colinfoster77! #mathscpdchat

Mary Pardoe @PardoeMary · 17h

#mathscpdchat

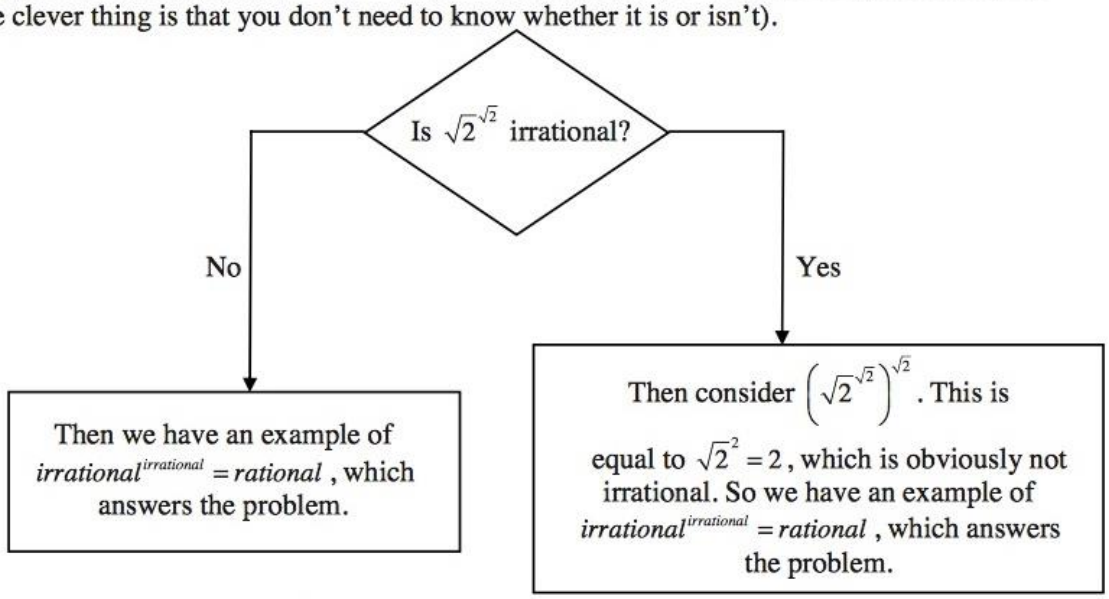
This is from his Pure Maths and Statistics book: atm.org.uk/Shop/Ideas-for

$\sqrt{2}^{\sqrt{2}}$

- Do you think that it is possible to raise an irrational number to an irrational power and get a rational answer?

It *is* possible.

Suppose for example that $a = \sqrt{2}^{\sqrt{2}}$ and $b = \sqrt{2}$. Perhaps $\sqrt{2}^{\sqrt{2}}$ is irrational (in fact it is, but the clever thing is that you don't need to know whether it is or isn't).



So either way the statement is proved.

This clever line of reasoning is an example of a 'non-constructive proof'. Often proving that numbers are irrational is very difficult. No-one knows whether π^{π}, e^{e} or $\frac{e}{\pi}$, for instance, are irrational.

Matt Man @mr_man_maths · 17h
Wonderful! #mathscpdchat

The next shorter conversation, which was also in response to the host's first question …

Matt Man @mr_man_maths · 13h
Q1: How has this year's teaching of A Level Maths / Further Maths been going for you this academic year? #mathscpdchat

… focussed on the observation that studying GCSE Additional Maths prepares students well for embarking on an A level Maths course:

Adam Goodridge @AdamGoodridge18 · 18h
We also have our first GCSE Stats/Add Maths cohort currently in Year 12. We've been more adventurous with the SOW as a result and seen a positive impact on the most able students test scores #mathscpdchat

Matt Man @mr_man_maths · 18h
Amazing! In what ways has GCSE Statistics / Additional Maths helped the students with their A Levels this year? #mathscpdchat

