

## Curriculum Intent: How we aim to meet the range of SEND needs with our teaching

Subject: Mathematics

To make mathematics lessons inclusive, teachers need to anticipate what barriers to taking part and learning particular activities, lessons or a series of lessons may pose for pupils with particular SEN and/or disabilities. So in our planning we need to consider ways of minimising or reducing those barriers so that all pupils can fully take part and learn. In some activities, pupils with SEN and/or disabilities will be able to take part in the same way as their peers. In others, some modifications or adjustments will need to be made to include everyone. For some activities, we may need to provide a 'parallel' activity for pupils with SEN and/or disabilities, so that they can work towards the same lesson objectives as their peers, but in a different way – eg using tactile equipment for work relating to shape, space and measures rather than visual information. Occasionally, pupils with SEN and/or disabilities will have to work on different activities, or towards different objectives, from their peers.

1. All children have common needs—for example, the need to receive effective teaching.
2. Some children have specific needs that are shared with a similar group—for example, pupils with a hearing impairment need access to means of audiological support.
3. All children have individual needs—for example, pupils with a Speech and Language Disorder may benefit from pre-teaching of vocabulary and scaffolded talk opportunities.

The following strategies are pedagogical approaches that will be used in our subject to support all students, but particularly those students with SEND. Strategies have been linked with areas of particular need but are not exclusive in supporting students with this area of need.

These strategies will be used flexibly in response to individual needs and used as the starting point for classroom teaching for all pupils

**The following will be employed alongside and in addition to the needs and strategies:**

### Cognition and Learning

1. Stimulation of prior knowledge to identify gaps and boost confidence.
2. Live modelling, being clear on 'what a good one looks like' and making the process explicit.
3. Clear scaffolding as the lesson progresses, awareness of cognitive load and use of physical resources available.

### Communication and Interaction

1. Building independence through flexible use of TA support and teacher working with small groups. Regular checking of vocabulary understanding.
2. Prior knowledge checks to include recapping key vocabulary.
3. Providing a range of response strategies e.g. hands up, think/pair/share, whiteboards, voting.

### Social, Emotional & Mental Health

1. Positive maths mind set for students & staff – positive & challenging regardless of starting point.
2. Celebration of success and recognising that this happens at different times in different topics for different students.

### Sensory and Physical

1. Flexible groupings, use of seating plans that acknowledge individual needs.
2. Availability of easily accessed concrete resources including mini whiteboards and IT resources.
3. Consistent learning environment e.g., use of similar representations, useful but not distracting display and current key vocabulary on show.

## Maintaining an inclusive learning environment

Maintaining an inclusive learning environment	Mathematics	Observed	Tried out
<p><b>Sound and light issues</b> For example:</p> <ul style="list-style-type: none"> <li>background noise and reverberation are reduced</li> <li>sound field system is used, if appropriate</li> <li>glare is reduced</li> <li>there is enough light for written work</li> <li>teacher's face can be seen – avoid standing in front of light sources, eg windows</li> <li>pupils use hearing and low vision aids, where necessary, and</li> <li>video presentations have subtitles for deaf or hearing-impaired pupils and those with communication difficulties, where required.</li> </ul>	<p><b>Sound and light issues</b> Interactive whiteboards are non-reflective to reduce glare.</p>		
<p><b>Seating</b> Pupils' seating and the main board position are planned for the shape of the room.</p> <p>Pupils can see and hear clearly, as necessary:</p> <ul style="list-style-type: none"> <li>the teacher</li> <li>each other, and</li> <li>the board/TV/screens.</li> </ul> <p>Seating allows for peer or adult support.</p> <p>There is room for pupils with mobility difficulties to obtain their own resources, equipment and materials.</p> <p>Furniture is suitable. Consider the choice of chairs and desks, eg adjustable height tables, raised boards.</p>	<p><b>Seating</b> Seating should allow all pupils in the class to communicate, respond and interact with each other and the teacher in discussions.</p> <p>Avoid the need for copying lots of information. For example, notes on interactive whiteboards can be printed off for all pupils.</p>		

