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Doing mathematics together: empowering families to develop mathematical resilience.

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January 16th 2015
The Shard Symposium

Mathematical Resilience – Making it Happen

@Nat_Numeracy

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What is numeracy: our take?

It means having the confidence **and** competence to use numbers and other mathematical skills in everyday life – in your ***social, leisure, work and personal*** life.

It is the ability to reason with numbers and other mathematical concepts and to use and apply these in a range of contexts and to solve a variety of problems.

This concept underpins all of our work.

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Parental Engagement Project

With funding awarded by the Paul Hamlyn Foundation in Oct 2013…

Parental Engagement Aims:

- Support parents/carers/families in engaging with their children's education
- Change attitudes - encourage parents/carers to avoid 'I can't do maths'
- Offer parents/carers support in developing their own numeracy skills

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Parental Engagement – Project Overview

October 2013 - April 2014: Research Phase

1. Desk research: what does existing research tell us?

2. Field research: Expert Group, Focus groups, Online surveys.

3. Interim report (1st April 2014). On website and also see article in upcoming BSRLM proceedings.

April 2014 – April 2015: Development and Pilot Phase

1. Developing pilot resources (we will show you these)

2. Pilot Sept 2014-Feb 2015

3. Final report (due 1st April 2015)

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Findings relating to Mathematical Resilience

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The effect of parental engagement at home was **stronger than that of either socio-economic status** or parents level of education[1].

"There is a proven relationship between improved parent engagement and improved **attendance, behaviour and achievement."** [2]

Some of the barriers to parental engagement in maths.

- Cultural beliefs
- Effects of socio economic status
- Time constraints
- Confidence and skills
- Language and communication

1. Desforges C, Abouchaar A. 2003. 'The impact of parental involvement, parental support and family education on pupil achievement and adjustment'.
2. 'Achievement for all 3A's' Impact Report 2012/2013

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Focus on anxiety:

Anxiety related barriers

- Lack of confidence[3]
- Own experiences of maths/school[4]
- Worried about own numeracy levels[5]
- Put off by other parents[6]
- Maths is a big worry for parents[7]
- Mums worry about passing on gender stereotypes[8]

"[The] minute you lose touch with maths that's when the fear creeps in". Parent

"Because of this [fear of maths] it just didn't enter my head to help my son with maths". Parent

"It's a massive confidence boost having your mum or your dad there". Student

3. Review of best practice in parental engagement' DfE 2010
4. Ibid
5. 'Let's read them a story!' The Parent Factor in Education PISA OECD 2012
6. Review of best practice in parental engagement' DfE 2010
7. 'Why do parents help their children with maths?' Rosemary Russell 2009
8. 'Let's read them a story!' The Parent Factor in Education PISA OECD 2012

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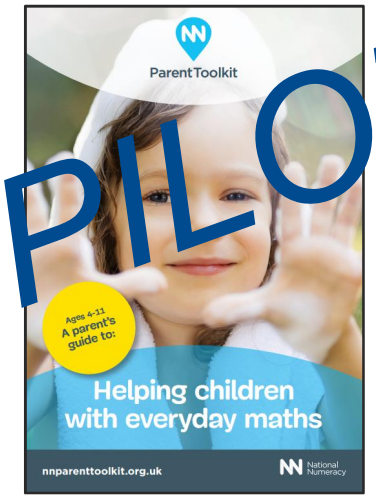
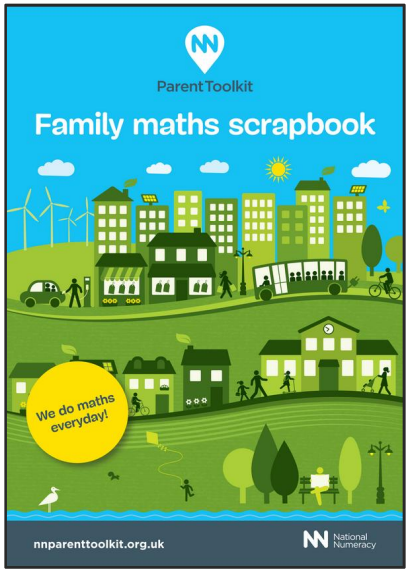
Project outcomes – website, leaflet, scrapbook

Based on the research – including ideas and approaches from work on mathematical resilience - we developed some materials.

IN PILOT





We are currently piloting these materials in 7 primaries and 3 secondaries. These schools are based in the Isle of Wight (x2), Brighton, Crawley, Glamorgan, Solihull, Grimsby, Leeds, Bradford (x2).

