Maths Through Stories

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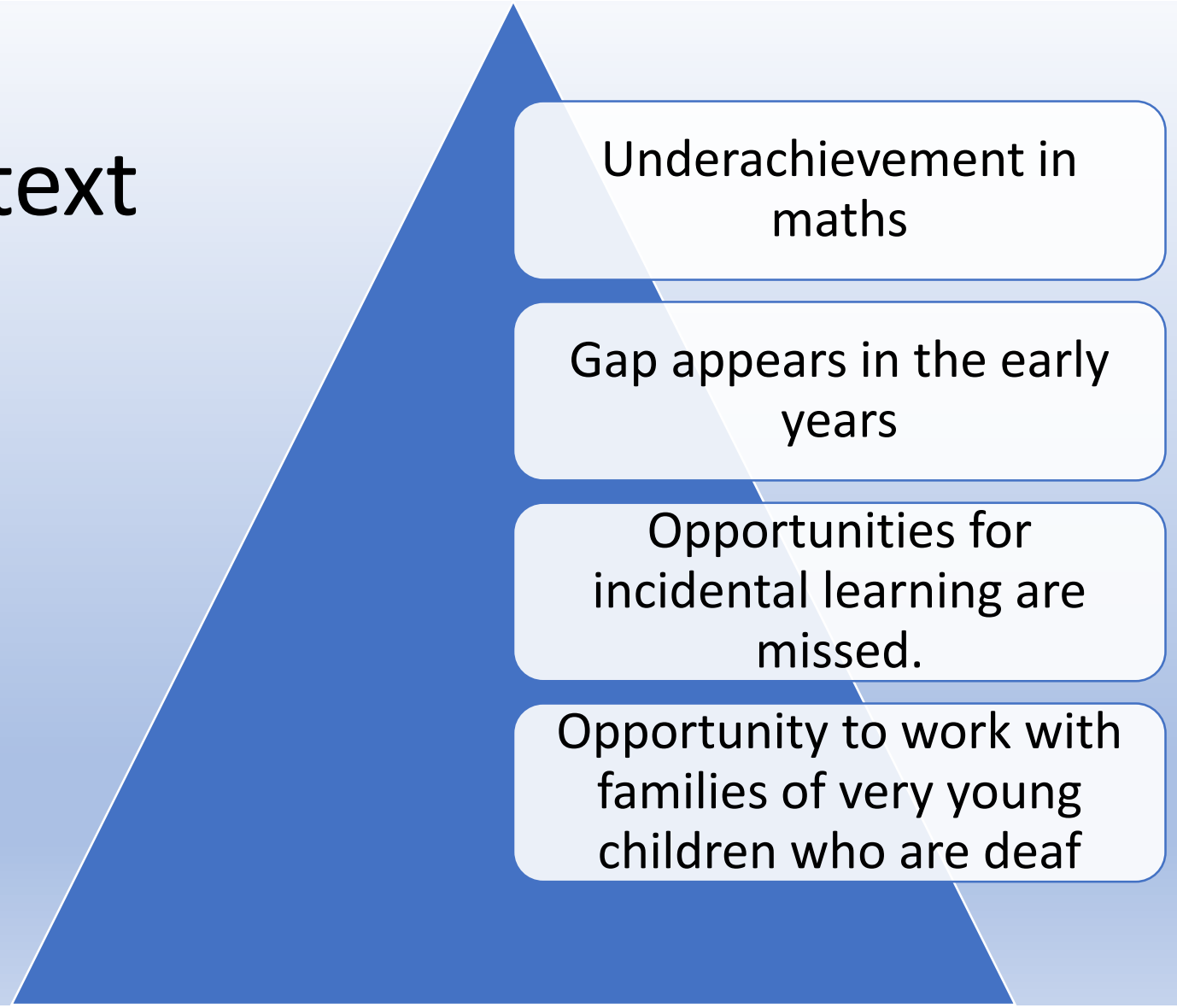
Outcomes for the Workshop

- Recognition of the importance of targeted mathematical learning in the early years to secure improved outcomes in preparation for formal schooling.
- Extension of the workshop examples to inform planning and direct working with families leading to improved measurable outcomes in mathematical vocabulary and concept development
- Recognition how stories can provide opportunities for the development of mathematic vocabulary and concepts.

Context


Underachievement in maths
Gap appears in the early years
Opportunities for incidental learning are missed.
Opportunity to work with families of very young children who are deaf

Proportion of children reaching expected standard at Key Stage 1 for mathematics CRIDE 2018

Year	Deaf Children	No Identified SEN	All children
2018	52%	84%	76%
2017	51%	83%	75%
2016	47%	80%	73%

