Education Endowment Foundation

Blog: Supporting the learning of mathematics at home

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Mathematics matters. Developing an understanding of mathematical concepts when we are young is essential, and children's early mathematical understanding is strongly associated with their later school achievement.1

But many parents state the biggest barrier to helping their children with mathematics is their own confidence in the subject,2 and parents' fears and worries about maths are negatively associated with their children's achievement at school.3 Given many parents are now playing a key role supporting maths in the home, schools face a challenge in supporting parents to support their children.

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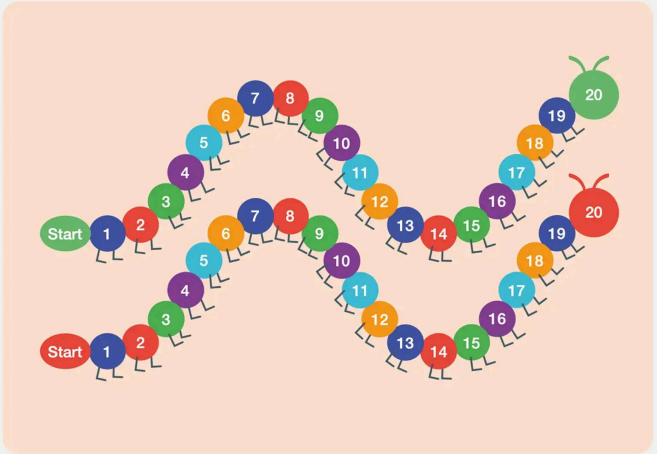
So, what does the evidence suggest might be the most effective ways of working with children at home to develop their mathematical knowledge and understanding, and how does this vary for children of different ages?

Younger children

Younger children will likely benefit from activities, games, and discussion with parents. Working with younger children at home, it is important not to see mathematics as a separate or standalone activity but rather as something which can be incorporated into everyday activities, games, stories, and conversations.4

Here are some ways that we can support parents to celebrate maths as part of their day:

- Board games, particularly ones with linear, numbered, equal-sized spaces can be useful for the development of early number skills. Most families will have ‘Snakes and Ladders’ or something similar; if not, this is a great opportunity to make your own!



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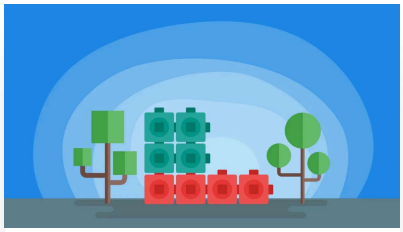
- Incorporate mathematics into everyday routines and activities: tidying up and meal times in particular provide opportunities for conversations about counting, comparing, time, and sharing.
- Snack times and meals are a great opportunity to learn mathematics, such as counting, estimating and comparing. For example, with young children, you could count and match items in a ‘Teddy Bears’ Picnic.’ You can compare quantities such as more or less or quantify food items (making sure to link the last number counted to the number of items in the set) or discuss the capacity of different cups or jugs. A parent or puppet can make deliberate errors in counting and sharing, with the child encouraged to identify these mistakes.
- Use mathematical vocabulary where possible as part of conversations and play: for example, when making comparisons (which is bigger? which teddy is first in line? who has more? are they shared fairly?). Opportunities can also be taken for ‘shape-spotting’ and sorting around the home.
- Finding the mathematics in story books. www.mathsthroughstories.org contains explicit links to mathematics in stories, but you can also consider opportunities in more common story books for mathematical discussion.
- Use manipulatives to support learning. For example, building bricks could be used to model simple addition and multiplication, or toys used to make comparisons of size or quantity. Measuring items, scales, construction materials, puzzles, sorting and pattern materials are also great sources for discussion!

More can be found in the EEF guidance report: Improving Mathematics in the Early Years and Key Stage 1



Guidance Reports

Improving Mathematics in the Early Years and Key Stage 1

Support maths understanding for three – seven year olds.

Early Years

Primary

Older children

Older children's work at home is likely to be more closely linked to the mathematics recently studied in the classroom. When working with older children at home, parents are often faced with an additional challenge – that of mathematical subject material that they themselves may not have used for many years, or methods with which they are not familiar.

