



**THIRD SPACE
LEARNING**

The Secondary School Guide to Metacognition

Examples, tips and strategies to successfully embed
a metacognitive approach to teaching and learning
across your school.

SLT Guides

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Introduction

What is metacognition?

Metacognition is an awareness and understanding of one's own thought processes. It is one of three essential components of self-regulation; supporting students to think about their own learning more explicitly:

Cognition – the mental process involved in learning

Metacognition – Often described as 'learning to learn' or 'thinking about thinking'

Motivation – willingness to engage our metacognitive and cognitive skills.



Metacognition and self-regulation approaches to teaching support students to think about their own learning more explicitly, often by teaching them specific strategies for planning, monitoring, and evaluating their learning.

EEF, Teaching and Learning Toolkit¹

Most teachers often support metacognition and self-regulation without realising it. This automaticity is why it can be difficult to give concrete examples and share best practice.

Teaching metacognitive strategies is easier said than done; **this guide aims to bridge the gap between research and practice in the classroom.**

We've dug into the research and summarises the key information teachers need on metacognition in regards to maths teaching and learning, and provided practical and advice for today's maths classrooms.

This guide draws on our experience as an online one to one maths tutoring providers since 2013, helping 170,000+ students develop their metacognitive skills.

Why is metacognition important?



“There is a strong body of research from psychology and education demonstrating the importance of metacognition and self-regulation to effective student learning. The Sutton Trust-EEF Teaching and Learning Toolkit—which summarises international evidence—rates ‘metacognition and self-regulation’ as a high impact, low cost approach to improving the attainment of disadvantaged learners.”

Metacognition and self-regulated learning guidance report, EEF²

Studies reviewed by the EEF found disadvantaged students are less likely to use metacognitive strategies. Introducing these strategies can be a great way to support your students who need it most.

When students use metacognitive activities effectively, they:

- ✓ Set goals;
- ✓ Select specific strategies to enhance their learning experiences;
- ✓ Use self-assessment or self-questioning to monitor their own learning.

In recent years, metacognitive strategies have been increasingly researched with findings being applied to students' problem-solving skills, study strategies, reading comprehension interventions, and learning strategies.



Cognitive processes are the range of learning skills that students possess. In contrast, metacognitive processes enable students to self-evaluate the effectiveness of their cognitive processes.

Schraw, 1998.³

Why is metacognition important?

+ Raises attainment

7+ The EEF's report states that the potential impact of metacognition and self-regulation approaches is high (+7 months additional progress).

+ Closes the attainment gap

There is some indication from the EEF stating students who come from disadvantaged backgrounds are less inclined to use such tactics and, as a result, could potentially gain the most from them.

The EEF's research indicates that using metacognitive teaching strategies is more beneficial for learners who are at a disadvantage compared to their peers.

+ Develops more independent learners

When young people are capable of monitoring their progress, it enables them to manage their own thinking and independent learning, both in and out of the classroom.

+ Easy-to-implement

A metacognitive approach to teaching does not require specialist equipment. It only requires teachers to be trained effectively in metacognitive practices. Professional development and training opportunities are the main expense for integrating metacognition in education.

+ Transferable

Metacognition helps learners apply their knowledge and understanding across tasks, contexts and subjects.

+ Improves resilience

By identifying their successes and failures, and which specific strategies work best for them, learners have a toolkit for perseverance with their work.

+ Supports emotional and social growth

Gaining awareness of their own thinking, learning processes and cognition allows learners to think about how to be happy and confident in themselves. Metacognition also allows learners to consider others' perspectives.



Read: [What Is A Growth Mindset And What Does It Mean For Kids And Parents⁴](#)

3 min read

+ Boosts motivation

Research shows metacognition increases learner motivation because learners feel more in control of their own learning. Learners who make use of metacognitive strategies are more aware of their own thinking and more likely to be active learners who learn more deeply.

Maths & metacognition

Although the skills of planning, monitoring, and evaluating are common to all subjects, the way these skills are applied can vary depending on the subject. For instance, planning an essay requires a different skill set than planning how to find the tangent to a curve.

When used simultaneously with approaches that support talk in the classroom, metacognitive strategies can improve mathematical skills and confidence.



One to one teaching provides a unique opportunity for focused maths talk. All teachers wish they could sit side by side with their students and discuss maths and problem solving in depth – but in a busy class of 30, this isn't always possible.

Third Space Learning provides online one to one maths tutoring for primary and secondary students. With their dedicated maths specialist AI tutor, students work through topics at their own pace.

AI tutor Skye models different strategies and verbally explains how to approach maths problems. When students move on to more independent practice, Skye asks questions and encourages students to do the same to develop their metacognitive skills.

The EEF found that metacognitive strategies are most effective when embedded in the curriculum and a specific subject lesson. This means that to foster metacognitive awareness in mathematics, learners must acquire it in the mathematics classroom.



Research has shown that intervention programmes targeted metacognition:

- ✓ Are more successful at raising maths attainment
- ✓ Have a higher impact than curriculum reform and computer-assisted instruction
- ✓ Reduce maths anxiety



At Third Space Learning, we teach metacognitive skills within our maths lessons.

Our team of pedagogical experts carefully design curriculum-aligned lessons and prompts for AI tutor Skye that actively develop metacognitive strategies.

