THIRD SPACE LEARNING

Effective Maths Assessment in Secondary Schools

A step by step breakdown of when and how to use different assessment strategies including 19 detailed examples, free tools and resources.

SLT Guides

Contents

Introduction

This resource takes a detailed look at effective assessment strategies for secondary mathematics, both in the classroom and at a departmental level. It includes a comprehensive review of summative and formative assessment as well as how diagnostic assessment fits into this picture.

The result is aimed to be an informative and practical resource to ensure that you and your colleagues fully understand and get the most out of every assessment you undertake during a term.

How to use this resource

Inside this guide you'll find practical tools to help you develop your own assessment skills and confidence in understanding the purpose and the intended outcome of the assessments you set. As well as recommendations for which type of assessment to use in different circumstances, there are also lots of examples and strategies to try with your class, and links to further downloadable resources, including ready made questions.

As ever, we recommend that you share this resource with the rest of your department: there are even suggested departmental discussion points to help inform your thinking and next steps.

This guide is structured to give an overview of different assessment strategies, detailed explanations, practical examples, and ready-to-use tools and templates. Each section focuses on a specific assessment type, offering actionable insights and recommendations tailored to the secondary school context.

Here's a quick look at what you can expect:

1. **Why assessment matters:** Understand the importance of assessment in secondary education and student progress.
2. **Types of assessment:** Definitions and examples of summative, formative, and diagnostic assessments.
3. **Summative assessments:** Understand how to effectively use summative assessments in secondary schools, including practical examples and checklists.
4. **Formative assessments:** Explore key formative assessment strategies and tools that are easy to implement in secondary classrooms.
5. **Diagnostic assessments:** Learn about diagnostic assessment techniques and how they can help identify and address learning gaps.
6. **Practical strategies and tools:** Effective strategies and tools for implementing assessments.

Share this resource with your whole teaching team or use it to provide discussion points during staff meetings and professional development sessions.

Why we have developed this resource

Assessment is integral to teaching and learning, often happening without teachers consciously acknowledging they're doing it. When we adjust a lesson because students don't understand, improve materials for future use, or select students for additional support, we're using assessment to inform our decisions and respond to student needs.

Students progress when teaching is tailored to their current starting points. If the pitch is too low, they become bored and unmotivated; too high, they become frustrated. Assessment is crucial for student progress as it guides us in deciding what to teach, how to teach it, and at what pace.

> Assessment is the bridge between teaching and learning – it is only through assessment that we can find out whether what has happened in the classroom has produced the learning we intended.
>
> **Dylan Wiliam, 2011**

Assessment is at the heart of our tutoring programmes

At Third Space Learning, we recognize the crucial role of effective assessment in teaching and learning. Since 2013, we've worked with over 4,000 schools across the country, and we've consistently seen the impact of targeted, personalised support.

Before starting any online tutoring programme, we individually assess each student's understanding of relevant maths topics. This allows us to tailor our support to each child's strengths and weaknesses, at a suitable pace.

Our tutors focus on individual misconceptions and provide actionable feedback to help students progress. By sharing our expertise, we aim to help schools use assessments effectively to enhance student learning and progress.

Our tutoring programmes use various assessments, including:

- Diagnostic assessments before tutoring begins
- Structured formative assessments at the start of each lesson
- Regular low-stakes quizzes and assessments during lessons
- Post-session quizzes
- Summative assessments at the end of each programme

Defining assessment types

While definitions may differ slightly among schools and teachers, we'll use the following definitions in this guide:

Summative assessment

Measures attainment, tracks progress, or benchmarks students against standards. Also known as assessment of learning.

Formative assessment

Identifies students' needs and adapts teaching to meet them. Includes assessment for learning and assessment as learning. Assessment is only formative if the evidence collected is used to inform teaching.

Diagnostic assessment

Evaluates students' knowledge and understanding in a specific area. Can be considered a type of formative assessment.

Differences between formative and summative assessment

	Summative assessment	Formative assessment
Purpose	• To provide a quantitative measure of attainment • To track student progress over time • To compare students with their peers or cohort	• To check security of prior knowledge and pitch teaching episodes appropriately • To monitor understanding in relation to the planned learning intentions • To provide ongoing feedback about students' learning • To identify and address misconceptions as they arise
Design	• Often high stakes • More formal assessment procedures • Marked against a standard	• Usually low-stakes • Less formal procedures (e.g. short quizzes) • Sometimes includes elements of self/ peer assessment
Frequency	• Given at the end of a specified period of learning (e.g. unit of work, term, year or key stage)	• Ongoing during every lesson and often at the end of a lesson or teaching episode
Outcomes	• Final grade or mark • Limited feedback	• Adaptations to the learning process • Adaptations to learning materials • More detailed feedback

Summative assessment

A summative assessment is any assessment with the primary goal of **tracking progress** or **measuring student attainment.**

Characteristics of summative assessment

High stakes

Traditional summative assessments tend to be deliberately high-stakes, as there are greater consequences for students based on their results.

Typically, there are greater consequences for students, for example GCSE exams at the end of KS4.

Marked against a standard

This ensures that students answering at a similar level achieve a similar grade as their result - for example, the GCSE mark scheme.

At secondary level, in-house summative assessments (e.g. end-of-term or end-of-year tests) frequently include or are composed entirely of GCSE-style exam questions. This can be advantageous as a rigorous scheme for marking already exists.

Standardised

Standardisation allows for comparisons between cohorts and groups within a school or across a trust.

Externally, it ensures that the grade awarded for a particular standard of work is comparable across various exam seasons, and that students are not positively or negatively impacted by the comparative difficulty of the exam paper to previous seasons.

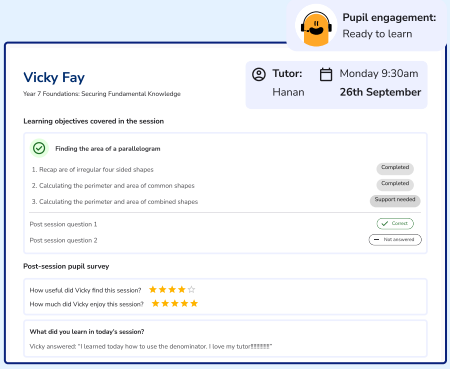
5 examples of summative assessment

1. External examinations and qualifications, such as GCSEs and A-Levels
2. Externally-marked assessments, such as CATs
3. Tests at the end of a unit of work to measure attainment of taught content
4. Departmental assessments occurring at the end of term or year
5. Tests which feed into progress monitoring (e.g. at reporting points)

Many online learning programmes also include summative assessments, where students must achieve above a certain percentage to progress onto the next level or stage.

Post-Session Questions (PSQs)

At the end of each Third Space Learning session, we ask students a few short questions independently. Students are asked questions related to the Learning Objective(s) they've covered with their tutor in that session, as well as Learning Objectives they've not yet covered. Their answers help their teachers understand both how well they've understood the content of the lesson, and which Learning Objectives they still need to cover in the future.



Use cases for summative assessment

Formal assessments which feed into progress monitoring

- Taken in exam conditions
- Composed of exam-style questions
- Based on the content covered in a previous extended time period (e.g. term)
- Reported with some kind of quantitative measure, such as a grade

Consider the frequency of these assessments carefully. Too many formal assessments can increase staff workload, encourage surface learning, and shift focus from deep learning to test content.

