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# Final report

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PARENTAL ENGAGEMENT PROJECT

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## PARENTAL ENGAGEMENT

The aim of the parental engagement project was to research barriers and successful strategies for parental engagement in maths, and contribute to the area through the development and trial of resources and approaches for engaging parents/carers in their children's mathematics education.

Focus groups and a literature review conducted in the research phase of the project indicated various complex barriers in parental engagement, main themes include:

- Cultural beliefs
- Socio-economic effects
- Time constraints
- Confidence and skills
- Language and communication
- School based barriers e.g. sustainability

We wanted to develop resources that would serve to help schools and parents/carers begin to break down the barriers listed above. We created a number of different tools to target these issues, and piloted them with 10 schools – seven primary and three secondary.

We aimed to begin to break down barriers to parental engagement in maths by:

- Making connections to and bringing together best currently existing materials/guidance/support
- Amongst parents/carers, recognition and implementation of a number of strategies to improve engagement – like routinely using the Family Maths Scrapbook
- Parents/carers becoming more actively engaged with their child's learning of maths
- Pilot schools developing a plan for parental engagement that includes universal, targeted and bespoke approaches
- Parents/carers who continue to experience barriers related to accessing the school still having access to resources
- Experiment in creating a secondary school intervention – since secondary schools are often not included in such projects
- Creating an intervention that is sustainable and we can see schools intending to continue with this work

## Section 1: Outputs

As outlined in the Interim Report, our key **outputs were:**

**A website** - the National Numeracy Parent Toolkit. One of our core aims was to bring together the best current material and guidance in an easy to use, accessible manner for parents/carers/carers and schools. We imagined this would help address the time pressures carers and schools experience. We also wanted to provide schools with guidance about implementing a parental engagement strategy and inform them of evidence about the value of parental engagement. We felt this could be best achieved through a website.

Producers of resources see National Numeracy as the kitemark of quality, and we provide detailed explanation in the case of not agreeing to add a proposed resource. During this project we confirmed criteria for what resources are of appropriate quality.

**For parents/carers**, the Parent Toolkit aimed to provide positive messages about maths, show opportunities for maths activity and conversation in everyday life – both ideas from National Numeracy and other sources, and provide additional information about maths within school.

**For schools**, the site provides resources, information, and signposting in relation to effective approaches that break down barriers in parental engagement with maths, including universal, targeted and bespoke approaches. We also produced an audit tool to assist schools in developing a parental engagement in maths strategy, unique to their context.

**A weekly maths challenge scrapbook** – the Family Maths Scrapbook. As attitudes to maths and struggling with new methods were clear barriers brought out in the research phase, we wanted to develop a resource which would challenge perceptions of maths and encourage everyday maths conversation and activity within families. For this project, we focused only on developing activities for years 3 and 4.

**A leaflet** – so that schools/community centres can distribute the key messages quickly and also in a paper form (recognising the digital divide), we developed a leaflet prototype. Schools/community centres etc. can download from the site, key messages are 'locked', and there is then also a section which schools populate with their own ideas.

**Pilot-specific provisions** – We used Google Drive as a platform for sharing information and ideas between pilot schools. This way we were able to support schools in developing their strategies and resources.

## Section 2: Pilot projects

In the Interim report, we specified piloting with four to eight sites. We had wanted to pilot with the schools that we ran focus groups with in the research phase, so parents/carers could see the resources they requested produced as a result of their contributions and may have been more motivated to trial and feedback. However, only three of the original focus group schools wanted to take part in the pilot, so we had to open it out to other schools. As a result, this became a ten site pilot: we worked with seven primary schools and three secondary schools based across South East, South Wales, the North East and the Midlands.

The structure of the pilot was:

1. Survey parents/carers, teachers and pupils, regarding attitudes to mathematics and parental engagement.
2. Using survey analysis and the Parent Toolkit, schools create and implement their strategy for parental engagement in mathematics.
3. National Numeracy support and advise schools during creation and implementation.
4. At the end of the pilot in February, schools survey again to measure impact.

The pilot was different in primary and secondary schools as the scrapbooks were only available to primaries. While some secondaries used the activities, we did not provide them with the same physical National Numeracy scrapbooks that the primaries received.

## Section 3: Measuring impact

Quantitative and qualitative feedback has been collected on this project through:

Visits to the schools and professional dialogue with the teachers leading the project. This has served to maintain the momentum of the pilot, and allowed us to collect qualitative feedback at various points of the project.

An Expert Group review was undertaken by Parental Engagement Expert Group members, and some other additional experts in the field including an informal meeting with Professor Charles Desforges, an acknowledged international expert in the field.

Surveys have been administered to parents/carers, pupils and staff in all schools at the beginning and end of the pilot. Analyses have been written overall as well as for individual schools. We aimed to arrive at similar samples so we can usefully compare results with some mixed outcomes. We received a similar sample in the staff survey, but the parents/carers' one had a very different sample – despite the efforts of the pilot partners.

Without going as far as to weight the samples, we have excluded from the comparison the results for a school which only undertook one of the surveys (Westminster C of E Primary). Comparing or interpreting parents/carers' results is challenging, as we would expect parents/carers who are already more engaged to complete the surveys, thus creating bias. We did provide a cash incentive for the end of pilot surveys which aimed to address this issue as far as possible. Additionally, researchers at Everyday Maths in Bristol shared with us that survey collection is a common issue in such projects.

We monitored schools' progress through the use of shared folders on Google Drive. Each school's folder contained their completed audit tool, survey analysis and information about the project. Some schools then used the Google Drive to share evidence of progress within their projects.

## Section 4: Outcomes

At the start of pilot survey, we asked parents/carers and teachers to tell us how many agreed with the statement cited herewith to the right – i.e., that maths is an innate ability. On surveying them at the end of the project, among both teachers and parents/carers, the proportion of survey respondents who agreed that you cannot change your ability to do maths fell. Amongst teachers this shifted from 22% to 8%. Amongst parents/carers it shifted from 29% to 24% agreeing<sup>1</sup>.

**“Some people are good at maths, some are not. You cannot change your ability to do maths.”**

81%/89%<sup>2</sup> of staff reported that the project has broken down barriers to parental engagement in their school. Some of those who disagreed fed back qualitatively that there were no barriers to break down to begin with, while others highlighted that some of the challenges are quite big. Although the pilot was different in secondary schools, 88% of secondary school teachers said the pilot helped break down barriers. Comments from staff include:

- *It highlighted numeracy across all subject areas*
- *More teachers around the school seem more confident to embed numeracy in their lessons; this reduces worries about talking to parents/carers about maths.*
- *Better parent engagement of those hardest to reach through work of numeracy coordinator*
- *Made it part of everyday life - less scary; made it more accessible*
- *More parents/carers engaging with helping their children with maths. This will have a knock-on effect to other subject areas too*
- *Open their minds to the ease of assisting their children through everyday activities as well as providing a platform for discussion and support for parents/carers*
- *Parents/carers feel like they can actually contact the teachers now and they are more confident in supporting what is being delivered to their children.*
- *It has given the parents/carers that took part an insight into the workings of the department and empowered them to help their own children with their maths.*
- *Talking more about partnership between home and school*
- *Actively encouraged parents/carers to get involved, invited parents/carers into school*
- *Parents/carers know that they just need to talk about maths in everyday life*
- *It made me feel more comfortable communicating with parents/carers and it made them more aware that they can contact teachers for help if they want to.*
- *More parents/carers were obviously engaged. Many left comments.*

<sup>1</sup> Please have in mind the sample differences discussed at the start of the write-up.