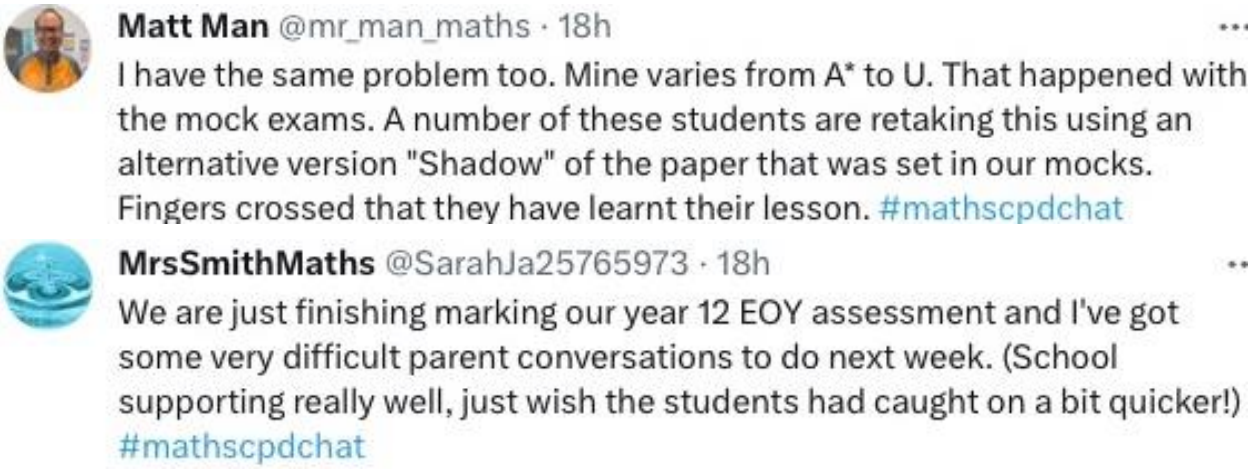
Adam Goodridge @AdamGoodridge18 · 18h
Students knew how to differentiate, integrate etc following the Add Maths course. This meant we were able to start certain chapters a few exercises in. We used this freed up time to challenge them with more challenging exam questions #mathscpdchat

Matt Man @mr_man_maths · 18h
Time saving! Love it! My colleague @Just_Maths did this for a few of our current Year 11s and it has definitely helped them with their problem solving skills and continuing to be challenged in Maths. #mathscpdchat

JustMaths @Just_Maths · 18h
TBH another colleague took most of the load towards the end as my Pearson work kept clashing & also the main group of students didn't need a lot of teaching. They were superb.

The following interchange was about coping with A level classes in which the prior attainment of the students is 'mixed':

MrsSmithMaths @SarahJa25765973 · 18h
I've been teaching it for the first time, really enjoying it but it is a more "mixed ability" class than I am used to teaching. I have found it tricky to really push the stronger ones whilst persuading some of our lazier students to do anything at all! #mathscpdchat



