



Oide

Tacú leis an bhFoghlaim
Ghairmiúil i measc Ceannairí
Scoile agus Múinteoirí

Supporting the Professional
Learning of School Leaders
and Teachers

Primary Mathematics Curriculum

School and Curriculum Leaders' Seminar

Professional Learning Booklet 2023-2024



Key Messages



The PMC is for all children attending primary and special schools.



'How' children learn in mathematics is as important as 'what' they learn in mathematics.



Maths helps us understand the world, and we use the world to understand maths.



"The role of teachers and school leaders is pivotal in initiating and sustaining curriculum implementation, and little can be achieved, and sustained, without their engagement"
(OECD, 2020, p. 43)

Name:

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PMC CPD Framework/Supports

When applicable, the outlined supports will be facilitated by an Oide Professional Learning Leader / NCSE Primary Curriculum Advisor for both primary and special schools.

PMC Introduction Sept '23 – June '24	
Info Video	This short video highlights the reasons for changing how we teach maths. It gives a brief overview of what these changes are, and outlines the CPD Framework of supports for the PMC.
School and Curriculum Leaders' Seminar Sept– Oct 2023	This full day face-to-face seminar introduces all primary and special school leaders, along with a nominated curriculum leader per school, to the PMC and provides an overview of the CPD supports available.
Leaders' Online Collaboratives Nov 2023 - June 2024	Join our online collaborative sessions facilitated by Oide/NCSE to customize your closure day and promote peer learning. Don't miss out on this chance to make the most of your school closure day.
School Closure Day 1 Nov 2023 - June 2024	We are delighted to tell you about your full day school closure. Small and medium schools will be clustered to maximise peer learning. The closure will be facilitated by Oide/NCSE and will be informed by your Leaders' Collaborative. We will notify you of your closure date soon.
Online Clinics Jan - May 2024	These clinics will be available during and after school hours, for school and / curriculum leaders. An Oide PLL will provide real-time support to help you build momentum in introducing the PMC in your school.
Muinín Collaborative Workshop Series Jan – June 2024	These elective online workshops, guided by Oide PLL, will have a strong stage focus. This approach will enable teachers to delve deeper into the five strands of the PMC and explore them more extensively.
Online Learning Hub	Introducing your 'one-stop-shop' for valuable resources, including PMC in practice videos, exemplars, resources that accompany CPD Supports, and more. You'll also find Leaders' Additional Supports, outlined in more detail below.
Additional Support Material	These online resources are designed to support whole staff engagement in the 5 Pedagogical Practices. These supports include good practice videos, facilitation guides, research articles, presentations, etc.
PMC Implementation Sept '24 – June '25 PMC Embedding Sept 2025 – Onwards	
Further information is available on the PMC Hub	

Overview of Day

Session 1 9:30 – 11:00	<ul style="list-style-type: none"> • Explore the rationale for change • Outline key documents and supports • Overview of the Primary Curriculum Framework • Overview of the Primary Mathematics Curriculum • Overview of the elements
Coffee Break 11:00 - 11:15	
Session 2 11:15 – 1:00	<ul style="list-style-type: none"> • Workshop to explore the pedagogical practices
Lunch Break 1:00 – 2:00	
Session 3 2:00 – 3:30	<ul style="list-style-type: none"> • Assessing primary mathematics • Signpost supports • Pedagogical practice: Fostering productive disposition • Consider next steps

