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Bringing **Maths** and **English** together
across the curriculum

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**For the love, sparkles, rainbows, empty mugs, tough love,
direction, babysitting, tea, books, ideas, push, belief,
opportunity and inspiration.**

This is for you.

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I would like to acknowledge all those colleagues, both present and past, from Joseph Swan and those who collaborated from far and wide, who supported me through discussion of Manglish ideas, practised Manglish in their classrooms or schools and provided me with feedback to move forward.

Special thanks must go to my husband, Tony Ashes. His Manglish mind has been the inspiration behind all of my ideas – and his meals have kept me alive.

PROLOGUE

A taste of the future



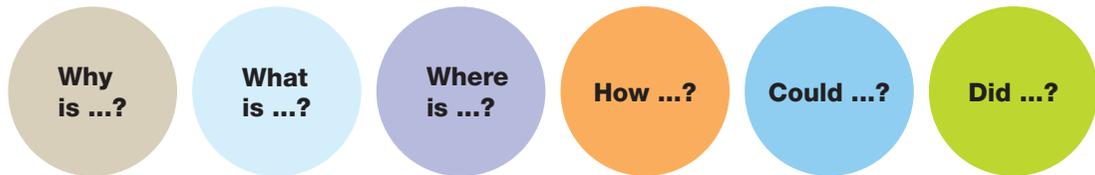
Where's the maths in that?

Look at the image above and ask yourself: where's the maths in that?

Recently, I put the same question and image to a group of Scottish teachers in Edinburgh. To find the answer, they needed to interrogate the image further. I used question balls to get them going.¹ The teachers picked

¹ A question ball is simply a plastic ball with a question stem written on it which is placed into a mini ball pool.

out one ball at a time and created their own questions about the possibilities for maths in the image. Modern technology has not come on far enough to allow me to integrate an actual ball pool into this book. Instead, I have provided you with some visual examples of the balls so you can have a go yourself. Using one ball at a time, look again at the picture. Complete the stem and create a question that helps you further investigate the possibility of maths being contained in the image.



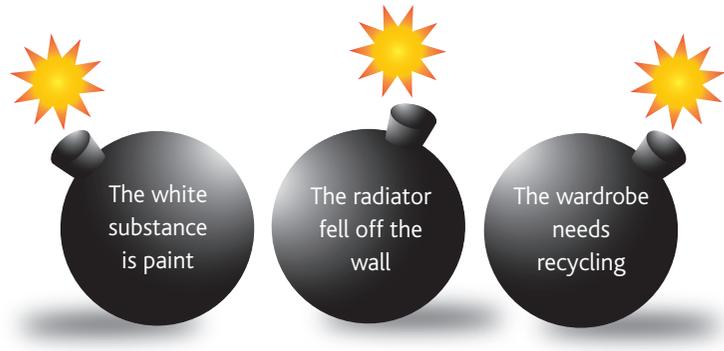
Here are some of the questions that my Scottish friends asked that day:

- › What is the white stuff?
- › Did the white stuff get there because they were cooking?
- › Where was this picture taken?
- › Could this person be a skilled craftsperson?
- › Why is Lisa asking us to find the maths in a random image?

After a few minutes, the teachers were slowing down in their discussion – a *boom* moment was required. They had determined that there definitely was potential to find maths in the image, but it was time to get more precise with what maths was actually there.

I began throwing thought bombs to provoke new thinking and a more focused discussion.² As technology has come no further since page one, you will once again have to make do with an image to represent the thoughts being thrown.

² A thought bomb is simply a dressed-up ball which is painted black, has a string fuse and is sprinkled with glitter. It has a hole in the bottom for the insertion of new ideas, which can be written on slips of paper and inserted into the bomb to help explode the thoughts that are already being formed. The idea for thought bombs came from reading Hywel Roberts's book *Oops!* (Carmarthen: Independent Thinking Press, 2012), in which he describes throwing thought grenades at children to explode their thinking. Awesome book!



The teachers began reorganising their ideas based on what was contained in the bombs. The cooking idea was quickly thrown out and new ideas were added in its place. Once the teachers had begun forming an extensive list of the potential maths contained in the image (we were only about five minutes into the session here – it wasn't difficult), I provided them with a brief overview of the key concepts and processes teachers are expected to draw on when teaching mathematics in schools:

Number and algebra

Rational numbers, their properties and their different representations; rules of arithmetic applied to calculations and manipulations with rational numbers; applications of ratio and proportion; accuracy and rounding; algebra as generalised arithmetic; linear equations, formulae, expressions and identities; analytical, graphical and numerical methods for solving equations; polynomial graphs, sequences and functions; experimental and theoretical probabilities.