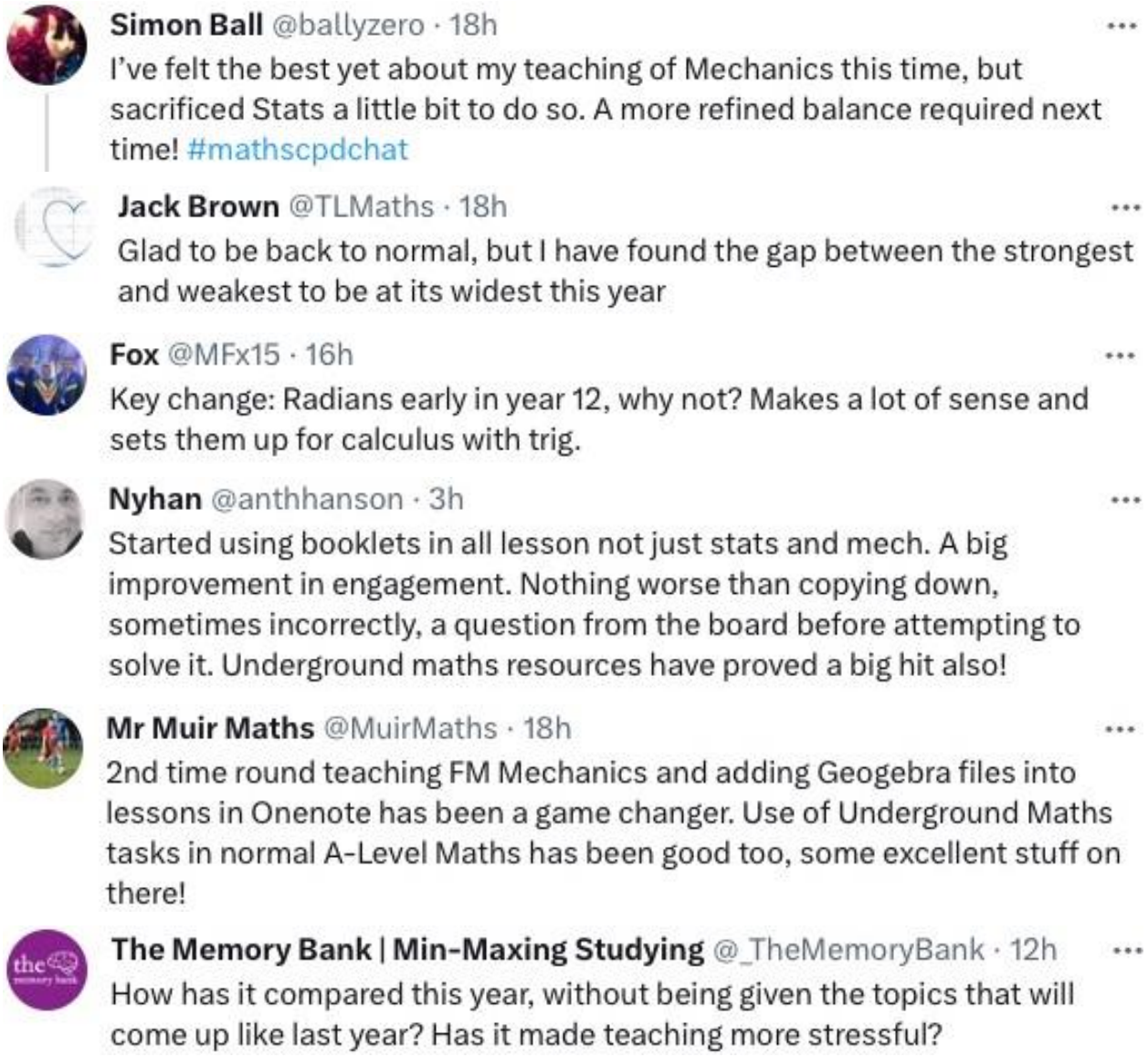
Matt Man @mr_man_maths · 18h

I have the same problem too. Mine varies from A* to U. That happened with the mock exams. A number of these students are retaking this using an alternative version "Shadow" of the paper that was set in our mocks. Fingers crossed that they have learnt their lesson. #mathscpdchat

MrsSmithMaths @SarahJa25765973 · 18h

We are just finishing marking our year 12 EOY assessment and I've got some very difficult parent conversations to do next week. (School supporting really well, just wish the students had caught on a bit quicker!) #mathscpdchat

The following (remaining) comments in response to the host's first question did not generate discussions (threads):



Simon Ball @ballyzero · 18h

I've felt the best yet about my teaching of Mechanics this time, but sacrificed Stats a little bit to do so. A more refined balance required next time! #mathscpdchat

Jack Brown @TLMaths · 18h

Glad to be back to normal, but I have found the gap between the strongest and weakest to be at its widest this year

Fox @MFx15 · 16h

Key change: Radians early in year 12, why not? Makes a lot of sense and sets them up for calculus with trig.