Key Documents



Primary Curriculum Framework



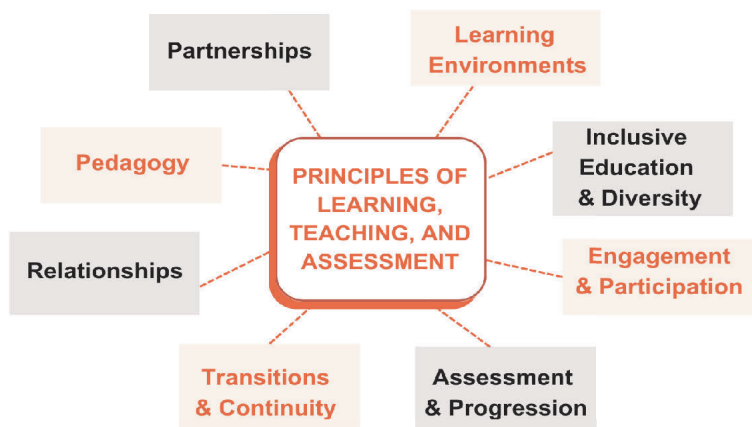
Preparation for Teaching and Learning

Circular

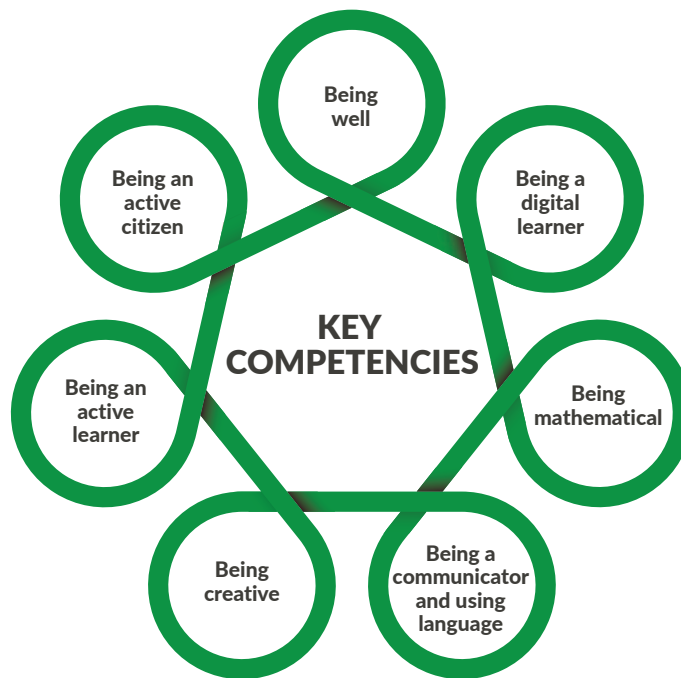
(September 2023)

Circular

Principles of the Primary Curriculum Framework



Key Competencies



Notes:

Continuity Across the Sectors



Early Years



Primary Years



Junior Cycle

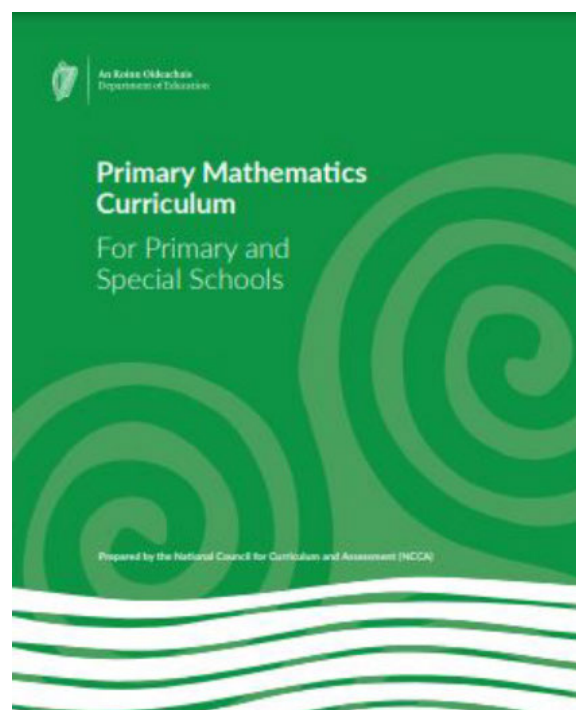


Senior Cycle

Notes:

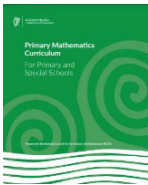


The Curriculum

Book Walk



The NCCA have created a book walk to help you to navigate the curriculum. This may be useful when engaging with the document for the first time, and can be found on the NCCA website.

Learning Outcomes and the Toolkit

<p>Learning Outcomes</p> 	<p>Learning outcomes are used to describe the expected mathematical learning and development for all learners at the end of a two-year stage, when due account is taken of individual abilities and varying circumstances. Learning outcomes articulate big mathematical ideas across different stages and encompass the knowledge, skills and dispositions that the Primary Mathematics Curriculum supports children to develop.</p>
<p>Mathematical Concepts</p> 	<p>Mathematical concepts are considered key ideas that underpin each learning outcome. These key ideas may provide useful entry and reference points in relation to preparation, teaching and assessment and may serve to remind teachers of key mathematical knowledge at each stage.</p>
<p>Progression Continua</p> 	<p>The progression continua outline a sample learning trajectory of Mathematics at primary level. They suggest a series of learning experiences which children might engage with as they develop and deepen their mathematical knowledge, skills and dispositions.</p>

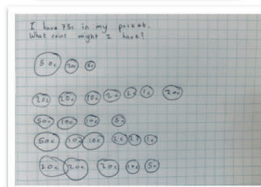
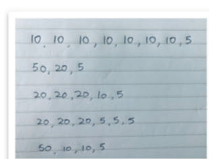
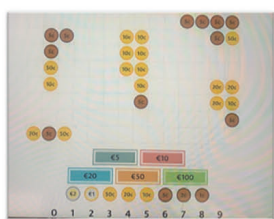
The Elements

What coins are in my pocket?



I have 75c in my pocket.
What coins do I have?