Skye is trained to promote the development of metacognitive skills through questioning. One to one tutoring allows students to feel more comfortable and confident in verbalising their thoughts, reflecting on their progress, and actively participating in the learning process, which may not be possible in a whole-class environment.

Effective Questioning Techniques

Questioning does **not** mean just asking your students any questions. Questions should be thought out when you are planning your lessons such that you are able to **use questioning as an assessment for learning (AfL) tool** whilst you are teaching.



Effective questioning techniques

- Asking a range of questions, from basic fact recall to more open-ended and exploratory questions (e.g. *"What do we need to do when adding two fractions together?"*)
- Using "why" and "what if" questions often, which focuses on depth of learning and clarifying understanding (e.g. *"Why can't our answer be an even number?"*)
- Using effective follow up questions, that facilitate meaningful discussion (e.g. *"How do you know your answer is correct?"*)



Ineffective questioning techniques

- Repeatedly asking ineffective or complicated questions (e.g. *"Is it 6? Are you sure it's 6? Is it 6 or is it 5?"*)
- Questions that obviously guide the student to just choose the opposite answer (e.g. *"Are you sure?"*). You could instead say to the student: *"Can you explain how you got that answer?"*.
- Telling the student the answers and/or what methods/calculations should be used, which impedes learning during the session (e.g. *"To find the difference you have to subtract"*)

Step by step: how to teach metacognition

★ Research has shown that students' use of metacognitive strategies significantly improves when their teachers explicitly state the cognitive processes required to complete a task.

To help teachers with this, the EEF produced an evidence-based 7-step framework for teaching metacognitive skills. It can be applied to all subjects and to any age group.



Read: [Metacognition and Self-Regulated Learning Guidance Report⁵](#)

We've summarised the EEF's report below and practical examples from our own online one to one GCSE maths tuition so you can see each step in action.

1 Activating prior knowledge

Before every lesson, teachers should activate students' prior knowledge relevant to the lesson. This technique helps students assimilate the new information with previously learnt material and reduce the demands placed on the working memory during the lesson.

Using a low-stakes quiz is one of the most effective ways of activating prior knowledge and can take as little as 5 minutes at the start of a lesson. This could be a quick recap quiz as a class or could take the form of homework set in advance of a new lesson.





Practical examples to activate prior knowledge

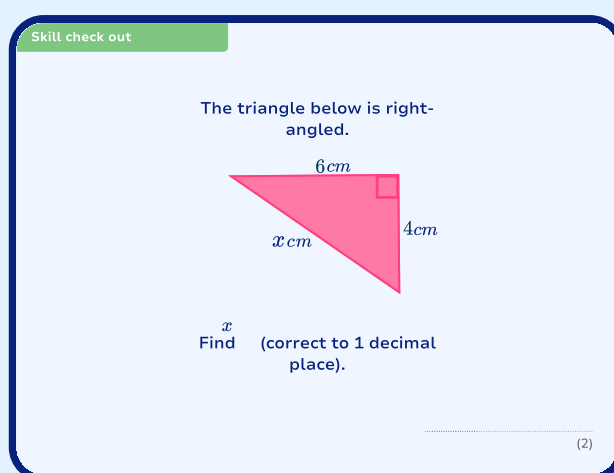
Our one to one tutoring sessions begin with a skill check in question to check students prior knowledge. Skye uses this diagnostically to understand what the student does and doesn't know and adapts the teaching and learning accordingly.

By asking carefully considered questions, Skye can model various planning techniques for its students.

For the GCSE lesson, examples may include:

- How do you know that is correct?
- How have you worked out their answer?
- Do you remember the formula given by Pythagoras' Theorem?
- How could you use it to answer this question?
- Would you change your method if you were not trying to find the longest side?
- How do you know which side is the longest?

Skye also encourages students to monitor metacognitive strategies. Every lesson ends with a confidence check out so the learner can assess how confident they now feel applying their knowledge of the maths concept in different contexts.



Third Space Learning's online one to one GCSE maths revision programme introduction slide

2 Explicit instruction

Explicit instruction is important for developing metacognitive skills. It ensures that students are secure in their knowledge of the cognitive strategies available to them for problem-solving. It is teacher-led and the quality of the instruction depends on the teachers' knowledge.

Clear worked solutions with notes that detail each step is effective for explicitly teaching new topics.



Practical ideas for explicit instruction of metacognitive skills

Skill check in

Here are the first three patterns in a sequence.



a) How many blue and how many orange squares will there be in pattern number 4?

Blue:

Orange: (2)

b) Can you explain what makes the pattern of blue squares an arithmetic sequence?

..... (1)

Skye engages students in their Third Space Learning one to one maths tutoring by asking questions.

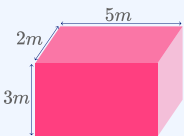
If students do not demonstrate sufficient understanding during the skill check in, lessons begin with explicit instruction to model the mathematical concept and develop their knowledge.

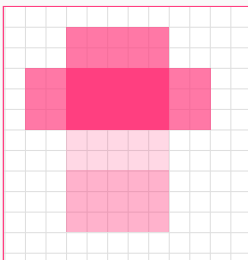
Skye then moves on to working through a similar problem with the student. At this stage, it may ask students questions such as “How could you check that is correct?”

For students with a good understanding of the skill check in, Skye jumps straight to an independent GCSE style question to assess whether the student can already use the strategies accurately.

Let's go through it together.

Find the surface area of the cuboid.





