UNSTOPPABLE
— LEARNING —

# Rapid Results at Moreton School

*Moreton school, part of the Amethyst Academies Trust, saw improvements across year groups following just a few months' implementation of atomisation principles.*

***Head of Maths, James Watton,*** *explains how.*

Moreton School
bringing education to life

Amethyst Academies Trust
enabling everyone to thrive and be the best they can be

## Results

**+28%**

28% point increase in
**Y10 Grade 5-9 Pass Rate**

**+10%**

Projected 10% point increase in
**Y11 Grade 4-9 Pass Rate**

**+19**

Increase in
**Y10 Average Point Score**
for group taught using atomisation

### Year 11

The Year 11 cohort has received three terms of teaching based upon 'Unstoppable Learning,' with a focus on atomisation.

For Year 11, end of year projections suggest that **Grade 4-9 pass rates will increase by 10 percentage points,** and **Grade 5-9 will increase by 7 percentage points**.

### Year 10

The Year 10 cohort has received two terms of 'Unstoppable Learning' and atomisation.

For Year 10, the outcomes from the most recent mock exam suggest **even greater improvement**. **Grade 4 to 9 pass rates** compared to 2023 Y10 mock exams increased by **9.6 percentage points** and **Grade 5 to 9 pass rates** increased by **28 percentage points**.

Although they have been taught this way for less time, we think the increase has happened because we better understood how to implement the approach at the time we started with Year 10, so the teaching they received has been much higher quality.

We've also seen that, where atomisation is employed with greatest skill and understanding, class data is strongest. In sets 1, 3 and 4 teachers have used atomisation more rigorously and the results have been strong: Set 1 Average Point Score (APS) compared to 2023 is higher by 17% points, Set 3 is higher by 19% points, and Set 4 APS is also higher by 19% points.

On the other hand, Set 2 performance, where atomisation has been used least, has stayed approximately the same as the previous years.

> *Students' engagement will improve. [They] will have success throughout, building mathematical knowledge as they are given the opportunity to learn each atom before chaining them into a routine. [It] will create a culture in the department that understands and values the intricacies of mathematical learning.*

**— James Watton**
Head of Maths

## Overall Recommendation

There are many interventions and systems that promise a quick fix. I am glad that atomisation is not it and neither should it be so.

The work we have done with Kris Boulton has improved the practice of all staff in the department as it encourages them to think deeply about what they are delivering. It asks them to be a true professional, plan nuanced lessons for themselves and to consider the intricacy of mathematical processes and routines.

Atomisation does require investment of time and most importantly thought. But that time and thought will create a culture in the department that understands and values the intricacies of mathematical learning, not simply mathematical knowledge.

Students' engagement in maths will improve.

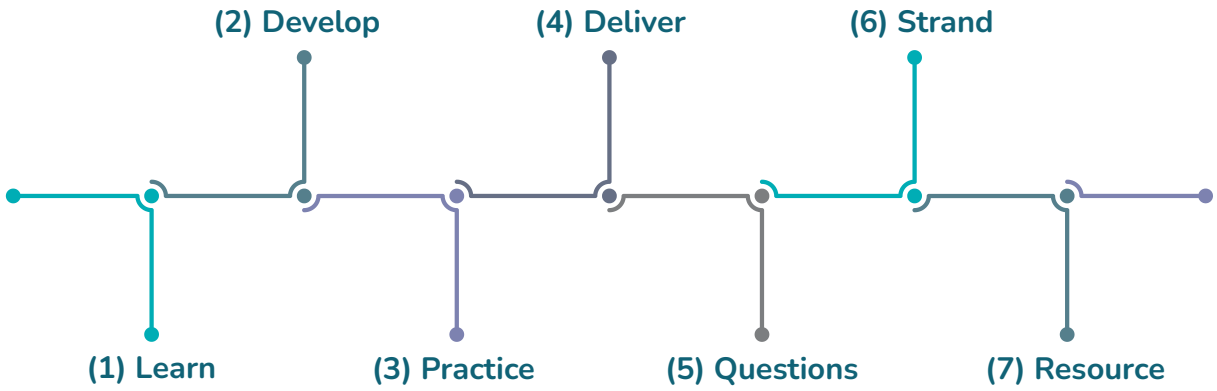
Students will have success throughout, building mathematical knowledge as they are given the opportunity to learn each atom, before chaining them together into a routine.

