Teaching the Mastery Way

Wednesday 11th October

Aims of session

- What is Teaching for Mastery?
- Why change our approach to the teaching of mathematics?
- Key principles
- What does a lesson look like?
- Workgroups – CPA – concrete, pictotial, abstract.
  - Number bonds
  - Fractions
  - Bar Modelling
- Questions

What is Teaching for Mastery

Teaching maths for mastery is a transformational approach to maths teaching which stems from high performing Asian nations such as Singapore. When taught to master maths, children develop their mathematical fluency without resorting to rote learning and are able to solve non-routine maths problems without having to memorise procedures.

NEED TO KNOW
Evidence-based approach to teaching maths
Helps pupils develop a deep, long-term and adaptable understanding of maths.
Inclusive approach where all children achieve.
Slower pace which results in greater progress.
Reflected in the 2014 English national curriculum for mathematics.
Endorsed by the Department for Education, NCETM and OFSTED

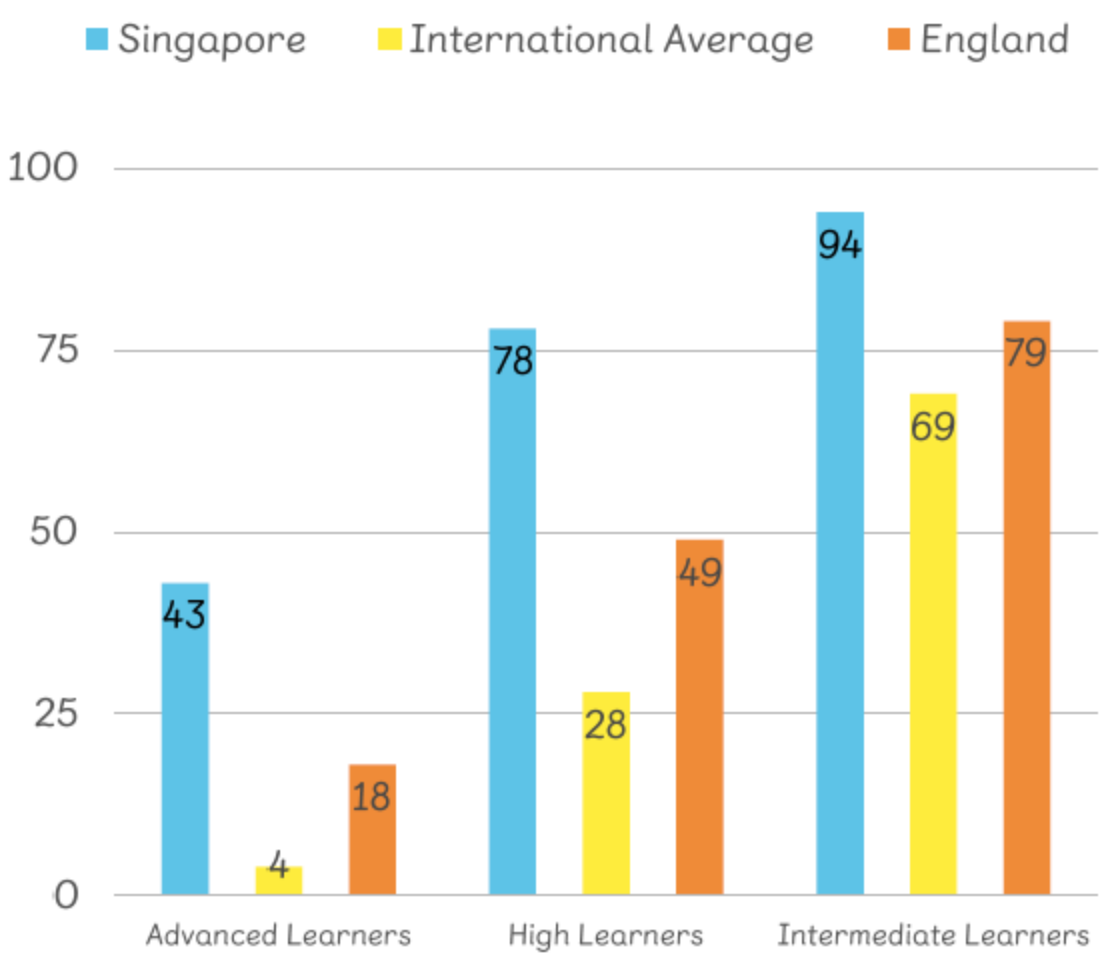
Singapore Education

Singapore hasn't always had great Maths performance.

