Comments on the Ofsted Draft Framework and the mathematics-specific draft: March 2019

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Although individual lessons are not to be graded, what inspectors observe in lessons will contribute to overall judgements. I have collected statements from the Draft Framework, the research background document, and the mathematics guidance that, for non-specialist inspectors, might lead to contradictions and misjudgements.

From the Framework:

79. Ofsted does not advocate that any particular approach should be used exclusively in teaching. Different approaches to teaching can be effective. What is appropriate will depend on the aims of a particular lesson or activity, and its place in the sequence of teaching a particular topic. Nevertheless, any approach used has features that must be present to ensure that it is delivered effectively.

85. Inspectors will not take a random sample of lesson observations. Instead, they will connect lesson observation to other evidence: discussions with curriculum leaders, teachers and pupils, and work scrutiny. Inspectors will select subjects that are relevant to the focus of the inspection and observe lessons in which this subject is being taught. Lesson observation is not about evaluating individual teachers; there will be no grading of the teaching observed by inspectors. Instead, inspectors will view lessons across a faculty, department, subject, key stage or year group and aggregate insights from those observations to provide part of the evidence for an overall view of quality of education or behaviour and attitudes.

90. Work scrutiny is useful primarily for gathering evidence about the 'impact' of the quality of education. Inspectors can use work scrutiny to evaluate pupils' progression through the curriculum. Work scrutiny will show whether pupils know more and can do more, and whether the knowledge and skills they have learned are well sequenced and have developed incrementally. Inspectors will synthesise what they find in order to contribute to their overall assessment of the quality of education across a faculty, department, subject, key stage or year group.

From the Research Commentary

(https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/771328/Research_for_education_inspection_framework-final-160118.pdf):

Ofsted offer three knowledge perceptions of schools:

- In **knowledge-rich schools**, the leaders see the curriculum as the mastery of a body of subject-specific knowledge defined by the school. Skills are generally considered to be an outcome of the curriculum, not its purpose. They emphasise big ideas and invaluable knowledge they want their pupils to acquire.
- In **knowledge-engaged schools**, knowledge is seen as underpinning and enabling the application of skills, although the latter are often taught alongside knowledge, and school

leaders express a desire for both to be developed. Leaders and teachers in these schools do not perceive a tension between knowledge and skills, and instead see them as intertwined.

- Finally, we identified a small group of schools as having **skills-led curriculums**. In these schools, the curriculum is designed around skills, learning behaviours and 'generic knowledge'. Leaders place an emphasis on developing the skills that pupils will need for future learning, often referring to resilience, a growth mind-set and perseverance.

The document includes the following:

Research on teaching effectiveness suggests that achievement is likely to be maximised when teachers actively present material and structure it by:

- providing overviews and/or reviews of objectives
- outlining the content to be covered and signalling transitions between different parts of the lesson
- calling attention to main ideas
- reviewing main ideas.

…

This does not, of course, mean that lessons need to follow a particular structure or sequence. These elements can occur at different points in a lesson, or over a sequence of lessons, and can be integrated in different ways and at different times,

…

The focus on teachers actively presenting materials should, therefore, not be seen as lecturing.

…

[Re: questioning]: The best strategy would appear to be to use a mixture of recall and higher-order questions, increasing the latter as the level of understanding increases. This does not mean that a mix should be used in all lessons; depending on where the lesson sits within a sequence of lessons about a particular topic, the balance can be strongly towards one or the other

…

- Over the course of study, teaching is designed to help learners to remember in the long term the content they have been taught and to integrate new knowledge into larger concepts.

Nevertheless, the mathematics guidance, in my view, does suggest a focus on developing memorised skills and knowledge through accumulating small steps lesson by lesson. Indications from the draft handbook are:

2.1 pupils understand and remember the mathematical knowledge, concepts and procedures, including knowledge of efficient algorithms, appropriate for their starting points, and which ensure readiness for the next stage, whether that is the next lesson, unit of work, year or key stage, and including post- 16 mathematics

This could be interpreted by a non-specialist to mean that a 'next task' has to be based on prior knowledge and skills

2.3 the curriculum divides new material into manageable steps lesson by lesson

This could be interpreted by a non-specialist to mean that every lesson is based on some manageable step in an accumulation of elements of knowledge and skill.

