

SHANGHAI SPECIAL

ISSUE 3



Welcome to this special edition newsletter from the Central Maths Hub reflecting on the visit of our two Shanghai colleagues Duan and Daisy. We thank Parkfield Community School for hosting our Shanghai teachers and would like to send a special thank you to Helen Hackett and Claire Duncan for supporting and accommodating the vast numbers of you who have had the opportunity to observe the Shanghai teachers first hand.

Over 200 teachers have observed the Shanghai style lessons. Within this newsletter we will share some of the key findings and think about the implications for us as we continue to develop our collective understanding of Teaching for Mastery. We hope you enjoy reading this newsletter.

Kind regards

The Central Maths Hub Team





MEET THE SHANGHAI TEACHERS

Our two primary school teachers from Shanghai arrived in the UK in January for a two week period. During this time they taught Maths at Parkfield Community School in Birmingham to Year 2 and Year 4 classes.

Duan Yuexing and Zhu (Daisy) Guangqin worked and taught alongside Helen Hackett and Claire Duncan, from Parkfield and Worlds End Junior School, also in Birmingham. Helen and Claire were part of a research visit to Shanghai in November 2016.

The exchange is part of a project, funded by the Department for Education (DfE), to help English primary school teachers understand and implement some of the key elements of Shanghai maths teaching that have proved so effective in helping school pupils in Shanghai reach exceptionally high levels of attainment. It follows on from the Primary Shanghai Exchange (September 2014) and Secondary Exchange (November 2015).



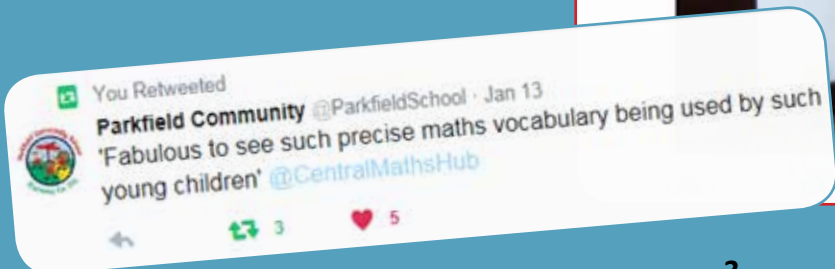
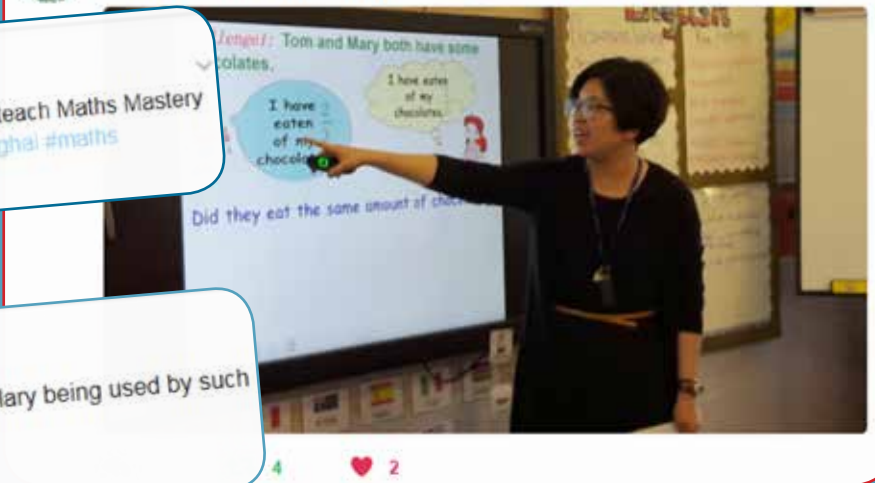
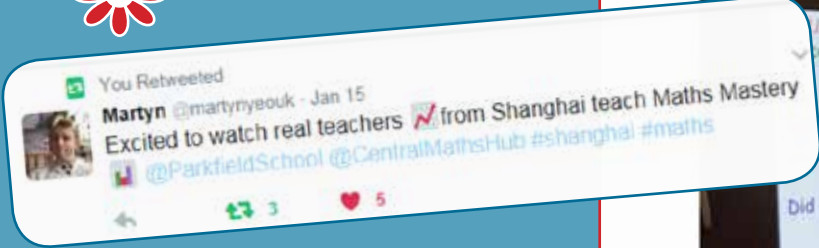
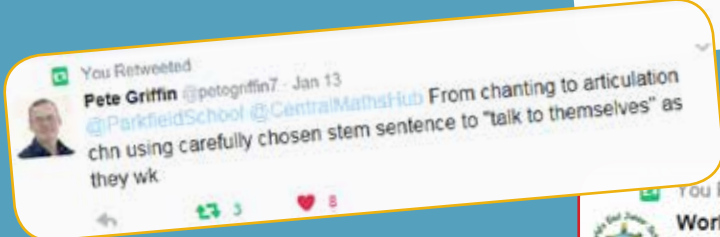
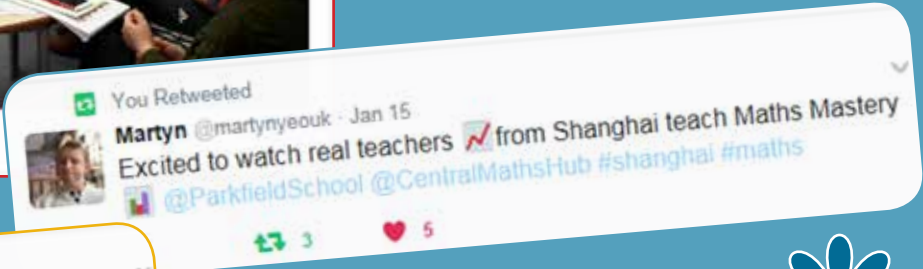
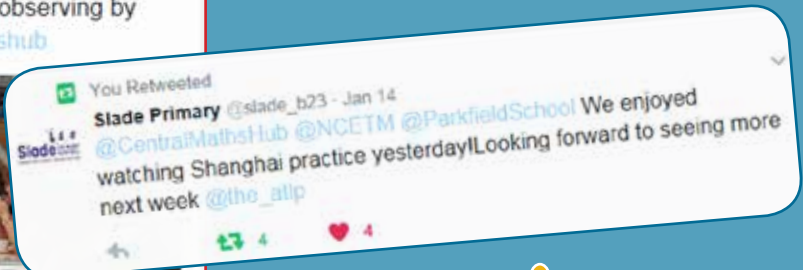


