

Unlocking the Potential of Every Child

Mathematics Guide

Revised: June 2021

Review Date: June 2022

Rationale

This policy describes our values and philosophy in relation to meeting the needs of all Mathematical learners at Safa British School. It outlines the framework within which all staff work and gives guidance on planning, teaching and assessment. The 2014 Early Years Foundation Stage framework is used as a guide for Foundation Stage before the incorporation of the statutory requirements of the 2014 National Curriculum in Mathematics for Year 1 to Year 6.

Our Vision

We want all children at Safa British School to develop into confident and competent Mathematical thinkers and to be able to use mathematics in real life situations. We strive towards unlocking the potential of every child in order to achieve outstanding progress and attainment.

Our vision is that all pupils:

- become **fluent** in the fundamentals of Mathematics, including through varied and frequent practise with increasingly complex problems over time, enabling pupils to 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; demonstrating a systematic approach to their learning.

Our Curriculum

We cover the 2014 National Curriculum of England objectives using the White Rose Maths Hub (WRM) materials to assist with lesson planning and implementation. Teaching teams, guided by Senior Leaders (SLT), Heads of Department (HoD) and Heads of Year (HoY) are given the flexibility to adapt the order in which materials are taught in order to allow for cross-curricular links and to address gaps in learning, as long as all course material within the term is covered.

In the times of COVID-19, teachers are also encouraged to regularly assess any gaps from the previous year of learning – looking back to the previous curriculum content to ensure that children build from a solid foundation into their new academic year.

WRM resources are used to ensure that lessons stimulate deeper thinking and encourage reasoning in order to develop children's understanding of concepts. Children are guided through developing fluency before moving to problem solving, reasoning and, in some cases, mastery of a concept. Where possible, links to everyday school life and mathematical narrative are also encouraged, ensuring that Reading Across the Curriculum links are present but purposeful.

We follow a mastery approach to teaching and learning, aiming to embed a deep understanding of Mathematics by employing a concrete, pictorial, abstract approach – using objects and pictures before numbers and symbols so that pupils understand what they are doing rather than just learning to repeat routines without grasping what is happening. During the global pandemic of COVID-19, concrete materials are less available to the children due to sanitization. In this case, children are given manipulatives that can either be used personally or presented with digital manipulatives via Seesaw Activities.

This approach is used for **all** age groups for pupils to develop understanding of a concept. Reinforcement is achieved by going back and forth between these representations:

<p><u>Concrete representation</u> The active stage – a child is first introduced to a concept through the use of real life or mathematical objects. It is important for children to use a wide range of concrete resources as this ‘hands on’ approach is the foundation for conceptual understanding. Examples of resources include real life objects like sweets, straws, pencils etc; base 10; numicon; bead strings; counters; cubes.</p>	<p><u>Pictorial representations</u> The iconic stage – a child has sufficiently understood the hands-on experiences performed and can now relate them to representations such as diagrams or pictures. These are used to represent numbers and symbols. Examples of pictorial representations include: number lines, 100 square, place value grid, bar method, drawing of concrete representations.</p>	<p><u>Abstract representation</u> The symbolic stage – with the foundations firmly laid, students should be able to move to an abstract approach using numbers and key concepts with confidence.</p>
<p>Mastery can be displayed when children consistently use these different representations to explain their reasoning.</p>		

Safa British School uses materials created by White Rose Maths Hub as part of our working week involving 45-minute lessons while using one lesson dedicated to the fluency and efficiency of Mental Mathematics by using Rising Stars, Doodle and CENTURY.

Day 1	Day 2	Day 3	Day 4	Day 5
Mathshub Concept	Mathshub Concept	Mathshub Concept	Mathshub Concept	Consolidation
Gap Analysis	Gap Analysis	Gap Analysis	Gap Analysis	Mental Mathematics Method problem solving strategies.

Concepts are covered in accordance with the **Mathematics Overview** for Safa British School.