This issue is particularly relevant in secondary schools due to the GCSE exams at the end of Key Stage 4. Ofsted's 2023 report, Coordinating Mathematical Success, highlighted this concern and urged the DfE, Ofqual, and awarding bodies to examine whether the design of GCSEs affects teaching practices in ways that may not benefit students.

Read more: Ofsted Mathematics Subject Report: Coordinating Mathematical Success[1]

12 min read

Shorter assessments at the end of a unit or module of work

This approach gives a quick snapshot of recent attainment and can be used to identify persistent gaps. Cognitive research shows that learning improves when students retrieve information from long-term memory, known as the practice testing effect. This is why regular retrieval practice is now a key part of maths lessons.

Read more: How Retrieval Practice Helps Long-Term Maths Skills[2]

8 min read

Summative assessments can raise achievement even without formative use of the results. Activities like short end-of-unit tests have intrinsic learning value. However, teachers must remain responsive to student needs and avoid narrowing the curriculum to meet assessment deadlines. Flexibility in test timing can help prevent this.

Using the results of summative assessment

Shorter assessments at the end of a unit or module of work

For shorter unit tests, teachers may only need to briefly analyse student results. Evaluate how marking and data collection procedures impact teacher workload and student learning.

Consider if it's necessary for teachers to individually mark each paper or if students could peer-mark. If data from these assessments must be recorded centrally, ensure it serves a specific purpose.

Using results from a summative assessment formatively

Information from shorter summative assessments at the end of a unit is often used formatively by providing students with:

- Verbal or written feedback on strengths and weaknesses
- A test paper walkthrough in class
- Next steps for learning
- Red/amber/green coding of topics
- Question-level analysis (QLA) of the assessment

However, there are concerns about using summative assessments for detailed QLA. Adam Boxer highlights the risk of over-interpretation, noting the 'just right' phenomenon, where students receive marks for barely meeting criteria.

Instead of only reviewing incorrect questions or reteaching specific content, Boxer suggests a broader approach: examining the content domain of the question to identify wider issues within that domain.

> Going over the test by modelling correct answers was not so successful. It did not identify the specific gaps in students' knowledge or provide students with additional teaching or opportunities to practise the areas of mathematics they had struggled with.
>
> **Ofsted**

For example, if the majority of the class have got an expanding double brackets question wrong, teachers might need to look at where misconceptions are cropping up from the whole domain of algebraic notation and simplification - perhaps students are struggling because they have fundamental misconceptions about the difference between x^2 and $2x$, or there's an issue with working with negative coefficients.

Formal summative assessments covering several units or modules

Formal summative assessment results are often recorded and extensively analysed, with many departments using a central spreadsheet to monitor student progress. This centralised information is useful for all department members.

However, avoid overcrowding the spreadsheet with less useful data. Recording every single end-of-unit assessment result for each student is usually unnecessary. If data doesn't inform actions that impact student learning and progress, it doesn't need to be recorded.

Using results from a summative assessment data for analysis and tracking

Use assessment data frequently to make decisions on a departmental level, such as:

- Identifying students who need additional support
- Identifying high achievers to ensure sufficient provision
- Moving students up or down in a teaching set

It's also used to look for trends within a department and to compare attainment for subgroups of students. You may be interested in considering:

- Pupil premium
- Students with SEND or disabilities
- Gender
- Race/ethnicity

While results of formal summative assessments are an important part of building the picture of a student's learning and progress, they cannot provide the whole picture. This is for a couple of reasons:

1. All exam-type assessments measure performance and not learning, which is influenced significantly by extraneous factors (how the student was feeling on the day, for example)

2. Data collected through internal processes such as in-house assessments will not be as robust and reliable as data from standardised external examinations - be particularly aware of this if you choose to assign grades to a non-standardised exam paper

Single data points don't justify making large changes - for example, moving a student down a set because they have achieved significantly lower than their classmates on a single assessment, or confirming that students are 'progressing well' when using GCSE grades to measure performance and to set targets.

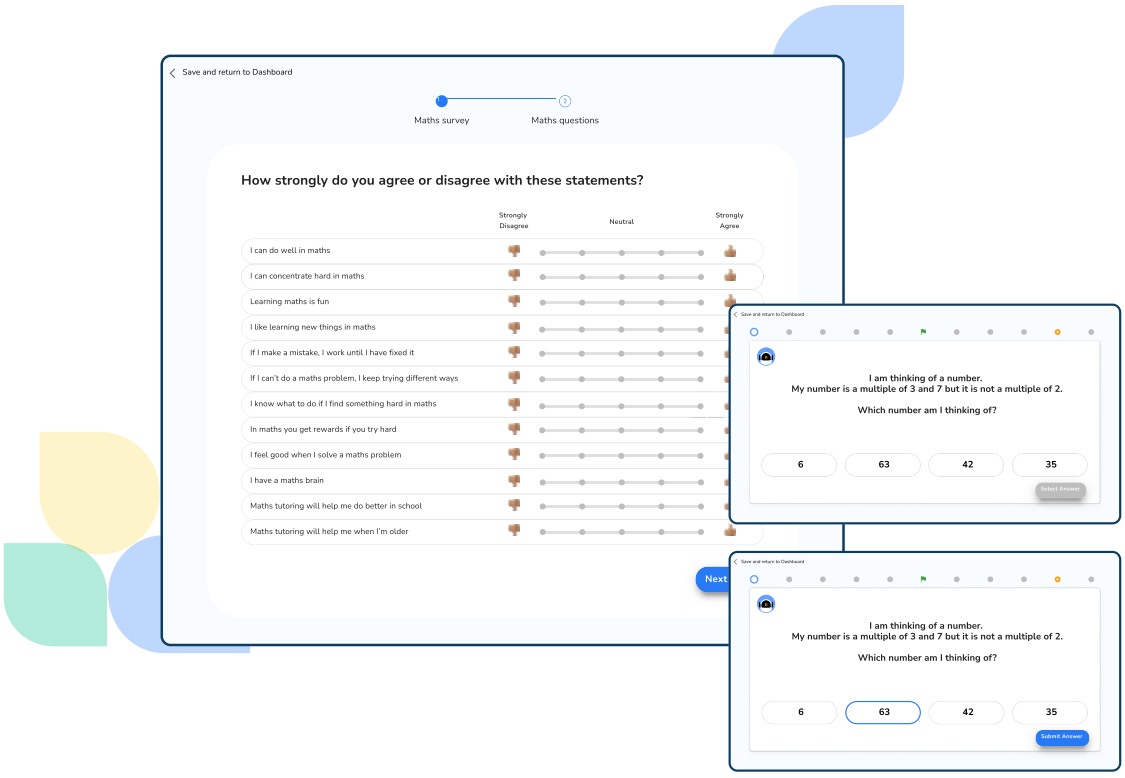
Many schools visited use the outcomes of tests to track students' progress against GCSE, or similar, targets. Teachers were sometimes expected to make intervention plans for students who were 'behind target'. This resulted in some students with identical mathematical needs not receiving the support given to others.

Ofsted: Coordinating Mathematical Success

How we use summative assessment in online one to one tutoring

Each Third Space Learning programme finishes with a programme-end quiz, which acts as our summative assessment and is used to evaluate student learning and skill acquisition. The insights gained from this assessment are crucial for evaluating the overall success of the intervention programme, ensuring accountability, and highlighting to their teachers the specific areas where a student might require further assistance.

We also incorporate 2 post session quiz questions at the end of every lesson to act as a "mini summative" assessment on the concepts just taught, which also offer an opportunity for independent practice.



Summative assessment checklist

Is there an intended meaningful use for any data collected?