Maintaining an inclusive learning environment	Mathematics	Observed	Tried out
<p><b>Resources</b> Storage systems are predictable. Resources are:</p> <ul style="list-style-type: none"> <li>accessible, eg within reach, and</li> <li>labelled clearly to encourage independent use, eg using images, colour coding, large print, symbols, Braille, as appropriate.</li> </ul>	<p><b>Resources</b> Use systems such as racks so that maths equipment can be checked out and checked back in.</p> <p>Some pupils may need modified maths equipment. In particular, some may need access to tactile and other specialist equipment for work relating to shape, space and measures, to overcome difficulties in managing visual information.</p>		
<p><b>Displays</b> Displays are:</p> <ul style="list-style-type: none"> <li>accessible, within reach, visual, tactile</li> <li>informative, and</li> <li>engaging.</li> </ul> <p>Be aware of potentially distracting elements of wall displays.</p>	<p><b>Displays</b></p>		
<p><b>Low-arousal areas</b> A low-arousal area is planned for pupils who may need it and is available for use by all pupils. The area only needs to have immediately relevant materials/resources to minimise distraction.</p>	<p><b>Low-arousal areas</b></p>		
<p><b>Health and safety</b> Health and safety issues have been considered, eg trailing leads secured, steps and table edges marked.</p> <p>There is room for pupils with mobility difficulties to leave the site of an accident.</p> <p>Remember that pupils with an autistic spectrum disorder (ASD) may have low awareness of danger.</p>	<p><b>Health and safety</b></p>		
<p><b>Unfamiliar learning environments</b> Pupils are prepared adequately for visits.</p>	<p><b>Unfamiliar learning environments</b></p>		

## Multi-sensory approaches, including ICT

Multi-sensory approaches, including ICT	Mathematics	Observed	Tried out
<p><b>Multi-sensory approaches</b> Pupils' preferred learning styles are identified and built on:</p> <ul style="list-style-type: none"> <li>when teaching – eg visual, tactile, auditory and kinaesthetic approaches are used, such as supporting teacher talk with visual aids; using subtitled or audio-described film/video</li> <li>for recording – alternatives to written recording are offered, eg drawing, scribing, word processing, mind maps, digital images, video, voice recording, and</li> <li>to promote security and aid organisation – eg visual timetables are used to show plans for the day or lesson; visual prompts for routines, such as how to ask for help; shared signals are developed so that pupils can convey their understanding, uncertainty or need for help.</li> </ul>	<p><b>Multi-sensory approaches</b> Find out how pupils prefer to learn mathematics. There is no reason why the term 'learning style' should be restricted to the well-known visual, auditory and kinaesthetic styles. Many pupils, for instance, particularly value learning through ICT of one kind or another.</p> <p>Build on pupils' preferred learning styles when explaining mathematical concepts, by exploiting different media – eg stories, acting out processes, models, computer simulations, animations, concept mapping etc. There should be "something to see, something to listen to and something to do at each stage of mathematical development" (El-Naggar, 1996).</p> <p>Explore concepts in different forms – eg as a word-sentence, sequence of body language, picture, graph or equation. Puppets, mascots and objects add fun and elements of surprise to lessons, and action songs, games and rhymes encourage a physical response.</p> <p>Use concrete or visual support for mathematical discussions whenever possible.</p> <p>Exploit the many forms of mathematical representation – eg pie charts, number lines, abacus, bar charts, tiles – and the connections between them. ICT can enable pupils to switch quickly between different representations.</p> <p>Simple audio recording devices can replace the need for written notes during activities or visits.</p>		

