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Year 6 Maths Catch-up and Revision Guide

17 teacher-tested techniques to help your pupils plug their gaps and ace their SATs

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Introduction

I don't know about you, but when I hear 'Maths SATs revision guide', I get a pretty clear image in my head – essentially, questions about each topic of the curriculum accompanied by a bit of explanation.

Shortly after I started planning it out, it became obvious that this isn't that sort of revision guide.

It's not been written for children to use directly and to be honest, it doesn't cover every aspect of the Year 6 Maths curriculum or offer questions and tasks for them to complete. What it is however is a collection of ideas to try out in your Maths classroom.

There maybe some who may say that some of the methods are not necessarily the 'correct' way to tackle every problem, but come the national assessments, pupils need all the support we can give and these techniques are those which have worked for me and my pupils over the years.

I really hope at least some of them resonate with you and the needs of your class.

Arithmetic paper

The arithmetic paper was a brand new element of the KS2 Maths SATs suite of fun, replacing the mental Maths paper. I have to say that this is one change that I think does work in favour of many children.

The mental Maths paper involved being able to listen, make jottings and work under restrictive time limits – there was a lot going on. The arithmetic paper is, in a sense, more straightforward.

Five-a-day

To be able to ace the arithmetic paper, children need to be able to calculate efficiently, using both mental and written methods when appropriate. There are two parts to calculating efficiently: speed and accuracy. Doing a five-a-day practice is one tool to try and tackle this – especially the speed part.

When first thought about my Maths group being able to do **36 questions in 30 minutes**, I was a little worried. So, I started by giving them five to do in five minutes – and they did this every day at the beginning of the lesson.

They weren't happy at first: "A test? Every day?" However, I made it a low stakes test. I didn't take in or record their scores, which I think helped them believe that it really was just a tool to help them practice and get better. The funny thing is, as they got more confident, they would always share their scores with me anyway!

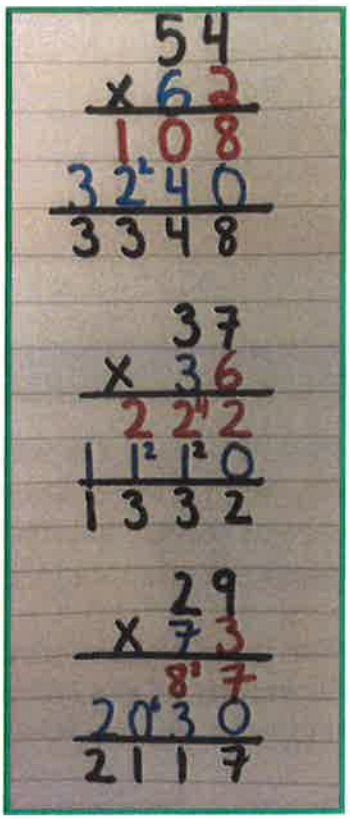
To start with, I gave them similar sorts of questions based on what we were doing in class, e.g. all multiplying by multiples of 10 questions. Then, I would mix it up with new topics, until we got to the point that they were doing five random questions.

As they got quicker, and realised that some questions really wouldn't take them anywhere near a minute to do, we started doing six or seven-a-day in five minutes. Now and again, we might do 10 at once.

Doing five-a-day in this way really helped them build up confidence and speed and made giving the full 30 minute arithmetic paper less daunting in the end. Also, going back and regularly practicing calculation methods that we had explicitly taught some time before, helped to memorise them.

Colour-coding

Before you can get into increasing efficiency in written methods, some children may need some extra help actually understanding the steps of the written method and remembering what to do. In the past, I have found that when it comes to column multiplication, some children are fine with multiplying by 1 digit, but it all begins to unravel when multiplying 2 digits by 2 digits. They seemed confused by the layout of the calculation, what went where and the relationship between it all. I found using colour coding helped with this.

