

Multiplying skills, adding value

Comments and cameos

Numeracy and mathematics
for Scotland's learners:
a thematic inspection



1. Getting the tone right for numeracy and mathematics



Children and young people?

“I think maths is enjoyable. I learn different new things and can use them anywhere. They can come in handy.”

“I enjoy maths. You use maths outside of school within sports.”

“Maths is my favourite subject. I like the STEM club at lunchtimes. We use maths there and design and science too.”

“I like maths because I find it fun but we are still doing work and learning.”

“I enjoy maths because I am really good at it and I find it really useful. I enjoy the challenge of working things out.”

“I love maths. My teacher helps me to understand and I am good at it.”

“Maths is my favourite lesson. I want more maths!”

...but...

“I don't particularly enjoy maths. The explanations are good and the teacher is helpful, but it is just so boring. The lessons are so predictable.”

...and staff?

“When we asked the children how they felt about numeracy and maths their responses were quite negative. We have had a focus on making maths more meaningful and relevant which has helped them to have a much more positive view.”

“We wanted to change attitudes to maths and to let them see maths is not something you only use in class but is all around us. I think over time we have achieved that.”

2. Sorting the curriculum

Children and young people?

“People came in to talk to us about their jobs and they told us why we need maths when we are older.”

“You have to learn about money so that you can work out your shopping when you are older.”

“We’ve been finding out about budgeting and using credit cards. You have to know about how much interest you pay so that you don’t get in debt.”

“(IDL work) is useful because it shows you how you can use it (numeracy) in every subject”

“(numeracy is) important because that’s what employers are looking for”

Parents and carers?

“In this school the curriculum fits the kids, the kids don’t have to fit the curriculum.”

“The school has started making maths more applicable to real life. The children need relevance.”

“The school has highlighted this year the importance of using maths in a day-to-day way.”

...and staff?

“We’ve had a focus on literacy over the last few years. Numeracy isn’t as strong and children are not as secure in their understanding as they should be. We need to work on that now.”

“We have to equip children and young people with skills for their lives beyond school.”



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3. ...and what about the learning?

Children and young people?

“I like it when we have challenges and problems. It’s good when we get to work together and talk about them.”

“We do lots of peer learning, I like that because you don’t always need to go to the teacher for help.”

“We’ve got our freedom back, it’s not just the teacher who decides what we learn now.”

“Talking about our ideas and our learning helps us to improve. Then we self-assess by using red, amber or green to show if we’ve understood what we’re doing. If you use red you have to say what you are finding difficult.”

“I like it when we get hard maths. It makes us think and use our strategies. Sometimes the work is too easy.”

“I think I’m more confident in maths because it’s okay if you don’t get it right first time. You have to give it a go. We get the chance to reflect on our learning and the skills we’ve used and how these might help us when we’re older.”

“I think it is satisfying solving maths questions. I really enjoy working through the problems but don’t like it when we do this every lesson. We need some lessons that are a bit different so we don’t get bored.”

“There’s not enough variety in our maths lessons. It’s the same everyday: the teacher talks to us and then we do textbook work. I know we have to do examples to get better but it gets boring. More variety would make it more interesting.”

“Maths is really important so I want to do well. I work hard in class and take time to look over my notes at home so I remember what I learned.”



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“I’ve had much more support in maths this year.”

“The teachers are good and help you a lot.”

“Teachers are patient with you, they try harder to explain.”

“Maths are one of the best departments in the school for support.”

3. ...and what about the learning?



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Parents and carers?

“My daughter was always quite nervous about maths but with the focus on trying to change the children’s mindset, she is beginning to realise that she is actually quite competent”

“The teachers have created a very positive environment for learning maths. They make it interesting and fun. But they also challenge our children to strive higher.”

...and staff?

“The key thing for us has been bringing maths to life for children and they are seeing how useful numeracy can be and we have reduced anxiety around maths.”

“The big difference this year is that we have been encouraged to make the children’s learning real. The children are enjoying it more and so are we.”

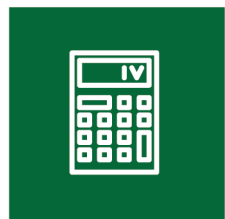
“I was one of the ones that said no, I am not changing how I do it, I’m glad we changed though because I can see the difference.”

“The training we’ve had has been really good quality. It’s made a difference to how we approach numeracy and maths and I think the children are benefitting from it.”

