

RAISING THE ATTAINMENT OF DISADVANTAGED PUPILS IN MATHEMATICS

Peter Howard and Bev Bessey



AIMS OF THE PROJECT...

In 2016, the achievement gap between our disadvantaged and non-disadvantaged children widened in maths.

We wanted to take action to ensure that this gap closes and that our disadvantaged children make rapid progress.

We dedicated our eight week project to raising the attainment of disadvantaged children in maths across our school.



WHY?



What does the school need to do to improve further?

Improve teaching and learning in mathematics by:

- providing training and support for teachers to develop their subject knowledge
- ensuring planning and teaching are designed to enable all pupils to secure their understanding effectively

Improve the effectiveness of leadership and management by:

- ensuring information about the use of the pupil premium is detailed, and that pupils' progress is checked regularly to ensure the additional funding is used effectively

"Overall, teaching in the school is good... It is not yet outstanding because some of the teaching in mathematics does not have the right amount of support and challenge to enable all pupils to make the best progress."

"Disadvantaged pupils make progress that is broadly in line with that of other pupils. However, as their starting points were lower, they still need to catch up the relatively small gap. Although their progress has improved since the last inspection, they do not all make sufficiently rapid progress in order to close the gap with their peers."

"There are few open-ended activities and real-life examples to enable pupils to deepen their understanding."

"A few teachers do not always have good enough subject knowledge in mathematics to ensure pupils gain a deep understanding of some of the more complex ideas."

"Some teachers lack a deep understanding of the mathematics they are teaching. At times, this holds pupils back."