The journey we are on has only just begun and we have seen signs of growth already. As the department develops its understanding of atomisation the success will compound.

What is more, in Kris Boulton you have an individual that will work tirelessly for you. Kris has inspired my team and I through his dedication to talking through every stage of the process. His resources are excellent, and if a bespoke issue arises, I have been given bespoke answers. What I have enjoyed most about working with Kris is the genuine dialogue and collaboration. I believe that we have added to his approach to mathematical learning. If there were more Kris' working in education, education would be better for it.

# Implementation

We took a seven-step approach to implementing Unstoppable Learning:




## 1. Learn

To start, I as head of department and the lead practitioner read through the materials, communicated with Kris Boulton, and discussed the ideas deeply. Then, we conducted pilot lessons **with our own classes** to see for ourselves the impact of building lessons with atomisation at the core.

### Learning Point

*Before going to the rest of the team, we found it important for us as the leadership of the department to understand the principles and attempt the process of atomisation for ourselves. Atomisation brings in concepts that teachers are unfamiliar with and asks a teacher to think deeply about how they teach. If the leaders cannot confidently articulate their own interpretation of this, and of what the department should be working towards, you will find that you get a large number of questions you cannot answer, which will stop teachers from delivering the approach successfully.*

## 2. Develop

Next, we delivered introductory CPD to the whole team. This focused on the **concepts**, the **vocabulary** and **processes** of atomisation. The CPD began with why solutions to maths problems **are often 'cognitively overloading'**. It then developed into how 'breaking down' the cognitive process of an example solution into the **atoms** should be an essential teaching task.

At this stage we didn't refer to the typology of atoms ('the four elements,') and instead simply asked staff to 'break down the cognitive routine.' As expected, this was challenging for staff as traditional teaching does consider prior knowledge, but not in any systematic way.

At the same time, we had to explicitly teach staff that, whilst prior knowledge is part of atomisation, **it is not the entirety of the process.**

### Learning Point

*Before any implementation in lessons, teachers will need to be given time to practise the atomisation of concepts using their own understanding. Whilst the department leadership team can provide pre-atomised content, it is essential that staff understand the process and 'buy in'. Even if you do not incorporate other aspects of atomisation into the way your department delivers mathematical education, this adaption will allow staff to have a greater understanding of what they deliver in lessons and thus* ***lead to more efficient planning****.*

## 3. Practice

The third phase of implementation was CPD on the **four elements**, and how best to deliver learning sequences that ensured the purposeful learning of atoms.

We felt that *designing* sequences must first be practised before any classroom delivery. So, the department was given the opportunity to build sequences for specific atomisation with **no expectation of delivering them in lessons**.

### Learning Point

*This phase of implementation should not be rushed. In our case a misconception arose amongst Senior Leaders that the process was 'discovery learning'. When we dug into what caused the misconception, we found we hadn't spent enough time at this phase, and some teachers were delivering random examples with a high probability of failure, not the tight sequence of 'Unstoppable Learning' (Logically Faultless Communication,) that we had intended. It is a non-negotiable that you explicitly make clear the distinction between a 'good sequence' and a 'bad sequence,' and how the precise design of the sequence elucidates the concept; it often needs clear, precise language for observers to understand the nuanced instruction being delivered. If we did it again, we wouldn't move on to phase 4 until our CPD had covered the* ***'precise use of language,'*** *and its implications for* ***developing implicit and explicit memory****.*

## 4. Deliver

The fourth phase of our implementation was to allow staff to **deliver atomised sequences in class**. For this phase we had to think deeply about how this would be built into our curriculum sequencing, and how it would fit into the school's wider teaching and learning policy.

We found that our existing 'I Do, We Do, You Do' model was still useful for going through example-problem pairs for full cognitive routines (the **full chain of atoms**,) while **Atomic Instruction** came in just before. So our new model is Atomic Instruction first, then I Do / We do for the full routine.