Deaf Children achieving expected level at Key Stage 2 Maths

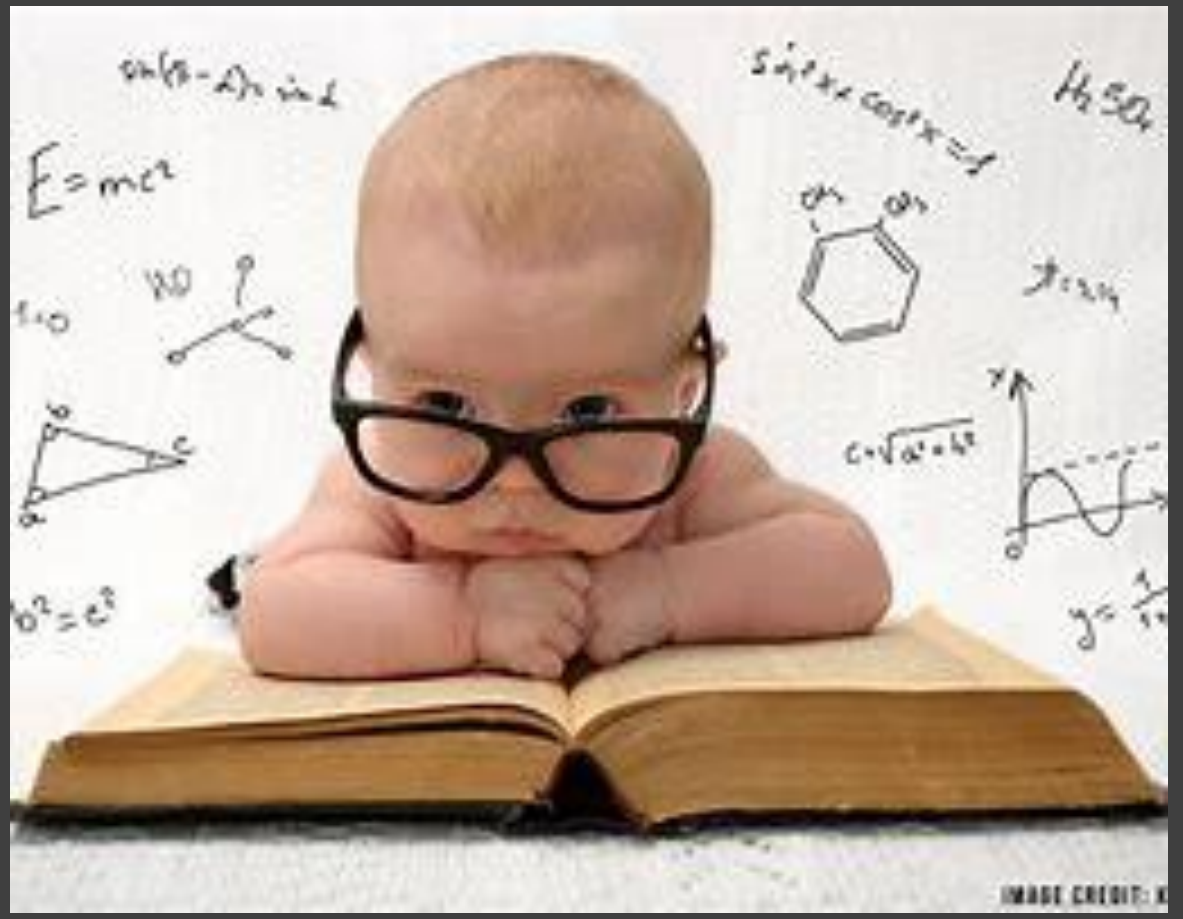
Year	Deaf	No SEN	All Children
2018	56%	84%	76%
2017	56%	83%	75%
2016	53%	78%	70%

