BEING FOCUSSED:

MONITORING THE 10 KEY ISSUES TO IMPROVE CHILDREN'S LEARNING EXPERIENCES IN PRIMARY SCIENCE

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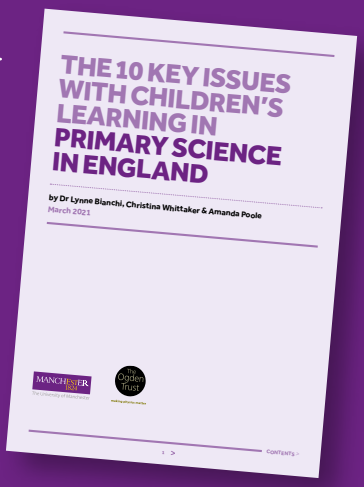

The 10 Key Issues with Children's Learning in Primary Science in England Report (March 2021)

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CONTENTS

BUILDING ON THE 10 KEY ISSUES REPORT

In March 2021, the 10 Key Issues with Children's Learning in Primary Science in England report was launched (Bianchi et al, 2021). This focussed attention on the experience children have learning science at primary school and recognised the issues that influence children's identity, ability and subsequent choices and options in STEM subjects.

This report follows on to provide guidance to science teachers and senior leaders when monitoring teaching and learning in primary schools. The 10 Key Issues report has been valued for creating a shared language and understanding about the things that are going well or could be a focus for improvement (Bianchi, 2022). This guidance enables the reader to use the issues to monitor children's science learning effectively, using a process of discussion to enable informed decision making and justification of actions based on sound understanding of current practice.

The Education Endowment Fund (2019) recognises the significance of effective monitoring in the cycle of school improvement and when implementing new approaches to teaching and learning.

> A key element of effective implementation is monitoring how well a new programme or practice is adopted and whether it achieves the intended outcomes. Schools should regularly monitor and review data that describes the progress and quality of implementation and apply this information to refine the use of the intervention over time. (Sharples et al, p25)

This 'Being Focussed' guidance report contributes to this area of practice, drawing insights from a 12-month study, working with mainstream schools in three areas of England. The professional views and perspectives from science subject leaders and senior leaders are integrated into the report and inform the development of a range of approaches that form a cyclical process of evidence-informed monitoring.

> Implementation monitoring and data collection processes also need to be operationalised. They need to fit with school routines and be usable for staff as part of their daily work. Data collection processes that are complicated and require extensive resources run the risk of not being supported and sustainable in a busy work environment. (ibid, p24)

The research says...

Monitoring can be defined as keeping track of progress, performance and compliance but key to this study is the key role it plays in evaluating the effectiveness of learning and teaching processes (Matthews, 2009, p32). It has the potential to support schools in taking accountability for the learning of children and with 'great accountability improves the present as it shapes the future. Invests in, grows and circulates professional capital throughout the system.' (Fullan et al, 2015, p15). 'This would provide greater ownership by schools of improvement and system reform.'
Matthews & Ehren, 2021, p57

USING THIS GUIDANCE

Users	The 10 Key Issues report impacted by providing...	Being Focussed inspires...
School leadership teams	**Science subject terminology** allowing for shared discussion about key issues in children's primary science learning	**Priority setting** allowing shared decision making about which key issue(s) matter most
Science subject leaders	**Science subject collegiality** enabling staff to recognise that they are part of a wider group of colleagues working to improve children's science experiences	**Judgement validation** to support staff to draw on a range of evidence to justify their focus for improvement
School based specialist advisers and coaches	**Science subject profile and value** increasing attention to science as a core subject	**Impact recognition** increasing attention to children's progress in science learning as a core subject
STEM sector leaders and providers of CPD	**Science subject clarity** providing opportunity for organisations and individuals across the sector to map their expertise and guidance to shared and agreed key issues	**Implementation fidelity** by interrogating an intervention against one or more of the 10 key issues

This table provides an overview of how this guidance develops from the original 10 Key Issues Report (Bianchi et al, March 2021)

In building upon the first report, published 2021, this guidance goes further by enabling a range of users to engage in constructive and reflective professional observation and discussion.

