Policy for:

Maths

Date Written: September 2021

Date Reviewed: February 2025

Next Review Date: February 2028

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THE GROVE SCHOOL

MATHEMATICS POLICY

Rationale

Mathematics teaches children to enquire, investigate and interpret their experiences and how to effectively communicate these with others. It provides a subject base for the development of ideas and reasoning skills in concise orderly ways which supports the cognitive development of thoughts which can be generalised, tested and discussed.

Mathematics permeates almost every curriculum subject and all other areas of experience through the intrinsic use of precise language, the development of the concepts of number, shape, space and measures by handling data and developing problem solving and investigative skills through teaching a child to analyse and develop logical thought through progression in their own cognitive ability. Pupils learn through practical activities which are meaningful to them. Through these focussed activities learners are supported to develop ways of thinking which lead onto grasping an established body of knowledge, whilst also retaining the creativity of investigation, the use of the imagination and the ability to describe, explain and predict.

Aims

Through the Mathematics Curriculum and each learner's Individualised Education Plan, which personalises the approach for each child, it is our aim to enable all learners to be appropriately stimulated and challenged at a level suitable for both their age and development. Every learner is supported to be as independently competent as possible, effectively using competencies and skills on a life long basis.

Objectives

To:

- develop and progress each learner's cognitive ability and reasoning, interpretation, investigative and communication skills
- to support learners to become as numerate as possible, to understand the value of numbers and the importance of their accurate use.
- value numeracy as one of the most important aspects of mathematics for our learners. It is given a high priority within our mathematics curriculum as it is considered essential towards developing our

learner's independence within a range of related mathematical activities, cross-curricular subject areas and life skills, including specifically competency with time and money.

- provide a wide range of practical experiences using a variety of materials to teach shape, space and measures within purposeful contexts. Understanding will be developed through the appropriate use of vocabulary developing the skills of sorting, comparing, naming, describing, positioning and measuring.
- develop investigative skills, the ability to ask questions of relevance and depth, how to gather information, observe how data can be handled and recorded through meaningful experiences eg recording pupil's own height and weight etc
- further develop the understanding of mathematics by discussing probability, providing direct experiences to experiment with this and to encourage develop and extend the appropriate use of specific vocabulary.

It is our aim to follow the Programme of Study Guidelines starting from the Pre-mathematical skills and progressing through the National Curriculum Key Stages and Entry Level Functional Skills for our Sixth Form by effectively using scaffolding, thinking skills and assessment for learning strategies. For some, Maths will be embedded within MAPP targets where this is appropriate to the individual child's needs.

Guidelines - Initial Use and Application of Mathematics

To begin with it is important to establish a learner's response to the materials provided. Some learners may be within this stage for some considerable time, it is vital therefore to recognise the importance of constantly withdrawing and reintroducing equipment whilst also creating fresh and unusual stimulus. Equipment used to establish a response may be quite dramatic such as the Liteworks, software used with the touch screen and switches or relatively basic equipment such as a tambour. It is the way in which it is approached and used which is vital.

Learners are then encouraged to show their preference for certain activities by either eye-pointing, gesture, vocalisation, physically touching it or some other individual means of communication (refer to English AT1). Teaching learners to realise that they can cause their environment to change and have an effect upon the equipment they are using is a vital stage and when reached is one upon which much further work can be established.

Developing on from this learners are encouraged to appropriately use equipment rather than always approaching it in a stereotyped manner. Learning to play is really the centre of the next focus, which will develop into appropriately using materials for a specified task. This may be selecting a brush to brush the doll's hair, or a cup to give her a drink, or a car to push around the floor into a garage. Adults constantly reinforce understanding by introducing and repeating appropriate language which will establish a base from which pupils learn to communicate what the steps of their actions are when carrying out a task. Effective and successful interactive, play based learning specifically scaffolds the learning and incorporates the best practice of assessment for learning and thinking skills strategies.

