



Mathematics at Witton Middle School: A responsive teaching model



“Increasingly, classroom organisation is used flexibly so that more able pupils are able to move on to apply and deepen understanding, rather than listen to teacher input. Teaching is effective in identifying and addressing gaps in learning. The feedback informs pupils what they have done well and what they need to do to improve, leading to some significant and sustained gains in learning over time.” Witton SEF April 2015

Responsive Teaching

Responsive teaching is a blend of approaches with direct response to the needs of learners at its core.

The key principles at the base of this are:

- Children need to master certain skills, securing knowledge and concepts which underpin new learning.
- Every child can achieve well, given the right level of challenge.
- No ceiling is placed on learning – all children can work towards age related expectations+, with gaps being identified and ‘scooped up’ in the process.
- Assessment information is used daily to identify gaps and next steps – a flick through the books can identify a group to intervene with the following day.
- Strong communication between adults enhances this assessment.
- Intervention takes place daily, in the classroom, and with a group of pupils who have a similar need.
- Pupils are not placed in fixed ability groups: no ability is fixed and *all* children are likely to require a teacher to intervene at some point.
- Our most needy children will receive high-quality classroom intervention from our most qualified adults.
- Fluidity of organisation will allow children to move forwards or secure concepts at the rate appropriate to them.
- Children are given opportunities to apply skills in a range of new contexts as soon as concepts are secure.

- Children will achieve more if the feedback they receive allows them to engage fully with their own next steps.

What will this look like in action?

Teachers at Witton have been developing this approach for some time. It represents a significant step away from some of the 'traditional' models, and gives teachers permission to adapt and mould learning experiences to the needs of the children. **This document is a summary of what this should look like in lessons:**

- Entry tasks are often provided, so learning time is maximised – maybe a lively mental/oral activity, a diagnostic question, or a question or vocabulary to discuss... some advancing learners may be at the stage where they just need to go straight into their work.
- Diagnostic questions and models take account of possible misconceptions. These are pre-empted when considering models, images and CPA (concrete-pictorial-abstract) approaches.
- Use of a model, or modelled approach, which gives pupils basic strategies and relates to the SC. The model could be introduced at a variety of points in the sequence of learning, but you would not normally expect to see pupils working independently without having had a model to refer to.
- Pupils are not held back if they do not need teacher input. Pupil judgements on this will need careful development over time. In a 'rolling' lesson, some pupils may start without watching the model and may receive adult input at a different stage in the learning sequence. This group does not need to be the same pupils each time, and may change according to those who have grasped the concept more quickly and are ready to practise, or to deepen their learning.
- Pupil groupings are not fixed. Pupils may have a 'home' seat that would be used at the start of topics before diagnosis of gaps had taken place, and appear on a table plan. Use of a laminated list of names or a pile of books can direct pupils to their places for that lesson.
- Pupils should have access to resources to enable them to choose and use the tools for learning. CPA processes will model the use of these and make them 'usual'.
- Opportunities for pupil talk are important but they must be structured around specific questions, concepts or vocabulary. Number talks are

carefully chosen and thinking worked through by teachers using visual models.

- Resilience is encouraged, and mistakes are valued as a learning opportunity: children understand that mistakes are vital for brain growth!
 - Stuck strategies – use of SC; planner colours; 4 before me – are in action.
 - Pupils should not be doing unnecessary or easy practice consolidation if they can reasonably be moved on. A group may be doing consolidation work as part of the lesson, to enhance fluency and accuracy, and consolidate procedures.
 - A culture of self - challenge is vital if pupils are to select their entry level. Pupils should be given opportunities to self - mark at regular intervals to give reassurance, enable mistakes to be rectified and signal the need for further challenge.
 - Pupils will be provided with opportunities for developing increasingly precise peer feedback.
 - Pupils must be given time to respond to marking in line with school policy. Actions in response to developmental marking may include:
 - Mathematical skills-related target work.
 - Identification of specific errors and explaining what misconception occurred.
 - A specific correction or a skill to revise/consolidate.
 - A calculation to complete: this may include reasoning.
 - A 'what if' question.
 - Given a calculation, write a problem that this answers.
 - A modelled example to follow and apply.
 - A worded problem.
 - Another action pertaining to the SC.
 - Pupil work must represent: Appropriate challenge; opportunities to develop understanding and knowledge through reasoning; layering of topics, so that links can be made between concepts; real-life problems and contexts for learning; regular teaching, practice and mini-assessment of key mental arithmetic skills.
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The following article represents an example of this 'responsive style of teaching with a group of younger children...

