The independent evaluation of the pilot of the linked pair of GCSEs in mathematics

First interim report

Appendices

Alpha*Plus* Consultancy Ltd

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1 Methodology

1.1 Centre-based case study data

1.1.1 Centre sample

A breakdown of case study centre characteristics, together with the centre number allocated is identified in Table 1 below. For the majority of the centres this was a second visit. Of the three original centres not visited this time, two gave workloads as the reason for non-participation in the second-round of visits (C5 and C6) and one (C14) has delayed the start of the pilot. Two further case study pilot centres were recruited based on the characteristics of C5 and C6. A further OCR centre will be recruited if C14 later withdraws from the pilot.

The 14 original pilot centres (Centres 1 – 14) identified for the longitudinal case studies were selected from a total of over 250 centres to ensure coverage of the:

- Awarding organisation representation in the pilot
- type of centre
- type of centre by region
- phase of education, i.e. 11–16 and 11–18
- urban/rural.

After a first cycle of recruitment, further selected centres were invited to take part to rebalance the stratification and to ensure that selected centres were most likely to give the depth of data required.

Table 1: A breakdown of case study pilot centre characteristics

Pilot Centre Number	Type of School	Selective/ non-selective	School Category	Region	Age Range	Gender of intake	AO
1	Secondary School	Non-selective	Community	North East	11 to 16	MIXED	AQA
2	Secondary School	Non-selective	Community	South East	11 to 16	MIXED	AQA
3	Secondary Comprehensive	Non-selective	Community	South Wales	11 to 18	MIXED	WJEC
4	Secondary School	Non-selective	Voluntary Aided	East of England	11 to 18	MIXED	Edexcel
7	Secondary Comprehensive	Non-selective	Community	West Midlands	11 to 18	MIXED	OCR
8	Secondary Comprehensive	Non-selective	Community	West Midlands	11 to 16	MIXED	Edexcel
9	Independent School	Selective	Independent	East of England	7 to 18	GIRLS	OCR
10	Secondary School: Academy	Non-selective	Academy: Non-maintained	London	11 to 18	MIXED	Edexcel
11	Secondary School	Non-selective	Voluntary Aided	North West	11 to 16	MIXED	AQA
12	Secondary School	Non-selective	Community	North West	11 to 16	MIXED	Edexcel
13	Secondary Comprehensive	Non-selective	Foundation	East Midlands	11 to 18	MIXED	OCR
15	Secondary School	Non-selective	Voluntary Aided	West Midlands	11 to 16	MIXED	AQA
16	Secondary School	Non-selective	Community	Mid Wales	11 to 18	MIXED	WJEC

A breakdown of case study non-pilot centre characteristics, together with the non-pilot centre number allocated is identified in Table 2 below. Centres NP3 and NP4 were visited during the first round of data collection for the Pre-pilot Report (December 2010) when the focus was on post-16 GCSE delivery. The three schools participating this time were identified from the case study centres for the DfE independent evaluation of the impact of changes to A levels of GCSE, which includes the new specification single GCSE.

Table 2: A breakdown of case study non-pilot centre characteristics

Non-pilot Centre Number	Type of School	Selective/ non-selective	School Category	Region	Age Range	Gender of intake	Mathematics award delivered
NP1	Secondary Comprehensive	Non-selective	Foundation	South East	11 to 18	MIXED	new single
NP2	Secondary Comprehensive	Non-selective	Foundation	East of England	11 to 18	MIXED	new single
NP3	FE college	Non-selective	FE college	East of England	14+	MIXED	legacy
NP4	FE college	Non-selective	FE college	East of England	14+	MIXED	legacy
NP5	Secondary School	Non-selective	Community	West Midland	11 to 18	MIXED	legacy

1.1.2 Case study sample coverage

Table 3 below shows the roles and numbers of each role included during MLP case study pilot centre visits in spring 2011.

Table 3: Roles and numbers of each role included during MLP case study pilot centre visits in spring 2011

Pilot centre number	School/centre Category	Institution type	Location	Head of mathematics department	Mathematics teachers	Number of students	Student focus groups
1	Community School	Secondary	North East	1	2	12	2
2	Community School	Secondary	South East	1		6	1
3	Community School	Secondary & Sixth Form	South Wales	1	2	21	2
4	Voluntary Aided (denominational)	Secondary & Sixth Form	East of England	1	2	11	2
7	Community School	Secondary & Sixth Form	West Midlands	1	2	12	2
8	Community School	Secondary	West Midlands	1			
9	Independent school	Primary & Secondary (7 to 18)	East of England	1	2	9	2
10	Academy (non-maintained)	Secondary & Sixth Form	London	1	3	18	3

Pilot centre number	School/centre Category	Institution type	Location	Head of mathematics department	Mathematics teachers	Number of students	Student focus groups
11	Voluntary Aided (denominational)	Secondary	North West	1			
12	Community School	Secondary	North West	1	1		
13	Foundation School	Secondary & Sixth Form	East Midlands	1	1		
15	Voluntary Aided (denominational)	Secondary	West Midlands	1	1	5	1
16	Community School	Secondary & Sixth Form	Mid Wales	1	2	6	1
Total number of each role included				13	18	100	n/a

Table 4 below identifies the roles included during MLP case study non-pilot centre visits in spring 2011.

Table 4: Roles included during MLP case study non-pilot centre visits in spring 2011

Non-pilot centre number	School/centre Category	Institution type	Location	Head of mathematics department	Teacher of mathematics
NP1	Foundation School	Secondary	South East	1	
NP2	Foundation School	Secondary	East of England	1	1
NP5	Community School	Secondary	West Midland	1	

2 Research instruments

2.1 Observation Record

2.1.1 Section 1 – The Lesson

<table>
<tr><td colspan="2">Centre:</td><td colspan="3">Class size (state number)</td></tr>
<tr><td colspan="2" rowspan="2">Teacher:

Observer:</td><td>Total:</td><td>Girls:</td><td>Boys:</td></tr>
<tr><td colspan="2">Date:</td><td colspan="3">Class type (✓</td></tr>
<tr><td colspan="2">Time: (start and finish time 24 hour clock)</td><td colspan="2">Foundation</td><td>Higher</td></tr>
<tr><td colspan="2">Length of lesson:</td><td colspan="3">Banding (note any information on banding within group below)</td></tr>
<tr><td colspan="2">GCSE type (✓)</td><td colspan="3" rowspan="2"></td></tr>
<tr><td>Single</td><td>Linked pair</td></tr>
</table>

In this section you should document the stages of the lesson in as much detail as possible, including key events and verbatim quotes where appropriate. Important issues can be noted for the follow-up interview and the codes from the summary sheet can be used to point to these strands of mathematical activity in the lesson. Please note the length of time spent on specific stages of the lesson in the 'time' column in this way: 10.05 -10.15 or 13.30 – 13.40

Topic/learning objectives:		
Time	**Description of lesson**	**Notes/codes**
	Please use a separate row of the table for each time slot or where you are coding in the right hand column	

Other general comments (especially those not included in the table below)

Record your room layout on the reverse of this sheet. *If possible*, scan and return a hand drawn layout as opposed to reproduce it electronically.

Section 2 - Summary

Try to give your overall impressions of the lesson against the eight aspects of pedagogy by circling the most representative point on the scale. The 'better' (high score) pedagogy is listed in bold type and, where appropriate, the low end of the scale is italicised.

Code	Area of mathematics pedagogy	Low				high
Q	High-order **questioning**: opportunities for higher-order questions requiring explanation, application and synthesis rather than just *recall*	1	2	3	4	5
SC	**Stretching and challenging**: opportunities for resolving through discussion, opportunity to struggle and learn through perseverance rather than just *repeating previous success*	1	2	3	4	5
CC	**Creating connections**: encouraging identification of related concepts, supporting generalisation, transfer and recontextualisation rather than teaching and *learning topics or skills in isolation*	1	2	3	4	5
R	**Encouraging reasoning**: supporting and encouraging reasoning to get to the answer rather than *just getting the answer*	1	2	3	4	5
PS	Supporting development of strategies for investigation and **problem solving**: there is a range of skills described as problem solving, this could include understanding the mathematics required and application within a particular context (AO2) to higher level theorising (AO3).	1	2	3	4	5
V	Encouraging the recognition of the role of mathematics in everyday life, as a discipline and its historical/philosophical roots – the **value of mathematics**	1	2	3	4	5
MLE	**Making learning explicit**: supporting reflection of how and what learned	1	2	3	4	5
L	**Developing 'mathematical' language**: supporting development of mathematical language for description, modelling, framing and argument	1	2	3	4	5

2.2 Student focus group with observation (linked pair)

L2/V2/student focus group/linked pair/with observation

Student focus group following a lesson observation of the linked pair of GCSEs in mathematics

Topics for discussion

- Topic 1: reflection on the lesson
- Topic 2: the student experience
- Topic 3: student experience of the functional elements and problem solving in the linked pair of GCSE in mathematics
- Topic 4 student perception of assessment of progress
- Topic 5: assessment through examination

The student focus group will follow an observation of a mathematics lesson for the linked pair of GCSEs in mathematics. Please use your notes from the observation to encourage students to reflect on the observed lesson and then take them through the other topics and prompts. Please encourage the students to:

- Articulate the benefits (or otherwise) of the linked pair, particularly in terms of what is being learned and ways in which their confidence with mathematics is developing
- Compare the linked pair of GCSEs in mathematics with the single GCSE in mathematics if they have knowledge and/or experience of the single GCSE in mathematics (not the legacy GCSEs in mathematics). This may be as a result of their fellow students studying for the single GCSE in mathematics or family members who have studied mathematics at GCSE.

Please note that the vocabulary used here may be unfamiliar to students and it is important that you mirror the language used by the students during the focus group.

Topic 1: reflection on the lesson

Please use your notes from the observation to prompt discussion on the lesson aims, the activities and content of the lesson:

Prompts

- *how typical was the lesson?*
- *awareness of the aim or purpose of the lesson*
- *views on:*
    - *approaches used*
    - *activities used*
    - *resources used e.g. text books, worksheets, use of technology*
    - *tasks set*
    - *student groupings*
- *what was learned by each student?*

Topic 2: the student experience

Are you aware that you are studying the linked pair of GCSEs in mathematics or two GCSEs in mathematics (if students are not aware of the terminology of linked pair)?

Prompts

- *Explore understanding of why they are doing linked pair or two GCSEs in mathematics*

What do you hope/want to get from studying the linked pair of GCSEs in mathematics?