Total surface area = m²

..... (2)

3 Modelling

Modelling a new strategy offers two important benefits for students:

- ✓ They learn how to apply the new strategy to solve problems.
- ✓ It is an opportunity for the teacher to model metacognitive strategies if they think-aloud and verbalise their decision-making processes.

Modelling a strategy using worked solutions is an effective form of explicit instruction in mathematics, especially for novice learners (Manson and Ayres, 2019).

However, expert learners benefit more from partial worked solutions due to the expertise-reversal effect. The amount of detail included in demonstrating a new technique should depend on the students' proficiency and the difficulty of the technique.

Example-Problem Pairs is a very effective approach for modelling in mathematics.

The teacher presents two very similar problems to the class (one on each side of the board). On one side, the teacher models a complete solution; students then attempt the question on the other side of the board, using the worked solution as a guide.

“Today, we’re thrilled to be at the forefront of using Third Space Learning’s AI voice tutoring. This innovative one-to-one maths tutoring solution offers an even more cost-effective alternative. The children are thoroughly enjoying the experience, and their engagement and focus are clearly evident.”



Chris Harris, Deputy Headteacher
Admirals Academy, part of EMAT



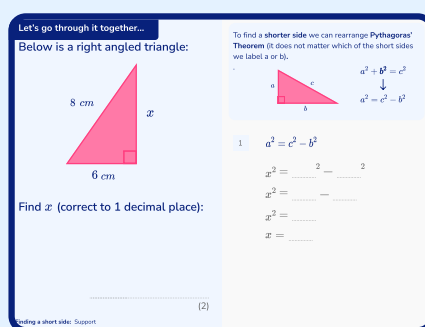
Practical ideas for modelling of learned strategy

In our online one-to-one tuition, Skye demonstrate maths concepts to students and explicitly explains the metacognitive skills that students need to improve their maths performance.

Together, Skye and the student discuss ideas through their audio connection. Skye demonstrates the planning, monitoring and evaluating thought processes of a maths specialist.

For example:

- “The first thing I would always try to do with questions like this is to...”
- “I might check at this point that I am on the right track by...”
- “To check if the answer is correct, I would...”



Skye breaks down complex multistep questions step by step

In our GCSE revision lessons, the support slide allows Skye to break down more complex questions and walk through them step by step.

For example in this Pythagoras' theorem question, Skye would either model or guide the student through a problem solving approach by finding CB in order to find CD (x).

I have been asked to find x in this question, but I cannot find it straight away because I do not have enough information – what side can I find and how? How does finding CB help me to find x(CD)?

4 Memorisation

Students will eventually need to memorise new strategies in their long term memory if they are to use them successfully under exam conditions and beyond.

This benefits the students by reducing their cognitive load, allowing them to focus more on applying the new process rather than remembering it.

Memorising a new strategy requires students taking responsibility for their own learning, with the teacher taking a supportive role.



Practical ideas for the memorisation of learned strategy

Students are encouraged to memorise metacognitive strategies through independent practice at the end of each session.

During the sessions themselves, Skye asks questions to make sure the student is practising using the metacognitive strategies the tutor just demonstrated.

For example:

- What did you notice first?
- How could you check that the answer is correct?
- How do you know what strategies to use here?
- What could you start by working out?

5 Guided practice

Scaffolding is an effective form of guided practice; the process of supporting students to answer a question through a series of hints or prompts. In mathematics, scaffolding is positively correlated with the development of metacognitive strategies.

Guided practice likely involves adapted activities, allowing students to work at different levels or at a different pace to each other.

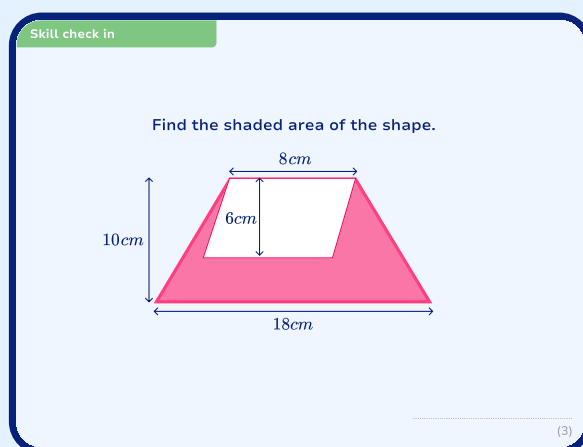
Verification feedback (identifying if an answer is right or wrong without further explanation) effectively supports guided practice (Guo and Wei, 2019)[9]. Teachers act as facilitators at this stage with the majority of the work being completed by the students.

In mathematics, when students self-mark, they can provide themselves with verification feedback to prepare them for independent practice.



Practical ideas for guided practice

Our structured teacher-created curriculum lessons use paired examples to give the student an opportunity to practise completing a question with a perfect model answer and tutor support. This provides scaffolding for the student to approach the question in easy digestible steps.



Students complete the 'your turn' section, using their tutors example and guidance to help them

Our GCSE lessons provide as much or as little scaffolding as an individual student may need.

Once a student has completed a guided question, the Skye may ask the student to recall what they have learnt and then give them a chance to apply it again using a similar question.

If the student seems confident, Skye takes the student to an independent slide.

6 Independent practice

The five preceding stages are essential stepping stones towards independent learning and practice.

Independent practice involves intelligent practice where students get a chance to make active choices in how to manage, organise, deploy, monitor and evaluate metacognitive skills.