To demonstrate confidence requires a level of expertise or depth that is able to articulate and justify why this, why this way, and why now. Across teams committed to raising standards for primary children's learning will be those that are less confident about science, or less confident about leadership, or less confident about school practice in other settings, or less confident about research rigour and sector credibility. This guidance offers a structure to inspire the sharing of professional viewpoints. Using a series of professional discussions a consistent process is encouraged by supporting teachers to be: more informed, more critical and more focussed when engaging in the monitoring of science learning. By following this process users will develop more ownership and shared commitment to the urgency to improve the experiences for children in primary science learning.

School leadership teams usually have expertise and can talk about their approaches to monitoring but without science insight might lack confidence of what good practice should look like. Subject leaders are generally keen to please their senior line managers, and often see monitoring in terms of a task to be done with success based on the completion of those tasks. Specialist teacher advisers, working beyond their own school, risk holding assumptions that there is a 'right way' to do things. Innovators,within the STEM education sector, also are familiar with theoretical models of learning and apply these into resources and guidance to help teachers with implementation that supports the research fidelity. Yet, often they are less explicit about how to identify impact and success of a desirable difference that is intended.

This guidance is unique because it brokers collaborative learning through professional discussions, building knowledge transfer and strengthening self-awareness and confidence to make the right monitoring choice for the right reason, and informing the right action for the right outcome.

HOW THE GUIDANCE WAS DEVELOPED

Framing of the study

The Science & Engineering Education Research and Innovation Hub's research approach (Bianchi, 2021) is underpinned by a theoretical model for teacher engagement using the Trajectory of Professional Development (Bianchi, 2017). This describes a 5-step model to teachers' socially-constructed professional learning – pre-engage, participate, collaborate, co-create and connect. When developing this guidance, teachers were involved in a process of co-creation with the authors.

> '... the shift in engagement when teachers collaborate, co-create and connect enables a shift towards interpretivism. This offers the opportunity to include teachers' lived experiences and the voices of those within schools alongside our own interpretations. In this way we can gather deeper meaning, for instance about the levers and barriers to encouraging children to ask their own scientific questions and the implications that this has for the classroom.' (Bianchi, 2021, p 36)

A social learning space was created whereby teachers and the authors brought their experiences and knowledge of primary science education and practice to a shared and defined purpose. Through this collaboration, they analysed, debated and synthesised knowledge towards co-created solutions and conclusions. It is important to acknowledge the authentic development between the two groups, where professional collegiality, openness and non-judgemental approaches underpinned the development of this guidance report.

The research says...

The role of the science subject leader in monitoring science learning in the primary school is key, particularly in implementing change to improve children's learning, 'implementation is a complex process that requires leadership at different levels of the school; that is, dedicated but distributed leadership' (Sharples et al., 2018, p10). Subject leaders should be engaged in identifying aspects of learning to be developed through exploratory monitoring, where subject leaders work with senior leaders to 'identify a tight and appropriate area for improvement, using a robust diagnostic process' (ibid., p12). As subject leaders plan for implementing change, they will define the intended outcomes, and map out a robust and pragmatic monitoring system to help evaluate impact.

Cocreating the Guidance

Recruitment: six primary schools across three regions (Greater Manchester, Stoke on Trent, Coventry). Involvement of science subject leader and at least one other member of the senior leadership team.

Regular virtual workshops: during which teachers and the project team reviewed current practice across the schools, explored issues in an in-depth manner.

One-to-one school mentoring: across the project period, enabling in-person discussion and focussed reflection on individual school practice.

Headteacher group discussions: periodically undertaken to share project insights, to elicit leadership perspectives on the monitoring approaches and to invite critique and professional challenge to the project team.

E-portfolio school narratives: one per school, structured to gather teacher reflections, activities and evidence of monitoring practice.

PROGRESS AND INSIGHTS ON THE 10 KEY ISSUES REPORT

The aim of this work has been to identify how The 10 Key Issues report positively informs the monitoring of children's science learning experiences in classroom settings.

Reflective discussions and much debate was had on:

1. Differences between the issues

- Which issues could be interpreted in different ways?
- Which issues would benefit from improved clarity?
- Which issues created confusion or uncertainty for teachers?

2. Similarities between the issues

- Which issues were linked or connected?
- Did groupings, clusters or schema emerge between certain issues?
- Did the 'list' present too simplistic a representation of the issues in practice?
- Did the issues vary depending on context?
- Is it possible to find relationships between certain issues – causes and effects?