Prompts

- *mathematical skills and knowledge*
- *future aspirations for employment/ further study*
- *life skills*
- *personal fulfilment*
- *number of qualifications*
- *comparison between other GCSEs in mathematics and linked pair of GCSEs in mathematics if appropriate*

What do you find the most and least enjoyable and in what circumstances do you get the most from the linked pair of GCSEs in mathematics?

Prompts

- *ways of working i.e. group work, individual tasks*
- *topics*
- *delivery styles*
- *types of activities*
- *what are the things they seem to like/enjoy most about lessons in the linked pair of GCSEs in mathematics?*
- *what are the things they seem to like/enjoy least about lessons in the linked pair of GCSEs in mathematics?*
- *comparison between other GCSEs in mathematics and linked pair of GCSEs in mathematics if appropriate*

Do you feel there is a difference or 'jump' between the mathematics you were learning before and the mathematics you are learning now as part of the linked pair of GCSEs in mathematics?

Prompts

- *perceived changes in difficulty and demand*
- *perceived changes in terms of skills; problem solving, functionality etc*
- *changes to teaching and learning styles*
- *continuity from previous years/key stages*
- *comparison between other GCSEs in mathematics and linked pair of GCSEs in mathematics if appropriate*

What is the difference for you between methods and applications in the linked pair of GCSEs in mathematics?

Prompts

- *clarify differences – awareness of when learning which*
- *skills used/developed*
- *where functional elements sit*
- *where problem solving sits*

When do you use mathematics? Is it useful to your life and will it be in the future?

Prompts

- *mathematics in other subjects*
- *mathematics used in employment*
- *mathematics used in everyday life*

When else do you work on the linked pair of GCSEs in mathematics?

Prompts

- *additional sessions e.g. lunchtime, after school*
- *homework:*
    - *type of tasks*
    - *examples of tasks*
    - *use of technology*
    - *time taken*

Topic 3: student experience of the functional elements and problem solving in the linked pair of GCSE in mathematics

Awareness of the functional elements and problem solving aspects of the linked pair of GCSEs in mathematics. (this topic will not be posed in this way with students, but will be broken down using everyday language and examples of what is meant)

Prompts

- *students' understanding of functional elements and problem solving*
- *where the functional elements and problem solving comes in their teaching of methods and applications (ask for examples or prompt with examples)*
- *time spent on the functional elements and problem solving in lessons (proportion and balance)*
- *familiarity with functional elements and problem solving from previous years*
- *comparison between other GCSE sin mathematics and linked pair of GCSEs in mathematics if appropriate*

Topic 4: student perception of assessment of progress

How do you know how well you are doing in the linked pair of GCSEs in mathematics?

Prompts

- *actions and/or assessments conducted by the teacher*
- *assessments and tests undertaken*
- *self assessment by students*
- *feedback on homework and/or class work tasks*

How do your teachers know how well you are doing?

Prompts

- *actions and/or assessments conducted by the teacher: use of:*
    - *reflection*
    - *assessments and tests undertaken*
    - *self assessment*
    - *feedback on homework and/or class work tasks*

Who supports or helps you with your mathematics and what helps you most when you get stuck?

Prompts

- *support from individuals such as teachers, parents, other family members and peers*
- *support from resources and materials*
- *what can make mathematics better/easier/more accessible for you?*
- *When you find mathematics difficult what do you do?*
- *When you are stuck, how do you try to get unstuck?*

Topic 5: assessment through examination

Some students will have sat examinations in January 2011. Students who have not sat examinations may have had access to examination material.

How did you prepare for any examinations undertaken? Is this different to what you might have done in the past?

Prompts

- *who/what helped or provided support*
- *perceived areas for concern or extra effort*
- *amount of time taken to prepare*
- *how the teacher helped students revised for examinations in the linked pair of GCSEs in mathematics*
- *examples of the sort of things you have done **in lessons** to prepare for examinations in the linked pair of GCSEs in mathematics*
- *examples of the sort of things you have done **outside lessons** to prepare for examinations in the linked pair of GCSEs in mathematics*
- *comparison between other GCSEs in mathematics and linked pair of GCSEs in mathematics if appropriate*

What was your experience of the examinations (or exam practice and exemplars)?

Prompts

- *differences between the actual papers and what was expected*
- *perceived level of difficulty*
- *time allocated to papers/questions*
- *comparison between other GCSEs in mathematics and linked pair of GCSEs in mathematics if appropriate*

2.3 Student focus group without observation (linked pair)

L2/V2/student focus group/linked pair/without observation

Student focus group for linked pair of GCSEs in mathematics (without observation)

Topics for discussion

- Topic 1: reflection on the lesson
- Topic 2: the student experience
- Topic 3: student experience of the functional elements and problem solving in the linked pair of GCSE in mathematics
- Topic 4: student perception of assessment of progress
- Topic 5: assessment through examination

During the focus group please encourage students to reflect on studying for the linked pair of GCSEs in mathematics and then take them through the other topics and prompts. In particular we want students to:

- Articulate the benefits (or otherwise) of the linked pair, particularly in terms of what is being learned and ways in which their confidence with mathematics is developing
- Compare the linked pair of GCSEs in mathematics with the single GCSE in mathematics if they have knowledge and/or experience of the single GCSE in mathematics (not the legacy GCSEs in mathematics). This may be as a result of their fellow students studying for the single GCSE in mathematics or family members who have studied mathematics at GCSE.

Please note that the vocabulary used here may be unfamiliar to students and it is important that you mirror the language used by the students during the focus group.

Topic 1: reflection on studying the linked pair of GCSEs in mathematics

What sorts of things do you do in lessons for the linked pair of GCSEs in mathematics?

Prompts

- *ask students to take you through a typical lesson for the linked pair of GCSEs in mathematics, for example:*
  - *awareness of the aims of a lesson*
  - *how a lesson begins*
  - *use of different teaching approaches (list will be in researcher guide)*
  - *balance of whole group, small group, individual and pair work*
  - *resources used e.g. text books, worksheets, use of technology*
  - *how a lesson ends*

Topic 2: the student experience

Are you aware that you are studying the linked pair of GCSEs in mathematics or two GCSEs in mathematics (if students are not aware of the terminology of linked pair)?

Prompts

- *Explore understanding of why they are doing linked pair or two GCSEs in mathematics*

What do you hope/want to get from studying the linked pair of GCSEs in mathematics?

Prompts

- *mathematical skills and knowledge*
- *future aspirations for employment/ further study*
- *life skills*
- *personal fulfilment*
- *number of qualifications*
- *comparison between other GCSEs in mathematics and linked pair of GCSEs in mathematics if appropriate*

What do you find the most and least enjoyable and in what circumstances do you get the most from the linked pair of GCSEs in mathematics?

Prompts

- *ways of working i.e. group work, individual tasks*
- *topics*
- *delivery styles*
- *types of activities*
- *what are the things they seem to like/enjoy most about lessons in the linked pair of GCSEs in mathematics?*
- *what are the things they seem to like/enjoy least about lessons in the linked pair of GCSEs in mathematics?*
- *comparison between other GCSEs in mathematics and linked pair of GCSEs in mathematics if appropriate*

Do you feel there is a difference or 'jump' between the mathematics you were learning before and the mathematics you are learning now as part of the linked pair of GCSEs in mathematics?

Prompts

- *perceived changes in difficulty and demand*
- *perceived changes in terms of skills; problem solving, functionality etc*
- *changes to teaching and learning styles*
- *continuity from previous years/key stages*
- *comparison between other GCSEs in mathematics and linked pair of GCSEs in mathematics if appropriate*

What is the difference for you between methods and applications in the linked pair of GCSEs in mathematics?

Prompts

- *clarify differences – awareness of when learning which*
- *skills used/developed*
- *where functional elements sit*
- *where problem solving sits*

When do you use mathematics? Is it useful to your life and will it be in the future?

Prompts

- *mathematics in other subjects*
- *mathematics used in employment*
- *mathematics used in everyday life*

When else do you work on the linked pair of GCSEs in mathematics?

Prompts

- *additional sessions e.g. lunchtime, after school*
- *homework:*
  - *type of tasks*
  - *examples of tasks*
  - *use of technology*
  - *time taken*

Topic 3: student experience of the functional elements and problem solving in the linked pair of GCSE in mathematics

Awareness of the functional elements and problem solving aspects of the linked pair of GCSEs in mathematics. (This topic will not be posed in this way with students, but will be broken down using everyday language and examples of what is meant.)

Prompts

- *students' understanding of functional elements and problem solving*
- *where the functional elements and problem solving comes in their teaching of methods and applications (ask for examples or prompt with examples)*
- *time spent on the functional elements and problem solving in lessons (proportion and balance)*
- *familiarity with functional elements and problem solving from previous years*
- *comparison between other GCSE sin mathematics and linked pair of GCSEs in mathematics if appropriate*

Topic 4: student perception of assessment of progress

How do you know how well you are doing in the linked pair of GCSEs in mathematics?

Prompts

- *actions and/or assessments conducted by the teacher*
- *assessments and tests undertaken*
- *self assessment by students*
- *feedback on homework and/or class work tasks*

How do your teachers know how well you are doing?

Prompts

- *actions and/or assessments conducted by the teacher: use of:*
  - *reflection*
  - *assessments and tests undertaken*
  - *self assessment*
  - *feedback on homework and/or class work tasks*

Who supports or helps you with your mathematics and what helps you most when you get stuck?

Prompts

- *support from individuals such as teachers, parents, other family members and peers*
- *support from resources and materials*
- *what can make mathematics better/easier/more accessible for you?*
- *When you find mathematics difficult what do you do?*

- *When you are stuck, how do you try to get unstuck?*

Topic 5: assessment through examination
Some students will have sat examinations in January 2011. Students who have not sat examinations may have had access to examination material.

How did you prepare for any examinations undertaken? Is this different to what you might have done in the past?

Prompts

- *who/what helped or provided support*
- *perceived areas for concern or extra effort*
- *amount of time taken to prepare*
- *how the teacher helped students revised for examinations in the linked pair of GCSEs in mathematics*
- *examples of the sort of things you have done **in lessons** to prepare for examinations in the linked pair of GCSEs in mathematics*
- *examples of the sort of things you have done **outside lessons** to prepare for examinations in the linked pair of GCSEs in mathematics*
- *comparison between other GCSEs in mathematics and linked pair of GCSEs in mathematics if appropriate*

What was your experience of the examinations (or exam practice and exemplars)?