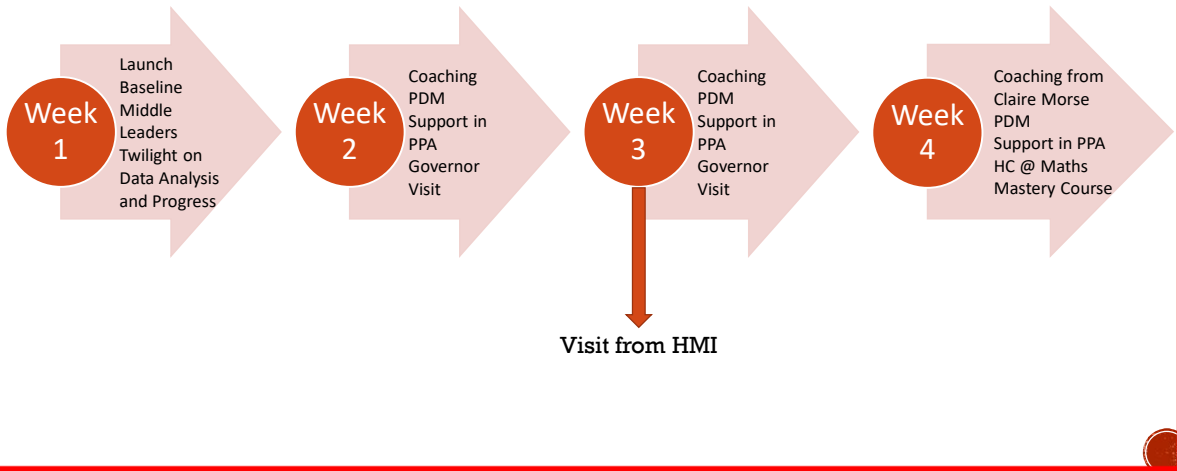
ACTION PLANNING – OUR JOURNEY

SUCCESS CRITERIA

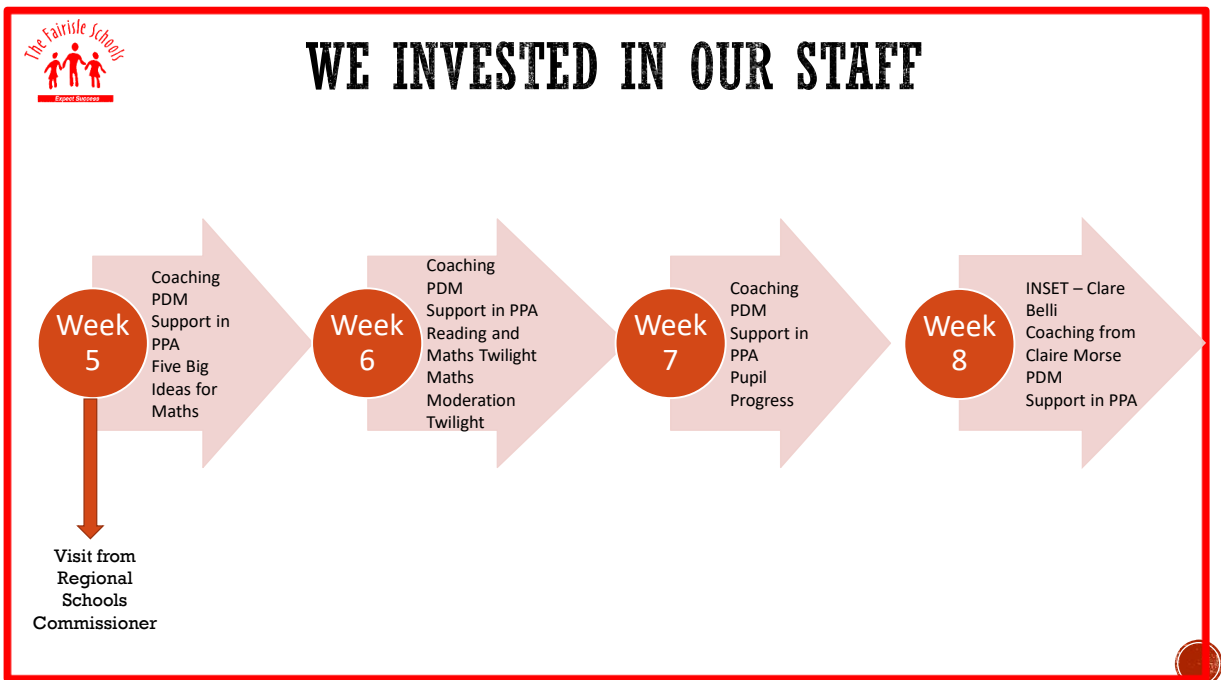
- All Governors, Teachers and Support Staff are clear about the project and its aims
- Challenge from SLT leads to improved planning, which help teaching become more effective
- Better use of physical apparatus and visual representations lead to better conceptual understanding
- Lessons are more personalised for individual pupils
- Disadvantaged pupils are more engaged and become better mathematicians
- Improvements in engagement and outcomes are clear in pupils' books



WE INVESTED IN OUR STAFF



WE INVESTED IN OUR STAFF





CONTINUOUS CYCLE TO IMPROVE TEACHING AND LEARNING...



CHILDREN, TEACHERS AND GOVERNORS

The book look and pupil discussions in the lower school revealed that many disadvantaged pupils perceived achieving well as presenting work neatly. This was a contrast to their non-disadvantaged peers, who referred to success as explaining their ideas. The disadvantaged children spoke more honestly about how difficult they find certain areas of maths and how they have to persevere.

Children felt that the work was not challenging enough for them and they wanted to do more problem solving and have displays which supported and challenged them. They wanted to be mixed with different children so they are not grouped according to how good they are at maths.

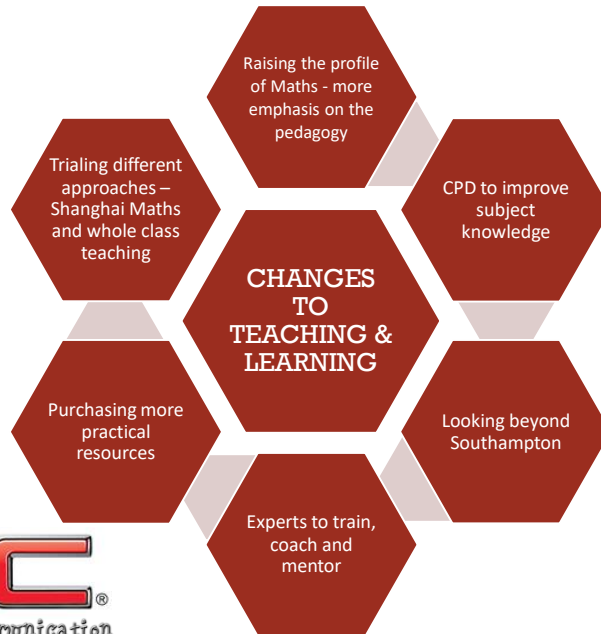


CHILDREN'S VIEWS IN JANUARY 2017

There was a clear difference in attitude towards learning between the two groups of children. The disadvantaged children showed a growth mind-set towards maths and were very aware of the progress they had made through overcoming challenges and this made them proud. The non-disadvantaged children talked about enjoying the challenges they have been faced with but did not talk about needing to persevere at all.