Developing mathematical skills in the Early Years

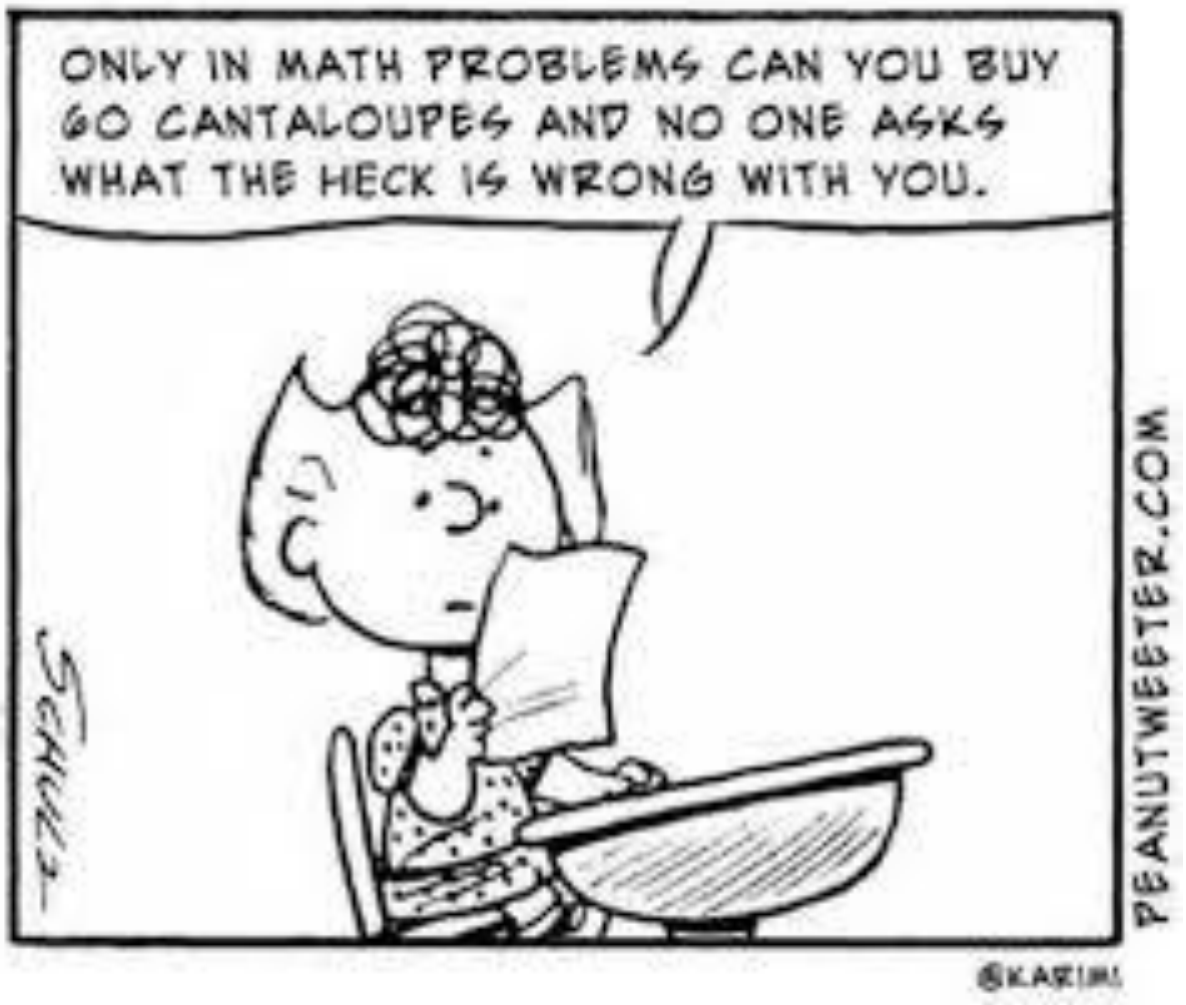
Experience at home

- Mathematical conversation
- Number rhymes, counting sequences
- Routine language
- Incidental Language

- Mathematical concepts are developed as early as 6 months - Cross et al (2009)
- Cognitive skills are developing alongside at this stage - Kritzer & Pagliano (2012)



Maths as a driver …..



So why Stories?

“Stories can help to contextualise or humanise mathematics, and when presented in the picture book format with abstract mathematical concepts being visually represented to readers, they provide a useful tool to develop learners’ conceptual understanding’

