Being Focussed guidance

Following the 10 Key Issues Report, this report provides guidance on monitoring school science.

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BEING FOCUSSED:

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

Dr Lynne Bianchi, Christina Whittaker & Amanda Poole, January 2023

Who are you?

https://www.menti.com/alm9j7eby4qy

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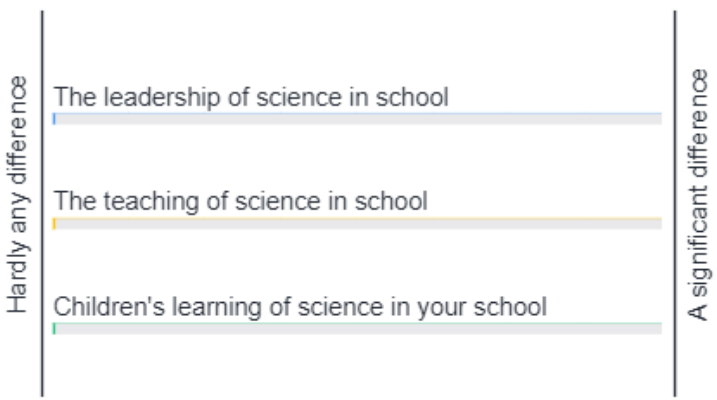
Are you someone who does or has monitored science in your school?

Which words best describe your experience of monitoring?

Waiting for answers

What difference did the monitoring you did have on:



THE 10 KEY ISSUES WITH CHILDREN'S LEARNING IN PRIMARY SCIENCE IN ENGLAND

by Dr Lynne Bianchi, Christina Whittaker & Amanda Poole

March 2021

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making physics matter

In partnership with Science Across the City

Impact

- OfSTED Research Review (2021)
- Ogden Trust resource development
- CPD mapping – SEERIH, PSQM
- Whole school curriculum review
- Informing Science Subject Review methodology (SATC, SEERIH)
- …today…you!

Journal by the Association for Science Education, Vol 91, 8-13.

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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.

10 KEY ISSUES

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

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.

In association with teachers:
Melissa Allport, Katrina Anderson, Ashley Byrne, Jane Jackson, Ash Jones, Rachel Matthews, Emily Royall and Claire Wilding-Young

Reality Check

A. Scary…

B. Little or no support…

C. Expectation to know what you are doing…

D. Get on with it and see what you find…

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

Which prompt plugs a gap for you?

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

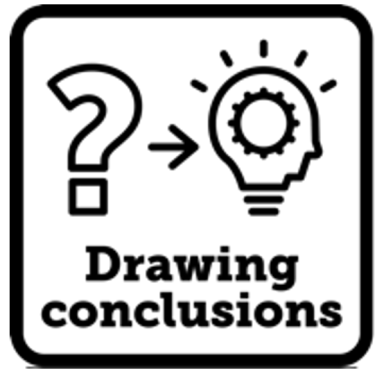

Questioning


Predicting


1
2
3
Planning


Gathering evidence


Analyse and interpret


Drawing conclusions


Share

Prompt A:

What matters to you?

Prompt A:

What matters to you?

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.			

Justifying the focus

Selecting the right issue for change

What issue(s) are there in our children's science learning?

Prompt B:

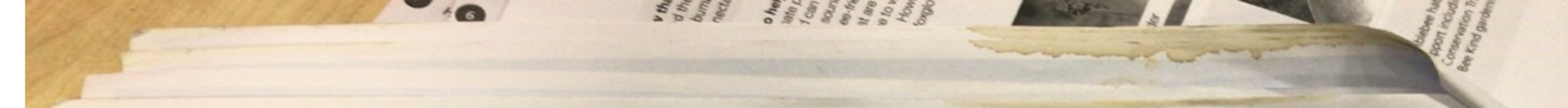
What Key Issue(s) are your top priority at this time?

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.



Are issues in isolation – No

Our key Issues

Are we looking at our issues or trying to squeeze them into a preset category?

* Really Hard to Choose *

Does this inadvertantly detract from possibilities to move forward change?

