



2018 - 19

How we teach mathematics

Aims:

To raise the standard of maths in all year groups
(measured by journaling for reasoning, times tables
knowledge and testing)

To promote a love and enjoyment for maths in the
children by teaching fun and exciting maths lessons,
linking it to real life contexts and with lots of practical
hands on activities.

Date: September 2018

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Maths

White Rose progression of skills is taught across all year groups. White rose helps to develop children's fluency, reasoning and problem solving where children need to apply their understanding to a question. The White Rose curriculum shows guidance on how to move children through the concrete, pictorial and abstract stages of learning. White Rose can also be used alongside other resources.

At the Palmer Academy we want children to know and understand the 5 core number sense competencies:

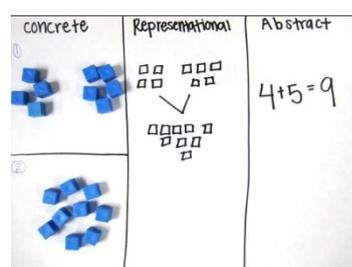
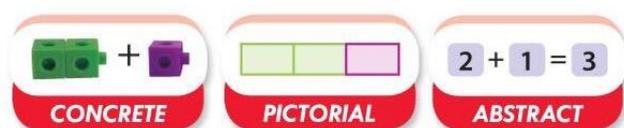
1. Number bonds
2. Making 10/the importance of 10
3. Doubling and Halving
4. Regrouping
5. Using known facts

Developing these number sense competencies is important as these underpin so much of pupils' learning in maths. Refer to the document for guidance and support on how to teach the 5 core competencies.

Skills development

All children must be move through the **concrete, pictorial and abstract** stages in their learning. In doing so children will be able to become fluent Mathematicians. Children also need to be able to explain and show their thinking through reasoning and problem solving.

- ✓ Concrete stage: All children should start at the concrete stage when learning a new concept in maths. Practical resources and real life examples must be available and used in all classrooms during a lesson. Only when a child is solid in their understanding can they move to the pictorial stage.
 - ✓ Pictorial Stage: Children can draw pictures to solve the answer to the question. They rely on their knowledge they learnt from using concrete resources and represent their understanding through pictures or drawing. **Bar modelling** is a great strategy for children to represent their thinking in the pictorial stage. When children are comfortable at this stage they become abstract thinkers.
 - ✓ Abstract Stage: Children are introduced to abstract concepts such an addition, subtraction, multiplication and division symbols (+ - x /)
- These stages are not age specific. They should be part of normal classroom practice throughout all the year groups in the school.



- ✓ Reasoning and Problem solving: Along with fluency children need to be able to reason and problem solve. They need to be able to share and explain their thinking using the correct vocabulary. To improve these skills children will create their own Maths journal which aim to allow children to share their ideas and love for maths through writing (see section on Journal).
- ✓ Timetables: All children are expected to learn their timetables. (see section on times table)

What a Maths lesson should look like

1. The first part of every maths lesson should start with an arithmetic starter. This allows children to be exposed to these concepts daily.
2. Start the lesson with a problem.
 - ✓ The beginning of the lesson should start with a form of question or problem posed to help the learners construct meaning. This should be
 - Based on the NC objective that was set at the beginning of the lesson
 - Open ended questions and must be accessible to all children
 - Visual or concrete prompts to introduce
 - Provide concrete apparatus if needed.
 - ✓ The children must share and talk through their ideas together to find their mathematical voices. This gives the teacher a chance to:
 - Circulate the room
 - Look at how the children are working through the problem
 - Identify the range of methods being used
 - Assess and listen to who may need more support and identify who needs more challenge.
 - This is not a time to correct the children's thinking but rather to be an observer.
 - ✓ Take responses from the children. Encourage them to explain the methods they used to work the problem out.
 - The problem can be 'solved' straight away or come back to at the end of the lesson where children may change their mind about the answer they have given. You may also want children to journal about the problem they faced in the lesson (See journal in the next section).
3. Main structure of the lesson
 - ✓ Guide children through the learning by the teacher modelling.
 - ✓ Give children opportunities to show their understanding and skills by using their white boards and concrete apparatus.
 - ✓ Children you can see are ready to move on don't need to sit through this part and can be moved straight to independent work.
4. Spend sufficient time on independent work in their books so that it shows understanding.
 - ✓ Support children through guided groups.
 - ✓ Encourage peer teaching for early finishes.
 - ✓ Challenge the Greater depth children by extra challenge.