The outcome of these professional discussions are:

The 10 Key Issues by Theme: indicating the interconnected nature of the issues, and therefore the knock-on impact of the issues on teaching and learning themes, such as assessment, curriculum, subject and disciplinary knowledge.

And,

The Essential Features of Children's Learning in Primary Science: whereas the original 10 Key Issues report presented the story of challenge and concern in the primary science classrooms, the intention in this guidance is to reverse this approach and to describe the essential features of primary science learning experiences that reflect 'when children's science learning works well.' The following table provides an indicative list of features and observations that are not exhaustive, but are useful for professional reflection and discussion during the monitoring process.

These are significant contributions to the sector discourse around high quality primary science education.

The research says...

The evidence gathered through monitoring practice will only support the improvement of primary science learning if key stakeholders engage with it and that involves making time for talk. Dialogue refers to both constant professional exchanges that underpin reflective provision as well as planned and programmed occasions for sharing, learning, planning and evaluating together (Matthews, 2009, p32). While informal and low-functioning dialogue tend to confirm teaching practices without determining their worth in terms of children's learning (Little, 1990), high-functioning communities of practice will get far more out of dialogue, where disagreements are brought to the surface and given recognition so they can be addressed.
Hord, 2004, p18

THE KEY ISSUES BY THEME

Teacher associations and suggested connectivity between the 10 key issues	Themes connecting the 10 key issues
1: Children's science learning is superficial and lacks depth 3: Children's science learning lacks challenge 7: Children are engaged in prescriptive practical work that lacks purpose 8: Children do not draw on their learning from prior scientific skills, they do not build on repeated and regular experiences	Issues arising associated with **ineffective curriculum design for primary science**
2: Children's preconceptions aren't adequately valued 3: Children's science learning lacks challenge 8: Children do not draw on their learning from prior scientific skills, they do not build on repeated and regular experiences	Issues arising associated with **ineffective assessment of children's learning**
4: Children are over reliant on teacher talk and direction, they lack autonomy and independence in learning science 6: Children are not encouraged to use their own curiosity, scientific interests and questions in their science learning 7: Children are engaged in prescriptive practical work that lacks purpose	Issues arising associated with **insecure primary teacher science subject knowledge**
5: Children experience 'fun' science activities that fail to deepen or develop new learning 6: Children are not encouraged to use their own curiosity, scientific interests and questions in their science learning 9: Children rarely see themselves, their families, community members or their teachers as scientists	Issues arising from the **lack of understanding children have with the identity of the discipline of science of what it means to be a scientist**
10: Children do not apply literacy and numeracy skills in science at the same standard they use in English and Mathematics 1: Children's science learning is superficial and lacks depth 3: Children's science learning lacks challenge 8: Children do not draw on their learning from prior scientific skills, they do not build on repeated and regular experiences	Issues arising from **low expectations of children's outcomes in science**

THE ESSENTIAL FEATURES OF CHILDREN'S LEARNING IN PRIMARY SCIENCE

Whereas the original 10 Key Issues report presented the story of challenge and concern in the primary science classrooms, the intention in this guidance is to reverse this approach and to describe the essential features of primary science learning experiences that reflect 'when children's science learning works well.' The following table provides an indicative list of features and observations that are not exhaustive, but are useful for professional reflection and discussion during the monitoring process.

Key features related to the original 10 Key Issues report	**Observations** Children's science learning is going well when...
Children's science learning has depth	• Children are aware of where the lesson fits, why they are doing it and what comes next. • Children discuss learning using scientific vocabulary and knowledge. • Children can talk in-depth about what they know and understand in science. • Children reason and ask questions. • Children make links between their science learning and their lives. • Children explain what they have learnt so far and how this links to their current lesson objective. • Children link what they are learning to previous knowledge and experiences – within and outside of the planned curriculum. • Children know and understand the practices of science. • Children know and apply the disciplinary knowledge related to science enquiry. • Children apply learning in a range of contexts and to answer a range of different questions with which they are unfamiliar. • Children make connections between different aspects of their understanding within science and in other subjects.
Children's preconceptions are adequately valued	• Children are given time to share their ideas and understanding (with peers as well as with the teacher). • Children are regularly involved in using diagnostic tools like concept cartoons to inform next step learning. • Children's understanding and possible misconceptions are valued and regularly form part of the learning process in the lesson. • Children respond to teacher questioning to expose their prior understanding/misconceptions.
Children's science learning is challenging	• Children are encouraged to think deeply about the concepts that they are learning about. • Children do not always get the answer right or complete enquiries without the need to reframe their thinking or try something different. • Children are regularly engaged in assessment for learning strategies, such as low stakes quiz retrieval to identify gaps in prior knowledge. • Children receive regular feedback on their learning progress through marking and discussion.
Children have autonomy and independence in their science learning	• Children have opportunities to talk about science. • Children are given regular opportunities for hands on exploration in science. • Children are able to explore a concept before the teacher tells them how to do it. • Children are accustomed to working in groups with lots of purposeful discussion guided by questioning from the teacher.

