



## SANDYE PLACE ACADEMY Numeracy Policy

### Statement Document History

Issue	Date	Comment
1.00	February 2014	Approved by Board of Trustees
1.1	March 2017	Ratified by Board of Trustees
1.2	July 2018	Ratified by Board of Trustees

### Policy Statement

Mathematics provides an unique way of viewing and making sense of the world around us. It is used to analyse and communicate information and ideas, and to tackle a wide range of practical tasks and real-life problems. This policy summarises the aims of Sandye Place Academy in its mission to raise the Numeracy skills of our pupils, and to expand their conceptual understanding of the principle mathematical fields in preparation for GCSEs and for life far beyond Secondary Education. As well as preparing pupils for a number of possible careers, we strive to build pupil confidence and to inspire enthusiastic engagement through imaginative, motivating and enjoyable teaching. Teachers are equipped and encouraged to balance challenging expectations with a keen sensitivity towards individual differences between children. These aims include the nurturing, application and development of each pupil's imagination, initiative and flexibility of mind, as well as practising skills in inquiry and experimentation in pursuit of mathematical excellence.

### Aims

As well as cultivating mathematical expertise as outlined above, the mathematics Department at Sandye Place Academy fully appreciates that full mastery of the subject requires much more than this alone. Maths requires as much creativity as science, and holistic understanding can only be gained through open-minded exploration, inventive problem solving, purposeful communication, focussed reasoning and rigorous application.

The main areas covered in KS2 and/or KS3 include (not in order):

- **Number:** Place value, fractions, decimals, percentages, proportion, ratio and negative numbers. Written and mental techniques of addition, subtraction, multiplication and division. Powers, roots and other types of number.
- **Shape, Space and Measure:** Measures (Metric and Imperial), including time. Symmetry and other transformations. Finding and calculating angles, constructions with properties and visualisation of 3D and 2D shapes. Co-ordinates in all four quadrants. Perimeter, area and volume.
- **Handling Data:** Data presentation and interpretation. Averages and spread, statistical enquiry and probability.
- **Algebra:** Number patterns and sequences, multiples and factors. Equations and formulae. Simplifying and manipulating expressions. Algebraic graphs and solutions.



**At Sandye Place Academy, our aims in teaching Mathematics are that all children will develop the abilities to:**

- Use and apply Mathematics with understanding, confidence, imagination, initiative and flexibility of mind.
- Work both independently and co-operatively with others.
- Think clearly and work systematically and logically.
- Extend their skills and experiences in handling number, algebra, shape, space, measurement and handling data in structured frameworks which empower progression and create continuity between the ages of 9 and 13.
- Appreciate the power of Mathematics as a problem solving tool.
- Devise investigative strategies, to record, question and present findings.
- Develop passion for Mathematics and be confident in their ability to gain pleasure from mathematical activities and experiences.
- Use Mathematical language to communicate results and learning.
- Relate and apply mathematical skills and concepts to other curricular areas and to practical situations in their own environment.
- Appreciate mathematical patterns and relationships.
- Use appropriate equipment e.g. computer, calculator, measuring apparatus correctly to facilitate the task.
- Use their own mental strategies as a basis for the development of competency and confidence in numeracy.

### **ICT**

All Mathematics groups will make use of ICT in their programmes of study. All classrooms are equipped with Interactive Whiteboards to provide inclusive, inviting, interactive and fun ways to learn. Sandye Place Academy has also invested in specialist websites and software to enhance and inspire learning. All pupils have password protected access to [www.mymaths.co.uk](http://www.mymaths.co.uk), an entertaining website which enables learners to engage with tutorials, interactive tasks and compelling games which cover all Curricular topics. Each topic is reinforced through completion assessments and level boosters. These are designed to give pupils instant feedback and further support where needed to fill in gaps in learning. Pupils can prepare for their SAT's and end of year assessments by using Alfiesoft. This appealing program allows teachers to provide subject-specific and level-specific assessments and past QCA tests to keep pupils in touch with their current levels, deliver formative feedback on strengths and areas for development and further reinforce their mathematical development.

### **Time Allocation:**

There are 6 hours of allocated Numeracy per week for KS2 and 4 hours of Mathematics per week for KS3 pupils. Where needed for specific and targeted pupils, booster groups, One to One sessions and other Intervention programmes, such as Y8 Maths Mentors, increase the number of hours of numeracy study across the Academy. Science provides an additional opportunity for pupils to deploy real-life formulae and produce statistical information to aid experimental and investigative analysis.