Nyhan @anthhanson · 3h

Started using booklets in all lesson not just stats and mech. A big improvement in engagement. Nothing worse than copying down, sometimes incorrectly, a question from the board before attempting to solve it. Underground maths resources have proved a big hit also!

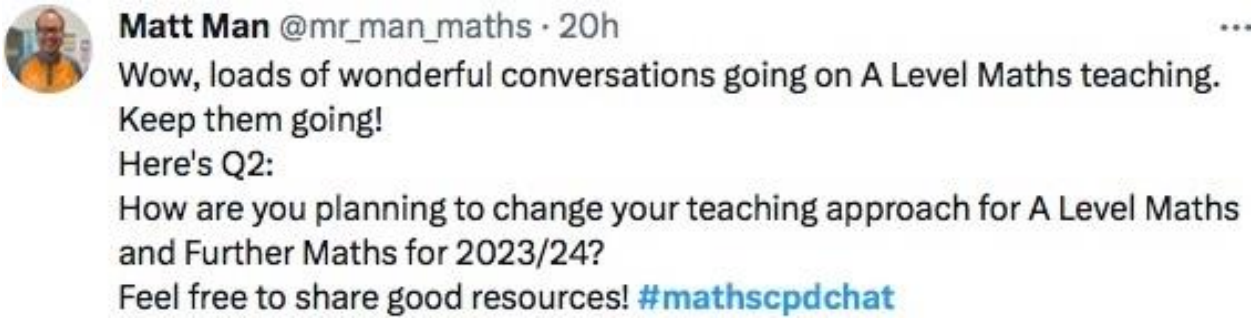
Mr Muir Maths @MuirMaths · 18h

2nd time round teaching FM Mechanics and adding Geogebra files into lessons in Onenote has been a game changer. Use of Underground Maths tasks in normal A-Level Maths has been good too, some excellent stuff on there!

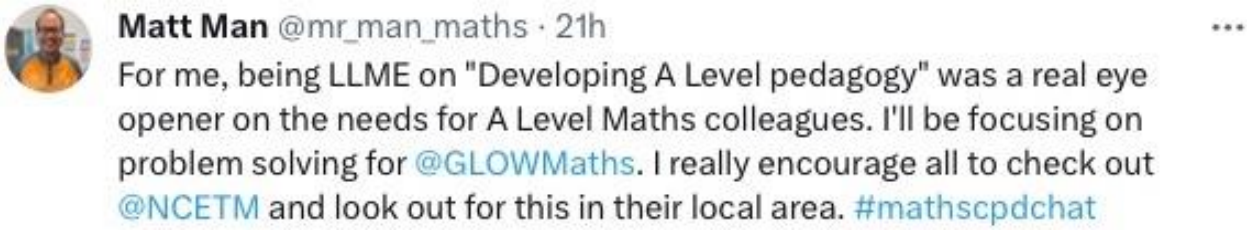
The Memory Bank | Min-Maxing Studying @_TheMemoryBank · 12h

How has it compared this year, without being given the topics that will come up like last year? Has it made teaching more stressful?