<sup>2</sup> Including those who abstained/excluding those who abstained

In the start of pilot survey, more than a 1/5 of teachers (22%) said they ‘never engage parents/carers in their child’s learning’. During the pilot we managed to more than halve that to 10%. The most radical change was in the percentage of staff who now say they often engage parents/carers – this rose from 17% to 42%. Teachers feel that the progress achieved during this pilot is sustainable – 85% (while 10% abstained from commenting).

As a result of the pilot, a number of the parents/carers surveyed shared that it was now easier to talk to their child about maths and that they are now more able to support their child with maths (about 61% and 64% respectively) or (70% and 73% if we only consider those who answered the question)<sup>3</sup>. It is worth noting that some parents/carers felt that they already engaged quite heavily with their children or felt their children were quite good at maths. Comments from parents/carers include:

- *Really enjoyed working with my daughter on the scrapbook activities we have had fun*
- *Been lots of fun. We have done lots of cooking. Made me try and find Maths in everything*
- *Been really interesting to work very closely with my child on Maths and help them*
- *Really interesting talking on the playground and realising how many women think they can't do Maths - think I need to make sure I remember that as I have daughters*
- *Really good useful tool*
- *I believe small less time consuming activities would be more beneficial, the level of difficulty tends to take the fun out of it.*

There is some indication that the pilot project helped parents/carers engage more with children through everyday maths and that parents/carers now feel more positive about maths. More parents/carers report feeling positive when maths (77% at the end of pilot survey as opposed to 68% at the beginning). However, for some parents/carers challenges are on-going:

**In the start of pilot survey, 48% of parents/carers said they talk to their children about everyday maths to support their learning – by the end of pilot survey this rose to 75%.**

<b>Barriers to Engagement</b>	<b>%</b>
Conflict with child when trying to help	29%
Finding the time	37%
My own confidence	24%
New methods of teaching	40%

Only 15% of secondary school children reported being aware of tasks that schools had sent home for parents/carers and children to do together. This is surprising, as two of the three secondary schools involved created maths bags/packs for targeted students to take home and use with their parents/carers. It is therefore possible that secondary schools surveyed students who did not receive any such intervention. A similar percentage - 16% - said they were aware that schools had

<sup>3</sup> Amongst parents/carers 10%/9% abstained rather than disagreed. From the data we can infer they most likely did not feel confident they had featured in the pilot enough to comment, but responded to the survey never the less.

organised a session for parents/carers and children together. Primary school children were much more aware of activities to do with parental engagement, 81% had done scrapbook activities, 71% did them with someone at home. Secondary student comments include:

- *Please refrain from doing any parent-student activities.*
- *Sometimes we use methods that my parents/carers don't understand which can make me confused*
- *we have had a maths pack*
- *i really enjoy maths and i think this school should do some activities including parents/carers and children.*
- *if i need help with my homework my mom helps me which i very helpful because somethings we learn in class i dont sometimes understand or pick up.*
- *when i get a job i wont be using pie charts or none of that*
- *they should try to get parents/carers more involved in homework*
- *No, they have sesions for parents/carers but I havent attened any with my parents/carers.*
- *i really enjoy the activities we do with our parents/carers*
- *i like doing the scrap book homework with my mum and other family members.*
- *why do we have to do homework with parents/carers?*

## Outcomes of the Parent Toolkit site

The Parent Toolkit is well established and has received over 12,000 visits. 24% of which are returning visitors. So as to have maximum reach, the site is 'responsive' – it has been designed to work well across computers (61% of usage), tablets (21% of usage) and smartphones (18% of usage).

The website offers a framework around which schools developed their parental engagement in maths strategies. The outcome of this has been that while most schools already had some form of universal engagement strategy, the pilot has encouraged them to consider a more differentiated approach to include targeted support and bespoke support. Attitudes towards parental engagement have been changed – schools have been “made to think, made to change”, and re-evaluate their parental engagement strategy. In some cases, staff have “had their eyes opened” to barriers to parental engagement.

**98%<sup>4</sup> teachers would recommend the Parent Toolkit.**

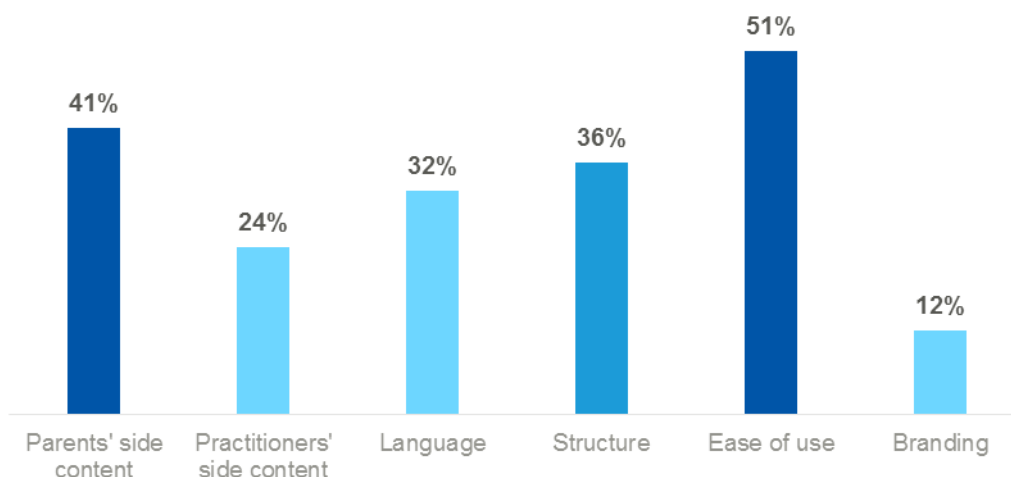
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<sup>4</sup> This excludes those who didn't answer the question.



**83% of teachers and 95% of parents/carers<sup>5</sup> fed back that they will continue to use the Parent Toolkit.**

What do you like or find useful about the Parent Toolkit?



Staff fed back that the site was informative and concise, and contained good resources and ideas:

- *A good way of promoting all the Maths we use all the times in our lives and that all parents/carers use. Lots of up to date information in easy to understand language that you can't point parents/carers to elsewhere.*
- *An excellent resource, easy to access key information, good content*
- *It provides real life ideas that some parents/carers wouldn't have considered were beneficial to their child's maths education.*

The Parent Toolkit was not as well promoted in some pilot sites as in others - 11% of teachers surveyed left the question blank, feeding back that they haven't seen these resources. The Parent Toolkit has been most successful in schools which have actively promoted it, rather than just sending the link out on a newsletter.

Comments from the Expert Group review:

- *We like the different colour text and inclusion of photographs and the section at the top (with the moving animation) is particularly attractive and eye catching...the front page is simple and not mathematically threatening.*
- *Under the family maths activities we like the way the activities have been categorised into age bands. Within this section there are plenty of relevant activities to support parents in different contexts. This is a particular strength of the website.*

**“This website gives us all the resources we need to really incorporate numeracy into all of our daily activities” – parent/carer**

<sup>5</sup> A proportion of the parents/carers surveyed (36%) did not use the site – they are excluded from this proportion.