Maths Through Stories

Numbers

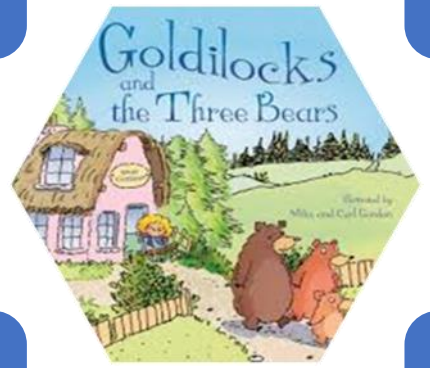
Shapes and Spatial

Measurement

Patterns, relationships and change

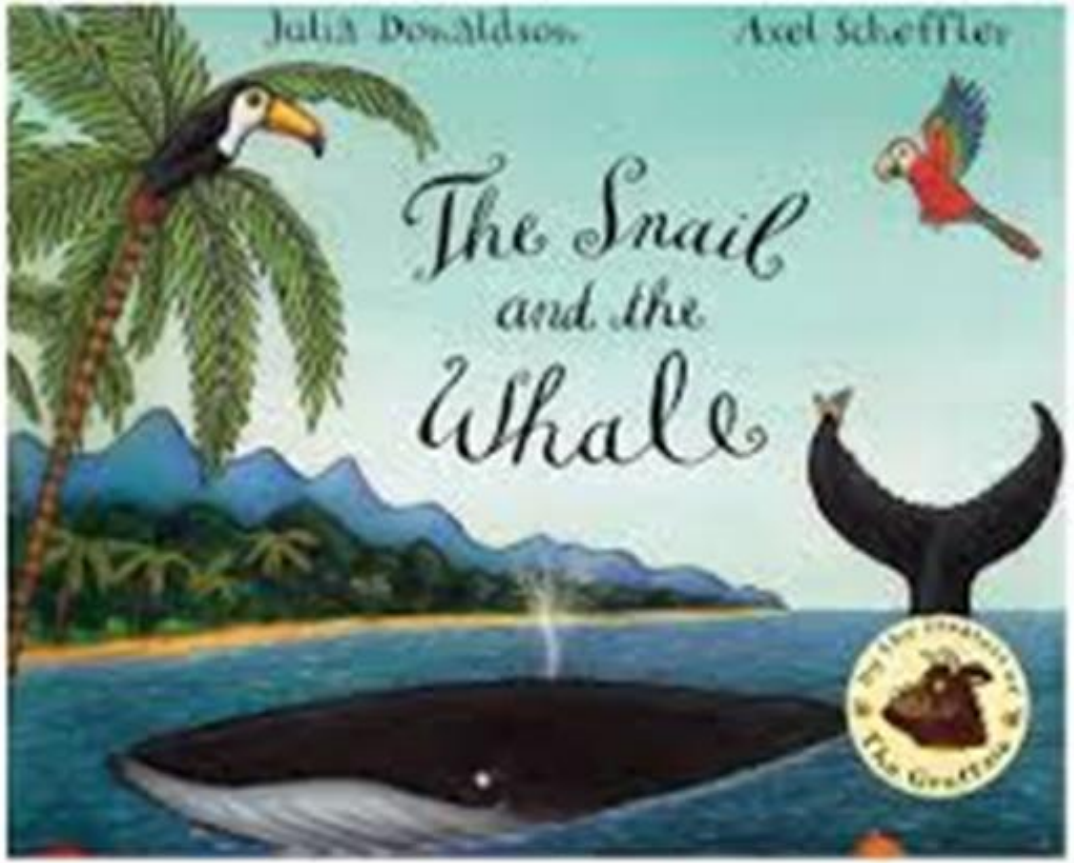
Collecting and organising information

