

# Mathematics Mastery

## Information Sheet

ARK Schools is a growing network of inner city academies several of which succeeded schools with significant issues of underperformance and underachievement. Our aim is that irrespective of prior attainment we will ensure that all our pupils gain the qualifications that would enable them to go on to higher education or the route to a rewarding career. For many this means that they need to progress further and faster than in other schools to overcome lower early attainment. To enable every ARK pupil to achieve these goals, we are developing a mathematics programme based on the curricula principles used in Singapore, the nation that has achieved consistently high performance in maths over the past 30 years.

### Why should we teach mathematics differently?

The recent publication of ACME's Mathematical Needs, the Vorderman Report, and outstanding work by Nuffield and others have made a strong case for change. International comparisons show that there is significant room for improvement in performance in mathematics in the UK.

### ARK's Mathematics Mastery programme seeks to

- 1) Provide a curriculum framework that
  - meets the mathematical requirements of learners
  - meets the needs and expectations of higher education and employers
  - motivates and encourage young people to continue studying mathematics post-16
- 2) Improve the quality of mathematics teaching through a rigorous programme of professional development and resource development.

### What's new about the mastery approach?

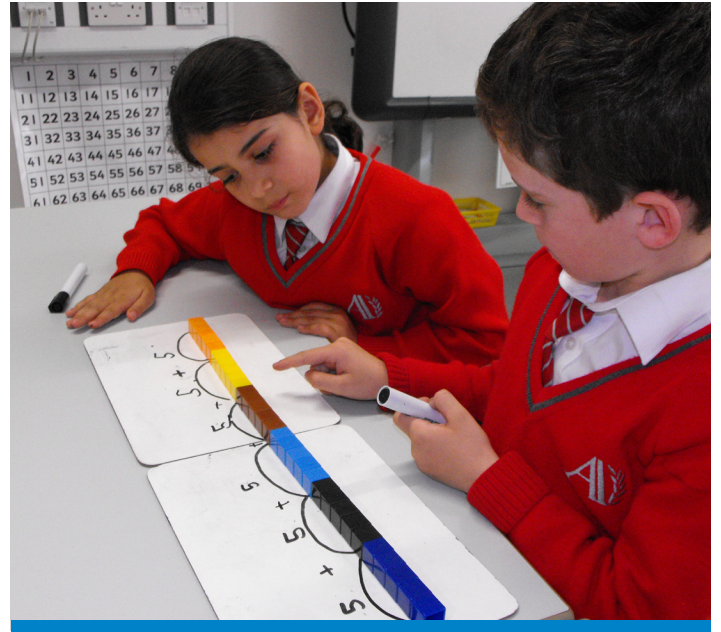
Actually, none of the individual aspects of the mathematics mastery programme is 'new'. They are the tried and tested successful approaches that the best teachers, departments and schools have been using for years. What is special about Mathematics Mastery is that it brings these approaches and techniques together in a rigorous and systematic structure.

### Key features of Mathematics Mastery:

- Research-based curriculum and pedagogy
- More time on fewer topics
- Always using objects and pictures before numbers and letters
- Calculating with confidence – and understanding why it works

The programme emphasise **cumulative mastery** of the essential knowledge and skills in mathematics. It embeds a deep understanding of maths by employing a concrete, pictorial, abstract approach so that pupils understand what they are doing rather than just learning to repeat routines without grasping what is happening.

The development of understanding, calculating and problem solving skills are not competing for time, but are developed simultaneously. The teaching of critical thinking and problem solving skills is embedded into the programme – one of the strengths of the approach is the use of model drawing to represent problems.