Childrens' Work Samples



Understanding and Connecting



Reasoning



Communicating

Applying and Problem-Solving

Elements: Reflection



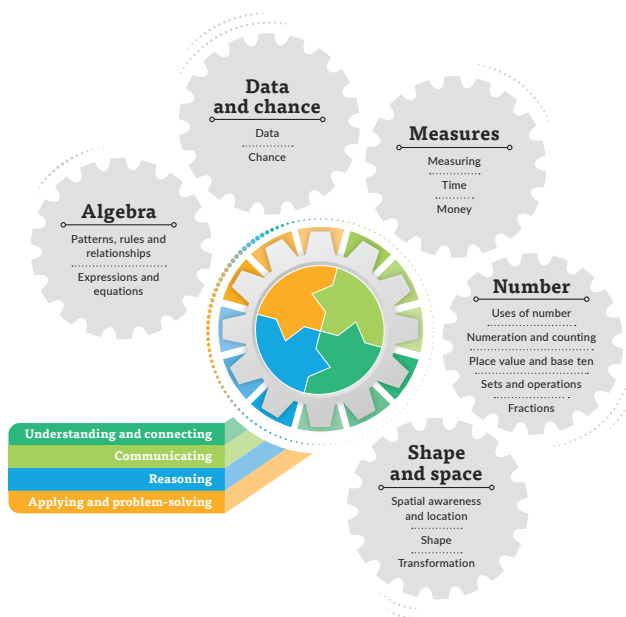
The elements are the processes the child engages in as they move towards being mathematically proficient. Children engage in all of these simultaneously.

It is what you observe the children doing.

During the “What coins are in my pocket” activity, what elements did you engage with?

Understanding and Connecting	
Take time to think	
Interact and collaborate with peers	
Connect new and previous learning and ideas	
Make links and relationships between ideas, procedures and solutions	
Connect learning across mathematical strands, and beyond mathematics	
Engage in learning that offers an appropriate level of challenge	
<i>Be curious and innovative</i>	
Communicating	
Learn, use and apply mathematical language	
Express their ideas and share their thinking with others	
Model and represent their thinking in different ways	
Compare how they and others represent their thinking	
Argue their logic	
Listen to others	
<i>Be open, confident and sociable</i>	
Reasoning	
Analyse and deduce ideas, strategies and solutions	
Argue and justify their thinking	
Question and evaluate evidence	
Generalise their learning to other areas	
Determine and justify how their ideas and conjectures make sense	
<i>Be logical and analytical</i>	
Applying and Problem Solving	
Engage with a range of appropriate problems rooted in meaningful contexts	
Pose problems	
Investigate and explore ways to solve problems	
Compare ideas strategies and approaches	
Make decisions and apply mathematics to real world problems	
Interpret and evaluate solutions	
<i>Be creative and adventurous</i>	

The Strands and Elements



Notes:

The Elements

Reflection: Leading Learning in your School

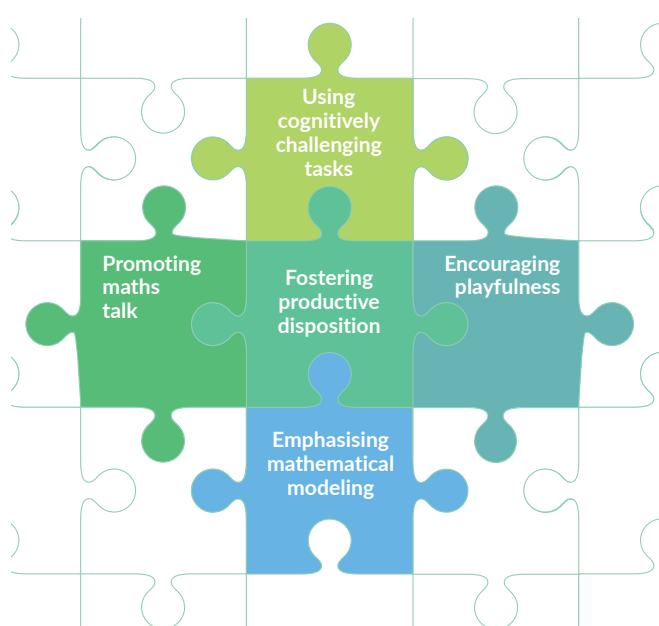


What?
So What?
Now What?

Exploring the Pedagogical Practices

Teaching Primary Mathematics

'How' children learn is as important as 'what' children learn. The following five pedagogical practices are rooted in research. These practices are acknowledged as essential to the provision of quality mathematical learning experiences.



They foster an inclusive learning environment and culture where children engage in rich and meaningful learning processes, as described in section 6a. Moreover, these pedagogical practices allow for children to learn and develop at a pace and level of challenge that is individual to their needs and interests whilst developing their confidence and proficiency in Mathematics. As such, these practices should permeate teachers' everyday decision-making about learning, teaching and assessment of Mathematics.

Primary Mathematics Curriculum p.26

As with most good classroom practices, these practices are dynamic and naturally link with each other.

The practices highlighted here should not be considered exhaustive or hierarchical.