SHANGHAI EVENTS

"ALL THINGS ARE DIFFICULT BEFORE THEY ARE EASY."

Nearly 600 colleagues from the Hub network have attended events relating to the exchange programme, including over 200 who observed Daisy and Duan at Parkfield Community School.

Helen and Claire have led an extensive programme of other external events to support the exchange, including feedback presentations, demo lessons and update sessions to various governing and external bodies.



PHASE 1 - VISIT TO SHANGHAI

HELEN HACKETT, PARKFIELD COMMUNITY SCHOOL



In November 2016, Claire and I were part of a group of 70 cohort 1 Mastery Specialist Teachers to visit Shanghai. We spent our first week at The Experimental School of Foreign Languages, with partner teacher Duan Yuexing and the second week at Aiju Primary School with Zhu Guangqin (Daisy). We also benefitted from a lecture at the university by Professor Gu and a weekend workshop at the hotel led by Shanghai teachers and Debbie Morgan from the NCETM.



This was the first leg of the third Shanghai exchange programme led by the Maths Hub network and was a great way for Claire and myself to further develop our understanding of Teaching for Mastery, which we've been sharing with colleagues over the last two years on the Mastery Days and other workgroups we've been leading with the Central Maths Hub.

Prior to our visit, we had done our research and felt we knew something about Shanghai, but actually being there for two weeks helped to dispel many of the myths about why children from Shanghai consistently out-perform UK children when it comes to international tests. It has deepened our understanding of how mathematics is taught in China and by identifying the key aspects of successful teaching there; we are more able to support colleagues back in the UK to enhance the teaching and learning of mathematics.

In the schools we visited, there were 40 children in each class, with no teaching assistant and they use maths specialist teachers. Maths lessons were 35 minutes of teaching, followed later in the day by a further session for 'intelligent practice'. Children learn to understand the mathematics deeply and are fluent in basic number facts – demonstrated through their 2 minute chanting of number facts at the start of each lesson. The 'five big ideas' of Teaching for Mastery were all observed.

The visit highlighted to us the Chinese approach toward teacher CPD, which is key to ensuring every child receives the very best teaching and therefore reaches their full potential. Some of these approaches, such as lesson study and open lessons we've been using at our own schools for a while, but need to develop further. It made us question attitudes in the UK toward CPD and what actually constitutes as effective CPD. Are opportunities are missed in the UK? In Shanghai teachers always plan collaboratively and carefully craft each lesson. In the UK teachers have PPA time to facilitate this, but too often one teacher plans the maths alone.

In Shanghai the main focus is the crafting of the lesson in detail, nothing is left to chance – teachers carefully consider the 'tricky bits' and plan to address these. In the UK should teachers spend less time on producing paper lesson plans and marking, and more time on crafting lessons? In Shanghai classroom doors are open and colleagues are welcomed – in this country there is still often apprehension around being observed.

WHAT ARE THE FIVE BIG IDEAS?

- Representation and structure
- Fluency
- Thinking mathematically
- Variation
- Coherence

During the visit we were impressed by the two minutes of chanting that began each maths lesson. Upon our return to the UK we worked via email with our partner teachers on establishing the same chanting in our classrooms. We looked forward to sharing these chants with Daisy and Duan during phase two of the exchange.



PHASE 2 - SHANGHAI TEACHERS AT PARKFIELD

On Sunday 8th January Claire, myself and Hazel Pulley (executive head teacher, Parkfield Community School) collected Daisy and Duan from London. On Monday 9th January they met the children for the first time. Duan taught a Year 2 class and the focus was multiplication. Daisy taught a Year 4 class with the focus on fractions.

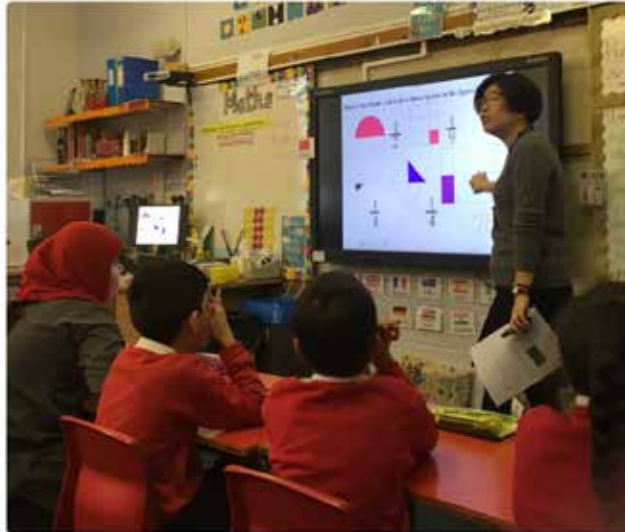
From Tuesday 10th to Thursday 19th January, 211 teachers from 77 different settings came to Parkfield to observe lessons. The first 12 lessons were in classrooms with around 14 teachers observing each lesson. The final two lessons were 'showcase lessons' held in the school hall for a larger audience. There was a pre and post lesson discussion led by Claire and I. Other Mastery Specialist Teachers and teachers from our Teacher Research Groups gave valuable feedback during these discussions. It was really interesting how each post lesson discussion focused closely on the mathematics and people raised different points of interest for discussion. Feedback (shared via Twitter) was really positive – everyone learnt something and had lots to think about.