Prompts

- *differences between the actual papers and what was expected*
- *perceived level of difficulty*
- *time allocated to papers/questions*
- *comparison between other GCSEs in mathematics and linked pair of GCSEs in mathematics if appropriate*

Student focus group with observation (single GCSE)

L2/V2/student focus group/single GCSE/with observation

Student focus group following a lesson observation of the single GCSE in mathematics

Topics for discussion

- Topic 1: reflection on the lesson
- Topic 2: the student experience
- Topic 3: student experience of the functional elements and problem solving in the single GCSE in mathematics
- Topic 4: student perception of assessment of progress
- Topic 5: assessment through examination

The student focus group will follow an observation of a mathematics lesson for the single GCSE in mathematics. Please use your notes from the observation to encourage students to reflect on the observed lesson and then take them through the other topics and prompts. Please encourage the students to:

- Articulate the benefits (or otherwise) of the new single GCSE in mathematics, particularly in terms of what is being learned and ways in which their confidence with mathematics is developing
- Compare the single GCSE in mathematics with the linked pair of GCSEs in mathematics if they have knowledge and/or experience of the single GCSE in mathematics (not the legacy GCSEs in mathematics). This may be as a result of their fellow students studying for the single GCSE in mathematics or family members who have studied mathematics at GCSE.

Please note that the vocabulary used here may be unfamiliar to students and it is important that you mirror the language used by the students during the focus group.

Topic 1: reflection on the lesson
Please use your notes from the observation to prompt discussion on the lesson aims, the activities and content of the lesson:

Prompts

- *how typical was the lesson?*
- *awareness of the aim or purpose of the lesson*
- *views on:*
    - *approaches used*
    - *activities used*
    - *resources used e.g. text books, worksheets, use of technology*
    - *tasks set*
    - *student groupings*
- *what was learned by each student?*

Topic 2: the student experience

Are you aware that you are studying for a new GCSE in mathematics? (if not don't press too hard here)

Prompts

- *Explore understanding of the new GCSE – they may be able to compare with experience of friends or other family members who studied GCSE mathematics in the past*

What do you hope/want to get from studying the single GCSE in mathematics?

Prompts

- *mathematical skills and knowledge*
- *future aspirations for employment/ further study*
- *life skills*
- *personal fulfilment*
- *number of qualifications*
- *comparison between other GCSEs in mathematics and linked pair of GCSEs in mathematics if appropriate*

What do you find the most and least enjoyable and in what circumstances do you get the most from the single GCSE in mathematics?

Prompts

- *ways of working i.e. group work, individual tasks*
- *topics*
- *delivery styles*
- *types of activities*
- *what are the things they seem to like/enjoy most about lessons in the single GCSE in mathematics?*
- *what are the things they seem to like/enjoy least about lessons in the single GCSE in mathematics?*
- *comparison between other GCSEs in mathematics and linked pair of GCSEs in mathematics if appropriate*

Do you feel there is a difference or 'jump' between the mathematics you were learning before and the mathematics you are learning now as part of the single GCSE in mathematics?

Prompts

- *perceived changes in difficulty and demand*
- *perceived changes in terms of skills; problem solving, functionality etc*
- *changes to teaching and learning styles*
- *continuity from previous years/key stages*
- *comparison between other GCSEs in mathematics and linked pair of GCSEs in mathematics if appropriate*

When do you use mathematics? Is it useful to your life and will it be in the future?

Prompts

- *mathematics in other subjects*
- *mathematics used in employment*
- *mathematics used in everyday life*

When else do you work on the single GCSE in mathematics?

Prompts

- *additional sessions e.g. lunchtime, after school*
- *homework:*
    - *type of tasks*
    - *examples of tasks*

- *use of technology*
- *time taken*

Topic 3: student experience of the functional elements and problem solving in the single GCSE in mathematics

Awareness of the functional elements and problem solving aspects of the single GCSE in mathematics. (this topic should not be posed in this way with students, but broken down using everyday language and examples of what is meant)

Prompts

- *students' understanding of functional elements and problem solving*
- *where the functional elements and problem solving comes in their teaching of methods and applications (ask for examples or prompt with examples)*
- *time spent on the functional elements and problem solving in lessons (proportion and balance)*
- *familiarity with functional elements and problem solving from previous years*
- *comparison between other GCSE sin mathematics and linked pair of GCSEs in mathematics if appropriate*

Topic 4: student perception of assessment of progress

How do you know how well you are doing in the single GCSE in mathematics?

Prompts

- *actions and/or assessments conducted by the teacher*
- *assessments and tests undertaken*
- *self assessment by students*
- *feedback on homework and/or class work tasks*

How do your teachers know how well you are doing?

Prompts

- *actions and/or assessments conducted by the teacher: use of:*
  - *reflection*
  - *assessments and tests undertaken*
  - *self assessment*
  - *feedback on homework and/or class work tasks*

Who supports or helps you with your mathematics and what helps you most when you get stuck?

Prompts

- *support from individuals such as teachers, parents, other family members and peers*
- *support from resources and materials*
- *what can make mathematics better/easier/more accessible for you?*
- *When you find mathematics difficult what do you do?*
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Topic 5: assessment through examination

Some students will have sat examinations in January 2011. Students who have not sat examinations may have had access to examination material.

How did you prepare for any examinations undertaken? Is this different to what you might have done in the past?

Prompts

- *who/what helped or provided support*
- *perceived areas for concern or extra effort*
- *amount of time taken to prepare*
- *how the teacher helped students revise for examinations in the single GCSE in mathematics*
- *examples of the sort of things you have done **in lessons** to prepare for examinations in the single GCSE in mathematics*
- *examples of the sort of things you have done **outside lessons** to prepare for examinations in the single GCSE in mathematics*
- *comparison between other GCSEs in mathematics and linked pair of GCSEs in mathematics if appropriate*

What was your experience of the examinations (or exam practice and exemplars)?

Prompts

- *differences between the actual papers and what was expected*
- *perceived level of difficulty*
- *time allocated to papers/questions*
- *comparison between other GCSEs in mathematics and linked pair of GCSEs in mathematics if appropriate*

2.4 Student focus group without observation (single GCSE)

L2/V2/student focus group/single GCSE/without observation

Student focus group for the single GCSE in mathematics (without observation)

Topics for discussion

- Topic 1: reflection on studying for the single GCSE in mathematics
- Topic 2: the student experience
- Topic 3: student experience of the functional elements and problem solving in the single GCSE in mathematics
- Topic 4 student perception of assessment of progress
- Topic 5: assessment through examination

During the focus group please encourage students to reflect on studying for the single GCSE in mathematics and then take them through the other topics and prompts. In particular we want students to:

- Articulate the benefits (or otherwise) of the new single GCSE in mathematics, particularly in terms of what is being learned and ways in which their confidence with mathematics is developing

- Compare the single GCSE in mathematics with the linked pair of GCSEs in mathematics if they have knowledge and/or experience of the single GCSE in mathematics (not the legacy GCSEs in mathematics). This may be as a result of their fellow students studying for the single GCSE in mathematics or family members who have studied mathematics at GCSE.

Please note that the vocabulary used here may be unfamiliar to students and it is important that you mirror the language used by the students during the focus group.

Topic 1: reflection on studying for the single GCSE in mathematics
What sorts of things do you do in lessons for the single GCSE in mathematics?

Prompts

- *ask students to take you through a typical lesson for the linked pair of GCSEs in mathematics, for example:*
  - *awareness of the aims of a lesson*
  - *how a lesson begins*
  - *use of different teaching approaches (list will be in researcher guide)*
  - *balance of whole group, small group, individual and pair work*
  - *resources used e.g. text books, worksheets, use of technology*
  - *how a lesson ends*

Topic 2: the student experience

Are you aware that you are studying for a new GCSE in mathematics? (if not don't press too hard here)

Prompts

- *Explore understanding of the new GCSE – they may be able to compare with experience of friends or other family members who studied GCSE mathematics in the past*

What do you hope/want to get from studying the single GCSE in mathematics?

Prompts

- *mathematical skills and knowledge*
- *future aspirations for employment/ further study*
- *life skills*
- *personal fulfilment*
- *number of qualifications*
- *comparison between other GCSEs in mathematics and linked pair of GCSEs in mathematics if appropriate*

What do you find the most and least enjoyable and in what circumstances do you get the most from the single GCSE in mathematics?

Prompts

- *ways of working i.e. group work, individual tasks*
- *topics*
- *delivery styles*
- *types of activities*
- *what are the things they seem to like/enjoy most about lessons in the single GCSE in mathematics?*
- *what are the things they seem to like/enjoy least about lessons in the single GCSE in mathematics?*
- *comparison between other GCSEs in mathematics and linked pair of GCSEs in mathematics if appropriate*

Do you feel there is a difference or 'jump' between the mathematics you were learning before and the mathematics you are learning now as part of the single GCSE in mathematics?

Prompts

- *perceived changes in difficulty and demand*
- *perceived changes in terms of skills; problem solving, functionality etc*
- *changes to teaching and learning styles*
- *continuity from previous years/key stages*
- *comparison between other GCSEs in mathematics and linked pair of GCSEs in mathematics if appropriate*

When do you use mathematics? Is it useful to your life and will it be in the future?

Prompts

- *mathematics in other subjects*
- *mathematics used in employment*
- *mathematics used in everyday life*

When else do you work on the single GCSE in mathematics?

Prompts

- *additional sessions e.g. lunchtime, after school*
- *homework:*
  - *type of tasks*
  - *examples of tasks*
  - *use of technology*

- *time taken*

Topic 3: student experience of the functional elements and problem solving in the single GCSE in mathematics

Awareness of the functional elements and problem solving aspects of the single GCSE in mathematics. (this topic should not be posed in this way with students, but broken down using everyday language and examples of what is meant)

Prompts

- *students' understanding of functional elements and problem solving*
- *where the functional elements and problem solving comes in their teaching of methods and applications (ask for examples or prompt with examples)*
- *time spent on the functional elements and problem solving in lessons (proportion and balance)*
- *familiarity with functional elements and problem solving from previous years*
- *comparison between other GCSE sin mathematics and linked pair of GCSEs in mathematics if appropriate*

Topic 4: student perception of assessment of progress

How do you know how well you are doing in the single GCSE in mathematics?

Prompts

- *actions and/or assessments conducted by the teacher*
- *assessments and tests undertaken*
- *self assessment by students*
- *feedback on homework and/or class work tasks*

How do your teachers know how well you are doing?

