

# **Contextualising post-16 GCSE Mathematics: a toolkit**

**Strategies for preparing learners for  
the maths examinations**

## About this guide

This guide is part of a toolkit to support practitioners in developing contextualised resources to support post-16 GCSE Mathematics. It offers suggestions for helping your post-16 learners who are due to resit GCSE Mathematics to prepare for their examinations.

## Topics to focus on when time is limited

There is a tension between trying to cover the whole of a GCSE Mathematics course in the available time and mastering the basic maths that learners will need for everyday life. If learners are sitting the examination in June you will have around thirty weeks with them; if they are sitting in November then around just nine weeks. Making the most effective use of the time available is crucial.

Initial assessment of each learner's strengths and weaknesses is essential for making the best use of the time available. It will help you to identify the areas each learner is struggling with so that you can focus on them. It is unlikely that all of your learners find the same topics difficult and so, in a resit course in particular, it is very important to manage differentiation.

In the same way that you might consider which topics to spend time developing contextualised resources for, you can also be tactical about where to use your time to best effect for examination preparation. There are some topics in GCSE mathematics that are regularly tested in the examinations, and for which a good, solid understanding can help learners to answer more questions. They often underpin other topics and are therefore well-worth investing time in.

It is particularly useful to concentrate on the Number strand of topics, which include fractions, decimals, percentages and ratios, as these are often embedded in many of the more challenging topics. These are readily contextualised either using the vocational area or personal interest ideas that can be found in the toolkit's 'context grid'. Regular homework can be a good way of reinforcing general number knowledge.

There are also topics that learners need to study that are difficult to contextualise. If you find it difficult to motivate learners without the use of context, then you may need to focus on the benefits of passing GCSE Mathematics to supporting learners' future careers. It may help to explain that learning maths is not only about learning how to use a tool to solve everyday problems, it's also about learning to think things through in logical ways. Although they may not use some of the maths directly in their vocational area, they may find they use the approaches they are learning to solve different kinds of problems in the future.

Learners often struggle with topics that they meet on a stand-alone basis and are not connected to other topics, or topics for which they cannot see any use. For example:

- properties of angles
- inequalities
- sequences

There are also topics learners may find very hard to understand. Consider whether it is worth spending precious time on a topic that learners may never be happy with, and which may knock their confidence or overload them. Some examples of these kinds of topics are:

- simultaneous equations
- factorising quadratic brackets
- using exact trigonometric ratios
- parallel and perpendicular lines
- quadratic graphs
- inverse proportion

It may be that these topics can be covered with homework and tutorials. Or, after looking at the learners' profiles, it might be worth finding ways to work with learners individually on these topics.

## Formative assessment for measuring learners' progress

Formative assessment must be effective and allow teachers to build on learners' prior knowledge, extend it and improve learning. When there is insufficient time to teach the whole course, frequent formative assessment can help tutors and learners to focus on what individual learners have greatest need to learn. However, spending a lot of time on formal testing does not always promote learning.

Formative assessment presents opportunities to involve a mix of contextualisation and focus on GCSE-style questions. Context-related problems or functional skills activities may be helpful at an early stage, but as the course progresses it is important to include more GCSE questions to provide learners with more opportunities to practise them.

### Forms of assessment

- Verbal questioning

Questions should be open-ended and allow learners to think and explain answers. Good questioning allows teachers to assess learners' understanding.

Questions can be to the whole class. This promotes discussion, and allows you to listen to individuals.

Mini white boards are useful to check learners' answers. When learners hold their ideas up it is possible to see at a glance what every learner thinks. You might also ask questions like "Show me an example of....."

Flash cards and matching activities can also be very useful for encouraging discussion and assessing learning.

- Written questions

You could use a worksheet to assess learning, in which case the questions could be contextualised.

Provide learners with regular practice in answering GCSE questions by spreading them throughout the course. After each topic has been covered, learners can be assessed by answering relevant GCSE questions. [Exampro](#) is useful for this, but requires a subscription.