Guidelines - Developing Use and Application of Mathematics

At Key Stage One and beyond demands are made upon pupils to reason and think logically which aims to further develop their independent use of mathematics in practical situations.

An example of how we initially approach this is to ask pupils specific, focussed and open ended questions such as:

"What day do we go horse-riding?"
"What do we use to tell the time?"
"At what time do we have morning break?"
"How would you draw a straight line?"
"What will we use to measure our ingredients?"

which are at their cognitive level of understanding and to which they are able to successfully respond.

To begin with the appropriate equipment would be amongst a chosen selection close to hand and the task would be gradually stepped to become more complex. Successful teaching of the "Using and Applying of Mathematics" is dependent upon this programme of study being intrinsic to all mathematics and cross curricular lessons.

An embedded use of thinking skills and assessment for learning strategies is essential to ensure each learner is able to apply and meaningfully use the knowledge learnt.

Guidelines - Initial Number Skills

Number rhymes are a very important part of this subject area. Whilst they can be sung and enjoyed purely in this way, with pupils listening to adults voices and joining in if they can, there are many variations of use which can be implemented. Some examples of practical use are when pupils are helped to display the relevant number using their fingers, pupils move themselves or are helped to move in rhymes such as "5 Little Ducks", creating mini-dramas and equipment is used such as pretend and/or real buns, coins and large numerals for rhymes such as "5 Currant Buns". Learners are supported to progress their listening skills, respond to counting games and develop the skills to independently and meaningfully participate.

Work on object permanence is oriented around equipment which stimulates and interests the learners, helping them to realise it still exists when out of their vision and encouraging learners to look and search for the object which has been withdrawn.

By learning to pass on one object to an adult the early base for giving 'one' item on request is established. This is developed into an understanding of one to one correspondence.

Stacking bricks and then enjoying knocking them down is a fun situation which can involve counting, object-permanence and one to one correspondence.

Putting together nesting cups and other equipment and then stacking these is an activity designed to bring attention to objects and their difference in size and how these can be measured: big; small; biggest; smallest; etc. Holding, touching and lifting a variety of selected objects gives experiences of weight, of heavy and light objects. Exploring the properties of water gives children experiences of working with volume, how liquid changes and the ways in which this can be measured.

Listening to a clock ticking and an alarm bell ringing gives experiences of how time is measured. Initially this begins with the division of the day into routine times which are important to the pupils such as milk time, play time, lunch time. This is followed by other regular timetable features which are significantly different such as music, computer, hydrotherapy, rebound therapy etc.

The necessity for money and its use begins with early shopping experiences where the pupil passes, or is helped to pass, the money to the shop assistant, bus conductor, etc, and holds out their hand, or is co-actively supported to receive the ticket or receipt and change.

Participating co-actively or independently on a one to one basis in a cookery lesson and then helping to share out for example the baking gives some involvement and experience of division. Making sponge cake can similarly give learners the experience of observing and partaking in or actually cutting co-actively or independently the baking into halves, quarters etc. Such lessons are beyond the cognitive ability of some of our learners, but are planned to ensure the appropriate personalisation of the methodology used to ensure that the participation of all learners is of value to and is meaningful for them.

In the early stages developing the understanding of patterns and the repetition of these centres around learners making a noticeable effort to exhibit their desire for an activity to be repeated (refer to English AT1). Once established that learners can communicate, their skills are then generalised into use within as many situations and with as much choice of equipment as is possible.

Furthering this skill would be for learners to consciously repeat an activity themselves. Some examples would be stacking bricks and repeatedly knocking them down or placing balls at the top of a ball slide and watching them travel to the bottom and then repeating the process. Technology and the use of computers etc are helpful in developing the skill of repeating an activity which may have either an auditory, visual or tactile response or a combination of these. The senses of taste and smell can also be used to create situations which stimulate learners towards making a significant indication that they wish for a particular activity to be repeated.

Within our holistic methodology it is essential that learners are taught and given an awareness of the different properties of a variety of equipment and that each object is appropriately approached.