The primary goal of a summative assessment is to provide a quantitative measure, so there's little point in assessing summatively if there is no intended use for that measure. Consider a formative assessment instead if there's no intended use.

Is the assessment activity measuring progress or statistical noise?

Over-testing students can mean variations in achievement (due to the non-linear nature of progress) which could be over-interpreted, leading to unnecessary interventions. Conversely, overestimating the reliability of data could mean teachers miss students who do need additional support.

Has assessment content been selected appropriately for its intended purpose?

Teachers need to carefully select the content of a summative assessment - and this content may vary depending on the intended use of the assessment data. For example, it won't be useful to collect data from an isolated short end-of-unit test and convert it to a GCSE grade to report to parents.

Does the activity assess what students have actually been taught?

With the exception of external terminal assessments such as GCSE exams, summative assessments should generally only include the content that students have actually been taught. This is relevant to the use of unadapted GCSE papers as summative assessments in Key Stages 3 and 4, which is an example of weaker practice given by Ofsted.

How often do we need to formally assess our students via high-stakes assessment?

A good answer to this is: as infrequently as you can while maintaining a decent picture of student progress across the department.

> Collecting data can [...] create an additional workload for school leaders and other staff. Inspectors will look at whether schools' collections of attainment or progress data are proportionate, represent an efficient use of school resources, and are sustainable for staff.
>
> **Ofsted Inspection Handbook 2023, Point 364**

Ofsted has adopted the Teacher Workload Advisory Group's recommendation that:

- Two or three data collection points a year is sufficient
- These collection points should be used to inform clear actions
- There should be "clear reasoning" for choosing to use more than three data collection points

Do our formal assessment procedures generate excessive workload?

The time needed to mark and analyse test-based assessments should be taken into account and balanced against using this time in other ways to benefit students. It may be appropriate to use peer-marking.

Inspectors will not look at non-statutory internal progress and attainment data on inspections of schools. That does not mean that schools cannot use data if they consider it appropriate. Inspectors will, however, put more focus on the curriculum and less on schools' generation, analysis and interpretation of data.

Ofsted Inspection Handbook 2023, Point 234

Ensure that formal assessment points are spaced across the year so that staff don't end up marking exam papers for more than one year group at the same time. For pinch points like GCSE mocks, consider spreading the marking load by sharing papers between all staff members equally, including those not teaching GCSE.

How do we meaningfully communicate results to students and parents?

Many schools use GCSE grades as part of their tracking process. However, since GCSE papers go through a rigorous standardisation process, it's difficult to assign grades in a similar manner to school-created assessments for the following reasons:

- GCSE grades are assigned as a result of a terminal examination, taken once all course content has been covered. Students are highly unlikely to have covered the required material before Year 11
- School-created assessments are often a single paper and cover a "snapshot" of material, perhaps focusing on what has been covered that term or year, whereas a set of three GCSE papers aims to cover the majority of the course. There may be considerable content gaps in a single in-house assessment
- It is impossible to standardise the results to benchmark students against national standards

It may be more appropriate to briefly report what has been assessed (e.g. "Foundation Geometry content" or a brief topic list) and a percentage score.

[Taking tests that included topics that students had not studied...] is an inefficient use of students' time, which could be better spent learning new mathematics. It could also harm students' perceptions of their mathematical capability.

Ofsted: Coordinating Mathematical Success

Formative assessment

A formative assessment is any assessment with the primary goal of **adapting teaching to meet the emerging needs of our students**. When we assess formatively, we're checking that the received curriculum matches the intended curriculum - i.e. whether students are correctly picking up what they're being taught.

> Classroom formative assessment makes more difference to student achievement than anything else that we could do.
>
> **Wiliam, 2020**

Assessment tends to be formative if it fulfils any of these aims:

- Check students' starting points before planning a teaching episode
- Ensure that any pre-requisite knowledge is secure before introducing a new concept
- Provide a "live" check during a teaching episode to see whether students are following the explanation given
- Provide feedback on the pace of the lesson
- Check whether the received curriculum matches the intended curriculum in a lesson scenario
- Check to what extent the learning accomplished by students matches the learning that was planned and intended over time
- Provide students with actionable next steps for their learning
- Involve students actively in their learning and promote independence

Characteristics of formative assessment

Low stakes

They tend to be used informally and regularly in the classroom, and have limited consequences for getting a wrong answer. In some situations it may be appropriate to use wrong answers as the basis for a discussion about a particular misconception.

Informs the next steps in a teaching sequence

It can determine the appropriate starting point for new content (see diagnostic assessment for more on this), to check whether the lesson and content delivery is paced correctly, or to check whether students' learning matches the planned learning intentions.

For example, tutors start all Third Space Learning one to one tutoring session with a 'prior learning' question. This, coupled with the results of the pre-programme diagnostic assessment each student has completed, helps them choose the most effective pathway through that lesson; giving opportunities to revisit prior learning if the student needs or moving straight to guided or independent practice as appropriate.

Five key strategies of formative assessment

To help you choose a strategy, it helps to think about formative assessment as a means to answer one of the following questions:

- Where is the student going?
- Where is the student now?
- How will the student get there?

Wiliam and Thompson (2008, rev. 2020) provide a visualisation of how these three questions can be answered using five key strategies of formative assessment:

1. Clarifying, sharing and understanding learning intentions
2. Engineering effective discussions, tasks and activities that elicit evidence of learning
3. Activating students as learning resources for one another
4. Activating students as owners of their own learning
5. Providing feedback that moves learners forwards

<table>
<tr><th></th><th>Where the learner is going</th><th>Where the learner is</th><th>How to get there</th></tr>
<tr><td>Teacher</td><td rowspan="3">Clarifying, sharing and understanding learning intentions</td><td>Engineering effective discussions, tasks and activities that elicit evidence of learning</td><td>Providing feedback that moves learners forward</td></tr>
<tr><td>Peer</td><td colspan="2">Activating students as learning resources for one another</td></tr>
<tr><td>Learner</td><td colspan="2">Activating students as owners of their own learning</td></tr>
</table>

11 examples of formative assessment

When using these strategies, bear in mind:

- We should avoid using a "tick-list" approach to formative assessment

The quality of assessment isn't improved by the number of different strategies used, but by selecting strategies that are appropriate for the scenario

- Expectations of students need to be clearly communicated

It may be useful for your school to have a department-wide policy for these strategies

Formative assessment example	Level of student responsibility	This strategy works well with...
Sharing learning intentions	Low	Diagnostic assessment
Using non-examples	Low	Questioning
Low-stakes quizzes	Low	Mini-whiteboards
Exit tickets	Low	Giving feedback
Diagnostic assessment	Low	Mini-whiteboards Confidence indicators Sharing learning intentions
Example-problem pairs	Medium	Mini-whiteboards Questioning
Questioning	Medium	Diagnostic assessment Using non-examples Example-problem pairs
Mini-whiteboards	Medium	Diagnostic assessment Example-problem pairs
Giving feedback	High	Exit tickets
Metacognitive prompts	High	Confidence indicators
Confidence indicators	High	Metacognitive prompts Diagnostic assessment

1 Sharing learning intentions or lesson objectives

Where is the student going?