Geometry and measures

Properties of 2D and 3D shapes; constructions, loci and bearings; Pythagoras' theorem; transformations; similarity, including the use of scale; points, lines and shapes in 2D coordinate systems; units, compound measures and conversions; perimeters, areas, surface areas and volumes.

Statistics

The handling data cycle; presentation and analysis of grouped and ungrouped data, including time series and lines of best fit; measures of central tendency

1

Starting from scratch

Why we need a blank slate

To create the perfect Manglish curriculum, all staff members will need to be prepared to start from scratch. The whole school should be on board and a brave head teacher will need to invest time and effort in its creation. However, if you are merely one person and you are not yet in a powerful enough position to make that happen, do not stop reading! You can still use this book to make a difference for your pupils. The ideas contained in each section will allow you to develop Manglish experiences within individual lessons. A lone teacher can make a difference to a number of pupils; however, if a whole-school approach is adopted, we can change the attitudes of whole generations. If whole countries were to adopt a more joined-up approach to teaching, then we could change the economic future of the world!

Before the national curriculum (which was introduced in England, Wales and Northern Ireland as part of the Education Reform Act 1988), experience of a range of subjects did not come as a right for all pupils, which frequently left the poorest in society at a disadvantage. Secondary schools now give all children access to knowledge about the history of their country and the opportunity to learn foreign languages and to play a musical instrument.

This is great, but it has also left teachers of individual subjects isolated from one another. Subject specialists are compartmentalised and pupils rarely see for themselves how the knowledge acquired in one subject can be applicable in another. Pupils might spend an hour learning to understand space and shape in a design and technology lesson, but do not go on and employ the principles learned (even though the opportunity could easily have been built in). These links must be made explicit to young people.

The example Manglish curriculum outlined in this book would be suitable for delivering to a Year 7 cohort in England. In theory, you could just copy everything and practise it verbatim; however, that's not really the point. For one thing, curriculums change as subjects are added or taken away at the whim of government. You need to engage with Manglish as a state of mind if you are going to really make it work. To get *your* Manglish curriculum right, *you* will need to start from scratch with *your* school and *your* pupils' needs in mind. If you adopt Manglish as a mindset, you are no longer thinking within subject areas but as a whole school. As a whole school, you will adapt to any new expectations that are thrown at you and work together with the pupils' future needs at the heart of your plans.

I am about to take you step by step through the Manglish planning process to show you how you can create a similar approach in your school. The core planning begins with English and maths teachers, but the aim is to develop a curriculum with colleagues from all departments. In turn, this will create pupils and educators who see and apply links between all learning.

What do *your* pupils need to know?

We may be starting from scratch but we aren't throwing everything out of the window. We all know that we can't teach just any old thing to our pupils; there are certain expectations for schools set out in government policies that tie our hands, and most of this already exists in the national curriculum. We must cover our backs and make sure we teach everything we are told to teach – but that doesn't mean we all have to teach it in the same way.

To plan the basic overview for your Manglish curriculum, you must start

with a blank canvas and create a shopping list for teaching English and maths that covers all the necessary programmes of study and attainment targets. For example, Joseph Swan Academy is following an English curriculum that states the following must be taught: speaking and listening, spoken language, other cultures, extended reading, plays, Shakespeare, poetry and writing for various purposes. The mathematics curriculum states that pupils must cover: numbers, algebra, calculation, statistics, probability, geometry, measures, ratio, proportion and rates of change. Within each of these topics, there are many layers of skill which must also be taught, so skills are also fully audited at this time and put onto our shopping lists. This information will be useful later during the creation of the Manglish mats. (A more detailed explanation of the Manglish mat is set out at the end of this chapter and examples of completed mats can be found on pages 32–43.)

This part of the process requires the collaboration of every member of the English and maths departments. Pupils need consistency and, at this point in the development of our own curriculum, we found that English and maths teachers were not consistent in their approach to topics. There is nothing wrong with teaching in your own style, but when pupils have to learn different methods for multiplication or develop a new approach to written plans just because that's how their new teacher prefers to do it, essential time is being wasted.

Typically, a student will have a new teacher for English and maths every year in their lower schooling, meaning that they may have changed their way of approaching a topic – particularly a method that already works for them – up to three times. Pupils may also be unlucky enough to have a split timetable and may be asked to approach the same topic using two different methods at any one time – confusing! Once a pupil becomes highly skilled at a topic, there is plenty of merit in demonstrating various styles of approach – the pupil can then choose the most effective method for them. However, this should be included as differentiation for such pupils, rather than causing confusion and losing precious learning time for the masses.