- *Plenty of good content for schools to use in engaging parents and particularly useful is the parental engagement audit tool. It is almost a one stop shop for schools to support their parents mathematically.*
- *We thought it contained a wealth of information that is useful to both parents and schools. It could be marketed as a 'one stop shop' to support parents (and schools) with mathematics. We liked the balance between activities, research tools to support etc.*
- *The information and statistics are extremely interesting and from my professional view the information appears to be accurate and clear*
- *The information on the site is very helpful. The 'Tips and Ideas' section is really helpful to parents as it gives them pointers in how to use everyday tasks and objects in an educational way.*
- *The reports that can be read via external links are very interesting and add another dimension to knowledge and the importance of engaging parents.*

#### Examples of Twitter mentions:

**Maths4ukplc:** Another useful website to engage parents from @Nat\_Numeracy  
nnparenttoolkit.org.uk #pertschat

**AllThingsMaths:** @Nat\_Numeracy love it!!! Thank you for sharing. Will be passing  
on to our parents this week.

### Recommendations for the Parent Toolkit site

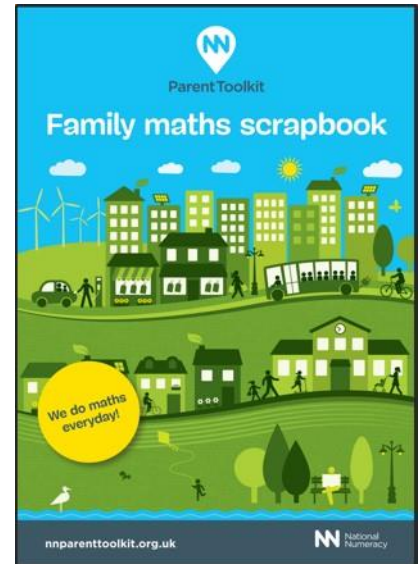
- Change some terminology and phrasing
- Add more images to add appeal and engage; change others
- Move some sections to make most popular more easily accessible and prominent
- Review possible additional resources and content
- Investigate solutions for refining the search function
- Consider the language barrier for non-English speaking parents
- Investigate solutions for confusion caused by scrolling and large amount of content

## Outcomes of the Family Maths Scrapbook

What we referred to in the Interim Report as the 'Maths Challenge' was renamed the 'Family Maths Scrapbook' in order to encourage all members of the family to participate and engage with maths. This has been well received by schools and parents/carers in primary schools (specifically years 3 and 4 where the scrapbooks were mainly piloted).

Qualitative feedback showed us that some of the positive impacts of this have been:

- The activities have transformed maths homework, and attitudes towards homework *"pupils who hated homework have been fired up to engage their parents, write maths puzzles and develop a maths trail"*.
- Parents/carers and children have enjoyed completing the activities together. We believe that in the long term this will impact negative cultural attitudes towards maths – *"one child is going to make a maths trail for his dad cos he doesn't like maths and he will after this"*.
- Teachers are more enthusiastic about maths - *"can't wait to see what they have done with the activities"*.
- Parents/carers and staff have been able to see more opportunity for everyday mathematical conversation in the home/school. We believe that impacts the richness of mathematical conversations at home/school - *"[the project] has engendered conversations about maths which are more meaningful"* – Teacher.
- The scrapbooks themselves *"feel special"* due to the design and National Numeracy logo. *"Liked the specific book for the scrapbook activities and think it raised the profile of the project and homework"* – Teacher.



The scrapbook was aimed at years 3 and 4. Not all those who completed the end of pilot survey had piloted the scrapbooks. The majority of children had worked on the scrapbook with their parents/carers – 71% said they did them with someone at home.

**75% of primary school children surveyed said the scrapbook helped them talk to their parents/carers about numeracy.**

There was an overwhelmingly positive response from those who had completed the scrapbooks activities. 83% of staff and 90% of parents/carers rated the scrapbook as "Good" or "Excellent".

Primary school children surveyed rated the activities positively – 70% rated them as "Good" or "Excellent". It was encouraging to see that 57% liked them because they were a challenge.

When children liked the activities, it was for the following reasons:

<b>They were a challenge</b>	<b>57%</b>
<b>They were easy</b>	20%
<b>They were interesting</b>	42%
<b>They were fun</b>	50%

This suggests the scrapbooks achieved some of their main aims: they were a challenge, interesting and fun. These were some of the comments from the children who used the scrapbook

- *we had lots of fun with the problems to solve*
- *we play lots of maths games and we a lot of adding and dividing*
- *when i,m stuck on something, I have someone to help me*
- *you can try it with them and it's nice hugging up while your doing it and working it out.*
- *you get to spend time with them*
- *I got some help and it was fun with my family*
- *i enjoy working with my family!*
- *I enjoyed working with someone at home because I am not very confident with matha*
- *I enjoyed working with my family because i needed some saport*
- *I get a little bonding time*
- *i learn from my mistakes*
- *I liked it a lot because IT WAS VERY FUN I would like to do it a gain*
- *I think its a realy good idea about the family scrap book*
- *It gave me a chance to interact with my parents/carers and we enjoy it*
- *When I did maths at home it made me close to my family. It was very fun doing maths.*
- *it helped me*

Some teachers are adapting the activities for other year groups though this is not universal in all schools as most would just like more resources provided. Some children have developed these to match their own preferences.

Some students and parents/carers did report that the activities were, on occasion, either too hard or too easy. One parent reported that the “activities were GCSE level” but another asked for “more challenge – we found these too easy”. This links with teacher feedback that the activities did not match all their pupils’ abilities – clearly parents/carers also have varying confidence/ ability levels. Although most activities were designed to be ‘low threshold, high ceiling’, teachers sometimes need to adapt either the activity or to use one from a lower or higher age group. There is also the

issue that thinking and reasoning are pre-requisite skills needed for some of the activities, which some children will need support developing.

Both the Parent Toolkit and the Family Scrapbooks have initiated mathematical conversations, resulting in parents/carers feeling more comfortable/confident talking to teachers about maths. The best example of good practice with the scrapbooks is the school where the teacher introduced the activities, explaining the rationale and how to get the best out of them. She then initiated a written dialogue about each activity on the sheets – valuing both the parents/carers’ comments and the efforts made. It was also clear she valued the parents/carers as partners in education and shared successes and misconceptions constructively. Schools need to model some of the activities with parents/carers, or encourage sharing amongst parents/carers.

**“[the scrapbook activities] have encouraged parents/carers to change their mindset that maths is abstract, not required and that only a select few can achieve”.**

The activities have encouraged mathematical conversations between pupils and their peers, between pupils and parents/carers, and a richer interaction between pupils and teachers. Improved communication, engagement and enthusiasm, and pupil enjoyment of the subject and appreciation of its purpose and meaning, will all lead to higher achievement. An additional positive impact is on the siblings who it is known have sometimes been the family support for the activities at home.

### Recommendations for the Family Maths Scrapbook:

- Reword cover instructions
- Add more images and diagrams to new activities
- Produce a 'complete set' of activities for a wider range of year groups
- Include some tips and key messages on the activities
- Include some tips or diagrams on more complex activities
- Send answer sheets (where appropriate) to teachers
- It was the intention that schools develop own activities to match their teaching – we would still like to encourage this.

