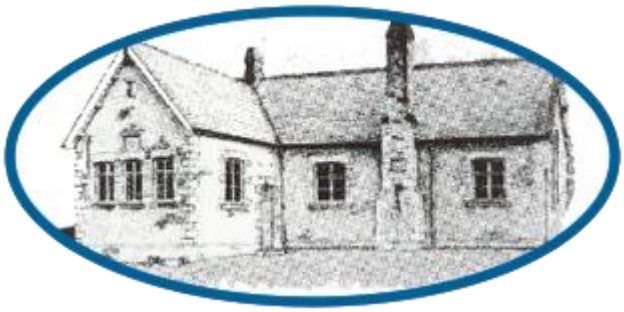

Including pupils with SEND in Science

Sound and light issues

- Interactive whiteboards are non-reflective to reduce glare.

Seating

- Consider the accessibility of science demonstrations.
- Plan the demonstration area so that it is clearly laid out, uncluttered and gives all pupils a clear view.
- Height-adjustable tables and benches make activities more accessible.
- 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

- Use systems such as racks so that science equipment can be found and put back easily.
- Get specialist advice on equipment for pupils with particular SEN or disabilities, eg tactile ridges on measuring glassware for pupils with a visual impairment.

Health and safety

- Make sure pupils do not come into contact with any substances or materials that they are allergic to.

Unfamiliar learning environments

- Make sure pupils are well prepared for visits, particularly to museums. Preparation can include photographs, videos etc so that pupils are not worried about unfamiliar situations.

Multi-sensory approaches

- Build on pupils' preferred learning styles when explaining concepts, by using different media – eg diagrams, stories, acting out processes, computer simulations, concept mapping, etc.
- Use mind maps to help pupils see patterns and relationships.

- Simple audio recorders can be used instead of written notes during investigations or field trips.

ICT

ICT can be used to make science lessons more accessible for all pupils. For example, it can be used to:

- capture images and processes and replay them at different speeds and magnifications, and with particular image characteristics – eg to help pupils study events and causality, to identify underlying patterns or to look at detail
- monitor activities and experiments that require mobility and dexterity that some pupils do not have, and to explore difficult or dangerous environments
- " carry out research
- " present work in a variety of formats to a high standard, and
- " extend the range of the senses and make difficult-to-see processes visible – eg using camcorders or CCTV.

Planning support

Consider:

- " risk points in the lesson, eg for pupils with noise or smell sensitivity
- " when it would be useful to pre-tutor important science vocabulary, concepts or processes
- " whether pupils need support in using science equipment, especially for tasks that require a high level of skill or accuracy.

Teachers' communication

Recognise that the language of science may be challenging for many pupils – for example:

- " the specific scientific use of everyday words such as 'weight', or
- " terms specific to science, such as 'electrical circuit'.

  Plan to teach new language explicitly.

Pupils' communication

- Build on investigations, using careful discussions that help pupils understand and use scientific vocabulary and help them to analyse and understand what they have observed.

Pupil-teacher interaction

- In a plenary after the class has completed an investigation, 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 the focus of each lesson and how successive lesson topics link together to develop understanding of an area of science work. This could include symbols, images or objects to make it more accessible.

Pupils know where they are in relation to learning aims

- Revisiting a mind map of the same area of learning, say after three weeks of studying a science topic, can be a good way of demonstrating and assessing – through the added 'branches' of the map – how pupils' understanding of concepts is developing. This approach can be particularly valuable for pupils for whom oral and written communication present a barrier, as pictures and symbols can be included.

Reviewing progress and helping pupils to improve

- For example, ask pupils which key scientific words, concepts or processes were difficult and why, and how this could be improved. Ask them which parts of a task slowed them down and what could be done to make things go more efficiently – eg using ICT to log temperature continuously rather than taking frequent readings manually.

Gathering assessment evidence

- Check pupils' understanding by inviting them to reformulate explanations in their own words or in other ways. For example, after an investigation of floating and sinking, ask pupils to explain what happened using diagrams, as well as explaining it orally or in writing.

Relevant and motivating tasks

- Identify pupils' existing science knowledge and prior experience – eg using posters, concept maps or mind-mapping software.
- Use real objects as a starting point for developing the concepts and the language needed to describe, discuss and explain what pupils have observed or experienced.

Recapping

Invite pupils to list the key points from the lesson under specific headings – eg in an investigation about bridge building:

- " what they were trying to find out
- " how they went about it
- " how they controlled the variables
- " what happened
- " suggested reasons for what happened, and
- " what they will do next.

Reducing reliance on memory

- Use a digital camera to capture each stage of an investigation, or important findings on a field trip, for future reference. Images can also be used to build a visual record.
- Use mnemonics to help pupils remember things like the order of the colours in a rainbow or the relative distance of the planets from Earth.