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Monitoring practical science in schools and colleges

Appendix 5: School Staff Focus Groups and Telephone Interviews

Durham University

Prepared for the Gatsby Charitable Foundation and the Wellcome Trust

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2 School Staff Focus Group and telephone interview questions – Year 1

	Topic	Suggested questions	Probe for	Comments
1.	<p>Priority and status of science</p> <p>Priority and status of practical work within science</p>	<ul style="list-style-type: none"> • How would you describe the status and priority of science within your school/college? • Is science practical work supported? • Do you consider practical work an important contribution to the status of science? • What would be your priority if you could increase the budget? 	<p>School leadership support for science – evidence either way</p> <p>Value of examination results on status / priority</p> <p>Pupil premium funds allocated to science</p> <p>Budget sufficient for all planned practical work</p> <p>Technical support level maintained</p> <p>All departments (biology, chemistry, physics, any others, e.g. electronics) give practical work similar status</p> <p>Students valuing practical work</p>	<p>Some details could be obtained from documents</p> <p>Ask why</p>
2.	<p>Importance of practical work in science</p>	<p>Why is practical work important/ not important in science?</p>	<p>Trains students' scientific method / investigation / inquiry / skills</p> <p>Authentic experience of "being a scientist"</p> <p>Learning vs not learning science concepts</p> <p>For examination requirements only</p> <p>Expensive but worthwhile vs Too expensive for little outcome</p> <p>Varying importance across Key Stages</p>	<p>See continuum below "Importance of practical work", ask the group to decide where the Department lies on the continuum</p>

3.	Examples of practical work	Describe a piece of practical work in science that illustrates the <i>most typical</i> / <i>“best”</i> example of your practice.	(If time) probe for an example at each Key Stage Probe why it’s the “most typical/best” (not just teachers’ / technicians’ favourite)	May be hard to get agreement Ask for worksheet / resource to illustrate
4.	How is practical work in science taught?	What factors influence how practical work teaching is organised and delivered? Changes for next year: If any, what are these and why are they happening?	Ability groups: e.g. high ability gets more / less practical work vs low ability gets more /less practical work Key Stages: KS3 lots of practical work vs KS4 / 5 less practical work Subjects: Variations between biology / chemistry / physics / other Teachers: All have confidence and knowledge for all practical activities vs needing support – how is this provided? Context: student behaviour / time of day / room available / amount of lesson time / technical support	Try to get an overview of practices in the school/ college
5.	Ethos for practical work in science	What ethos drives the experiments / practical activities your students do? Changes for next year: If any, what are these and why are they happening?	Fixed instructions vs open-ended What is their position? Experiments needed for examinations vs all practical work has purpose How do students record practical work– formal written report / informal discussion? What happens if a student has an idea for a new experiment? What happens if a teacher / technician has an idea for a new experiment?	See continuum “Ethos for practical work” below, ask the group to decide where the department lies on the continuum

			Extent of shared opinion on this topic?	
6.	Facilities for practical work	<p>Please describe the facilities you have for teaching science practical work.</p> <p>Changes for next year: If any, what are these and why are they happening?</p>	<p>Excellent / generally good / average for the area/ poor</p> <p>Rooms allocated to Key stages / subjects / individual teachers</p> <p>Perceptions about how quality of facilities relates to quality of practical work, e.g. is a good lab vital? Can good practical work be done in a poor quality lab?</p> <p>What type of practical work can be done in the best / worst lab?</p>	Take photo of best / worst labs if possible.
7.	Preparation for next phase	Are students prepared for science practical work in the next phase of their education?	<p>Students working in groups / pairs / individually</p> <p>Students with hands-on experience of equipment / chemicals vs only knowing <i>in theory</i> / by watching demonstrations</p> <p>Why do participants think in the way they describe?</p>	Qualify question depending on key stages in school/ college

Ethos for practical work

Students carry out most experiments by following instructions to arrive at pre-determined outcomes.

Students carry out most experiments as open-ended inquiries or investigations.

Importance of practical work

To ensure students
get good/excellent
grades in
qualifications.

To learn science
creatively,
“becoming a
scientist”.

