

Activity SL Ci - Knowing about science in your school

Science subject leadership is strengthened and developed through an effective monitoring and improvement cycle that informs development in science

It is important to find out what is happening in science at in your school because this ‘monitoring’ not only provides evidence about current practice but also helps you evaluate and identify strengths and areas to develop. Effective monitoring is a powerful tool if you are to truly lead and bring about improvements in science at your school.

Ask yourself:

- How can I find out what is happening with science?
- Which areas are strengths to celebrate and which areas need to be developed?
- How can I find out about the impact of new strategies that I am going to implement?

Monitoring can be time-consuming and sometimes it is difficult to know where to start. First, recognize that you cannot do everything immediately by yourself. It is crucial that you plan with the SMT and consider what time, resources and opportunities you have before selecting the way ahead. It is a great help if regular, periodic non-contact time is available to undertake activities. Linking the science monitoring schedule to the SDP can also work well.

Monitoring activities often include formal observation and planning/work scrutinies but you can also find out about the general health of science informally e.g. by taking a learning walk around the school and by speaking to staff, children and families.

Here are some key techniques that can be used to support you in monitoring:

Learning Walk - *How does the trained or untrained eye see science in your school?*

Weekly Display Boards – *What has been going on in classes this week?*

Planning Scrutiny - *What is science teaching and learning like in school as evidenced by the scheme of work and teachers’ planning?*

Work Scrutiny - *What is science teaching and learning like in school as evidenced by the children’s work?*

Lesson Observation – *How do teachers provide learning opportunities for all children to make progress during lessons?*

Learning Walk - *How does the trained or untrained eye see science in your school?*

This is a great activity to get started with. It will provide a visible impression of the value placed on science across the school, both indoors and outdoors.

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Arm yourself with a camera or video recorder. Start just outside the school gate. Move around school capturing evidence of science outdoors and indoors. It is interesting to involve someone else e.g. the school council or a governor in this process as they may spot things that you don't notice.

Review the photographs/recording along with these points:

- a. From the gate: Does the view reveal any science presence or opportunities?
- b. In the outdoor area: Have any garden or nature areas been developed? Is there evidence of children working on science outdoors?
- c. In the entrance area: Is there any sign of science being valued or celebrated by the school?
- d. Moving through corridors: Are there science displays? Are children at work on science?
- e. Entering classrooms: Is there any evidence of science learning?
- f. What science do you see in other areas of school buildings, e.g. staff room or resource areas?
- g. Check the school diary for any trips or signs of extra-curricular science activity.

Overall, what is the impression of science being valued, being a part of life at school? Are there any successes, any opportunities and any issues for sharing with school?

Weekly Display Boards – *What has been going on in classes this week?*

This is a quick, weekly activity for teachers to share what is happening in their classrooms.

Once it is up and running, experience shows that you may only get to operate this for a term, as other subject leaders want their turn too! (This task can also provide evidence for SL2, T1, T2, and T3.)

- Use a display board where staff will see it regularly, e.g. in the staff room. Divide the board into areas; one space for each class in the school. N.B. A smaller display space based around capturing sticky notes could be used in the same way.
- By Thursday each week, staff must pin up a class science example from the previous week. Note: it is not to be mounted. This stays up until Wednesday the following week. (Keep the items you take down for your evidence collection.)
- Some weeks, an over-arching theme can be allocated, e.g. progression, assessment, enquiry skills such as questions, predictions, data, graphs etc. Discussions will start to happen regarding the nature of what evidence can be displayed. Use photos, pupils' written work, quotes on sticky notes, a slide show or video examples.

This is a good opportunity to have a nose at what is happening in classrooms and it may suggest a focus for further monitoring.

Planning Scrutiny - *What is science teaching and learning like in school as evidenced by the scheme of work and teachers' planning?*

A planning scrutiny provides an opportunity to find out how curriculum planning addresses the varying needs and learning experiences of all pupils.

You could start by reviewing the whole school scheme of work. Does it cover the curriculum fully? Is continuity and progression built in? The next step is to collect teachers' medium term/short term planning and find out if the SOW is being addressed effectively in classrooms.

Often all the planning is made available to the subject leader on a particular day of the half term or term. If it is a hard copy, rapid turnaround (often overnight) is expected. Instead, perhaps you could take a particular class or year group and look at their planning each week during the half term. The first cycle can be a little challenging, as each week the planning completed will be at different stages of the topic, but once a second cycle starts then previous topic planning can be considered. (You may decide to carry out the planning scrutiny in conjunction with a book scrutiny to monitor the outcomes.)