Guidelines - Developing Number Skills

Learners will begin to rote count with the numbers 1 - 3, with additional introductions as their skill develops. This is approached in a multi-

sensory way: - a learner says the number they listen to this, look at it and trace over it with their finger.

Pupils learn to match up to ten objects to the relevant numerals by using equipment such as Unifix cubes. Various jigsaw plaques are useful in that the number can be divided into three sections with the pupil having to combine the correct numeral, amount of objects and word for the number. House numbers, school and home telephone numbers, a learner's age, and calendar dates etc are examples of how this skill can be generalised. Learning to place numbers in sequential order can be a skill learned in parallel to conservation of number. It is also important that within these activities pupils learn that the size of a set is given by the last number in the count.

Writing numbers, initially to 10, (refer to English Writing) will be developed in parallel with other number skills, although it is recognised that this is not always possible.

Addition and subtraction begins in play situations using real objects. 'House Corner' activities are a valuable resource for this is where crockery, cutlery, dolls, teddies, etc can be put together and "added" or taken away and "subtracted". The understanding of language associated with number is introduced in a concrete way helping to develop a learner's meaningful depth of understanding. Within 'play' situations which have been specifically and thoughtfully planned and resourced words such as 'more', 'fewer' and 'the same' are brought into generalised use. Estimating is a difficult concept and learners are encouraged to attempt this in activities which ask them to 'guess how many cups are on the tray' etc. Accuracy is then encouraged by further investigation about which 'guess' was the closest.

The recognition of and the value of coins and notes is initiated around 'shopping' games and exercises which are class based. The use of money in shops, the post office and on local buses begins by trying to establish an understanding of a 'covering amount' eg "Is 50p enough to buy a ticket to Berwick?" Addition and subtraction is furthered in the classroom based upon the actual items bought, the money given to purchase these and the change which was given. Through time this helps to establish an understanding that costs are not constant and that prices do change.

Use of weight and measurement and the need for standard units is successfully achieved through cookery lessons which are practically based. Spoons, cups and scales are frequently used to help pupils understand the importance of measuring and how this can be achieved in a variety of ways. Weighing themselves and measuring their own height also helps to create an awareness of how their own body changes. Use of standard and non-standard measures is also used to measure objects, rooms and distances both in and around school.

Learning to read the time to the hour begins when learners are confident with their number recognition up to 12. Half past, quarter past and quarter to are gradually introduced. Clocks divided by colour with the addition of phrases "past" and "to" beside the appropriate numbers help by giving learners additional visual clues. Learning specific times in relation to events throughout the day and in the planning of activities helps learners to recognise their timetable and should any changes happen, help to give an understanding of early and late. Use of a magazine or newspaper to establish the starting time of learners favourite programmes, also helps to generalise this skill, as does the use of bus and train timetables and timing, for example, the baking of a cake.

The calendar and the sequence of days of the week, months of the year and the four seasons is discussed on a daily basis. By this repetition and constant reference it is aimed to give pupils an understanding of these sequential changes. Observation of the weather (cross Ref. Geography) is also discussed in relation to the date with the aim of establishing some correlation between this and weather patterns.

Learners enjoy playing group number games such as beetle, dominoes and bingo which gives them the opportunity to generalise their skill and the ability to integrate socially with their peers.

Learners begin to understand matching skills by sorting objects. Initially this will be with objects they are familiar with but which are significantly different, such as "dolls and cups", "teddies and plates". Gradually this is developed into matching and sorting objects which have similar attributes or use but which are still markedly different such as "dolls and teddies" and "cups and plates".

By developing visual discrimination and discussing the differences and similarities of equipment, pupils learn to sort by one attribute. Usually

this begins by looking at the colour of an object and putting all the red ones in the red bowl and yellow ones in the yellow bowl. Initially main colours are used and careful observations need to be made at this point as to whether a child is colour blind or not. Use of a tea set which is divided into four main colours is ideal for grouping by either colour for setting the table or by shape eg sorting all the cutlery, etc, or by size eg tea plates and saucers.