Key features related to the original 10 Key Issues report	Observations Children's science learning is going well when...
Children experience science activities that deepen and develop new learning	• Children experience science lessons that have a clear purpose and learning objective. • Children engage in activities designed to enable them to meet the set objectives. • Children's lesson time is used well. • Children explain what they are doing and why (in relation to the learning objective).
Children are encouraged to use their own curiosity, scientific interests and questions	• Children use their own ideas to answer questions. • Children construct their own science questions and know how to answer them. • Children are able to use their prior knowledge and skills to select their own enquiry questions, with support and guidance from their teacher. • Children can tell you something that they have learnt during a lesson (that they didn't know previously). • Children ask and investigate their own scientific questions. • Children's learning is related to the world around them e.g. their own lives, communities or world events.
Children are engaged in purposeful practical work	• Children set up their own enquiries and know how they can gather evidence to answer a question. • Children have a range of relevant resources and equipment available to choose from. • Children use a range of enquiry types and scientific skills to answer questions. • Children can explain their findings and how they relate to them or the wider world.
Children draw on their prior learning and build on repeated and regular experiences	• Children's learning is related to clearly sequenced schemes of work. • Children engage in progressive learning activities that activate prior knowledge during lessons. • Children are involved in formative assessment throughout the lesson to review their understanding. • Children's learning is adapted to respond to their progress. • Children's experience of science challenges stereotypes. • Children learn about scientists in a range of careers, settings and in relation to their impact on the world historically and today.
Children see themselves, their families, community members and teachers as scientists	• Children are able to discuss a range of careers that depend on a secure understanding of the science that they are learning. • Children identify a range of scientists that may affect their own lives or the lives of others. • Children's learning involves their families in science at home and spaces outside the classroom. • Children learn about actual scientists, both contemporary and historic, what they do and their common practices. • Children's learning is related to real life contexts familiar to them, and not familiar to them.
Children apply literacy and numeracy skills in science at the standard they use in English and mathematics	• Children demonstrate their writing skills independently when reporting on aspects of their enquiry work (e.g. formal writing, instructions, explanations, arguments, reporting in the passive voice.) • Children use and apply mathematical skills in science. • Children's verbal language supports and prompts well written answers in science. • Children recognise how and why English and maths skills link and improve their science learning. • Children regularly use a range of measurements to an appropriate level of accuracy based on the place value of the number they are working with in maths. • Children apply statistics skills – interpreting and drawing a full range of charts and graphs to answer scientific questions, e.g. mean averages of data sets, drawing bar charts, line graphs and scatter graphs from enquiry data.

THE BEING FOCUSSED MONITORING PROCESS

The school environment or culture permeates all stages of the Being Focussed Monitoring Process and is therefore shown discretely as an introductory and explicit stage.

To guide a monitoring process to be effective the Being Focussed Monitoring Process suggests six sequential stages. Smaller stages in the process enable a better understanding of how to improve or review current monitoring practice. The process has been developed on a strong ethos of supporting all involved to know and justify what the purpose and method of monitoring should be in their school. The stages stimulate professional reflection and encourage new thinking for teachers and other stakeholders involved in monitoring science learning in schools.

By planning for monitoring through the six stage process, the focus is on children's science learning experiences and therefore a better driver of improvement.

The Being Focussed Monitoring Process is unique in the way it stimulates us to justify our approach to each other at every stage. It encourages an open approach so that everyone involved in the process of monitoring can engage in analysis and evaluation of practice in a valuable and professional manner.

