

# Implementation Audit for Science



Key questions	How will you address this?
<p>(i) Teachers have expert knowledge of the subjects that they teach and, where they do not, they are supported to address these gaps so that pupils are not disadvantaged by ineffective teaching</p>	<ul style="list-style-type: none"> <li>• Science team are attending CPD in Trafford - TTSA</li> <li>• Staff meeting October 2019 - share information from own CPD, introduce 5 enquiry strands</li> <li>• Second staff meeting being held in June 2020 - rearrange</li> <li>• Front covers with 'I can' statements</li> <li>• Staff knowledge questionnaire</li> <li>• Share ASE, STEM, Explorify websites with staff</li> <li>• Created new planning format for every topic in every year with prior learning and current year strands highlighted. Also link to 5 enquiry strands for teachers to highlight.</li> <li>• Making stronger links with other subjects such as PE, English, Eco etc.</li> <li>• Links with high school.</li> <li>• Membership of The National Trust</li> </ul>
<p>(ii) Teachers enable pupils to understand key concepts, presenting information clearly and promoting appropriate discussion</p>	<ul style="list-style-type: none"> <li>• Learning walks (need to book one in) and book looks</li> <li>• Pupil voice (once returned)</li> <li>• Enquiry based learning- 5 strands pictures up in every classroom and being refer to.</li> <li>• Child led investigations</li> <li>• Open ended questioning</li> </ul>
<p>(iii) Teachers check pupils' understanding effectively, identifying and correcting misunderstandings</p>	<ul style="list-style-type: none"> <li>• High expectations</li> <li>• Learning is sequenced in a way that lessons build upon previous learning</li> <li>• Concept Cartoons at the start of topic - facilitating the children's learning to rectify misconceptions</li> </ul>



<p>(iv) Teachers ensure that pupils embed key concepts in their long-term memory and apply them fluently</p>	<ul style="list-style-type: none"><li>• Developing - Science Royal Charter of Knowledge</li><li>• Work on sticky knowledge- assessment</li><li>• Introduce concept- use experiencing- making it real- SCIENCE IN ACTION</li><li>• Links to previous topics, experiences, trips etc.</li><li>• STEM ambassadors- real life, making connections</li><li>• Understanding prior learning and building upon it - highlighted on new medium term plan</li></ul>
<p>(v) The subject curriculum that classes follow is designed and delivered in a way that allows pupils to transfer key knowledge to long-term memory; it is sequenced so that new knowledge and skills build on what has been taught before and towards defined end points</p>	<ul style="list-style-type: none"><li>• Progression ladders</li><li>• LO's subject specific</li><li>• Developing a Royal Charter of Knowledge</li><li>• Concept Cartoons at beginning and end of a topic</li><li>• Importance of science displays- updated- working wall</li><li>• Floor books</li></ul>
<p>(vi) Teachers use assessment to check pupils' understanding in order to inform teaching</p>	<ul style="list-style-type: none"><li>• Science checklist for teachers to assess - this is be followed up</li><li>• Specific topic related vocab</li><li>• Lessons build upon what has gone before, increasing in scale, or using a skill shared/guided/independently</li><li>• Lots of group and class based discussion</li><li>• Curiosity sparking language used - I wonder how? What if? How about?</li><li>• Children have the opportunity to investigate their own question</li></ul>

(vii) Teachers use assessment to help pupils embed and use knowledge fluently, develop their understanding, and not simply memorise disconnected facts.

- Focus on the 5 enquiry strands
- Science is taught consistently, once a week for up to two hours, but is discretely taught in many different contexts throughout all areas of the curriculum. For example, through English, i.e. writing a letter to a local politician regarding the closure of a park/biography of a famous scientist's life, etc.
- Science specific vocabulary displayed, taught at the beginning of the topic and used throughout
- Use of Knowledge Charter
- Use of science roles (collaborative working)