It is useful to have one or more specific foci for the planning scrutiny. Here are a few areas to consider:

Focus	Comment	Action
The scheme of work is being followed and there is continuity within and between units of learning		
Children are learning from their own starting point (AfL)		
Appropriate levels of challenge are planned for		
Development of accurate scientific vocabulary is planned for.		
The progressive development of skills is planned for i.e. skills pitched at a level appropriate for this age		
Different learning styles are planned for		
Application of ICT, English, mathematics skills is embedded		
Maximum use of the outside environment is planned for.		
Opportunities to enrich learning are planned for e.g. visits from experts		
Other comments		

An important aspect of the planning scrutiny is to provide feedback to staff as a critical friend and as a mentor. Remember to celebrate strengths and consider feedback with respect to additional resources, strategies, activities etc. that individual staff may not be aware of. Issues may be identified that affect the school as a whole, in which case whole school CPD should be considered.

Work Scrutiny - *What is science teaching and learning like in school as evidenced by the children's work?*

A work scrutiny, sometimes called a work scrutiny or work look, provides an opportunity for finding out about the outcome of learning experiences and the varying responses of pupils. It can also provide a good starting point as a base line for the school’s self-assessment

Very often, the work scrutiny becomes dominated by noting whether works are neat and tidy and in keeping with the school’s presentation and marking policies. This may be relevant but what does it tell you about the quality/impact of science teaching on children’s learning? The crucial question here is: ***What impact has science teaching had on all children’s learning as evidenced by their work?***

Use the following bank of questions to prompt a more focused work scrutiny of science and its assessment. You could select just one of the highlighted boxes to focus on as these are much ‘bigger’ areas that may need more actions to improve.

Prompt	Comment	Action
Is the scheme of work is being followed?		
Is there is continuity between year groups?		
Are children are learning from their own starting point (AFL)?		
Are appropriate levels of challenge are being set?		
Is there accurate use of scientific vocabulary?		
Are scientific enquiry skills being developed progressively which are appropriate for this age		
Are different learning styles addressed?		
Is there evidence of differentiation?		
Does marking give suitable feedback to children?		
Have children acted on feedback given?		
Is there evidence of the application of ICT, literacy, numeracy skills?		
Is the task set relevant to assessment objectives?		
Are tasks marked to assessment criteria?		
Is marking accurate?		
Does written feedback reflect assessment criteria?		
Can you trace improvement through the book?		
Are there opportunities for self & peer assessment?		
Is work completed? Has homework been done?		
What is the overall view?		

Lesson Observation – How do teachers provide learning opportunities for all children to make progress during lessons?

Collaborative teaching strategies such as team teaching may be used as a less formal approach to observing lessons. However, you may wish to carry out a formal lesson observation to see the process of teaching and learning in action.

When undertaking a formal lesson observation for the first time, it can be daunting for both the teacher under observation and for you as the observer. Plan it carefully and ensure that the observation is in-line with your school’s agreed policy, for example:

- Agree a focus for the monitoring and establish the evaluation criteria with the person being observed. Ensure you have a clear idea of what you want to look for and what you think it will look like.

For example:

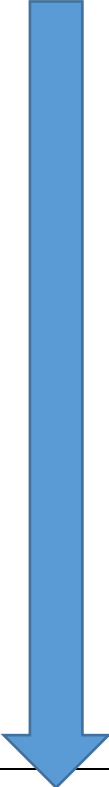
Observation focus: (What to look for)	Expectations: (What might it look like?)
Use of questioning to challenge pupils	<ul style="list-style-type: none"> • Range of open/closed questions used throughout the lesson; • Identified key questions to provide cognitive conflict • Lesson starts with a ‘big’ question

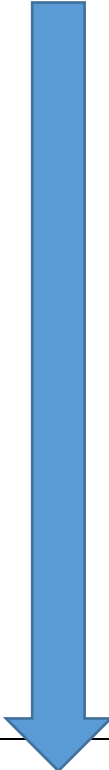
- Carry out the observation using the school’s lesson observation pro forma and criteria to record the observation.
- Give verbal feedback to the person being observed in a dialogue which enables them to reflect upon his/her own practice. Identify one or two areas to develop. Give written feedback to the person being observed and share with the Head Teacher.
- Follow up can take many forms e.g. a further lesson observation in a supportive capacity, team teaching, peer observations, training opportunities, informal examples of improved practice from either party etc.