You Retweeted
Parkfield Community @ParkfieldSchool · Jan 17
Y4 lesson on fractions begins - children explaining what they learnt yesterday @CentralMathsHub



3 retweets 2 likes

You Retweeted
Parkfield Community @ParkfieldSchool · Jan 17
Comparing unit fractions & explaining, using 'because' @CentralMathsHub



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You Retweeted
Katherine Weston @kwest91 · Jan 18
Looking forward to the maths showcase at @ParkfieldSchool today! @CentralMathsHub @NCETM

1 retweet 3 likes

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Parkfield Community @ParkfieldSchool · Jan 18
'Inspiring - everyone can succeed - no one left behind' Helen, Slade @CentralMathsHub

2 retweets 5 likes

You Retweeted
Gary Setchell @mistersetchell · Jan 21
Agreed. I think many teachers and chn across the city have benefited from their willingness to share ideas. @HyperHelga @CentralMathsHub

Matthew Wynne @matt_Wynne1
@NickGibbMP @NCETM @WorldsEndJunior @ParkfieldSchool Helen and Claire are amazing advocates for Maths #gamechangers and #changemakers

4 retweets 5 likes

You Retweeted
Matthew Wynne @matt_Wynne1 · Jan 21
@NickGibbMP @NCETM @WorldsEndJunior @ParkfieldSchool Helen and Claire are amazing advocates for Maths #gamechangers and #changemakers

4 retweets 10 likes



Claire's head teacher generously released her from her school in the mornings for the two weeks of the exchange to work at Parkfield.

Parkfield has 3 classes in each year group and all benefitted from the expertise of our Shanghai colleagues as the lessons were taught to the rest of the year group a day after the open lesson. This was great PD for Parkfield teachers. The progress the children made was clear to see, but also their enjoyment – especially when tackling challenging questions in lessons. It helped us to see how carefully each lesson was planned and how mathematical concepts were revealed to children through clear representations. What interested us most was how variation was used to ensure depth of understanding.

Over the two weeks there was a really exciting atmosphere around the school, amongst pupils and teachers. Actually seeing lessons in action is far more useful than hearing someone talk about the key aspects, so teachers who took advantage of this opportunity will be able to use it to enhance their practise.

Our School Twitter feed practically exploded as we posted regular updates about the exchange, with thousands of people from all over the country following us, commenting and closely watching events. One tweet alone attracted the interest of over 7000 teachers.

We also took the opportunity of sharing with each group of visiting teachers the other CPD on offer from Central Maths Hub.

To ensure that Duan and Daisy were kept busy during their first ever trip outside of China, we took them on some sight-seeing adventures: a tour of Birmingham (Mailbox, Bullring, ICC, library), Warwick Castle, Stratford Upon Avon (including a backstage tour of the RSC), Bicester shopping village, Oxford (including the university), and finally places of interest around London.

At the end of the exchange Claire and I accompanied Duan and Daisy to a reception at the Chinese Embassy in London, attended by Nick Gibb. Daisy gave a speech to the audience on behalf of the Shanghai teachers and highlighted the excellent behaviour of UK pupils and the way some of their responses had surprised their Chinese teachers, because they showed creative thinking.

It is really important to note that following this exchange, we feel reassured that we have been heading in the right direction with maths teaching and learning and our approaches to TfMastery. We still have a distance to travel, but at least we know we're on the right road and have clarity on what we need to develop further. We are sharing our experiences in more detail through a range of opportunities, such as the Shanghai Feedback twilights.



LESSON OBSERVATION - YEAR 2

MULTIPLICATION SHOWCASE LESSON

JAMES COUGHLAN, CENTRAL MATHS HUB LEAD



The lesson began with a review of previous learning which was focussed on the two and five times tables.

The pupils were encouraged to chant

"Three fives is fifteen"

When they reached 9×2 the teacher reminded them of the importance of,

"always saying the smaller number first"

in this case,

"two times nine"

The lesson today was to focus on the four times tables. Pupils were asked to consider how many sticks were needed to make a square? They used concrete apparatus to construct the square on their desks and then began to complete the following table.

One square need 4 sticks

Square (s)	1	2	3	4	5	6	7	8	9
Stick (s)	4	8	12	16	20	24	28	32	36

Multiplication: $1 \times 4 = 4$
Multiplication: $2 \times 4 = 8$

The class were encouraged to all say together,

"One square needs four sticks"

The squares were shown on the PowerPoint and the slideshow actually constructed the squares in a similar way to the concrete construction happening on the pupil's desks. Pupils then chanted together,

"1 times 4 equals 4."

There was evidence of scaffolding to support the construction of two and then three squares



"Do you want to make more squares?"