Element	Key Questions	What it looks like
<p><b>Implementation (i)</b></p> <p>Teachers have expert knowledge of the subjects they teach</p>	<ul style="list-style-type: none"> <li>• Is there evidence that teachers are <b>enthusiastic about the subject</b> they are teaching and is this impacting positively on the pupils?</li> <li>• Does the teaching take account of <b>how the brain develops concepts</b>?</li> <li>• Are teachers <b>proactive in identifying opportunities for pupils</b> to use their knowledge across different subject domains?</li> <li>• Do the learning sequences at the point of delivery enable pupils to develop <b>increasingly more sophisticated levels of thinking</b> from concrete to application, analysis and creativity in and across subject domains?</li> <li>• Can teachers give <b>examples of how talent is recognised</b> in and across subject domains and explain how the curriculum has been modified to ensure that individual talent is developed both in school, in the extended curriculum and, where appropriate, through signposting to organisations within the community?</li> <li>• How does the teaching show that the <b>principles of metacognition</b> are woven into the curriculum so that pupils develop skills of self regulation and how they can contribute to the learning of others?</li> </ul>	<ul style="list-style-type: none"> <li>❑ Teachers motivate their pupils because they are highly enthusiastic about the subject they teach. They inspire their pupils and almost demand the same level of enthusiasm as they show themselves.</li> <li>❑ Their knowledge of the subject is such that they are quick to identify any barriers to learning and can provide pupils with the necessary support to help them overcome their difficulties.</li> <li>❑ Teachers are able to pick up misconceptions quickly because they have excellent knowledge of their subject.</li> <li>❑ It is clear that the teachers have taken account of the latest research into teaching and learning methods and individual subjects and are applying systems that focus heavily on improving learning.</li> <li>❑ Teachers are encouraging pupils to raise their own questions and this is built into the activities that pupils address.</li> <li>❑ Teachers maximise opportunities for pupils to learn collaboratively and have high expectation that pupils know how to learn together.</li> <li>❑ Teachers are able to challenge the most able of pupils and take time to engage them in additional tasks that further their knowledge but also enthusiasm for the subject.</li> </ul>

Element	Key Questions	What it looks like
<p data-bbox="107 201 443 304"><b>Implementation (iii)</b></p> <p data-bbox="107 427 443 730">Teachers check pupils' understanding effectively, identifying and correcting misunderstandings</p>	<ul data-bbox="506 201 1229 1361" style="list-style-type: none"> <li>• How effective are teachers at <b>identifying pupils' barriers to learning</b>?</li> <li>• Are teachers quick enough to recognise where <b>misconceptions</b> may be evident in pupils' learning?</li> <li>• Is <b>feedback in all subjects precise and pertinent</b> to intended outcomes?</li> <li>• How effective is <b>peer assessment</b> used to help support pupils' understanding and misconceptions?</li> <li>• Does <b>feedback relate directly to the concepts being developed</b> and therefore, able to support rapid progress?</li> <li>• Is there evidence in books to show that <b>learning pathways have been adjusted in the light of pupils' developing knowledge and understanding</b> and this is consistent in all subjects?</li> </ul>	<ul data-bbox="1256 201 2107 1457" style="list-style-type: none"> <li>❑ In all lessons there is a high expectations that pupils' misconceptions are picked up quickly and that staff work at ensuring they overcome their difficulties.</li> <li>❑ Teachers continually focus on the barriers to learning by asking pupils to tell them what it is that makes the learning difficult nor complex.</li> <li>❑ Teachers have a clear sequence of learning outlined so that they can help to understand where pupils are finding the learning difficult.</li> <li>❑ Leaders have taken full account of the latest research into feedback and have adapted the school's approach to feedback accordingly.</li> <li>❑ In line with the latest research, pupils play a major role in identifying their own errors and in making amendments accordingly.</li> <li>❑ Teachers are quick to recognise the difference between genuine misconceptions and careless errors.</li> <li>❑ Peer assessment is a regular feature of the classroom, with pupils being coached to be critical friends.</li> </ul>