We recognise that to do monitoring of science learning well we must establish the right culture, work on the right issue(s), choose the right approach for the context, select the right actions at the right time and for the right purpose.

The research says...

The successful implementation of change to tackle one of the key issues with children's learning in primary science will be dependent on learning-centred subject leadership which can be thought of as three linked behaviours:

- *Modelling – demonstrating high-quality teaching, transmitting and infecting others with values and principles that should be part of school culture*
- *Monitoring – analysing and acting on evidence relating to pupils learning*
- *Dialogue – opportunities for teachers to talk with colleagues about learning and teaching*

Southworth and Du Quesnay, 2005, p218; Matthews, 2009, p32

BEING FOCUSSED MONITORING PROCESS

THE BEING FOCUSSED APPROACH

Throughout the monitoring process, teachers and stakeholders benefit from understanding and justifying the decisions, based upon informed professional agreement. This guidance stimulates collaboration to generate a collective understanding through professional discussion.

Debate and dialogue is encouraged with the aim of developing shared vocabulary towards a shared vision and shared commitment to a set of agreed priorities that will improve children's learning in primary science. The Being Focused Approach relies on teachers and stakeholders working together and having respectful and honest conversations about practice.

In this section, discussion prompts are outlined to stimulate professional discussions in order to assist the brokerage and transfer of knowledge between the monitoring team. The prompts are designed to complement your current practice.

Why talk about monitoring?	Professional discussion prompts
To increase stakeholder engagement in the monitoring	**The Monitoring Principles:** What matters to you?
To identify priorities for the monitoring	**The Monitoring Priorities:** Focussing on your top issues
To agree the purpose of the monitoring	**The Monitoring Question:** Defining causal relationships
To determine indicators of successful monitoring	**The Monitoring Evidence:** Being precise, clear and accurate
To select methods to monitor effectively	**The Monitoring Bank:** Having ideas and options

PROMPT A

THE MONITORING PRINCIPLES: WHAT MATTERS TO YOU?

The list of principles provide stimulus for you to identify with your colleagues the way in which monitoring takes place in your school. Do you already use (implicitly or explicitly) a set of principles to guide your monitoring practice? What might they be?

A suggested way to use the grid might be to initially complete it individually and then add in principles that you believe are relevant but missing. The list is not exhaustive but simply to get you started. Along with other stakeholders, for whom science learning at your school matters, reveal, compare and contrast the lists. What is the same, what is different? Seek to agree and rank your list of principles from absolutely essential through to desirable. By publishing your school focussed principles for monitoring primary science learning, monitoring is likely to be more effective because you are focussed on the team and increasing stakeholder engagement.

Principle to guide the monitoring of primary science learning	We have this and it is made explicit to all	We would benefit from this being made explicit to all	This would not be useful at this time
Collaborative – the process invites and supports different perspectives from a range of stakeholders. A no-blame culture is created.			
Cyclical – the process is continuous and informs the next stage, evaluating impact and informing further development.			
Inclusive – the process involves a range of diverse and representative stakeholders involved in children's science learning experiences (teachers, parents, children etc).			
Confidential – discretion is used throughout, in particular when sharing findings.			
Targeted - the process is purposeful with a clear intended area(s) of focus.			
Developmental – the process authentically moves on from previous reviews and assessments.			
Evidence-informed – a variety of evidence sources are gathered to provide information about the areas of focus.			
Proactive – the process is undertaken to mitigate against problems, isn't undertaken only as a reactive activity and is viewed to inform planning.			
Dialogic – there are ongoing shared dialogues about children's learning where the meaning of evidence is explored.			
Evaluative – the process enables assessments to be made about the value of approaches, practices and activities.			
Diagnostic – the process identifies areas of strength and development in advance of the implementation of change.			

PROMPT B

THE MONITORING PRIORITIES: FOCUSSING IN ON YOUR TOP ISSUES

All stakeholders involved in science development should engage in a shared vocabulary that is specific to children's learning in science. Refer to the 10 Key Issues report on page 19 and provided as a card set on page y. Try to sort the issues in response to the provocation questions. The questions are designed to help you to personalise the relevance of national findings to your setting.

Schools have many priorities including those beyond science. It is suggested that improvement focuses on one or two issues and that the monitoring priorities align with the issues of interest as top priorities. When an issue becomes a positive feature then it is useful to return to the 10 cards and reconsider the next focus priority.