Time / Topic based work ← Time in lessons eg to teach use of skills/ application

Working Scientifically

Staff awareness of skills + progress (how to teach / our plans for)

? need to check on ⑦ moved or new ⑦

MAJOR CONCERN AT MEEE

10 KEY ISSUES

The issues are not hierarchical – each are of equal worth.

Issues identified	Implication	Observations
1 CHILDREN'S SCIENCE LEARNING IS SUPERFICIAL AND LACKS DEPTH	Children are not developing a deep understanding of the big ideas of science.	o Lesson planning lacks sequence: the 'Why this? Why now?' isn't clear o Teachers and senior leaders align success in science with vocabulary recall, often using age-inappropriate terminology o Overload of inappropriately selected science
2 CHILDREN'S PRECONCEPTIONS AREN'T ADEQUATELY VALUED	Children are not able to process or build on their prior learning.	o Staff have limited science subject knowledge relevant to their year group teaching o Assessment does not inform next step teaching o Assessment practice does not inform teaching leading to insufficient response to pupil needs o Resources are selected with insufficient professional critical analysis
3 CHILDREN'S SCIENCE LEARNING LACKS CHALLENGE	Children do not meet their full potential which limits their opportunities and aspirations.	o Teacher talk often dominates the lesson o Learning is not structured to be truly collaborative with decisions on groupings steered mainly by organisation of equipment or behaviour issues o Talk for learning is compromised o Children's work lacks value and ownership
4 CHILDREN ARE OVERRELIANT ON TEACHER TALK AND DIRECTION, THEY LACK AUTONOMY AND INDEPENDENCE IN LEARNING SCIENCE	Children's learning outcomes in science mimic those of their peers, as such not supporting individual feedback and progression.	o Teachers misunderstand the point and purpose of practical work o Inconsistent understanding of how to model working and thinking scientifically o Contexts for learning science relevant to children or of public interest are poorly utilised or seized
5 CHILDREN EXPERIENCE 'FUN' SCIENCE ACTIVITIES THAT FAIL TO DEEPEN OR DEVELOP NEW LEARNING	Children retell the 'magic' moments in science learning and aren't able to explain what they have seen or the concept explored.	o Being 'hands on' dominates being 'minds on' o Teachers are working harder than the children
6 CHILDREN ARE NOT ENCOURAGED TO USE THEIR OWN CURIOSITY, SCIENTIFIC INTERESTS AND QUESTIONS IN THEIR SCIENCE LEARNING	Children lack motivation towards working scientifically.	o National curriculum coverage is not met o Formative assessment is not focused on developing skills o Availability of equipment or its accurate use when available is ad hoc o Inappropriate scheduling or timetabling for science
7 CHILDREN ARE ENGAGED IN PRESCRIPTIVE PRACTICAL WORK THAT LACKS PURPOSE	Children experience working scientifically that is formulaic and lacks authenticity.	o Unconscious bias reinforces messages of scientific stereotypes, gender and BAME (Black, Asian and Minority Ethnic groups) o The needs of disadvantaged children are not met o Contexts for science learning are poorly utilised
8 CHILDREN DO NOT DRAW ON THEIR LEARNING FROM PRIOR SCIENTIFIC SKILLS, THEY DO NOT BUILD ON REPEATED AND REGULAR EXPERIENCES	Children have gaps as they move to the next phase of learning.	o Limited opportunities for children to transfer, practise and embed skills
9 CHILDREN RARELY SEE THEMSELVES, THEIR FAMILIES, COMMUNITY MEMBERS OR THEIR TEACHERS AS SCIENTISTS	Children believe that science is about other people making a difference, not them.	
10 CHILDREN DO NOT APPLY LITERACY AND NUMERACY SKILLS IN SCIENCE AT THE STANDARD THEY USE IN ENGLISH AND MATHEMATICS	Children fail to see the interconnectedness of their science learning.	

Justifying intended success

Visioning the intended outcomes for children's science learning

What do you want children's science learning to be like when improved?

What will success look like?

