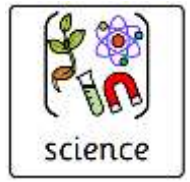
Subject Specific SEND

Science



Communication & Interaction	Cognition & Learning
Challenges **Pupils may have:** • Difficulty understanding instructions: Struggling to follow verbal instructions or explanations. • Challenges in group work: Finding it hard to communicate with peers during collaborative activities. • Limited vocabulary: Difficulty expressing scientific concepts or asking questions. • Sensory overload: Being overwhelmed by the sensory aspects of experiments (e.g., smells, sounds). **Provision** **Teaching staff do:** ✓ Difficulty understanding instructions: Struggling to follow verbal instructions or explanations. ✓ Challenges in group work: Finding it hard to communicate with peers during collaborative activities. ✓ Limited vocabulary: Difficulty expressing scientific concepts or asking questions. ✓ Sensory overload: Being overwhelmed by the sensory aspects of experiments (e.g., smells, sounds). **Teaching staff provide:** ✓ Difficulty understanding instructions: Struggling to follow verbal instructions or explanations. ✓ Challenges in group work: Finding it hard to communicate with peers during collaborative activities.	**Challenges** **Pupils may have:** • Difficulty understanding instructions: Struggling to follow verbal instructions or explanations. • Challenges in group work: Finding it hard to communicate with peers during collaborative activities. • Limited vocabulary: Difficulty expressing scientific concepts or asking questions. • Sensory overload: Being overwhelmed by the sensory aspects of experiments (e.g., smells, sounds). **Provision** **Teaching staff do:** ✓ Difficulty understanding instructions: Struggling to follow verbal instructions or explanations. ✓ Challenges in group work: Finding it hard to communicate with peers during collaborative activities. ✓ Limited vocabulary: Difficulty expressing scientific concepts or asking questions. ✓ Sensory overload: Being overwhelmed by the sensory aspects of experiments (e.g., smells, sounds).

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Social, Emotional & Mental Health	Sensory/Physical
Challenges **Pupils may have:** • Difficulty understanding instructions: Struggling to follow verbal instructions or explanations. • Challenges in group work: Finding it hard to communicate with peers during collaborative activities. • Limited vocabulary: Difficulty expressing scientific concepts or asking questions. • Sensory overload: Being overwhelmed by the sensory aspects of experiments (e.g., smells, sounds). **Provision** **Teaching staff do:** ✓ Simplified and differentiated learning materials. ✓ Graphic organizers and mind maps to help with problem-solving. ✓ Assistive technology such as text-to-speech software. ✓ Alternative formats for reading and writing tasks. **Teaching staff provide:** ✓ Access to school counselling services. ✓ Social stories and role-playing activities to improve social skills. ✓ Safe spaces for pupils to calm down if feeling anxious. ✓ Regular check-ins to monitor emotional well-being.	**Challenges** **Pupils may have:** • Difficulty understanding instructions: Struggling to follow verbal instructions or explanations. • Challenges in group work: Finding it hard to communicate with peers during collaborative activities. • Limited vocabulary: Difficulty expressing scientific concepts or asking questions. • Sensory overload: Being overwhelmed by the sensory aspects of experiments (e.g., smells, sounds). **Provision** **Teaching staff do:** ✓ Adapts physical activities to accommodate different abilities. ✓ Ensures all pupils can see and hear instructions clearly. ✓ Allows for frequent breaks to prevent fatigue. ✓ Uses adaptive teaching methods for pupils with fine motor difficulties. **Teaching staff provide:** ✓ Adaptive equipment such as modified lab tools or writing aids. ✓ Visual and auditory aids to support learning. ✓ Ergonomic furniture to support physical comfort. ✓ Accessible learning materials and resources.

Primary Science

Planning Inclusive Lessons

Learning in science involves children and young people building their knowledge of important concepts and procedures. When learning new content, learners must connect this to what they already know. This means that it is important that learners develop secure understanding of previously taught concepts and procedures.