It was ranked 16th out of the 26 countries participating in the 1983 SIS study.

The government recognised this was not good enough for an economy entirely dependent on its human resources, so they started examining leading teaching concepts in the early 1980s.

TIMSS Benchmark 2011

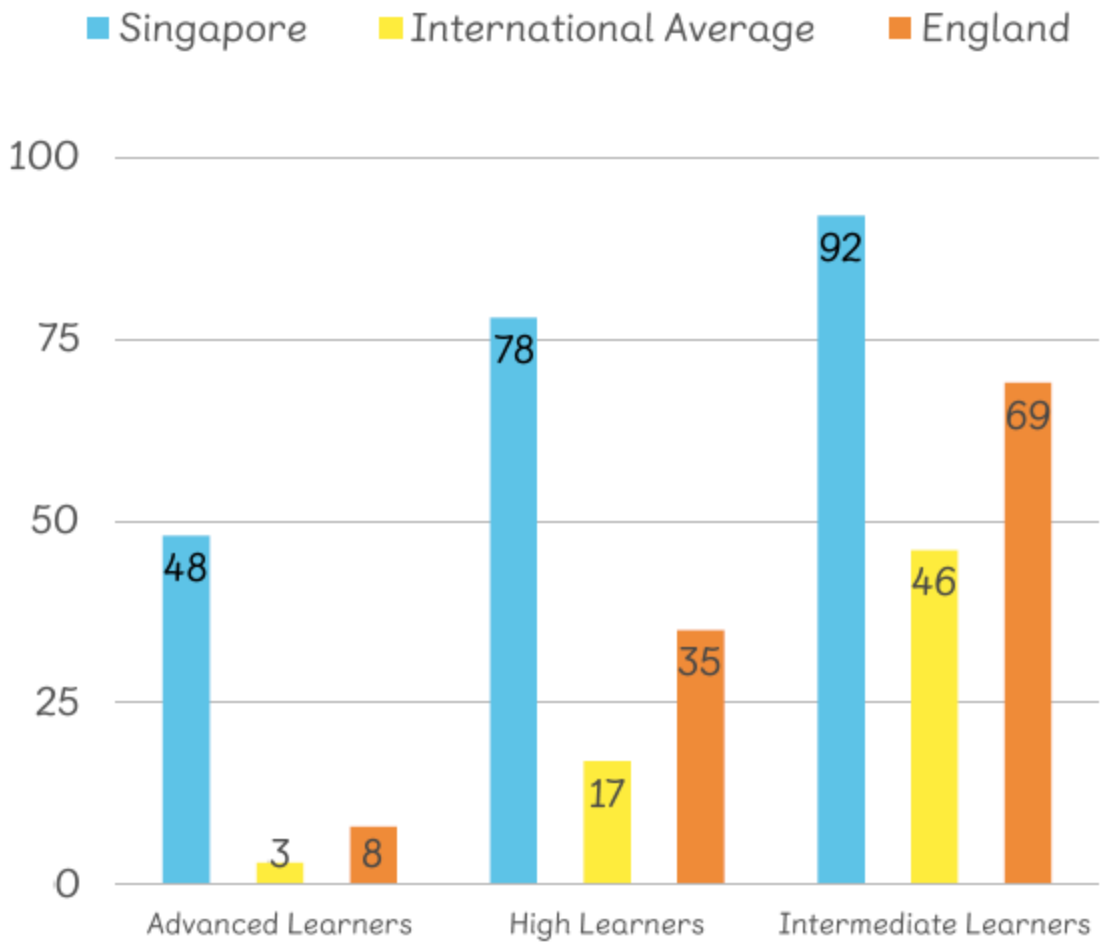


Grade 4 is the same age as UK Year 5

Since 1995 Singapore has been at the top of mathematics education

MATHS NO PROBLEM!