Prompts

- *actions and/or assessments conducted by the teacher: use of:*
  - *reflection*
  - *assessments and tests undertaken*
  - *self assessment*
  - *feedback on homework and/or class work tasks*

Who supports or helps you with your mathematics and what helps you most when you get stuck?

Prompts

- *support from individuals such as teachers, parents, other family members and peers*
- *support from resources and materials*
- *what can make mathematics better/easier/more accessible for you?*
- *When you find mathematics difficult what do you do?*
- *When you are stuck, how do you try to get unstuck?*

Topic 5: assessment through examination

Some students will have sat examinations in January 2011. Students who have not sat examinations may have had access to examination material.

How did you prepare for any examinations undertaken? Is this different to what you might have done in the past?

Prompts

- *who/what helped or provided support*
- *perceived areas for concern or extra effort*
- *amount of time taken to prepare*
- *how the teacher helped students revise for examinations in the single GCSE in mathematics*
- *examples of the sort of things you have done **in lessons** to prepare for examinations in the single GCSE in mathematics*
- *examples of the sort of things you have done **outside lessons** to prepare for examinations in the single GCSE in mathematics*
- *comparison between other GCSEs in mathematics and linked pair of GCSEs in mathematics if appropriate*

What was your experience of the examinations (or exam practice and exemplars)?

Prompts

- *differences between the actual papers and what was expected*
- *perceived level of difficulty*
- *time allocated to papers/questions*
- *comparison between other GCSEs in mathematics and linked pair of GCSEs in mathematics if appropriate*

2.5 Teacher interview with observation (linked pair)

L2/V2/teacher interview/linked pair/<u>with observation</u>

Teacher interviews following an observation of a linked pair in GCSE mathematics lesson

Topics for discussion

- Topic 1: reflection on the lesson
- Topic 2: teacher experience of the functional elements and problem solving in the linked pair of GCSE in mathematics
- Topic 3: teacher perception of student experience of progress
- Topic 4: teacher perception of assessment of progress
- Topic 5: assessment through examination
- Topic 6: support and development for teachers

The interview of the teacher will follow an observation of a linked pair of GCSEs in mathematics lesson. Please encourage teachers to reflect on the observed lesson and then take them through the other topics and prompts. In particular we want teachers to:

- Articulate the benefits (or otherwise) of the linked pair, particularly in terms of what is being learned and ways in which student confidence with mathematics is developing
- Compare the linked pair of GCSEs in mathematics with the single GCSE in mathematics if they have knowledge and/or experience of the single GCSE in mathematics (not the legacy GCSEs in mathematics)

Topic 1: reflection on the lesson

Please use your notes from the observation to prompt discussion on the lesson aims, the activities and content of the lesson:

Prompts

- *how typical was the lesson?*
- *why choices were made about:*
  - *approaches used*
  - *activities used*
  - *resources used*
  - *tasks set*
  - *student groupings*
- *what was learned by the students?*
- *did the teacher achieve his/her aims?*

Do you feel there is a difference or 'jump' between the GCSE(s) in mathematics you were teaching before and the mathematics you are teaching now as part of the linked pair of GCSEs in mathematics? Is there the same 'jump' in the new single GCSE in mathematics?

Prompts

- *perceived changes in difficulty and demand*
- *perceived changes in terms of skills; problem solving, functionality etc*

- *changes to teaching and learning styles*
- *continuity from previous years/key stages*
- *comparison between single GCSE in mathematics and linked pair of GCSEs in mathematics*

Please ask: **Whether they perceive the amount of content in the single GCSE to be more comparable to two GCSEs** (in the same way as English literature and English language or two GCSEs in science)

What are the main differences for you between methods in mathematics and application of mathematics in the linked pair of GCSE in mathematics? What do students learn in each?

Prompts

- *topics*
- *skills used/developed*
- *how problem solving approached in methods and applications*
- *how functional elements approached in methods and applications*
- *comparison between single GCSE in mathematics and linked pair of GCSEs in mathematics*

Topic 2: teacher experience of the functional elements and problem solving in the linked pair of GCSE in mathematics

How, if at all, has the increased emphasis on functional elements and problem solving in the new KS4 programme of study led to changes in your curriculum and the way that you teach mathematics in the linked pair of GCSEs in mathematics?

Prompts

- *teacher's understanding of functional elements and problem solving*
- *where the functional elements and problem solving comes in their teaching of methods and applications (ask for examples)*
- *time spent on the functional elements and problem solving in lessons (proportion and balance)*
- *examples of ways in which teacher plans and teaches the functional elements and problem solving*
- *comparison between single GCSE in mathematics and linked pair of GCSEs in mathematics*

How successful do you think the examinations are/will be at assessing the functional elements and problem solving skills?

Prompts

- *examples or suggestions of good or appropriate questions*
- *areas of concern*
- *areas of uncertainty*
- *suggestions for different ways of assessing*
- *comparison between single GCSE in mathematics and linked pair of GCSEs in mathematics*

Topic 3: teacher perception of student experience

What do you hope students will get from studying the linked pair of GCSEs in mathematics?

Prompts

- *mathematical skills and knowledge*
- *future aspirations for employment/ further study*
- *life skills*

- *personal fulfilment*
- *amount of qualifications*
- *comparison between single GCSE in mathematics and linked pair of GCSEs in mathematics*

When do you think students find the linked pair of GCSEs in mathematics most and least enjoyable and in what circumstances do they seem to be getting the most from their work?

Prompts

- *ways of working i.e. group work, individual tasks*
- *topics*
- *delivery styles*
- *types of activities*
- *what are the things they seem to like/enjoy most about your lessons in the linked pair of GCSEs in mathematics?*
- *what are the things they seem to like/enjoy least about your lessons in the linked pair of GCSEs in mathematics?*
- *comparison between single GCSE in mathematics and linked pair of GCSEs in mathematics*

Topic 4: teacher perception of assessment of progress

How do you know how well your students are doing in the linked pair of GCSEs in mathematics?

Prompt for:

- *what happens in lessons to tell you how well students are doing on the linked pair of GCSEs in mathematics course? Use of:*
  - *actions and/or assessments conducted by the teacher*
  - *assessments and tests undertaken*
  - *self assessment by students*
  - *feedback on homework and/or class work tasks*

How do your students know how well they are doing?

Prompt for:

- *actions and/or assessments conducted by the teacher: use of:*
  - *reflection*
  - *assessments and tests undertaken*
  - *self assessment*
  - *feedback on homework and/or class work tasks*

Would your responses to questions 1 and 2 be the same or different for the single GCSE in mathematics?

Prompts

- *Explore reasons if teacher thinks their responses would be the same*
- *Explore reasons if teacher thinks their responses would be different*

Topic 5: assessment through examination

Some students will have sat examinations in January 2011. Teachers may have students who sat examinations or had access to examination material.

How did you prepare students for any examinations undertaken? Is this different to what you might have done in the past?

Prompts

- *who/what helped or provided support*
- *perceived areas for concern or extra effort*
- *amount of time taken to prepare*
- *how teacher helped students revise for examinations in the linked pair of GCSEs in mathematics?*
- *examples of the sort of things you have done **in lessons** to prepare for examinations in the linked pair of GCSEs in mathematics?*
- *comparison between single GCSE in mathematics and linked pair of GCSEs in mathematics*

What was your experience of the examinations (or exam practice and exemplars)?

Prompts

- *differences between the actual papers and what was expected*
- *perceived level of difficulty*
- *time allocated to papers/questions*
- *comparison between single GCSE in mathematics and linked pair of GCSEs in mathematics*

Topic 6: support and development for teachers

This topic may crop up throughout the interview and it may be more appropriate to prompt teachers when discussing other topics.

What kinds of support have you had for teaching the linked pair of GCSEs in mathematics?

Prompts

- *support from awarding organisations, professional bodies, subject specialist organisations, advisory services, initial teaching training institutions, private training providers*

Are there other forms of support or professional development you would find helpful?

2.6 Teacher interview without observation (linked pair)

L2/V2/teacher interview/linked pair/without observation

Teacher interviews on the linked pair of GCSEs in mathematics (non-observation)

Topics for discussion

- Topic 1: reflection on teaching the linked pair of GCSE mathematics
- Topic 2: teacher experience of the functional elements and problem solving in the linked pair of GCSE in mathematics
- Topic 3: teacher perception of student experience of progress
- Topic 4: teacher perception of assessment of progress
- Topic 5: assessment through examination
- Topic 6: support and development for teachers

During the interview please encourage teachers to reflect on teaching the linked pair of GCSEs in mathematics. In particular we want teachers to:

- Articulate the benefits (or otherwise) of the linked pair, particularly in terms of what is being learned and ways in which student confidence with mathematics is developing
- Compare the linked pair of GCSEs in mathematics with the single GCSE in mathematics if they have knowledge and/or experience of the single GCSE in mathematics (not the legacy GCSEs in mathematics)

Topic 1: reflection on teaching the linked pair of GCSEs in mathematics

What sorts of things do you do in lessons for the linked pair of GCSEs in mathematics?

Prompts

- *ask teacher to take you through a typical lesson for the linked pair of GCSEs in mathematics, for example:*
  - *how a lesson begins*
  - *use of different teaching approaches (list will be in researcher guide)*
  - *the kinds of activities the teacher uses*
  - *the kinds of tasks the teacher sets for students*
  - *balance of whole group, small group, individual and pair work*
  - *balance of resources used e.g. text books, worksheets, use of technology*
  - *how the teacher checks that learning has taken place in the lesson*
  - *whether lesson aims are generally achieved*
  - *how a lesson ends*

Do you feel there is a difference or 'jump' between the GCSE(s) in mathematics you were teaching before and the mathematics you are teaching now as part of the linked pair of GCSEs in mathematics? Is there the same 'jump' in the new single GCSE in mathematics?

Prompts

- *perceived changes in difficulty and demand*
- *perceived changes in terms of skills; problem solving, functionality etc*

- *changes to teaching and learning styles*
- *continuity from previous years/key stages*
- *comparison between single GCSE in mathematics and linked pair of GCSEs in mathematics*

Please ask: **Whether they perceive the amount of content in the single GCSE to be more comparable to two GCSEs** (in the same way as English literature and English language or two GCSEs in science)

What are the main differences for you between methods in mathematics and application of mathematics in the linked pair of GCSE in mathematics? What do students learn in each?