Once the shopping list for exactly what is going to be taught is complete, the English and maths departments can then create the order in which the

topics would best be taught. For example:

Half-term	Mathematics	English
1	Numbers/calculation/algebra	Writing for purpose and audience: fiction (Shakespeare/poetry)
2	Statistics/probability	Reading for meaning
3	Geometry/measures	Spoken language/speaking and listening
4	Ratio/proportion/rates of change	Writing for purpose and audience: non-fiction
5	Probability/statistics 2	Reading for meaning (plays/autobiography)
6	Review	Review

Making purposeful links

Once the maths and English departments have their solid plan for the year in place, the other departments are now ready to do the same. However, as English and maths are the driving force behind the Manglish curriculum, their job is not yet complete. During the reformation of Joseph Swan Academy's curriculum, all departments were led through the same process of plotting out their own subjects' needs and expectations by myself and our maths AST, Gary Mitchelson.

Teachers didn't scrap their topics in favour of teaching English and maths; however, they did ensure that what was being taught was engaging, relevant and purposeful. As literacy and numeracy provide the foundations for all other learning, opportunities for developing these skills exist in all subjects (even if they are not immediately obvious). Gary and I were there to support teachers in finding the openings that already existed within their subjects. Where is the maths in that, Mr Historian? Where is the opportunity for communication, Mrs Physics? Where are you already practising reading skills, Mr Geographer? What purposes do you need to write for, Mrs Music?

We were not there to force our own subjects into theirs, but to explore where the skills already exist. Remember, there is maths in everything, but you must make that maths explicit, real and applicable if you are going to support your pupils in seeing its purpose and embedding that skill for life.

Once you have completed the collaboration between departments, your skeleton plan should now resemble something like this:

Half-term	Mathematics	English	Linking to:
1	Numbers/ calculation/ algebra	Writing for purpose and audience 1: fiction (Shakespeare/ poetry)	History: Europe and the wider world, 1901 to present day Technology: design, make, evaluate, technical knowledge
2	Statistics/ probability	Reading for meaning 1	Citizenship: civil liberties and the law Science: biology, genetics and evolution
3	Geometry/ measures	Spoken language/ speaking and listening	MFL: manipulating key grammatical structures including voices and moods
4	Ratio/proportion/ rates of change	Writing for purpose and audience: non-fiction	Music: improvise and compose Computing: creative project to select, use and combine multiple applications
5	Probability/ statistics 2	Reading for meaning (plays/ autobiography)	Geography: human and physical geography PE: developing physical techniques
6	Review	Review	Review

This table represents a basic overview, demonstrating which subjects will be collaborating at which times. As a result of detailed conversations at a subject and departmental level during the planning process, individual subject teachers should also come away with extensive lists of what each of their half-terms will contain in terms of content, progression and skills. Consequently,

each department in your school has a plan for the year ahead. In theory, they could return to school and practise what they have set out with success, but don't forget that continuing collaboration is absolutely essential. Teachers need to plan not only individual learning experiences together, but also to review these experiences regularly to assess their purpose and effect.

Imagine that this plan was created collaboratively, but then the lead teachers from English and maths and the teachers delivering the skills in other subjects never meet again. Teachers experiencing success may flourish; they may make links and develop reading, writing, communication and maths all by themselves. But without effective communication between departments, links may still be lost on the pupils as, for example, their learning in English is, for one reason or another, no longer progressing according to the plan. Similarly, teachers who struggle will soon scrap the new ideas in favour of tried and tested approaches to their own subjects, perhaps fearing examination failure. The key to success is continuing evaluation, discussion, ideas and support when things do not go to plan.

Dedicating time to this process is crucial. Teachers are overworked – fact! The initial planning is hard work, but it will pay off in time as a smarter way of working evolves. Effective planning will mean that collaborating teachers will begin to share workloads – for example, teachers of English will be marking homework tasks for teachers of PE. This should not mean that teachers of English take on *extra* marking (goodness only knows, they have enough already). Rather, English teachers' homework, which would usually be set by them, is set by PE that week. The English teachers then use this to inform their planning of pupil progression as they would have done with their own set homework. Similarly, teachers of maths won't need to set homework this week because the geography department has set a task for them. Teachers of both departments will then work together to analyse the results – all teachers are working together towards a common goal of pupil progress. We will look at how this works in practice in more detailed lesson planning on pages 24–26, but understand that time set aside for collaborative planning is essential.

Big ideas and relevant learning

All teachers should be aware of the bigger picture, whether it is their collaborative half-term (i.e. the half-term that they are linked to the English and maths departments, as in the table above) or not. Likewise, all teachers should be aware of the importance of making connections between learning experiences. The Manglish curriculum teaches pupils about the importance of making connections between everything, and so adopts a more ‘expert’ approach to learning. Industry experts may specialise in one area but they are always able to draw on their knowledge of other subject areas when necessary. In contrast, pupils often do not see how their mathematical knowledge can support them in their geographical studies, or how essay planning in English will be valuable to them in their PE written exam. If they aspire to a more integrated way of working, they will become more adept at selecting appropriate cross-curricular skills and therefore begin to act more like the experts they aspire to be.