The Essential Features of Children's Learning in Primary Science

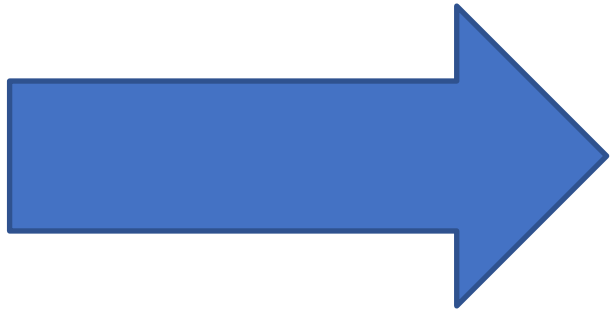
Key features related to the original 10 Key Issues report	Observations Children's science learning is going well when...
Children's science learning has depth	• Children are aware of where the lesson fits, why they are doing it and what comes next. • Children discuss learning using scientific vocabulary 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 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).

Justifying the monitoring question

Defining the cause and effect

What will we change and how will we measure the difference it makes?

The observation threw out other issues, that were different from the hunches - in particular Issue 10. We observed pupils using Newton meters, however they were less secure with the scale to be able to read the measurements accurately. We questioned ourselves about the extent to which there should be alignment between Maths and Science, as the numeracy skills were potentially holding back the science enquiry.



We need to consider whether and how maths skills should be highlighted and aligned to science topics. The challenge with the topic-based approach will need to be overcome as it’s not easy to move maths or science lessons around as it disrupts the topic itself.

Prompt C:

What is the relationship you're focusing on?

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.

10 KEY ISSUES

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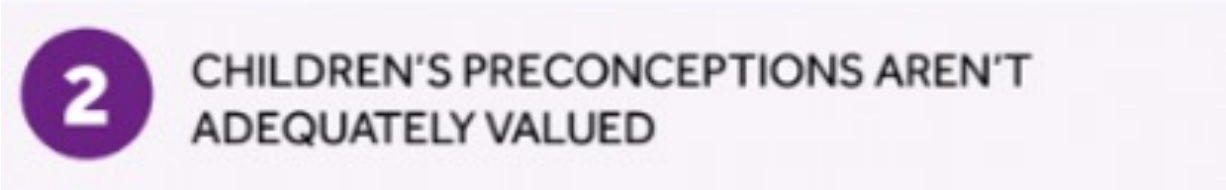
What's the monitoring question you're currently seeking to answer?



What do you intend to change?

What impact do you expect to see?

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

What do you intend to change?

What impact do you expect to see?

Justifying the baseline

Choosing the right monitoring approach

What approaches are best to gather evidence about where we are now with the focussed issue(s)?

Prompt D:

How will you know you have been successful?