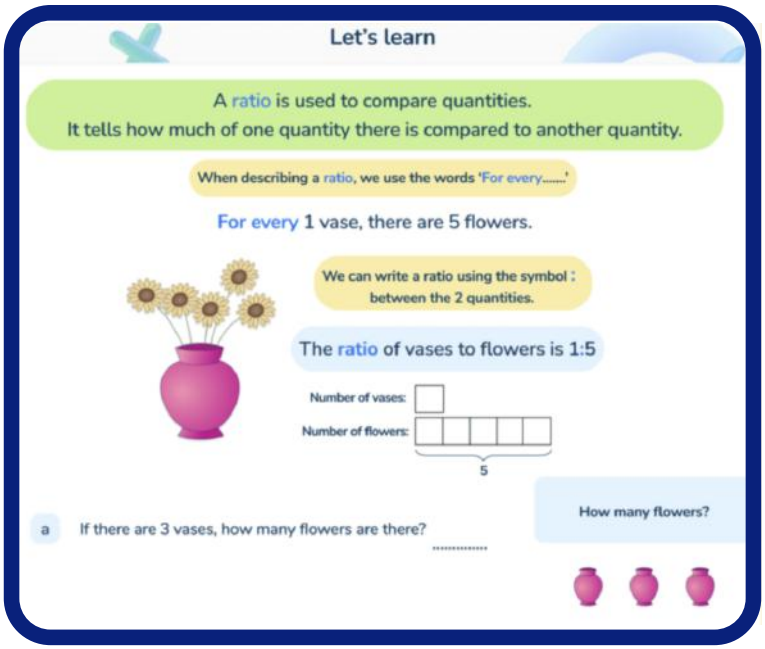
Sharing learning intentions usually includes:

- Making links to prior learning - identifying the prior knowledge needed for this new topic
- Explaining how the new learning fits into the student's current picture of maths
- Contextualising the learning and giving applications (within maths or a "real world" use)

It can be done formally at the start of a lesson, or by copying the learning objective into exercise books. For example, some schools use a short learning objective in place of a title.

Wiliam points out that making this compulsory at the start of every lesson is counter-productive, as sometimes students (and the teacher!) may not know exactly where the lesson is going - and this is OK. Using objectives that are too specific can close down or limit paths that students could take.

This evidence is used formatively to build a collective picture of the group's current level of mathematical knowledge and understanding, allowing the teacher to find more personalised "jumping-off" points to introduce new ideas and concepts. For example, a student's contextual example could be used within the teacher's initial explanation.



Third Space Learning's one-to-one tutoring uses real-life examples to help to contextualise learning and link back to prior knowledge

2 Using non-examples

Where is the student now?

Non-examples are a powerful teaching strategy for introducing new concepts, and work well for areas of maths where something is given by definition, such as a shape or a type of number.

- Presenting students with a non-example gives them the opportunity to explore the limits of the given definition and examine boundary cases
- Providing students with a series of interleaved examples and non-examples is a great way to have them develop a concept for themselves and leads to better retention

This strategy becomes formative when the teacher uses the evidence collected to identify and address deep misconceptions that arise during class discussions. Students can be encouraged to reflect on how their understanding of a concept has been challenged and altered.

3 Low-stakes quizzes

Where is the student now?

Low-stakes quizzes tend to be short, regularly-occurring, with limited consequences for students. One example is a ten-minute weekly quiz about the previous week's work. Low-stakes quizzes may be used for:

- Retrieval practice
  - Improved retention of recently learned information via the testing effect
- Diagnostic assessment
  - Results are used to identify key misconceptions or continued gaps in students' knowledge
- Providing quick feedback
  - Students can self or peer-assess to find short, meaningful actions to be taken from their results
  - Teachers can provide targeted verbal feedback to those who are making more persistent errors
- Improving metacognition and study habits
  - Students can reflect on their results and identify target topics for independent work
  - See the section on Metacognitive Prompts for more ideas.

A low-stakes quiz used only for retrieval practice is not formative assessment. However, if the teacher uses the results of a short quiz to identify a persistent misconception and adapt the next lesson accordingly, the strategy becomes formative.

4 Exit Tickets

Where is the student now?
How will the student get there?

An exit ticket is a short low-stakes question or exercise, usually issued at the end of a lesson and printed for students to physically hand in when they leave. They can also be presented on-screen, which means the question(s) can be adapted on the fly if the lesson has not proceeded as planned (for example, if some content has not been covered).

This strategy becomes formative when student responses to exit tickets are collected and analysed before the next lesson, so that learning materials can be adapted as required.

Well-formulated exit questions often provide a good opportunity for focus-marking and giving written feedback, particularly if the question is formulated diagnostically or draws out common misconceptions.

Read more: How To Use Exit Tickets To Find Out What Your Students Have Learned[3]

7 min read

5 Diagnostic assessment

Where is the student going?
Where is the student now?

Any assessment with the primary goal of identifying and evaluating students' current knowledge and understanding in a content domain is considered a diagnostic assessment.

We take a more detailed look at diagnostic assessment in a dedicated section later in the guide, but here are a few strategies that work particularly well to generate detailed evidence for diagnostic use:

- Diagnostic questions
- Always, Sometimes, Never tasks
- One-minute papers
- Concept mapping

The evidence collected is used formatively by the teacher to adapt lessons, to ensure that required prior knowledge is secure, or to forensically diagnose deep misconceptions that are holding students back.

6 Example-problem pairs

Where is the student now?

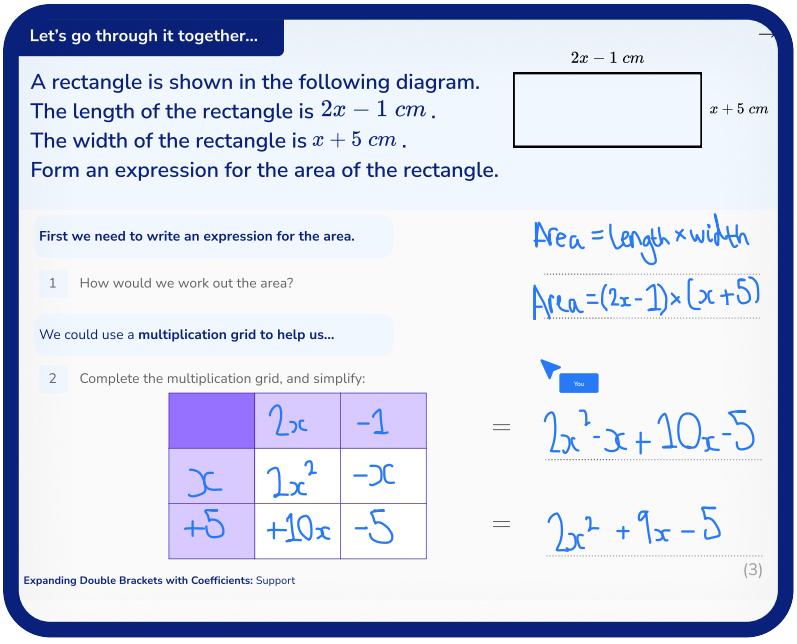
Example-problem pairs are commonly used for rehearsal of a new method or concept. They are used after the teacher has completed their initial explanation, and replace the typical teacher-only worked example.

In an example-problem pair:

- The teacher completes a worked example
- Students complete a mirrored example (e.g. some numbers are changed)
- The process is repeated, usually until all students are able to successfully replicate what has been demonstrated

The teacher uses student responses to draw out and address misconceptions, and to decide whether to provide an alternative model for understanding. However, if all students are answering correctly straight away, it's an indication that they are ready to move to deliberate independent practice of the new concept.

The evidence collected is used formatively by the teacher to adapt and vary their explanations or change the pace of the lesson.



During Third Space Learning one to one tutoring sessions, students work through a scaffolded example with their tutor before trying a similar question on their own, helping them move from guided to independent practice.