“We need time to embed the changes now, time to observe each other and improve consistency.”

“Professional dialogue supports us to learn from, and challenge, each other.”

Cameos: curriculum, learning and teaching, attainment



A primary school helps parents support their children's learning at home through various parental engagement resources and events held throughout the year. For example, the majority of families participated recently in a curricular evening focusing on the delivery of numeracy and mathematics. Teaching staff led workshops and shared pedagogy and assessment information for early, first and second levels within Curriculum for Excellence. All families were issued with a 'Making Sense of Maths' booklet to support them as their children progress in learning. The school's approach to numeracy and mathematics is shared also on the school website and as part of displays in school. Feedback from parental engagement approaches is very positive. Staff are committed to using feedback to improve further approaches to family learning in numeracy and mathematics.

A café initiative is well embedded in a nursery. It is successfully encouraging families to attend on a more regular basis. It enables children to make food, plan and create menus as well as deal with real money. The initiative has resulted in the setting receiving funding from Scottish Government as 'A setting of innovation and impact'. The links with the local community because of this initiative are providing real and meaningful contexts for numeracy and mathematics, for example, the use of money in the local shops and visiting the local café.

In a primary school effective partnership working and clear processes are in place to transfer information about children's learning and achievements at key times of transition: between establishments (nursery – P1, P7-S1 and moving to another school P1-P7); across stages/ classes; between mathematical topics; and spanning Curriculum for Excellence levels. Written and oral 'transfer of information' sessions are built into the school's collegiate calendar. Staff share relevant information about children's progress and ensure a smooth transition for children from class to class. End of year data is collated for receiving teachers to support continuity of learning. This maintains pace, challenge and depth of learning. Shared approaches to planning and record keeping now ensure better continuity across all stages. Children are displaying a gradual improvement in resilience when making transitions between stages, establishments, Curriculum for Excellence levels and numeracy and mathematics topics. They now comment on aspects they enjoy and feel confident about, rather than always commenting on things that they find difficult or dislike. Some older children are opting to set personal targets in areas that they feel less confident.

Cameos: curriculum, learning and teaching, attainment

A secondary school has worked with a range of stakeholders to develop an aspirational vision for both its numeracy and mathematics curriculum. Of particular note is the school's approaches to numeracy across learning. Considerable time and effort has been used to develop consistent approaches to numeracy across the school. All curricular areas have bought in to the vision. This has resulted in common methodology and language, supported by a useful booklet and videos, used across all areas of the school. Staff work collaboratively across faculties to develop common approaches and consistency to numeracy. Young people recognise this and report they have found it very helpful to have a unified approach to the delivery and learning of numeracy. Staff from the mathematics department, supported by senior leaders, regularly work to build capacity across the school and associated primary schools to ensure all staff have an understanding of what is required. This has been helped by deployment of additional staffing to the mathematics department using Pupil Equity Fund. This has resulted in all staff taking ownership of numeracy as a responsibility for all, and numeracy and mathematics having a positive, high profile both within the school and the wider community.

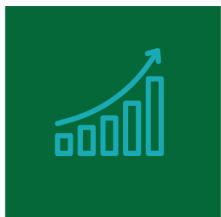
In a special school learning takes place in an interdisciplinary manner. Lessons are planned to ensure children experience all curricular areas with a sensory context appropriate to their needs. This holistic view of learning challenges teachers to be able to identify the early mathematical concepts within a range of activities. Children and young people are supported to transfer their skills in different curricular areas. Numeracy and mathematics are developed actively in real life contexts. Enterprise and citizenship activities support children and young people to experience learning in a range of contexts. Opportunities to practice numeracy and mathematics skills in new environments are increasing year on year. These include opportunities to visit an outdoor adventure centre; a community classroom; a local college; and a skills academy.

In a primary school children demonstrated their confidence in working in groups and their use of mathematical terminology, while having a high level of fluency in Gaelic. Staff had planned total immersion intervention at the beginning of P1 where children had a high concentration of play-based numeracy learning in contexts, alongside strong total immersion approaches for an extended period. This focused on listening, talking and use of commentary, including in numeracy and mathematics contexts. Staff are able to demonstrate that this has had a very positive impact on fluency, including numeracy vocabulary, with children competently enabled to access the curriculum through Gaelic.