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What fosters mathematical resilience?

This is what Clare mentioned earlier today – that literature suggests that this positive adaptation to mathematics can be developed through:

- developing vocabulary and phraseology that allows the expression of mathematical ideas
- experience of experimenting with mathematical ideas eg using ICT
- understanding that all mathematics as connected
- a focus on mathematical thinking and reasoning
- building a willingness to persevere/struggle
- having a belief in mathematical growth

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What fosters mathematical resilience?

To develop mathematical resilience learners must:

- be encouraged to talk about mathematics and have the skills to do so
- be given opportunities that ask for thinking and reasoning and exploring mathematical concepts
- consolidate ideas and develop fluency through meaningful practice
- develop a growth mindset (Dweck) and lose the fixed mindset
- collaborate when learning
- have choice, independence and the opportunity to experiment, make mistakes and grow as a mathematician.

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Examples of activities from the scrapbook

Parking Meters

Do you have parking meters in your town?

The coins you can use to pay at a parking meter are 5p; 10p; 20p; 50p; £1

A meter charges 30p per hour. It does not give change.

How many different ways can you pay for one hour? …and for two hours?

Would your answers be different if the Parking Meter gave change?

Human Anatomy Facts

Facts about humans:

Humans' arm spans (finger-tip to finger-tip) are the same length as their height

There are about 8 head-lengths to a person's height

Can you check these facts on you and your family? Is it the same for everyone?

If you have teddies, dolls or adventure figures, see if they have been made to match human shapes!

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Extra support for parents

Questions to extend children's thinking

Can you tell me what to do in your own words?

How are we going to do this?

What information do we have? What do we need to find out or do?

What do we need?

How are we going to record what we are doing?

How are we going to start?

Could there be a simpler way to do this?

What do you mean by...?

What do you notice when...?

Have we thought of all the possibilities?

Is there something that we already know that might help?

Would a picture/ table/graph/diagram/ photo help?

Would any equipment or counters help?

Why not make a guess and see if it works?

How did you get that answer?

What could you try next?

How could we check this is correct?

What if...?

What do we do if we get stuck? Is it a reasonable result?

What have we learned or found out?

If you were doing it again, what would you do differently?

Did we learn any new words today?

What skills have we used?

What else could we do with this activity? How could we make it a bit more challenging?

How can we show the rest of the class what we have done?

Comments to encourage children

I'm enjoying this!

I'd like to.../My idea is...

I'm going to do this differently to you so we can compare.

That's a really good idea.

Sometimes things are hard, but you learn a lot more when something is tricky than when it's easy.

Let's have fun! Let's challenge Mum... Dad... Granny... Uncle...

You're doing so well because you've worked so hard!

I like the way you thought about that.

This will be useful in real life because...

People in work use this skill when they...

I like the way you kept at it and didn't give up!

Promoting mathematical resilience through the scrapbook activities

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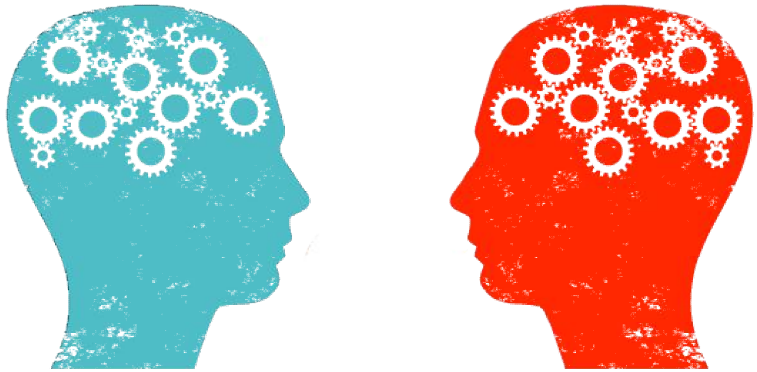
Some time now to look at the activities.

Do they develop the different aspects of mathematical resilience that Clare spoke about earlier? How?



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User feedback

Pilot not ended yet, but here are a few quotes we have gathered already:

"It was good fun to do some maths without any pressure."
Parent

"Really made us think about different maths questions. Definitely made us all use our brains to think of good questions."
Parent

"Much better than a sheet of sums."
Student

"We had great fun with this exercise, looking for numbers while walking our dog and on the bus to Pound Hill and Crawley. Emily's 14 year old sister did it too!"
Parent

"[the scrapbook activities] make me feel more confident."
Student

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Thank you

ParentToolkit

www.nnparenttoolkit.org.uk

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