A resounding **"YES!"**

As the pupils completed the table the teacher wrote on the whiteboard

$$\begin{aligned} 1 \times 4 &= 4 \\ 2 \times 4 &= 8 \\ 3 \times 4 &= 12 \end{aligned}$$

She then, very deliberately, wrote

"four two is eight"

At first it was assumed that this was something perhaps lost in translation but this was a very deliberate move on the part of the teacher as discussed post-lesson. A key point in this lesson was to stress the commutative nature of multiplication hence the need to 'always say the smaller number first'. With the written statement above if you commute it still becomes quickly readable as,

"two four is eight"

If,

"four two's is eight"

is used there can then be confusion with,

"two's four is eight"

The teacher began to move the pupils to the 'abstract' asking them to link the concept that if four squares need 16 sticks then $4 \times 4 = 16$. She then challenged pupils to think about how many sticks would be needed for 6 squares and how they might know this if they did not need to make the squares. The pupils start to see a connection through adding four and the teacher emphasises,

"so we don't need to make squares anymore."

There is some discussion over how many sticks are needed for 9 squares and eventually the correct answer is given after misconceptions being fully explored by the teacher. It is interesting to note that 10 squares does not form part of the table to complete.

The pupils are then shown the following table:

What can you find between these sentences?

1	×	4	=	4
2	×	4	=	8
3	×	4	=	12
4	×	4	=	16
5	×	4	=	20
6	×	4	=	24
7	×	4	=	28
8	×	4	=	32
9	×	4	=	36

and asked to look for connections. There are some brilliant pupil responses which include ...

"They only end in even numbers."

"The first number just increases by one."

*"The second factor is always four"
(yes, they used the word factor!!)*

"The end number is always four bigger than before."

The pupils then begin to look at Chinese chanting. This is shown in the following slide. There is a clear decision to highlight certain statements in red and others in green. Emphasis is again placed on saying the smaller number first.



To say the chanting

() 4 s

chanting

$1 \times 4 = 4$

$2 \times 4 = 8$

$3 \times 4 = 12$

$4 \times 4 = 16$

$5 \times 4 = 20$

$6 \times 4 = 24$

$7 \times 4 = 28$

$8 \times 4 = 32$

$9 \times 4 = 36$

One four is four

two four is eight

three four is twelve

four four is sixteen

four five is twenty

four six is twenty-four

four seven is twenty-eight

four eight is thirty-two

four nine is thirty-six

The class then begin to chant. They get quicker as they repeat the chanting several times. They consistently put the smaller number first in the chanting.

The teacher then moves on to a flashcard activity mixing up the four times tables. Again lots of verbal responses. Then they are given an exercise to further consolidate:

Exercise:

Fill the blanks

$() \times 4 = 12$

$4 \times () = 8$

$() \times 5 = 20$

$6 \times () = 24$

$() \times 7 = 28$

$4 \times () = 4$

$4 \times () = 36$

$() \times 4 = 32$

$4 \times () = 16$

$4 \times () = 12$

The lesson concludes with a challenge question.

challenge

There are 5  , each car needs 4 tyres, there are 19 tyres in the factory , are there enough to fit all these 5  ?



KEY POINTS FROM THE LESSON

- The lesson provided an excellent demonstration of Concrete, Pictorial, and Abstract (CPA) approaches through the use of squares. The key thing being the 'C' the 'P' and the 'A' happening within the same episode of the lesson not as isolated activities or even as separate lessons.
- The pace within the lesson was relentless. The back and forward exchange between teacher and pupils exemplified the “ping-pong” approach. Pupils were rarely left for long on their own.

OTHER CONSIDERATIONS

- Scaffold before differentiating
- All pupils working together on the same thing.
- Lots of “ping-pong” back and forwards.
- In Shanghai this hour long lesson would have been 35 minutes – the pace in the hour was very fast!
- The next lesson would be looking at the 8 times tables.
- Precise use of mathematical language is embedded throughout the lesson.
- Why stop at 9×4 ? When asked this is the post lesson discussion the simple answer was that this was seen as “too easy” as “you can just add a zero on the end” these facts would be almost taken as read before they learn the Chinese chanting.



LESSON OBSERVATION - YEAR 2 MULTIPLICATION

CLAIRE DUNCAN, WORLDS END JUNIOR SCHOOL

I have selected this lesson because all of the 5 Big Ideas are evident.

The lesson began with an anchor task in a context that the children were familiar with – a party. The teacher explained that in China, the people use chop sticks and that the mommy needed to work out the number of chopsticks that she needed.

Let's learn

Can you help mommy bear to figure out how many pairs of chopstick does she put?
And how many chopsticks altogether?



One pair has two chopsticks.

Pair (s)	1	2	3	4	5	6	7	8	9
Chopstick (s)	2	4	6	8	10	12	14	16	18

1 pair



$$\text{Multiplication: } 1 \times 2 = 2$$

2 pairs



$$\text{Multiplication: } 2 \times 2 = 4$$



The children had sticks on the desk and grouped the sticks into pairs. The teacher explained that one pair of chop sticks could be represented as $1 \times 2 = 2$. She ensured that the children understood what each of the numbers represented by linking it to the image. She repeated this with $2 \times 2 = 4$. The children were then encouraged to complete the table.

Once the children had completed this, the teacher went through the answers, all of the time ensuring that links were made between the equation, the picture and the numbers in the grid. The concept was understood by the children linking all 3 representations – ‘Representation and Structure’ and ‘Variation’ are two of the 5 Big Ideas at the heart of TfM. A high level of repetition further supported the children in understanding the different representations.