Teaching and Learning

<u>Small Steps Approach</u>	<u>Developing Mastery</u>
<p>Breaking the curriculum down into small manageable steps to help children understand concepts better. Digging deeper into concepts in order to encourage mathematical thinking and reasoning.</p> <p>Concepts introduced for all types of learners using Concrete, Pictorial and Abstract representations.</p>	<p>Fluency - Reasoning - Problem Solving – Mastery The overviews:</p> <ul style="list-style-type: none"> • have number at the centre. A large proportion of time is spent reinforcing number to build competency. • ensure teachers stay in the required key stage and support the ideal of depth before breadth. <ul style="list-style-type: none"> • ensure students have the opportunity to stay together as they work through the schemes as a whole group. • provide plenty of opportunities to build reasoning and problem solving elements into the curriculum.
<p style="text-align: center;"><u>Consolidation</u></p> <p>Mental Maths - weekly mental mathematics practise and rolling mental maths starters</p> <p>Gap analysis - class teachers review concepts identified as areas of concern</p> <p>Re-teaching – important concepts are regularly reviewed to ensure learning is secure</p> <p>Arithmetic – ensuring children are secure with all four operations</p> <p>*Designed with GL Progress Tests/ TIMMS in mind.</p>	<p style="text-align: center;"><u>Assessment (Year 1-6)</u></p> <p>Part 1: Fluency based arithmetic practise Part 2: Reasoning and problem solving based question</p> <p>Used to determine gaps in children's knowledge and to guide planning support and intervention strategies.</p> <p style="text-align: center;">*Designed with KS1 and KS2 SATs in mind.</p>

Mental Mathematics

Pertinent starters should be used by all class teachers to review key mental mathematics skills for almost every lesson. Objectives can be taken from a range of sources:

- concepts identified in the gap analysis from assessments;
- objectives from 'mental maths starters across the school' resource;
- concepts covered earlier in the year which require consolidation;
- CENTURY and Doodle data;
- Numbots and TTRS data.

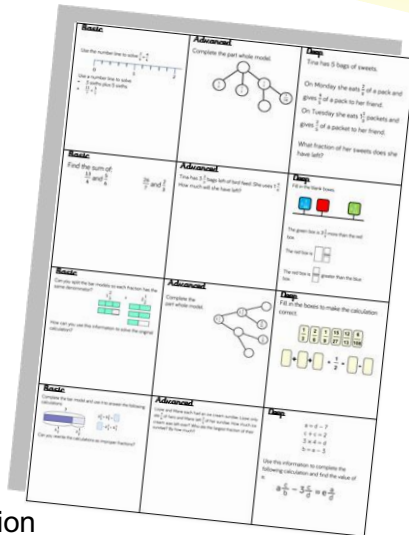
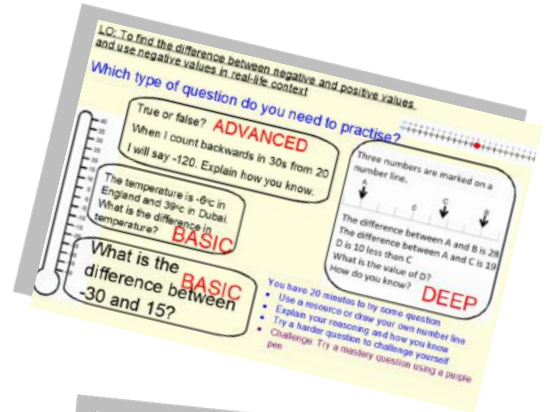
Small Steps Approach (White Rose Maths Hub)

The White Rose Maths Hub Small Steps materials are used from Year 1 to Year 6 as a resource to plan lessons.

Teachers should use the resource along with teacher judgement based on the needs of the pupils. Other resources should be used through the year to complement the scheme of learning.

The Small Steps move from varied fluency to reasoning and problem solving and should be used as part of a well-planned lesson. This is a common structure which should be used with reference to KHDA lesson observation criteria:

1. Mental Mathematics
2. Shared teaching – adapted Small Steps to assess understand and stimulate discussion for basic, advanced and deep understanding (see example from a Year 6 lesson)
3. Independent learning – children should apply their understanding using the Small Steps materials (see example of questions for children to stick in books or action on Seesaw and answer).