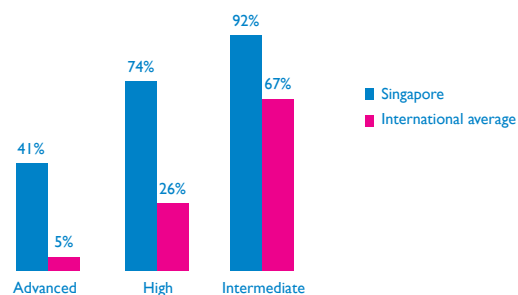


### Why do we think it works?

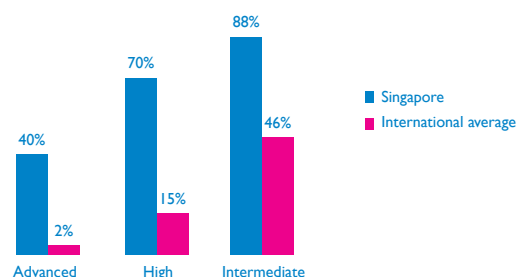
Mathematics education research consistently demonstrates that the key features of Mathematics Mastery are those that are most effective for pupils' understanding of mathematics.

The programme is based on the world leading curriculum and pedagogy of Singapore, which has consistently been amongst the highest performers in the Trends in International Mathematics and Science Study (TIMSS) since 1995. This is a quadrennial study of Mathematics and Science achievement of Grade 4 (UK Year 5) and Grade 8 (UK Year 9) students in different countries.

### International Benchmark Grade 4 - Mathematics Performance 2007



### International Benchmark Grade 8 - Mathematics Performance 2007



# ARK Schools using the *Mathematics Mastery* approach

ARK's primary schools began to use the Mastery approach in 2010.

Ofsted inspectors visited Ark Primary school in June 2011 to observe Mathematics Mastery in practice and to see how the programme could be adopted more widely. The Ofsted team interviewed pupils and staff, including the school's maths lead Julie Harrison. They reviewed the course materials, examined pupils' work and observed seven maths lessons. Their conclusion was that:

**“Pupils’ achievement in number is outstanding. Pupils are developing a high level of proficiency for their age in addition, subtraction, multiplication and division. This is underpinned by a secure understanding of place value and good recall of number facts.”**



Following their induction and training in the programme, from this September, all six ARK primaries are using the Mathematics Mastery approach.

Secondary schools in the network have also devised a programme of study for key stage 3 that follows the mastery approach.

## Will Mathematics Mastery work in other UK schools?

Our experience so far, endorsed by Ofsted, indicates that this is a highly effective approach to the teaching and learning of mathematics for all and could have particular benefits for pupils who tend to fall behind in the current system.

Transforming a whole school's approach to the teaching and learning of mathematics is an enormous challenge, and requires exceptional leadership skills. It also requires support for those leading, and planning and professional development tools for teachers.

## How can my school get involved?

We are currently looking for a small number of Pioneer Schools to co-develop and pilot this approach.

The Mathematics Mastery programme has three strands:

- A members only professional development and planning teacher website
- A two-year implementation programme
- Student resources (to print from website)

The [Primary Pioneer programme](#) will be launched in September 2012. The [Secondary Pioneer programme](#) will be launched in September 2013.

It is anticipated that a number of Pioneer Schools from the first two years of implementation will be able to become ambassadors for the programme, and support its further development and implementation in further schools.

Primary Pioneer Schools will begin implementation with Year 1 classes, rolling out to Reception and Year 2 in the 2nd year, then continuing up the school.

## How is the Pioneer programme possible?

ARK Schools is constantly seeking ways to improve and develop the curriculum. In line with our belief in depth before breadth we have focused on the core subjects and are excited by the very impressive results that the pupils have achieved so far. We are, however, in the very early stages of this process and although we are confident in the work we are doing we are also determined to ensure our curriculum is externally evaluated.

ARK Schools is proud that the Mathematics Mastery programme is being supported by the Education Endowment Foundation, which will invest more than £200m over the next 15 years on innovative schemes to boost the attainment of poor pupils in some of the country's most challenging schools. Sir Peter Lampl, Chairman of the EEF, said, "We are delighted to be announcing these first grants...all our grants are for projects that will be rigorously evaluated and can be significantly scaled up if they are found to be cost effective in raising the achievement of disadvantaged pupils."

The Pioneer programme will be independently evaluated by the Institute of Education.