## Planning

Long term and medium term planning in Mathematics is undertaken by the HOD with support from the 2<sup>nd</sup> in department and other Maths teachers. The overall program of study for Maths ensures balance, progression and differentiation across the key stages. The KS2 medium term plans for Mathematics are outlined in the NNS using an online scheme of work from Hamilton Trust; this includes hyperlinks to a comprehensive set of activities and resources aligned with the teachers' plans, and which can be easily incorporated into their classroom activities. Medium term plans set out each unit of work in detail, including the suggested number of hours to spend on the unit as well as opportunities for extensions. KS3 planning contains detailed objectives as described in the Key Stage 3 Framework for Teaching Mathematics: Y7, 8 and 9. A variety of supplementary textbooks and photocopied resources is also available. Teachers work inside a culture where good practice and resources which can potentially enhance the curriculum are readily shared.

All Maths teachers are responsible for weekly and daily planning based on the agreed long term plans. Maths teachers will:

- Identify vulnerable groups and areas for development, planning accordingly.
- Personalise learning in accordance with the individual needs of pupils.
- Monitor the progress pupils are making in their classes and measure the impact of their intervention and strategies to progress pupils further.
- Structure their mathematics lessons to flow and maintain a good pace.
- Use and explain mathematical vocabulary whenever it will enhance pupils' knowledge, skills and understanding of the topic.
- Use targeted questions to encourage pupils' learning effectively and to the appropriate level.
- To plan frequent activities which develop the 'using and applying' strand, particularly in problem solving.
- Ensure that differentiation is manageable and centred inside work common to all pupils, with positive support to help those who have difficulties with specific areas.
- Assess and plan for the specific needs of the children within their own class whilst adhering to the progression outlined in the programmes of study.

## Setting

The Mathematics Department organises pupil groups by placing children according to their ability. This process is informed by thorough analysis of pupil performance, inclusion of test results and consideration of teacher assessments which take into thorough account a range of other aspects of each child's strengths or development needs. Individual social and emotional needs are taken into consideration, as well as the number and mix of children with SEN and other specific needs. Year 5 sets are mindfully informed utilising a combination of the information passed on from lower schools, and our own battery of CAT tests and KS2 initial assessments which help us to avoid any discrepancies. At the end of each year pupils will undergo a written assessment covering non-calculator, calculator and mental arithmetic tests. These results and combined with teacher assessments to guide any re-setting requirements for the following year. Year 7 sets are mainly based on results from KS2 SATs tests. Mathematics Department meetings take place at least once a month to discuss possible further individual changes in setting based on ongoing performance, social factors or other emergent needs. We aim to maintain groups as fluid and flexible communities with the smallest possible range in ability so that each Maths lesson is as appropriate as possible and learning can be most effective. Both parents and each affected pupil are always informed before any move takes place.



### **Teaching and Learning**

In Sandye Place Academy we recognise that pupils require an in-depth knowledge of the four aspects of the maths mentioned earlier i.e.

- Number,
- Shape, Space and Measure
- Handling Data
- Algebra).

Nonetheless, it is vital that we develop strategies to increase their deeper understanding of mathematics by encouraging the following skills:

### **Problem Solving**

- Selecting materials and mathematics appropriate for a particular task.
- Planning and working methodically.
- Checking for sufficient information.
- Reviewing progress at appropriate stages.
- Checking that results are sensible.
- Using trial and improvement methods.
- Trying alternative strategies.
- Completing a task.
- Presenting alternative solutions.

### **Communicating**

- Making sense of a task.
- Interpreting mathematical information.
- Talking about work in progress and asking questions.
- Exploring and recording work systematically.
- Presenting results in an intelligible way to others.

### **Reasoning**

- Asking the question “What if ....?”
- Making and testing predictions.
- Making and testing statements.
- Generalising, making and testing hypotheses.
- Following arguments and reasoning as well as checking for validity.
- Conjecturing, defining, proving and disproving.

### **Monitoring and Evaluation**

Please refer to the Sandye Place Marking and Assessment policies for further detailed information as to how the Mathematics department regularly monitors exercise books, assessments and the timetabled program of moderation in place for assessment within year groups and across key stages.



### **Homework**

Each year group is required to complete one piece of homework per week set by the classroom teacher. In each year group pupils are required to complete two pieces of written homework each month as well as one MyMaths, online homework assignment and one example of a more functional open-ended task. In addition Year 6 must complete a home based mental arithmetic task in order to prepare them for the SATs mental test.

### **More Able and Talented (MAT)**

More able and talented pupils in mathematics are placed in set 1 where they are given every opportunity to experience even more challenging and open-ended tasks. In Year 8 pupils have an opportunity to mentor Year 6's with their SATs preparation. In all years there is the opportunity once a year to compete in the Mathematics Challenge for a bronze, silver or gold award. There is an opportunity for gifted pupils to be involved in the enterprise "Snack Bar" where pupils can deploy their mathematical skills towards making money from the break-time snack bar. This involves calculating profits, using statistics and conducting and interpreting surveys to inform their buying of new products as well as producing graphs to show trends and perform business analysis.