7 Questioning

Where is the student now?

Questioning can be a really effective way to assess formatively.

Open questions

Questions like "How do you know?" or "Can you convince me?" are a powerful way to encourage students to recognise and explore how they know rather than just what they know. See the section on Metacognitive prompts for more on this.

Closed questions

These questions can be used during a teacher-led explanation to keep students actively listening, without interrupting the flow of the lesson like an open question might. Incorporating closed quickfire questioning with a tool such as mini-whiteboards is a fantastic formative assessment strategy.

William points out that if classroom dialogue is flowing well, asking a question can close this down as it invites a "guessing contest" rather than following the natural flow of discussion.

This strategy becomes formative when the teacher uses students' answers to change or adapt the lesson. Questioning techniques are useful at "hinge points" in the lesson, when transitioning from teacher-guided work to independent deliberate practice.

Read more: Effective Questioning in the Classroom[4]

5 min read

8 Mini-whiteboards

Where is the student now?

Effective use of mini-whiteboards means developing a consistent routine from Year 7 onward. While students are likely to have used mini-whiteboards at primary school, there may be variations in the routines they are used to.

In order to develop a consistent department-wide routine for using Mini-whiteboards:

1. Insist on full participation from **all students**
2. Students **must not** show their boards to anyone until everyone has sufficient time to respond - students could instead "hover" their boards face-down above their desks, ready to flip up when they are given the instruction to do so
3. The time allowed to answer a question should be relative to the difficulty of the question asked. For quickfire questions, five to ten seconds is sufficient
4. Give students a predictable verbal indicator that they need to show their answers - e.g. a countdown from three/five and "Show me"
5. Make a mental note of students who have incorrect answers or have taken a long time to answer - these are the students to target during independent work
6. Repeat questioning until all students are getting the questions correct - peer support could be used to identify and dispel persistent misconceptions

Read more: Mini-Whiteboards: 7 Ways To Use Teachers' Favourite Classroom Resource[5]

7 min read

Mini-whiteboards can be used for a wide variety of assessment tasks and strategies, and are one of the easiest ways to get instant, whole-class feedback. They are not a formative assessment strategy in their own right until that feedback has been used to adapt teaching in some way.

9 Giving Feedback

How will the student get there?

Research studies since the 1990s have confirmed that comment-only feedback is better than feedback which includes grades or other benchmarking, which tends to result in an ego-involved, emotional response and does not motivate learning, even if comments are given as well.

So teachers aren't over-burdened by writing lengthy paragraphs on each student's work, they could:

- Provide verbal feedback
- Ask students to find and fix a given number of errors ("detective marking")
- Work as a group to assign short pre-printed comments to each other's work
- Focus marking on a portion of work or single question

Black, Wiliam and others describe feedback as one of the best ways to increase student achievement, and the EEF rates feedback as "very high impact for very low cost", assigning it +6 on their impact measure of additional months' of progress.

This strategy only becomes formative when students act upon the feedback. The benefits of detailed feedback should be balanced against workload considerations and the likelihood of students taking action as a result of feedback.

10 Metacognitive prompts

Where is the student now?
How will the student get there?

Metacognition is an introspective, intentional examination of our thoughts, feelings and mental processes - described as "thinking about thinking". This can include:

- Planning a strategy to solve a problem or learn a new skill
- Monitoring progress, adapting the planned strategy where necessary
- Evaluating how things have gone and changes that can be made for the future

While metacognition is a powerful tool, some students may struggle with it. Providing prompts can help them to verbalise some of their ideas and begin to identify where their next steps might be. Here are a few examples of prompts you could give to assist when solving a more complex, multi-step problem:

- What are the most important parts of this question?
- What do you already know that might be relevant to answering this question?
- Have you seen a problem like this before?
- What strategies could you try if you get stuck?
- (Evaluating) Do you understand the solution?

This strategy becomes formative when students engage with the strategies and use the skills they have developed to effect a longer-term change - for example, choosing a particular information source like a website that they can refer to in future when stuck.

Read more: The 10 Metacognitive Strategies That Will Empower All Primary And Secondary Students[6]

5 min read

11 Confidence indicators (Red, Yellow, Green)

Where is the student now?

Students use coloured objects (usually cups or cards) to indicate to the teacher whether the pace and pitch of the lesson is right for them.

During teaching episodes:

Students could stack red, yellow and green cups on their desks, and use these to show whether they are following the steps. The meaning of each colour needs to be made clear, as indicated in this example rubric:

- Green - I understand what's going on
- Yellow - The pace is a bit too fast, please slow down
- Red - I want to stop the lesson and ask a question

A powerful strategy to accompany this is the rule that, if the lesson is paused because **a student displays a red cup, a student with a green cup is selected to answer their question.** This prevents students just leaving themselves on green to avoid participation in the lesson.

Consider using this example rubric:

- Green - Everything is OK, I don't need help
- Yellow - I have a question but it's not stopping me from working at the moment
- Red - I can't make any more progress without help

William explains that a system like this allows teachers to "triage" their time and work out which students to prioritise when offering assistance.

This strategy becomes formative when the lesson pace or structure is adapted in response to student feedback. Although this strategy gives a subjective measure of confidence (we often worry that our students can't self-assess accurately), it can be a powerful accompaniment to other formative assessment strategies.

For example, the teacher could use this strategy in conjunction with mini-whiteboards. A student might have incorrectly answered a question on the mini-whiteboard and yet be displaying a sign that they're confident in their answer. This could indicate that the student has not actually understood the concept (but thinks they do) and needs support.

Common formative assessment misconceptions

Misconception 1: formative assessment tells you what students have learned in a lesson

Learning can be defined as an alteration in long-term memory. If nothing has altered in long-term memory, nothing has been learned.

Ofsted Inspection Handbook 2023

We can never say objectively that the learning we intended has definitely taken place, particularly over as short a time period as one lesson. Learning involves changes to students' mental structures, so we can only measure this subjectively and performatively.

As Wiliam and others have pointed out, the point of eliciting evidence of learning via formative techniques is to **incrementally increase the probability** that the learning that has taken place matches the initial learning intentions - the more you check and correct, the more likely this becomes.

Didau, 2014

Misconception 2: formative assessment only occurs when particular tools or strategies are used

There is nothing intrinsic to an assessment strategy or resource that automatically makes it either formative or summative assessment. Unless you do something formative (adapt the lesson, revisit a topic, encourage students to engage in self-assessment) with the assessment results, there's no formative assessment going on!

Misconception 3: a wide variety of observable formative assessment strategies should be used in all lessons

Using a whole host of different strategies in one lesson is likely to break the natural flow of a teaching episode and waste time. Students and teachers function far better with one or two well-learned routines than a whole host of different ideas.

Misconception 4: all strategies are equally applicable for all groups and circumstances

Some strategies just won't work with some groups of students - the time required to get the strategy functioning effectively is not worth the investment. Introducing routines and strategies in Year 7 and using them consistently is more likely to be worth the time invested.

Misconception 5: students must be given regular, detailed feedback to improve

> Few practices in teaching take up such enormous amounts of time and energy as marking. If we are going to dedicate such a lot of these limited resources to an activity, we must be sure that there will be a [more significant] impact on learning [...] than if the time and energy had been invested in undertaking a different activity.
>
> **McCourt, 2019**

Detailed written feedback generates an unsustainable workload, particularly for teachers with a large number of classes, and the process may become a tick-box exercise with no meaningful impact. Marking policies need to be assessed for their usefulness against other activities which might more greatly benefit students.