Cameos: curriculum, learning and teaching, attainment

A secondary school has a programme “Numeracy in STEM” running in S1 and S2. Young people have one period per week on the programme, designed to develop transferable numeracy skills between STEM subjects. The programme was developed in response to evidence from attainment of young people in the school in STEM subjects in the senior phase and their lack of awareness of transferable skills. Work is led very well by the Principal Teacher STEM with staff across the relevant departments involved. Staff are identified as “Numeracy Champions” or “Delivery Team Members” and work very well together to ensure the programme is successful and improves outcomes for young people. Professional learning for staff is included in the programme. Pupils complete a learning log which they refer to when applying their numeracy skills in the STEM subjects. Each “skill” is broken down into “steps to success”. Work has taken place to evaluate the impact of the “Numeracy in STEM” project. Staff report a positive impact on young people’s learning experience in S1 and S2 with a consistent approach to the language used for these skills. Learner conversations with the first cohort undertaking the STEM numeracy course showed that 78% of pupils were able to identify successfully where they had used transferable numeracy skills.



Planning in a nursery ensures that experiences and opportunities involve children in leading their own learning, alongside experiences, which are planned carefully by practitioners. Planning guidance ensures that experiences take full account of children’s interests and ideas. The nursery environment has been considered carefully to provide opportunities to develop skills in numeracy and mathematics, for example, children engaged in STEM experiences, baking activities, loose parts and outdoor learning. All had an appropriate focus on numeracy and mathematics.

In a secondary school, the curriculum offers an evolving programme of enriching numeracy and mathematics opportunities including a numeracy week and a STEM week, participation in Pi Day, and, more recently, the appointment of S6 Numeracy Ambassadors who carry out a range of support and promotional activities. These include working with children at the primary stages on a regular basis. These initiatives contribute to positive attitudes for numeracy and mathematics in the school.

There has been a focus in one primary school on ensuring children have a positive attitude to numeracy and mathematics and see the relevance in their own lives and in the jobs around them in their local area. Alongside this has been a clear focus on improving the approach to learning and teaching in numeracy and mathematics. Children are now much more actively engaged in their learning in mathematics. The school has been successful in improving children’s attitude to numeracy and mathematics and numeracy. As a result, children’s attainment overall has improved.

Cameos: curriculum, learning and teaching, attainment



In a primary school, children reflect on their learning and identify their achievements in numeracy and mathematics. During weekly assemblies, staff recognise a numeracy 'Star of the Week' and take the opportunity to share with the whole school what the learner has achieved to earn the award. Each class has an achievement display and children's successes in numeracy are shared on these.

A secondary school shared details of a specific approach designed to help pupils who have significant gaps in their numeracy knowledge. From the initial baseline assessment in S1, a cohort of pupils are identified who could benefit from additional support in numeracy. Young people in S1 have received focused numeracy support each week. Post-intervention analysis highlights that this is helping improve pupils' numeracy skills and pupils' confidence in their own mathematical ability.

A secondary school's approaches to raising attainment include working with their associated school group to improve numeracy skills at the point of transition. Improved training and communication with staff in the associated schools, coupled with targeted learning support, has raised attainment. Pupil Equity Fund has been used to support interventions in S1 and S2 including a small group approach in S2. Meetings with parents to support individual pupils have resulted in increased attendance at mathematics support sessions. As a result of these approaches S1, S2 and S3 pupils surveyed feel they are making progress with their maths.

In a primary school, senior leaders and staff have introduced targeted interventions in numeracy and mathematics, some funded by the school's Pupil Equity Fund allocation. Staff have a clear rationale for the use of these interventions based on an analysis of assessment information. These interventions include: proprietary numeracy support materials, online software to support the teaching of numeracy and mathematics and support staff deployed to help children understand numeracy concepts. These interventions are having a positive impact on children's attainment, enjoyment and confidence in class. A focus on pedagogy, especially regarding developing approaches to improving mental agility skills is having a positive impact on numeracy and mathematics attainment.

In a primary school, because of the increased awareness and growing accuracy of assessing children's progress, resources are being targeted more effectively to support progress and achievement. Support staff are deployed more effectively and have been given training in using resources that support children to develop their number fluency and mental agility. Staff are much more aware of the need to monitor the impact of additional support or resourcing and ensure it improves children's progress and attainment.



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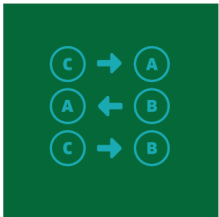
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