Mastery

The WRM should be used to develop fluency before children begin to display application of a concept through reasoning and problem solving. After this, mastery can be evidenced in other subjects (especially Science) and through the explicit presentation of mastery materials within a Maths lesson.

Mastery can also be shown using the 'Teaching for Mastery' resource. This resource can be used when children are identified in a lesson or through the week as having potential for displaying mastery of a concept.

Mastery Tasks should be highlighted in purple by the children or written in purple pen to indicate when an extension has been provided. On Seesaw, tasks that offer mastery should be shown with purple on the activities document.

Planning

Mastery	Mastery with Greater Depth
<p>On Monday I ran $1\frac{1}{2}$ km and on Tuesday I ran $2\frac{1}{2}$ km. How far did I run altogether on these two days?</p> <p>On Wednesday I ran $1\frac{2}{3}$ km and my sister ran $2\frac{2}{3}$ km. How much further did my sister run than I did?</p>	<p>Altogether on Monday and Tuesday I ran $3\frac{1}{2}$ km. On neither day did I run a whole number of km. Suggest how far I ran on Monday and how far on Tuesday.</p> <p>On Wednesday I ran some km and my sister ran $1\frac{1}{6}$ km further than I did. Altogether we ran $4\frac{1}{2}$ km.</p> <p>How far did I run on Wednesday?</p>

Plans are submitted weekly into the appropriate planning week on the OneDrive. SMART Notebooks should be detailed and stimulating for pupils while resources (concrete, pictorial and abstract) should be made prepared in advance. Large sheets of paper can be used for teacher workings and added to the class working wall, in class. For Distance Learners, lesson plans should be followed carefully by the dedicated teacher, with recordings of delivered Zoom lessons recorded for future use if needed.

Teaching and Learning Strategies

- Children are taught in mixed ability classes within their year group.
- Differentiation is manageable with targeted, positive support to help those who have difficulties with Mathematics and extension activities for the more able.
- Our approach is based on practical experience and discussion, providing the tools for children to succeed yet developing mathematicians who can see the benefits of and choose a suitable method to solve a problem.
- Children should engage in discussion and tasks that will enable them to develop their mental imagery of mathematical situations.
- Work is carried out using a balance of individual, paired and group work whilst being mindful of the restrictions necessary during COVID-19, such as not sharing materials and maintaining a social distance.
- Teachers demonstrate, explain and illustrate mathematical ideas to fully involve pupils and maintain their interest through appropriately demanding work.
- During Distance Learning, teachers systematically work through the children on zoom, ensuring that all children have the opportunity to answer questions and share their answers before being set off to their task at the appropriate time. Distance learning teachers then hold onto a group of children who may need more support or, alternatively, need more of an extension.
- Teachers use and expect pupils to use correct mathematical notation and vocabulary.
- Mathematical errors and misconceptions are dealt with as they are identified in a positive and supportive way. Mini plenaries or a plenary at the end of a lesson is an ideal opportunity for dealing with misconceptions.
- The emphasis on pupil's learning begins with mental strategies, leading onto informal jottings and finally to formal representations as laid out for Key Stages in the 2014 National Curriculum.

- Pupils are taught a variety of mental calculation strategies and they share their own methods.
- Children are given a variety of mathematical approaches to solving problems. They are encouraged to develop their own mathematical strategies as well as learning standard methods.
- We recognise and help to develop the children's abilities to select methods for problem solving mentally, recognising that these may differ from those used to solve pencil and paper problems.
- Teachers will use pencil and paper calculation methods that are set out in the calculations policy to ensure continuity across the school.
- Classroom assistants are trained in supporting children in all 3 parts of the Mathematics lesson.
- Pupils are expected to present work neatly.

Recording Work

Work does not always have to be recorded in books. Pictures or rough jottings may be used underneath the learning objective on occasion.

Home Learning

Children are currently spending more time on their devices in the classroom, due to the global pandemic. With this in mind, home learning has been reduced. Instead, children are given the opportunity to access additional learning in the following ways:

- Weekly updates from the teachers with links to tasks;
- Tailored intervention in the morning drop off;
- Tailored Seesaw activities
- CENTURY nuggets for KS2
- Doodle tasks for KS1 and FS2

Maths – BODMAS and order of operations

BODMAS is an easy way to remember the order you should carry out calculations.