An interesting alternative to a formal lesson observation involves focusing on the children and their learning (rather than the teacher and teaching strategies). This can feel less threatening for the teacher under observation and gives a fresh perspective on how the science lesson is viewed by pupils.


It is very important that the lesson observation outcome is used effectively as a valuable opportunity to further develop the teacher’s practice. How can the follow-up be presented as a positive experience? What form of support would the teacher prefer?

The following table provides an opportunity to analyse in detail and assess children’s work in science enquiry. It is adapted from ‘AKSIS Investigations: Making an impact’ by Anne Goldsworthy ASE 2002 (2006). The arrows show increasing achievement in the responses observed. The prompts are very useful for a book scrutiny and lesson observations and there is no expectation to look at all these areas in one go.

Planning: questions to ask	Obtaining and presenting evidence: questions to ask	Considering evidence: questions to ask	Increasing achievement
<p>Investigations</p> <ul style="list-style-type: none"> ❖ Has the child asked questions? ❖ Has the child suggested and described what they will do? ❖ Has the child suggested ideas for investigation? ❖ Has the child decided what enquiry approach to use? ❖ Has the child gone some way towards setting up the investigation? ❖ Has the child set up the investigation independently, identifying variables and how to collect evidence? 	<p>Observations</p> <ul style="list-style-type: none"> ❖ Has the child made observations? ❖ Has the child made a comparison? ❖ Has the child made measurements? ❖ Has the child taken repeat readings? 	<p>Conclusions</p> <ul style="list-style-type: none"> ❖ Does the child describe what happened? ❖ Has the child drawn a simple conclusion, which matches the evidence? ❖ Does the child use comparative language to describe their sort? ❖ Does the child make a generalisation? ❖ Does the child sort objects in different ways? ❖ Has the child drawn a conclusion, which is a general statement about all his/her results? ❖ Has the child drawn a conclusion which refer to key variables and describes the pattern in results? 	

Predictions	Tables	Explanation	Increasing achievement
<ul style="list-style-type: none"> ❖ Has the child made a simple prediction? ❖ Has the child made a prediction, which describes what they think will happen in terms of the pattern for all their results? ❖ Has the child sketched a line graph to predict the pattern in their results? ❖ Has the child given a reasonable justification of his/her prediction making links to their scientific knowledge? 	<ul style="list-style-type: none"> ❖ Has the child recorded their observations? ❖ Has the child used a simple two column table? ❖ Has the child constructed and used a simple two column table? ❖ Has the child constructed and used a table for repeat readings? 	<ul style="list-style-type: none"> ❖ Has the child offered a simple explanation? ❖ Has the child offered an explanation, which links to his/her scientific knowledge? ❖ Does the child say whether or not what happened was what they expected? ❖ Has the child referred back to his her original prediction? ❖ Has the child referred back to his/her original prediction and suggested why it may-or may not –have matched the evidence? ❖ Has the child made further predictions for values he/she has not tested based on the patterns in evidence? 	

Planning observations/ measurements	Graphs	Development of method or improvement	Increasing achievement
<ul style="list-style-type: none"> ❖ Has the child decided to use a reasonable size of sample if carrying out a survey? ❖ Does the child decide what equipment to use? ❖ Does the child plan whether to take repeat readings? 	<ul style="list-style-type: none"> ❖ Has the child used a pictogram? ❖ Has the child used a bar chart? ❖ Has the child constructed a bar chart, labelling axes correctly? ❖ Has the child partly constructed and use a line graph? ❖ Has the child constructed and used a line graph, labelling axes and selecting an appropriate scale? ❖ Has the child chosen an appropriate graph to present their results? 	<ul style="list-style-type: none"> ❖ Does the child say what they found difficult? ❖ Has the child suggested simple improvements to his/her method? ❖ Has the child said how easy or difficult it was to make the test fair? ❖ Has the child said how easy or difficult it was to make the test accurate? ❖ Has the child said how reliable his/her results were? ❖ If doing a survey has the child considered the effect of sample size? ❖ Has the child said how much he/she can trust results? ❖ Has the child said how much he/she can trust his/her results and given reasons for his/her comment? 	

<p>Variables</p> <ul style="list-style-type: none">❖ Does the child suggest values for what they are changing if doing a fair test?❖ Does the child suggest values for what they are keeping the same if doing a fair test?			<p>Increasing achievement</p> 
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