- Add 'pupil comment' box

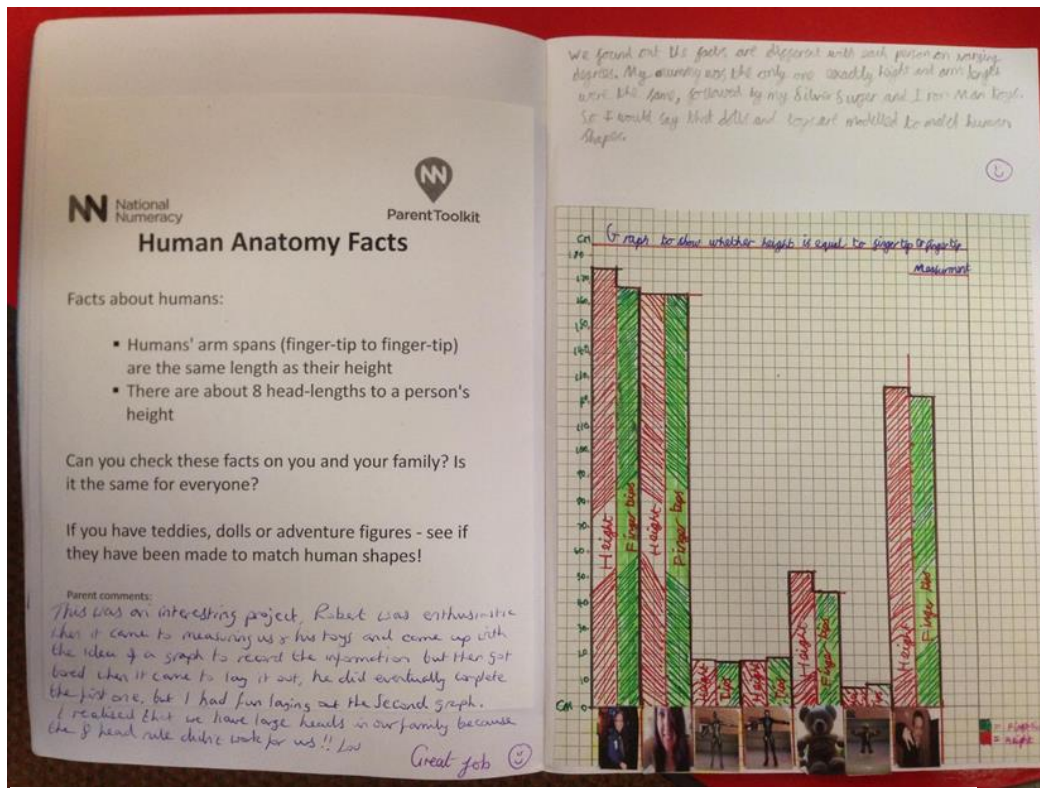


FIGURE 1: HUMAN ANATOMY FACTS

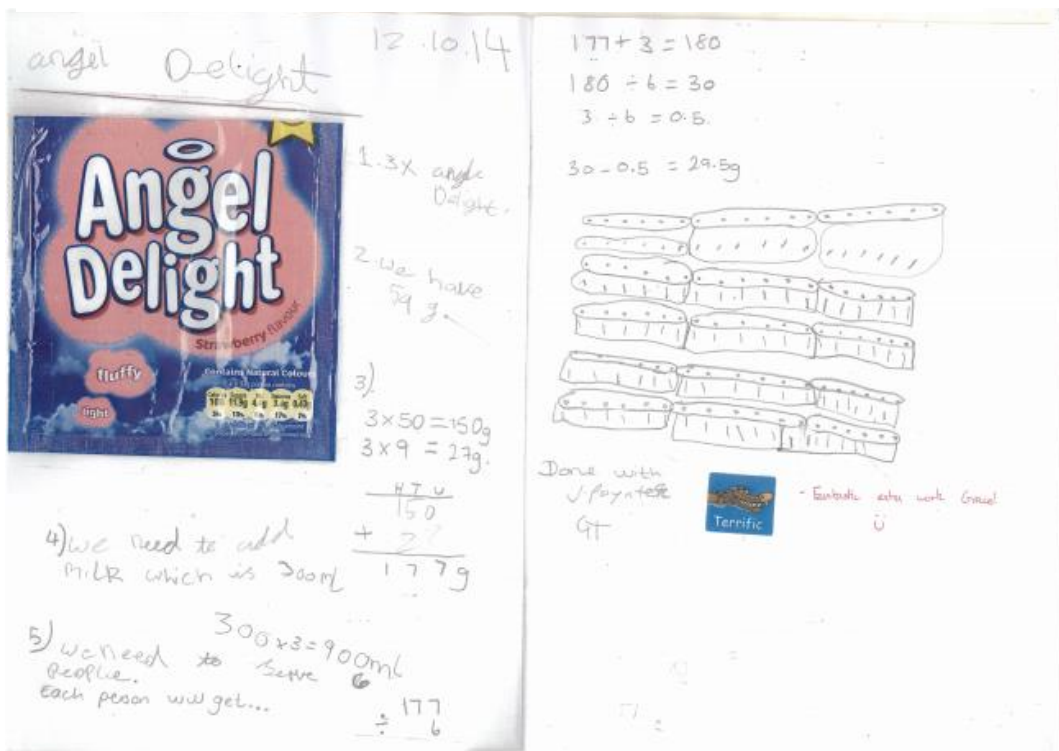


FIGURE 2: ACTIVITY WRITTEN BY CHILD

## Outcomes of the leaflets

We chose to develop leaflets so as to ensure that all parents could be reached regardless of access to technology within the home. Leaflets included an editable section which was populated by pilot schools and distributed to parents/carers.



96% of parents/carers who saw the leaflets rated them as “Good” or “Excellent”. However, on average only about 35% of parents/carers who responded had seen them.

89% of the teachers who rated and used the leaflets said they were excellent or good (20% excellent). Among the teachers surveyed, 27% had not used them.

Feedback on the leaflets included:

- Suggestions for reviewing images e.g. *‘The choice of photographs could be improved ... perhaps children actively participating in numeracy/maths with a parent. It would be good to use a photo to clearly convey the message that numeracy is all around us and it is fun to engage with; perhaps a child and parent measuring a football pitch or weighing food for a Christmas dinner’.*
- Suggestions for smaller version – bookmark/postcard etc. Also suggest having an e-version that opens like a book and can be easily emailed.
- Suggestions for a more detailed version e.g. *‘It headlines with a parent’s guide to helping children with everyday Maths - needs more substance/space to be really called a guide. Missed opportunity to signpost the Challenge’.*

## Recommendations for the leaflets

- Review images and content in line with feedback
- Create a suite of alternatives – both shorter and more detailed.

## Outcomes of the pilot provisions

The start of pilot survey findings informed whole school planning – in parental engagement and also across the curriculum. The survey write-ups also set a precedent for collaboration as it showed schools the level of dedication National Numeracy has to providing support specific to school’s individual needs. In one instance, the school compiled a flyer which summarised the main parental feedback and outlined the action the school would take to address the issues raised.