This stage is student-led and teachers are used as a source of expertise when necessary.



Practical ideas for independent practice

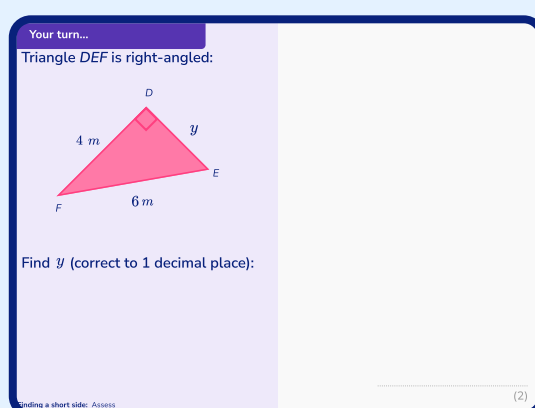
Students have Skye on hand to give effective and timely feedback whilst supporting motivation with specific praise that develops a growth mindset.

For example:

- “Excellent demonstration of converting to an improper fraction correctly, I saw that you drew a bar model and that helped you remember what to do!”
- “I see you picked up on the mistake in the last question correctly, can you explain why so many students make this mistake?”

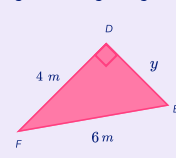
Our exam question slides give students the ability to demonstrate and practise what they have learnt. Skye encourages students to talk through their thinking as they select their strategies:

- Can you approach this question by yourself?
- What strategies are you going to use?
- Can you talk me through your thinking?



Your turn...

Triangle DEF is right-angled:



Find y (correct to 1 decimal place):

..... (2)

Finding a short slide: Access

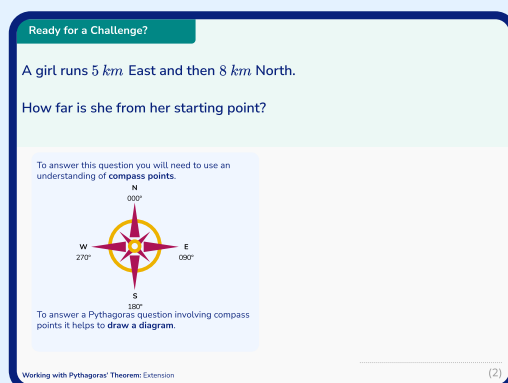
Exam style questions in Third Space Learning's GCSE revision programme



During independent practice, challenge is also crucial to allow students to develop and progress their knowledge of tasks and themselves. Our Third Space Learning lessons end with a challenge slide which extends students' thinking.

Extension questions in our GCSE programme allow all students to be stretched and supported in the way that best supports their learning. It also gives them an opportunity to think about how they can apply the strategies they have practised in a more unexpected context.

For example, in the challenge question below, students need to either mentally construct or sketch the triangle described in order to apply the techniques they have learnt in the lesson.



A challenge slide from Third Space Learning's GCSE programme.

7 Structured reflection

When students share reflections of the learning process with their teachers, it significantly improves students' ability to use metacognitive strategies.

It's successful because it provides opportunities for teachers to intervene or adapt their strategies to further enhance students' learning.



For example, a study found that secondary students' attainment when learning Pythagoras' Theorem was significantly higher when metacognitive prompts were introduced at the end of each lesson compared to control groups taught by the same teacher (Baliram & Ellis, 2019)⁶.

Student prompts:

- 'Today, I learned...'
- 'I can now apply...to solve...'
- 'I understand...but still don't understand...'

Dedicate the first 5-10 minutes of the next lesson was dedicated to whole-class feedback based on any identified misconceptions.



Practical ideas for structured reflection

We build structured reflection time into our lessons; Skye questions students to encourage active reflection on their learning.

Metacognitive Questions for Mini-Plenaries	
Creating	Can you think of other strategies you might have used when calculating (link to lesson...)? How would you check if someone had understood this lesson?
Evaluating	How efficient were the strategies you used to find the answers? Which part of this lesson do you feel you did really well on? Which part of this lesson did you find the hardest?
Analysing	What made the learning easier? Explain how the strategies you used were successful.
Applying	How could you use what you learned here in other areas of Maths? When might you need to use what you have learned in real life?
Understanding	What do you think are the most common mistakes people make when learning about (link to lesson...)? What is the most important thing we need to know when learning about (link to lesson...)?
Remembering	Tell me 3 things you remember from this lesson. Tell me one new thing you have learned today. What skills did you use in this lesson?

Example questions for mini plenaries taken from Third Space Learning's initial tutor training programme

The 3 stages of metacognition in the maths classroom

Planning Stage

- ✓ When presented with a probability question, a student decides whether to draw a sample space, Venn diagram or tree diagram.
- ✓ When preparing for an assessment, a student chooses between reviewing notes or answering practice questions.
- ✓ When approaching a maths problem, a student asks themselves questions such as:
 - Have I done something like this before? If so, what did I do?
 - How is this similar or different from the examples I've seen before?
 - What can I find out, even if it isn't what the question is asking for?

Monitoring Stage

- ✓ A student checks their answers while completing an exercise to see whether they are using an effective strategy.
- ✓ When solving questions involving angles, a student checks whether their answers make sense compared to the diagram. For example, asking themselves if an acute angle makes sense in that particular situation.
- ✓ A student may ask themselves the following type of questions:
 - Am I getting the right answers?
 - Am I using the most efficient method?
 - Could I get the same answer using a different strategy?

