

How can I improve pupil's ability in the reasoning strand in the Numeracy Framework?

The Intervention- Problem Solving Station

The children can practically, aurally and visually work out written problems.

This will help them extend their existing maths skills and work in different learning groups which suit their needs.



Key words: Numeracy, Boys, Attainment, Reasoning, Problem Solving, Teaching and Learning

Methods

Quantitative data methods used in this inquiry are: questionnaires and tracking. These methods provided instant results. Through tracking you can see the impact the intervention has had in an instant. Questionnaires reflected the children's attitudes towards reasoning and overtime they changed which created a more positive approach towards reasoning.

Qualitative data methods used in this inquiry are: semi-structured interviews, observations and journal notes which include photographs. These forms are data collection provided lots of data to analyse. Although, are the children enjoyed taking part in as they carried the semi-structured interview as part of a group. This made them feel more confident and they said what they actually thought rather than a one to one interview may have provided evidence that the teacher/researcher wanted to hear.

Literature - What information and research has already been found?

In lots of classrooms there are "formal approaches to teaching." (Taylor et al. 2016) This does not suit all learners, we should create a "spiral curriculum" (Bruner, 1996)

"An inclusive culture in the classroom should reduce the barriers to learning" (Booth and Ainscow, 2002).

Estyn (2014) suggests that "mathematical development has been the lowest performing area of learning for higher outcomes over the last three years." We need to "equip children for the real world." (Smith and Morgan, 2016)

"Misunderstanding can occur due to lack of language and knowledge." (Whyte, 2015)

Data Collection

Results

	Baseline	Intervention		
		Before	During	After
Pupils (names changed)		Spring 1	Summer 1	End of Yr 1
Callum	3.4	3.8	4.2	4.7
Alex	3.3	3.6	4.0	4.4
Tommy	3.4	3.8	4.0	4.6
Matthew	4.1	4.3	4.6	4.6
Joseph	3.9	4.2	4.4	4.7
Freddie	2.8	3.4	4.0	4.4

"I can do it now! I like working as a team!" (Callum, 2016)

"Maths is so much fun!" (Freddie, 2016)

"I like being the teacher and helping the others." (Joseph, 2016)



"The outdoor Problem Solving Station is the best!" (Alex, 2016)

"It is good we can work with our friends and then we get the answer." (Tommy, 2016)

Making a difference

With the right intervention all children can access to the best of their ability. The intervention was tailored to the children's interested and developed so that the intervention could take place in the indoor and outdoor learning environment. When the learning environment was rich with mathematical language and a supportive team, attainment levels increased as well as the confidence in the children's mathematical language and written work.

Future plans and developments

- All staff to further develop open style questions in maths to allow the children to explain their workings out,
- Problem solving stations to be implemented in Foundation Phase and Lower Key Stage 2,
- Development of a Problem Solving Mat for upper Key Stage 2, so that the children can work out the problem following simple steps and questions. For example: what do I know? What maths operation do I need to use? Let's work it out!

References

Booth, T. and Ainscow, M. (2002). *Index for Inclusion: Developing learning and participation in schools*, Bristol: Centre for Studies on Inclusive Education.

Estyn, (2014), *The Annual Report of Her Majesty's Chief Inspector of Education and Training in Wales 2013-2014*, Wales; ESTYN (Online: http://www.estyn.gov.wales/sites/default/files/documents/The_Annual_Report_of_Her_Majestys_Chief_Inspector_of_Education_and_Training_in_Wales_2013-2014.pdf) (Accessed on 13.01.15)

Pound L. (2005), *How children learn from Montessori to Vygotsky- educational theories and approaches made easy*, London: Step Forward Publishing

Smith C, and Morgan C. (2016) *Curricular orientations to real-world contexts in mathematics*, *The Curriculum Journal*, 27:1, 24-45, DOI: 10.1080/09585176.2016.1139498

Taylor C, Rhys Mand Waldron S. (2016) *Implementing curriculum reform in Wales: the case of the Foundation Phase*, *Oxford Review of Education*, 42:3, 299-315, DOI: 10.1080/03054985.2016.1184872

Whyte S. (2015): *Understanding and enriching problem solving in primary mathematics*, *Education 3-13*, DOI: 10.1080/03004279.2015.1068823