### **Assessment for Learning**

Formative assessment carried out by the class teacher is an integral part of their role and is used on a daily/weekly/half-termly and termly basis to inform future planning. It involves calibrating children's progress and key skills acquisition against teaching objectives, determining what a child has already achieved and moving them on to the next stage of learning. Agreed marking symbols, rewards and target symbols are used to inform pupils of their achievements and direct them towards helpful support in the classroom environment. Child-friendly targets are kept in the child's exercise books and pupils (supported by their teacher) are encouraged to identify their strengths and areas for support using the following examples of AFL:

- Traffic light cards
- Smiley faces
- Success criteria aids
- AlfieSoft areas of development
- MyMaths AFL generator
- Peer and self-assessment comments written in exercise books
- 2 stars and a wish

Teachers continuously assess progress by groups and individuals within their classes, recording achievements and highlighting areas for concern. In addition, this information is exploited further in departmental discussions at a twice yearly PPM (Pupil Progress Meeting) with the HOD.

Formal, summative assessments are carried out at the end of Key Stage 2 in accordance with National Assessment Curriculum requirements and every half term/term for teacher assessments. Examples of writing from all groups are moderated within the department and across the Pinnacle Trust throughout the year.

Reporting procedures are in line with DfE regulations. Parents receive an annual written report for Mathematics and are invited to parental interviews during the academic year.



### **Presentation of pupils' work**

As well as the Sandye Place Academy policy on the presentation of pupils' work, the Mathematics Department champions additional expectations:

- Pupils must split their pages vertically in order to get the maximum use of the area provided.
- Pupils should write only in pencil to prevent mistakes and errors decreasing presentation quality.
- Pupils need to construct a margin.
- Self-assessment must be written in red/pink pen.
- Peer-assessment must be written in blue/black pen (with initials).
- Pupils are required to write a title, learning objective and date for every lesson.

### **Resources**

Pupils have access to a wide range of resources and equipment essential to their learning. In KS2 pupils are provided with Numeracy textbooks which scaffold practice in written arithmetic techniques as well as providing differentiated tasks involving fractions, percentages, decimals, ratio and proportion. KS3 have access to three differentiated textbooks for each year group which fall in line with the scheme of work; these include functional and real-life problems which promote the relevance of mathematics. There are also a variety of ICT resources available (see ICT).

Pupils have access to a range of mathematical equipment such as calculators (both scientific and basic), protractors, compasses and measuring equipment. As well as this there are a number of mathematical board games and activities available.

### **SEN Provision**

Please see Special Needs Policy for detailed information of provision in the Mathematics Department. Differentiated activities are provided to empower less able, and extend more able pupils.

### **Equal Opportunities**

We are committed to maintain an awareness of, and to provide equal opportunities for, all our pupils in Mathematics. We take into account their cultural background, gender and special needs, both in our teaching standards and all materials we use with our pupils. All children cover the content made statutory by the Programmes of Study within the National Curriculum. Children access the curriculum at the level most appropriate to their needs and ability, thus ensuring progression and differentiation. Suitable resources, environments and professional support will be available to enable all children to access the full educational curriculum at Sandye Place Academy.

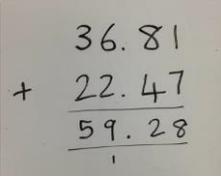
*A. Lawson*



## Progression in Addition

**Key Vocabulary:** add, addition, plus, and, count on, more, sum, total, altogether, increase, equals, balance, much, same as, make, inverse, near double.

### Phase 6: Standard (compact) column method

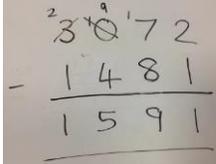
Children use column method for addition (carrying below the line).  Children add more than two numbers and numbers with different digits using this method.	$\begin{array}{r} 789 \\ + 642 \\ \hline 1431 \\ \hline 11 \\ \hline \end{array}$ <p>Answer: 1431</p>	Year 5 and Year 6.
Children add decimal numbers using column method.	 $\begin{array}{r} 36.81 \\ + 22.47 \\ \hline 59.28 \\ \hline \end{array}$	Year 5 and Year 6.



## Progression in Subtraction

**Key Vocabulary:** subtract, subtraction, less than, minus, find the difference, take away, decrease, difference between, count on, count back, leave, left over, gone, fewer, equals, inverse.