Notes:

Exploring the Pedagogical Practices



Supporting an Inclusive Maths Environment

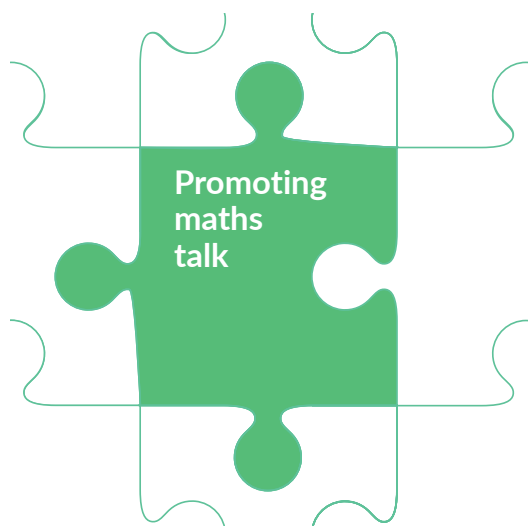


Ronda's Four Freedoms (2012) as cited in the NCCA Support Document
An Introduction to Maths Talk

Notes:

Teaching Primary Mathematics

Promoting Maths Talk



Maths talk is a collaborative process where children's thinking, strategies and ideas are discussed, shared and exchanged.

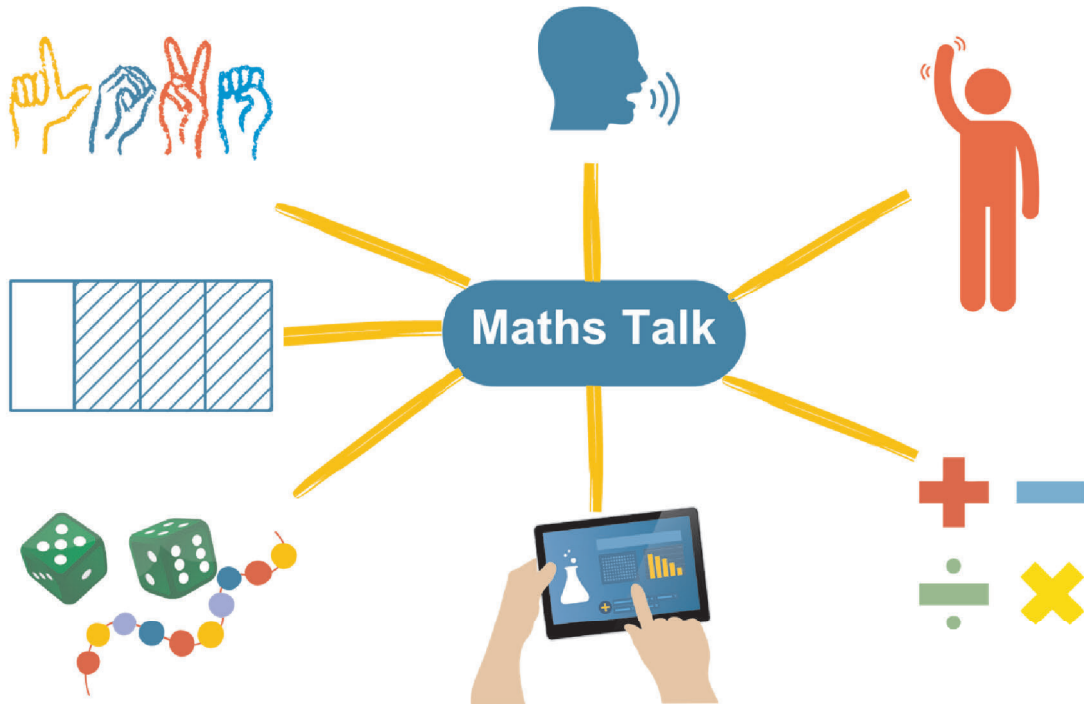
By engaging in Maths Talk, children can reflect on their own understanding of maths concepts. They can define, present and justify their ideas while developing their ability to express and articulate their thinking. They can make sense of, and critique their own ideas and those of others.

Maths Talk is defined as '...patterned ways of using questioning, explaining, listening, and different modes of communication in the classroom to promote conceptual understanding in math for all learners'

(Sztain et al. 2020) cited in NCCA Support Document;
An Introduction to Maths Talk

Promoting Maths Talk

Tools to Make Thinking Visible



Every child, every classroom, every day

The images on the slide illustrate the tools that maths talk equips children with to make their thinking visible eg: words, sign language, body language and gestures, symbols, diagrams, concrete manipulatives and technology.

Notes:

Promoting Maths Talk

Task: Odd One Out



<https://wodb.ca/>

In Odd One Out, pupils observe images and identify which one is the odd one out and give a reason why.

All pupils can engage with Odd One Out activities, effective questioning can support or extend pupil thinking.



Structured Partner Talk for Maths

Salt and Pepper Strategy

Children work in pairs, and are assigned names, for example, one is Salt and one is Pepper.

Teacher provides sentence stems; Salt; you are going to turn to your partner (Pepper) and tell them which one doesn't belong.