### Numeracy at Woodrush

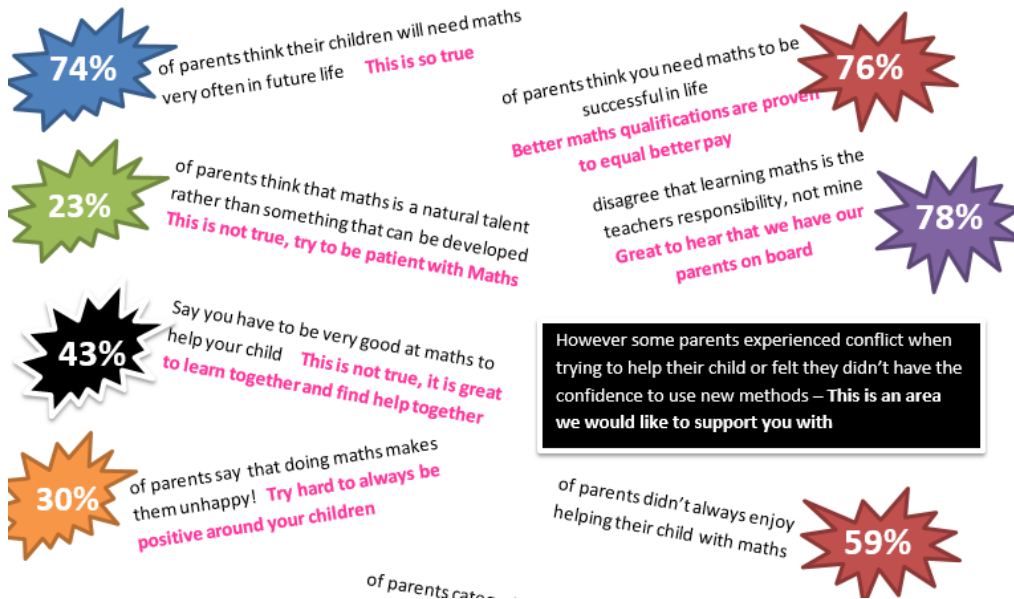


STRENGTH  
IN NUMBERS



#### PARENTAL QUESTIONNAIRE FINDINGS

A huge thank-you to all of our parents who filled in the Numeracy questionnaire for us in September. We would like to take this opportunity to share the findings with you.



### Google Drive

Schools were encouraged to use Google Drive as a collaborative tool to share their progress, resources and documents. For some schools, this worked extremely well and they have populated the site with a wide variety of examples of good practice. For others, however, it has been used variably or not at all – sometimes due to staff lack of technical competence/confidence and at other times due to technical difficulties within the schools.

Extract from an audit tool:

## Woodrush High School



## Task 1.1 - Analysis

What is overall parental engagement like at the school at the moment?

Tip: Use the other forms in your Pilot Partner pack to help you measure current general parental engagement.

Relatively low, mainly through parent evening conversations.

What does the school currently do to encourage parental engagement in maths?

We subscribe to mymaths website that parents/carers can also access. We encourage parents/carers to support their child through conversations at parents/carers evenings. Last year we started to put video links for our students on Frog that parents/carers could also access if wanted. We also devised a new style homework that allowed students to teach their parents/carers if they wanted to, creating more engagement from parents/carers.

What do you feel currently works well? What do you feel should be discarded?

Through conversations at parents/carers evenings we know that some parents/carers do use mymaths.

## Task 1.2 - Consultation and identifying barriers

Consult your parents/carers, staff and pupils using NN pilot surveys in your Pilot Partner pack. (we will analyse this and send you the results in the third week of term)

Outline:

What they feel already works well/not well:

78% of parents/carers disagree with the statement that 'helping my child with learning maths is the teacher's responsibility, not mine'. This tells us that a lot of our parents/carers are actively helping students at home with homework.

What prevents them from engaging with the school and with maths:

Parents/carers reported experiencing conflict with their child when trying to help, have trouble with new methods of learning and are not confident in their own mathematical abilities. Overall 30% of parents/carers say that doing maths (not necessarily when they are helping their child) makes them feel unhappy. Amongst the whole cohort, 59% admitted they didn't always enjoy helping their child with maths, 10% said that they categorically do not enjoy it. Those who didn't mention having poor maths, and not understanding new maths methods in particular. Quotes include "I have always struggled with maths" and "it has changed since I was at school and I usually don't understand what to do".

What they want that is currently not provided:

- A website or workshop(s) which talks them through new teaching methods.
- Send home examples and explanations of techniques for each topic.

**52% of parents/carers would prefer to be contacted via email, compared to 27% by text message.**

## Section 5: Pilot site successes and challenges

As no two schools are the same, and as we encouraged schools to develop strategies unique to their individual needs, we came across a variety of successes and challenges across the pilot sites:

### Successes of the pilot sites

The pilot schools all responded to the project in different ways based around the Parent Toolkit, leaflet and, in primary schools, the Family Scrapbooks. Many schools also developed their own ideas for parental engagement. These include inviting parents/carers in to maths workshops and lessons, developing support material for parents/carers, developing maths packs and bags, adapting the activities to match teaching or context, developing website information, organising fun maths sessions, enhancing the school environment with maths based activities and displays, maths trails and competitions. One secondary school developed a maths character SuperNuman who has enthused maths throughout the school. Where the strategy involved the whole school it also had more success, and some schools reported teachers across year groups being more aware of numeracy across the curriculum, of planning thinking and reasoning activities, and finding it easier to talk to parents/carers. It has been most successful when schools have used the audit tools, plus NN's analysis of the surveys, to inform their action plan.

**"The whole school is talking about maths and the impact of being positive."**

Good practice has been demonstrated by some schools who have subsequently shared these findings with parents/carers and highlighted what action they are going to take as a result – parents/carers then feel valued and have ownership of new initiatives. A further successful feature has been where headteacher support was pro-active – if the co-ordinator was given extra time and resources to implement the pilot, it was – understandably - more effective. Where children have

had autonomy the pilot has also been successful - in one primary school, children are taking responsibility for developing ideas to engage their parents/carers. This has included puzzles and activities on the school website, running workshops for parents/carers and developing a maths trail both in a local park and in the school grounds. Additionally, talking to children was very valuable – during the pilot, it really made them feel a worthwhile part of the project and thus motivated and enthusiastic.

Other successes to inform any future developments also include:

- Quality of professional discussions with schools and strategic development
- Changes in parents/carers' perception of themselves as educators
- Appreciation of everyday maths as valuable contribution to children's learning
- Liaison with other professionals and providers of resources
- Some increased desire and motivation to improve own maths (parents/carers and teachers)

## Challenges of the pilot sites

Sites where the pilot had the least impact were sites that experienced external difficulties beyond the control of the school. For example, Westminster C of E opened late in September due to overrunning building work. It then experienced closures due to staff illness and adverse weather. The pilot lead at the school also experienced a bereavement during the pilot. These circumstances meant that Westminster C of E became unable to complete the pilot. We can conclude from this that implementing and sustaining a developed parental engagement strategy is not always possible – it is secondary to wider functioning of the school. We need to be aware of this and offer support to schools which would like to re-start their parental engagement strategy after a period of turbulence. Schools with a high proportion of children who do not speak English at home also struggled with the surveys and the scrapbooks. We need to take this into account and work in the future to provide better solutions for families with English as an additional language, including allocating a proportion of funding to translation. Secondary schools also experienced more barriers than primary – to be expected in a context where the relationship between parents/carers/carers and schools, and parents/carers/carers and children begins to change. While the scrapbooks offered a strong vehicle for parental engagement in primary schools, there was not a clear equivalent in secondary schools. If we are to work with secondary schools in the future, we need to consider alternative strategies for enabling parental engagement in maths with older children.