Discussion prompts to encourage exploration in depth of the 10 key issues

Which of these issues do we understand? Which do we need to read more about?

Which issues surprise us? Which issues did we expect to be in the list?

Which of these issues link to our whole school priorities? Which are science specific?

Which have we worked on previously and made progress? Which are new to us?

Which issues might be quick to affect? Which are the toughest to change?

Which issues are definitely not an issue for this setting/school? Which are definitely an issue for this school?

Which issues need external CPD to resolve? Which issues can be addressed in house?

Which issues depend upon individual teacher confidence and experience? Which issues are relevant to all?

Agree from the professional discussion the **two issues** that are the right priorities for your school at this time.

You have now identified your monitoring priorities.

PROMPT C

THE MONITORING QUESTION: DEFINING CAUSAL RELATIONSHIPS

Seeking correlation is important to effective monitoring as by developing and defining a cause and effect question the monitoring will be purposeful.The monitoring question is sometimes described as the line of inquiry. It is useful as it puts impact at the heart of what is being monitored and not the list of activities that can sometimes become disjointed from the reason for doing it. A good monitoring question can also be used as a strong vision statement.

The 10 Key Issues by Theme and The Essential Features of Children's Learning in Primary Science are important guidance for stakeholders in discussion to form the monitoring question for their local setting. This prompt table suggests a colour coding activity whereby cause is represented in one colour and effect is a different colour. A clear monitoring question should have both colours within it.

What do you intend to change?

Discuss, agree and identify the theme to which change is being implemented.

What do you want to do more of or get better at? What do you want to change?

What impact do you expect to see?

Discuss, agree and identify the theme to which change is being implemented.

What do you want to do more of or get better at? What do you want to change?

Combine your blue and orange to create a monitoring question.

You now have your monitoring purpose.

Monitoring Questions : Examples of causal links

To what extent are lessons sequenced and developing deep learning rather than superficial learning

To what extent are enrichment opportunities beyond the lesson enhancing curiosity and interest in science lessons.

To what extent are elicitation assessment activities activating prior knowledge during lessons .

PROMPT D

THE MONITORING EVIDENCE: BEING PRECISE, CLEAR AND ACCURATE

Any form of development benefits from having clearly identified specific baseline information and precise intended success targets. Effective monitoring is focussed on improving and being able to evidence the progress along the journey.

Stakeholder's professional discussion supported by the prompts will enable purposeful evidence that can be used to tell the story of successful change. Having thought about the type of evidence there is likely to be less wasted time or unused generic findings. The evidence pre and post will articulate how you know what you think you know. It is often helpful to quantify progress when using numerical baseline evidence. Qualitative evidence (comments, narrative etc) can also be highly appropriate, yet can sometimes be ambiguous and subjective when seeking to describe whether a target has been achieved.

By having clear measurables of successful change monitoring can also inform when is the time to pause and celebrate - an aspect too often forgotten in practice. Precise and known starting points and desirable points means that monitoring is more likely to be viewed as the rigorous and fair route to formally congratulate.

Furthermore, by recognising with evidence when an issue is no longer an issue provides for the right time to move on to consider the next right issue.

How will you know? Evidence evaluator

Know how you know the starting point

Where
Where will the information be logged for use ongoing?

Who
Who is best placed to gather the evidence?
Who will interpret the evidence?

When
The start for monitoring is not necessarily the start of the school year. When might the evidence be gathered? Is there opportunity to combine the pre information gathering alongside other evidence gathering activity?

What
What do you expect to find?

Which
Which topics or lesson approaches are of the most interest?

Which children are the focus?
Year groups? Specific learner categories, e.g. gender? Pupil premium? SEND?

How
How will you do the initial evidence gathering?

Know how you will know successful change has happened

Where
Where will the evidence be reported once the target is achieved? Plan to be celebratory as appropriate – is it social media, local press, school website, governor reports, etc?

Who
Who is best placed to gather the evidence?
Who will interpret the evidence?

When
Estimate when you might be likely to see or hear successful change. This is not always at the end of an academic year. Note on the school calendar the schedule of monitoring tasks.

What
What do you expect the difference to be?
How much better?