Problem solving



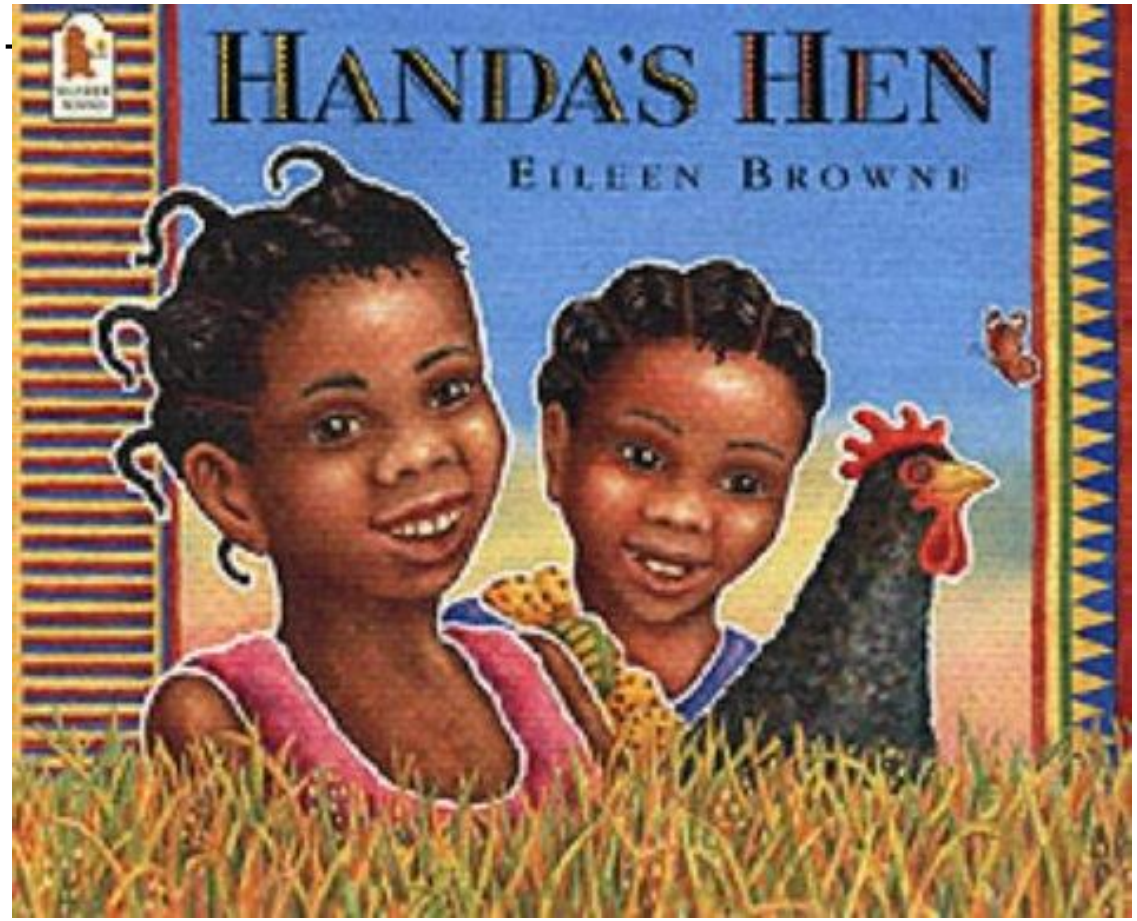
Problem Solving

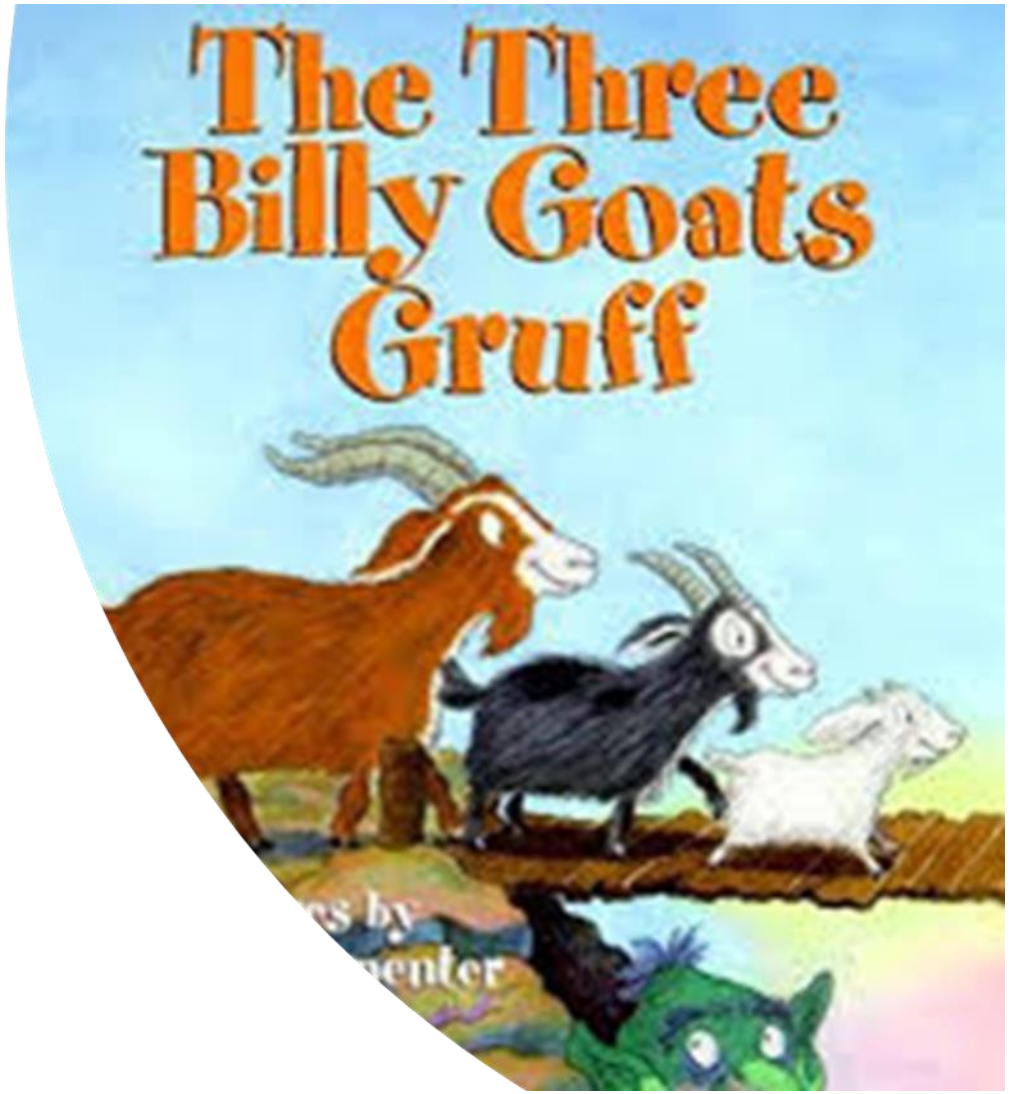
- Comparisons
- Quantity
- Estimating
- Problem Solving
- Patterns