Children wanted to be given more challenging problems, particularly in Year 6. Year 5 children wanted to be given more time to practise what they had learned.





REGGIE REASON

GMC
Good Mathematical Communication

OUTCOMES – IMPACT OF JOURNEY

Starter

X	5	3	2	4	10
4	20	12	8	16	40
6	30	18	12	24	60
3	15	9	6	12	30
7	35	21	14	28	70
9	45	27	18	36	90

Find the missing factors.

Factors of 12: 1 2 4 6 12

Factors of 15: 1 5 15

Factors of 18: 1 2 3 6 18

Factors of 28: 1 2 4 7 28

Factors of 36: 1 2 3 4 9 12 18 36

Bouding Code Breaker

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
400	400	50	500	10	100	10,000	100	100	2000	200	50	40													
10	100	1000	10000	100000	1000000	10000000	100000000	1000000000	10000000000	100000000000	1000000000000	10000000000000	100000000000000	1000000000000000	10000000000000000	100000000000000000	1000000000000000000	10000000000000000000	100000000000000000000	1000000000000000000000	10000000000000000000000	100000000000000000000000	1000000000000000000000000	10000000000000000000000000	


Answer the following questions to crack my code.
The order of the letters in each word has been muddled up.

Question	Answer	Letter
287 is between 300 and 300	1400	A
1489 is between 1000 and 1000	1000	T
190 is between 100 and 100	100	M
52 is between 30 and 30	10	X
863 is between 800 and 100	1400	S
Round 7 to the nearest 10	10	T
Round 1420 to the nearest 100	1400	M
Round 3.922 to the nearest 1000	4000	T
Round 25 to the nearest 10	30	F
Round 1318 to the nearest 10	1320	V
Round 995 to the nearest 10	1000	T
Round 12.8 to the nearest 10	10	F
Round 430 to the nearest 1000	1000	F
Round 50 to the nearest 100	100	F
Round 155 to the nearest 10	160	V
Round 5.955 to the nearest 1000	6000	A
Round 397 to the nearest 10	400	R
Round 994 to the nearest 10	990	U
Round 970 to the nearest 100	1000	T
Round 54.89 to the nearest whole number	55	C
Round 1429 to the nearest 1000	1000	T
Round 45 to the nearest 100	100	U
Round 188 to the nearest 10	190	U
Round 452.9 to the nearest 10	450	B
Round 1363 to the nearest 100	1400	S