3 School Staff Focus Group and Telephone Interview questions – Year 2

General comments:

- The aim of the focus groups in year 2 is to focus on changes from last year
- Wherever possible, please relate the discussions you have to the year 2 survey responses from the school

	Topic	Suggested questions	Probe for	Comments
1	<p>Priority and status of science</p> <p>Priority and status of practical work within science</p>	<ul style="list-style-type: none"> • How would you describe the status and priority of science within your school/college? • Has this changed in the last year? If so, how? • Is science practical work supported? • Do you consider practical work an important contribution to the status of science? 	<p>School leadership support for science – evidence either way</p> <p>Value of examination results on status / priority</p> <p>Explore reasons for changes</p> <p>Pupil premium funds allocated to science</p> <p>Budget sufficient for all planned practical work</p> <p>Technical support level maintained</p> <p>All departments (biology, chemistry, physics, any others, e.g. electronics) give practical work similar status</p> <p>Students valuing practical work</p>	<p>Some details could be obtained from documents</p> <p>Ask why</p>
2.	<p>Importance of practical work in science</p>	<ul style="list-style-type: none"> • Why is practical work important/ not important in science? • Have your views about the importance of practical work changed in the last twelve months? If so, how? 	<p>Trains students’ scientific method / investigation / inquiry / skills</p> <p>Authentic experience of “being a scientist”</p> <p>Learning vs not learning science concepts</p>	<p>See continuum below “Importance of practical work”, ask the group to decide where the</p>

			<p>For examination requirements only</p> <p>Expensive but worthwhile vs Too expensive for little outcome</p> <p>Varying importance across Key Stages</p>	<p>Department lies on the continuum</p>
3.	Budget for science	<ul style="list-style-type: none"> • Has your budget for science changed? • Have your priorities for spending your budget changed in the last year? If so, how? • What would be your priority if you could increase the budget? • How is the budget distributed across the sciences? 	<p>Reasons needed for any changes</p> <p>Explore priorities – last year v this year</p> <p>i.e. what would departments like to do vs what they actually can do with their funds?</p> <p>Are any one subject / age group favoured over any others? If so which and why? Explore perceptions of colleagues</p>	<p>Note these questions should pick up differences between school types</p>
4.	Examples of practical work	<ul style="list-style-type: none"> • Describe a piece of practical work in science that illustrates the <i>most typical</i> / “best” example of your practice. • Do you have any examples of practical work that occur outside the laboratory? • If so, what are these? 	<p>(If time) probe for an example at each Key Stage</p> <p>Probe why it’s the “most typical/best” (not just teachers’ / technicians’ favourite)</p> <p>Explore by subject (e.g. “just” biology fieldwork, or university/employer visits for all sciences)</p> <p>Explore by age group</p> <p>Explore by visitor to department/school</p>	<p>May be hard to get agreement</p> <p>Ask for worksheet / resource to illustrate</p>
5.	How is practical work in science taught?	<ul style="list-style-type: none"> • What factors influence how practical work teaching is organised and delivered? • Have any changes occurred at any key stage since last year? Please explain. • Are all sciences treated equally? • Has the school previously followed any very prescribed curricula for practical work (e.g Salters A level etc)? Are they 	<p>Ability groups: e.g. high ability gets more / less practical work vs low ability gets more / less practical work</p> <p>Explore reasons for changes</p> <p>Does lesson duration make a difference to the type of practical science that is carried out?</p>	<p>Try to get an overview of practices in the school/ college</p>

		<p>continuing using these even though the curriculum has changed?</p> <ul style="list-style-type: none"> Please describe the professional development that colleagues have experienced in the last 12 months. 	<p>Key Stages: KS3 lots of practical work vs KS4 / 5 less practical work</p> <p>Are independent projects or independent practical work carried out? Can they give examples? Are extended projects or practical work carried out, if so, what form does it take? Is more independent and/or project/problem based learning carried out at KS3 than KS4/5? If so, why? Has the amount of independent and/or extended project/problem based learning changed since last year?</p> <p>Subjects: Variations between biology / chemistry / physics / other</p> <p>Teachers: All have confidence and knowledge for all practical activities vs needing support – how is this provided?</p> <p>Context: Student behaviour / time of day / room available / amount of lesson time / technical support Explore if this is just examination specification related, and / or other objectives – if so what are these? Connections to teaching specific topics/ experiments etc.</p>	
6.	Ethos for practical work in science	<ul style="list-style-type: none"> What ethos drives the experiments / practical activities your students do? Have any changes occurred at any key stage since last year? Please explain. 	<p>Fixed instructions vs open-ended What is their position?</p> <p>Experiments needed for examinations vs all practical work has purpose</p> <p>Explore reasons for changes</p> <p>How do students record practical work– formal written report / informal discussion?</p>	<p>See continuum “Ethos for practical work” below, ask the group to decide where the department lies on the continuum</p>