Ofsted has recently included considerations of whether assessment practices and feedback policies are manageable for staff in the current Inspection Handbook:

> "Inspectors will discuss with staff their workload, including whether assessment practices create any unnecessary burdens"

Using the results of formative assessment

During that lesson

Adapting lesson materials and explanations in real-time is a powerful use of formative assessment. For instance, if a model isn't working for a group of students, a teacher can quickly switch to an alternative model and use additional strategies to ensure it's effective. This aligns with Wiliam's concept of formative assessment as 'responsive teaching'.

This approach can be challenging for ECTs, less experienced, or non-specialist teachers. It might be better to prepare different materials for the next lesson instead of adapting on the spot. Careful diagnostic assessment prior to starting new work can also reduce the need for this.

For subsequent lessons

Formative assessment can also be used to change the planned content for a series of lessons. This could mean slowing the pace and building in more time for deliberate practice, or designing a task to address a particular misconception.

Exit tickets or questions can be particularly useful for providing a snapshot on which to base the starting point for the next lesson.

For future teaching

Formative assessment should be used to adapt teaching materials or schemes of work for subsequent classes.

If a misconception crops up during a lesson one year, a teacher can anticipate this for future teaching of the same content and proactively build in activities to expose and address that misconception.

How Third Space Learning uses formative assessment data

We're fortunate to have **1.9 million sessions' worth of data** to work with when we're looking to identify any areas for improvement in the way lessons are set up. Each month, we use metrics such as feedback from tutor and pupil, and which questions are most often answered incorrectly to analyse the lessons delivered.

With this wealth of qualitative data at our fingertips, we can look into whether the incorrect answers are stemming from a wider issue and from there make adjustments to our curriculum design or tutor training depending on the answer. We are continuously monitoring the data to ensure that each pupil has the best experience possible!

Questions to answer at a departmental level

Does your staff observation policy promote good practice?

If you carry out regular staff observations using a rubric or checklist, ensure that it's clear that you're interested in the **formative action taken** as a result of assessment strategies, rather than checking off a list of specific strategies observed during a lesson.

Check the wording of policy documents - remember that learning is a long-term process and that the aim of formative assessment strategies is not to measure what students have learned in a single lesson.

Would your department benefit from consistent formative assessment routines?

Developing a department-wide approach for formative assessment helps students know what to expect in each lesson. For example, you may decide to implement a departmental mini-whiteboard routine (as previously discussed) which will be introduced to students in Year 7 and remain consistent during their time at secondary school.

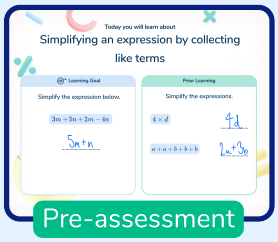
For strategies which require resource development such as low-stakes quizzes, staff could create a shared central bank of resources on a departmental template and tweak them for each class.

Using formative assessments in one to one teaching

Unlike the outcome-centred approach of some assessments, at Third Space Learning our formative assessments are focused on the teaching process. Conducted at the beginning of each lesson, they provide in-depth insights into the current topic and offer various methods and strategies that tutors can employ to adapt their teaching accordingly.

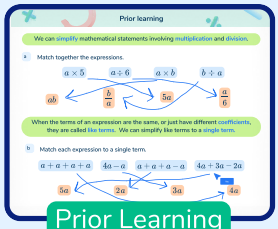
Third Space Learning sessions contain multiple structured pathways, guided by diagnostic assessment and ongoing tutor assessment, that allow pupils to move quickly through areas they are confident in and receive additional support in areas they are struggling with.

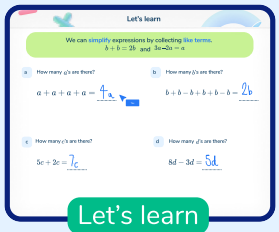
All students complete a quick assessment with their tutor before they begin

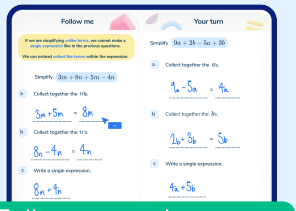


Students start here if they need a refresh of the concept before they move on

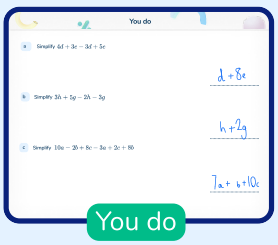
Students start here if they've shown they have the required prerequisite knowledge

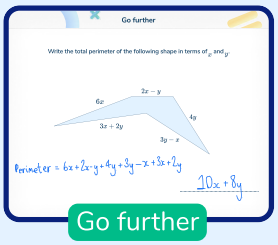






Students start here if they've shown they're ready to go straight to application

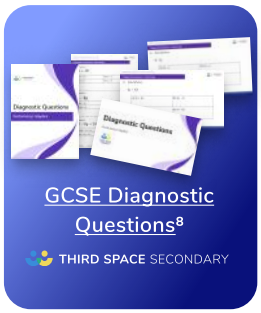




Example Year 7 Lesson: **Simplifying an expression by collecting like terms**

Diagnostic assessment

A diagnostic assessment is any assessment with the primary goal of identifying and evaluating students' current knowledge and understanding in a content domain. This type of assessment usually aims to inform teaching and adapt planning, demonstrating the association between diagnostic and formative assessment.



Characteristics of diagnostic assessment

Low stakes

Diagnostic assessment strategies are low-stakes and used informally. Wrong answers don't usually have significant consequences, and can be used to initiate a discussion about misconceptions.

Informs the next steps in a teaching sequence

Diagnostic assessment does not have to occur just at the start of a unit of work - it may be used formatively during a series of lessons to identify issues which have arisen during the teaching of new content.

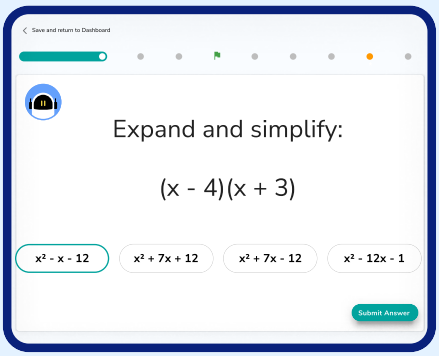
3 examples of diagnostic assessment

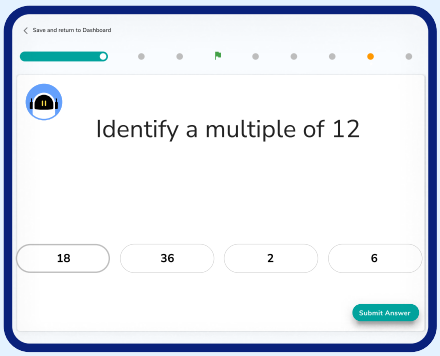
1 Diagnostic questions

Where is the student going?
Where is the student now?

Popularised by Craig Barton, diagnostic questions are closed, multiple choice questions with very carefully selected answer options. One of these is the correct answer; the others (sometimes called distractors) are precisely chosen to each reveal different misconceptions.

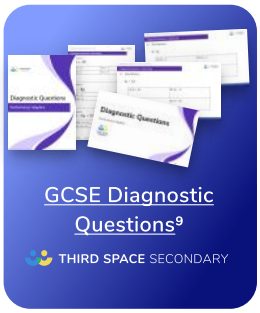
Every student sits a diagnostic kick off quiz before starting their Third Space Learning tutoring programme which helps their tutor personalise their learning.