() () s Chinese chanting

$1 \times 2 = 2$	one two is two
$2 \times 2 = 4$	two two is four
$3 \times 2 = 6$	two three is six
$4 \times 2 = 8$	two four is eight
$5 \times 2 = 10$	two five is ten
$6 \times 2 = 12$	two six is twelve
$7 \times 2 = 14$	two seven is fourteen
$8 \times 2 = 16$	two eight is sixteen
$9 \times 2 = 18$	two nine is fourteen

Helping the children to understand the representation and structure was further evidenced when the children were then introduced to Chinese Chanting. Chinese Chanting is different from English Chanting because the smallest factor is always placed first. The children were shown the times table displayed as number sentences as well as in words. The colour coding of the wording helped the children to see where the factors began to swap places in order for the smallest number to be placed first. Later, this will be used to enable the children to chant all of the multiplication tables daily in order to develop their fluency.

Mathematical Thinking was then encouraged when the teacher asked the children to look at the relationships between the numbers in order to spot the patterns.

() () s Great Chinese chanting 2's chanting commutative

$1 \times 2 = 2$	one two is two	$2 \times 1 = 2$
$2 \times 2 = 4$	two two is four	$2 \times 2 = 4$
$3 \times 2 = 6$	two three is six	$2 \times 3 = 6$
$4 \times 2 = 8$	two four is eight	$2 \times 4 = 8$
$5 \times 2 = 10$	two five is ten	$2 \times 5 = 10$
$6 \times 2 = 12$	two six is twelve	$2 \times 6 = 12$
$7 \times 2 = 14$	two seven is fourteen	$2 \times 7 = 14$
$8 \times 2 = 16$	two eight is sixteen	$2 \times 8 = 16$
$9 \times 2 = 18$	two nine is eighteen	$2 \times 9 = 18$

What's the secret between these sentences?

1	\times	2	=	2
2	\times	2	=	4
3	\times	2	=	6
4	\times	2	=	8
5	\times	2	=	10
6	\times	2	=	12
7	\times	2	=	14
8	\times	2	=	16
9	\times	2	=	18

The first factor, the next one is greater than the previous one by 1.

The second factor is same.



The next product is greater than the previous one by 2.

A number $\times 2$, the product is always an even number.

Once the patterns had been uncovered, the children looked again at the Chinese chanting. This time, the children also shown the commutative law, this had been explored earlier in week, the children were encouraged to make these links.

two six is twelve () nine is eighteen () () is four

Rather than practicing the 2 times table by completing lots of questions, the children were given three questions that they had to think hard about and a worded problem. One of the reoccurring features of the lessons was that the children were not expected to complete many written examples, rather, the children were given a few questions which included some very challenging questions. All of the children had an opportunity to attempt the most challenging questions, and the solutions were modelled for all.

Peter has 15 pounds ,he want to bought 8 each  cost 2 pounds, does his money  , enough to buy?

$8 \times 2 = 16$



WHAT HAVE WE LEARNT?

VARIATION

Looking at the concept in multiple ways within one lesson helps the children to really understand it.

REPRESENTATION AND STRUCTURE

Helping the children to understand what each of the numbers represents by linking it with concrete resources and by using a high level of repetition.

MATHEMATICAL THINKING

Pattern spotting and the ability to reason is a reoccurring feature.

FLUENCY

The Chinese Chanting helps the children to become fluent by practicing all multiplication facts without the need to repeat the commutative facts.

COHERENCE

The small steps through the lesson and through the sequence of lessons enabled the class to move though the learning together.

FEEDBACK FROM THE OBSERVATIONS

HAYLEY SHAW, KNOWLE PRIMARY ACADEMY

What struck me immediately about Daisy's lesson was the very clear conceptual journey and small steps through the lesson (COHERENCE) - Daisy kept a tight focus and the carefully chosen variation to the visual images resulted in intelligent practice. For example, rather than showing just non-unit fractions of whole shapes, two of the images contained grouped and circled items in equal parts (REPRESENTATION AND STRUCTURE / VARIATION). The emphasis was very much on 'equal parts of a whole' so children were not confused by this and I feel that this would often be the stage where misconceptions would occur within the concept of fractions.

Another thing that struck me was the preciseness of the stem sentences to support the concept. e.g.

5 swans are divided into 5 equal parts. The 4 white swans are $\frac{4}{5}$ of the whole'

Stem sentences were displayed with missing values so that the children could apply this to each question). Children were confidently using and explaining vocabulary such as 'denominator, numerator, fraction bar, equal parts, non-unit fraction, several, whole' etc.

What really 'wowed' me was the key difficulty point or 'Dong Nao Jin' activity (MATHEMATICAL THINKING): children were asked if Tom and Mary both ate $\frac{2}{3}$ of the sweets would they eat the same amount? Of course they all said yes!!! Incredibly clever planning of an activity to expose a misconception. She then clearly demonstrated that the whole would have to be defined in order to make a judgement on this. So simple, yet so effective!

HELEN FULKER, KNOWLE PRIMARY ACADEMY

Helen trialled one of the Shanghai lessons with her own teaching group.

The retention of vocabulary and understanding from all children was outstanding as well as their confidence and willingness to contribute (that may be because we didn't have 13 strangers in the room!!)

We started our recap at the swans slide. Where I asked children what is the whole and they said "5 swans". They completed the sentence confidently and without support from me and correctly said 1 equal part is $\frac{1}{5}$ - 10 children put their hands up for this.