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

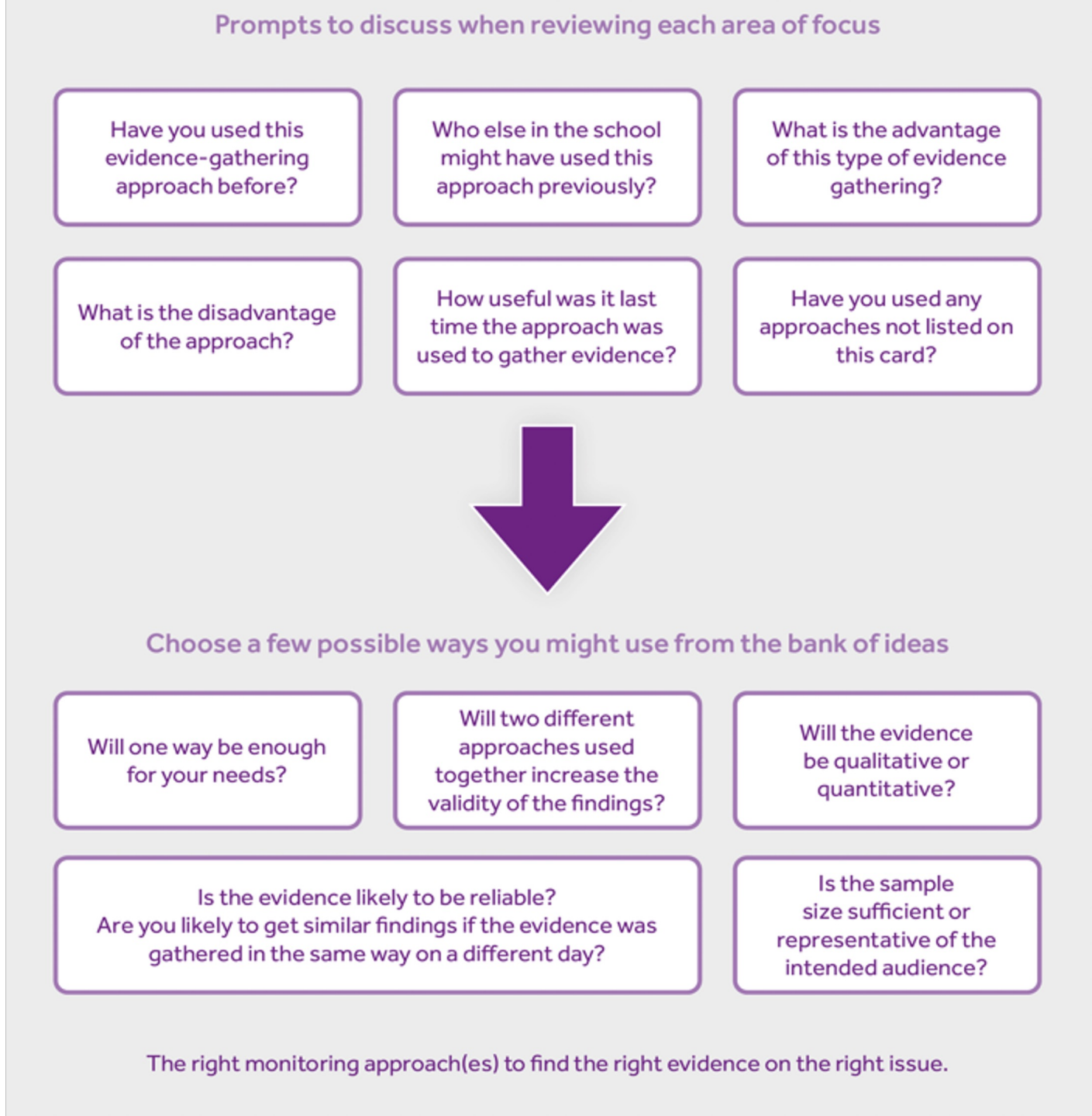
Justifying the action

Choosing the right tasks

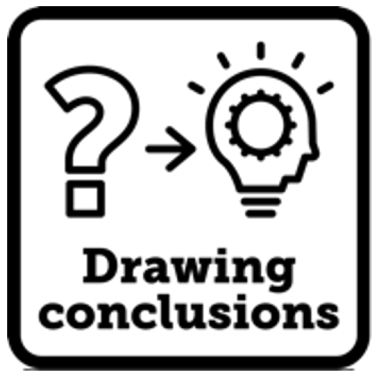
What is/are the best thing(s) to do?

Prompt E:

What ideas and options should we use?