For this reason, much of the evidence about supporting older children with mathematics is about structure, encouragement, and routines.

Given support routines can prove so helpful, here are some ideas to share with parents:

- Create a daily routine for mathematical practice with your child and reinforce this with praise and rewards. This can increase the amount of time spent 'on task' and improve the effectiveness of how that time is spent.5 You might want to consider linking this routine to the rhythm of a normal school day, but be realistic in what you can manage as a family.
- Encourage your child to set goals, plan, and manage their time, effort, and emotions. This type of support can help children to regulate their own learning and will often be more valuable than direct help with mathematical tasks. As children become older, more independence can be expected but support will still be needed.
- Having a place to study mathematics is helpful. This could be a desk in a bedroom or a place at the kitchen table. Ensure your child has the materials they need. Whatever they may tell you, a notebook and pen will always be needed for working out (even when tasks are online). Also, a calculator

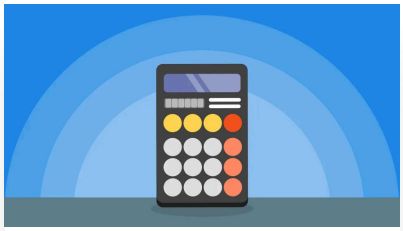
(scientific whenever possible), and a ruler as a minimum. Some tasks set by schools may need online access, and a laptop or tablet will usually be better than a mobile phone.

Away from providing structure, there are some tips for engaging in mathematical content with older children at home:

- Many children enjoy practising times tables either online or on paper. There is value in this: evidence shows that pupils need to develop a fluent recall of mathematical facts, and times tables are among the most important of these.6
- It can be difficult to learn new mathematical content away from the classroom, but evidence suggests that we should provide opportunities for children to retrieve the knowledge that they have previously learnt.7Parents should encourage practice of previously studied content. This might be via an online learning platform – a textbook – or simply revisiting questions from their school exercise book.
- When attempting to engage with new content, providing worked examples of concepts is likely to be beneficial.

If parents don't feel confident providing these, schools should consider sending these home, either via email, an online learning platform, or in the post. A good worked example should show all steps clearly, be annotated, and provide a very similar follow-up problem for children to try.

More can be found in the EEF guidance report: Improving Mathematics in Key Stages 2 and 3



Guidance Reports

Improving Mathematics in Key Stages 2 and 3

Improve maths teaching for seven – 14 year olds.

Primary

There is, of course, much more to the learning of mathematics than is suggested in the above summary. But now is not the time to worry about perfect learning. By following some of these tips we hope that

parents can gain some confidence in continuing the development of mathematical skills and knowledge under challenging circumstances.

References

1 Duncan, G., Dowsett, C., Claessens, A., Magnuson, K., Huston, A., Klebanov, P., Pagani, L et al. (2007). 'School Readiness and Later Achievement'. Developmental psychology, 43(6), 1428. DOI: 10.1037÷0012–1649.43.6.1428

2 National Numeracy (2014). 'Parental engagement and firm foundations for all'. Available from: https://www.nationalnumeracy.org.uk/sites/default/files/interim_report_april_2014_-_updated_branding.pdf

3 Disassociating the relation between parents' math anxiety and children's math achievement (2018). Journal of Experimental Psychology: General, Vol 147 (12).

4 Education Endowment Foundation (2020). Early Maths: Improving Mathematics in Early Years and Key Stage 1. Available from: https://educationendowmentfoundation.org.uk/tools/guidance-reports/early-maths/

5 Education Endowment Foundation (2018). Working with Parents to Support Children's Learning. Available from: https://educationendowmentfoundation.org.uk/tools/guidance-reports/working-with-parents-to-support-childrens-learning/

6 Education Endowment Foundation (2017). Improving Mathematics in Key Stages 2 and 3. Available from: https://educationendowmentfoundation.org.uk/tools/guidance-reports/maths-ks-2–3/

7 Education Endowment Foundation (2018). Improving Secondary Science. Available from: https://educationendowmentfoundation.org.uk/tools/guidance-reports/improving-secondary-science/