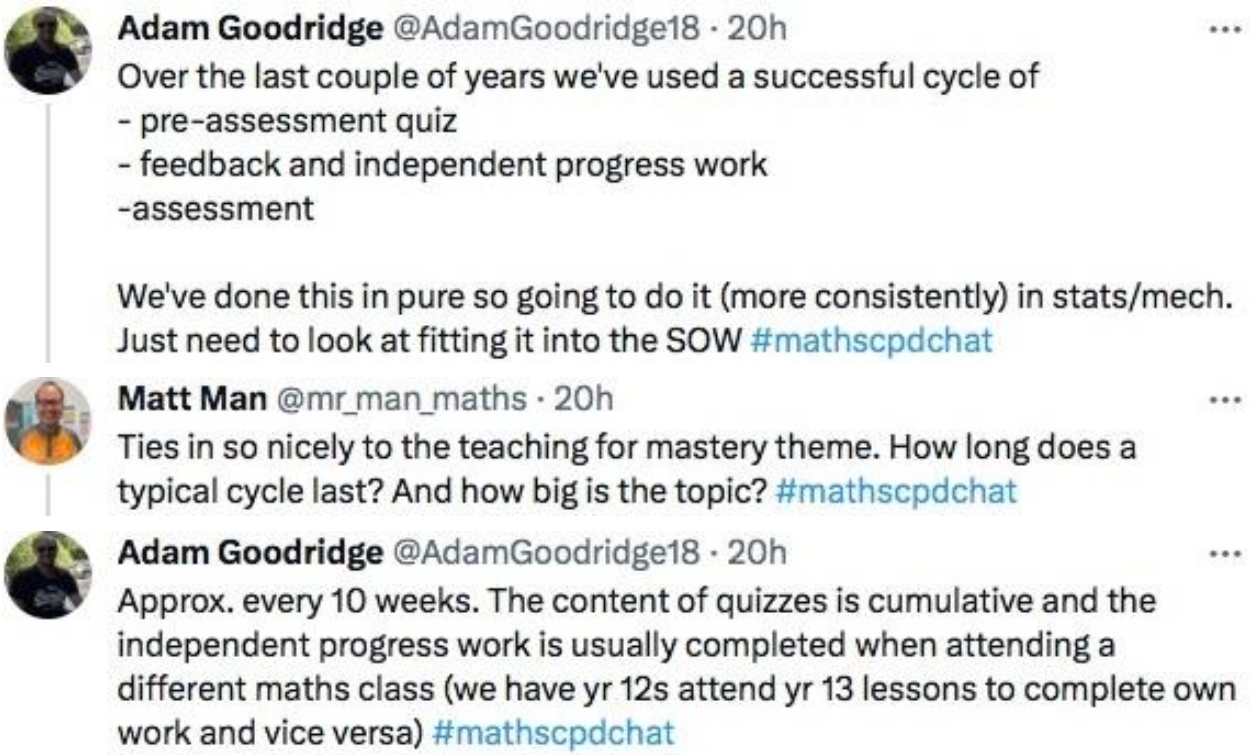
The host followed his second question …



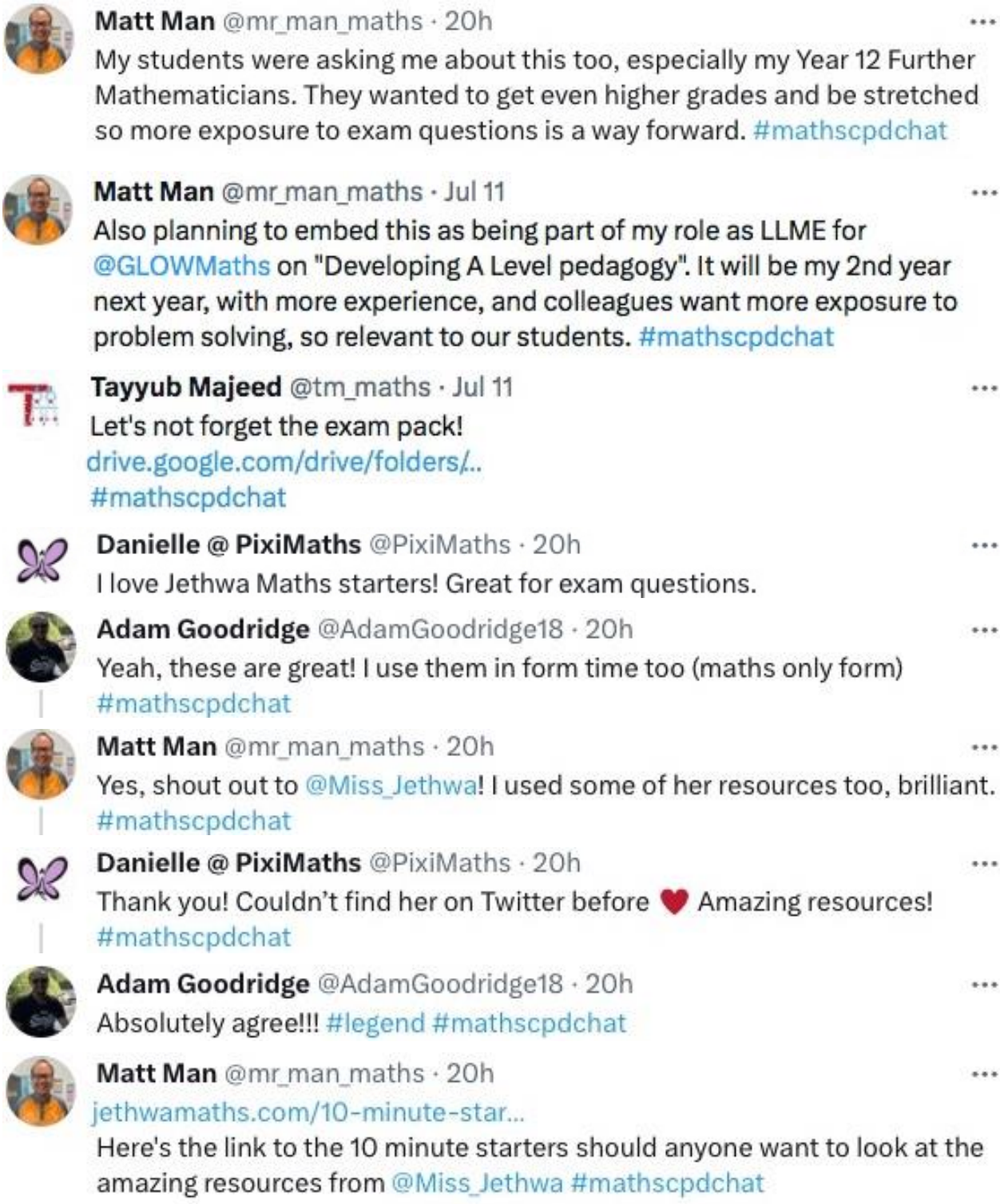
… with his own reply to it:



The second question, about change in practice, generated several conversations and some single responses. This short thread was about a cycle in students' engagement …



… and a longer conversation was initiated by the same contributor:



Matt Man @mr_man_maths · 20h
My students were asking me about this too, especially my Year 12 Further Mathematicians. They wanted to get even higher grades and be stretched so more exposure to exam questions is a way forward. #mathscpdchat

Matt Man @mr_man_maths · Jul 11
Also planning to embed this as being part of my role as LLME for @GLOWMaths on "Developing A Level pedagogy". It will be my 2nd year next year, with more experience, and colleagues want more exposure to problem solving, so relevant to our students. #mathscpdchat

Tayyub Majeed @tm_maths · Jul 11
Let's not forget the exam pack!
drive.google.com/drive/folders/..
#mathscpdchat

Danielle @ PixiMaths @PixiMaths · 20h
I love Jethwa Maths starters! Great for exam questions.

Adam Goodridge @AdamGoodridge18 · 20h
Yeah, these are great! I use them in form time too (maths only form)
#mathscpdchat

Matt Man @mr_man_maths · 20h
Yes, shout out to @Miss_Jethwa! I used some of her resources too, brilliant.
#mathscpdchat

Danielle @ PixiMaths @PixiMaths · 20h
Thank you! Couldn't find her on Twitter before ❤ Amazing resources!
#mathscpdchat

Adam Goodridge @AdamGoodridge18 · 20h
Absolutely agree!!! #legend #mathscpdchat

Matt Man @mr_man_maths · 20h
jethwamaths.com/10-minute-star...
Here's the link to the 10 minute starters should anyone want to look at the amazing resources from @Miss_Jethwa #mathscpdchat

Question 2 also prompted short replies in which links to resources were shared, as shown next:

Mark Willis @markywillis63 · Jul 12

sites.google.com
Mathematics video site
Please click on the photo for the level you wish to study or use the navigation on the top left ...