- Self-assessment

Learners mark their own work and see what they need to do to improve. If a teacher marks work, a learner may simply look at the mark and not the correction. Asking learners to work through a mark-scheme themselves ensures they find each individual mistake and understand what went wrong.

- Peer assessment

Peer assessment involves learners marking each other's work and commenting on how it can be improved, or discussing with each other how to improve it. They might also work through a sample marked paper generated by the teacher, and suggest how it might be improved.

- Revision

You might ask learners to create their own posters or produce their own revision guides for topics, or even write their own GCSE-style questions. These can reveal misconceptions which can then be cleared up.

## Feedback

Feedback should be meaningful and not simply a mark. It should be detailed and explain why something is wrong and how to improve to gain marks in the examinations.

Feedback should also be individual. Learners should not be comparing themselves with others, but improving their own learning. Each learner will have different problems in examinations that need addressing.

As well as marking the method and answer, provide feedback on the clarity of handwriting, setting out, workings and spelling. Train your learners to make it as easy as possible for the examiner to award marks.

## Approaches to revision

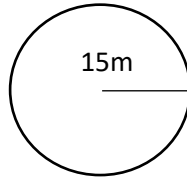
When revising maths, it is not a case of “doing the whole course again, only quicker”. Much of the whole course is revision as your learners will have covered the content before and they will be recapping throughout the year. The mantra for revision should be “practice, practice, practice”.

## Short tests

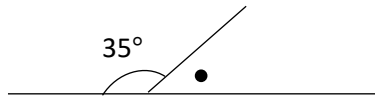
Create short tests to be used as lesson starters. These should contain straightforward questions. They may or may not include some contextualised examples. For example:

- What is 15% of £80?
- Simplify  $3a \times 2b$
- What is the area of a rectangular room which is 8m by 5m?
- Expand  $3(x + 5)$
- Which is bigger  $\frac{3}{7}$  or  $\frac{4}{9}$  ?
- What is  $0.3 \times 15$ ?

- Split £30 in the ratio 3:2
- Find the area of the circle



- If 50 raffle tickets are sold and you bought 4 of them what is the probability you will win the main prize?
- Find the angle marked



The questions should be designed to make learners feel confident. Use one set of questions at the beginning of each lesson in the weeks leading up to the examinations. Let learners mark their own work here.

### Past papers

Concentrate on examination-type questions, but don't just give learners past papers and tell them to get on with them. Instead, cut up old examination questions and sort them into topics, then concentrate on different topics in each lesson.

Explain the format of examination papers - learners need to be clear about:

- what examination question will look like
- what kinds of questions may be asked
- what the format of the examination is
- how many questions they have to answer
- where the harder questions are likely to be
- how many marks there are for each type of question
- the differences between the examinations they will sit – how long will each one last and in which one(s) will they be allowed calculators?

### Marks Schemes

Talk about mark schemes to learners when discussing examination technique. Make sure that learners understand the mark scheme, how it operates and what it means. For example:

- The number of marks can give you clues to help you answer questions.
- 1 mark often means just write down an answer.
- 2 marks often means there are 2 things to do – for example, add two numbers together (1 mark) and multiply the result (1 mark).
- If there are 3 marks then it is likely that learners need to write three things down, for example if asked to describe a transformation, you might write: rotation, around (0, 0), 90° clockwise.
- If the question has 5 marks there will be a few steps to be done and working must be shown.

You might ask your learners to mark their own or other's past-papers using the official mark scheme so that they find where they have made mistakes. There are opportunities here for discussion of why answers don't always get full marks, and how to get them.

## Examiners' reports

Make sure that you read the examiners' reports from previous examination sessions so that you can highlight common mistakes and explain how to avoid making them.