Multi-sensory approaches, including ICT	Mathematics	Observed	Tried out
<p><b>ICT</b> ICT is used to support teaching and learning.</p> <p>Accessibility features are used to include pupils with SEN and/or disabilities, as appropriate, eg:</p> <ul style="list-style-type: none"> <li>keyboard shortcuts instead of a mouse</li> <li>sticky keys</li> <li>a foot-controlled mouse, a head-controlled mouse or a wireless mouse</li> <li>screen filters to cut down glare</li> <li>increased font sizes for screen extension – in any case, fonts used in printed material should not be smaller than 12 pt (24 pt for screen presentations)</li> <li>clear font type (normally sans serif, such as Arial or Comic Sans)</li> <li>appropriate contrast between background and text, and/or</li> <li>a talking word processor to read out text.</li> </ul> <p>Pupils with poor motor control may gain confidence and achieve success through writing/drawing on the computer.</p> <p>Predictive text can encourage pupils to use a more extensive vocabulary and attempt 'difficult' spellings. It can be enhanced by using subject-specific dictionaries.</p>	<p><b>ICT</b> In mathematics, ICT can allow pupils to:</p> <ul style="list-style-type: none"> <li>try out hypotheses with programs like Excel'</li> <li>turn mathematical ideas into graphic and three-dimensional forms</li> <li>practise and enjoy developing their abilities in calculation using, for example, programs such as Numbershark or hardware such as personal digital assistants (PDAs) – a PDA can be carried between home and school, so pupils can practise mental mathematics at any time</li> <li>react quickly to opportunities for mathematical thought in their environment – eg taking photographs of patterns on a wall with a digital camera and analysing them on the computer, and</li> <li>use mathematical information from the internet, eg social issues expressed in mathematical terms such as percentages.</li> </ul> <p>There are now web browsers, such as Webwise, that offer a simplified version of the page being viewed.</p>		

## Working with additional adults

Working with additional adults	Mathematics	Observed	Tried out
<p><b>Consulting pupils</b> Wherever possible, pupils are consulted about the kind and level of support they require.</p>	<p><b>Consulting pupils</b></p>		
<p><b>Planning support</b> Support from additional adults is planned to scaffold pupils' learning, allowing them, increasingly, to work independently.</p> <p>Planning should identify:</p> <ul style="list-style-type: none"> <li>• which individuals/groups will receive support</li> <li>• where in the lesson pupils will need support</li> <li>• the type of support pupils should receive, and</li> <li>• when pupils should be allowed to work independently.</li> </ul> <p>Additional adults:</p> <ul style="list-style-type: none"> <li>• are clear about the lesson objectives</li> <li>• know the sequence of the lesson</li> <li>• understand the lesson content</li> <li>• know how to break tasks into more manageable chunks</li> <li>• are provided with key questions to encourage formative assessment, and</li> <li>• where appropriate, are familiar with any ICT used to support pupils.</li> </ul>	<p><b>Planning support</b> Plan, where appropriate, for:</p> <ul style="list-style-type: none"> <li>• pupils to be pre-tutored in important mathematical vocabulary, concepts and/or processes</li> <li>• 'scaffolding' when pupils use equipment, especially for tasks requiring accuracy or skill (eg drawing or measurement), and</li> <li>• help for pupils – eg pupils with a hearing impairment – to interpret or respond to oral aspects of mathematics lessons such as mental mathematics.</li> </ul> <p>Prepare resources – eg pre-prepared grids for recording information can be helpful for some pupils.</p> <p>Tightly targeted mathematics interventions for individual pupils can be highly effective, even if they only take a short time each week (see section 7 of Dowker, 2004).</p>		
<p><b>Evaluation</b> Additional adults report to the teacher on pupils' progress. The effectiveness of support is monitored and reviewed.</p>	<p><b>Evaluation</b></p>		

## Managing peer relationships

Managing peer relationships	Mathematics	Observed	Tried out
<p><b>Grouping pupils</b> All forms of pupil grouping include pupils with SEN and/or disabilities.</p> <p>Manageable mixed-ability grouping or pairing is the norm, except when carefully planned for a particular purpose.</p> <p>Sequence of groupings is outlined for pupils.</p> <p>The transition from whole-class to group or independent work, and back, is clearly signalled. This is particularly helpful for pupils on the autistic spectrum.</p>	<p><b>Grouping pupils</b></p>		
<p><b>Managing group work and discussion</b> Pupils move carefully from paired discussion to group discussion – the language necessary for whole-class discussion work may be a barrier for pupils who find it difficult to express themselves in public. Paired and small group discussions provide opportunities for all to take part.</p> <p>Pupils are assigned specific roles (eg chair, writer, reporter, observer) which gives all pupils something to do and keeps them focused.</p>	<p><b>Managing group work and discussion</b></p>		
<p><b>Developing responsibility</b> Pupils with SEN/disabilities are:</p> <ul style="list-style-type: none"> <li>• given opportunities to initiate and direct projects, with support as appropriate, and</li> <li>• involved as equal contributors in class/school governance and decision making.</li> </ul>	<p><b>Developing responsibility</b></p>		