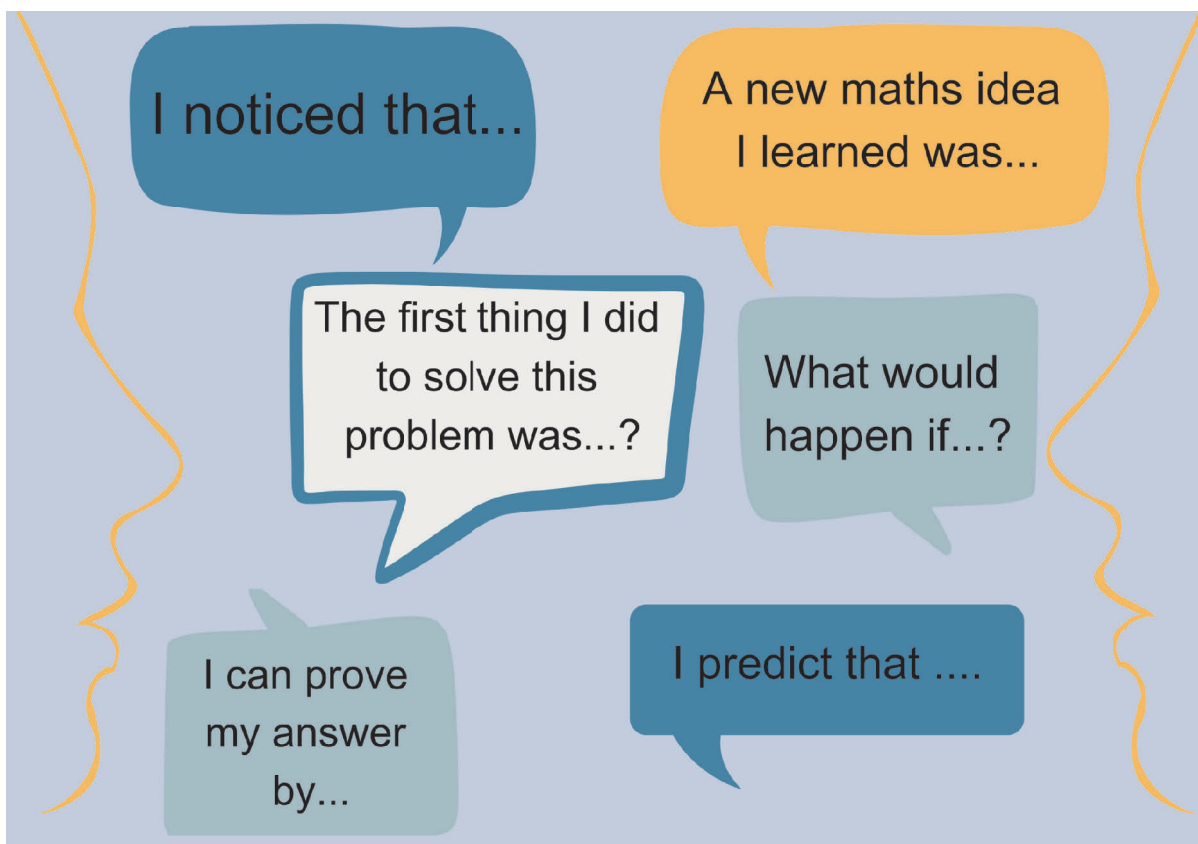
Peppers you have 2 choices - you can either repeat what Salt said or ask a question about their choice.

Teacher encourages partners to agree/disagree/build on or move on.

Notes:

Promoting Maths Talk

Some Examples of Sentence Stems




Notes:


Promoting Maths Talk

Let's Talk Maths




 **Reflect**

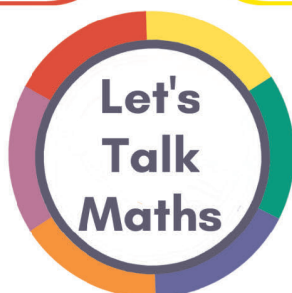
- Which way was easiest for you to understand and why?
- Can you try again using another strategy?
- Which is the most efficient strategy?

 **Think**

- Have we solved a similar question?
- Where could you start?
- Can you use concrete materials or draw a picture etc to represent your thinking?


 **Extend**

- Can anyone take Róisín's idea and add to it?
- Can you represent it a different way?
- Are there other ways of solving this?




 **Share**

- Can anyone explain how they approached the question?
- Did anyone do it differently?
- Mary had an interesting idea, would you like to share it with us?

 **Revoice**

- Who can repeat Sean's thinking?
- Who can put Ali's thinking into their own words?
- Who can explain how Jack came up with that answer?

 **Examine**

- Did your representation help you to solve the question?
- Will your idea/solution always work?
- Why didn't your strategy work?

Promoting Maths Talk

Reflection: Leading Teaching in your School

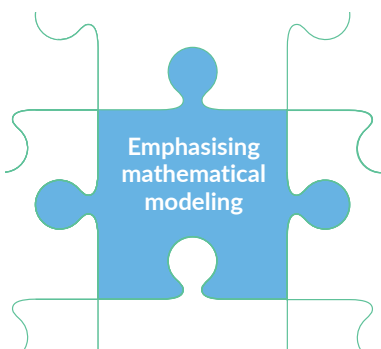


What?
So What?
Now What?



Teaching Primary Mathematics

Emphasising Mathematical Modeling



Mathematical modeling is a process by which children represent their thinking. Children might use words, objects, pictures, symbols or diagrams to demonstrate their interpretation of different mathematical problems. While accuracy is valued, mathematical modeling places more importance on exploration, sense-making, conceptual understanding and flexibility in thinking. By engaging in mathematical modelling, children create their own mathematical models which make sense to them.