BEFORE

OUTCOMES — IMPACT OF JOURNEY

Ultimate Division and Times Table Challenge										13 20 25
28.01					Previous Score:					
Time taken		Number Correct			Previous Score					
120s	1-3	132-112	120-140	15-35	9-11	9	7-11	1	1	
240s	5-6	160-2	240-10	240-4	✓	240-18	40-6	20	20	
360s	8-11	9-35	1080-10	21-35	7	8-6-11	33-35			
480s	2-4	90-3	1440-3	12-35	7-7	40-6	36	2-7	2	
600s	5-6	90-3	12	3-5	90-8	14-2-7	55-5-11			
720s	1-1	72-9-9	25-5	5	90-8	13-11-11	16-7-7			
1080s	30	9-3-5	11-11	11	24-11	22	10-7-7	50-10	5	
1440s	3	63-0-4	3-7	3-7	9-9-7	63-7	10-7-7	10-10	5	
1800s	20	60-3	18	5-13-11	21-11	22	13-13-1	20-7-7	10	
2160s	2	27-9-3	30	10-10	83-0-9	28-9-7	98-8			
2520s	60	10-3	10	5-7	35	30	3-8	80-11	8-8	
2880s	1-1	10-3	10	5-7	35	30	3-8	80-11	8-8	
3240s	1-1	27-9-3	30	10-10	83-0-9	28-9-7	98-8			
3600s	1-1	27-9-3	30	10-10	83-0-9	28-9-7	98-8			
4080s	1-1	27-9-3	30	10-10	83-0-9	28-9-7	98-8			
4560s	1-1	27-9-3	30	10-10	83-0-9	28-9-7	98-8			
5040s	1-1	27-9-3	30	10-10	83-0-9	28-9-7	98-8			
5520s	1-1	27-9-3	30	10-10	83-0-9	28-9-7	98-8			
6000s	1-1	27-9-3	30	10-10	83-0-9	28-9-7	98-8			
6480s	1-1	27-9-3	30	10-10	83-0-9	28-9-7	98-8			
6960s	1-1	27-9-3	30	10-10	83-0-9	28-9-7	98-8			
7440s	1-1	27-9-3	30	10-10	83-0-9	28-9-7	98-8			
7920s	1-1	27-9-3	30	10-10	83-0-9	28-9-7	98-8			
8400s	1-1	27-9-3	30	10-10	83-0-9	28-9-7	98-8			
8880s	1-1	27-9-3	30	10-10	83-0-9	28-9-7	98-8			
9360s	1-1	27-9-3	30	10-10	83-0-9	28-9-7	98-8			
9840s	1-1	27-9-3	30	10-10	83-0-9	28-9-7	98-8			
10320s	1-1	27-9-3	30	10-10	83-0-9	28-9-7	98-8			
10800s	1-1	27-9-3	30	10-10	83-0-9	28-9-7	98-8			
11280s	1-1	27-9-3	30	10-10	83-0-9	28-9-7	98-8			
11760s	1-1	27-9-3	30	10-10	83-0-9	28-9-7	98-8			
12240s	1-1	27-9-3	30	10-10	83-0-9	28-9-7	98-8			
12720s	1-1	27-9-3	30	10-10	83-0-9	28-9-7	98-8			
13200s	1-1	27-9-3	30	10-10	83-0-9	28-9-7	98-8			
13680s	1-1	27-9-3	30	10-10	83-0-9	28-9-7	98-8			
14160s	1-1	27-9-3	30	10-10	83-0-9	28-9-7	98-8			
14640s	1-1	27-9-3	30	10-10	83-0-9	28-9-7	98-8			
15120s	1-1	27-9-3	30	10-10	83-0-9	28-9-7	98-8			
15600s	1-1	27-9-3	30	10-10	83-0-9	28-9-7	98-8			</


**AMERICAN
REVOLUTION
BICENTENNIAL**
 1776-1976
 A partnership of the National Endowment for the Arts and the National Endowment for the Humanities
 Department of the Interior
 National Park Service
 National Historic Landmarks
 National Historic Sites
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 National Historic Parks
 National Historic Monuments
 National Historic Scenic Areas
 National Historic Sites

[illegible]

BEFORE

OUTCOMES – IMPACT OF JOURNEY

Starter

213,644 > 158,578 > 117,204 ✓

16,903 < 37,953 > 21,533 ✓

2,813,514 > 1,813,221 > 999,614 ✓

1,813,221 > 999,614 ✓

Starter

Starter

What is the 5th number in these patterns:

612,918 , 613,918 , 614,918 ...
16
615,918 x

265,311 , 275,311 , 285,311 ...
505,311 x
295,311 x

34,756 , 24,756 , 14,756 ...
9,756
8,756

210,677 , 210,777 , 210,877 ...
210,977 x
211,077

542,309 , 542,309 , 442,309 ...
242,309
243,309

factors of

Starter

Which of these numbers are common factors of 18 and 24? (Circle)

20 3 5 15 6 10 2

Explain how you would find a common factor.

I have written the numbers on my whiteboard
and I found 18 and 24 on my time's table sheet.

after

OUTCOMES – IMPACT OF JOURNEY

Prove it!
Draw a diagram to demonstrate this question.
The temperature was -8°C . It fell by 6 degrees. What is the temperature now?

