

Teaching the new Core Maths at Malmesbury

School in focus: Malmesbury School

Official Job title: **Teacher Curriculum Leader Core Maths: Ruth Gibson**

AQA Certificate in Level 3 Mathematical Studies (Core Maths)

Case Study

“Core Maths is a compulsory subject at our school. Students have to study it post-GCSE, unless they’re studying A-level Maths. This means we have a really large cohort.

The SLT decided we should teach Core Maths. I think this was a strategic decision as they know it will help us perform well in the 2017 league tables. They handed the implementation over to me, which was a great opportunity. Having such strong support from them has made it much easier to implement the course.

Timetables and classes

We have 50-60 students enrolled on Core Maths. We've split them in to five teaching groups of various sizes and arranged the timetable so it's in every option block. This means there's a Core Maths class for every teaching group.

We have one class with 3 students and another with 22. All our classes are taught by 3 specialist maths teachers. I teach two groups, my Head of Maths teaches another (this is great as it raises the profile of the subject amongst students and parents) and the third teacher used to be Head of Maths at another school.”

aqa.org.uk/core-maths



Why we chose to work with AQA

Last August I was starting to panic as I still hadn't decided which exam board to teach with and the new school year was approaching fast.

When I saw AQA's digital Route Map, this changed my mind. Visit allaboutmaths.aqa.org.uk/coremaths to view the Route Map. You can see all the topics and skills you need to teach, you can move them around easily and it's really interactive and flexible to teach. If I want to spend 3 weeks on percentages in November, I can simply drag that box to that slot. Each topic also links to multiple resources so I've got lots of new teaching tips and ideas too.

The Route Map really was the big decider for me. Everything I needed was right in front of me. That's why I chose AQA. AQA have lots more resources available. I'd never set up a course before, I didn't really know what I was doing, **the Routemap gave me the confidence and knowledge I needed.**

If you need any support getting to grips with Level 3 Mathematical studies give us a call on **0161 957 3852**, email **maths@aqa.org.uk** or tweet us at **@AQAMaths**



Graham Hall,
Qualifications Developer for
Level 3 Mathematical Studies

Teaching Core Maths

The challenges we faced

The three main things for me have been:

1. Assessing pupil progress.

I've been very lucky and my SLT haven't really demanded that I hold regular assessments – with 'normal' maths courses they would.

They've been quite flexible and understanding that it's a new course but I do need to address how to assess more throughout next year. Do I do mini topics? An end of unit test? Should I test weekly or monthly? I think that will give that course more backing for the students when they realise its credibility.

We've done mini topics which were successful.

2. Recommended teaching time.

The Core Maths Support Programme (CMSP) recommended I do about 2 hours a week. We couldn't fit that in with 5 classes, so I do an hour and a half and that's been ok.

I was initially quite concerned that we would not have enough time but we managed to fit quite a lot in – including plenty of time for problem solving.

The SLT have said that if I need more time to fit in extra project work in Year 13 they'll include it in the timetable.

If you're concerned about how you're going to fit things in, don't be. I've covered the full course in an hour and a half a week without struggling for time. I plan to need the same time for Year 13.

3. Student engagement.

We decided to offer the course towards the end of the school year when our Year 11s had already left for the summer. This meant they didn't know they'd have to study Core Maths until they received a letter from us.

Next year's cohort are fully prepped, they've had it in their options booklet and are very positive about what's coming.

What's worked well?

Student retention. We've kept our entire cohort going through to Year 13.

Change in student attitude. I got some student feedback recently and this is a quote from one of them: "So glad that I now feel much more confident about things I was previously unfamiliar with – I'm ready to go out into the world."

They're clearly starting to see the usefulness of studying Core Maths – especially the financial skills. They're seeing how it will help if they choose to study psychology, sciences, geography and more at University.

The mathematical content for these subjects has increased and they want support with teaching it.

They says things like "Oh yeah, we did that in geography recently, is that going to link in with this?" or "We did something very similar in biology."

I've tried to get other subject areas to work with me to achieve this. I asked biology and geography teachers if I could support them in anyway so that we're both coming from the same angle.

We've got a good structure in place now. I'm in charge of organising Core Maths for the five groups that we have and I prepare the termly smart boards for what we'll teach.

It's nice all three of us teach the same thing as we can feed back to each other, and share what works and what doesn't. As I said, since the rocky start, student support has been very positive and the parents have been very impressed that we're thinking about their children's future.

My top tips for getting started with Core Maths

Class size

I teach a range of class sizes and I've got one group of seven students who are grade C/low B ability. This class size works really nicely because I can spend more time with each of them.

Another group has 17 students – these are B and A ability. This group works well too, as they can all interact together. The class of 22 is ok, but not ideal for offering the same level of support. 15 is probably a good size to aim for.

Location

We teach in the computer room and this has its positives and negatives. We can use the Internet

and students can use spreadsheets which will be useful to them in future.

Measuring progress

Make sure you plan progress assessment opportunities because there's a lot to do and this is something that I probably didn't do enough. I will focus on this with my next cohort.

Real life application

In terms of which teaching route to go down, applying teaching to real life situations really helps get them engaged and makes this course different to their GCSEs.

They want something a bit different and that's what's really nice about teaching Core Maths.

Resources

- It's good to get into a habit of sharing resources. I've got a drop box link with people in my cluster.

We're all sharing things together and always inviting new people to the group.

- There's also the [NCETM](#) community. In the beginning we were all early adopters sharing our resources and it was a little bit clunky, but now the CMSP do quality assurance and check resources before putting them up. All of the early adopters are producing resources.