Reduce time by creating a departmental bank of questions to use at key points within a scheme of work.

Third Space Learning's team of former maths teachers have created topic-based sets of carefully created Diagnostic Questions that are available to download for free.



Read more: Diagnostic Assessment: Your Teaching And Intervention Must Have[10]

7 min read

2 Always, Sometimes, Never tasks

Where is the student now?

Always, Sometimes, Never tasks generally take more time than simple diagnostic questions, are more open in nature and generally require more discussion time.

Teachers provide students with a series of statements connected to a particular topic, with the goal of grouping these statements under three headings - those which are always true, sometimes true and never true. Here are a couple of examples:

Always true	Sometimes true	Never true
$x + x = 2x$	$x^2 > x$	$x + 3 = x + 5$
Squares are rectangles	Rectangles are squares	A quadrilateral has five lines of symmetry

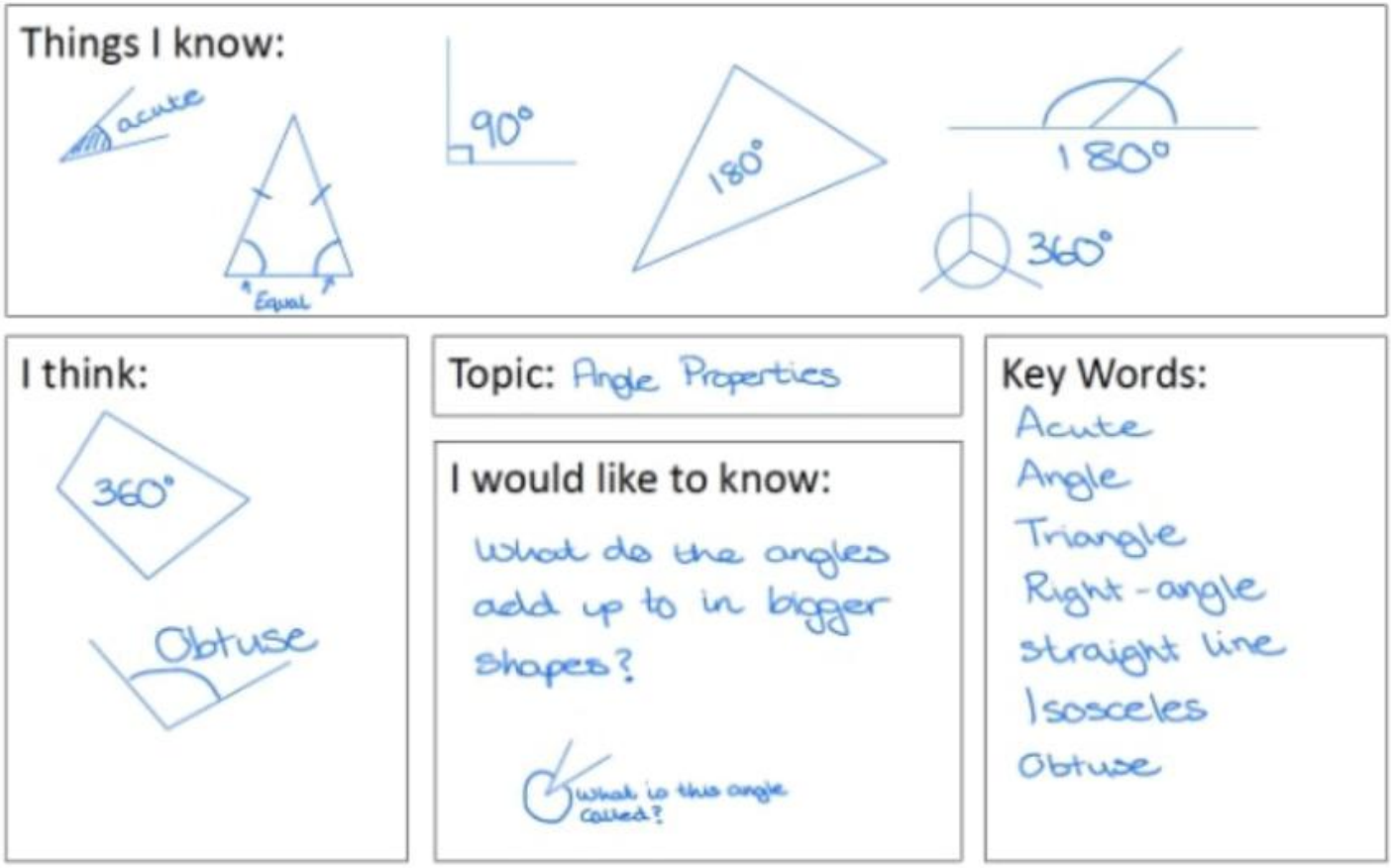
The Standards Units, NRich and ATM publications are a great source for this type of activity.

3 One-minute papers and concept maps

Where is the student now?

One-minute papers, also known as brain-dumps, require students to take a short time to write down everything they know about a given topic. This helps you check and assess prior knowledge to determine the most appropriate starting point for a new topic.

Your students can do this informally on a blank sheet of paper or a whiteboard. Alternatively, you could provide them with a rubric:



Concept maps are a related strategy where students brain-dump and then draw the links they already know between different parts of a new topic. This helps to emphasise the interconnectivity of the web of maths.

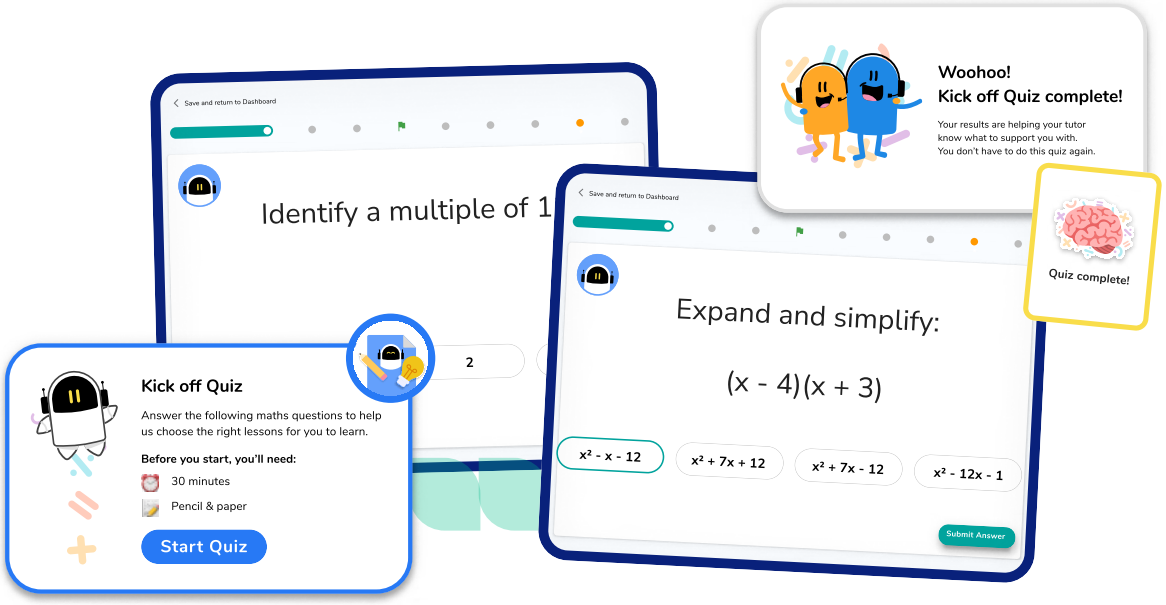
These strategies are "weaker" diagnostic tools because you're relying more on students' independence and ability to self-assess and self-regulate. However, they can be useful in combination with other formative and diagnostic strategies.