			<p>What happens if a student has an idea for a new experiment?</p> <p>What happens if a teacher / technician has an idea for a new experiment?</p> <p>Extent of shared opinion on this topic?</p>	
7.	Facilities for practical work	<ul style="list-style-type: none"> Please describe the facilities you have for teaching science practical work. Have any changes occurred since last year? Please explain. To what extent do students use their own equipment for practical work, e.g. mobiles, watches, ipads, pcs? Have any changes occurred to risk assessments in the last 12 months? Have there been any changes to technician support in the last 12 months? 	<p>Excellent / generally good / average for the area / poor</p> <p>Rooms allocated to Key stages / subjects / individual teachers</p> <p>Perceptions about how quality of facilities relates to quality of practical work, e.g. is a good lab vital? Can good practical work be done in a poor quality lab?</p> <p>What type of practical work can be done in the best / worst lab?</p> <p>Explore what is done – do students supplement resources?</p> <p>Examples of activities using students' equipment</p> <p>Establish yes /no, then explore (note there is no technician survey this year)</p> <p>If the head of science survey responses indicated that technician support has changed since last year, probe this in more detail as to the reasons for the change. If no head of science response was provided, discuss whether there has been a change.</p>	<p>Take photo of best / worst labs if possible.</p> <p>Ask for examples</p> <p>Ask for example if not too hard to get</p>
8.	Preparation for next phase	<ul style="list-style-type: none"> Are students prepared for science practical work in the next phase of their education? Do you think the quality of their preparation has changed since last 	<p>Students working in groups / pairs / individually</p> <p>Students with hands-on experience of equipment / chemicals vs only knowing <i>in theory</i> / by watching demonstrations</p> <p>Why do participants think in the way they describe?</p>	<p>Qualify question depending on key stages in school/ college</p>

		year? If so, how? And why has this change occurred?		
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Ethos for practical work

Students carry out most experiments by following instructions to arrive at pre-determined outcomes.

Students carry out most experiments as open-ended inquiries or investigations.

Importance of practical work

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4 School Staff Focus Group and Telephone Interview questions – Year 3

General comments:

- The aim of the focus groups in year 3 is to **focus on changes** from last year
- Wherever possible, please relate the discussions you have to the year 3 survey responses from the school

	Topic	Suggested questions	Probe for	Comments
1.	<p>Priority and status of science</p> <p>Priority and status of practical work within science</p>	<ul style="list-style-type: none"> • How would you describe the status and priority of science within your school/college? • Has this changed in the last year? If so, how? • Is science practical work supported? • Do you consider practical work an important contribution to the status of science? 	<p>School leadership support for science – evidence either way</p> <p>Value of examination results on status / priority</p> <p>Explore reasons for changes</p> <p>Budget sufficient for all planned practical work</p> <p>Technical support level maintained</p> <p>All departments (biology, chemistry, physics, any others, e.g. electronics) give practical work similar status</p> <p>Students valuing practical work</p>	<p>Some details could be obtained from documents</p> <p>Ask why</p>
2.	<p>Importance of practical work in science</p>	<ul style="list-style-type: none"> • Why is practical work important/ not important in science? • Have your views about the importance of practical work changed in the last twelve months? If so, how? 	<p>Trains students’ scientific method / investigation / inquiry / skills</p> <p>Authentic experience of “being a scientist”</p> <p>Learning vs not learning science concepts</p> <p>For examination requirements only</p> <p>Expensive but worthwhile vs Too expensive for little outcome</p>	<p>See continuum below “Importance of practical work”, ask the group to decide where the Department lies on the continuum</p>

			Varying importance across Key Stages	If AS/A2 are offered please explore these for post-16
3.	Budget for science	<ul style="list-style-type: none"> • Has your budget for science changed in the last twelve months? • Have your priorities for spending your budget changed in the last year? If so, how? • What would be your priority if you could increase the budget? • How is the budget distributed across the sciences? 	<p>Reasons needed for any changes</p> <p>Pupil premium funds allocated to science</p> <p>Explore priorities – last year v this year</p> <p>i.e. what would departments like to do vs what they actually can do with their funds?</p> <p>Is any one subject / age group favoured over any others? If so which and why? Explore perceptions of colleagues</p> <p>Have they felt that they have had to buy enough equipment so that all classes can do experiments simultaneously (e.g. for GCSE ‘required’ practicals), or can they make arrangements so that they can do with fewer sets of equipment?</p> <p>Do they see the current level of expenditure as something that will change?</p>	Note these questions should pick up differences between school types
4.	Practical work “in practice”	<ul style="list-style-type: none"> • Has the practical work you carry out changed in the last twelve months? If so, why? • Has the quality of the practical work changed? 	<p>What is included now / dropped from previous years?</p> <p>Is the amount of practical work the same/ more / less than previously?</p> <p>Explain any changes – explore possible “barriers”, e.g. extra content, resourcing, staffing changes</p> <p>i.e. in terms of “quality of student experience”</p> <p>STEM clubs are of particular interest. Is the practical work in STEM clubs etc. different from lessons and if so, why?</p>	Please explore for GCSE in all schools and AS and A2 where offered