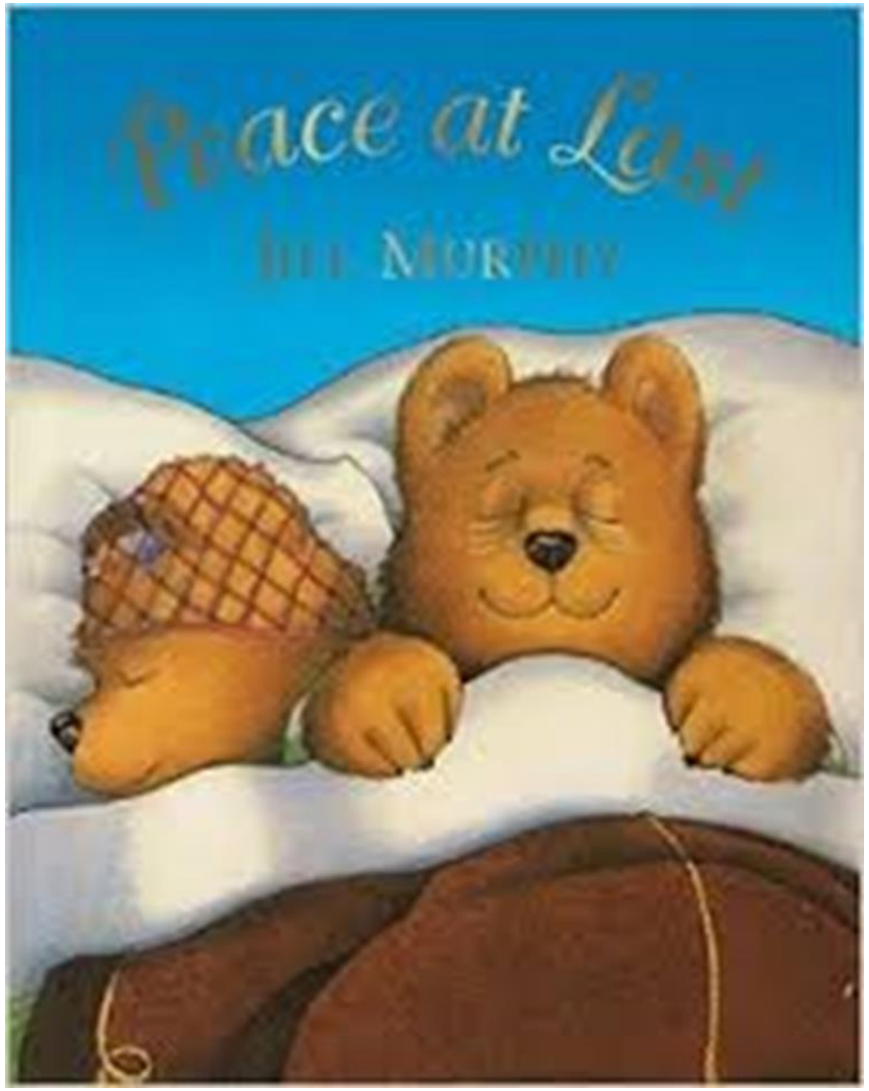
Size / Comparisons

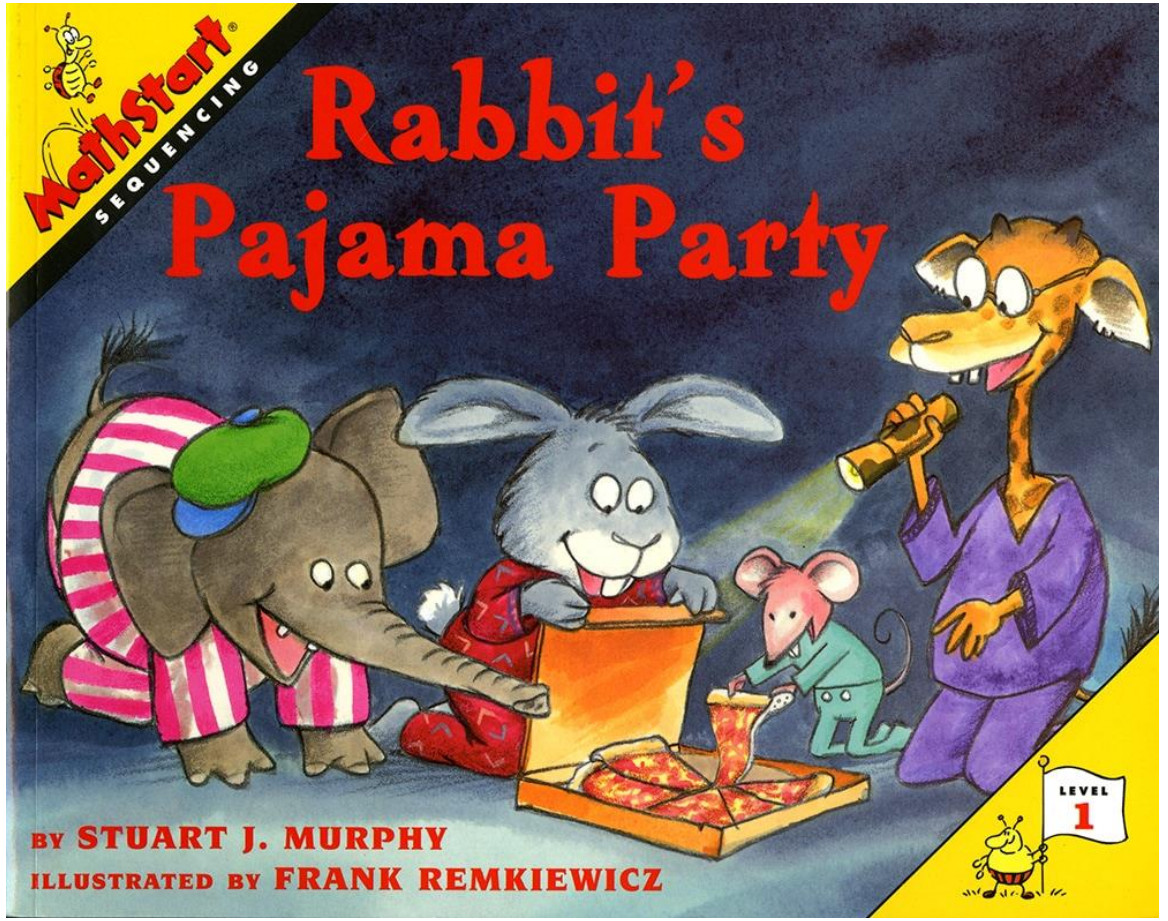
Counting

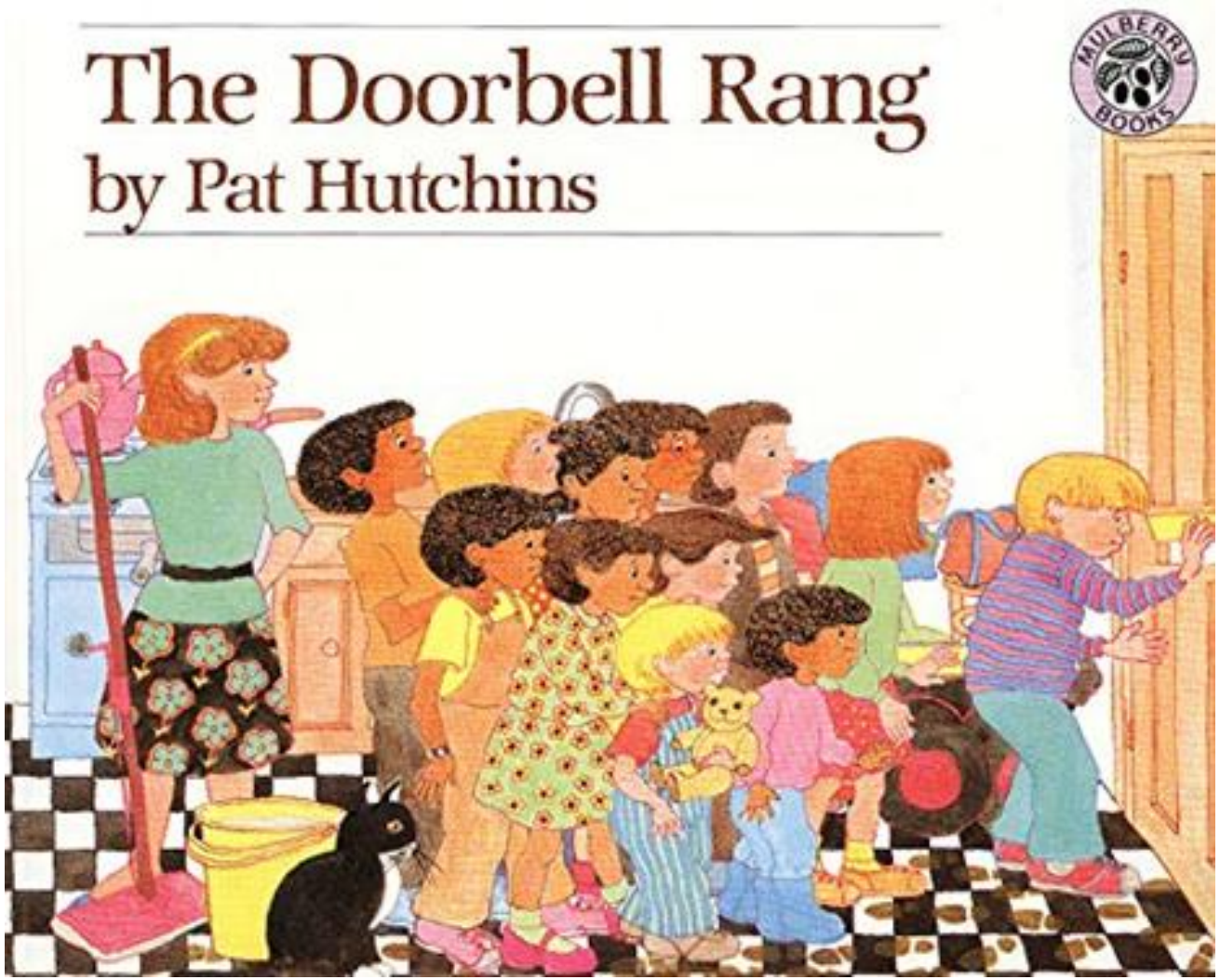




Time


Peace at Last
Jill Murphy


MathStart
SEQUENCING
Rabbit's Pajama Party
BY STUART J. MURPHY
ILLUSTRATED BY FRANK REMKIEWICZ
LEVEL 1



Sharing /Division

Planning with parents beyond counting……..

Natural opportunities when sharing books

Develop awareness of mathematical vocabulary and concepts in books at home.

Modelling

Planning exposure to particular vocabulary and concepts

Tracking progress - observations, understanding of vocabulary/ concepts.

Goldilocks and the Three Bears

	Whole Group activity	Focus Activity or Free Play	Art and Craft	Snack time	Listening and Music	Role Play
Number and operations understanding the concept of number, quantity, order	Story – outlining the sequence- first, then, later,	Making bear biscuits -counting biscuits, eyes, nose Weighing ingredients Pouring porridge oats in containers	Bear puppets – how many in the Bear family.	• Counting children • How many boys/girls? • Counting plates, pomme bear crisps	• Song -When Goldilocks went to the House of the Bears	• Laying the table – sets of bowls, spoons, cups for the 3 bears
Shapes and spatial relationships (geometry).		• Stacking cups and rings	• Paper plate bear faces using shapes		Teddy Bear Teddy Bear Turn Around	