Prompts

- *topics*
- *skills used/developed*
- *how problem solving approached in methods and applications*
- *how functional elements approached in methods and applications*
- *comparison between single GCSE in mathematics and linked pair of GCSEs in mathematics*

Topic 2: teacher experience of the functional elements and problem solving in the linked pair of GCSE in mathematics

How, if at all, has the increased emphasis on functional elements and problem solving in the new KS4 programme of study led to changes in your curriculum and the way that you teach mathematics in the linked pair of GCSEs in mathematics?

Prompts

- *teacher's understanding of functional elements and problem solving*
- *where the functional elements and problem solving comes in their teaching of methods and applications (ask for examples)*
- *time spent on the functional elements and problem solving in lessons (proportion and balance)*
- *examples of ways in which teacher plans and teaches the functional elements and problem solving*
- *comparison between single GCSE in mathematics and linked pair of GCSEs in mathematics*

How successful do you think the examinations are/will be at assessing the functional elements and problem solving skills?

Prompts

- *examples or suggestions of good or appropriate questions*
- *areas of concern*
- *areas of uncertainty*
- *suggestions for different ways of assessing*
- *comparison between single GCSE in mathematics and linked pair of GCSEs in mathematics*

Topic 3: teacher perception of student experience

What do you hope students will get from studying the linked pair of GCSEs in mathematics?

Prompts

- *mathematical skills and knowledge*
- *future aspirations for employment/ further study*
- *life skills*

- *personal fulfilment*
- *amount of qualifications*
- *comparison between single GCSE in mathematics and linked pair of GCSEs in mathematics*

When do you think students find the linked pair of GCSEs in mathematics most and least enjoyable and in what circumstances do they seem to be getting the most from their work?

Prompts

- *ways of working i.e. group work, individual tasks*
- *topics*
- *delivery styles*
- *types of activities*
- *what are the things they seem to like/enjoy most about your lessons in the linked pair of GCSEs in mathematics?*
- *what are the things they seem to like/enjoy least about your lessons in the linked pair of GCSEs in mathematics?*
- *comparison between single GCSE in mathematics and linked pair of GCSEs in mathematics*

Topic 4: teacher perception of assessment of progress

How do you know how well your students are doing in the linked pair of GCSEs in mathematics?

Prompt for:

- *what happens in lessons to tell you how well students are doing on the linked pair of GCSEs in mathematics course? Use of:*
  - *actions and/or assessments conducted by the teacher*
  - *assessments and tests undertaken*
  - *self assessment by students*
  - *feedback on homework and/or class work tasks*

How do your students know how well they are doing?

Prompt for:

- *actions and/or assessments conducted by the teacher: use of:*
  - *reflection*
  - *assessments and tests undertaken*
  - *self assessment*
  - *feedback on homework and/or class work tasks*

Would your responses to questions 1 and 2 be the same or different for the single GCSE in mathematics?

Prompts

- *Explore reasons if teacher thinks their responses would be the same*
- *Explore reasons if teacher thinks their responses would be different*

Topic 5: assessment through examination

Some students will have sat examinations in January 2011. Teachers may have students who sat examinations or had access to examination material.

How did you prepare students for any examinations undertaken? Is this different to what you might have done in the past?

Prompts

- *who/what helped or provided support*
- *perceived areas for concern or extra effort*
- *amount of time taken to prepare*
- *how teacher helped students revise for examinations in the linked pair of GCSEs in mathematics?*
- *examples of the sort of things you have done **in lessons** to prepare for examinations in the linked pair of GCSEs in mathematics?*
- *comparison between single GCSE in mathematics and linked pair of GCSEs in mathematics*

What was your experience of the examinations (or exam practice and exemplars)?

Prompts

- *differences between the actual papers and what was expected*
- *perceived level of difficulty*
- *time allocated to papers/questions*
- *comparison between single GCSE in mathematics and linked pair of GCSEs in mathematics*

Topic 6: support and development for teachers

This topic may crop up throughout the interview and it may be more appropriate to prompt teachers when discussing other topics.

What kinds of support have you had for teaching the linked pair of GCSEs in mathematics?

Prompts

- *support from awarding organisations, professional bodies, subject specialist organisations, advisory services, initial teaching training institutions, private training providers*

Are there other forms of support or professional development you would find helpful?

2.7 Teacher interview with observation (single GCSE)

L2/V2/teacher interview/single GCSE/with observation

Teacher interviews following an observation of a single GCSE mathematics lesson

Topics for discussion

- Topic 1: reflection on the lesson
- Topic 2: teacher experience of the functional elements and problem solving in the single GCSE in mathematics
- Topic 3: teacher perception of student experience of progress
- Topic 4: teacher perception of assessment of progress
- Topic 5: assessment through examination
- Topic 6: support and development for teachers

The interview of the teacher will follow an observation of single GCSE in mathematics lesson. Please encourage teachers to reflect on the observed lesson and then take them through the other topics and prompts. In particular we want teachers to:

- Articulate the benefits (or otherwise) of the new single GCSE, particularly in terms of what is being learned and ways in which student confidence with mathematics is developing
- Compare the single GCSE in mathematics with the linked pair of GCSEs in mathematics if they have knowledge and/or experience both (not the legacy GCSEs in mathematics)

Topic 1: reflection on the lesson

Please use your notes from the observation to prompt discussion on the lesson aims, the activities and content of the lesson:

Prompts

- *how typical was the lesson?*
- *why choices were made about:*
    - *approaches used*
    - *activities used*
    - *resources used*
    - *tasks set*
    - *student groupings*
- *what was learned by the students?*
- *did the teacher achieve his/her aims?*

Do you feel there is a difference or 'jump' between the GCSE(s) in mathematics you were teaching before and the mathematics you are teaching now in the single GCSE in mathematics? Is there the same 'jump' in the new linked pair of GCSE in mathematics?

Prompts

- *perceived changes in difficulty and demand*
- *perceived changes in terms of skills; problem solving, functionality etc*

- *changes to teaching and learning styles*
- *continuity from previous years/key stages*
- *comparison between single GCSE in mathematics and linked pair of GCSEs in mathematics*

Please ask: **Whether they perceive the amount of content in the single GCSE to be more comparable to two GCSEs** (in the same way as English literature and English language or two GCSEs in science)

Can you say what the main differences are between methods in mathematics and application of mathematics in the linked pair of GCSE in mathematics? Are you aware of what students learn in each?

Prompts

- *topics*
- *skills used/developed*
- *how problem solving approached in methods and applications*
- *how functional elements approached in methods and applications*
- *comparison between single GCSE in mathematics and linked pair of GCSEs in mathematics*

Topic 2: teacher experience of the functional elements and problem solving in the single GCSE in mathematics

How, if at all, has the increased emphasis on functional elements and problem solving in the new KS4 programme of study led to changes in your curriculum and the way that you teach mathematics for the single GCSEs in mathematics?

Prompts

- *teacher's understanding of functional elements and problem solving*
- *where the functional elements and problem solving comes in their teaching of methods and applications (ask for examples)*
- *time spent on the functional elements and problem solving in lessons (proportion and balance)*
- *examples of ways in which teacher plans and teaches the functional elements and problem solving*
- *comparison between single GCSE in mathematics and linked pair of GCSEs in mathematics*

How successful do you think the examinations are/will be at assessing the functional elements and problem solving skills?

Prompts

- *examples or suggestions of good or appropriate questions*
- *areas of concern*
- *areas of uncertainty*
- *suggestions for different ways of assessing*
- *comparison between single GCSE in mathematics and linked pair of GCSEs in mathematics*

Topic 3: teacher perception of student experience

What do you hope students will get from studying the new single GCSE in mathematics?

Prompts

- *mathematical skills and knowledge*
- *future aspirations for employment/ further study*

- *life skills*
- *personal fulfilment*
- *amount of qualifications*
- *comparison between single GCSE in mathematics and linked pair of GCSEs in mathematics*

When do you think students find the single GCSE in mathematics most and least enjoyable and in what circumstances do they seem to be getting the most from their work?

Prompts

- *ways of working i.e. group work, individual tasks*
- *topics*
- *delivery styles*
- *types of activities*
- *what are the things they seem to like/enjoy most about your lessons?*
- *what are the things they seem to like/enjoy least about your lessons?*
- *comparison between single GCSE in mathematics and linked pair of GCSEs in mathematics*

Topic 4: teacher perception of assessment of progress

How do you know how well your students are doing in the single GCSE in mathematics?

Prompt for:

- *what happens in lessons to tell you how well students are doing in the single GCSE in mathematics course? Use of:*
  - *actions and/or assessments conducted by the teacher*
  - *assessments and tests undertaken*
  - *self assessment by students*
  - *feedback on homework and/or class work tasks*

How do your students know how well they are doing?

Prompt for:

- *actions and/or assessments conducted by the teacher: use of:*
  - *reflection*
  - *assessments and tests undertaken*
  - *self assessment*
  - *feedback on homework and/or class work tasks*

Would your responses to questions 1 and 2 be the same or different for the linked pair of GCSEs in mathematics?

Prompts

- *Explore reasons if teacher thinks their responses would be the same*
- *Explore reasons if teacher thinks their responses would be different*

Topic 5: assessment through examination

Some students will have sat examinations in January 2011. Teachers may have students who sat examinations or had access to examination material.

How did you prepare students for any examinations undertaken? Is this different to what you might have done in the past?

Prompts

- *who/what helped or provided support*
- *perceived areas for concern or extra effort*
- *amount of time taken to prepare*
- *how teacher helped students revise for examinations*
- *examples of the sort of things you have done **in lessons** to prepare for examinations*
- *comparison between single GCSE in mathematics and linked pair of GCSEs in mathematics*

What was your experience of the examinations (or exam practice and exemplars)?

Prompts

- *differences between the actual papers and what was expected*
- *perceived level of difficulty*
- *time allocated to papers/questions*
- *comparison between single GCSE in mathematics and linked pair of GCSEs in mathematics*

Topic 6: support and development for teachers

This topic may crop up throughout the interview and it may be more appropriate to prompt teachers when discussing other topics.

What kinds of support have you had for teaching the new single GCSE in mathematics?

Prompts

- *support from awarding organisations, professional bodies, subject specialist organisations, advisory services, initial teaching training institutions, private training providers*

Are there other forms of support or professional development you would find helpful?

