

MENTOR HANDBOOK

S6 | SUBJECT: PROMOTING DEEP THINKING

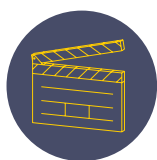
STUDY

KEY TAKEAWAYS FOR THIS MODULE

Your teacher can promote deep thinking by:

- > Seeing deep learning as an extension of pupils' mental models of the subject.
- > Helping pupils access knowledge more flexibly.
- > Showing pupils how to apply knowledge to new problems and contexts.

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SUMMARY BELOW:**

TEACHING CHALLENGE

Mr Jones has worked to identify and convey the key ideas in each topic to his pupils. However, he wants pupils to develop more than a basic, inflexible knowledge of the facts: he wants them to develop sophisticated mental models of the subject which allow them to apply what they have learnt to new and complex problems. How can he support his pupils to develop the kind of mental model which makes this deep thinking possible?

KEY IDEA

Teachers can develop increasingly complex pupil mental models by promoting practise of thinking which supports pupils to access and apply their subject knowledge flexibly; carefully sequencing teaching to facilitate this process is important.

DEEP THINKING REQUIRES BACKGROUND KNOWLEDGE

Mr Jones wants his pupils to be able to tackle new problems, to think critically and to be creative. Pupils must have good mental models to do so. Mr Jones cannot simply ask his pupils to think critically about a source, a problem or an image. This is because pupils need background knowledge, an understanding of how to think critically in the subject and the habits of doing so (Bailin et al., 1999). For example, to think critically about the design of an experiment, pupils need to know what effective experiment design looks like, what equipment is available, the goal of the experiment and so on. In the same vein, they rely on existing mental models to solve problems and come up with ideas which are creative but also feasible.

DEEP THINKING RELIES ON FLEXIBLE KNOWLEDGE

The first step in developing mental models to permit deep thinking is moving from inflexible to flexible knowledge. When pupils learn about a new idea, their knowledge is inflexible: tied to the context in which it was learned. This cannot be avoided, it is how new information enters long-term memory: “a natural step on the way to the deeper knowledge that we want our students to have” (Willingham, 2002). For example, if Mr Jones introduces addition through an example about a child collecting feathers, pupils will associate it initially with feathers.

Having gained inflexible knowledge, pupils’ knowledge can become more flexible if they access it through different cues: increasingly varied and difficult questions with decreasing amounts of scaffolding and hints.

Effective forms of variation include:

- > **Contextual variation:** Encountering the same knowledge in different contexts.
- > **Conceptual variation:** Presenting examples and non-examples to refine understanding.
- > **Situational variation:** Providing a broad range of application problems in pursuit of a more generalised understanding of a concept (Pan & Rickard, 2018).

By doing this, Mr Jones balances the desire to make the task more difficult – increasing the level of thinking required – and the wish to ensure pupils’ continued success, for its own sake and to maintain their motivation.

TRANSFER IS MORE LIKELY IF PUPILS ARE PROFICIENT AT ACCESSING THEIR KNOWLEDGE

Mr Jones also wants pupils to be able to transfer what they learn to new topics, and even to other subjects within and beyond school. Transfer means being able to apply existing knowledge to new questions and

situations (Barnett & Ceci, 2002). For example, he may want pupils to recognise that they can use a previously learned technique to answer a new question – using the idea of perimeter in a more complex maths problem, or maybe an everyday problem they need to solve. He may want them to see similarities between topics or ideas and themes across lessons, topics, or subjects. However, transfer is difficult and does not come naturally – pupils are likely to struggle to transfer what has been learnt in one discipline to a new or unfamiliar context.

Transfer can be supported by retrieval practice – the act of recalling prior knowledge. After completing a unit, pupils can be asked to retrieve core knowledge and concepts frequently to ensure they retain them (Pashler et al., 2007). This makes it more likely that pupils will be able to transfer knowledge to new contexts (Pan & Rickard, 2018). When planning, teachers should think about which aspects of subject knowledge are most significant for pupils – ideas and concepts that are pre-requisite to developing knowledge in other topics – and build in retrieval practice to ensure that these are readily accessible.