Matt Man @mr_man_maths · 12h
Awesome Mark, thank you! #mathscpdchat

Mark Willis @markywillis63 · 12h
Thank you for your kind feedback I hope you find this useful.

Danielle @ PixiMaths @PixiMaths · 21h
I'm mostly teaching foundation GCSE which is heavily resourced already. I'm looking forward to getting creative for year 12! Big shout out to @UndergroundMath resources ❤️

Tayyub Majeed @tm_maths · 20h
I'm adding more and more FM resources into my Google Drive:
tinyurl.com/TMmaths
#mathscpdchat

Nyhan @anthhanson · 6h
In the booklets I'm using putting QR codes that link to videos relating to the topic. Found this beauty for appliction of matrices

youtube.com
The Applications of Matrices | What I wish my teac...
Sign up with Dashlane and get 10% off your subscription: ...

(To watch this video go to the tweet from Nyhan that is shown above.)

This thread addressed 'challenge rather than acceleration':

Rick HT @RickysMaths · 13h
I'll also be ensuring every sheet/task comes with a when/if you finish extension. The same (very capable) student admitted she would purposely go slow, and distract her partner when the instruction was 'do these questions, let me know if you finish'

Rick HT @RickysMaths · 13h

At the end of every academic year we send out a survey to get student input. One student asked for more optional challenge questions. She expressed that past papers and textbook questions were boring, and the only time she enjoys maths is when it's challenging.

Rick HT @RickysMaths · Jul 12

In response to that all of my homework sheets will consist of ukmt/Olympiad/step questions that are optional for students. I'll collect it in and mark with the homework. I've done it occasionally over the past few years, I wasn't sure if anyone was appreciating it until now.

Matt Man @mr_man_maths · 16h

Replying to @RickysMaths and @AdamGoodridge18

It now reminds me of what @mathsjem shared in her last workshop at #MathsConf32 to talk about depth rather than acceleration. Definitely applies for A Level too. #mathscpdchat

Towards the end of the hour of the chat Matt tweeted some links to resources that can be found via tweets from previous days. In each case the link to the original tweet is provided:

Matt Man @mr_man_maths · Jul 11

Thanks to @Dids31 for this amazing resource on "3 a day" for the new Year 12 students #mathscpdchat

webmathscouk @Dids31 · Jul 9

Starting to write a "3 a day" for Year 12 Maths. September done. Planning on using as homework, encourage lots of independent practice, exit tickets etc.
Link herewebmathscouk.wordpress.com/ks5-maths/
Answers will follow

Year 12 September 3 a Day

Day 1	Evaluate (non calc) $5^{-2} + 36^{-\frac{1}{2}}$	Factorise $9x^2 - 64$ $3x^2 + 14x - 12$	Find the length of the line passing through (1,5) and (7,7)
Day 2	Simplify (non calc) $\frac{10}{\sqrt{2}} + 7\sqrt{2}$	Expand and simplify $(x+4)(2x-3)^2$	Find the equation of the line parallel to $6x + 2y = 3$ and passing through (1,4)
Day 3	Write as x^n $\frac{1}{x^3}$ $x\sqrt[3]{x}$	Verify that (2,7) lies on a) $y = 3x + 1$ b) $y = 5x^2 - 4x - 5$	Write in the form $y = a(x+b)^2 + c$ a) $y = x^2 + 8x - 4$ b) $y = x^2 - 10x + 3$
Day 4	Evaluate (non calc) $64^{\frac{2}{3}} \times 8^{-\frac{2}{3}}$ $\left(5\frac{4}{9}\right)^{-\frac{1}{2}}$	Factorise $100y^2 - 9x^4$ $x^2 - 25x^6$ $x^2 - 7x - 30$ $12x^2 - 29x + 15$	Find the equation of the line perpendicular to $y = 10 - 2x$ and passing through (3,8)
Day 5	Find the equation of a circle with centre (0,0)	Simplify (non calc) $\sqrt{18} + 6\sqrt{2} - \frac{8}{\sqrt{2}}$	Solve a) $\frac{7}{2x-1} = \frac{3}{4}$