Task

Can you show me

$3\frac{2}{5}$

as a fraction greater than 1?
Show me how you might solve it

Children's Work Samples

Notes:

Emphasising Mathematical Modeling

Reflection: Leading Teaching in your School

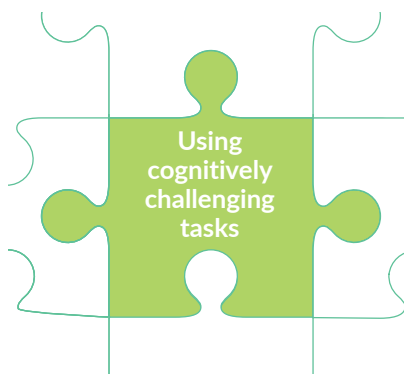


What?
So What?
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Teaching Primary Mathematics

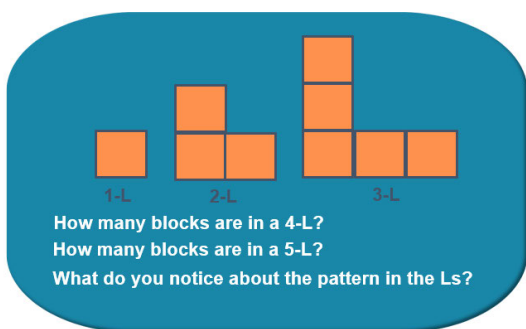
Using Cognitively Challenging Tasks



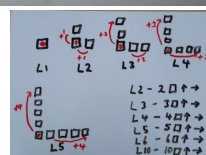
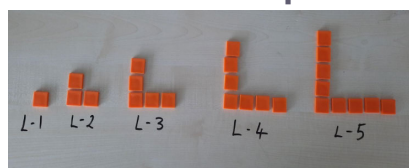
Cognitively challenging tasks are rich, higher-order learning opportunities that should appropriately stretch and challenge children's conceptual understanding. These tasks should provide **all** children with the opportunity to access maths, while offering the potential for deeper engagement.

Through exploring cognitively challenging tasks, all children have the opportunity to freely explore different ways of solving problems with few prescribed rules or methods.

Task:



Children's Work Samples:



What do you notice about the patterns in the L's?
 What is staying the same/changing each time?
 What is the largest L that you could tell us about?

Notes:

Using Cognitively Challenging Tasks

Reflection: Leading Teaching in your School

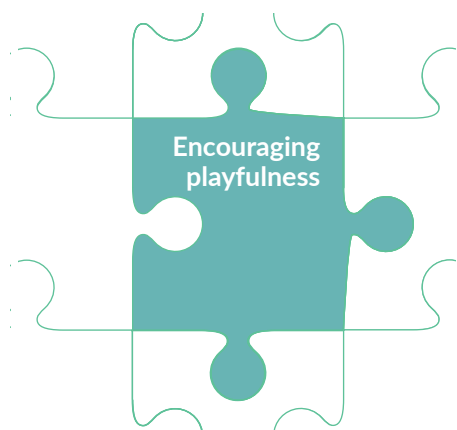


What?
So What?
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Teaching Primary Mathematics

Encouraging Playfulness with Mathematics



Playful learning is appropriate for **all** children across all stages of primary and special education. Play provides a context for mathematical thinking and the development of maths language and concepts. Playfulness can be supported by providing opportunities for exploration, investigation, challenge, creativity, choice and independence.

Through play, children can be supported to make choices about their learning. In doing so, their mathematical concepts are strengthened and extended. Opportunities for children to make connections and share ideas are increased.

Learning Outcome Stem: Stages 1-4 Junior Infants to Sixth Class

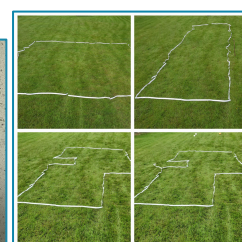
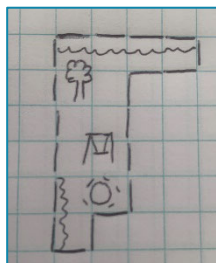
"Through appropriately playful and engaging learning experiences, children should be able to.."

Encouraging Playfulness with Mathematics

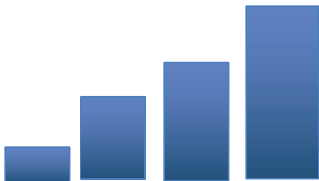
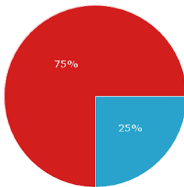
Open-Ended Task

An open-ended task is one where there is a range of 'correct' solutions and/or a range of ways to achieve one or more solutions.

You have 20 metres of fence for a garden.
What might your garden look like?