Sometimes, Always, Never?
When the temperature rises the answer will always be a positive number.

true or False?
Reggie thinks if you multiply by 10 you just need to add a zero.
Is Reggie correct?
Explain how you know using mathematical vocabulary.

please explain
How did you know how to order the decimals?
Why did you put them in those places?

Name	Score
K. Raskonen	33:253
L. Hamillan	32:72
S. Vastel	32:9
J. Palmer	30:13
M. Ericsson	34:463
J. Button	31:9
F. Massa	31:72
N. Rosberg	31:4
F. Alonso	34:45
N. Hulkenberg	31:192

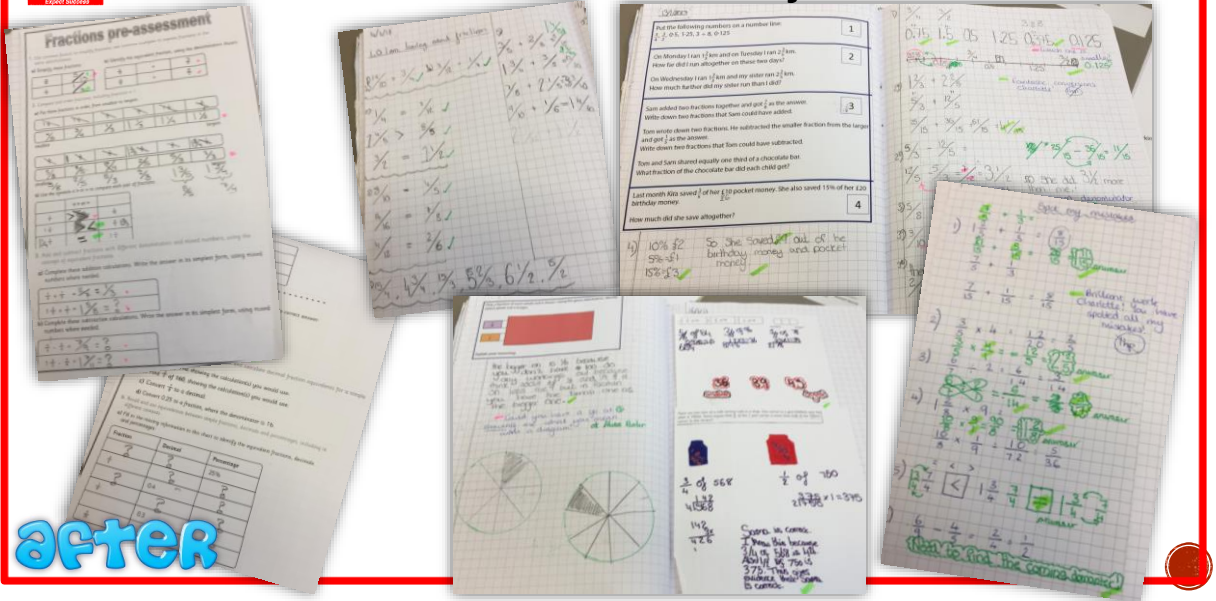
OUTCOMES – IMPACT OF JOURNEY

Problem Solving
A 3 digit number is multiplied by a 2 digit number and the calculation is written out as shown below.
Each star like this stands for one digit. ✱
Apart from the zero shown the only digits which occur are 2, 3, 5 and 7. This is sufficient information to complete the whole multiplication.

