
Teaching Core Maths

Recruiting students

I think it's really important to promote the subject as early as possible. We didn't have the luxury of that this year as it's a new subject, but we'll promote it at options evenings this year. At the moment, lots of students still have no idea what Core Maths is all about.

When I started thinking about introducing Core Maths at Cardinal Newman College, we had no idea how we were going to get students onto the course. It was quite a scary prospect.

Decide who you want to target

We knew which students were likely to choose A-level Maths and we knew which students were resitting their GCSE or doing FSMQs.

So where were we going to get our Core Maths students from? We realised lots of students would need a certain level of maths skill for their future HE course or career, so we focussed on them, alongside the BTEC students.

These students didn't need to know the level of maths needed for a maths degree but they'd need to retain their GCSE Maths knowledge and develop the confidence and skills to tackle common maths tasks in the workplace.

We also targeted a group of students who had signed up to do A-level Maths but hadn't got the grades. Most had achieved a GCSE C rather than a B.

When the new GCSE grading system comes in we'll have to think again about who qualifies for Core Maths and A-level Maths but it should be pretty similar to the current system. A few students actually dropped out of A-level Maths in favour of Core Maths.

My cohort for the first year

We have 20 students in our first cohort. All 20 are pleased they chose Core Maths and are continuing their studies next year.

We had 10 to start with, but quickly increased our numbers through linking the benefits of Core Maths to the careers students were considering.

For example, one student wanted to be a primary school teacher, so we explained how Core Maths would be beneficial. Other students were considering becoming nurses or psychologists – both of which require maths, and especially statistics.

The majority of my students are on BTEC courses. The rest switched over from A-level Maths. I was a bit apprehensive as they all have different experiences and ability but it's a really nice mix.

They don't necessarily have lots in common but that's proved useful because there's always someone who understands the context a little bit better than someone else and they start to share and help each other.

How I've promoted Core Maths at other schools

This year I've visited schools, spoken at subject information meetings and spoken to maths departments about Core Maths. This has proved really worthwhile because students have started asking about Core Maths at open evenings.

It's not too late to start going into schools if you want to target specific students or you know a certain cohort you think would enjoy Core Maths. Go and speak to them so they know about it before September.



Fitting Core Maths into your timetable

I've experienced Core Maths in lots of different institutions. In my institution it's a timetabled lesson and fills one of the blocks, for 3 hours a week.

However, I know other institutions offer it as an enrichment block outside the school day. If you do this, be prepared your students may stop coming as exam time approaches (lots of them forget they'll also have Core Maths exams the following year).

If you can get Core Maths included in the core teaching hours it'll be much easier to entice students to the subject.

How do I run my lessons?

Most of my lessons are discussion based. We don't sit down and do X amount of exercises like you might with A-level Maths.

I don't stand at the front of the class, I tend to generate discussions and get them to find the maths in what we're talking about – it could be a newspaper article or a video, anything goes!

What I taught first...

I started the year by teaching Fermi estimation and I recommend you do the same. It helps students understand how Core Maths is different to GCSE and A-level Maths and really engages them right at the start. They often say things like "oh yeah I'm doing maths, but it's not like maths".

My students didn't like it at first; they certainly didn't like getting the wrong answer – but it got them thinking.

Most of the assessment is about using maths to work out the answer to a scenario. It might be a simple multiplication, ratio, division or percentage, but that simple piece of maths comes from understanding the scenario.

It's something they're not particularly good at to start with, but their skills improve significantly throughout the year.

We have a Fermi at the start of every lesson now and the students compete to see who gets to a reasonable answer first.

I encourage students to bring maths they've seen elsewhere or covered in other lessons too – it helps them practice and go over things they didn't understand in more depth.

The beauty of Core Maths is it gives you the extra time and flexibility to cover areas students are genuinely interested in. With lots of the new A-levels, you don't have that so I've found it really useful.