TIMSS Benchmark 2011

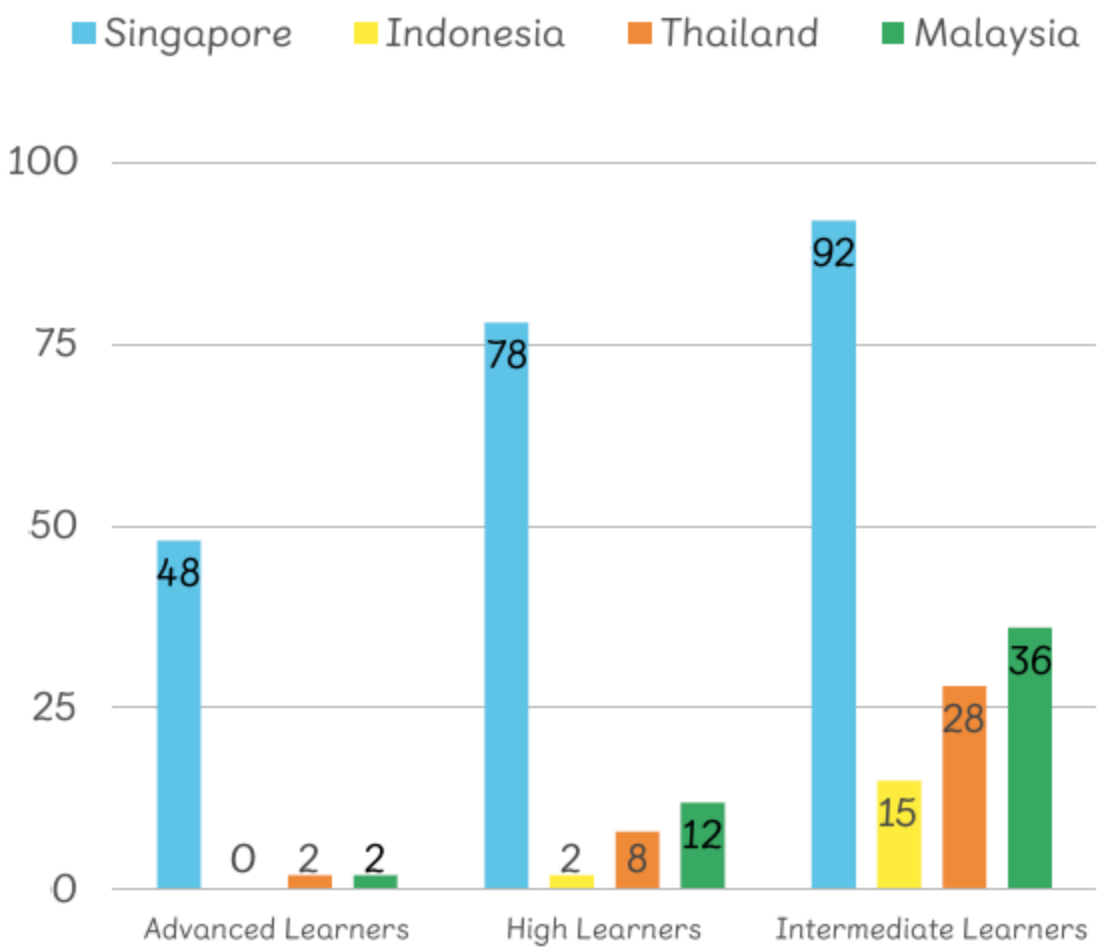


Grade 8 is the same age as UK Year 9

Singapore bucks the trend and maintains its high results in Secondary school.

MATHS NO PROBLEM!