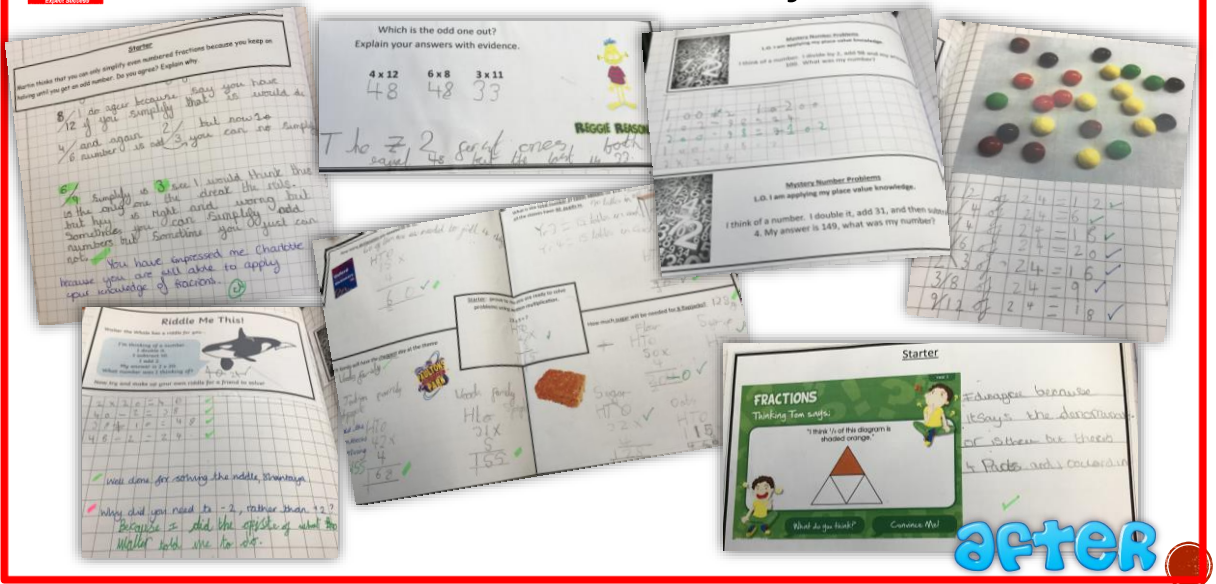
7x TABLE
Explain how you know the 7x table is correct. Use the 147 to 1000 numbers.

Challenge
Each question has a set of digit cards. Using each of the digit cards once, complete the multiplication calculation.

OUTCOMES – IMPACT OF JOURNEY



OUTCOMES – IMPACT OF JOURNEY



CHILDREN, TEACHERS AND GOVERNORS



CHILDREN'S
VIEWS IN
MARCH



AN EXTERNAL VIEW...

'The pupil premium is used effectively to support disadvantaged pupils in mathematics. A good example is through the purchase of practical resources that provide pupils with concrete experiences to help them understand mathematical concepts such as place value.'

'...You have made effective use of external trainers...to strengthen the quality of teaching and learning in mathematics.'

'Teachers demonstrate a good understanding of how to develop pupils' knowledge, understanding and skills in mathematics. This was confirmed in my observations of teaching and learning across the school, as well as by the work in pupils' books. The good quality of teachers' planning reflects the extent to which they plan carefully, taking account of what pupils have learned and how well they progressed in previous lessons... Plans respond to pupils' additional needs and misconceptions.'

THE SCHOOL SHOULD TAKE FURTHER ACTION TO:

'Ensure teaching provides good levels of challenge for the most able pupils, including those that are also disadvantaged.'



'Leaders, managers and teachers benefit from the highly effective training provided by external consultants, particularly in mathematics and to further improve the quality of their leadership and management.'

REGIONAL SCHOOLS' COMMISSIONER

He concurred with the view of HMI regarding the children's work and expects the school to be judged as good at its next inspection.

We have good teaching and good outcomes in books. The current trajectory is positive.

3
February
2017

PROGRESS – WHAT'S MADE THE DIFFERENCE?



'Following a dip in results in 2016...you have since developed a much more rigorous system for tracking and checking on the progress made by different groups of pupils. This is shared with teachers, who spoke enthusiastically about the progress made by different groups of pupils in their class, including those who are disadvantaged. Regular pupil progress meetings provide a good opportunity for staff to review the progress made by pupils, and to identify additional support for those at risk of underachieving.'

'...You have raised teachers' expectations of what pupils can achieve. You have also helped to raise pupils' aspirations so they are happy to work hard and aim high.'

THE FUTURE

So...

Although we have made progress, we are by no means there yet... our journey continues...

We have a very clear vision of where we want maths to be at Fairisle Junior School and we know how this will be achieved.

We now need to embed new approaches and keep the plates spinning. We want to now ensure that the provision for our most able children, including those who are disadvantaged, are challenged in all subjects. This is part of our School Improvement Plan and our Pupil Premium Strategy.



...Teaching does not provide enough challenge to stretch the most able pupils, including those that are also disadvantaged.