B Brackets first
 O Orders (i.e. Powers and Square Roots, etc.)
 DM Division and Multiplication (left-to-right)
 AS Addition and Subtraction (left-to-right)

*The main type of question that might try and catch you out is like this:
 $3 + 5 \times 2 = ?$ (You need to do the multiplication before the addition)

Choose a set of questions to practise.

Basic	Advanced	Deep
1. $7 + 6 \times 2 =$ 2. $4 + 42 \div 7 =$ 3. $3 \times 5 + 8 \times 3 =$ 4. $6 \times 4 - 5 \times 8 =$ 5. $7 \times 9 - 6 \times 7 =$ 6. $9 \times 6 + 7 \times 3 =$	Put the correct sign (< or > or =) into the statements below. You will have to work out the sums first, remembering BODMAS 1. $6 + 4 \times 3$ <input type="checkbox"/> $3 \times 4 + 6$ 2. $8 \times 8 - 20$ <input type="checkbox"/> $6 \times 6 + 20$ 3. $2 \times 32 + 46$ <input type="checkbox"/> $62 + 4 \times 9$ 4. $8 + 8 \times 6$ <input type="checkbox"/> $6 + 8 \times 8$ 5. $120 \div 6 \times 7$ <input type="checkbox"/> $6 \times 7 + 40$ 6. $140 \div 4 \times 7$ <input type="checkbox"/> $32 \times 5 + 5$	Put in the signs and/or brackets to make the following true: 1. $4 \ 4 \ 3 = 16$ 2. $4 \ 6 \ 4 = 20$ 3. $7 \ 6 \ 11 = 12$ 4. $10 \ 3 \ 5 = 35$ 5. $2 \ 2 \ 4 = 8$ 6. Investigate: Using only these numbers and signs make a statement or expression which will give you the biggest possible answer: $8 + 7 - 6 \times 4$ and one set of brackets.

Challenge: Can you write this problem out using BODMAS rules?
 Joe buys 2 shirts at £8.00 each. He also buys a pair of jeans for £20.00 that gets a £3.00 discount. Write a numerical expression and solve.

(See the school's home learning policy)

Assessment and Tracking

Assessment is a vital tool in the teaching of Mathematics, designed to monitor children's progress and measure attainment. It is also used to inform day-today planning.

The assessment procedures within SBS encompass:

- Short-term assessment as an informal part of every lesson. Lesson objectives should always be displayed in the IWB (on every slide) and on the Seesaw Activity task bar. This must then be discussed with the children each lesson. Teachers should monitor groups and individual children throughout the lesson. At the end of the lesson the children will self and/or peer assess their work to further inform the teachers and their own understanding of what they have understood.
- Using knowledge of pupils drawn from on-going pupil tracking records and key objectives records to guide our planning and teaching.
- Adjusting planning and teaching within units in response to pupils' performance and evidence of gaps from the academic year of 2020-2021.
- Use of information gained from statutory and optional tests. Analysis is done at both a quantitative and qualitative level. Information gained is used to set focused curricular targets (what to teach) and also to determine which strategies or methods are particularly effective in respect of specific areas of Mathematics (the how and why).
 - Century and Doodle also provide tailored analysis of children's learning based on the nuggets and tasks they complete.
- Work in Mathematics can generate a great deal of marking and it is recognised that it is not always necessary to mark every piece of work. The children can sometimes mark exercises with support and guidance from the teacher. Where appropriate, children in KS2 are encouraged to check computational exercises with a calculator or discuss answers with their peers. This can foster independence in the children, who can seek help if they are unable to locate and correct their errors.
 - More in-depth feedback will currently be given to children who are Distance Learners, through written, highlighted or voice note responses from the teachers and teaching assistants.
 - In class learners will currently receive more verbal feedback, followed with a 'like' on approval through Seesaw activities.

- Marking includes:
 1. Highlighting the LO if it is achieved by the child, when book contact returns
 2. Green comments with 'HP' for when House Points are awarded
 3. Pink comments to address an area requiring support **or** to extend learning.
Feedback from children should be checked and highlighted green otherwise the child should be spoken to in order to address the area of concern in person
 4. Like and approval on Seesaw.
 5. Voice note or written comment on Seesaw.

