



Making Science Inclusive

At Giles Junior School, we aim to support our children in developing their scientific knowledge through carefully planned exciting Science opportunities. All Science lessons, where appropriate, are cross-curricular and embed previous learning to deepen understanding. We aim to support our children in developing an understanding of the process and methods of Science by providing a range of scientific enquiries, investigations and questions to help them explore the world around them. We hope to develop and nurture our children's natural curiosity by not only following the National Curriculum, but also following their questions and interests to develop a love, passion and appreciation for Science.

The purpose of science is to develop curiosity about phenomena in the world around our children and offer opportunities to find explanations. It engages learners at many levels, linking direct practical experience with scientific ideas. Experimentation and modelling are used to develop and evaluate explanations, encouraging critical and creative thought. Pupils learn how knowledge and understanding in science are rooted in evidence. They discover how scientific ideas contribute to technological change – affecting industry, business and medicine and improving quality of life. They trace the development of science worldwide and recognise its cultural significance. They learn to question and discuss issues that may affect their own lives, the directions of societies and the future of the world.

As a school, it is our responsibility to ensure we are teaching a broad and balanced Science curriculum. As teachers, it is our responsibility to ensure that all children with SEN/disabilities are supported and challenged appropriately and can thus enjoy Science and foster a love of learning for the subject.

Teaching and learning

To make science 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. Therefore, in your planning you 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, you 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 a computer simulation of a process rather than manipulating equipment. Occasionally, pupils with SEN and/or disabilities will have to work on different activities, or towards different objectives, from their peers.

Maintaining an inclusive learning environment

Sound and light issues

- Background noise and reverberation are reduced
- Sound field system is used, if appropriate " glare is reduced
- There is enough light for written work
- Teacher's face can be seen
- Avoid standing in front of light sources, eg windows
- Pupils use hearing and low vision aids, where necessary
- Video presentations have subtitles for deaf or hearing impaired pupils and those with communication difficulties, where required.

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.

Displays

Displays are:

- Accessible, within reach, visual, tactile informative, and engaging.
- Be aware of potentially distracting elements of wall displays.

Health and safety

Health and safety issues have been considered:

- Trailing leads secured, steps and table edges marked.
- There is room for pupils with mobility difficulties to leave the site of an accident.
- Remember that pupils with an autistic spectrum disorder (ASD) may have low awareness of danger
- Make sure pupils do not come into contact with any substances or materials that they are allergic to.

Unfamiliar learning environments

- Pupils are prepared adequately for visits.
- 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

Working with additional adults

Consulting pupils

Wherever possible, pupils are consulted about the kind and level of support they require.

Planning support

- 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.

Managing peer relationships

Grouping pupils:

- All forms of pupil grouping include pupils with SEN/disabilities.
- Manageable mixed-ability grouping or pairing is the norm, except when carefully planned for a particular purpose.
- Sequence of groupings is outlined for pupils.
- The transition from whole-class to group or independent work, and back, is clearly signalled (this is key for autistic children).

Managing group work and discussion:

- 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).
- Pupils should be assigned specific roles to keep them focused and active, e.g. writer, reporter, observer.
- For some pupils, e.g. those on the autistic spectrum, developing ideas with others can be challenging. Pairings and groupings need to be sensitive to this.

Developing responsibility:

- Pupils with SEN/disabilities should be given opportunities to initiate and direct projects, with support as appropriate.
- Pupils should be involved as equal contributors in class/governance and decision making.

Adult-pupil communication

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.

Assessment

Assessment for learning:

- Lesson objectives are made clear in picture/symbols/writing as appropriate.
- Objectives are challenging, yet achievable. This will promote self-esteem and enable pupils to achieve success.
- Pupils' own ways of learning and remembering things are emphasised.
- Pupils are encouraged to talk about how they achieved something.
- End of lesson discussions focus on one or more of the ideas explored and the progress that pupils have made towards them during the lesson.
- Pupils are encouraged to look back to previous work/photos/records to see how much progress they have made.
- Emphasis is on the pupils' progress and achievement. Weaknesses are presented as areas for development.
- Praise is given discreetly where pupils find public praise embarrassing or difficult.
- The number of goals/assessment criteria is kept small.
- Pupils are involved in setting their own goals.
- Self-assessment and peer assessment are encouraged.

Memory and consolidation

Memory/consolidation:

- Recapping previous learning is key.
- Main points from the lesson are fed back by pupils, noted down and saved so pupils can refer back to them.

Bilingual learners

- Children must not be regarded as having a learning difficulty solely because the language or form of language of their home is different from the language in which they will be taught.

- Bilingual learners can take up to two years to develop basic communication skills. Some learners may take a long time before they feel confident and comfortable to participate in classroom activities. Silent periods are common and should not be seen as a learning difficulty.
- Visual and kinaesthetic learning approaches will be the most positive and successful for EAL learners in art, as they can watch the instruction and then copy/apply this themselves.

Differentiation and adaption:

Task differentiation examples:

- Giving children an option between a challenging task and a slightly simpler version – they have the autonomy to pick which they want to do.
- Provide children with a tick list to aid them working through their task so they can follow the steps independently, whilst ensuring they have completed each one.
- Making tasks optional – e.g. extension tasks/homework etc.
- Allocation of time – some children may complete more than one draft and be able to in depth analyse their work, whereas some children may not reach this and instead achieve one draft with basic analysis.
- Scale down an activity to support children with SEN, e.g. instead of sketching the flowers you are sketching one in detail.
- Using gloves if there is a sensory barrier/issue with touching clay or another media.
- Changing the media if there is a sensory issue or barrier, e.g. doesn't like the feel of the chalk so will use crayons instead or does not like touching clay so will use playdough instead etc.

Feedback:

The way you provide verbal feedback to children should depend on age, ability and individual needs or SEN/disabilities a child may have.

Ensure all constructive criticism is positive and consider a 'positive sandwich, e.g. positive comment, constructive feedback, positive comment'.