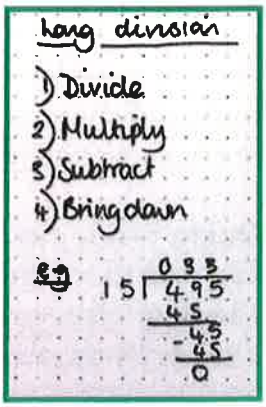


I do this by setting out a column multiplication as normal, but instead I write the units/ones digit at the bottom in red and the tens digit in blue. The I completed it, writing the calculations that relate to red digit in red and the ones relating to the blue digit in blue. When modelling, I asked questions like "what colour pen do I need now? Why?" Then I give out questions set out in this way and blue and red pencils to try it out themselves. It was really interesting. **It was almost like having to swap pencils forced them to think about swapping columns, slowed them down and made them pay more attention to each step of the calculation**.

Eventually, the aim is to move away from needing the colour coding, but it worked as tool to get us there.

'Boiled down' algorithms

The thing about long division is that it's, well, long. There are several steps and just remembering what to do in what order can be enough of a memory challenge for some children. **One way I've tackled this is to boil down the algorithm into simple succinct steps of a word or two that the children can remember and then apply**.



Our long division algorithm goes something like this:

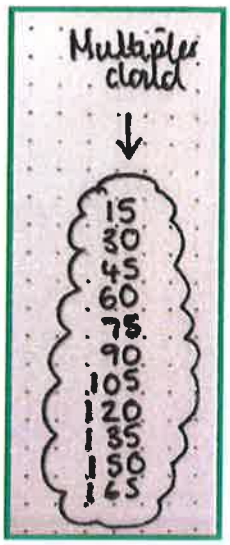
- Divide
- Multiply
- Subtract
- Bring down

As I modelled and we did examples together, we kept repeating the steps of the algorithm. Later, when attempting problems involving long division, I noticed some children noted down the algorithm above themselves so they had it in front of them when working – almost like a checklist.

Of course you come up with boiled down algorithms for many calculations and strategies, as needed. I also tried incorporating colour coding into it to help reinforce the different parts too.

Multiples clouds

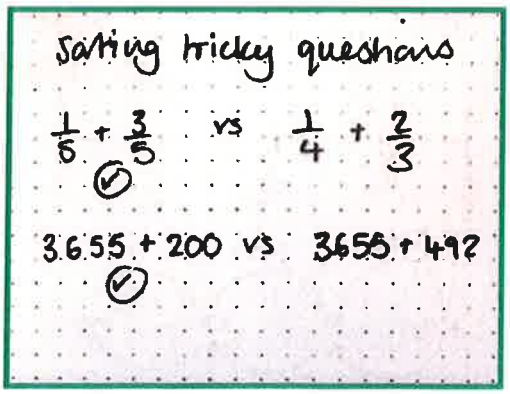
When using long division, knowing multiplication and division facts is key. However, I've seen some children get unstuck when the divisor (the number you're dividing by) is a larger 2-digit number that they don't know the multiplication facts for. **Writing, what we came to call a 'multiples cloud' (because we put it in a 'cloud' bubble, but really it is just a multiples list!) before beginning the long division calculation helped some children with this.**



For example, if tackling 6571 ÷ 14 then the children would quickly write a list of the multiples of 14, typically stopping at the 10th multiple. They would then refer to the list when having to work out how many 14s would go into 65 and so on. If they later had to go on beyond the 10th multiple, they could. Stopping at the 10th multiple initially is a good idea because, if children are confident at multiplying any number by 10, then it's one way of checking your multiples list hasn't gone wrong.

Sorting the trickier questions from the easier ones

Not all questions in the arithmetic paper are created equal – some are definitely trickier than others and teaching children to recognise which ones are which can be a useful skill. It helps them get clear about which ones they are going to be able to tackle quickly and which ones they might use a bit of their 'extra' time on.



An example of this might be questions on adding fractions. $\frac{1}{5} + \frac{3}{5}$ is easy because the denominator is the same so I can simply add the two numerators and away I go. However something like $\frac{1}{4} + \frac{2}{3}$ is trickier because the the denominators aren't the same and so I have to do some work finding a common denominator before I can add them. **If children can approach questions knowing what ones are harder and what ones are more straightforward, I've found this makes the paper overall less daunting**. They know they can go in and tackle some of the easier ones with less effort.

To reinforce this, while modelling, I might say, "why do I like this question?", "why is $\frac{2}{10} + \frac{5}{10}$ a breeze?" or "why is this one going to be a bit trickier?"