		<ul style="list-style-type: none"> • Do you have any examples of practical work that occur outside the laboratory? • If so, what are these? • How are staff teaching GCSE/ AS /A2 interpreting 'required'/'core' practicals? 	<p>Are students undertaking "hands on" practical work for all 'required' GCSE/AS/A2 practical activities? Are some taught purely as theory? Do staff think that to pass written exams that students need to have done ALL the 'required' practicals? Are they teaching the practicals in any particular order? Do all classes do the practicals at the same time?</p>	
5.	<p>How is practical work in science taught?</p>	<ul style="list-style-type: none"> • What factors influence how practical work teaching is organised and delivered? • Have any changes occurred at any key stage since last year? Please explain. • Has the school previously followed any very prescribed curricula for practical work (e.g. Salters A level etc.)? Are they continuing to use these even though the curriculum has changed? 	<p>With the recent changes at GCSE, is practical work given the same amount of time as previously? Are there differences in practical work time given to different ability groups? Can they give examples of differences?</p> <p>Explore reasons for changes</p> <p>Does lesson duration make a difference to the type of practical science that is carried out?</p> <p>Key Stages: KS3 lots of practical work vs KS4 / 5 less practical work</p> <p>Is open-ended practical work carried out? Has this changed in the last twelve months? Can they give examples?</p> <p>Is extended practical work (more than 2 weeks of lesson time in duration) carried out, if so, what form does it take?</p> <p>Is more open-ended and/or project/problem based learning carried out at KS3 than KS4/5? If so, why?</p> <p>Has the amount of open-ended and/or extended project/problem based learning changed since last year?</p> <p>Subjects: Variations between biology / chemistry / physics / other</p>	<p>Try to get an overview of practices in the school/ college</p>

		<ul style="list-style-type: none"> Please describe the professional development that colleagues have experienced in the last 12 months. 	<p>Teachers: All have confidence and knowledge for all practical activities vs needing support – how is this provided?</p> <p>What in-house /external professional development relating to practical work is / has been provided? What opportunities (i.e. informal professional development) for sharing expertise are provided/ occur?</p> <p>Context: Student behaviour / time of day / room available / amount of lesson time / technical support</p>	<p>Try to find out where CPD comes from and how staff establish best practice.</p>
6.	Ethos for practical work in science	<ul style="list-style-type: none"> What ethos drives the experiments / practical activities your students do? Have any changes occurred at any key stage since last year? Please explain. 	<p>Explore if practical work is regarded as examination specification related only. If not what other objectives are there for doing it? Connections to teaching specific topics/ experiments etc.</p> <p>Fixed instructions vs open-ended What is their position?</p> <p>Experiments needed for examinations vs all practical work has purpose</p> <p>Explore reasons for changes</p> <p>How do students record practical work– formal written report / informal discussion?</p> <p>What happens if a student has an idea for a new experiment?</p> <p>What happens if a teacher / technician has an idea for a new experiment?</p> <p>Extent of shared opinion on this topic?</p>	<p>See continuum “Ethos for practical work” below, ask the group to decide where the department lies on the continuum</p>

7.	Facilities for practical work	<ul style="list-style-type: none"> • Have any changes occurred in the facilities you have for teaching science practical work since last year? Please explain. • To what extent do students use their own equipment for practical work, e.g. mobiles, watches, iPads, PCs? • What do technicians actually do? • Have there been any changes to technician support in the last 12 months? • We would appreciate a comment on how technicians are employed – year round/ term-time only/ full-/part-time 	<p>Excellent / generally good / average for the area / poor</p> <p>Rooms allocated to Key stages / subjects / individual teachers</p> <p>Perceptions about how quality of facilities relates to quality of practical work, e.g. is a good lab vital? Can good practical work be done in a poor quality lab?</p> <p>Ask for comments on the range of tasks and if this has changed due to curriculum changes.</p> <p>If the head of science survey responses indicated that technician support has changed since last year, probe this in more detail as to the reasons for the change. If no head of science response was provided, discuss whether there has been a change.</p> <p>Are technicians able to carry out all the tasks that they consider to be necessary for efficient running of the laboratories (e.g. annual stocktaking, ordering materials, health and safety checks, deep cleaning etc.)?</p>	<p>Take photo of best / worst labs if possible.</p> <p>This is to corroborate survey data</p>
8.	Preparation for next phase	<ul style="list-style-type: none"> • Are students prepared for science practical work in the next phase of their education? • Do you think the quality of their preparation has changed since last year? If so, how? And why has this change occurred? 	<p>Students working in groups / pairs / individually</p> <p>Students with hands-on experience of equipment / chemicals vs only knowing <i>in theory</i> / by watching demonstrations</p> <p>Why do participants think in the way they describe?</p>	<p>Qualify question depending on key stages in school/ college</p>

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