Using diagnostic assessment in online one to one tutoring

All Third Space Learning programmes start with a "kick off quiz" which is used to assess the current knowledge and skills of students before instruction begins. They help identify students' misconceptions, strengths, weaknesses, knowledge, and skills prior to instruction.

This valuable information enables the tutors to tailor the instruction to the students' specific needs, thereby enhancing their learning outcomes. The tutor can understand if the goal of the lesson is to consolidate knowledge or address gaps, as well as using the quiz results as a baseline for measuring future learning progress.

Teachers can reorder the lessons at any point throughout the programme to focus on any gaps identified via diagnostic assessment.



"The diagnostic assessment is excellent as it's enabled the tutors to **focus on what the students actually need** rather than just whatever they feel like. Their teachers have noted that their **confidence has increased**. They see it in the classroom when a question comes up and they'll say **'I know how to do that! I did it with my Third Space Learning tutor'**."

Scarlett O'Sullivan
Deputy Headteacher, Barclay Academy

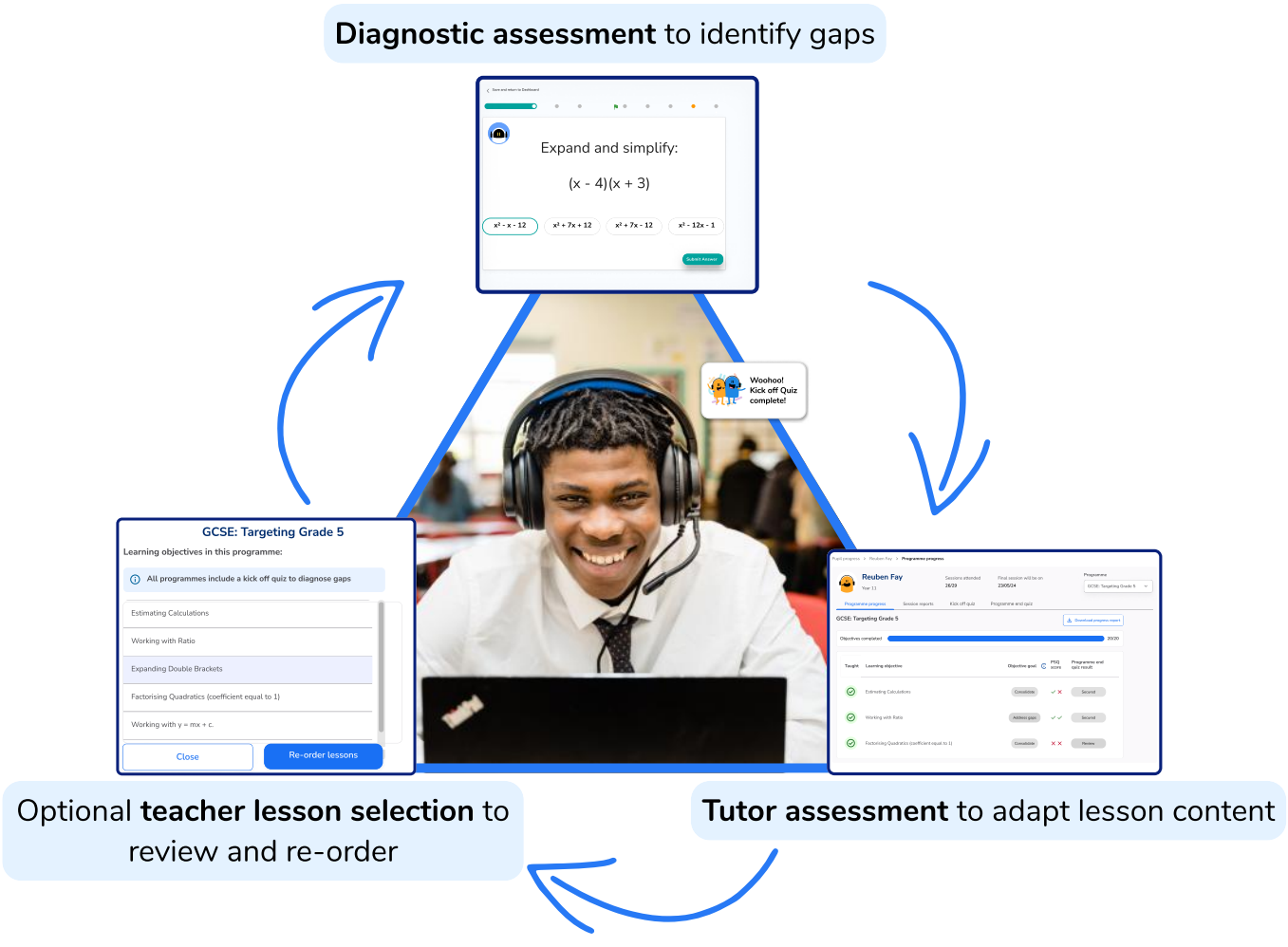
Final word on assessment

Summative, formative, and diagnostic assessments enable teachers to measure student achievement, inform instructional practices, and identify specific learning needs. To help you get started, we've included an assessment tool picker overleaf to help identify what kind of assessment you need and when.

Third Space Learning tutoring complements these assessment strategies by providing personalised, one to one support tailored to each student's unique needs. Our expert tutors use the insights gained from various assessments to customise each student's learning journey and address their specific gaps. This targeted approach not only helps students towards exam success but also builds their confidence in maths. By incorporating a range of different assessments into the structure of our tutoring programmes, we've helped schools to support multiple students simultaneously, at scale, and at a price that works for school budgets.

Third Space Learning: a more affordable approach to online one to one maths tutoring

We are proud to have provided online one to one tutoring to over 160,000+ students across 4,000+ schools since 2013. We'd love to support your school. Find out more about how Third Space Learning works and our impact in schools like yours.[11]



Assessment tool picker

Purpose	Type	Strategies to try
Measure student attainment of recently taught content	Summative but results can be used formatively	• Short module test
Track student progress over time and provide evidence to feed into reporting process	Summative	• Formal assessment at the end of the term or year
Check students' starting points before planning a teaching episode	Formative Diagnostic	• Diagnostic questions • One-minute papers • Concept maps • Confidence indicators
Ensure that any pre-requisite knowledge is secure before introducing a new concept	Formative Diagnostic	• Diagnostic questions • Low-stakes quizzes
Provide a "live" check during a teaching episode to see whether students are following the explanation given	Formative Diagnostic	• Example-problem pairs • Mini-whiteboards
Provide feedback on the pace of the lesson	Formative	• Questioning • Mini-whiteboards • Confidence indicators
Check whether the received curriculum matches the intended curriculum (in a lesson)	Formative Diagnostic	• Diagnostic questions • Mini-whiteboards • Exit tickets • Metacognitive prompts • Always, Sometimes, Never activities
Check to what extent the learning accomplished by students matches with the learning that was planned and intended (over time)	Formative Diagnostic	• Diagnostic questions • Questioning • Low-stakes quizzes • Metacognitive prompts • Short module tests used formatively
Provide students with actionable next steps for their learning	Formative	• Giving feedback
Involve students actively in their learning and promote independence	Formative	• Giving feedback • Metacognitive prompts

Acknowledgements, additional resources and reading

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