Reasoning paper

Getting the nuts and bolts of arithmetic right is one thing, but the reasoning papers are a different ball game; the aim of these are to provide opportunities for children to use their Maths skills in different contexts.

The Problem Solving Cycle

Someone once said to me that if you ever want to test a child's comprehension, forget a reading test and give them a Maths word problem – I think there's something to that! Being able to unpick a word problem set in a 'real life' scenario is key and in my experience some children find this really hard. One way to approach this initially is to deliberately slow down the problem solving process by guiding children through a problem solving cycle.

I've found that this stops some children just jumping to an answer – any answer! – quickly and moving on.

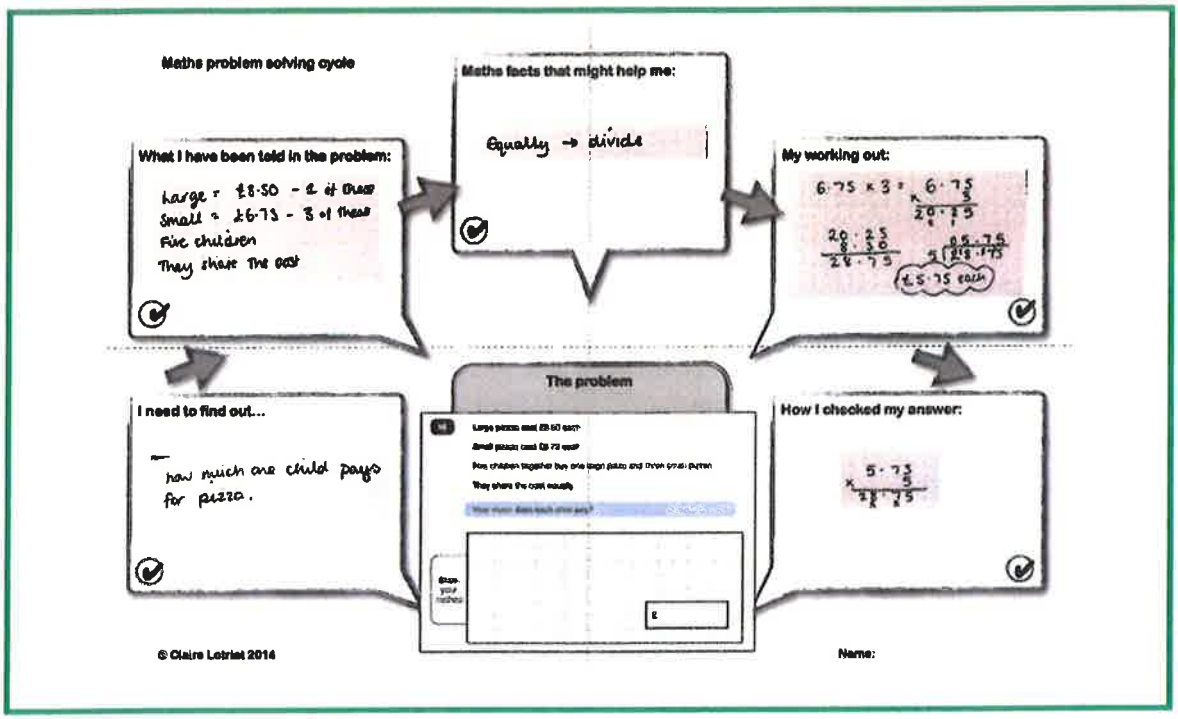
The five-part problem solving cycle

The five-part problem solving cycle I use works like this:

- What do I need to find out?
- What useful information is there?
- What Maths facts do I know that might help?
- Working out
- How can I check my answer?

I find the first bit is actually the most key bit – what is it exactly that you need to find out? This is useful for multi-step questions where some children work out the first step and then think they're done. By getting children to explicitly identify what they have to find out at the beginning, you can then keep referring back to it – "have you answered that question yet?"

The second stage gets them to pick out the useful information from the question and the third prompts them to think about Maths facts they might know that are relevant to the question. Only once these three parts have been done, can the working out commence. The fifth step involves using the inverse and is more optional.



Ultimately, you're aiming to wean children off of the problem solving cycle and speed things up, but a slower process at the beginning can be the way in for some children.