Measurement - size, weight, quantity, volume, and time.	Making Porridge – time how long it takes in the microwave	Making Porridge Bear Biscuits Paper plate bear faces using shapes Weighing the 3 bears -who is the heaviest, lightest, predicting Finding the longest/ Shortest spoon Big trees and Little trees in the forest	Wooden Spoon Goldilocks and 3 bears puppets (different sizes) Sticking activity matching bowls and bears		Song -When Goldilocks went to the House of the Bears	Different sized bowls, spoons, beds Dried pasta for filling containers Makinfg porridge with cornflour – how much water do we need?

Role Play / Routines at home

- Laying the table for the three bears
- Different size bowls and spoons - pasta to fill containers
- Putting the bears to bed
- Recognising groups of three opjects
- Counting

Art and Craft -Photos of children

- Counting fingers to make leaves
- Comparisons eg which tree is the tallest, thinnest, biggest?
- How tall am I compared to the tree?
- Who’s the tallest in the group?

Making Porridge

- Size of bowls
- Why did the porridge get bigger (because we added milk to it)
- How long did it take to cook in the microwave? minutes / seconds /long time or short time
- Concepts such as full and empty, half full, all gone
- Do you think there will be enough porridge for every one? !!

Play opportunities

- Making bear biscuits –measuring, shapes, counting
- Sorting which clothes belong to which bear
- Matching different bowls and bears by size
- Stacking cups.
- Exploring different textures and how materials can change shape

Capacity

Meal times

- 5 plates (8 children) – Oh dear there are not enough plates, how many more do we need?
- Cutting fruit, toast – whole and fractions (whole, part, share)
- Estimating – how much juice will we need?