Which
Which topics or lesson approaches are of the most interest? Which children are the focus?
Year groups? Specific learner categories, e.g. gender?
Pupil premium? SEND?

How
How will you do the follow up evidence gathering?
The pre and post do not have to be duplicate methodology. The post is often a lighter touch than the initial analysis.

You now have your monitoring actions that will be able to indicate success

PROMPT E

THE MONITORING BANK: HAVING IDEAS AND OPTIONS

The **Being Focussed Monitoring Index** cards, found on pages 20-22, are a resource that lists ways in which other schools find evidence within the generic categories: pupil voice, data analysis, teacher voice, work scrutiny, lesson look, spaces and places. The lists are intended as a stimulus to professional discussion with the aim to broaden the range of ideas, increase the creativity and find new ways that might be a better fit to need. Doing things differently can be refreshing.

Prompts to discuss when reviewing each area of focus

- Have you used this evidence-gathering approach before?
- Who else in the school might have used this approach previously?
- What is the advantage of this type of evidence gathering?
- What is the disadvantage of the approach?
- How useful was it last time the approach was used to gather evidence?
- Have you used any approaches not listed on this card?

Choose a few possible ways you might use from the bank of ideas

- Will one way be enough for your needs?
- Will two different approaches used together increase the validity of the findings?
- Will the evidence be qualitative or quantitative?
- Is the evidence likely to be reliable? Are you likely to get similar findings if the evidence was gathered in the same way on a different day?
- Is the sample size sufficient or representative of the intended audience?

The right monitoring approach(es) to find the right evidence on the right issue.

IN REVIEW

The 10 Key Issues report has had wide-scale take-up and influenced professional dialogue and practice across the sector (Bianchi 2022). Being engaged with the 'Being Focussed' project team has provided further insight into how the issues can drive school improvement.

The Being Focussed report brings new thinking to the sector on the effective monitoring of children's learning in primary science by broadening the knowledge and scope of monitoring approaches, increasing critical analysis of the selection of monitoring approaches, and focussing on outcomes from justified action choice.

The professional learning take-aways across the guidance are helpful to summarise as follows:

- Colleagues realise that monitoring should not take place in isolation or just for the sake of it. Monitoring makes a bigger difference to children's science learning when it is done collaboratively and with a shared and explicit vision.
- A myth for many colleagues in school is that monitoring is a process to check on teacher performance. Being secure and confident that the purpose of monitoring is to improve children's learning drives a clear vision and rationale for decisions associated with school intent.
- Having a clear understanding of what success will look like will allow you to anticipate the joy when children's learning in primary science is going well.
- Success of monitoring is determined by the positive change in children's learning and is not defined by having done all the actions on your list.

The authors prompt the sector to come together to review and debate our practice in classrooms, with a core focus on the experience children have when learning science in England. The guidance is provided to stimulate ongoing improvement and invites all stakeholders to take increased responsibility when planning for impact.

When undertaking regular monitoring of science learning we should be able to justify:

How the monitoring culture impacts on effectiveness

If the monitoring is focussed on the right issue

If we are confident we are using the best monitoring approach for the issue we are reviewing If the monitoring purpose is clear

If the monitoring question supports the selection of appropriate actions

How we will know when we know we've made a difference

The research says...

Monitoring is defined as a system of ongoing, interim and summary evaluation (Mertens, 2014, p48). It is based on and influences the implementation of educational policy; objectives; educational plans; determines timeliness of decision-making; provides accountability and bases for evaluation as effective monitoring of the educational process. Monitoring integrates information at all levels and provides school leadership teams and governing bodies with insight into the results of learning activity in the school, facilitating decision making by stakeholders in the learning process (Marriott and Goyder, 2009, p14). A monitoring system is much more than data collection, as it allows avoiding the 'closed loop' of poor reliability and poor quality.
Mishra, 2005, p217