When asked, is this a unit fraction? All children said yes and 5 children retained (no prompts from me) the sentence 'a unit fraction is one equal part!!!'

Similarly, when we moved onto the swans as $\frac{4}{5}$ - and I followed the same question sequence all children said yes this is a non-unit fractions because there are 'many equal parts of the whole' I then asked for another word and one child offered 'several'.

We moved onto a square example
= '3 coloured parts are $\frac{3}{4}$ of the square'

Over half the class put their hand up to answer this. We were moving through rapidly today.

I then popped up the chocolate challenge from yesterday to the children going **'YES!'** they were so excited to have a go. I asked the question and unlike yesterday, all children said "no they do not have the same amount of chocolates" one child remembered (without seeing) that Mary has 12 and Tom had 9. We then discussed in pairs, with all children engaged. In our shared discussion, one child said:

"Tom would eat 2 lines so that is 6 chocolates and Mary would eat 2 lines and that is 8".

One child came to the board and circled the chocolates. We were so impressed with the progress made over the two days. I asked the children to tell me all of the words they had used is these lessons. They said:

Denominator
numerator
fraction line
equal
fraction
non-unit fraction
unit fraction
several
whole

The children then had to write 2 sentences using any of these words to tell me what they now know about fractions..... WOW!!"

HELEN AND CLAIRE ON...

PLANNING

We noted from taking part in open lessons during the last exchange and from keeping track of the lessons being taught in other schools during this exchange that the KS2 lessons were all with a fractions focus and KS1 either addition or multiplication. We were sceptical as to whether the Shanghai teachers were all given the lessons in advance and just taught to the plans they were given, regardless. However, can definitely vouch for the fact that they didn't. They did have a basic lesson planned in advance, mostly due to translation challenges. But every day they spent loads of time discussing the lessons and making changes to the Power Points. They were making these changes right up until the last minute, literally until the minutes before the lesson began ... causing us great stress, but it was amazing how sometimes it was the tiniest of changes, but they said that would make a huge difference to the understanding.

There was some discussion over use of Power Points and we feel we must point out, they only used these because it was software we had in common and they were working on the lessons each evening on their laptops with Chinese/English translation. They loved the Promethean software we have on our interactive whiteboards and enjoyed exploring them, with great excitement.

LESSON FEEDBACK

What came across really clearly to us, as we took part in every lesson discussion and as we had both taken part in the previous primary exchange, was how the discussions focussed on the mathematics this time. People who observed knew about Teaching for Mastery approaches and really knew what they were looking for. Questions and discussion points related to the five big ideas. I think this is a real sign of how thinking around mathematics has developed over the last two years and the progress we've made. Many who came said what a relief it was to see that they were on the right track within their own settings.

It was nice to have Mastery Specialist Teachers from other hubs attend and share feedback from their schools. It was also good to hear feedback from TRG schools.

THE CURRICULUM

Both teachers were shocked by the UK curriculum and the learning objectives. Duan queried why they learn multiplication in Y2 when they've not had long enough learning addition/subtraction with depth. In Shanghai this is the focus for a whole year before moving on to multiplication. She explained that without a depth of understanding of addition and real fluency with addition facts, they couldn't possibly really understand multiplication. Daisy was horrified by the Y4 objectives for fractions, stating they were way too hard for such young children.

FORMATIVE ASSESSMENT

We noted that at the beginning of the exchange they were 100% reliant on children putting hands up and picking one or two to give answers, by the second week however they were exploring more 'all respond' strategies, such as writing on individual whiteboards and holding them up. They liked these approaches and said they were going to ask for more resources like these once back in Shanghai.

Both Daisy and Duan were interested in the responses they got from our children. They said they were taken aback by the children's more creative approaches to problems and the responses from them were far more varied than they would get from children at home. They felt our children were more creative and more 'out of the box' thinkers, whereas they felt in Shanghai they'd get very streamlined, expected responses with no surprises.

PRACTICAL RESOURCES

They have far fewer practical resources on hand in Shanghai schools and often make resources. In the UK I think we leave children with practical resources too long, relying on them to 'do' the maths, instead of to 'understand' the maths. Often in the UK even KS2 children are encouraged to use their fingers to work something out, whereas in Shanghai they use fingers in kindergarten and in term one, year one, then encourage children to move away from using them.