Another significant challenge was the gathering of surveys, especially at the end of the pilot. We have learnt that in the future we need to further develop our collection methodology. The schools were not given enough direction or support on sampling and this affected the data collected – resulting in some survey respondents having not heard of the project or the resources. We also experienced some difficulties with schools needing continual personal contact to explain elements of the project - we found that written instructions/support did not always solve this. Additionally, personal contact was needed to sustain momentum, which was difficult within the constraints of the project budget. Finally, we experienced ICT issues within schools – both individual's ICT confidence and server issues. This impacted use of either the Google Drive or the surveys.

## Overall

The pilot timescale was only a term and a half, so impact on progress is difficult to measure. However, observable changes in attitudes and approaches are encouraging and these need time to be embedded in order to impact on achievement. All schools have spoken about the positive impact of the project and how enjoyable they have found it to participate. There have been fundamental changes in awareness and attitudes to parental engagement. The pilot has highlighted the difference between 'parental involvement' and 'parental engagement in learning' and has positively moved forward how schools engage with their parents/carers. It has also enabled schools to re-evaluate their communication with parents/carers and this has resulted in clearer information shared with parents/carers. Schools who have taken part are keen to be further involved in National Numeracy initiatives.

**“parents/carers often think they need to know exact methods and so worry if they don't know them that they won't be able to help their child. This shows them that everyday life has plenty of mathematical applications which support children's learning.”**

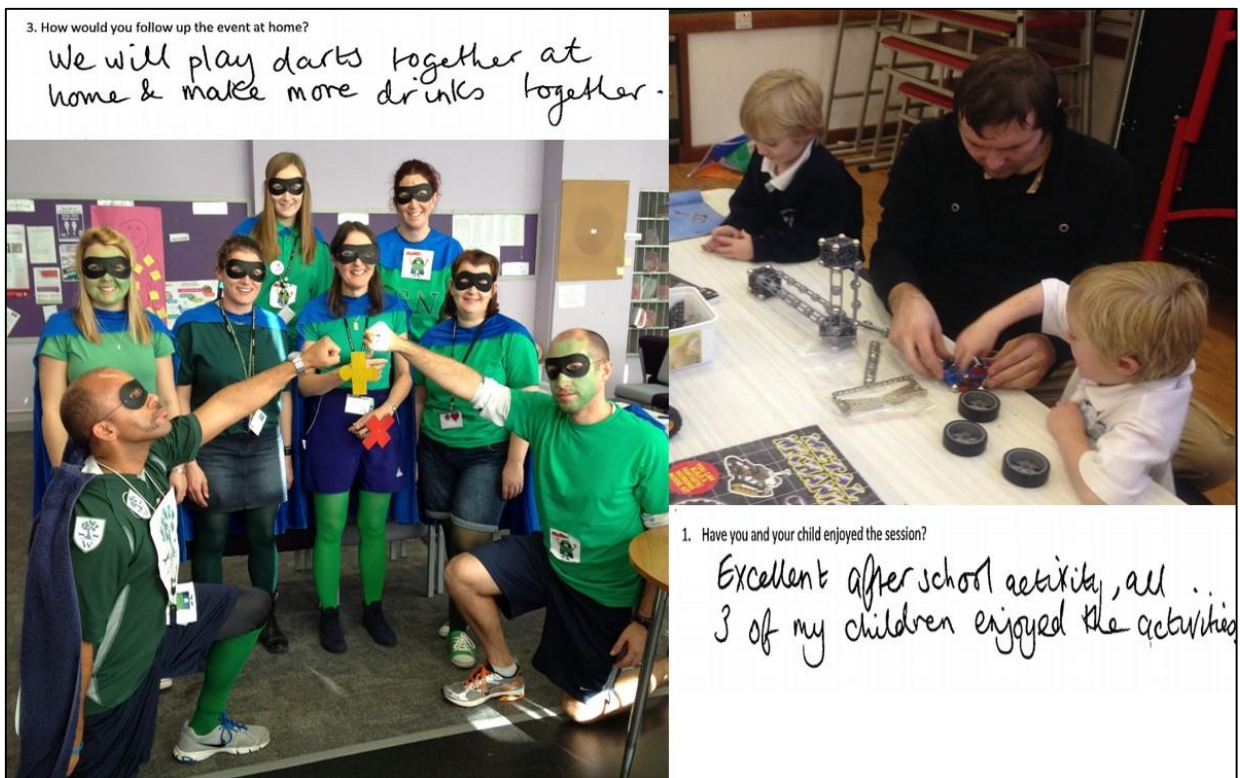


FIGURE 3: A SELECTION OF PHOTOS AND COMMENTS FROM PILOT SCHOOLS

## Victoria Park Maths Trail

This Maths Trail is aimed at Infants and Lower Juniors



Please start at the gate on Victoria Park Road East (closest to the shop)



Go to the bin by the entrance you have just come through and work out how many sides does it have? What shape is the bin?



FIGURE 4: THE MATHS TRAIL IN WELSH PILOT SCHOOL

## Section 6: Additional outcomes

There were also some unexpected outcomes of the project in the pilot schools. Although the project focus was on numeracy, schools are re-evaluating parental engagement across the curriculum. In some schools, teachers are preparing their own activities to match teaching and vice versa – matching their teaching to the activities. Teachers have reported an increase in quality of dialogue (and in some cases dialogue at all) and relationships between parents/carers/teachers at parents/carers' evenings. Parents/carers have felt comfortable talking about the scrapbook activities (as opposed to formal maths) and this has enabled them to develop a constructive dialogue with staff regarding all aspects of their child's time and learning in school. Sometimes, misconceptions identified from the home activities are informing teachers' planning. In at least two areas, there has been increased liaison within the community, or federation, of schools.

Teachers have talked about an appreciation of the new National Curriculum emphasis on thinking and reasoning, as they have realised that their children may not be fully equipped with the skills to complete more investigative tasks. Some teachers shared a fresh appreciation of how parents/carers feel about maths and an understanding of some of the barriers they experience. As a result, more guidance on calculation has been given with homework to support parents/carers who wish to help their child. Secondary pilot schools have shared the development of consistent approaches to numeracy across all departments and an awareness of where numeracy fits across the curriculum. In one high school, non-specialist maths teachers were asked to identify numeracy in their lessons for a week and display good examples. All pilot schools have developed richer maths environments around the school and, in some cases, have also re-designed school websites with more numeracy prominence (previously only literacy tended to feature). Whole school assemblies have been organised to celebrate maths and also, in secondary schools, to highlight

where maths is needed in a range of careers. A further positive outcome has been an increased focus on the need for quality CPD for Teaching Assistants' subject expertise so they can support children appropriately.

## Section 7: Scaling up effective practice

In order for National Numeracy to strengthen its sustainability, we are exploring options across the organisation for income generation. We have therefore made recommendations for both commercial and further funded pilot work. However, there is some cross-over as before considering any trading opportunity we would need to secure funding in order to develop resources in line with learning from this pilot.

### Funded strand:

We plan to pilot further with a focus on gathering stronger data, particularly around impact on achievement, behaviour and attendance. We are already in discussions with the Mayor's Fund for London around conducting a similar project solely based in London.