Evaluating Stage

- ✓ A student reflects on the effectiveness of a strategy selected in terms of accuracy and efficiency. For example, realising that using the alternate segment theorem would have been a quicker approach than using geometrical reasoning and other circle theorems to reach the correct answer.
- ✓ When evaluating their performance, students may use self-reflection questions such as:
 - Were any of my steps irrelevant?
 - What could I do differently to be more efficient next time?
 - Which topics should I revise before the next assessment?

10 practical metacognitive strategies for the classroom

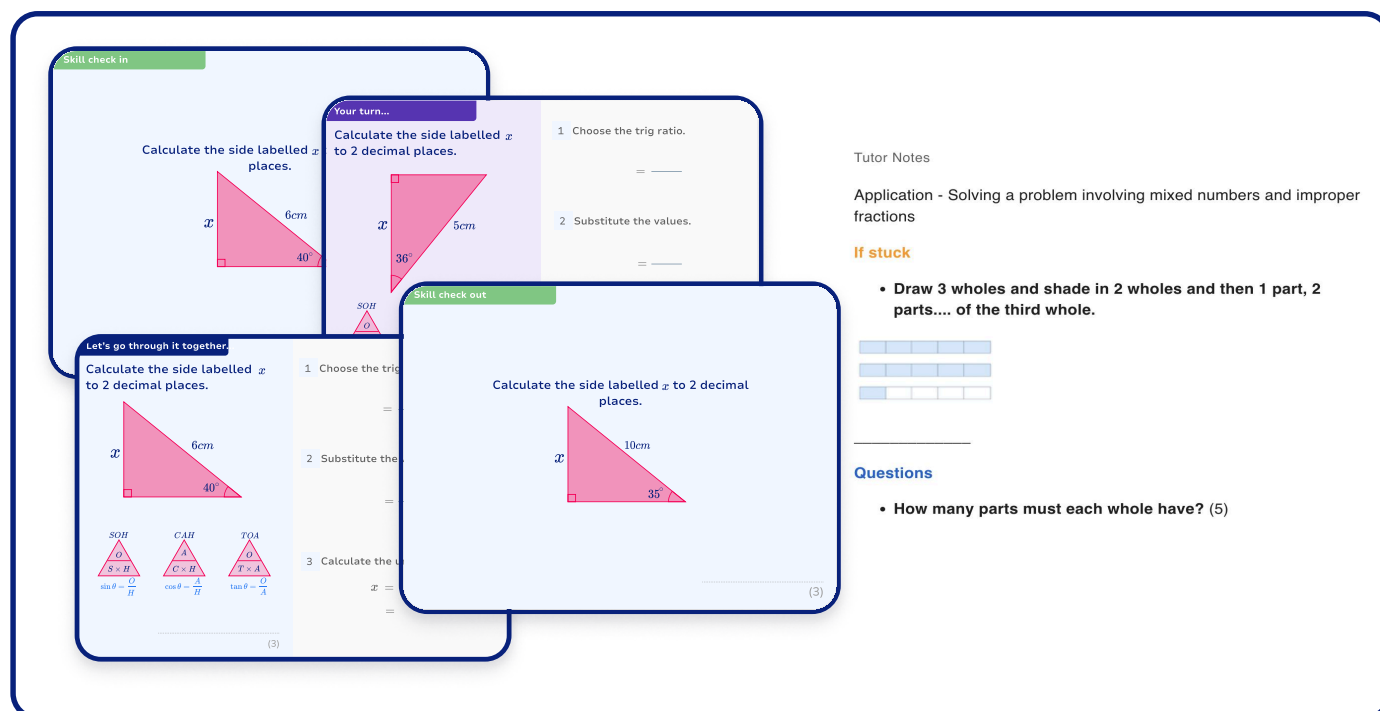
Planning Stage:

1 Break the problem down

Maths problems, especially multi-step word problems or problem-solving questions, can be overwhelming. Encourage learners to 'unpack' the question to make sure they understand it. Ask them questions like:

- ✓ Is this something you have done before?
- ✓ Is it similar to something you have done before?
- ✓ Is there anything you recognise?
- ✓ What are the important elements of the question or task?
- ✓ What resources do I need to answer this question?

It boosts their self-confidence if they have solved a problem like this before and help them to make connections in their learning and activate prior knowledge.



The screenshot displays a digital tutoring environment with several overlapping cards for trigonometry problems. The cards include:

- Skill check in:** A right-angled triangle with a hypotenuse of 6cm and an angle of 40°. The side opposite the angle is labeled x . The instruction is: "Calculate the side labelled x to 2 decimal places."
- Your turn...:** A right-angled triangle with a hypotenuse of 5cm and an angle of 36°. The side opposite the angle is labeled x . The instruction is: "Calculate the side labelled x to 2 decimal places."
- Let's go through it together:** A right-angled triangle with a hypotenuse of 6cm and an angle of 40°. The side opposite the angle is labeled x . The instruction is: "Calculate the side labelled x to 2 decimal places." Below the triangle are three trigonometric triangles (SOH, CAH, TOA) and their corresponding formulas: $\sin \theta = \frac{O}{H}$, $\cos \theta = \frac{A}{H}$, and $\tan \theta = \frac{O}{A}$.
- Skill check out:** A right-angled triangle with a hypotenuse of 10cm and an angle of 35°. The side opposite the angle is labeled x . The instruction is: "Calculate the side labelled x to 2 decimal places."