Explanations three ways

Providing children with plenty of opportunity to explain their mathematical thinking can also be useful and something that comes up in reasoning papers. Some children can find this tricky because they're still just looking to find the right answer. One way to get around this is to start by posing questions that don't have any actual specific problem within it and are more about strategies and methods.

a) Explain how

e.g.

How would knowing 10% of a number help you to find out 5% of the same number?

Explain how you can quickly multiply any number by 10.

Then you can move on to ones that do involve a specific scenario where someone has worked out an answer and you tell the children whether it's correct

or not and they have to explain how they know why.

b) Explain why

e.g.
Fred says to multiply any number by 10, you can just add a zero onto the end. Explain, using an example, why he is wrong.

Finally, you can move onto similar examples where not only do the children have to provide an explanation but they also have to work out if the given example is correct or not. Rewriting the above example might look something like this:

c) Explain why with an example

e.g.
Fred says to multiply any number by 10, you can just add a zero onto the end. Is he correct or incorrect? Explain your answer, using an example.

Diversify

Share the same skill in as many different ways as possible. For example, do children know that 25% x 350 means the same as 25% of 350? Even simple variations can throw children.

e.g. 825 + 14 = ____ might be straightforward to most, but rearranging the order to ____ = 825 + 14 can throw some children off the scent if it isn't specifically taught or addressed. Think about the different vocabulary options too:

- What is 825 + 14?
- Find the total of 825 and 14.
- What is 14 more than 825?
- Find the sum of 825 and 14.

Each one involves exactly the same skill, but exposure to different ways of presenting it can help with unpicking problems.

Other techniques that work for me

Catchphrases to help things stick

Over the years, I've found that certain phrases can help key points stick in children's minds. I use them as often as possible and get the children to complete them or say them back to me and it really seems to help. Here's some you might like to try too:

"Ten is your friend"

I use this one to help remind children that 10 is such a useful number in Maths in so many ways: relating number bonds to 10 to much larger numbers, e.g. if I know 7 + 3 = 10, then I must immediately be able to see how much I need to add to 70 to make 100.

I find some children also still try to reach for long multiplication when multiplying (or dividing) a number by 10, 100 or 1000 even though using place value and shifting the digits is quicker. I also want children to remember that finding 10% is the key to finding so many other percentages.

"We like it when things are the same"

This relates to problems with different units of measure mixed into one, calculating with fractions with different denominators, calculating with decimals to different numbers of places and calculating with fractions, decimals and percentages. The message here is that children need to tackle the conversions so they're dealing with the same unit of measure etc before attempting to solve the rest of the problem.

Rhymes as memory aids

Rhymes seem to work. This one about the different types of averages is one I use time and again – and I hear children repeat it back to themselves when they need it:

Hey diddle diddle,
The median's the middle,
You add, then divide for the mean,
The mode's the one you see the most
And the range is the difference between

"Keep it, change it, flip it"

This is a useful reminder for the process involved in dividing with fractions.
Eg. $\frac{4}{5} \div \frac{1}{2}$ – keep the $\frac{4}{5}$ the same, change the divide to multiply and the flip the $\frac{1}{2}$ over to $\frac{2}{1}$.

Make the most of every moment

This is a general point, but one example of how I do this is to get my Maths group to count up and down in different steps (multiple, decimals, fractions, negative numbers depending on what we're currently learning) as they come into class and leave class every day. The few times I've forgotten, they remind me!

Grid calculation practice

I've already mentioned diversifying the way you ask questions, but here's another way to add another layer to practising different calculation strategies: use a grid set up.

This can be adapted in many ways, but let's look at it in the context of practising the addition of numbers to three decimal places. Instead of asking children to solve a list of calculations, arrange the same numbers in a grid.

Let's look at adding decimals.