## Adult-pupil communication

Adult-pupil communication	Mathematics	Observed	Tried out
<p><b>Teachers' communication</b> Language is clear, unambiguous and accessible.</p> <p>Key words, meanings and symbols are highlighted, explained and written up, or available in some other way.</p> <p>Instructions are given clearly and reinforced visually, where necessary.</p> <p>Wording of questions is planned carefully, avoiding complex vocabulary and sentence structures.</p> <p>Questions are prepared in different styles/levels for different pupils – careful preparation ensures all pupils have opportunities to answer open-ended questions.</p> <p>Alternative communication modes are used, where necessary, to meet pupils' communication needs, eg signing, Braille.</p> <p>Text, visual aids, etc are checked for clarity and accessibility. For example, some pupils might require adapted printed materials (font, print size, background, Braille, symbols); some may require simplified or raised diagrams or described pictures.</p>	<p><b>Teachers' communication</b> Recognise that the language of mathematics may be challenging for many pupils. For example:</p> <ul style="list-style-type: none"> <li>• the specific mathematical use of everyday words such as 'tables', 'translate', 'right angle'</li> <li>• terms specific to mathematics – eg 'digit', 'subtract'</li> <li>• terms such as 'height', 'distance' or 'mass' can create barriers for some pupils, because of their abstract nature.</li> </ul> <p>Plan to teach new vocabulary explicitly.</p> <p>Make sure that pre-tutoring on mathematical vocabulary is available for pupils who need it.</p>		
<p><b>Pupils' communication</b> Alternative communication modes, such as sign or symbol systems, are encouraged, and pupils' contributions are valued.</p> <p>Advice is sought from the SENCO, a speech and language therapist, local authority advisory staff, and/or the pupil themselves on the best way of using such communication modes in lessons.</p> <p>Discussion of experiences and investigations is encouraged to help pupils understand them.</p>	<p><b>Pupils' communication</b> Give pupils with communication impairments time to answer open-ended questions.</p>		

Adult-pupil communication	Mathematics	Observed	Tried out
<p><b>Pupil-teacher interaction</b> Where appropriate, pupils are allowed time to discuss the answers to questions in pairs, before the teacher requests verbal responses.</p> <p>Pupils with communication impairments are given:</p> <ul style="list-style-type: none"> <li>• time to think about questions before being required to respond</li> <li>• time to explain, and</li> <li>• respect for their responses to questions and contributions to discussions.</li> </ul> <p>Additional adults prepare pupils to contribute to feedback sessions, where necessary.</p>	<p><b>Pupil-teacher interaction</b> Use discussion of mathematical investigations to inform pupils' development of mathematical language and help them to analyse and understand what they have seen.</p> <p>In a plenary after the class has completed a task, allow pupils time to discuss the answers to questions in pairs, before asking for verbal responses.</p>		

Formative assessment/ assessment for learning	Mathematics	Observed	Tried out
<p><b>Gathering assessment evidence</b> A range of sources of assessment evidence is drawn upon.</p> <p>Assessment looks at what pupils know and can do, not at labels associated with SEN and/or disabilities.</p> <p>Notes made about individual pupils' difficulties/successes in the lesson take account of their oral contributions as well as their written work.</p>	<p><b>Gathering assessment evidence</b> Use targeted questions to check pupils' understanding.</p> <p>Invite pupils to reformulate concepts in their own words to check their understanding – eg asking pupils how they would explain it to another person, using cartoons.</p> <p>Prepare questions using contexts relevant to pupils' strengths and interests – eg involving knowledge of the school or local area.</p> <p>Pupils with an autistic spectrum disorder are often stereotyped as being really good at mathematics. However, if they have particular skills, these are often isolated and cannot be used in any practical or real-life situation.</p> <p>The term 'developmental dyscalculia' has been in use since at least the 1970s. There are undoubtedly some individuals who have severe specific difficulties with arithmetic. But for this group, as with all others, identify the particular barriers to their learning and work to remove them, rather than assuming that any particular approach should be used.</p>		