I don't always teach content that relates to an exam. Instead, I make sure they're interested in the subject and want to know where things come from.

The finance content really appeals

If you give students a payslip and get them to work out how much they might take home from a job compared to how much they're earning, they get really irate about why so much of it goes to the government/tax etc. When you break it all down they start to understand it. This is such a valuable lesson and it's surprising how few of them are aware of this at the start. They think if you earn £25,000 a year that's how much you take home. If only!

Bringing politics and economics into your lessons works well too...

I found the students were surprisingly opinionated about politics and it proved an interesting way to stimulate discussion about economics with a link to Core Maths.

It helps them understand the context of doing maths. Integrating general knowledge with the subject helps them understand the way the world goes round.

This year's general election was brilliant as it enabled us to talk about all sorts of scenarios and economic factors.

What's CMSP?

The Core Maths Support Programme is CMSP. It's the working group contracted by the DfE to help implement the pilot of Core Maths. They employ me to help and support colleges in my area.

The Core Maths website CMSP used to be hosted by the National Centre For Teaching Mathematics (NCETM). They still have all of the Core Maths information from when they hosted it and you can see the people who started teaching in the first year of the pilot. They have an early developers' community for people teaching from September 2016 or haven't been affiliated with the Core Maths Support Programme (CMSP).

If you're already teaching Core Maths but haven't told the CMSP you're doing it with your own funding, you won't be on their record. To make sure they add you, simply make sure you register with them at: core-maths.org

It's worthwhile because you can have discussions with other members and share advice and resources. You'll find pages and pages of resources that people have developed themselves that aren't available via Nuffield or TES.

Just log in to NCETM.org.uk and email your username to cmisp@cfbt.org. They'll add your name to the community pages and give you access to all of the information.

Core Maths now has its own website with its own range of recommended resources, which are really easy to use.

Getting to grips with assessment

Teaching the lessons is fine, the area that still needs work is assessment – both in terms of tracking progression throughout the course and helping students prepare for their exam.

We're creating a portfolio based on something called 'building estates' which is on the NCETM website.

Students have to design a housing estate that complies with certain regulations. They have to follow rules, which is important. They also have to create and manipulate spreadsheets, use formulae and look at statistics, so it's a very realistic piece of work for them to relate to.

I've found it quite hard to assess Core Maths formally, but going by intuition works for me. I assess every other week and mark each topic we've covered and annotate how each student grasped it.

I know that other centres prefer a more formal approach so you might prefer to mark progress every lesson or every week.

I make sure I set homework tasks that help students practice working independently – I've included an example task for you at the end of this.

Lesson studies are really helpful

The lesson study has been championed by the Core Maths Support Programme as a tool for your own professional development.

You plan a lesson with your colleague or someone from a centre nearby. Then one of you teaches it and the other watches. Then you assess the lesson plan to see what worked well and what didn't.

Don't think of the observation as a chance for you to be criticised or judged, it's nothing like having Ofsted or your Head of Department come to watch you. It helps you see why the lesson plan is so helpful and highlights how despite having a plan, you need to be flexible with your teaching because you can never predict your student's reactions.

The [Core Maths website](#) has a great summary of the accumulated wisdom from study lessons.

How many guided hours are there?

The technical guidance says there are 180 guided learning hours. Different colleges have taken different approaches. I'm working with one college who taught two hours a week in the first year and are doing four hours a week in the second year, so the intensity is greater as the exam approaches.

The guided learning hours can be made up of independent study as well so don't worry if your timetable hours don't cover it all.

Which resources would I recommend?

The AQA route map is brilliant

It starts off with an introduction to spreadsheets and then goes on to statistics and data. It's a great introduction to the course and clearly shows all the topics you need to teach whilst giving you a huge amount of flexibility in the order you should teach each one.

If you want to get your students engaged, I'd start with a topic they've not covered before rather than extending their knowledge about something they touched on for GCSE.

Each topic includes links to useful teaching resources – there are lots of TES links and they're all free.