On the right side, there is a **Tutor Notes** panel with the following text:

Application - Solving a problem involving mixed numbers and improper fractions

If stuck

- Draw 3 wholes and shade in 2 wholes and then 1 part, 2 parts.... of the third whole.

Below this is a visual representation of three wholes, each divided into five parts, with some parts shaded.

Questions

- How many parts must each whole have? (5)

In our online one to one maths tutoring, lessons are structured to guide students from guided to independent practice. Skye uses questioning prompts to help students to use metacognitive strategies when working more independently.



Read: [Effective Questioning In The Classroom: 9 Tried and Tested Techniques For Teachers⁷](#)

5 min read

2 Peer and partner work

Talking with their peers, asking reflective questions, and debating approaches to problem-solving helps learners to develop **higher-order thinking and reasoning skills**. It can create productive conflicts that help learners develop multiple perspectives and a deeper understanding.

Peer work can be more effective in achieving successful learning than working independently, and as effective as working one on one with an adult.

Purposeful peer work allows learners to:

- ✓ Examine their thinking process and the approach they used in order to identify different ways of solving a particular problem;
- ✓ Explore diverse appropriate strategies or varying viewpoints;
- ✓ Use active listening and reading strategies;
- ✓ Think aloud;
- ✓ Test out ideas and methods that are different from their own;
- ✓ Debate or negotiate to reach a consensus in decision-making before presenting to the group.

In practice, this often means reducing teacher talk time. At the beginning of a lesson, a teacher will speak for a short time to set up a task, with learners then working independently to decide on an effective strategy and engaging in discussion and 'metacognitive talk' with their peers.

With younger students or those not yet confident with peer work, teachers can provide a structure for discussion, through questions, guidance and templates.

3 Goal setting

During the planning stage, learners should set themselves short-term goals or targets. This might look like a checklist or a success criteria.

Short-term goals:

- ✓ **Keep students on track** – Breaking a learning task up into smaller, more easily attainable chunks, in the form of goals, will enable learners to keep track of their progress.
- ✓ **Make students more productive** – Learners are less likely to procrastinate if they only have to focus on one small task at a time.

Monitoring (or doing) stage:

4 Questioning

Many learners are afraid to ask for help for fear of looking silly or inattentive. However, it is important that a teacher creates a learning environment that encourages learners to ask for help and not to fear making mistakes.

This will avoid cementing any misconceptions or misunderstandings they may have into their long-term memory. Asking questions allows learners to consolidate their new and prior knowledge and enables students to figure out which topics they don't understand.

Asking questions allows learners to seek feedback and advice on how to improve or adapt their strategies so they can become better learners.



“Third Space Learning provides the opportunity for the children to ask questions and apply skills in a safe environment where they are not afraid to fail in front of their peers. Very good for increasing confidence and this is demonstrated in class lessons where less able mathematicians are beginning to contribute more ideas.”



Helen Soderstrom
Assistant Headteacher, Mount Nod

Questions might include:

- ✓ What steps should I take first?
- ✓ What do I already know about this topic?
- ✓ How can I check that I am doing this right?

5 Monitoring progress

Learners need to be constantly monitoring their progress whilst completing a task. This might look like:

- ✓ Referring back and assessing their progress towards their goals.
- ✓ Self-questioning to ensure they are on the right track.
- ✓ Checking methods and looking out for calculation errors which might affect the outcome.

6 Improving self-regulation

Self-regulation, or metacognitive regulation is one's ability to manage thoughts, feelings, and actions whilst striving towards a goal. In other words, being aware of which phase you are working at.

How can we help learners to improve their self-regulation?

- ✓ **Manage time effectively** – Encourage learners to keep to deadlines and to adapt strategies based on how long the task is taking them.
- ✓ **Remove distractions** – Help learners to remove different distractions and help them to reflect on its impact on their productivity.

7 Developing resilience

When working on a new or difficult task, learners can find it daunting. When learners are stuck, they should ask themselves metacognitive questions, such as:

- ✓ What could I do differently?
- ✓ Have I seen anything like this before?
- ✓ What support will help me? *(for example, books, resources, manipulatives, peers, teachers)*

This will put them in a position to overcome obstacles along the way and, where possible, try different strategies before going to the teacher or teaching assistant for help.



Read: [What Is A Growth Mindset And What Does It Mean For Kids And Parents⁸](#)

3 min read

Evaluation (or reviewing) stage:

8 Self-evaluating

After successfully completing a task, learners may not remember what they struggled with, and may not realise how much new knowledge they have acquired.

It is important that learners engage in self-evaluation so that the next time they complete a task, they can apply what they have learned and avoid making the same mistakes.

Teachers can encourage self-evaluation by asking learners to review their corrected homework, classwork and exams, engage with teacher feedback and perform self-marking against a success criteria.

Teachers can also ask students to self-question:

- ✓ What did I learn about this topic that I did not know before?
- ✓ What was easy for me?
- ✓ What content was challenging to learn?
- ✓ Do I understand it now?
- ✓ Why did I make the mistakes that I did?
- ✓ Where did I succeed?
- ✓ Where did I go wrong?