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

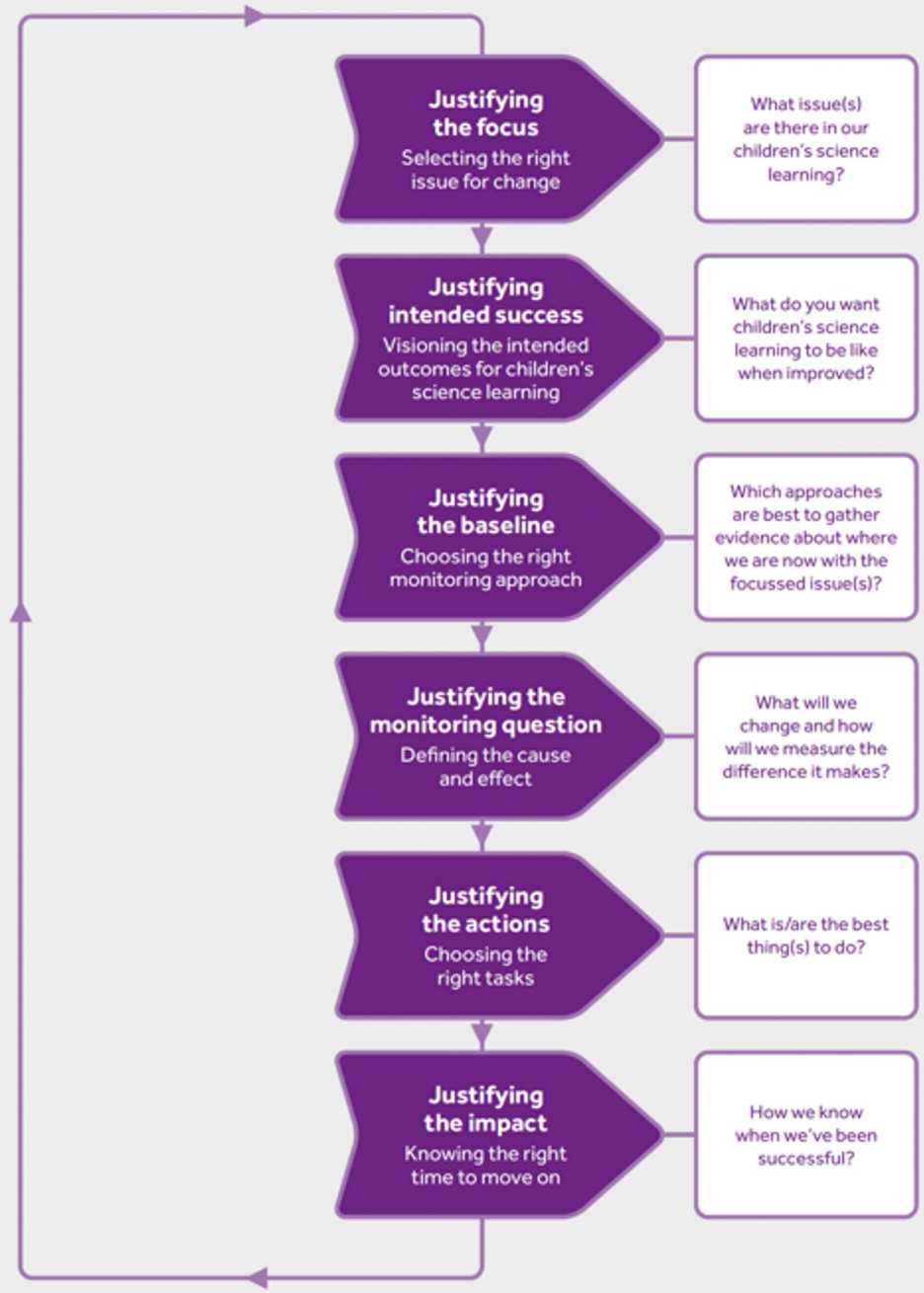


Justifying the impact

Knowing the right time to move on

How do we know when we have been successful?

BEING FOCUSSED MONITORING PROCESS



BEING FOCUSSED MONITORING PROCESS

Justifying the culture
Creating the right environment for subject improvement

Justifying the focus
Selecting the right issue for change
→ What issue(s) are there in our children's science learning?