Element	Key Questions	What it looks like
<p data-bbox="125 252 450 352"><b>Implementation (ii)</b></p> <p data-bbox="125 475 405 863">Teachers present key concepts clearly and invite appropriate discussions</p>	<ul data-bbox="517 252 1211 1422" style="list-style-type: none"> <li>• Is the teachers' delivery strong enough to <b>encourage pupils to raise their own questions</b>?</li> <li>• Does the delivery of the curriculum ensure that <b>teaching models effective learning both in core knowledge and in metacognitive strategies</b>?</li> <li>• Is the teaching based upon <b>deep subject knowledge</b> that translates increasingly complex concepts into a series of coherent steps for the learner?</li> <li>• Teaching ensures that <b>pupils are offered appropriate challenge</b> through choice that is relative to the stage of conceptual understanding within and across subject domains?</li> <li>• Is <b>effective use of appropriate questioning</b> to develop thinking an embedded feature of the teaching and learning programme at every stage?</li> <li>• Are <b>pupils well-motivated</b> and is there a tangible level of high expectation from both adults and pupils?</li> </ul>	<ul data-bbox="1256 252 2085 1549" style="list-style-type: none"> <li>❑ Teachers balance the need to introduce new learning with summarising previous learning through short, sharp but relevant plenaries.</li> <li>❑ Teachers break down new learning into manageable parts which helps the learners to understand the main concepts.</li> <li>❑ Teachers are keen on helping pupils to become more effective and efficient learners as well as imparting important knowledge.</li> <li>❑ In this way, principles such as metacognition is used well to help pupils to be more effective learners.</li> <li>❑ There is every encouragement for pupils to explain their understanding by working in small groups when it is appropriate but also within a full class situation.</li> <li>❑ Teachers' questioning is excellent and demands greater level of thinking from the pupils, this is feature of the teaching and learning.</li> <li>❑ Teachers are able to explain complex concepts in such a way that all pupils are able to follow the lesson.</li> <li>❑ Teachers encourage pupils to explain their understanding to others on a regular basis so that they can monitor if pupils have understood fully the learning being imparted.</li> </ul>

Element	Key Questions	What it looks like
<p data-bbox="114 204 450 304"><b>Implementation (iv)</b></p> <p data-bbox="114 427 443 874">Teachers ensure that pupils embed key concepts in their long-term memory and apply them fluently</p>	<ul data-bbox="517 204 1234 1326" style="list-style-type: none"> <li>• How have teachers identified the 'sticky' knowledge that pupils should take with them at the end of different topics or themes?</li> <li>• How do teachers attempt to identify what pupils now know that they didn't before the learning started?</li> <li>• Can pupils recall understanding of prior knowledge and can transfer this into unfamiliar contexts in order to access new learning?</li> <li>• Is the curriculum mapped and timetabled appropriately in order to ensure that sufficient time is allocated to the acquisition of key aspects of knowledge and understanding across the whole curriculum within each Key Stage?</li> <li>• Does the curriculum delivery maximise opportunity for enquiry, including pupil-initiated enquiry?</li> <li>• How do pupils articulate how they have used metacognition strategies to support their learning and can they give examples in a range of subjects?</li> </ul>	<ul data-bbox="1279 204 2130 1453" style="list-style-type: none"> <li>❑ The school has adopted the term 'sticky knowledge' or another appropriate term to help pupils recognise the knowledge that they should take with them through the rest of their life.</li> <li>❑ Subject and/or phase leaders have taken time to identify what key knowledge needs to be taught for all subjects and have set them out against year group expectations so that staff are clear about what should be taught each in each year group.</li> <li>❑ The task of getting pupils to identify what they now know that they didn't know before the learning started is a regular feature in every classroom.</li> <li>❑ There is strong focus on prior learning, where appropriate, both in terms of individual lessons and across themes in general. For example many lessons start with a brief plenary of what had been covered to date and themes link areas where possible, e.g., how the Romans helped to move Britain on since the Stone Age.</li> <li>❑ Reflection is a regular part of the curriculum mapping with pupils being asked to reflect on their learning on a regular basis.</li> <li>❑ The format of the reflection is changed regularly to allow pupils to develop their own ideas and to think more deeply.</li> </ul>

Element	Key Questions	What it looks like
<p data-bbox="129 236 443 331"><b>Implementation (vi)</b></p> <p data-bbox="129 459 454 683">Teachers use assessment to check pupils' understanding</p>	<ul data-bbox="510 236 1191 1281" style="list-style-type: none"> <li>• Do teachers use feedback effectively to help deepen pupils' understanding and knowledge?</li> <li>• Are teachers clear about what it is they want the pupils to learn, and transfer to their long-term memory?</li> <li>• What are the expectations in relation to formative and summative assessment and is this being applied appropriately?</li> <li>• Are pupils able to articulate how they learn and what strategies they use to overcome challenges?</li> <li>• Do pupils give examples of how they have been engaged in the decision making around spontaneous modification of the curriculum in response to their interests and developing learning needs?</li> <li>• Do pupils understand how this has contributed to accelerating their learning and adding substance to it?</li> </ul>	<ul data-bbox="1234 236 2056 1465" style="list-style-type: none"> <li>❑ There is a strong focus on pupils' 'keeping up' not 'catching up' when it comes to feeding back to pupils.</li> <li>❑ There is a huge expectation that pupils are not allowed to slip behind and this forms an important part of the feedback policy.</li> <li>❑ Teachers identify learning objectives for each lesson but also for sequence of learning so that pupils are left in doubt about what expectations are across a theme as well as within an individual lesson.</li> <li>❑ Pupils talk with some authority about how they learn best and how they modify activities, when appropriate, to help them learn well.</li> <li>❑ Pupils are able to talk about occasions when they, as part of a small group, have been provided with a challenge to 'champion' an aspect of their learning for others.</li> <li>❑ In the main, pupils have been provided with a choice as to which aspect they will 'champion' so that their personal interest can be met.</li> </ul>