## Words often used in examinations

Make sure that learners understand the key words that are frequently used in examination paper questions and which have a precise meaning:

Words	Meaning or implication
Write down	No working out needed. You are expected to know the answer from memory, e.g. the name of a shape.
Work out	You can't just read the answer, you need to work it out.
Solve	Find what value of $x$ (or another term) for which the equation balances.
Expand	Remove the brackets.
Factorise	Put into brackets.
Factorise completely	There is more than 1 common factor.
Measure	Use a ruler or an angle measurer. Accuracy is needed – if the answer given is more than 2mm or $2^\circ$ from the correct answer, it will be marked wrong.
Expression	This has no = sign.
Equation	This has an = sign.
Complete	All the spaces must be filled in.
Diagram <b>not</b> accurately drawn	Do not measure lines or angles. They will not be correct. Instead you need to work out the answer.
Give reasons	More than one reason is needed.
Give the answer in simplest form	There is a more concise way to write the answer, e.g. fractions can be simplified.
Points of intersection	This is where the lines meet.

## Formulae

Make sure that learners memorise any formulae that they are required to know for the examinations<sup>1</sup>. For example:

- area of a circle
- circumference of a circle
- area of rectangle, square, parallelogram
- Pythagoras' Theorem
- trigonometrical ratios
- area of a trapezium
- volume of a prism

Ask learners to practise memorising and recalling the formulae. Do they know any memory aids to help them, such as " $\pi r^2$  sounds like area to me – if you want the circumference use  $\pi d$ ". If they do and they find them helpful, then encourage them to use them. If not, you might suggest some that you and/or former learners have found helpful.

You might try displaying these formulae around the room – perhaps on a washing line. Also make sure learners have a copy of them.

Point out the formula sheet provided at the start of examination papers. Remind them about this page often, as learners sometimes forget to refer to it.

If a learner has difficulty recalling formulae, particularly when under pressure, then you might suggest that at the start of the examination he or she should write all of the ones they can remember. Then when a question comes up that needs one, such as "find the area of the circle", there is no need to panic, because they can just look back at their notes.

## Examination technique

Learners need to see some complete examination papers before the exam. They also need to have done some under examination conditions. This needn't be the whole paper if time is short, but even fifteen minutes under examination conditions doing past paper questions will get them used to it.

The checklist below can be used to help ensure learners are prepared before the examinations:

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<sup>1</sup> See Appendix 'Mathematical formulae' in DfE publication: GCSE Subject Level Conditions and Requirements for Mathematics, February 2017

Do learners know...	Check
the format of the examinations?	
how long each examination lasts?	
which marks are easier to get?	
what equipment to bring to the examination?	
when and where the examination is?	
know how long it takes to get to the examination room?	
Have learners...	
seen a complete paper for each examination?	
experienced the type of questions that will be asked?	
reviewed their answers and compared to the mark scheme?	
tested themselves under examination conditions?	
shown all their working in practice papers?	
written clearly in practice papers?	

Maths examinations always start with easier questions and get progressively harder – make sure learners know this. When learners open the examination paper they should always start with the first questions. It is not a good idea to look at the last questions, as they will be the hardest and very off-putting. If they are not sure about any question they should leave it and look at the next one, as it is important that learners are able to answer the first question they attempt, so that they will start to feel confident.

Advise your learners not to spend too long on any single question. They should try the questions they are more confident with and ones that look similar to questions they have done before.

If they have time learners should check their answers and try any that they have missed out. If there is no answer written in the answer space then no mark will be given - it is always worth putting something down.

Ensure learners know to try a bit of the harder questions, even if they can't complete them. There are marks to be gained at the beginning of these questions.

### Before the exam

Suggest your learners meet with you before the examination. This is an opportunity for you to put them at ease. You could even provide breakfast or lunch for them. Suggest that



learners write down all their worries on paper before going to the examination. Explain that research has shown that when learners do this their examination marks improve<sup>2</sup>.

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<sup>2</sup> Ramirez, G. & Beilock, S.L. (2011). Writing about testing worries boosts exam performance in the classroom. *Science*, Vol. 331, Pages 211 – 213.

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