Patterns can be made by using equipment and matching it to a 2D guide. The teddies can be made into a pattern by creating a line of them eg yellow teddy, red teddy, yellow teddy, red teddy, etc". Once visual skills and mathematical concepts are sufficiently developed the largest and smallest teddies of one colour can be put into a pattern of big teddy, small teddy, big teddy, small teddy, etc.

There is a variety of equipment which is used to help children to sort, match, classify and group objects. Pegboards, cotton reels, lacing shapes, are only some examples of the many resources available.

Use of shape and colour in art is a complementary subject based resource which can help towards an understanding of patterns. From the support of working co-actively to the use of visual and auditory prompts pupils are gradually encouraged towards making a conscious attempt to devise repeating patterns themselves and to discuss the criteria they have chosen, such as colour or shape etc. Once a learner understands the basic concepts within number they learn to explore number patterns within the four rules of number.

Becoming confident in the use of money, being able to read the time, using a recipe and successfully cooking and being able to enjoy a game is a reflection of how important numeracy is to our learners independence and how meaningfully they can generalise the "Use and Application" of Mathematics on a life long skills basis.

The programmes of study at KS2 and beyond further develop these skills by effectively personalising the learning and using scaffolding, thinking skills and assessment for learning strategies.

Guidelines - Initial Shape, Space and Measures

Learners interact with a variety of materials and activities and are encouraged to make various responses to these. The manipulation of objects and the communication of preferred equipment to an adult are prioritised aims. Tactile exploration, looking, listening and when appropriate smelling and tasting are planned in specific aesthetically stimulating ways, effectively practising the principles of a multi-sensory based curriculum.

As with 2D shapes school designed and purchased equipment provides learning experiences of heavy and light spheres, opaque and transparent ones, rough and smooth and for example small, bigger and biggest balls. Work is planned in a similar way to introduce cubes and pyramids.

The soft play area is an ideal school based resource to introduce appropriate language such as straight, flat, curved etc whilst the children are playing with the shapes or being physically supported by them. Large towers and castles can be built for pupils to hide behind and play at peeb-bo whilst also experiencing which shapes fit together and which do not. Treasure hunts for the ball or any other object can successfully introduce language which describes a position such as on, under, behind, next to, etc "Guess who?" activities can directly relate to equipment such as "Who is on the ball/sphere?" "Who is next to the slide/pyramid?" and "Who is behind the wall/cubes?" etc.

When moving around school and when out in the environment introducing language which is related to movement and position can be appropriately approached. Some relevant examples are going <u>in</u> the bus, going <u>over</u> the bridge, going <u>under</u> the tree and going <u>on</u> the trampoline. Introducing a concept of speed is also relevant within this subject area eg to travel <u>slowly</u>, and to travel <u>quickly</u>. Such activities are introduced in PE for example running straight to the wall, touching it and returning to the starting position.

Children who are wheelchair dependent participate by either independently controlling their chair or through another pupil or adult helping them. Movement sideways, backwards, around objects and through an obstacle course gives many varied experiences of how a learner's body can move in many different ways and in many different positions.

Playing with models with wheels which learners have made and bought means of transport to push along the floor, under the table, down the slope etc work towards building a concept that the starting position of a non-motorised vehicle affects its movement and the ultimate position reached. There are also opportunities within such activities to explore different surface bases and compare distances reached with the size of vehicle used. Reference to Number will detail how measures and number are taught in a combined approach.

Guidelines - Developing Skills in Shape and Space and Measures
Pupils learn to sort the four basic shapes into sets of circles/round, square, triangles and oblongs/rectangles. Frequently there is some confusion between the names triangle and rectangle and therefore for some learners the use of the word oblong is easier. These shapes are also sorted by size.

Threading activities help learners to relate a 2D key card to the 3D shape such as a square to a cube and a circle to a sphere.

Use of the Unifix cards helps learners to interpret 2D pictorial instructions to make 3D constructions.

Reference to Number details how measures is further developed through a close link to number being taught in a combined approach.