THE BEING FOCUSSED RESOURCES

The 10 Key Issues card set

1

CHILDREN'S SCIENCE LEARNING IS SUPERFICIAL AND LACKS DEPTH

2

CHILDREN'S PRECONCEPTIONS AREN'T ADEQUATELY VALUED

3

CHILDREN'S SCIENCE LEARNING LACKS CHALLENGE

4

CHILDREN ARE OVERRELIANT ON TEACHER TALK AND DIRECTION, THEY LACK AUTONOMY AND INDEPENDENCE IN LEARNING SCIENCE

5

CHILDREN EXPERIENCE 'FUN' SCIENCE ACTIVITIES THAT FAIL TO DEEPEN OR DEVELOP NEW LEARNING

6

CHILDREN ARE NOT ENCOURAGED TO USE THEIR OWN CURIOSITY, SCIENTIFIC INTERESTS AND QUESTIONS IN THEIR SCIENCE LEARNING

7

CHILDREN ARE ENGAGED IN PRESCRIPTIVE PRACTICAL WORK THAT LACKS PURPOSE

8

CHILDREN DO NOT DRAW ON THEIR LEARNING FROM PRIOR SCIENTIFIC SKILLS, THEY DO NOT BUILD ON REPEATED AND REGULAR EXPERIENCES

9

CHILDREN RARELY SEE THEMSELVES, THEIR FAMILIES, COMMUNITY MEMBERS OR THEIR TEACHERS AS SCIENTISTS

10

CHILDREN DO NOT APPLY LITERACY AND NUMERACY SKILLS IN SCIENCE AT THE STANDARD THEY USE IN ENGLISH AND MATHEMATICS

Being Focussed Monitoring Index Cards

The focus	Suggested approaches to listen for learning
Pupil Voice	Survey – multiple choice
	Structured interview
	Pupil-led school tour
	Focussed listening – informal comments
	My questions: Pupil-led question stems
	Science Council/STEM Leader's minutes
	Write a letter/story imagining a perfect science lesson
	Draw a picture to challenge stereotypes
	Presenting own work
	Survey – Likert Scales (using faces with expressions)
	Survey – Likert Scales (scaling using numbers)
	Science learning diary – audio or video diary
	Collaborative mind mapping
	Card sorting activities
	Other

The focus	Suggested approaches to listen for pedagogical and curriculum insight
Teacher Voice	Survey – multiple choice
	Structured interview
	Focussed listening – informal comments
	My questionsTeacher-led question asking
	Mark books
	Annotated medium-term plans
	Staff meeting minutes
	Opinion polls – word clouds
	Card sorting activities
	Anonymous teacher voice noticeboard/ideas box: What I need... Questions I have..?
	Performance management conversations
	Other

Being Focussed Monitoring Index Cards

The focus	Suggested approaches to listen to learning in action
Lesson Looks	Lesson observation – formal
	Lesson drop in – informal
	Learning walk – snapshot
	Live video stream
	Recorded video stream
	Survey gathering – grid to track specifics
	Children stop and respond to an observer question. Check for similarity across the class – are they hearing what the teacher thinks they are hearing?
	Graphing observations e.g. pupils engaged in active learning over time
	Specific and focused peer-to-peer observations
	Pupil exit tickets – what did they learn?
	Other

The focus	Suggested approaches to look for learning
Work Scrutiny	Book/work look – generic browse
	Book/work look – focussed dip
	School tour – display board review
	Graffiti wall – a single-focus display board of pupil work from every year group on a skill progression
	Tag and find – teachers selecting against criteria or principles
	Tag and find – children identifying progressive learning show the last time you did something similar
	Collective assessed plenary task or open question
	Focussed exploration of development of working scientifically skills to look for progression
	Other

Being Focussed Monitoring Index Cards

The focus	Suggested approaches to look for learning
Data Analysis Quantitative	End of key stage reported outcomes % at expected
	Attitude surveys
	Confidence checkers
	End of unit topic trackers
	Per pupil trackers
	Parent satisfaction questionnaires
	Participation – in clubs, etc
	Library book loan of science books
	Analysing whole class responses to diagnostic questions (eg BEST)
	End of key stage sampling tests
	Data tracking of end of topic quizzes and tests
	Science learning diary – audio or video diary
	Collaborative mind mapping
	Card sorting activities
	Other

The focus	Suggested approaches to look for access and opportunity
Spaces and Places	Equipment review of quality and quantity
	Outdoor space potential and usage across the school
	Health and safety policy awareness
	Enrichment calendar scope of variation
	Enrichment calendar whole school inclusion
	Science clubs – provision and quality
	Library review – quality and quantity of science texts (unconscious bias – stereotype checking)
	Review pupil work displays for age-appropriate outcomes
	Review classroom displays for topic and skills support for learning
	Other

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