2.8 Teacher interview without observation (single GCSE)

L2/V2/teacher interview/single GCSE/without observation

Teacher interviews for the single GCSE in mathematics (non-observation)

Topics for discussion

- Topic 1: reflection on teaching the new single GCSE in mathematics
- Topic 2: teacher experience of the functional elements and problem solving in the single GCSE in mathematics
- Topic 3: teacher perception of student experience of progress
- Topic 4: teacher perception of assessment of progress
- Topic 5: assessment through examination
- Topic 6: support and development for teachers

During the interview please encourage teachers to reflect on teaching the new single GCSE in mathematics. In particular we want teachers to:

- Articulate the benefits (or otherwise) of the new single GCSE in mathematics, particularly in terms of what is being learned and ways in which student confidence with mathematics is developing
- Compare the single GCSE in mathematics with the linked pair of GCSEs in mathematics if they have knowledge and/or experience of the single GCSE in mathematics (not the legacy GCSEs in mathematics)

Topic 1: reflection on teaching the linked pair of GCSEs in mathematics

What sorts of things do you do in lessons for the single GCSE in mathematics?

Prompts

- *ask teacher to take you through a typical lesson for the single GCSE in mathematics, for example:*
  - *how a lesson begins*
  - *use of different teaching approaches (list will be in researcher guide)*
  - *the kinds of activities the teacher uses*
  - *the kinds of tasks the teacher sets for students*
  - *balance of whole group, small group, individual and pair work*
  - *balance of resources used e.g. text books, worksheets, use of technology*
  - *how the teacher checks that learning has taken place in the lesson*
  - *whether lesson aims are generally achieved*
  - *how a lesson ends*

Do you feel there is a difference or 'jump' between the GCSE(s) in mathematics you were teaching before and the mathematics you are teaching now in the single GCSE in mathematics? Is there the same 'jump' in the new linked pair of GCSE in mathematics?

Prompts

- *perceived changes in difficulty and demand*
- *perceived changes in terms of skills; problem solving, functionality etc*

- *changes to teaching and learning styles*
- *continuity from previous years/key stages*
- *comparison between single GCSE in mathematics and linked pair of GCSEs in mathematics*

Please ask: **Whether they perceive the amount of content in the single GCSE to be more comparable to two GCSEs** (in the same way as English literature and English language or two GCSEs in science)

Can you say what the main differences are between methods in mathematics and application of mathematics in the linked pair of GCSE in mathematics? Are you aware of what students learn in each?

Prompts

- *topics*
- *skills used/developed*
- *how problem solving approached in methods and applications*
- *how functional elements approached in methods and applications*
- *comparison between single GCSE in mathematics and linked pair of GCSEs in mathematics*

Topic 2: teacher experience of the functional elements and problem solving in the single GCSE in mathematics

How, if at all, has the increased emphasis on functional elements and problem solving in the new KS4 programme of study led to changes in your curriculum and the way that you teach mathematics for the single GCSEs in mathematics?

Prompts

- *teacher's understanding of functional elements and problem solving*
- *where the functional elements and problem solving comes in their teaching of methods and applications (ask for examples)*
- *time spent on the functional elements and problem solving in lessons (proportion and balance)*
- *examples of ways in which teacher plans and teaches the functional elements and problem solving*
- *comparison between single GCSE in mathematics and linked pair of GCSEs in mathematics*

How successful do you think the examinations are/will be at assessing the functional elements and problem solving skills?

Prompts

- *examples or suggestions of good or appropriate questions*
- *areas of concern*
- *areas of uncertainty*
- *suggestions for different ways of assessing*
- *comparison between single GCSE in mathematics and linked pair of GCSEs in mathematics*

Topic 3: teacher perception of student experience

What do you hope students will get from studying the new single GCSE in mathematics?

Prompts

- *mathematical skills and knowledge*
- *future aspirations for employment/ further study*

- *life skills*
- *personal fulfilment*
- *amount of qualifications*
- *comparison between single GCSE in mathematics and linked pair of GCSEs in mathematics*

When do you think students find the single GCSE in mathematics most and least enjoyable and in what circumstances do they seem to be getting the most from their work?

Prompts

- *ways of working i.e. group work, individual tasks*
- *topics*
- *delivery styles*
- *types of activities*
- *what are the things they seem to like/enjoy most about your lessons?*
- *what are the things they seem to like/enjoy least about your lessons?*
- *comparison between single GCSE in mathematics and linked pair of GCSEs in mathematics*

Topic 4: teacher perception of assessment of progress

How do you know how well your students are doing in the single GCSE in mathematics?

Prompt for:

- *what happens in lessons to tell you how well students are doing in the single GCSE in mathematics course? Use of:*
  - *actions and/or assessments conducted by the teacher*
  - *assessments and tests undertaken*
  - *self assessment by students*
  - *feedback on homework and/or class work tasks*

How do your students know how well they are doing?

Prompt for:

- *actions and/or assessments conducted by the teacher: use of:*
  - *reflection*
  - *assessments and tests undertaken*
  - *self assessment*
  - *feedback on homework and/or class work tasks*

Would your responses to questions 1 and 2 be the same or different for the linked pair of GCSEs in mathematics?

Prompts

- *Explore reasons if teacher thinks their responses would be the same*
- *Explore reasons if teacher thinks their responses would be different*

Topic 5: assessment through examination

Some students will have sat examinations in January 2011. Teachers may have students who sat examinations or had access to examination material.

How did you prepare students for any examinations undertaken? Is this different to what you might have done in the past?

Prompts

- *who/what helped or provided support*
- *perceived areas for concern or extra effort*
- *amount of time taken to prepare*
- *how teacher helped students revise for examinations*
- *examples of the sort of things you have done **in lessons** to prepare for examinations*
- *comparison between single GCSE in mathematics and linked pair of GCSEs in mathematics*

What was your experience of the examinations (or exam practice and exemplars)?

Prompts

- *differences between the actual papers and what was expected*
- *perceived level of difficulty*
- *time allocated to papers/questions*
- *comparison between single GCSE in mathematics and linked pair of GCSEs in mathematics*

Topic 6: support and development for teachers

This topic may crop up throughout the interview and it may be more appropriate to prompt teachers when discussing other topics.

What kinds of support have you had for teaching the new single GCSE in mathematics?

Prompts

- *support from awarding organisations, professional bodies, subject specialist organisations, advisory services, initial teaching training institutions, private training providers*

Are there other forms of support or professional development you would find helpful?

3 Entry numbers for the pilot qualifications

3.1 Numbers of learners registered for January 2011 assessment window per awarding organisation.

Table 5: Numbers of learners registered for January 2011 assessment window per awarding organisation

Awarding Organisation	Paper	Unit	Entry numbers
AQA*	Applications of mathematics	Foundation Paper 1	814
AQA	Applications of mathematics	Higher Paper 1	1,048
AQA	Methods in Mathematics	Foundation Paper 1	1,746
AQA	Methods in Mathematics	Higher Paper 1	1,488
OCR	Applications of mathematics	Foundation Paper 1	62
OCR	Applications of mathematics	Higher Paper 1	116
OCR	Methods in Mathematics	Foundation Paper 1	184
OCR	Methods in Mathematics	Higher Paper 1	387
WJEC	Applications of mathematics	Foundation Paper 1	0
WJEC	Applications of mathematics	Higher Paper 1	0
WJEC	Methods in Mathematics	Foundation Paper 1	0
WJEC	Methods in Mathematics	Higher Paper 1	30

* Note: This is from the awarding stats in the system and may be revised very slightly.

Note: Edexcel did not have a January series in 2011.

3.2 Numbers of learners registered for June 2011 assessment window per awarding organisation

Table 6: Numbers of learners registered for June 2011 assessment window per awarding organisation

Awarding Organisation	Paper	Unit	Entry numbers
AQA	Applications of mathematics	Foundation Paper 1	1,563
AQA	Applications of mathematics	Higher Paper 1	2954
AQA	Applications of mathematics	Foundation Paper 2	491
AQA	Applications of mathematics	Higher Paper 2	672
AQA	Methods in Mathematics	Foundation Paper 1	2,013
AQA	Methods in Mathematics	Higher Paper 1	2,964
AQA	Methods in Mathematics	Foundation Paper 2	1,146
AQA	Methods in Mathematics	Higher Paper 2	972

Awarding Organisation	Paper	Unit	Entry numbers
Edexcel	Applications of mathematics	Foundation Paper 1	240
Edexcel	Applications of mathematics	Higher Paper 1	998
Edexcel	Applications of mathematics	Foundation Paper 2	82
Edexcel	Applications of mathematics	Higher Paper 2	334
Edexcel	Methods in Mathematics	Foundation Paper 1	1,346
Edexcel	Methods in Mathematics	Higher Paper 1	2,753
Edexcel	Methods in Mathematics	Foundation Paper 2	835
Edexcel	Methods in Mathematics	Higher Paper 2	507
OCR	Applications of mathematics	Foundation Paper 1	1,056
OCR	Applications of mathematics	Higher Paper 1	1,246
OCR	Applications of mathematics	Foundation Paper 2	18
OCR	Applications of mathematics	Higher Paper 2	9
OCR	Methods in Mathematics	Foundation Paper 1	1,219
OCR	Methods in Mathematics	Higher Paper 1	1,466
OCR	Methods in Mathematics	Foundation Paper 2	380
OCR	Methods in Mathematics	Higher Paper 2	385
WJEC	Applications of mathematics	Foundation Paper 1	484
WJEC	Applications of mathematics	Higher Paper 1	402
WJEC	Applications of mathematics	Foundation Paper 2	N/A
WJEC	Applications of mathematics	Higher Paper 2	N/A
WJEC	Methods in Mathematics	Foundation Paper 1	543
WJEC	Methods in Mathematics	Higher Paper 1	581
WJEC	Methods in Mathematics	Foundation Paper 2	N/A
WJEC	Methods in Mathematics	Higher Paper 2	N/A

4 Range and level of pedagogic approach to classroom observations

4.1 Moderation of observation scores

Whilst it should be recognised that there will be some subjectivity from the individual researchers and there is potential for misinterpreting the criteria, a moderation process was used to minimise the impact of this. The majority of observations were undertaken by two observers who in the first instance recorded individual scores. The first time a researcher observed a lesson s/he was always accompanied by a second researcher and the pairing of observers was varied across the visits. Scores were moderated during discussions after each observation finished. Further moderation was undertaken by the analysis team as classroom observation records were analysed alongside the summary scores.

4.2 Lesson observation radar charts of moderated scores

The radar charts here (figures 1 to 10) show the moderated score recorded by the observers.

The charts start at '0' for ease of reading but it should be noted that '0' was not an available score. The range of classes observed and the score for each pedagogic approach used can be seen clearly in the diagrams below. These have been presented per centre as this gives a clear indication of the difference recorded between lessons with students working towards foundation tier assessments and those working towards higher tier assessments. However the results for each have been anonymised further to ensure individual lessons cannot be recognised.