### Commercial strand:

As we develop different elements of the project we can then potentially begin to trade on a three-tier basis:

**Tier 1** – set of scrapbooks with some light touch support for practitioners – e.g. limited paper based/online ideas.

**Tier 2** – construct a toolkit/package for schools to implement their own strategy/some 'train the trainer' support (school or group of schools)/ launch day/training session. Provide a menu of options including the option to buy some consultant time. This tier pushes a whole school approach to parental engagement.

**Tier 3** – Full intervention. A series of CPD to support a full PE strategic plan and extend to include Numeracy across the Curriculum – a package delivered by National Numeracy personnel.

We also feel there is the case for the development of a parent handbook (separate to scrapbooks and more detailed than the leaflets). This would be a short, low-priced book with the key messages and a selection of ideas/activities to sell to schools or straight to parents/carers.

## Section 8: Dissemination

During this phase, we disseminated parental engagement findings from the Interim Report at the British Society for Research into the Learning of Mathematics (BSRLM) conference in November 2014. Following this conference, we submitted informal proceedings to the BSRLM, which has been published online on the [BSRLM website](#). We also shared findings with parental engagement expert and Exeter emeritus Professor Charles Desforges, who was very enthusiastic and impressed with the focus of the work we have done, which he described as 'very important'.

We will be speaking about the project at the Association of Teachers of Mathematics (ATM) conference on 1st April 2015. Additionally, parental engagement will be the focus of the next

National Numeracy Forum, which will be held on 21st April 2015. We will seek to further disseminate evidence and recommendations gathered from these projects at events and conferences in the future.

## Section 9: Appendix

### Breakdown of pilot activity in schools

ACTION TAKEN DURING PILOT	ISSUES	IMPACT
<b>PRIMARY SCHOOLS</b>		
<b>BROADLEA</b>		
<ul style="list-style-type: none"> <li>• Audit tool used to formulate plan</li> <li>• Family Scrapbooks introduced in Yrs 3 and 4</li> <li>• After school maths club for parents and children</li> <li>• Toolkit shared with parents</li> <li>• A video has been produced with a child demonstrating a calculation for parents. Plan to develop a set of these</li> <li>• School signed up as Numeracy Challenge Partner</li> </ul>	<ul style="list-style-type: none"> <li>• ICT an issue in school</li> <li>• Staff absences</li> <li>• Toolkit not sufficiently promoted – teachers to show in maths clubs</li> <li>• Was planned to have Challenge sessions led in school but shortage of staff</li> </ul>	<ul style="list-style-type: none"> <li>• Homework is changing to incorporate more everyday maths activities</li> <li>• Yrs 1 and 2 teachers developing homework in line with the pilot</li> <li>• Parents engaged in fun maths sessions and talking about maths – positive feedback captured</li> <li>• Some parents using the toolkit as a resource</li> <li>• Teachers more aware of planning thinking and reasoning activities</li> <li>• School keen to continue to develop PE beyond the pilot</li> </ul>
<b>POUND HILL</b>		
<ul style="list-style-type: none"> <li>• Driven by Expert Group member</li> <li>• Comprehensive SIP written using audit tool</li> <li>• Family Scrapbooks introduced in Yrs 3 and 4</li> <li>• Activities extended for more able within school</li> <li>• Leaflets have been written for parents 'what if your child is struggling with...' promoting instant recall of key facts</li> <li>• Maths INSET for staff</li> <li>• School signed up as Numeracy Challenge Partner</li> </ul>	<ul style="list-style-type: none"> <li>• ICT issues within school have hindered resources being available on the school website</li> </ul>	<ul style="list-style-type: none"> <li>• Parents engaged with the scrapbooks including some previously not engaged with school</li> <li>• Teachers engaged in planning AT1-pupil thinking and reasoning skills developing</li> <li>• Parents watching videos – example "I watched this 5 times until I could work it out" - positive change of mindset</li> <li>• Positive impact on whole school strategic planning- PE is now considered across the curriculum</li> </ul>
<b>ST NICHOLAS</b>		
<ul style="list-style-type: none"> <li>• HT support – time and resources allocated to pilot; enthusiastic coordinator</li> <li>• Family Scrapbooks trialled in Y6</li> <li>• Pupils were involved in NN visits to the</li> </ul>	<ul style="list-style-type: none"> <li>• Absence of Parent Champion</li> <li>• Staff absences</li> <li>• No plan written</li> </ul>	<ul style="list-style-type: none"> <li>• Yr 6 pupils feel part of pilot and ownership; they have taken responsibility for developing some resources to engage parents – a</li> </ul>

<p>school and have written maths puzzles and developed a maths trail for parents (local park – also plan one in school grounds and invite the local community)</p> <ul style="list-style-type: none"> <li>• Maths packs have been produced – rotated around parents</li> <li>• Maths workshop for parents – pupils doing demonstrations</li> <li>• Toolkit shared with parents</li> <li>• School involved in a 'Learning Platform' of other schools and has shared the pilot</li> <li>• 'Parent Champion' volunteered and has supported the pilot, positive encouragement of other parents</li> <li>• School very engaged with Google Drive</li> </ul>	<p>though audit tools found useful</p>	<p>'real-life' project impacting on their skills and understanding across the curriculum</p> <ul style="list-style-type: none"> <li>• Pupils who detested maths homework now declare they love it!</li> <li>• Parents not usually involved in schools are enjoying the maths packs</li> <li>• Community of schools motivated in PE</li> <li>• Parent Champion has engaged some parents previously not involved with the school</li> <li>• Excellent range of resources, ideas and strategies shared on GD – other schools will benefit</li> <li>• School very keen to be involved beyond the pilot – whole school renewed enthusiasm for maths</li> </ul>
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#### WESTBOURNE

<ul style="list-style-type: none"> <li>• Audit tool used</li> <li>• Maths homework clubs, with laptops, run for targeted parents</li> <li>• School has provided access to Education City</li> <li>• Maths club has introduced the toolkit and some activities from it</li> <li>• Family Scrapbooks used with mixed group of Y4 pupils – parents personally involved with a teacher</li> <li>• Termly workshops, Saturday morning clubs</li> <li>• Teaching Assistants encouraged to look at the Challenge</li> </ul>	<ul style="list-style-type: none"> <li>• EAL large percentage of parents speak Punjabi – no written script</li> <li>• Time – lead member of staff part-time</li> <li>• External demands on school during pilot</li> <li>• Access to technology limited in homes</li> <li>• Cultural barriers – parents reluctant to move away from 'traditional maths'</li> <li>• Same few parents attend any workshop</li> <li>• No engagement with Google Drive</li> </ul>	<ul style="list-style-type: none"> <li>• Teachers preparing their own activities, based on the scrapbooks, linked to their own teaching</li> <li>• Increased school focus on problem solving</li> <li>• All clubs now include maths activities</li> <li>• TAs more equipped to support pupils with maths</li> </ul>
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#### WESTMINSTER

<ul style="list-style-type: none"> <li>• Audit tool used</li> <li>• Family Scrapbooks introduced in Yrs 3 and 4</li> <li>• Parent's evening – scrapbooks and leaflets displayed; toolkit demonstrated</li> </ul>	<ul style="list-style-type: none"> <li>• Staff absences – including pilot coordinator</li> <li>• School closure due to sickness</li> <li>• School closure due to snow</li> </ul>	<ul style="list-style-type: none"> <li>• Increased parental interest in what is being taught in school</li> <li>• Increased pupil enthusiasm for maths</li> <li>• Staff who work with those 'new to English' have a focus on maths as well as literacy</li> </ul>
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|  | <ul style="list-style-type: none"> <li>• Supply staff in Yrs 3 and 4</li> <li>• EAL – 27 different languages</li> <li>• Building work delayed pilot</li> <li>• Workshop about everyday maths did not take place due to staff away</li> <li>• No engagement with Google Drive</li> </ul> | <ul style="list-style-type: none"> <li>• Children and parents worked on activities together – increased mathematical conversations</li> </ul> |
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WHITE LAITH