When planning lessons, it is important to consider learners with SEND. Carefully consider the objective of each individual lesson; what specifically do you want pupils to learn? How can you present new information in a way that all learners can access? How can complex ideas be broken down into simpler parts for pupils to learn and practise? How can you focus learner's attention on the new content? For example, learners could observe and explore a stimulus to hook them into the new learning. This could be an object, a model, or an image. You should encourage learners to ask questions about their learning and build in opportunities for small group and whole-class discussions. Oracy-led sessions, with visuals to support the access of all learners, can enable you to build on and extend your learners' scientific thinking. If you have an additional adult in the lesson, plan their role and share their responsibilities with them in advance. Further guidance on how you can deploy additional adults is provided here.

Creating an Inclusive Environment

Carefully consider the classroom – can all learners access the environment? Consider learners with sensory impairments and physical disabilities.

In creating a conducive learning environment, it is important for each lesson to follow on from prior learning, this can be both from the lesson before, or the academic year before. The curriculum can enable this by making sure that key concepts and procedures are systematically developed over time. Identify possible misconceptions that learners may have, and plan for how you will address these in the lesson. It is also important that curriculum plans try to pre-empt misconceptions by making sure content is taught in a logical order. Create opportunities to pre-teach, providing some learners with the opportunity to learn new vocabulary and concepts in advance of a lesson in a small group setting. Pre-teaching opportunities can also support learners who struggle with transitions or engaging in whole class teaching sessions, as it can prepare them for the learning and practical elements, they are likely to experience in a lesson.

Meticulously plan, and always test practical experiments before the lesson. Use your practice to create step-by-step instructions, which you can then modify with visuals and/or more precise steps for learners needing additional guidance. Make sure learners understand the purpose of each step and that they can link scientific content to what they are doing. The instructions can also be useful for additional adults supporting the lesson, giving them increased confidence when supporting the learning.

Curriculum Considerations

Working scientifically is an important goal of science education. It improves a learner's cognitive, social and linguistic development whilst becoming more inquisitive and interested in the world around them. Skills that are underpinned by scientific knowledge range from making predictions and asking scientific questions, to drawing conclusions and interpreting data or information collected.

As learners progress through each key stage, their knowledge of the methods, processes and nature of science is developed and deepened.

Key Stage 1

Key Stage 1 learners should regularly experience first-hand practical activities to explore and spark their interest for the topic. Scientific enquiry weaves throughout the whole of the Key Stage 1 curriculum, so practical activities should be considered which support and develop their understanding of scientific ideas. Secondary sources such as books, photos, videos and simulations should be used to help children and young people learn and make sense of the scientific content.

Key Stage 2

In lower Key Stage 2, learners should now be encouraged to broaden their scientific view of the world around them through exploration, discussion, testing and developing ideas.

In upper Key Stage 2, learners begin to learn about more abstract concepts which support learners in comprehending and predicting how the world around them works. Learners should continue to build on the foundational skills of exploration and talking about their ideas; asking their own questions; analysing functions, becoming methodical when identifying relationships and interactions.

Primary Science

Strategies to Scaffold Learning

How can I support learners who struggle to access lessons because of literacy difficulties?

- Provide topical word banks and picture cards that the learner can point or refer to when explaining scientific processes.
- Ask teaching assistants to collate word/picture banks on a mini whiteboard/paper with the learner during the teaching input to support their independent learning activity.
- Scaffold learning to make it accessible for all, e.g., if writing up the method for their experiment, a learner with writing difficulties could verbally explain for you or a teaching assistant to scribe, note-take or film explaining their answers.

How can I support learners who struggle to access lessons because of numeracy difficulties?

- Scaffold learning to make it accessible for all, e.g., when creating data tables for an experiment, learners with numeracy difficulties could create a pictogram.
- Employ manipulatives and resources used in maths lessons to support learning in science.
- Bring abstract concepts to life through concrete resources and comparisons.

How can I support learners who struggle to retain vocabulary?