Every (Infant) Child a Mathematician Emma Ann Hardy (extracts)

“...I wonder if one of the reasons children struggle later in Mathematics and can have huge misconceptions is because we rush through the essential building blocks because we have to demonstrate “rapid and sustained progress”? Are expectations caused by having Mathematics ability groups partly to blame? Do we make assumptions about children’s ability in Maths based on only one strand?



We devised a system with great flexibility that could react immediately to the knowledge and skills being demonstrated by the pupils. This is how we did it.

We started by stopping labelling the children and instead we labelled the tables. We simply *laminated 4 sheets of different coloured paper* and put them on the four different tables. Instead of telling children which group they were in we told them which table to work at.

We planned for four different abilities as usual and set the tables up with differentiated work and then decided daily which table they would work on. Depending on how the children performed each day mean that they moved around the classroom to work on the different tables. This meant that the activities were pitched to the ability of each child, in each activity, each day.

Day 1: Whole class teaching with the TA.

When teaching multiplication I show a repeated addition as a repeated addition and we agree that it takes ages to write this calculation out! Wouldn't it be great if there was a simpler way doing this? So then we count the groups in the repeated addition and conclude that $5+5+5+5$ – could be written as 4 'groups of 5'. Then I show them how to draw the array to find the answer.

Then they practise writing the addition and drawing the array on whiteboards with a carpet partner, discuss, take turns...so I can see what they are writing.

Then we 'agree' that writing 'groups of' takes ages. I explain that mathematics is great because they use symbols instead of writing and that's when I introduce the 'X' sign and tell them that it just means 'groups of.' We repeat this, writing both the multiplication calculation and drawing the array whilst working on whiteboards with a carpet partner.

By now, as a teacher, you will have noticed a couple of things:

1. Some children will have been unable to add together more than one number or they are totally unable to draw the array etc.
2. Some children can count in steps of different numbers and are racing through the examples.

In the previous system, I would have had the groups pre-arranged regardless of how the performed on day one. Also, I'm sorry to say, all of the children would have continued to sit and listen to me regardless of whether they immediately understood or had failed to follow after step 1.

A legacy of the three part lesson which dominated the past? Why, when they didn't all understand it at the same time do they all have to leave the carpet at the same time?... If the children already understood it why are you still making them sit there and listen? Let them go off and prove it! I recognise that it's convenient to have them all sat together but it's also a waste of learning time.

Now, when it is clear that some children have gaps I immediately send them off to revise this with my TA. This makes more effective use of the time available. Again, I have no preconceived ideas about who will understand quickly and be the first to be sent to work at tables. During the "chalk and talk" I continue to send children away to work independently as I work through more examples with the children on the carpet. Basically, I walk around the circle and say "go and prove you can do it on your own." Eventually, I am left with a small group with me, two groups working at tables – one table with a more challenging activity.

By the end of Day 1, after marking the books to check and speaking to my TA, I have my groups ready for day 2.

1. Children who need to consolidate with adult go into one pile.
2. Children who are ready to consolidate/start to extend independently go into another pile.
3. Children who have gaps which need addressing go into a different pile to work with an adult.
4. Children who successfully completed the activity independently and who are ready for more of a challenge go into another pile.

So this continues throughout the week.

The differentiated work is either on the different tables at the beginning of the lesson or on the board. For something simple like 'multiplication' I tend to have multiplication questions in different colours on the board and the children solve the calculations which correspond to the coloured table they are sat on.

Key thing with this method is the flexibility and movement of children. Each day we assess and record the children onto a grid and then we provisionally group them ready for the next day. This means that those children who need to consolidate can by moving tables and repeating the previous day's work. Children who have understood can easily be pushed by moving onto a more complicated table.

I must stress that after each day the groups can grow or shrink and if necessary I put tables together to make space for a larger group. The outcome of each day changes what I do the next. I also move the furniture around depending on what I want them to do – if I want them to share resources I arrange the tables into groups, if I want them to be able to see the board I put the tables in rows.

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This is what I did, this is why I did it and it worked for me. Sometimes you have to be a little experimental and accept that it's a work in progress and of course you need the support of your headteacher. To determine what works you have to first determine your expectations and what you think success will look like. I define success as children being able to do mathematics, feeling confident and enjoying mathematics."

<https://emmaannhardy.wordpress.com/2014/03/11/every-infant-child-a-mathematician-how-i-teach-mathematics-to-year-2-pedagoolondon/>