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| <ul style="list-style-type: none"> <li>• Comprehensive plan written using audit tool as guidance</li> <li>• Parent's evenings – governor talked about the toolkit and the Challenge</li> <li>• Leaflets given out and incorporated activities from the toolkit appropriate to age</li> <li>• Family Scrapbooks used in Yrs 3 and 4</li> <li>• 'Drop in' sessions for advice on maths – 'bring a buddy' encouraged</li> <li>• Maths walls in every classroom and an interactive challenge display in the corridor</li> </ul> | <ul style="list-style-type: none"> <li>• ICT problems within school</li> <li>• Some parents saw the Challenge as too challenging</li> <li>• Scrapbooks in addition to usual homework – school to reduce this</li> </ul> | <ul style="list-style-type: none"> <li>• A few parents engaged who were previously not involved in the school</li> <li>• Pupils immersed in enjoyable maths around the whole school environment</li> <li>• Activities to be a permanent part of 'learning logs' homework</li> <li>• Pupils interacting with maths with enthusiasm</li> </ul> |
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WROXALL

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| <ul style="list-style-type: none"> <li>• Enthusiastic coordinator with HT support</li> <li>• Audit tool used to develop plan</li> <li>• Family Scrapbooks used in Yrs 3 and 4 – teacher spoke to parents before introduction, teacher acknowledges parents' comments and feeds back</li> <li>• The school is a Numeracy Challenge Partner – some members of staff have accessed</li> <li>• Everyday fun maths workshops held and well attended by parents</li> <li>• Numeracy prominent on school website</li> <li>• Calculation booklets produced for parents</li> <li>• The scrapbooks have been showcased throughout the federation of schools</li> <li>• Variety of examples of good practice shared on Google Drive</li> </ul> | <ul style="list-style-type: none"> <li>• Parent toolkit not sufficiently promoted to analyse feedback</li> </ul> | <ul style="list-style-type: none"> <li>• A positive change in attitude displayed by some parents over the pilot</li> <li>• Dialogue between parents and teacher open and constructive</li> <li>• Communication at parents evenings more two way and comfortable</li> <li>• Feedback from the scrapbooks is informing teaching – particularly when misconceptions have been identified</li> <li>• Methods and approaches taught in class are being practised in activities</li> <li>• reflection on scrapbooks has led to planning being adapted to link activities to class teaching and/or use the activity to introduce new skills</li> <li>• Scrapbooks have led to a changing mindset regarding maths – the school is participating in Maths Mindset Intervention</li> <li>• The class now love maths and are</li> </ul> |
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		<p>demonstrating more willingness to tackle challenges</p> <ul style="list-style-type: none"> <li>• The school recognises the need to further develop the 'targeted' aspect of their PE strategy</li> <li>• Project has “re-ignited” the teacher’s enthusiasm for maths</li> <li>• Enthusiastic parents from the pilot will be role models for next year</li> <li>• Parents are talking about maths in the playground</li> <li>• School would like to continue to be involved beyond the pilot</li> </ul>
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## SECONDARY SCHOOLS

### PATCHAM HIGH

<ul style="list-style-type: none"> <li>• Parent packs distributed to over 100 targeted parents</li> <li>• open activities based on the primary scrapbook – optional and additional to traditional homework</li> <li>• School website re-designed to include a separate numeracy section – including a link to the toolkit</li> <li>• Parent workshops run (up to Yr11)</li> <li>• Leaflet adapted to local context</li> <li>• Assessment booklets have been produced with learning objectives and 'I can..' statements published</li> <li>• A further booklet 'methods used' has been written by the whole department</li> <li>• Whole school assemblies covering 'maths in careers'</li> <li>• Parent/child workshop with Yr7s filmed by ITV 'Tonight'</li> </ul>	<ul style="list-style-type: none"> <li>• Existing HW policy</li> <li>• Starting in secondary is hard if children are not used to working this way in primary</li> <li>• Focus from Yrs 9 onwards is GCSEs</li> </ul>	<ul style="list-style-type: none"> <li>• Parents who are not usually involved in HW engaged</li> <li>• Importance and awareness of numeracy raised in line with literacy</li> <li>• Parents aware of what is being taught in each year group and the methods used</li> <li>• Consistency of approaches across the school and curriculum</li> <li>• Pupils more aware of where maths is used in the workplace and its importance</li> <li>• It feels like there is more positivity around parents supporting their child but it is too early to quantify this yet</li> <li>• Staff other than maths teachers involved in numeracy</li> </ul>
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### HUMBERSTON ACADEMY

<ul style="list-style-type: none"> <li>• Parents' sessions held for Yr7 – 14 attendees which is pleasing as a new initiative</li> <li>• Results from the parents' surveys were shared and discussed</li> <li>• Leaflets sent to parents to encourage positivity around maths</li> <li>• E-mail addresses were set up for parents to have personal contact for maths queries</li> <li>• Toolkit was shared with parents</li> <li>• School identified the need for TA training for maths subject knowledge</li> </ul>	<ul style="list-style-type: none"> <li>• Change of coordinator delayed pilot</li> <li>• Time – release time makes TA training difficult</li> <li>• Time – to engage with Google Drive</li> </ul>	<ul style="list-style-type: none"> <li>• Parents feel able to say which areas of maths they lack confidence in – this informs the next session</li> <li>• Parents talking about maths, with enthusiasm, and useful websites – positive attitudinal change</li> </ul>
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### WOODRUSH HIGH

<ul style="list-style-type: none"> <li>• Enthusiastic coordinator supported by SLT</li> </ul>	<ul style="list-style-type: none"> <li>• Parents not using</li> </ul>	<ul style="list-style-type: none"> <li>• Parents of targeted families</li> </ul>
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- Numeracy bags produced – parents introduced to them at a workshop; pupils targeted; TA resourced to be responsible; all resources provided
- Maths week encouraged pupils to bring a parent in
- School is a Numeracy Challenge Partner
- School website has been re-designed with useful links to maths videos and support for parents
- SuperNuman character encourages constant awareness of and celebration of maths. A competition to design a SuperNuman raised awareness at home. Parents can anonymously e-mail the character for maths advice. SuperNuman has to be visible in all departments.
- School supported NSPCC's numbers day
- Toolkit promoted and constructive feedback received from parents
- A family numeracy letter – half termly
- A Governor wrote a 'case study' on the Challenge
- Each department has a numeracy rep; also 'student reps' if pupils would rather ask a peer
- Students keep a diary of when they use numeracy in other subjects

the SuperNuman helpline

- beginning to be engaged in numeracy activities at home
- 50% of invited parents attended maths week – constructive relationships developed
  - Parents more aware of what is taught in school
  - All staff are on board with NN key messages – whole school involvement and ownership of numeracy
  - Numeracy across the curriculum awareness raised with staff and pupils
  - A support network between parents established
  - School would like to continue to be involved beyond the pilot