The route map was my little crutch the whole way through this year. Now I understand the route map and the course a bit better it'll be even more useful in future.

AQA route map

Statistics resource

If you want to teach Statistics without traditional maths, there's a great book called *Statistics without mathematics*.

It's designed for social scientists and is a nice introduction to statistics that doesn't require an in-depth knowledge of maths – it's perfect for Core Maths and it went down really well with my students.

The Nuffield Foundation resources

I can't recommend these highly enough.

They work best if you plan and tweak them to your teaching styles and students but they're a fantastic place to start.

You can adapt them in different ways. The HE intuition just above the Anthropometric data is good. Depending on whether your students are going onto university or work, you can look at the proportions of different subjects studied and use various ways to analyse the data. Everything listed under Level 3 FSMQ is useful for Core Maths.

Nuffield lesson plans

The Fermi estimation sheet

How many burgers will a 16 year old eat by the time they're 16? That's just one of the example questions in AQA's lesson plan for Fermi estimation, which you'll find on their website. AQA have developed these questions, but I also use more from other websites, and ask my students for suggestions.

The best thing about Fermi estimation is getting your students to create the questions themselves, because they ask things that they want to know the answer to. This can be scary as you're giving them a lot of control over the lesson content but in my experience it pays off. When you give them a question, you have no idea what the answer will be – not even Google can help.

It's nice for them to explain their ideas and for the others to share what they did. They may do it completely differently but they often get similar answers. They love that.

My A-level students have started writing Fermi estimation questions for me to do with my AS students which is really interesting. Especially when they disliked Fermi at the start of the year.

Fermi estimation sheet

Resources I've made

Percentages

I gave the students a set of percentage questions and left them to work them out themselves.

Once they'd answered the first set, I sent them on a treasure hunt around the college. I did this at the start of Year 12 when they didn't know many teachers and weren't familiar with the site – it was a great way for them to meet the staff and find out where things were. I gave them their first question, then told them where to go for the next one.

We have five different buildings across our site. Even the Principal gave them a question. I'm not sure whether your principal would be willing but mine loved it!

They met all the maths teachers, they even met the dinner ladies!

They thought the exercise was a bit ridiculous but they got to know each other, the school, and they perfected their knowledge of percentages. It proved a really good team bonding experience and I'm sure they work better together as a result.

We've spent lots of time working things out together which is great as that's how you work in the real world. Just be careful that the stronger characters or better ability students don't take over too much.

Ask the exam boards if you can't find the resource you need

My colleagues and I have never taught finance and we didn't know where to start in terms of teaching it to our students. We asked AQA for help and they're now creating a resource for us.

Maths advocates are really useful too. They understand your task and offer great help and support.

Has teaching Core Maths changed how I teach A-level Maths?

It has actually. I wanted Core Maths to feel different for my students as I encouraged them onto the course. And I didn't want them to feel they were in a GCSE or GCSE resit class.

My A-level students prefer to sit down and work independently. However, since teaching Core Maths, I've stopped telling students the answer when we learn a new topic and like my Core Maths students, they work things out together a bit more.

I encourage my students to use every method and independent mark available so rather than focusing on what the answer is, they show their working. I rarely tell them the answer which frustrates them but it means they're interested in how they got their answer and why they may not have been given full marks.

I'm much more relaxed about working towards an exam in the A-level course too. It's still at the back of my mind as we don't have long to fit everything in, but working more collaboratively with the students develops their team building.

Launch and prepare to teach events

When we started teaching, we only had the draft specification which was quite scary. AQA's launch events provided an opportunity to learn teaching ideas and meet people with exactly the same struggles and concerns.

The CMSP run similar events and it's worth trying both because you'll meet more people and get even more teaching ideas.

My final tip...

If you're going to start your Core Maths, remember to start it with a bang. Start with new topics and get your students excited. Make sure they know it's not the same as GCSE or A-level Maths.

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