The Core Maths Support Programme now has its own website, with lots of resources:
www.core-maths.org

The Core Maths (ETP) community group and the Core Maths website are well established now and definitely worth looking at.

They have their own resources section and I like that they are checking items before they can be added.

They also feature really useful case studies. Especially if you're teaching Core Maths for first time. They've got case study notes and a little bit about the school, they talk about how they recruited students and how they plan to recruit next year.

They talk about how they taught the course, resources and their recommendations – a bit like what I'm doing here.

- AQA have resources you can use on All About Maths (allaboutmaths.aqa.org.uk/coremaths) which I feel are very good.
- There is lots of stuff out there but I think sharing makes you part of it. If you're on your own it can feel like a big task so it's nice to be able to share with people.

I find it takes me a lot longer to plan a Core Maths lesson because it is pushing me to think differently and get round the problem solving aspect. That's actually going to be really useful for teaching lower school because of all the GCSE changes.

Give yourself time to plan and get to know roughly how long it takes to do this stuff.

- **Which resources have I used most?**

A big one is Dan Mayer's three-act maths blog, which you can find from <http://blog.mrmeyer.com/>. The first Act is a video and image or question and you get your students to think how it relates to maths. It forces them to ask questions: "What do I need to know about this?" "What's important, what information do I need to know, how am I going to approach solving this problem?"

In the second Act, students are given some information – like pictures – to help them solve the problem.

The third Act is the assumption. So students have to do the maths in the second Act to get the pair. It's nicely structured and Dan keeps adding to it all the time. His blog's very interesting, with nice ideas. You can see one three-act maths activity on the last page of this case study.

Some of the examples can be strange, but it's nice to see maths in other contexts and helps get students thinking about what could be asked.

- [Estimation180.com](#) is a picture-based resource.

You might see a cup of hot chocolate with a marshmallow in it and a question asking how many marshmallows will it take to fill the cup.

You can take it as far as you want. You can use it lower down in school too. I've been doing [Estimation180.com](#) work with Year 7 – Year 9. It's really nice because all the maths is from a picture.

You might ask them, 'What maths is in this picture? What can we take from that?'

- The MAP shell centre (<http://map.mathshell.org/>) is a free American website for problem solving resources.

Problems are already set up, just explore the “tasks” and choose from novice, apprentice and expert examples.

You can see example answers and student working. Some of it is Americanised so you need to remember you’re working in different units and different money, but the ideas are still there.

It’s nice to have tried and tested examples that are ready to use. I’ve done the best buy tickets before so you might want to try that.

We’ve also done a frame one. The level of difficulty varies – the printed tickets task is simple.

- Sometimes current news stories can be relevant. I used an example with Barclays and RBS where “5 members of staff were paid more than 5 million pounds a year”.

I got the students to work out the hourly rate. We broke it down like a Fermi-estimation. Forcing students to think about factors for consideration – how many hours would they work in a day? How many days would they work a year? Would they have lots of holidays or not?

If I hear a nice story in the news we’ll discuss it – how sensible are these statistics, are they reasonable? Where have they got this justification from? Where has this idea come from?

A recent project we have just worked on was to do with a horse manure problem in the Victorian age about how they predicted

that London would be nine feet under all this manure because of how many horses they had!

I asked students where they could have got that information. We did a little project and we got an old map and used string to roughly work out where the road had been.

Sometimes the simplest things can inspire really interesting work.

Modelling maths in this way is new to the students so they need support and training, but it’s worth it.

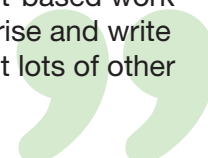
As a teacher, it can be hard not to step in to help but you have to let them try before you help and solve things together.

We worked on a heartbeats problem which excited them too. We estimated the number of heartbeats in one year. We also worked out how far humans walk over a lifetime. They had to consider how long a human might live etc. There’s lots of ways to teach Fermi estimation – I really enjoy teaching it.

I asked how they could work out the mass of a person. Would they break them down into objects? Imagine the head is a sphere or a cylinder?

When I introduced it I gave them a question and time to talk, and then told them to have a go at working it out.

That was too much freedom for some. I had staggered levels of support. It was too hard for Grade C students, but Grade A’s were ok with it. These all link well in to project-based work and getting students to summarise and write reports develops skills to benefit lots of other subjects.



An example I use from Dan Mayer's resources

Problem solving:

We often start with a video. In this week, it featured a pan of meatballs. A man is putting the meatballs in the pan and wants to know if they're going to overflow.

He leaves them cooking in the pan for a little while.

What questions do students need to think about? It encourages students to guess, which is a brilliant place to start. Everyone can guess, whatever their ability.

Get them to guess how many meatballs it will take to make the pan overflow. Sometimes I freeze the image of the meatballs in the pan whilst they decide.

Some go into great depth thinking whether the lip of the saucepan will affect it. I'll say we're making a model so do we need to consider that? Is that important now? Could we adjust our answer at the end?

Someone will say something about volume and someone will say something about a radius and you need to hone in on them.

When I introduce the next slide, students see the diameter and depth left in the pan.

Now how many meatballs are there?

Some of the Dan Myers resources are hilarious. In one of them, he pops bubble wrap. He sits popping bubble wrap with a big grin on his face.

We did one on a massive jelly bear. We worked out how many small jelly bears would fit inside it. The students were fascinated with that massive jelly bear.

Again, I let them try to work out the answer and eventually I'll give them a formula.

You can do these exercises quite quickly, or extend them.