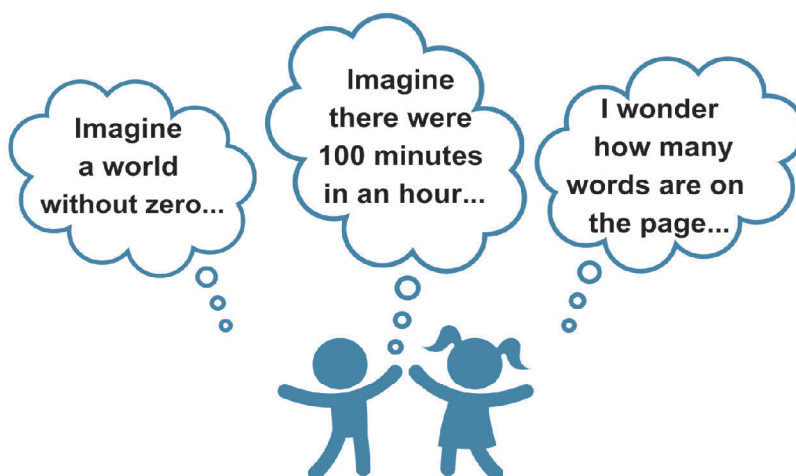


Examples of Open-Ended Tasks Strand: Data and Chance

Stage	Learning Outcome Through playful and engaging learning experiences, children should be able to..	Task
1. Junior and Senior Infants	explore, interpret and explain data in a variety of ways for a range of purposes	The zookeeper saw twelve legs walk by. How many creatures did he see? How many different answers can you find?
2. First and Second Class	pose questions of interest, record and use data as evidence to answer those questions and communicate the findings	You live next to a farm. When you look out the window one morning, you see 18 legs. What did you see? How many different answers can you find?
3. Third and Fourth Class	pose questions of interest, and collect, display and critically analyse data in a range of ways for a range of purposes and communicate the findings	What information could be represented by this bar chart? 
4. Fifth and Sixth Class	pose questions, collect, compare, summarise and represent data selectively to answer those questions	What information could be represented by this pie chart? 

Encouraging Playfulness with Mathematics

Imaginings/Wonderings



Notes:

Exploration of Everyday Materials



Sort these shapes in a way that a mathematician might.

Why do you think a mathematician might sort them in this way?

Notes:

Encouraging Playfulness with Mathematics

Reflection: Leading Teaching in your School



What?
So What?
Now What?



Teaching Primary Mathematics

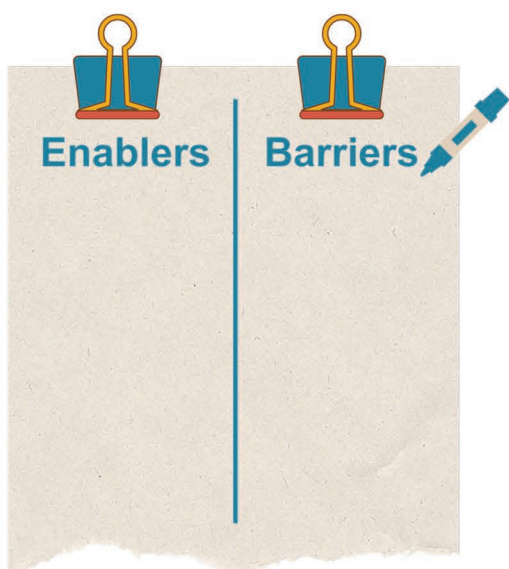
Fostering Productive Disposition



Productive disposition is the tendency to see maths as practical, useful and worthwhile. It can be nurtured or changed over time.

Attitudes and values, both at home and in school have a strong impact on the development of the child's productive disposition for maths.

When children see the application of maths in situations that they care about which relevant to their lives, it is more likely that they will engage in maths in a meaningful way.



What are the enablers/barriers to a productive disposition?

Notes:

Fostering Productive Disposition

Reflection: Leading Teaching in your School



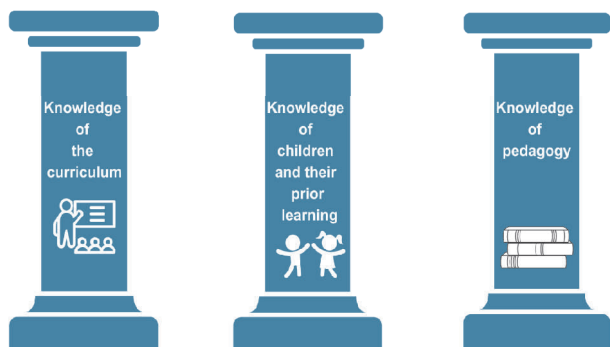
What?
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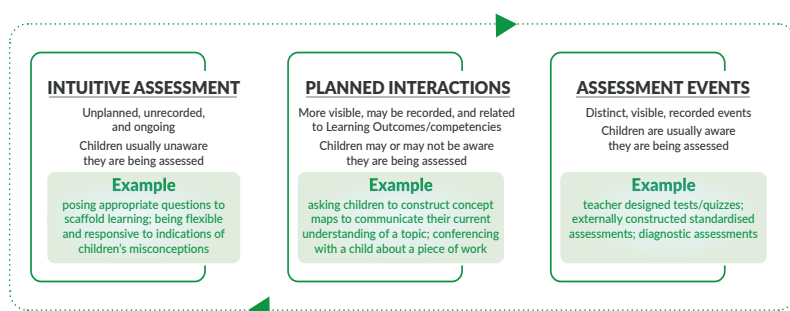
Assessing Primary Mathematics

As teachers, decisions that we make about maths learning and teaching are informed and shaped by:

- Knowledge of the child and their prior learning
- Knowledge of the curriculum
- Knowledge of pedagogy



Notes:



Notes:



Notes:

Assessing Primary Mathematics

Reflection: Leading Assessment in your School



What?
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Now What?