Handling Data

Rationale
Handling data is an aspect of the mathematics curriculum which is not featured at Key Stage One. We therefore consider that it is appropriate to begin teaching this area of the subject once learners have grasped the essential skills covered within Number, Shape, Space and Measures and particularly in Using and Applying Mathematics. However, sections of the programme of study inter-relate and whilst a learner may not have grasped all the skills detailed in Key Stage One this does not restrict a meaningful application of this subject area at a developmentally earlier stage.

Guidelines - Initial Handling Data
- To use computer software as a source of interesting data and as a tool for representing data.

- To ask questions linked to the present theme, collect the data, devise a way of representing it and then interpret the findings. This may include block graphs, pictograms, line graphs, pie charts etc.
- To interpret tables used in everyday life and what information they give us.
- To give direct experiences of probability in order to develop a greater understanding of this.* For example, "How tall a tower of bricks can you build without them tumbling down?" or "How far will the car roll when it goes down the ramp?" or "How many times is a six thrown in the dice out of twelve throws?"

*from National Curriculum Key Stage One for Mathematics

Guidelines - Developing Handling Data Skills
Developing work – will follow the KS2 programme of study.

Assessment Progression and Achievement
Assessment for learning effectively embedded in practice ensures that each learner's personalised objectives are meaningfully stepped and scaffolded for them. Through a range of methodology and thinking skills activities which focus on what a child can do, knows and meaningfully understands, further steps of achievement and progression are planned for.
Evidence of achievement and attainment is collated within each individual learner's IEP file which provides a summative record. For some learners school chosen standardised tests and National Curriculum tests or tasks are taken. However, because of most of our learner's cognitive needs they are disapplied from the N.C. SAT's.
A formative assessment of every learner's progress is completed annually and is measured and tracked within the 'P' Scales and N.C. levels, or through MAPP. Attainment and achievement within mathematics is reported upon as part of a summative assessment within each learner's annual review of statement school report.

Liaison
It is important for teaching staff to liaise with the Mathematics Co-ordinator, Mrs Penny Derries, from whom additional advice and support can be sought. Through open discussion with all other teaching members of staff it is intended to give support through mutually developing an awareness of methodology, strategies, techniques and equipment used in

school, but in particular to ensure continuity when a pupil moves on from one class group to another.

It is vital that teaching staff liaise closely with all class teaching assistants to ensure that they fully understand each learner's personalised objectives, and the approaches and equipment to use. Professional discussions with all teaching assistants collates their experiences, expertise, opinions, support and advice about how to most successfully plan for progression and achievement for each individual learner.

Formal liaison with parents is regularly achieved and recorded at least annually when objectives are agreed at each learner's annual review of statement meeting. Less formally these are referred to at twice yearly class based meetings and if appropriate through home/school diaries or personal contact.

Liaison may also be appropriate with multi-professionals who are currently working with any individual child.

Cross Curricular Links
In particular further reference to the policy documents for ASDAN, English, Humanities, Art, Craft and Design, Food Technology, History and Physical Education would be helpful when planning for specific areas within mathematics.

Health and Safety
At all times regard for the health and safety of pupils and staff is paramount. Reference to our Health and Safety guidelines is essential.

Equal Opportunities
We offer equal opportunities to all our learners regardless of gender, race or ability. However, it is essential that the Health and Safety of staff and learners is not compromised or put at risk and that all opportunities for every child are based upon what is appropriate and relevant for them within their personalised learning and individualised education plan.

Behaviour
Reference to our school behaviour policy and if relevant a child's behavioural objectives in their IEP is essential. Teaching a child self-

discipline and motivation is central towards successful progress and achievement in all learning, throughout the school day, which is relevant to both structured and non-structured situations.
Nurturing within all learners good working habits and dispositions for learning which include the attributes of attention to task, concentration and task completion, self discipline, co-operation and motivation skills is central.

Mrs P J Derries
Headteacher

Mr Robert Curry
Governor