Outcomes

Measurable benefits for the children – increased use of mathematical language

Modelling for parents – sharing ideas and opportunities

Teachers of the Deaf will plan for mathematical opportunities

Demystifies maths learning

Fun!

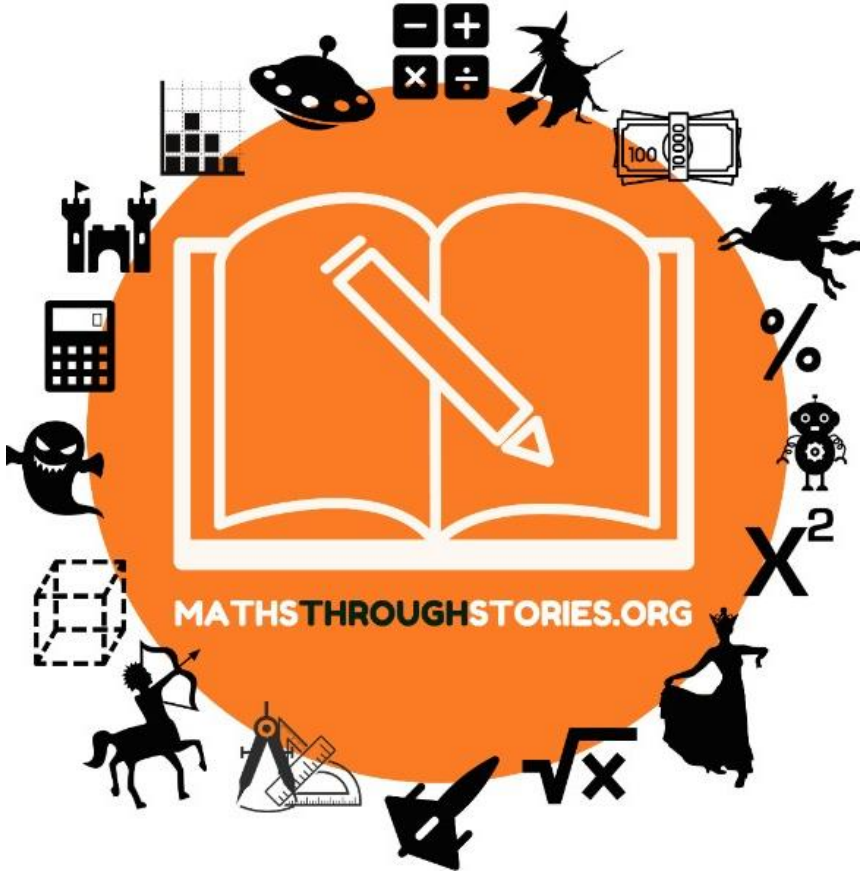

Mummy there aren't any corners it's a circle! (Lily 3)
Do you want me to cut your toast?
Cut in half –that's two pieces.
Before when I thought of Maths I just thought of counting. (mum)
I think about Maths differently – I didn't realise that there are so many opportunities just doing the things we do all the time (mum)

What next?

- More work on language of maths in the early years – eg development of time concepts
- Moving away from the belief that maths isn't as important as language or literacy
- Supporting parents to understand importance of maths language and everyday experience
- Importance of adult mediation

Maths Through Stories - Reading University

- Dr. Trakulphadetkrai Lecturer in Primary Mathematics Education at Reading University
- News Letters
- Data base of books linked to mathematical concepts
- Research projects



https://www.mathsthroughstories.org/

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- Bell, C. V. (2013). Developing number sense with literature: Sharing beans with friends. The Journal of Teaching Children Mathematics, 20(4), 238-244.
- Chick, L., Holmes, A. S., McClymonds, N., Musick, S., Reynolds, P., & Shultz, G. (2007). Read a story, discover the math. Teaching Children Mathematics, 14(4), 224-225.
- Cross, C. T., Woods, T. A., & Schweingruber, H. (Eds.). (2009). Mathematics learning in early childhood: Paths towards excellence and equity. **Washington** DC: Committee on Early Childhood Mathematics, National Research Council and National Academy of Sciences.
- Furner, J. M. (2018). Using children's literature to teach mathematics: An effective vehicle in a STEM world. European Journal of STEM Education, 3(3), 1-12.
- Gottardis, L., Nunes, T. and Lunt, I (2011) A synthesis of Research on Deaf and Hearing Children's Mathematical Achievements. Deafness and Education International, 13 (3) 131-150

- Kritzer, K.L., Gearing up for Math Readiness: Guiding Parents in Supporting Young Deaf and Hard-of-Hearing Children's Early Math Development.
- Kritzer, K. and Pagliaro, C. An Intervention for Early Mathematical Success: Outcomes from the Hybrid Version of the Building Math Readiness Parents as Partners (MRPP) Project. J. Deaf Stud. Deaf Educ. (2013) 18 (1): 30-46.
- Pagliaro, C.M. and Kritzer, K.L., 2013. The math gap: A description of the mathematics performance of preschool-aged deaf/hard-of-hearing children. *Journal of deaf studies and deaf education*, *18*(2), pp.139-160.
- PIERCE, M.E. and FONTAINE, L.M., 2009. Designing Vocabulary Instruction in Mathematics. *The Reading Teacher,* **63**(3), pp. 239-243.
- Trakulphadetkrai, N. V. (2018). Story picture books as a mathematics teaching and learning tool. *Primary Mathematics, 22(*2), 3-7.