Aims

- Significant shifts in learning
- Developing pedagogy
- SEAL - more than Early Level
- SEAL - not a resource
- Teachers need time to develop their understanding of SEAL and consider the impact this has on Learning and Teaching
Learning and Teaching in Numeracy

From the early stages onwards, children and young people should experience success in mathematics and develop the confidence to take risks, ask questions and explore alternative solutions without fear of being wrong. They will enjoy exploring and applying mathematical concepts to understand and solve problems, explaining their thinking and presenting their solutions to others in a variety of ways.

*Mathematics: Principles and Practice*
Let’s start with the children
What does the research say?

If the research indicates this……

How can we give every child a positive understanding and success in early number?

How do we identify and support development needs?
Observing the learner
The Stages of Early Arithmetical Learning

A model which highlights significant shifts in how children think about and understand number.
Learning Framework in Number

A - SEAL: Stages of Early Arithmetical Learning

B - FNWSs: Forward Number Word Sequences
   BNWSs: Backward Number Word Sequences
   Numeral Identification

Also focus on knowledge of:

C - Structuring numbers
C - Tens and Ones = conceptual place value
D - Multiplication and Division
Because…..

“….there is no such thing as arithmetical ability: only arithmetical abilities. The corollary is that arithmetical development is not a single process, but several processes, involving the development of different components. “

Ann Dowker, The Development of Mathematical Skills
I am able to use knowledge of number bonds to estimate and check answers to problems by partitioning numbers. This includes solving, by partitioning, a problem of subtraction of numbers with two or more digits, by using knowledge of number bonds to an appropriate amount. (MNU 1-0c)

I can solve addition and subtraction problems using number bonds and knowledge of number bonds to an appropriate amount. (MNU 1-0d)

I can solve problems by partitioning. This includes solving, by partitioning, a problem of subtraction of numbers with two or more digits, by using knowledge of number bonds to an appropriate amount. (MNU 1-0c)

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Emergent Counting

What do you see…..

• Organisation
• Numeral Sequence
• 1-1 correspondence

• IMBY – It might be you!

Table 19 – person with longest hair

Murray
Emergent Counting – What do I need?

- Copying and saying short number sequences forwards and backwards
- Using domino patterns and random arrays to develop ability to **ascribe number**
- Making Spatio-motor/Auditory patterns to **match** spatial patterns
- Making **finger patterns** – seen and unseen
- Copying and Counting temporal patterns and temporal sequences...including **double patterns**

*CfE*  
**Early Level - MNU 0-02a**  
*I have explored numbers, understanding that they represent quantities and I can use them to count, create sequences and describe order*
What does this mean for our teachers?

Research indicates that the quality of instruction is an important factor influencing student achievement in mathematics…. We believe this quality of instruction is critically important and is directly tied to the teachers’ specialised knowledge of the teaching and learning of mathematics; that is, what is referred to as pedagogical content knowledge. (Shulman, 1986)

*Developing Number Knowledge*

*Wright, Ellemor-Collins and Tabor*
Perceptual Counting

Table 5 – person with the shiniest shoes
Perceptual Counting - What do I need

• Saying alternate **FNWS, BNWS**
• Saying the number word **before** and **after**
• Sequencing/Identifying numerals 1-20
• Counting two collections with **one screened then two screened**
• Counting items in a row with some screened
• Partitioning visible and flashed **patterns to 10**
• **Combining patterns**
• **Finger patterns**; Five plus, partitioning 3-10, Doubles plus 1, Partitioning 10 fingers
• Describing equal groups, organising equal groups, making equal groups, describing equal shares, organising equal shares, partitioning equal shares
The Learning Cycle – What can SEAL offer?

Initial and on-going assessment

- SEAL
- Clear Learning Pathways

Problem solving opportunities to challenge current stage of development

Constructivist teaching with related teaching activities

Curriculum for Excellence – Cumulative Growth
Promoting discussion about strategies
What do they need?

- Develop understanding of tens and ones
- Opportunities to explore the structure of numbers to 100.
- Combine and partition numbers in a variety of ways
- Tens and ones - creating and counting
- Developing jump strategies for addition and subtraction
- Developing Knowledge and recall of equal shares and groups

What do they NOT need?

Algorithms (not yet!)
What are the key features of effective learning and teaching in numeracy?

• Active learning and planned purposeful play
• Development of problem solving activities
• Developing mental agility
• Frequently asking children to explain their thinking
• Use of relevant contexts and experiences, familiar to children and young people
• Using technology in appropriate and effective ways

Numeracy across learning – Pg 2
‘Children and young people will most effectively develop their numeracy through **cumulative growth** in their understanding of key concepts and the **application of their skills in new contexts.**’

Numeracy across learning – Page 3
Let’s finish with our teachers!


Teaching Number in the Classroom with 4-8 year olds (Maths Recovery Series) by Mr Robert J Wright, Garry Stanger, Ann K Stafford and Mr James Martland (Hardcover - 5 Jan 2006) ISBN: 978-1-4129-0757-6

Introducing SEAL, Mhairi Stratton, 2011