The tweet by webmathscouk quoted above is here.

Matt Man @mr_man_maths · Jul 11

A shoutout to @PixiMaths for her wonderful baseline assessment and intervention booklet. If you have used her resources for lower years / GCSEs, you'll know that this is also a fabulous addition to the wonderful work she has done! #mathscpdchat

> **Danielle @ PixiMaths** @PixiMaths · Jul 10
>
> New: A Level Maths baseline assessment and intervention booklet piximaths.co.uk/ks5-resource-i...
>
> We mostly follow the Pearson textbook for Edexcel for our maths A Level course. Rather than teaching the first chapter and a half, which many students hopefully won't need, I have designed a baseline assessment and intervention booklet. The topics included are indices, surds, expanding and factorising, solving equations and inequalities, minimum points and functions.
>
> The baseline assessment feeds into a question level analysis which informs students which sections of the intervention booklet they need to complete.
>
> Lesson 1 - baseline assessment - 1 hour, 60 marks. Calculators may be used for some questions. The teacher marks them and makes notes on misconceptions to share with the group. Then fill in the question level analysis (sheet 1 of the spreadsheet). Individual QLAs will automatically populate - print the whole workbook so each student has their personal QLA for their folder.
>
> Lesson 2 – The teacher should go through the baseline thoroughly. Students should make corrections and notes accordingly to support them with the intervention exercises.
>
> Lessons 3 and 4 (possibly 5, and definitely homework!) - students should complete the corresponding AND SUBSEQUENT sections of each of the 12 topics in the intervention booklet. For example, if their QLA shows amber for simplifying indices, they would complete the amber AND green sections of that topic in the booklet. If they finish but need further practice, exercises in the textbook are at the bottom of each topic, and then they can complete the mixed exercise too.
>
> This should make sure that no time is wasted and that students' individual gaps are filled.
>
> I have included answers for both the baseline assessment and the intervention booklet. I hope you find these new resources useful!
>
> Baseline Assessment and Intervention Booklet

The tweet by Danielle @ PixiMaths quoted above is here

Danielle @ PixiMaths @PixiMaths · Jul 11

Thank you 🥰

Matt Man @mr_man_maths · Jul 11

Another link to share for A Level colleagues is this from @simonclay_mei which will help with planning. Do check it out. #mathscpdchat

The tweet by Simon Clay quoted above is here

This was Matt's closing message:

Matt Man @mr_man_maths · Jul 11

It's 9pm and what an hour! Thank you so much to everyone who have contributed to the discussion on teaching strategies for A Level Maths this year and what they are planning to do in 2023/24. Please do keep the tweets coming in!
Have a wonderful summer everyone! #mathscpdchat

Sheena @Sheena2907 · Jul 11

Massive thanks to @mr_man_maths this was a really enjoyable discussion with loads of ideas and excellent points being made 😊

Matt Man @mr_man_maths · Jul 11

Replying to @Sheena2907

Awww...thanks Sheena! Honoured to be able to have this opportunity to discuss such a topical and relevant topic. #mathscpdchat

Danielle @ PixiMaths @PixiMaths · Jul 11

Agreed! I have lots to look at tomorrow 😁 Thank you everyone!

Matt Man @mr_man_maths · Jul 11

Replying to @PixiMaths and @Sheena2907

Thanks for joining in @PixiMaths! Really appreciate your contributions.
#mathscpdchat