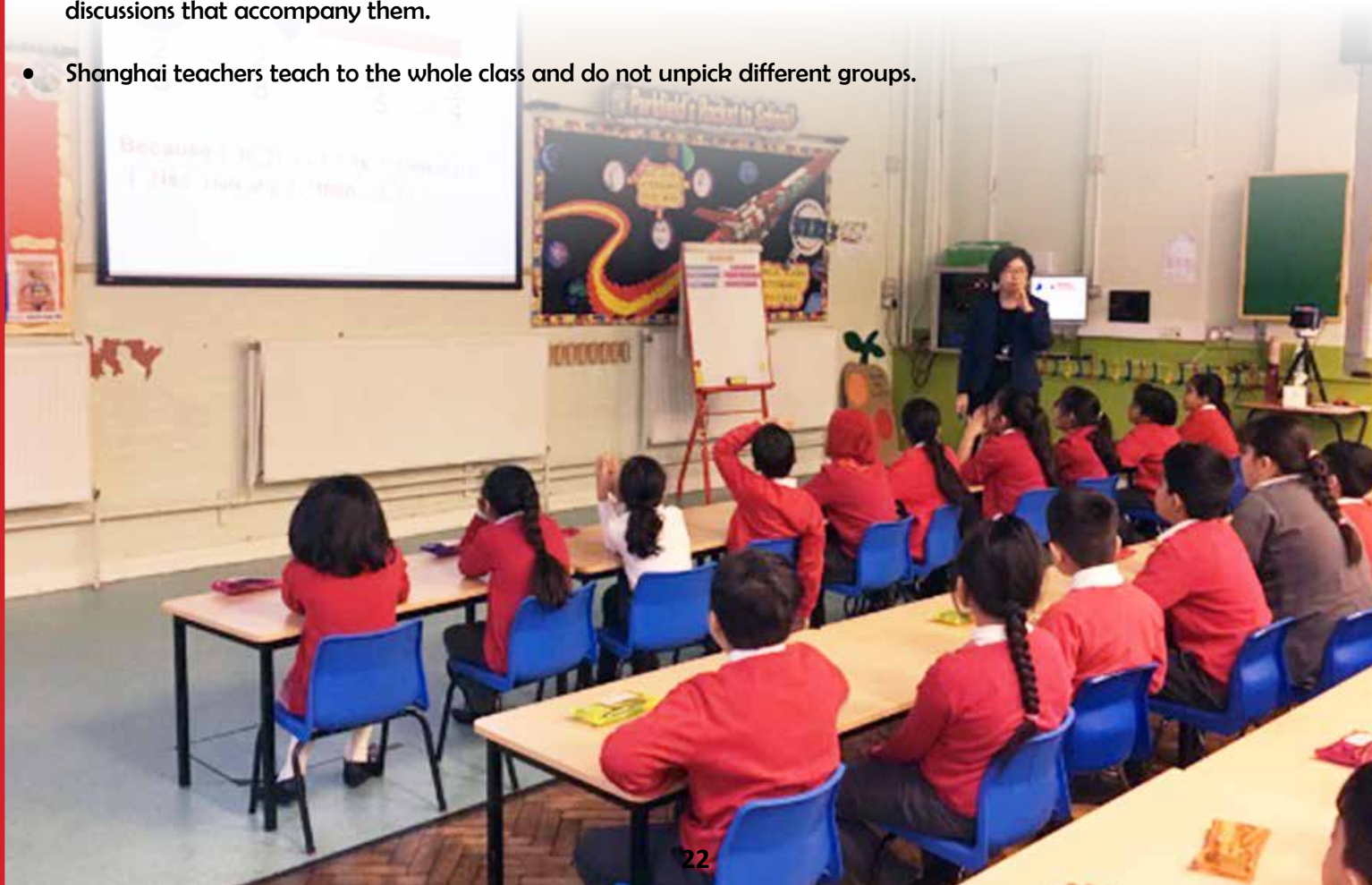
BEHAVIOUR

They were in awe of the behaviour in our school. (We were in awe of their classrooms.) What really impressed them was how calm and quiet the children were, even between lessons and going out to play. In Shanghai the children were very lively between lessons, and would run through corridors shouting between lessons quite energetically, but returned to seats immediately ready for learning when lessons began.

HELEN AND CLAIRE'S KEY LEARNING POINTS



- We need to develop a better understanding of 'variation' and use this to ensure depth of understanding.
- Fluency with basic number facts is still a huge issue in our UK schools - and the major cause of children struggling in maths classrooms - we need to develop the approaches we use to develop fluency and practice. We should not send any child into KS2 who is not fluent with number bonds to ten and unit and unit addition facts. Some schools have devoted an extra session of mental maths in the afternoons, devoted to practicing number facts.
- Representation - we need to continue delivering a range of CPD to ensure all teachers are able to choose the most appropriate representations in order to reveal the mathematical concepts and to know when to move children from concrete to pictorial and then abstract.
- Ensure all teachers have the ICT skills required to create lessons on interactive whiteboards ... the smallest things make the greatest difference, the way a concept is presented on the whiteboard is really important and making it interactive, but if a teacher doesn't know how to do that, it can be a huge barrier.
- The way we view CPD in the UK is different to in Shanghai. Every time teachers get together to discuss the mathematics in Shanghai, that's CPD. Classrooms are open all the time, every week there will be someone in your lesson, not to judge or grade you, but to support you and provide feedback helping you to improve and give maths specific feedback. Teachers in Shanghai welcome this feedback and welcome people in their lessons. There is still an issue in the UK about having other adults in your lessons - some teachers get nervous or avoid this. We need to change attitudes and embrace open lessons, along with the discussions that accompany them.
- Shanghai teachers teach to the whole class and do not unpick different groups.



HAZEL HOWAT, ST JOHN FISHER

YEAR 2 LESSON

COHERENCE:

small steps- I noted that 4 times table linked to apparatus initially then careful steps to adding 4 then counting in 4s followed by chanting.

REPRESENTATION:

physical - showing adding 4 structure, symbols, precise use of language e.g. commutativity, product.

MATHEMATICAL THINKING:

challenge at the end with cars and tyres

FLUENCY:

chanting of tables but taught with conceptual understanding of what 4 times table is.

VARIATION:

conceptual variation - symbols, verbal, physical.

YEAR 4 LESSON

COHERENCE:

careful steps through the mathematics, from comparing unitary fractions to same numerator fractions and then same denominator fractions to finally comparing all by finding a connecting fraction. Clearly built on the lesson before.