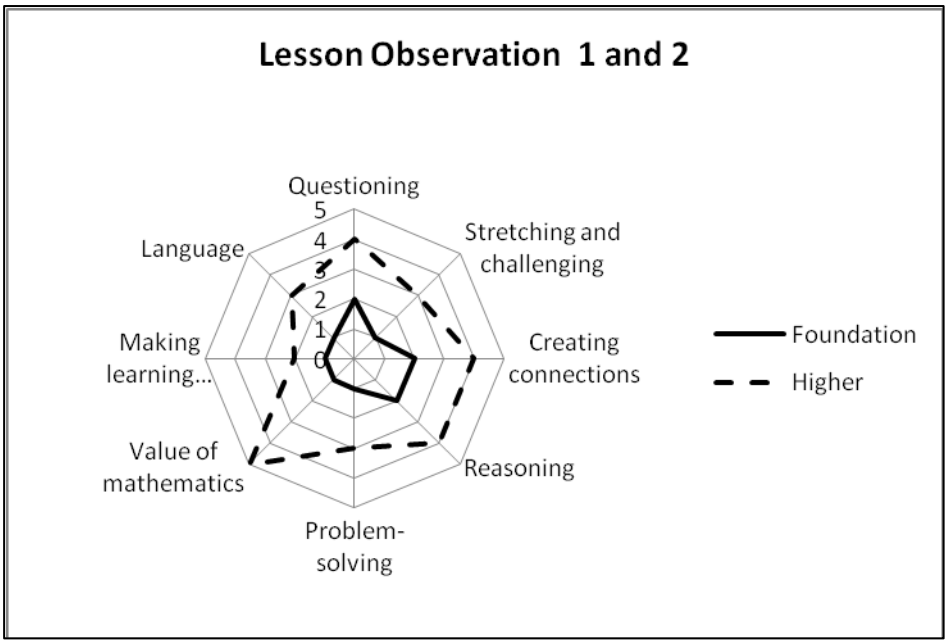

Figure 1: Moderated score recorded on summary table lesson 1 and 2

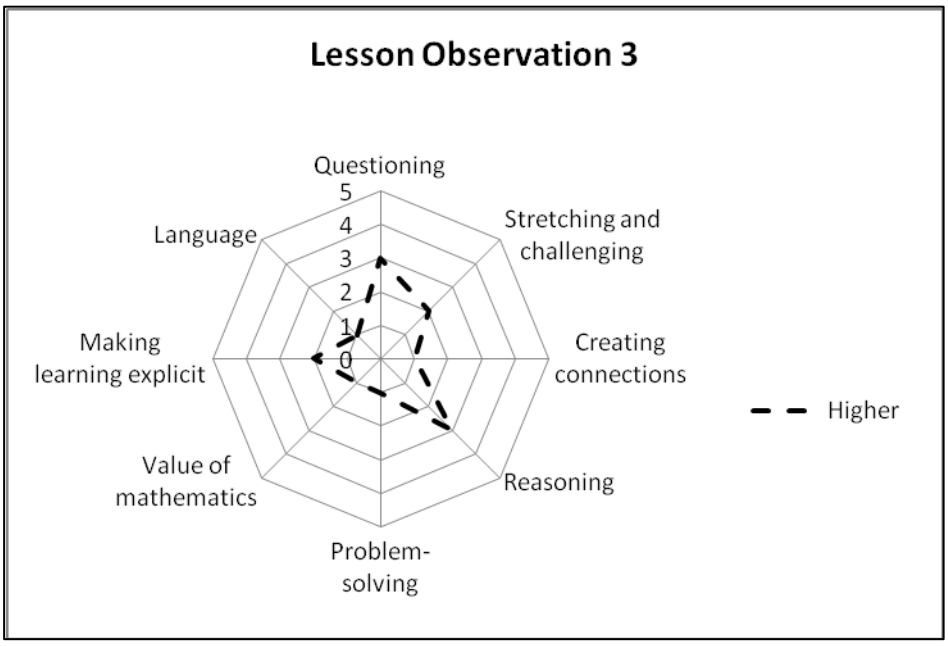

Figure 2: Moderated score recorded on summary table lesson 3

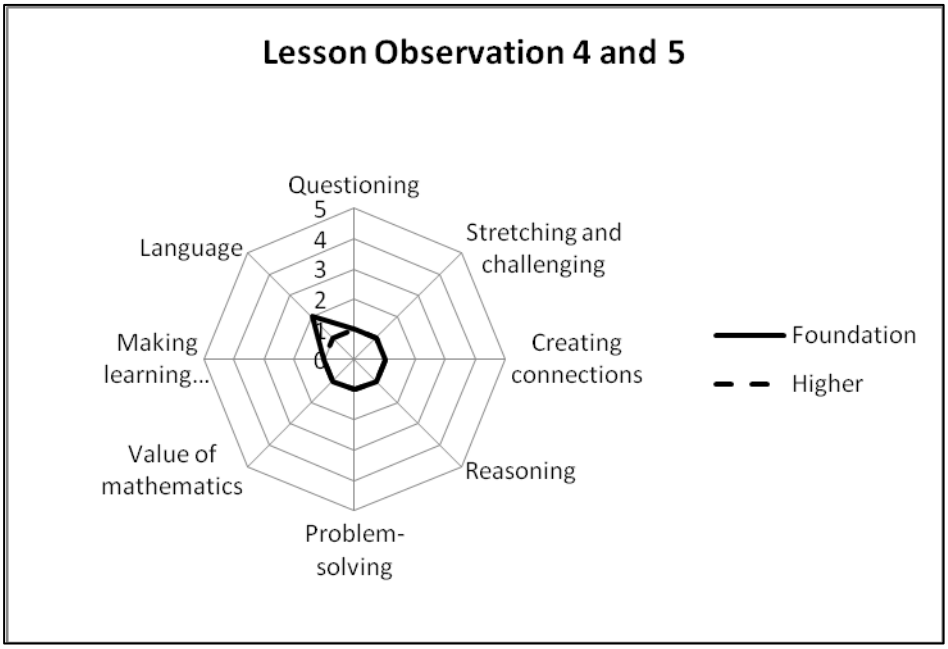

Figure 3: Moderated score recorded on summary table lesson 4 and 5

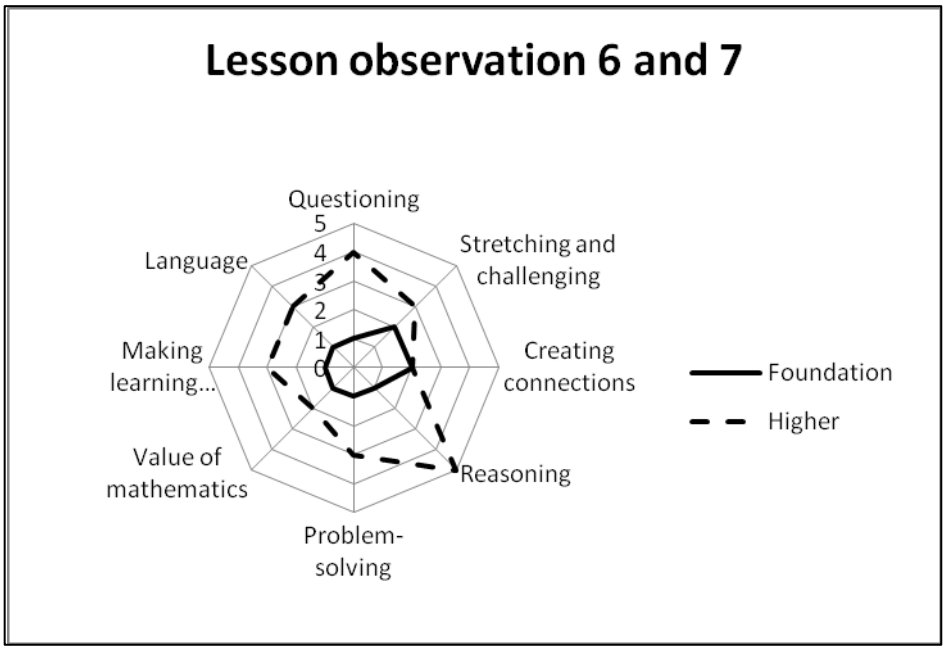

Figure 4: Moderated score recorded on summary table lesson 6 and 7

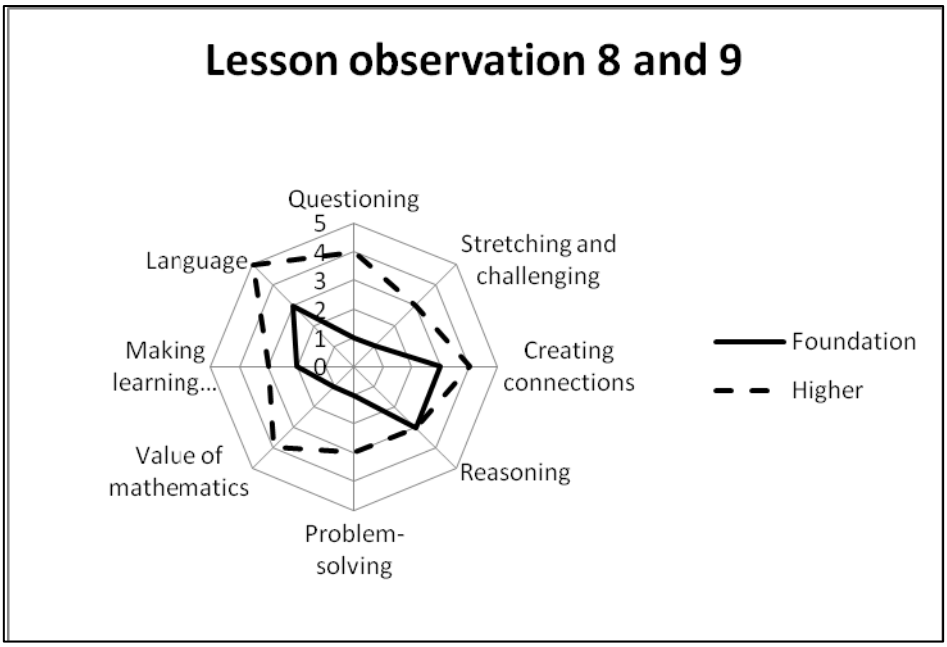

Figure 5: Moderated score recorded on summary table lesson 8 and 9