There are three connected levels of assessment:

<u>Long Term</u>	<u>Medium Term</u>	<u>Short Term</u>
<ul style="list-style-type: none"> - Baseline assessments (Sep) - GL Progress Tests FS2 to Year 6 (May) - End of Key Stage SATs for Year 2 and Year 6 (June) - Practise past SATs papers (Year 2 and Year 6) - Teacher Assessment through Learning Ladders <ul style="list-style-type: none"> - EYFS Profile 	<ul style="list-style-type: none"> - White Rose Maths Hub assessments each term (Year 1 to Year 6) <ul style="list-style-type: none"> - IEPs - Book and Seesaw looks, across each year group - Pupil Progress meetings - Parent consultations and sharing of targets - Analysis of data on Century and Doodle. 	<ul style="list-style-type: none"> - Informal assessments on a daily basis used to support planning - Written feedback on children's work - Pupils' self-reflection of lesson objectives and units of work - Pupils' 'Steps to Success' tables in their books <ul style="list-style-type: none"> - Homework

Gap analysis is used to identify areas of concern from GL Progress Tests which is used to influence planning throughout the year.

Tracking the progress of children using Learning Ladders, supported by Century, Doodle and regular teacher assessment, identifies children who may need intervention. This is used to inform Pupil Progress documents which are used when teachers meet the Primary Leadership Team to discuss the progress and attainment of children.

Targets are set using children's individual target sheets at the beginning of the year and updated on an ongoing basis in. These are discussed with pupils and the target sheet seen by parents at parent/teacher meetings. Pupils may be reminded of these targets and support given as appropriate to ensure progress and achievement.

LINK support

Within the daily Mathematics lessons, teachers aim to provide activities to support children who find mathematics challenging. Children with LINK are taught within the daily Mathematics lesson and are encouraged to take part when and where possible. When educational support staff are available to support groups or individual children, they work collaboratively with the class teacher. The support teacher feeds back to the class teacher when appropriate to inform evaluations, assessment and future planning. LINK children also have the opportunity throughout the year to take part in Intervention programmes that support them further, fill in any gaps in their understanding and enable them to reach their full potential. See the LINK policy.

Resources

Each class is equipped with a basic range of mathematical resources and apparatus relevant to the year group of that class. These are stored in accessible and clearly labelled drawers / shelves / containers. All children have access to a range of numeracy aids such as place value cards, number lines and 100 squares in their individual teaching packs or on Seesaw where appropriate.

At the beginning of each unit of learning, children are introduced to vocabulary through a specific word mat upload onto Seesaw. This is then available for all learners and their parents.

Relevant reading materials are also shared on EPIC to introduce concepts, deepen understanding and give context to different concepts.

Each teacher has a range of flexible teaching aids for use in the direct teaching part of the lesson though these may not be shared with the children directly.

All paper materials must be quarantined in accordance with the DHA guidelines before handing to children. When appropriate, paper resources could be laminated for easy sanitization and future use.

iPads have relevant apps loaded to allow interactive Mathematics games to be played in class, QR codes to be scanned (for support resources and to view questions).

Activities on Seesaw should be supported with online, digital manipulatives such as base ten images or counters.

Resources are regularly checked and updated. Areas of need are monitored and new equipment purchased in line with need.

The Head of Mathematics Role

- Ensure progression in attainment from all year groups;
- Monitor planning, teaching and assessment;
- Teach demonstration lessons when appropriate;
- Ensure teachers are familiar with the framework and help them to plan lessons;
- Lead by example in the way they teach in their own classroom;
- Prepare, organise and lead INSET, with the support of the Senior Leadership Team;
- Work co-operatively with the LINK team;
- Observe colleagues, when appropriate, with a view to identifying the support they need;
- Purchase Mathematical equipment that will raise attainment;
- Analyse children's test results to measure attainment and improve Mathematics within the school;
- Inform and support parents;
- Review Mathematics documentation and policies.
- Attend relevant cluster meetings within Dubai and the BSME Networks.