2.4 … Pupils have sufficient understanding of and unconscious competence in prerequisite mathematical knowledge, concepts and procedures that are necessary to succeed in the specific tasks set.

This could be interpreted by a non-specialist to mean that all students ought to be fluent already in particular skills and knowledge that seems to be used in the task.

2.5 within the curriculum, there are planned opportunities for sufficient revisiting of previously learned knowledge, concepts and procedures to ensure that, once learned, mathematical knowledge becomes deeply embedded in pupils' memories. This allows rapid and accurate recall and frees pupils' attention so they can work with increasing independence, considering the application of their mathematical knowledge to more complex concepts and procedures, and gain enjoyment through a growing self-confidence in their ability.

This could be interpreted by a non-specialist to mean that all students should remember fluently something that crops up in the lesson from prior learning.

2.7 there are objective assessments that can identify when all pupils have gained the intended understanding and unconscious competence in knowledge, concepts and procedures necessary before they move on to new or more complex content

This could be interpreted by a non-specialist to mean that complex tasks should be preceded by observable assessment processes.

2.8 teaching models new procedures and uses resources and approaches that enable pupils to understand the mathematics they are learning

This could be interpreted by a non-specialist to mean that new procedures should always be first modelled by teachers.

Here are four lessons that present mathematics in complex ways, during which the focus is on conceptual organisation of mathematical ideas, experience of underlying mathematical structures, development of mathematical methods of inquiry, and experience of mathematics as a broad domain.

In Ofsted's own terms, these can be interpreted by a specialist as contributing to a knowledge-rich curriculum in which skills and factual knowledge are the servants and/or by products of mathematical structure and the development of mathematical behaviour.

How might a non-specialist inspector use the guidance to understand the value of these lessons?

I leave it to expert readers to identify the value of these lesson in terms of mathematical learning.

1. Areas of compound shapes (KS2/3 content)

The lesson starts with students reminding themselves and others about how to calculate areas of rectangles and triangles. Then half the class are given shape A and half are given shape B, with enough suitable measurements to deduce missing lengths and do the calculations, and they are asked to find the total areas.
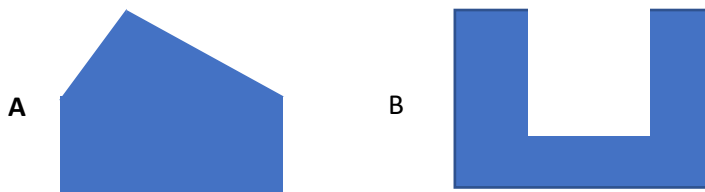
Students compare methods in A/B pairs and each has to explain to the class the methods of the other. It turns out that there are two kinds of method used: splitting the shape into parts that have to be added or constructing an outer shape from which pieces are subtracted. There is a whole class discussion about which version of each of these methods requires fewest steps and when each method might be the most sensible to use in other tasks. The whole lesson is based on working with A and B and the subsequent explanations and discussion of methods and how to decide when to use them.

