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School Self Assessment Maths

Summary of main strengths as identified in last SSE on 30.09.16:

- The majority of our pupils are performing well above the national average in mathematics standardised tests.
- Enthusiastic teachers
- Computation skills are strong
- Strong emphasis on learning tables using schematic teaching of tables
- A broad range of assessment tools are used in planning the next steps of the children's learning
- Extensive bank of teaching resources
- Differentiation is central to teacher planning for numeracy, good access to learning support including in-class support
- Supportive parents
- ICT is used to support numeracy learning
- Maths games are used to improve children's attitude and confidence in maths

Summary of main areas requiring improvement as identified in last SSE:

- Higher-order thinking and problem solving with an emphasis on the following teaching approaches; Co-operative/collaborative learning, talk and discussion, guided activity and discovery, teacher and pupil questioning
- Standardising mathematical procedures and associated maths language

Improvement targets (related to pupils' achievement)

It is encouraging to note that our problem solving scores have increased from an average of 66 to an average of 70 over the past three years

We aim to continue this improvement in problem solving strand in our standardised maths test from the present school average of 70 to 75 over the next three years.

Required actions (related to teaching and learning that will help to achieve the targets)

Problem Solving

Teacher as Facilitator – Getting children to ‘think mathematically’:

Read over the problem with the pupils and make sure that they understand what the problem is asking them to do. Then let them try their best to solve it by implementing creative strategies and using procedures they know.

Challenge learners (collaborative and individual work; teacher holds back)

(Note: Teacher facilitates the learning process rather than stepping in and offering explanations and solutions prior to allowing the students to think through the process for themselves. When teachers do step in, it should not be to show children how the problem or question is solved/answered but should involve questioning the child with suitable questions in order to allow the child to follow new lines of thinking about the problem or question).

Co-operative Learning/Collaborative Learning:



Practice a constructivist approach (children engaged; use own strategies; welcome multiple solutions; create problems)

Children work in various organisational settings including whole class, pairs or small groups. Allow children opportunities to explain and discuss how they arrived at a solution. Allow for a variety of solution methods!

Give the children the freedom to decide how they will solve the problem, it is possible that the children will solve it in different ways. Have each one or each group share their solution with the class and invite others to comment on the different approaches. You might ask questions such as:

1. How did ____ solve it?
2. Do you agree with what ____ did? (This is to avoid children saying that ____ is right/wrong)
3. Who can put what ____ did in your own words?

(Note: Although it might be hard, try not to tell the children if their solution is correct. Instead, try to encourage the children themselves to determine if an answer is correct, using their own reasoning. If their reasoning is faulty, this might be questioned by another pupil or by you).

Share the following three principles with your children:

1. You can learn a lot from your classmates
2. If you understand something, help others to understand it
3. It's good to ask questions or say "I'm not sure" if you don't understand

Emphasise the process rather than the product

Talk and Discussion – Getting children to ‘talk mathematically’:



Model and elicit mathematical language and practice effective questioning (AfL)

Teacher models the maths language and allows for various organisational settings for children to use it. By providing learners with meaningful opportunities to interact with the language both in the classroom and in alternative environments, the language is contextualised.

Practice open-ended questioning: (Reference handout)

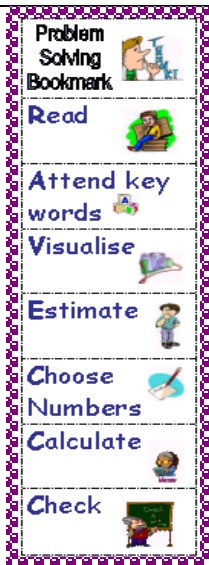
Create a class dictionary of mathematical terms.

Problem Solving Strategies:

The RUDE/RAVE CCC approach will be used in all classes.

Children need to be exposed to a variety of problem solving strategies in order to assist them in problem solving tasks. When solving problems, discussion of various strategies should form an integral part.

- **Making an estimate**
- **Constructing a model**
- **Drawing a diagram**
- **Making a chart or table of the information**
- **Look for patterns in a problem**
- **Make a guess and test it out (Guesstimate)**
- **Breaking the problem down and solving each part**
- **Write a number sentence for the problem**
- **Use appropriate materials**
- **Solve a simpler version of the problem**
- **Act out a problem**



Model how to use problem solving strategies:

Using the RAVE CCC, RUDE as an example, emphasize the importance of breaking down and teaching the individual steps of a problem solving strategy.

READ: Missing Contradictory Surplus data examples here, e.g. Mary had 3 sweets, Pat has 4 sweets, what colour is Mary's hair? – Missing data. Children need plenty of practice at deciphering what is being asked for in a problem.

Attend to Key Words: Spending time modeling for the pupils the key words and their meaning and underlining them. E.g. Claire is going from Dublin to Killarney on a train. There are **517** passengers on the train. The train makes two stops between Dublin and Killarney. The train stops at Portlaoise and **276** passengers **get off**. Train stops in Mallow and **109** passengers **get on**. **How many** passengers are **left on** the train when it arrives in Killarney?