REPRESENTATION & STRUCTURE:

emphasis on same whole. Fractions represented as circles and rectangles as well as symbolically. Precise use of language e.g numerator, denominator

MATHEMATICAL THINKING:

challenge at the end using connector fraction

VARIATION:

conceptual variation - rectangles, circles

PROCEDURAL VARIATION:

in each small step e.g. unitary fractions, same denominator fractions.



OTHER FEEDBACK (PCS + OTHERS)

Small steps at the start lead to greater strides being made by the children independently later on.

Lessons were planned in great detail and teachers anticipated what responses they'd get from children.

There was clear progression through the lesson and over the series of lessons.

Some children thought really deeply about the concept, because of the challenges set.

There was pace in the lesson, but it looked different. They didn't look at lots of different things, but at one thing, in lots of different ways

Children were able to give explanations and relate to real life contexts.

Use of working wall to record what had been learnt.

The lesson seemed to start very simply, but pitched up throughout and by the end was quite challenging.

Variation – still learning about this, but I could see it in the lessons. Revealing what something is, but also what it isn't. Looking at it in lots of different ways. Then practicing with variation. Very interesting.

Children who were struggling given chance to come to the front and explain, self-correct.

Small gradual steps to achieve goal.

The importance of being fluent with number bonds and times tables.

Using the correct vocabulary

I feel reassured that we are teaching in a similar way to the teachers from Shanghai.

Their approach with problem solving seems similar to ours and their use of visual images is similar to our flipcharts.



Interesting to see the chanting and repetition of sharing ideas orally i.e. I say, you say and this is something I am trying to use more in my lessons.

Shanghai teachers moved children on to mental methods to solve things rather than leaving them too long with equipment and images in the lesson.

How the language used also became more formal but followed the same pattern and was explored through the images use.

The teachers ensured the children saw the relationships between the numbers and spotted the patterns ... the flipcharts were key to revealing them.

The children were challenged to see the numbers and the concepts differently and understand more deeply.

Children had lots of opportunity to explore and to see the relationship between numbers and ideas.

The pace of the lesson was impressive, children were kept busy throughout, but the teacher led the learning in the direction it needed to go.

There was lots of partner talk and discussion, combined with whole class discussion.



COMMENTS FROM OUTSIDE OBSERVERS:

Use of open lessons as great teacher PD – the pre/post lesson discussions were so valuable.

The order in which times tables are taught. making links between e.g.: 5s and 10s, 2s 4s and 8s

Small chunks of learning in each lesson lead to big impact.

Great to see that the LO was not differentiated.

Children were obviously enjoying the challenge.

Variation was at the heart of what I saw today ... so key.

Keeping the whole class together.

Lots of repetition and chorusing I wasn't doing enough before.

Children were allowed to make mistakes and work through them, whilst allowing this, the teacher did not allow them to derail the lesson and take on another track. Some answers were merely acknowledged and the lesson moved on. Speaking during the post lesson discussion we realise these were not ignored, they will be revisited, but they did not take the lesson off in a different direction.

Clear objective for each lesson and the children were focussed on the learning throughout.

The lessons were so carefully crafted, key elements were explored through variation.

Fantastic challenge from what at first appeared to be a simple concept.

Feeling affirmed we're on the right journey.

A whole new way of teaching, planning and thinking – exciting times!

No more labels! Everyone can achieve in a maths class.

Looking at one thing in lots of different ways to ensure depth of understanding.

The episodic lesson was really effective at moving the learning forward.

Dialogue reinforced the learning and kept all engaged.

Comparing fractions using 'the connector' – why have we never thought of that? Amazing!

Fast paced and rapid learning for all.

Strategies used effectively in literacy lessons seen used in maths Repetition and chorusing.

Greater depth of understanding, greater manipulation of numbers.

Using what you know already to solve a new problem.

Pattern spotting and making connections.

Fabulous to see the pace and progression through use of variation today.

Inspiring to see how these strategies can ensure no one is left behind.

Chanting used as an aide memoir interesting and effective.

Amazing progress in one lesson, and children had fun.

Concrete – pictorial – abstract approach in action today.

Lots of light bulb moments in today's lesson for me.

Every child in the class given the same opportunities to succeed ... no ceiling put on their attainment. Fantastic lesson ... really showed links between C, P and A.

Great to see year 2 children using such precise mathematical vocabulary.



Primary Teaching for Mastery Development Workshop

Primary Mastery and Theory in Practice Workshop

This practical and hands-on session will cover Mastery theory and practice;

- Video examples of Shanghai teaching from the recent exchange programme
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- An update on the National picture
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"It was useful to see the whole class mixed ability teaching approach in my own year group so that I can make comparisons between how I am doing things now. This will help when considering what changes I can make when I am planning my lessons at school."

How to apply

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Further information

Please email mathshub@bishopchalloner.bham.sch.uk for further information about this programme, or any of our courses

"The day has been credible and amazing - thank you. The informative speakers are inspiring and passionate about children's learning and understanding of Mathematics."





TWITTER

Of course you can also always tweet us

[@centralmathshub](https://twitter.com/centralmathshub)

ONLINE COMMUNITY

You can continue the Shanghai discussions through the online community where links to resources, videos and other teachers' posts can be found.

www.ncetm.org.uk/community/13370

EMAIL

If you have an idea as to how the lessons learnt from Shanghai can be further embedded within your own setting or you would like to try out some of the Shanghai methodologies, please let us know.

mathshub@bishopchalloner.bham.sch.uk

WEBSITE

The Maths Hub website also contains information on the England China project and will be updated regularly as the project moves.

www.mathshubs.org.uk/