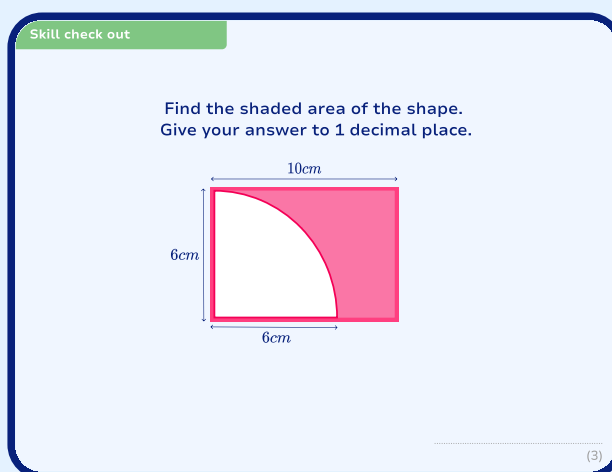
“[Self regulated] learners are proactive in their efforts to learn because they are aware of their strengths and limitations and because they are guided by personally set goals”

BJ Zimmerman, *Becoming a Self-Regulated Learner: An Overview*⁹



All tutoring sessions end with a skill check out question and confidence check out question to help students to reflect on their own learning and understanding of the content and strategies covered.

Student answers help us to assess their progress from the beginning to the end of the lesson. Reports are available for teachers after every session.



Post-session questions help students to reflect on their learning

9 Test yourself

Learners can use self-testing to help them remember information. Self-testing and retrieval practice allows learners to review what content they know well, identify what they need to practise more, and what they need to re-learn.

There are various ways in which teachers can encourage students to self-test, including:

- ✓ Completing practice tests
- ✓ Quizzes
- ✓ Flashcards
- ✓ Teaching peers

10 Identifying the best metacognitive strategies

There are many metacognitive strategies out there and there will be some which are more effective than others – but this will be highly dependent on the individual using them!

If students spend time building their own individual armoury of metacognitive skills to draw upon, they can make the most out of their learning in the classroom.

Teachers can encourage learners to do this in many ways, such as:

- ✓ Reflect on the pros and cons of the methods and strategies students have used;
- ✓ Rank metacognitive strategies from the most to the least effective for them;
- ✓ Recognise what mistakes they made when trying new metacognitive strategies and what they can improve on the next time they use this strategy.



How to embed metacognition across your school

Overall, the costs associated with implementing metacognition in schools are low and can broadly be divided into two main costs: skills and support.

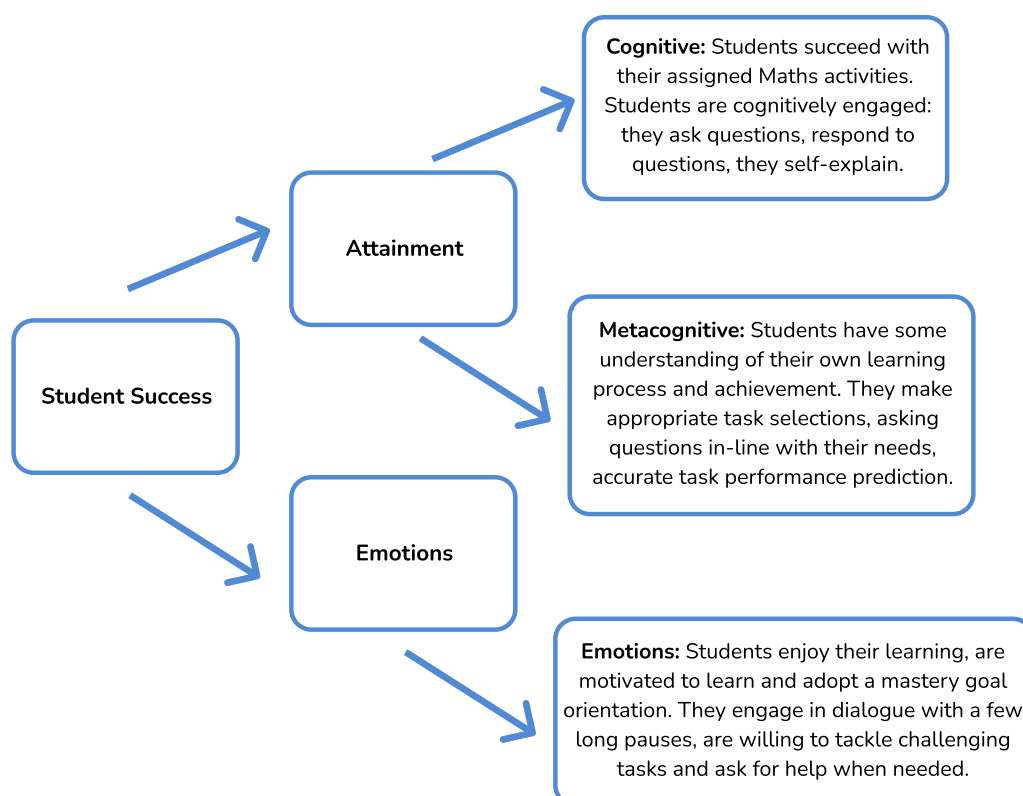
Boosting staff skills

Invest in appropriate CPD. While it can incur costs, it is essential that teachers are confident in understanding the metacognitive demands of the topics they are teaching so that they don't miss opportunities to develop students' metacognitive knowledge and skills.