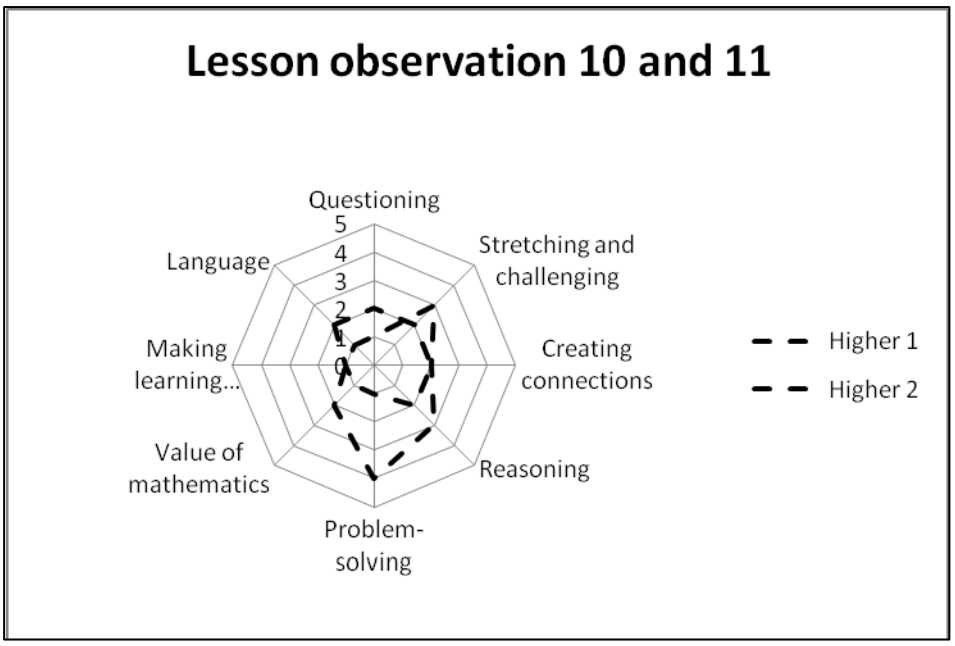

Figure 6: Moderated score recorded on summary table lesson 10 and 11

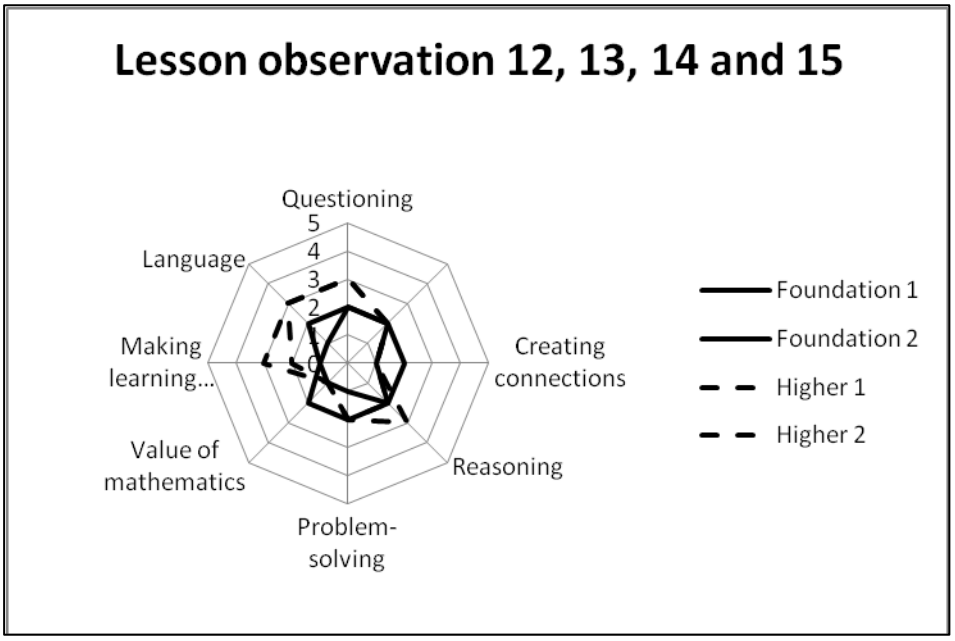

Figure 7: Moderated score recorded on summary table lesson 12, 13, 14 and 15

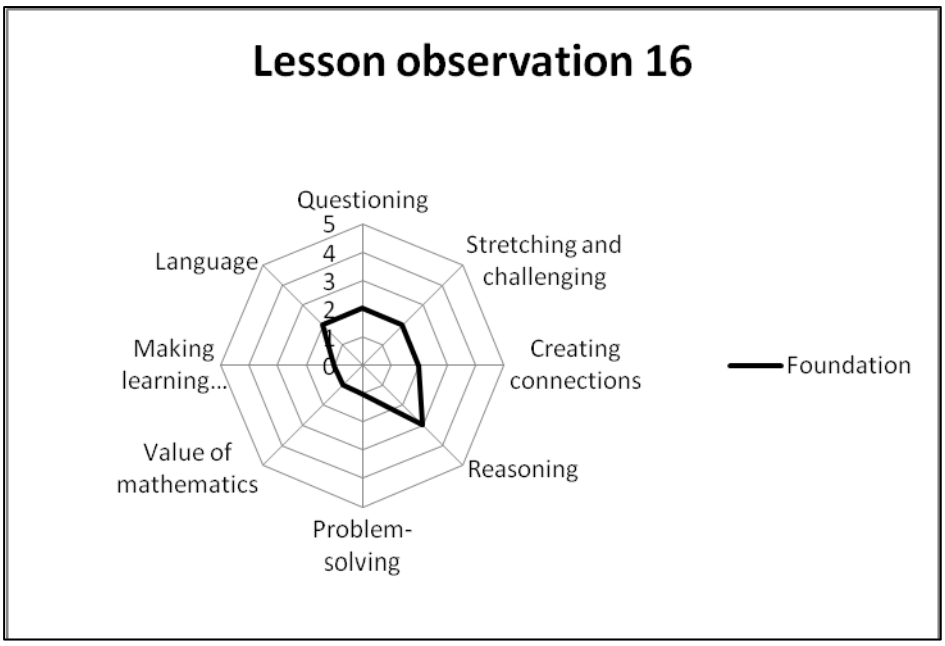

Figure 8: Moderated score recorded on summary table lesson 16

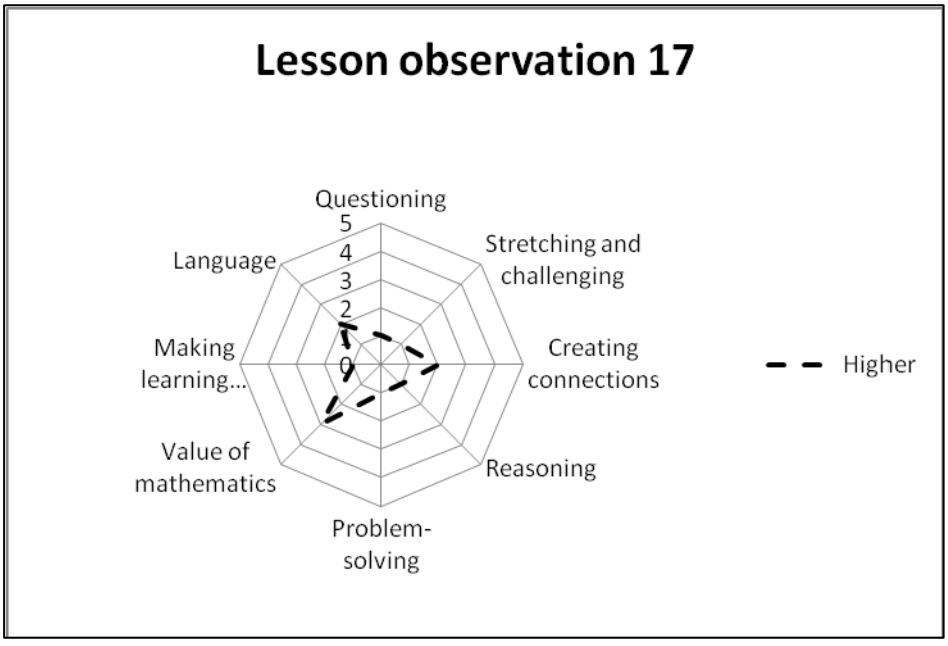

Figure 9: Moderated score recorded on summary table lesson 17

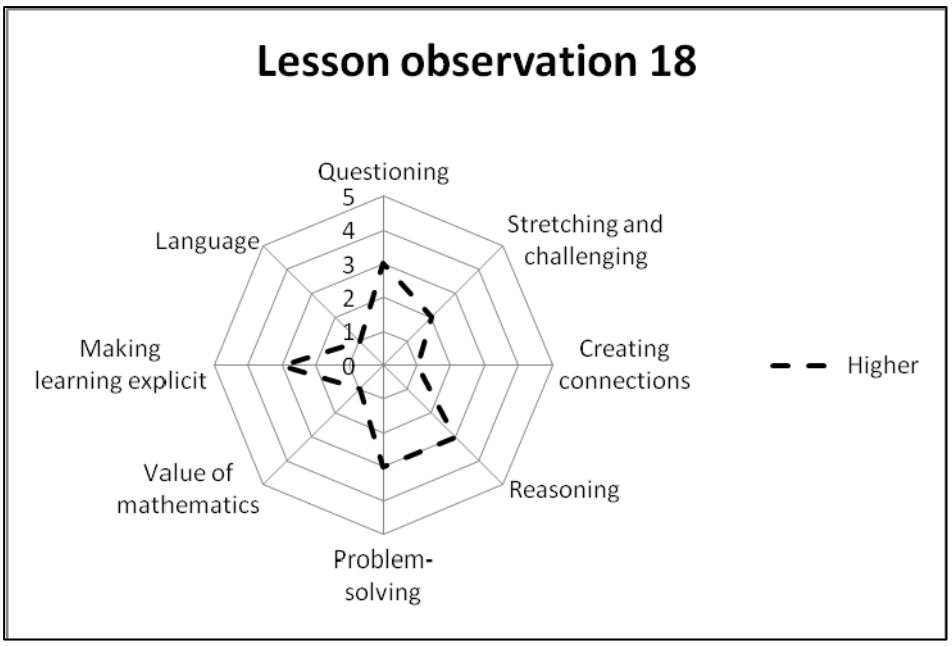

Figure 10: Moderated score recorded on summary table lesson 18