Element	Key Questions	What it looks like
<p><b>Implementation (v)</b></p> <p>Teachers enable pupils to transfer key knowledge to long-term memory, sequence the learning and ensure that it is building towards the defined end points</p>	<ul style="list-style-type: none"> <li>• Are teachers clear about the end point of the learning sequence they are delivering?</li> <li>• Are teachers capable of making adjustments if it is apparent that pupils are not on course to reach the identified end point?</li> <li>• Are end point linked clearly to the National Curriculum or other agreed curriculum?</li> <li>• Do teacher fully understand the difference between short and long term memory when it comes to learning opportunities?</li> <li>• Do pupils books indicate that the delivery of the curriculum has supported and 'scaffolded' learning appropriately so that the rate of progress towards age related expectations in all subjects is evident over time?</li> <li>• Are individual lessons set within a clear sequence of learning so that pupils access learning on a day-to-day basis within a cohesive and meaningful journey?</li> </ul>	<ul style="list-style-type: none"> <li>❑ All teachers know what the main focus of the learning is as the end points have been set out with support from phase and/or subject leaders.</li> <li>❑ The National Curriculum has been use das a central reference point to determine what the end points are.</li> <li>❑ Teachers are quick to make adjustments to their plans if they find that pupils are struggling with a concept or that they are finding things easier than anticipated.</li> <li>❑ Teachers are clear about the difference between pupils recalling knowledge close to the point of teaching and pupils taking knowledge with them through life.</li> <li>❑ Evidence in books clarifies that pupils are making steady progress towards the age group expectations.</li> <li>❑ Teachers' long, medium and short term plans show that the needs of pupils have been taken into account and that their progress is sequenced appropriately.</li> <li>❑ Pupils can talk with confidence about their learning journey indicating jhow they have acquired new knowledge and how they have made progress.</li> </ul>

Element	Key Questions	What it looks like
<p><b>Implementation (vii)</b></p> <p>Teachers use assessment to help pupils embed and use knowledge fluently, develop their understanding, and not simply memorise disconnected facts</p>	<ul style="list-style-type: none"> <li>• Does the teaching enable pupils to recall understanding of prior knowledge and transfer this into unfamiliar contexts in order to access new learning?</li> <li>• Do pupils talk with understanding about the choices they make in selecting tasks of appropriate challenge relative to their stage of development?</li> <li>• Do outcomes in books show that appropriate time has been allocated to the development of knowledge and understanding of key aspects in all subjects over time?</li> <li>• Is the teaching effectively accounting for the development of metacognitive strategies at the point of learning and is this a well embedded feature?</li> <li>• How does the teaching show that account has been made of hooking back to prior knowledge and experiences and the teaching of active memory skills?</li> </ul>	<ul style="list-style-type: none"> <li>❑ Most new themes will be introduced by linking it to an aspect of learning already covered.</li> <li>❑ There is a strong focus on 'what pupils think they already know' and 'what questions they have about the new learning'.</li> <li>❑ This is also the case for new vocabulary they are to meet.</li> <li>❑ Teachers use 'knowledge mats' or something similar to help pupils identify new vocabulary they are likely to meet and to outline the sticky knowledge they are expected to learn.</li> <li>❑ Pupils are able to talk with great authority about what they have learned and how the new learning relates to previous learning and supports new learning going forwards.</li> <li>❑ Pupils are expected to raise questions, act as critical friends, know how to work collaboratively and be able to reflect on their learning, using effective methods when doing so.</li> </ul>