TIMSS Benchmark 2011



Grade 8 is the same age as UK Year 9

Singapore used to be part of Malaysia and previous to changing how they teach in the 1980s their results were identical to Malaysia

MATHS NO PROBLEM!

A new way of thinking and teaching

WHOLE CLASS MOVES THROUGH CONTENT AT THE SAME PACE

When teaching maths for mastery, the whole class moves through topics at broadly the same pace. Each topic is studied in depth and the teacher does not move to the next stage until all children demonstrate that they have a secure understanding of mathematical concepts.

TIME TO THINK DEEPLY ABOUT THE MATHS

Students are given time to think deeply about the maths and really understand concepts at a relational level rather than as a set of rules or procedures. This slower pace leads to greater progress because it ensures that students are secure in their understanding and teachers don't need to revisit topics once they've been covered in depth.

BUILDS SELF-CONFIDENCE IN LEARNERS

In a traditional primary school maths lesson, children are put in different groups and given different content based on their anticipated ability. This means that from an early age children are classed as those who can and can't "do maths". Teaching maths for mastery is different because it offers all pupils access to the full maths curriculum. This inclusive approach, and its emphasis on promoting multiple methods of solving a problem, builds self-confidence and resilience in pupils.

DIFFERENTIATES THROUGH DEPTH RATHER THAN ACCELERATION

Though the whole class goes through the same content at the same pace, there is still plenty of opportunity for differentiation. Unlike the old model, where advanced learners are accelerated through new content, those pupils who grasp concepts quickly are challenged with rich and sophisticated problems within the topic. Those children who are not sufficiently fluent are provided additional support to consolidate their understanding before moving on.

BASIS FOR THE 2014 NATIONAL CURRICULUM FOR MATHS

Teaching maths for mastery is a key plank of the Government's education reforms and is reflected in the 2014 English national curriculum for mathematics. The NCETM, Department for Education and OFSTED have all endorsed this evidence-based approach which is a key part of the work within the Maths Hubs Programme.

Workshops

1. CPA – concrete, pictorial, abstract
2. Bar modelling
3. Number bonds
4. Fractions

National Curriculum 2014:

Aims
The national curriculum for mathematics aims to ensure that all pupils:

• become **fluent** in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately

• **reason** mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language

• can **solve problems** by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions

Differentiation

Enrichment and higher-level thinking

Taking a mastery approach, differentiation occurs in the support and intervention provided to different pupils, not in the topics taught, particularly at earlier stages. There is no differentiation in content taught, but the questioning and scaffolding individual pupils receive in class as they work through problems will differ, with higher attainers challenged through more demanding problems which deepen their knowledge of the same content. Pupils' difficulties and misconceptions are identified through immediate formative assessment and addressed with rapid intervention – commonly through individual or small group support later the same day: there are very few "closing the gap" strategies, because there are very few gaps to close.

- **Extension through developing reasoning skills and tackling unfamiliar problems.**

- **Support through use of concrete equipment and visual models**

Working with pupils core competencies

Problem solving is at the heart of mathematics

The focus **is not** on rote procedures, rote memorisation or tedious calculation but on relational understanding.

Pupils are encouraged to solve problems working with their core competencies, in particular:

1. Visualisation
2. Generalisation
3. Make decisions

MATHS NO PROBLEM!

What impact will 'Teaching for Mastery' have on our children?

- Children will have a greater conceptual understanding of number and calculation. They will be able to visualise and generalise more readily due to a more in-depth understanding.

- Struggling learners will be fully supported through accessing concrete equipment and use of visual models to support understanding (94% of grade 4 learners on Singapore at 'intermediate').

- Confident learners will be challenged through exposure to unfamiliar problems, development of reasoning skills and exploring multiple ways to manipulate numbers and solve problems (43% of grade 4 learners in Singapore at 'advanced' and this rises as the children get older, everywhere else it declines substantially).

- All learners will access teaching of content which matches the expectations of the new curriculum in England and be supported further if needed in order to access this. The resources match the expectations for formal written methods set by the government, alongside greater understanding (in order to reach 'mastery').

Any questions?

Thank you for coming.