2. Congruence as a special case of similarity KS3

The lesson starts with an animation already running on the smartboard. The animation shows a point D travelling up and down a side of a scalene triangle whose angles are all acute and whose base is horizontal. (This can now be found in Geogebra resources thanks to Ben Sparks - it was his lesson).
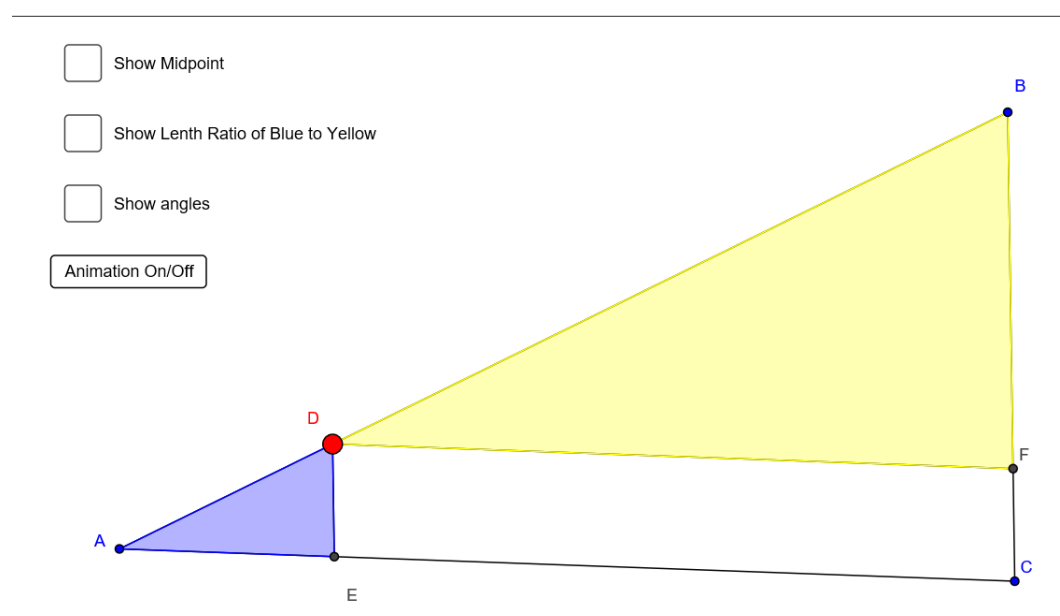
Students are asked to say what they see and what they deduce from what they see. During the discussion the teacher steers them towards statements that are more and more precise about similarity and asks for arguments to support their conjectures 'how do you know?' 'convince me' using facts about angles, parallel lines and triangles to be more precise about 'same shape'. However, a specialist observer would know that a discussion about similarity will probably move towards ratio of lengths of sides, and indeed the software offers that as an optional button. Taking his lead from the way the students talk about ratio the teacher then asks where the point would have to be to make the blue and yellow triangles 'the same size' and what the ratio will be when that happens. Since the board is interactive students can stop the animation themselves when they think this will happen – this is great fun and several students come to the board to have a go, egged on by their peers with some shouting. Eventually there is agreement that the midpoint is the necessary position, and

the software offers this as an optional button. There is no closure to the discussion but the word 'similar' has been used several times – students are still talking about what they saw and thought as they leave the room.

3. Measure as iterative units KS1/2 content

This lesson uses typical KS1 measuring activity in KS2 as a precursor to thinking about the relationship between measurement and ratio.

In a previous lesson groups of children chose from a variety of objects (centicubes, Cuisenaire rods, multilink cubes etc.) to measure some given strips of paper of several different lengths. They had started to record their results in written sentences such as 'the yellow strip is the same length as 3 orange rods'; 'the pink strip is the same length as 4 multilink cubes'. This lesson was a continuation of the task. The lesson started with groups fetching their workboxes and setting out their equipment, continuing their work. After a while they were given prepared tables of 'colour of strip' against 'measuring method' in which to record their results in an organised fashion and stick them on the wall where observations about the numbers of the measuring objects that are needed to measure different strips accumulates. The teacher asks them to compare their tables and see if anyone found different answers when measuring the same colour strip with the same objects. This is done with groups of children clustering around the wall display. After a discussion about accuracy when measuring with repeated units the teacher announces that they now have enough information for the next lesson.

4. Classifying quadratics according to the coefficients KS3/4

Students are working in pairs with graphing software to vary the coefficients a, b and c in the functions: $f(x) = ax^2 + bx + c$ and use their observations to classify quadratics according to their visual characteristics – they have not worked on quadratics before. They started this in a previous lesson and have stored their findings so far online. They continue their explorations in the first half of the lesson. About half way through the lesson they are given grids – each cell has to be given examples of a quadratic where possible. If students think it is impossible they have to prepare an explanation. The teacher has prepared the grid during the lesson using the characteristics some students are talking about and there are spare columns and rows for students to include other observations. The teacher is circulating and interacting with each pair about

their suggestions and conjectures, some of which are about using the software to vary scales and domain/codomains.

	Seems to have a maximum value	Appears to cross the x-axis twice	Appears to meet the x-axis once	Looks steep	Looks as if it doesn't cross the x-axis	Seems to have a minimum value	Crosses the x-axis each side of zero	
a is negative								
c is a big number								
c is negative								
c is a square number								
a is a 'big number'								
b is negative								
b is positive								
b is a big number								

Is it going to be safe to teach lessons like these while being observed by non-specialist inspector?