- Begin each lesson with a review of the vocabulary earnt in the previous lesson.
- Provide word banks that are accessible throughout the science topic. Encourage learners to tick the words they feel confident with to help target language that still needs support, e.g., when learners can independently use a word in a sentence. This could also encourage and motivate the learner to use language they have yet to use.
- Refer to language regularly during lessons and, where applicable, throughout the school day, as this will embed the vocabulary and build stronger links and associations.

How can I support learners who need additional time to develop conceptual understanding?

- Provide pre-teaching opportunities for learners to hear vocabulary prior to the lesson, to support their access and engagement in whole-class teaching.
- Plan small group teaching opportunities, for example whilst learners who have already met an objective are doing enrichment activities independently, dedicate time to conference with and/or provide additional learning opportunities for learners working towards the learning objective.
- Provide learners with worked examples to use as a model whilst completing independent work.

Progression of scientific knowledge across Key Stages: Electricity

Early Learning Goal:

Children know about similarities and differences in relation to pictures, objects, materials and living things.

Year 4:

Recognise some common conductors and insulators, and associate metals with being good conductors.

Year 6:

Compare and give reasons for variations in how components function including the brightness of bulbs, the loudness of buzzers and the on/off position of switches.

Primary Science

How can I support learners who struggle with attention?

- Create a working classroom environment that is calming and simple, e.g., clear routines, organised workspaces.
- Use preferential seating and proximity to engage all learners – have learners who struggle to concentrate at the front of the class, or plan for a teaching assistant to encourage the learner to participate and maintain focus.
- Pre-expose learners to the equipment and nature of the lesson (especially for experiments and practical lessons) to spark engagement and interest in the upcoming lesson.
- Plan movement breaks and classroom jobs (e.g., handing out materials) for individual learners.

How can I support learners who struggle with change and transition?

- Science doesn't always follow the same lesson format and structure, so prepare learners in advance by explaining how the lesson will run.
- Use visuals (e.g., now, next, then boards or visual timetables) to segment the lesson into manageable chunks that are achievable for the learner.
- Think about the individual learner – some learners may be highly motivated if they know something in advance of a lesson. Show them an object, or picture about the lesson, as detailed in the case study.

Case Study

Supporting a learner with autism in mainstream Year 1 science lessons

One of the learner's targets was to initiate and sustain attention to a given task. Following discussions with the SENCO, a Now, Next, Then board (NNT) was created and implemented across all areas of the school day to help structure lessons and support the learner's engagement in modified tasks aligned to the Year 1 curriculum. The NNT had three images for tasks and activities – with some being 'demands' (tasks that had to be completed), and some preferred, motivational activities which served as a reward for completed curricular tasks.

Planning: For science lessons, the teacher and teaching assistant (TA) talked through the expectations and planned outcomes for the lesson, and how these would be communicated to the learner. Some visuals were consistent, though sometimes the teacher and TA agreed language and visuals for more specialised tasks (e.g., when the class went on a learning walk in the local area to observe the changing of the seasons). Tasks were developed in line with the learner's individual needs, and most were planned to take about five minutes to complete. When the NNT was first implemented, the 'next' task was a preferred activity; as the learner made progress towards his target and was consistently able to complete the five-minute task, the 'then' task on the NNT became the preferred activity, so that the learner was extending his attention to curriculum tasks, completing two five-minute tasks before the preferred activity.

Implementation: At transition, when the learner came in from morning play, the teacher greeted the learner and walked with him to the back of the classroom to quietly discuss the lesson 1:1 whilst the TA settled the rest of the class on the carpet. The language staff used was familiar to the learner, and consistent across all adults in the classroom: 'Now you are sorting the animals into groups, next you will draw the animals into your chart, then you can have five minutes free time to create your favourite animal with the Lego' – the teacher pointed to pictures on the NNT board whilst reviewing the parts of the lesson. The teacher would then prompt, 'What are you going to do now?'. Once the learner was set up with his task, the teacher would work with other learners, checking in with the learner regularly. As each task was finished, the learner enjoyed taking the picture off the board – it provided both a sense of achievement and motivation, as he knew he was moving closer to his desired activity. The teacher or TA would prompt the learner, 'You have finished sorting the animals, well done! Let's move the pictures – what is happening next?'