1.114	2.554	1.257	1.101
0.483	0.342	1.517	0.973
1.569	2.473	0.886	1.446
3.658	1.027	2.899	0.431

You can then begin to pose questions that add layers to the activity

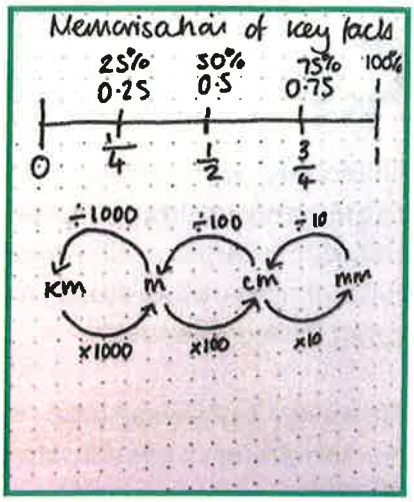
- Can you find four pairs of numbers that total 2?
- Can you find another four that total 4?
- What are the largest and smallest totals you can find by adding 2 numbers?
- What is the nearest total to 3 that you can make using 2 numbers?

By doing this, not only are children practising their addition methods, but those who need to be stretched a little further are also applying other skills to their work such as looking for patterns and relationships and working logically.

It also adds the element of competition, which in my experience is rarely a bad thing. You can easily make it tougher by putting in decimals to different numbers of places.

It's easy enough to change the numbers in the grid and the challenge questions to suit whatever operation you're focussing on and the levels within your class so hopefully endless lists of numbers sentences can become a thing of the past.

Memorisation of key facts



Spend time helping children memorising key facts that they just need to know – use self-quizzing practice, low stakes testing and any rhymes that help.

Examples of this might include a 0–1 Fractions-Decimals-Percentages number line. If children can quickly convert $\frac{1}{4}$, $\frac{1}{2}$ and $\frac{3}{4}$ into decimals and percentages, this can be really useful. Other key facts include different unit conversions and now how to work the area of different shapes too.

Revision timetable

As SATs approach, I've always tried to find time to revisit the key areas we have studied over the year. I block out the first 3-4 weeks of the summer term, leading up to SATs week, and create a timetable where each lesson has a key area focus.

You can weigh it according to what your class really need to go over most too.

Conclusion

Ultimately, and somewhat annoyingly, there is no silver bullet when it comes to preparing children for SATs. Different things work for different children and different cohorts in different contexts and really and truly a rich maths curriculum built on clear models and images with lots of opportunity for variation is what's going to be effective.

However, I'm always open to developing and trying out different techniques to try and address specific struggles that I see children come up against throughout the year.

We'd love to hear what's worked for you, and other ideas you have for the crucial Year 6 year. Do send them in to us hello@thirdspacelearning.com and we'll include them (and your name) in future editions of this resource.

About the author

Claire Lotriet is an Assistant Headteacher, and former Maths Coordinator, at a south London primary school, where she also leads teaching and learning, assessment, computing and enterprise.

Passionate about technology in and out of the classroom and social media, she regularly speaks to a variety of audiences about primary consulting. She is an author for Rising Stars, writes a column for TES and is the winner of a Naace Impact Award 2015.

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If you have pupils who need more support for SATs than these techniques for whole class teaching can provide, we can help. Our Maths specialist tutors will work 1-to-1 each week with your pupils to revise key concepts, plug learning gaps and help them make accelerated progress.

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KS2 Maths SATs Booster

Starting January 2017

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How it works

1. The class teacher chooses what each pupil learns

2. Each pupil completes a weekly 60 minute 1-to-1 lesson with their own Maths specialist tutor

3. Pupils revise key concepts, tackle practice questions and plug learning gaps to prepare for SATs

4. The class teacher receives weekly and termly progress reports, which are also useful for Governors and Ofsted

5. After the SATs, schools swap in their Year 5 pupils to accelerate progress and prepare them for Year 6

"Our Third Space pupils made great progress and absolutely smashed their Maths SATs!"
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Impact

*"**Our Third Space pupils did very well in the SATs tests**, the progress appears excellent in Maths - we're delighted!"* Nicola Noble, Assistant Head
Dunn Street Primary School, 2016

*"**I feel much more confident** when I think of SATs because I used to be very worried but now I'm not. **Third Space has helped me a lot in Maths** and I am very happy because of that!"*
Year 6 Pupil, Battle Primary

*"96% of our pupils achieve expected standard in Maths SATs - our **Third Space pupils did really well and all achieved expected progress.**"*
James McCormack, Deputy Head
Selborne Primary School 2016

*"The children performed at a much higher level than we expected in their SATs. **Over 15 weeks, the average progress was 3.4 APS.**"*
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