Including pupils with SEND in Mathematics

- **Sound and light issues**

- Interactive whiteboards are non-reflective to reduce glare.

- **Seating**

- Seating should allow all pupils in the class to communicate, respond and interact with each other and the teacher in discussions.
- Avoid the need for copying lots of information. For example, notes on interactive whiteboards can be printed off for all pupils.

- **Resources**

- Consider using a wireless keyboard and mouse to facilitate teacher-pupil interaction with minimal disruption.
- Is there one dedicated computer for assistive technology/specialist software, or can pupils with SEN and/or disabilities move between the resources?
- Provide assistive resources, such as templates or diagrams, to support pupils' input.

- **Multi-sensory approaches**

- 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. Build on pupils' preferred learning styles when explaining mathematical concepts, by exploiting different media – e.g. 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).

- **ICT**

- In Mathematics, ICT can " turn mathematical ideas into graphic and three-dimensional forms"

- Pupils can 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 " 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.

- **Planning support**

- Pupils to be pre-tutored in important mathematical vocabulary, concepts and/or processes " 'scaffolding' when pupils use equipment, especially for tasks requiring accuracy or skill (eg drawing or measurement), and " help for pupils – eg pupils with a hearing impairment – to interpret or respond to oral aspects of mathematics lessons such as mental mathematics. Prepare resources – eg pre-prepared grids for recording information can be helpful for some pupils.

- **Developing responsibility**

- Use collaborative tools like blogs, wikis and podcasts to enable pupils to make a positive contribution.

- **Teachers' communication**

- Recognise that the language of mathematics may be challenging for many pupils. For example: " the specific mathematical use of everyday words such as 'tables', 'translate', 'right angle' " terms specific to mathematics – e.g. 'digit', 'subtract' " terms such as 'height', 'distance' or 'mass' can create barriers for some pupils, because of their abstract nature. Plan to teach new vocabulary explicitly. Make sure that pre-tutoring on mathematical vocabulary is available for pupils who need it.

- **Pupils' communication**

- Use discussion of mathematical investigations to inform pupils' development of mathematical language and help them to analyse and understand what they have seen. 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.

- **Understanding the aims of the lesson**

- Build up a chart (using a wallchart or other space) to show each lesson's focus and how successive lessons or topics link together to develop an area of work in Maths. This could include symbols, images or objects to make it more accessible.

- **Recapping**

-Invite pupils to reformulate concepts in their own words to check their understanding – e.g asking pupils how they would explain it to another person, using cartoons.

- **Reducing reliance on memory**

- The amount of material to be remembered is reduced. Repeat or display important information.
- The meaningfulness and familiarity of the material is increased.
- Mental processing and explanations of complex tasks are simplified.
- 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.
- Activities are structured so that pupils can use available resources, such as word banks.
- Strategies, including using ICT based records, are used to reduce the need for pupils to rely on their short- or long-term memories.
- New learning fits into the framework of what the pupil already knows.
- Teaching assistants prepare pupils to contribute to feedback sessions, where appropriate.

- **Consolidating learning**
- Leave enough time to consolidate pupils' learning away at different points.