Our maths specialists have trained and prompted Skye to use evidence-based teaching strategies that encourage metacognition.

We also recognise the important role that enjoyment and fluent dialogue play in motivation, which we name 'Emotions' in our framework. That's why we put a huge focus on rapport and relationship building in our training and programme.



*Third Space Learning framework for student success,
with a focus on metacognition and cognition*

Supporting staff to develop metacognition

Once teachers receive initial training, schools should continue support to help teachers implement ideas in lessons.

Schools should ensure metacognition features regularly on their CPD timetable, with opportunities for teachers to discuss and share good practice.

It is also a good idea to include it as a focus for observations and learning walks to see good practice in action and identify opportunities for further development. This requires SLT & staff time and resources to complete, but should be a low cost considering schools should already be covering staff salaries, materials and equipment for teaching.



Our academic team evaluate Skye's tutoring on a daily basis to ensure it provides students with the strategies and modelling they require to develop their metacognitive skills in maths.



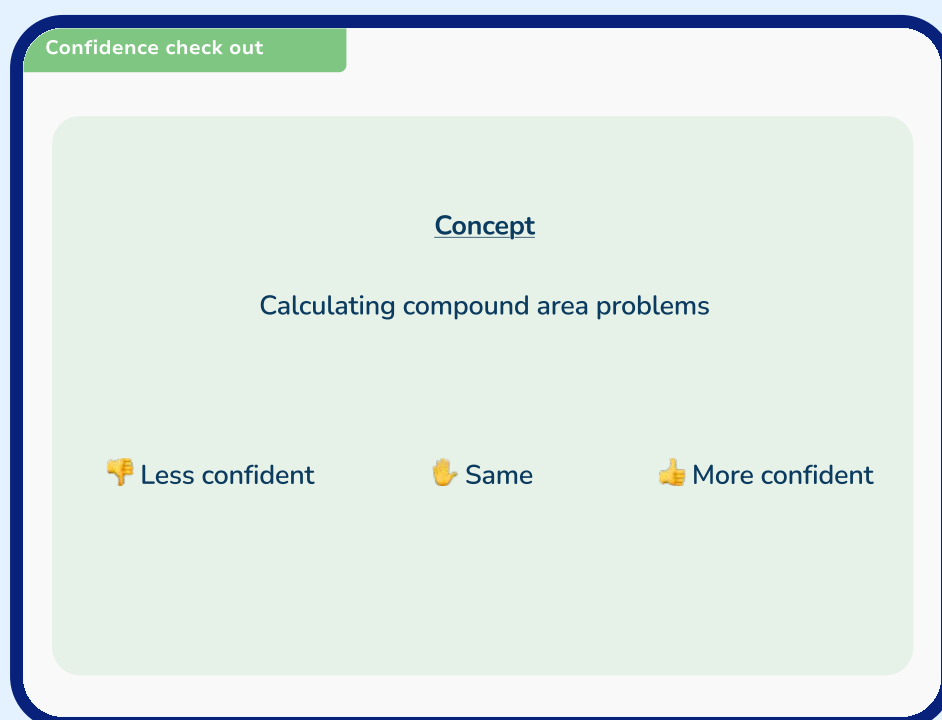
Reflect on the success of metacognition in your school

As with any initiative in schools, you must reflect on its success to decide if existing approaches are having the intended outcomes or if changes are required.



Here at Third Space Learning, we assess the impact of metacognition in our lessons by using student confidence check outs after each session.

This gives Third Space Learning an idea of which areas we are having the most (or least) impact in and this informs and supports our continuous development of Skye and curriculum design.



Confidence check out

Concept

Calculating compound area problems

👎 Less confident 👍 Same 👍 More confident

Before starting tutoring with Third Space Learning, students answer metacognitive and emotional questions about maths. This helps us to measure progress and adapt sessions.

Challenges of embedding metacognition

Metacognition is a valuable tool for students but it comes with challenges:

1 Metacognition is difficult to define

Metacognitive skills can become automatic, especially for teachers, which can make them difficult to identify, verbalise and teach. The EEF acknowledges that metacognition can be hard to define and describes it as an 'elusive' topic.

It's also something that we, as humans, sometimes do and develop naturally so it can be tricky to identify concrete examples. However, it is the explicit instruction of these techniques that can have a huge impact on student progress, especially among disadvantaged students.

2 Metacognition requires CPD

Teachers, and other educational staff, need to be shown how to develop students' self-regulation, emotional control, and independence.

Although metacognition is about learners taking control of their own learning, a teacher's role is vital to develop students' metacognitive skills and strategies to empower them to do so.



A great place for staff to start is over on the Third Space Learning blog:

- [What Is Metacognition And Why Does It Matter For Education?¹⁰](#)
- [How to Teach Metacognitive Skills: Practical Examples For Primary & Secondary Students¹¹](#)
- [Metacognition In The Classroom: A 7-Step Practical Approach To Maths Teaching⁸](#)

3 Metacognition requires careful planning

Metacognition is most effective when embedded in a school's curriculum and a specific subject lesson. As the EEF states, "without cognition, there is no metacognition".

Introducing new content alongside metacognitive skills can cause cognitive overload and hinder the learning process. Metacognitive teaching activities should be strategically integrated to avoid disrupting the ongoing learning process.

Organising the planning process with templates, teacher modelling, worked examples, and breaking down tasks into smaller steps can prove advantageous.

References

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