### Phase 7: Column subtraction

<p>Children use column subtraction using mental strategies without borrowing.</p>	<p>874 – 523 becomes</p> $\begin{array}{r} 874 \\ - 523 \\ \hline 351 \end{array}$ <p>Answer: 351</p>	<p>Year 5 and Year 6</p>
<p>Children use column subtraction using mental strategies including borrowing.</p>	<p>932 – 457 becomes</p> $\begin{array}{r} 8 \quad 12 \quad 1 \\ 932 \\ - 457 \\ \hline 475 \end{array}$ <p>Answer: 475</p>	<p>Year 5 and Year 6</p>
<p>Children 'bounce borrow' when the digits in the next column are zero.</p>		<p>Year 5 and Year 6</p>



## Progression in Multiplication

**Key Vocabulary:** multiply, multiplication, product, once, twice, three times, double, groups of, repeated addition, lots of, array, row, column, times, rows of, factors.

### Phase 5: Expanded column multiplication

Children use expanded column multiplication for multiplying by two digits (long division). Children present the numbers vertically and use brackets to record each stage of the calculation.

$$\begin{array}{r}
 56 \\
 \times 27 \\
 \hline
 42 \quad (7 \times 6) \\
 350 \quad (7 \times 50) \\
 120 \quad (20 \times 6) \\
 \underline{1000} \quad (20 \times 50) \\
 \underline{1512} \\
 1
 \end{array}$$

Year 5 and Year 6

### Phase 6: Compact column multiplication

Children use compact column method, for multiplying by one digit (short multiplication). Children carry the numbers below the line.

$$\begin{array}{r}
 38 \\
 \times 7 \\
 \hline
 266 \\
 5
 \end{array}$$

Year 5 and Year 6

Children use compact column method, for multiplying by two digits (long multiplication). Children carry the numbers below the line.

$$\begin{array}{r}
 56 \\
 \times 27 \\
 \hline
 392 \\
 \underline{1120} \\
 \underline{1512} \\
 1
 \end{array}$$

Year 5 and Year 6

Pupils may be taught the Chinese method if using the column method for long multiplication is ineffective. However pupils must use the column method for short multiplication.

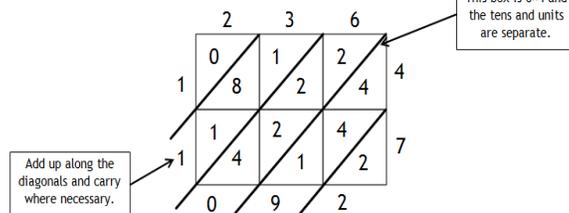
#### Multiplication - Chinese Method

This is a way of multiplying that is great with large numbers and decimals. You are only multiplying numbers between 0 and 9 and then separating the tens and units.

An example:

Calculate  $236 \times 47$

Draw out a grid like this:



Answer: 11092

Year 5 and Year 6

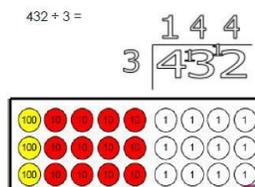


## Progression in Division

**Key Vocabulary:** divide, division, divided by, divided into, how many, each, share, left, left over, group equally, share equally, goes into, remainder, divisible, factor, divisor, dividend, quotient, inverse.

### Phase 5: Standard written method (short division)

Children use short division to decide how many times a divisor goes into the dividend, using place value counters for support.



Year 5 and Year 6

Children use short division to decide how many times a divisor goes into the dividend.

Children are expected to use this method for:

- Larger numbers (up to ThHTU  $\div$  U)
- Dividends with remainders
- Numbers up to 2 decimal places

$$\begin{array}{r} 110 \text{ r}3 \\ 6 \overline{)663} \end{array}$$

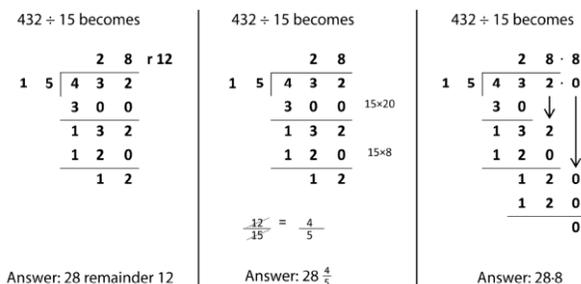
$$\begin{array}{r} 110.5 \\ 6 \overline{)663.0} \end{array}$$

Year 5 and Year 6

### Phase 6: Standard written method (long division)

Children use long division to decide how many times a divisor goes into the dividend (two digit number divisors).

Children will use the chunking method to solve HTU  $\div$  TU calculations. Children will be encouraged to subtract the largest chunks possible.



Year 5 and Year 6