### Motivation

Motivation	Mathematics	Observed	Tried out
<p><b>Understanding the structure of the lesson</b> Pupils are clear about the duration and overall structure of the lesson. Visual timetables or other devices are used to indicate the structure and progress of lessons.</p>	<p><b>Understanding the structure of the lesson</b></p>		
<p><b>Relevant and motivating tasks</b> Tasks motivate pupils. They:</p> <ul style="list-style-type: none"> <li>stimulate interest and enthusiasm</li> <li>are challenging but manageable</li> <li>draw on real and familiar contexts</li> <li>are relevant to pupils' lives, and</li> <li>build on previous learning in the subject and in other areas of the curriculum.</li> </ul>	<p><b>Relevant and motivating tasks</b> Relate mathematical concepts to everyday applications and other areas of the curriculum so pupils see how mathematics is relevant and how it can be applied – eg prepare questions where pupils can use their knowledge of the school or local area.</p>		
<p><b>Reward systems</b> Pupils understand reward systems and are motivated to achieve the rewards available.</p>	<p><b>Reward systems</b></p>		

### Memory/consolidation

Memory/consolidation	Mathematics	Observed	Tried out
<p><b>Recapping</b> Recap learning from the previous lesson.</p> <p>Main points from the lesson are fed back by pupils, noted down and saved so pupils can refer to them.</p>	<p><b>Recapping</b> Invite pupils to reformulate concepts in their own words to check their understanding – eg asking pupils how they would explain it to another person, using cartoons.</p>		
<p><b>Reducing reliance on memory</b> The amount of material to be remembered is reduced. Repeat or display important information.</p> <p>The meaningfulness and familiarity of the material is increased.</p> <p>Mental processing and explanations of complex tasks are simplified.</p> <p>The use of memory aids is encouraged. These can include wallcharts and posters, useful spellings, personalised dictionaries, cubes, counters, abacus, Unifix blocks, number lines, multiplication grids, calculators, memory cards, audio recorders and computer software.</p> <p>Activities are structured so that pupils can use available resources, such as word banks.</p> <p>Strategies, including using ICT-based records, are used to reduce the need for pupils to rely on their short- or long-term memories.</p> <p>New learning fits into the framework of what the pupil already knows.</p> <p>Teaching assistants prepare pupils to contribute to feedback sessions, where appropriate.</p>	<p><b>Reducing reliance on memory</b> Specific help with number recall or interpreting data in graphs, tables or bar charts, will help to compensate for difficulties with long- or short-term memory.</p>		

Memory/consolidation	Mathematics	Observed	Tried out
<p><b>Consolidating learning</b> Pupils' understanding is checked, eg by inviting pupils to reformulate key learning.</p> <p>Using visual or concrete ('real') materials, or activities involving movement, to reinforce or consolidate learning through a range of sensory channels.</p> <p>Reteach or revise material, where necessary, eg post-lesson tutoring.</p> <p>Opportunities are provided for pupils to repeat and reinforce previously learnt skills and processes on a regular basis, in similar and different contexts.</p> <p>Encourage pupils to develop their own strategies, eg an agreed approach to asking for help, rehearsal, note-taking, use of long-term memory, and place-keeping and organisational strategies.</p>	<p><b>Consolidating learning</b></p>		
<p><b>Independent study/homework</b> Independent study/homework is explained during the lesson, not at the end, to make sure it is understood and recorded. Teachers check all pupils are clear about homework tasks.</p> <p>Homework tasks are accessible after the lesson, eg published on a noticeboard or on the school learning platform, so pupils can return to them, if necessary, after the lesson.</p>	<p><b>Independent study/homework</b></p>		



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## Sensory and Physical

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