5. Journal when work is complete (see section on Maths Journals)
6. It is important that maths boxes with concrete apparatus are accessible for all children throughout the lesson.

Maths Journals

1. Maths journals is a strategy used to help children to write about their thought processes in maths. It also helps children to improve their reasoning through their writing about Maths.
2. The main purpose of journal writing
 - ✓ Help children to write about their learning
 - ✓ Used as a reference for children to look up a concept they have forgotten about.
 - ✓ Draw pictures about maths
 - ✓ Answer questions about maths
 - ✓ Create their own questions about maths
 - ✓ Explain a new concept they have learnt
 - ✓ Write how they are feeling about maths
3. When should journaling happen?
 - ✓ Journaling should happen at the end of a maths lesson. It does not need to happen every day but should be aimed for 3 times a week.
 - ✓ Children will eventually become independent journal writers and can also journal at any point in the day when they feel they would like to write an idea down.

Times tables

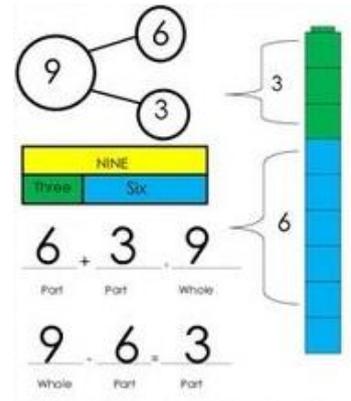
- ✓ Timetables are to be taught every day for 10 minutes. This can be structured into a Maths lesson or done at other times of the day e.g. lining up, going out to break or home etc.
- ✓ Timetables tests should be tested weekly and timed to track the speed and progress children are making.
- ✓ The Pixl timetable app will be available for all children to use at home or at school. The app helps to track the children progress they are making in their timetables.
- ✓ Timetables booklets will be made for the children to use as a tool to practise their tables.

Bar Modelling and number bonds

Number bonds are one of the 5 core competencies and are an important part of understanding that all numbers are made up of parts. This **part-part whole method** should be used in the classroom consistently. It is important that this vocabulary is used in the classroom. The use of number bonds and the language of part-part whole is essential if children are to understand bar modelling.

Bar modelling is an essential maths mastery strategy. Bar modelling allows pupils to draw and visualize mathematical concepts to solve problems.

The advantages of bar modelling provides pupils with a powerful tool for solving word problems. However, the lasting power of bar modelling is that once pupils master the approach, they can easily use bar models year after year across many maths topics. For example, bar modelling is an excellent technique (but not the only one!) for tackling ratio problems, volume problems, fractions, and more. Importantly, bar modelling leads students down the path towards mathematical **fluency** and number sense.



Working walls in the classroom

Working walls should be updated frequently showing the work that is currently being taught in the classroom. Children should refer to the working wall and use alongside their journals to enhance their learning. All working walls should display maths vocabulary and celebrate good examples of children work.

How we assess maths

At the Palmer Academy we track progress by the use of:

- ✓ Puma testing
- ✓ Pixl tests
- ✓ Teacher judgement
- ✓ Books

Useful link and resources

- ✓ Pixl- 343- maths starter
- ✓ Pixl- resources
- ✓ White rose
- ✓ Twinkl
- ✓ Classroom secrets
- ✓ <https://whiterosemaths.com/schemes-of-learning/using-our-schemes/>
- ✓ <https://mathsnoproblem.com/en/mastery/bar-modelling/>
- ✓ <https://mathsnoproblem.com/en/mastery/concrete-pictorial-abstract/>