Once departments become more confident with the application of reading, writing, communication and mathematics, following their collaborative half-term, they should begin to recognise opportunities to make links for themselves between the learning across the curriculum. After a few years of practising the Manglish approach, you will have teachers who are expert in finding opportunities to collaborate, not because they are told to but because they have experienced the success that working together towards a common purpose creates.

By following the process outlined above, your Manglish curriculum now has an effective skeleton structure. All subjects have been linked to maths and English and subject teachers have been coached in seeing for themselves the opportunities that exist to sustain effective collaboration and the application of skills from one subject to the next. Each half-term will now be given a ‘big idea’ as a driving force behind the collaboration taking place. The big idea should engage pupils and give teachers a planning focus that can span the whole curriculum. This big idea must be abstract enough to encompass every subject and allow interesting content to be developed from it. For example, if the big idea were Shakespeare, then it would be far too subject specific. Maths teachers would be turned off and it is hard to see

what tenuous links would have to be made to get the idea into design and technology (Shakespeare music boxes perhaps?). Similarly, if bridges were the big idea, maths teachers might flourish but English teachers would suffer from attempting to teach poems about bridges in an engaging way.

The big idea should be agreed upon by all departments and should make learning relevant for all your pupils. Magic would be my first choice for an initial Year 7 big idea – what child does not enjoy magic? And what a wonderful way to open your first year with these pupils, still fresh and enthusiastic from primary school, where it is still seen as acceptable to stick your hand up to answer every question. In mathematics, the idea that you can perform magic with numbers, as long as you learn how they work, is a far more engaging way to teach the number system than endless abstract and seemingly inapplicable sums. In English, pupils can learn about the illusion of writing and the writer as a magical being – someone who can create a whole new world from their imagination. In design and technology, the magical enthusiasm can continue into artistic creations which are mathematical in design but full of creativity. Did you know that magicians played an integral part in the success of two world wars? No? Well, pupils studying history will as this engaging big idea continues.

It is essential to have continuity across the curriculum, and a thematic approach to curriculum planning can support pupils when they are making links between learning. However, the big idea is merely the tip of the iceberg – the Manglish curriculum represents far more than just a theme.

Manglish is not a content-empty plan; on the contrary, engaging and cultural content is an integral part of its success. Pupils will find out about their ancestors, the origins of ideas, the wonder of cultural identity and what it really means to be a citizen of our world. In English lessons, pupils should be allowed to critically explore a myriad of writers and contexts both modern and historic; they should use this inspiration to experiment with their own personal writing styles. Pupils should be writing for contexts beyond their own classroom and understanding the contemporary world around them. I am sure that this is the aim of any curriculum plan. Where Manglish is different, however, is in the links made between historical periods being studied in other curriculum areas, such as history and art, to reinforce

What do you get when the maths department and the English department collaborate on a creative approach to improving literacy and numeracy across the whole school?

MANGLISH!

The brainchild of innovative English teacher, extensive blogger and Independent Thinking Associate, **Lisa Jane Ashes**, *Manglish* was created when Lisa decided that her inner-city school should approach literacy and numeracy in a different way. Building on the old maxim 'Every teacher *in* English is a teacher *of* English', Lisa shows that every teacher has the potential to be a teacher of literacy and numeracy and, when this is combined with the teaching of any other subject, everyone wins. This unique new book is full of practical ideas, strategies and insights designed to intertwine literacy and numeracy across the curriculum with the aim of improving both.

Lisa expertly blends her easy to read, enthusiastic and encouraging style with real practical examples which empower us to feel that we could all apply *Manglish* in our own classrooms.

Fearghal Kelly, biology teacher and learning coach, Preston Lodge High School

Lisa encourages us all to be galaxies rather than stars with her big thinking behind *Manglish*. If you want to prepare your students to collaborate and solve problems that don't yet exist, then this is a must-read book.

Jane Hutchison, Assistant Head, Joseph Swan Academy

Manglish offers an exciting and practical approach to the integrated curriculum which makes the seemingly impossible appear seamlessly practical.

Kathy McColl, ITT tutor

This book eloquently reminds us that while our duties as teachers of subjects are hugely and rightly important, we must never forget our responsibilities as teachers of children.

David Didau, teacher, writer and speaker



Lisa Jane Ashes is an experienced and successful English teacher, trainer and AST and takes a leading role in Continuing Professional Development at a secondary school in the North East of England. It was here that she developed the *Manglish* curriculum; her innovative solution to the problems inherent in implementing whole school literacy at Key Stage 3.