*See this post for more information on* ***Atomisation and I Do / We Do routines***

Atomic Instruction was carried out using mini whiteboards, with maximum participation from students.

### Learning Point

***This phase is where we are currently**, and the full second term has been given to staff members simply attempting to build this approach into their teaching practice. We are not assuming staff members are going to become experts at delivering atomised learning in weeks; this phase will take until the end of the year, and it is a whole-team effort, with all of us sharing in evaluating each other's practice. This approach is not about a few small quick wins but **a fundamental shift in how teachers think about their practice**, heading towards a new reality where every child succeeds in every lesson. After this phase we will begin the process of systemising the routines into our curriculum (Phase 5.)*

*So far, we have found that atomisation is best practised with students working on mini whiteboards with staff presenting from visualisers. PowerPoints can be used, but they do not allow quick adaption if your routine 'misses' a jump in comprehension. Working in an exercise book rather than a MWB leads to distraction and we have found that the exercise books are best left for the full cognitive routine; the mathematical end point you are working towards. This is an area that needs to be addressed with your school's teaching and learning policy as, when utilised well, atomisation reduces the amount of written work in your exercise books.*

## 5. Questions

Our next phase of implementation is turning all of the 'learning objectives' in our curriculum into questions that we want every student to be able to tackle. We are allowing staff to have autonomy over how atomisation routines are built into lessons, but we have learned that to maximise our potential each part of our curriculum needs a centralised and **definitive end point** that every student is working towards. To ensure no misunderstanding amongst staff, that end point needs to be in the form of a question, along with the response we want to see from students.

### Learning Point

*Atomisation lends itself to **extending understanding far beyond what students believe themselves capable of**; however, for staff, this can be overwhelming. Atomisation can also lead to large numbers of 'potential' atoms, especially when you do not know explicitly what you are working towards. Which atoms are important? Which should I include in my teaching? Which is it okay to ignore? So, we are now building 'suggested' end point questions that the atomisation can lead towards.*

## 6. Strand

Next year's phase of implementation is to translate our old 'spiral' curriculum to a 'strand' curriculum. Spiral curricula are not efficient enough to fully take advantage of atomisation, and early experiments with a 'hybrid strand design' have led to **enormous gains in student memory and retention**.

### Learning Point

*Unless the curriculum is structurally adapted, the atomisation efficiency can still lead to shallow learning. This has meant that we will be adapting our curriculum to prioritise spaced retrieval, with learning episodes being* ***at least 50% retrieval practice of previous content****. Furthermore, the mapping of retrieval practice will be based around intervals that lead to the best possible chance of long-term memory consolidation.*

### 7. Resource

For our final phase, over time we will build our own library of atomised sequences that all new members to our department can use as templates.

## School Context

Moreton school is a secondary school that is part of a small academy. It is in an area of high deprivation with above national average numbers of students who are identified as free school meals and SEND.

### LSOA

Using the LSOA scale for deprivation, the area we serve is on average in the 2nd decile for income, employment and health. Whilst crime deprivation and housing deprivation is in the 6$^{th}$ decile, adult education levels are in the 3$^{rd}$ decile.

### School Cohort

The school cohort is approximately 1000 students. The student demographic is majority British White; however, this majority is declining. There are growing numbers of students that have an African background with many students being identified as EAL. There are significant numbers of eastern European students.

### Attendance

Student attendance to school is in line with national average, however there is then a significant proportion of students that have a much higher internal truancy rate.

### Suspensions and Exclusions

Student suspension rates are higher than the national average, whereas exclusion rate is lower than national average.

### Historic Results

School GCSE outcomes have declined since the pandemic.

Last year the school P8 declined from -0.18 to -0.52.

Maths attainment was significantly below national averages at 52.4% Grade 4 or above, 30% Grade 5 or above and 9.4% Grade 7 or above.

### Department

We have only 2 members of staff that have been in the department for more than 3 years, 2 ECT teachers, a trainee teacher and a long-term supply teacher.