Visualise: Draw it out, act it out, construct it, etc

Estimate: Constantly try to refine the 'guess'. Reference Maths TG p.32-34

Choose Numbers: Model how to write number sentences for the children. Using train example above, $517 - 276 = 241$. $241 + 109 = 350$

Types of Problem Solving:

Aim for quality rather than quantity (in problems posed)

All teachers will follow the action plan for the different types of problem solving

Types of Problem Solving Action Plan:

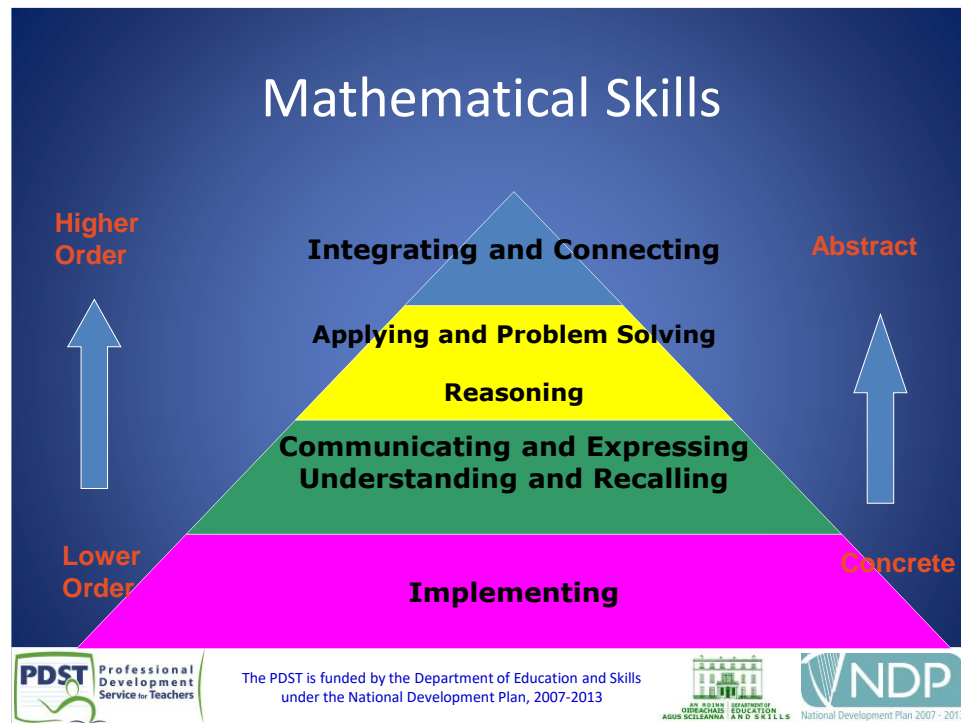
1. Word Problems – Sept
2. Practical Tasks - Oct
3. Open-ended Investigations - November
4. Games - January
5. Puzzles – February
6. Projects – March
7. Maths Trails – April

8. Missing Contradictory Surplus Data – May

Mathematical Skills:

Through completing the strand units of the maths curriculum the child should be enabled to develop the six mathematical skills.

Developing mathematical skills: All teachers will make a conscious effort to develop the 6 mathematical skills in the children particularly the higher order skills of reasoning, applying and problem solving and integrating and connecting.



Linkage:

Make connections between different mathematical areas and to be aware of the role of these connections in the discipline of mathematics.

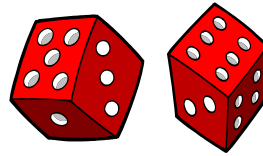
Numeracy Stream:

Invite children to record for one day only all the times they use maths from the moment they get up until the time they go to sleep.



Parental Involvement:

Consider setting up *Maths for Fun*.



Writing



Give children time to prepare a written report for the class in order to reduce the mental load when solving a problem and as a rehearsal for discussion.

(Assessment for Learning)

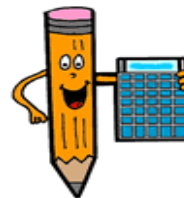
At the end of the lesson you could ask the children to write in response to one of the following prompts

I believe that the correct solution to today's problem is _____ because _____.

or "Use words, pictures and numbers to explain how you got your answer and why you think your answer makes sense and is correct."

- Today in maths I learned _____.
- Tomorrow/next week in maths I'd like to learn _____.
- One question I still have is _____.

ICT:



Consider using higher order problems from websites, iPad Apps, etc

Planning

Use *Problem - Solving Lesson Three Part-Format* handout to plan your lesson.

Before – Introducing

During – Exploring

Standardising mathematical procedures and associated maths language

- All teachers compile a comprehensive list of maths language for all the strands. Teacher models the maths language and allows for various organisational settings for children to use it. By providing learners with meaningful opportunities to interact with the language both in the classroom and in alternative environments, the language is contextualised.
- Agreed mathematical procedures will be developed and communicated to all teachers.
- Mathematical language and procedures will be communicated to parents as the need arises.

Persons responsible:

Principal and all teaching staff will implement, monitor and review the School Improvement Plan for Numeracy 2016 – 2019

The Learning Support and Resource Teachers will implement the School Improvement Plan through team teaching and small group work.

Timeframe for action: Sept 2016– June 2019

Success criteria / measurable outcomes:

We will use Drumcondra standardised test results to measure improvement in children’s problem solving abilities.

We will use Busy at Maths standardised tests conducted throughout the year by all classes to measure improvement

Feedback from teachers at termly staff meetings to ascertain how required actions are progressing.

Evidence gathered from Parent teacher meeting and Pupil Questionnaires will be analysed

Review dates

The School Improvement Plan for numeracy will be reviewed formally at termly staff meetings during the time period September 2016 to June 2019. Each teacher will review progress on an on-going basis through formal teacher observation and a range of other assessments as outlined in the NCCA publications *Assessment in the Primary School Curriculum Guidelines for Schools*