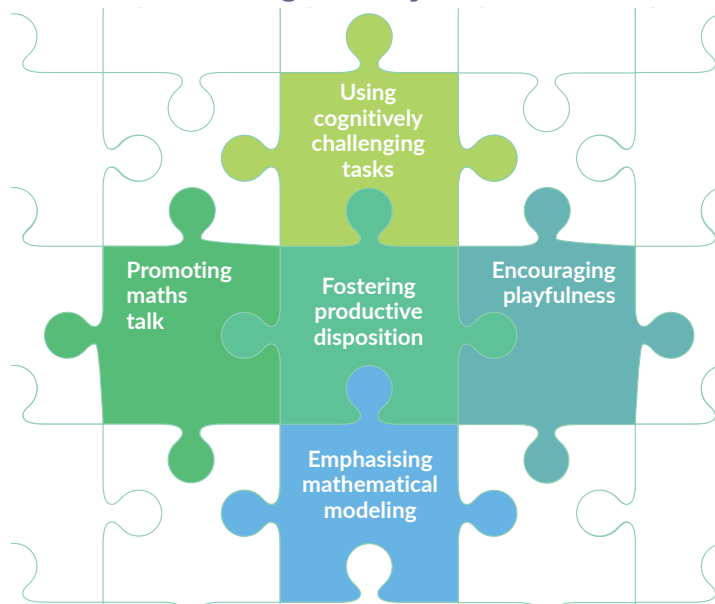


Footage from the Classroom

What elements did you see the children engaging in?
What Pedagogical Practices did the teacher use?
What methods of assessment were used? Were there more opportunities for assessment?



Learning Primary Mathematics

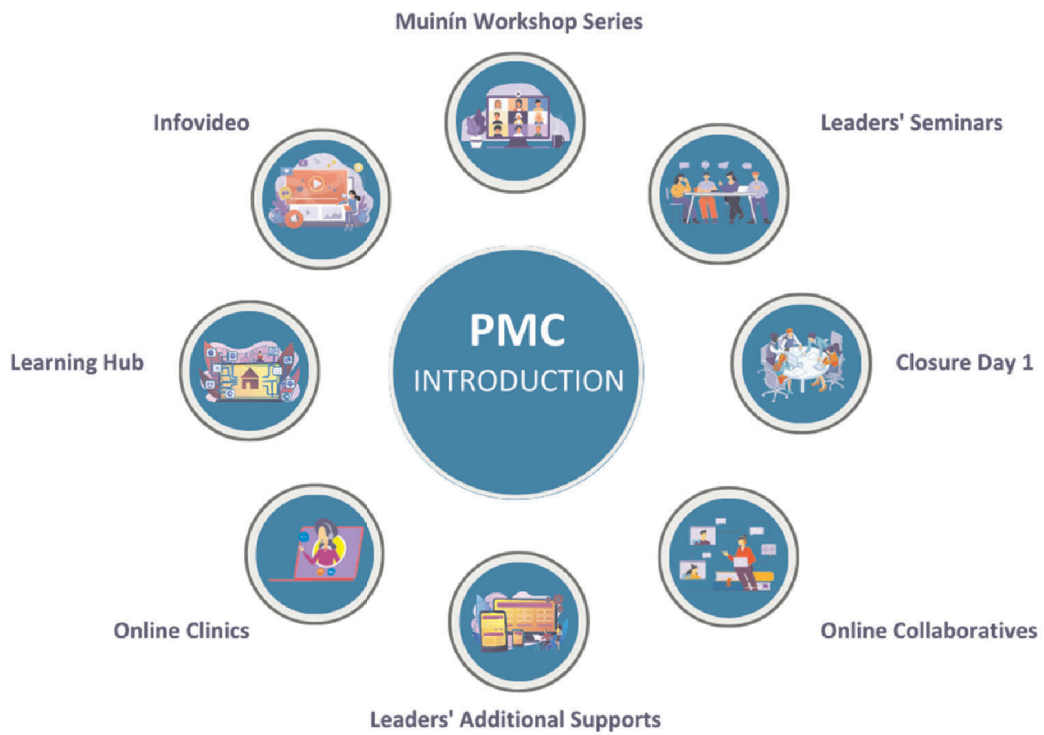


Teaching Primary Mathematics



Assessing Primary Mathematics

Next Steps



Practical Considerations

Our Next Steps



What?

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So What?

Blank space for notes under the 'So What?' section.

Now What?

Blank space for notes under the 'Now What?' section.





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