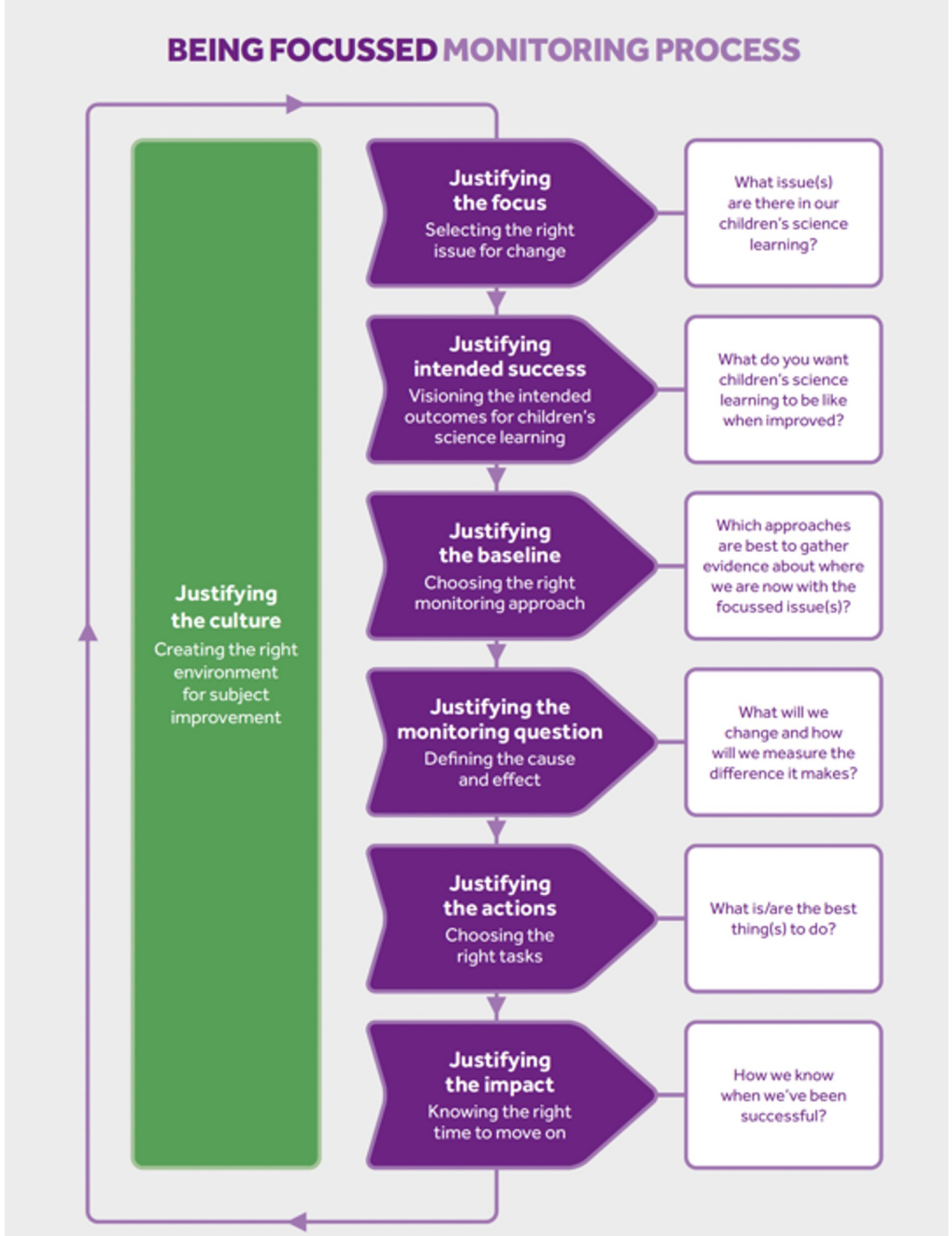
Justifying intended success
Visioning the intended outcomes for children's science learning
→ What do you want children's science learning to be like when improved?

Justifying the baseline
Choosing the right monitoring approach
→ Which approaches are best to gather evidence about where we are now with the focussed issue(s)?

Justifying the monitoring question
Defining the cause and effect
→ What will we change and how will we measure the difference it makes?

Justifying the actions
Choosing the right tasks
→ What is/are the best thing(s) to do?

Justifying the impact
Knowing the right time to move on
→ How we know when we've been successful?



- A clear **process** to work through that supports whole-school **improvement of children's science learning**.
- **Focussed** on the right issues at the right time in the right way - that will really make a difference.
- Builds **confidence through professional dialogue** using a cyclical process focussed on justified choices and approaches based on where you are at present, where you want to be in the future and how you are going to get there.

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

Professional Dialogue

What’s the main take away for you?

https://www.menti.com/alm9j7eby4qy

Join at menti.com use code 8565 9070

Which prompt plugs a gap for you?

Why?

Now what?

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- Ash Jones
- Rachel Matthews
- Emily Royall
- Claire Wilding-Young
- Steve Marsland
- Deborah Mason

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Stay part of the dialogue about children's learning in primary science

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A response to the Ofsted *Finding the Optimum* report: implications for practice in primary science

Jane Turner, Prof Lynne Bianchi and Dr Sarah Earle

May 2023

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