PUPILS MUST PRACTISE DEEP THINKING

Regular purposeful practice of what has previously been taught can help pupils to develop and consolidate their mental models (Pashler et al., 2007). If Mr Jones wants pupils to transfer ideas to new or unfamiliar contexts, or to think deeply, he must show them how to do so and offer opportunities to practise. Mr Jones should seek to show pupils the links between topics he hopes they will make. He might say: “we can use what you have learned in English about paragraph structure and grammar when writing in history. You have also been studying Victorian novels which you can use to illustrate what some Victorians might have thought about the Industrial Revolution, as long as you make clear it’s fiction. What other learning can we use to make our historical writing better?”. Likewise, if he wants them to think critically about a topic, he has to offer practice in this kind of thinking, he cannot rely on the accumulation of factual knowledge to lead to critical thinking automatically.

NUANCES AND CAVEATS

Transfer and critical thinking are both hard: neither of them come naturally – if teachers want pupils to think critically and to transfer knowledge to new contexts, they must teach this explicitly and allow pupils to practice doing so.

Pupils cannot exercise critical thinking without a strong knowledge of the thing about which they are being invited to think critically: teachers are unlikely to experience success if they teach critical thinking skills in isolation or expect pupils to transfer knowledge from one context to another without practise and models.

SELECT

Before you observe, first select a **DEVELOPMENT AREA** to focus on. Next, familiarise yourself with the **FOCUSED DEVELOPMENT AREAS**, as you will zoom in on one of these during your observation. Finally, craft a **PRECISE TARGET** when you observe your teacher (examples are provided below).

DEVELOPMENT AREA	FOCUSED DEVELOPMENT AREA	EXAMPLE PRECISE TARGETS
Planning tasks for deep thinking	<ul style="list-style-type: none"> > Teacher, with the support of a colleague, identifies the essential knowledge, skills and concepts they want pupils to think deeply about and plans for them to be revisited with added complexity, e.g. by removing scaffolding or introducing more elements. > Teacher plans a range of questions that get pupils to think with increasing complexity once they have the relevant subject knowledge. > Teacher plans to explain abstract concepts using concrete examples, drawing links and alternating between concrete and abstract, until the concrete examples can be faded and the abstract concept is understood. 	<p>If your teacher is...</p> <ul style="list-style-type: none"> > Not doing it at all: When pupils have the relevant subject knowledge, increase the complexity of their thinking by planning or adapting questions that enable them to practise and retrieve knowledge, skills and concepts. > Doing it but needs some improvement: When pupils have the relevant subject knowledge, plan a set of questions that increase in complexity, e.g. by increasing the amount of knowledge, skills or concepts pupils need to use and/or retrieve. > Doing it well, but needs some stretch: When pupils have the relevant subject knowledge, plan a set of questions that increase in complexity, e.g. by gradually removing scaffolding.
Variation	<ul style="list-style-type: none"> > Teacher uses a range of examples and non-examples to support pupils to understand concepts. > Teacher supports pupils to use knowledge and skills across a range of contexts and problems to help pupils apply existing knowledge in new situations and to new questions when they have the relevant subject knowledge. 	
Supporting deeper thinking	<ul style="list-style-type: none"> > Teacher plans questions and follow-up questions that support pupils to think more effortfully about essential concepts, knowledge and skills. > Teacher gives pupils time to formulate a response to questions that require deep thinking. > Teacher gives pupils time to rehearse their thoughts and responses when questions require deep thinking. 	

RECORD YOUR THINKING HERE

DEVELOPMENT AREA	FOCUSED DEVELOPMENT AREA	EXAMPLE PRECISE TARGETS
(select before observing)	(select whilst observing)	(select/write whilst observing)

OBSERVE

Consider the following questions based on a short (approximately 15 minute) observation of your teacher.

What was your teacher's **previous** target? Are they meeting it? How do you know?

For the **DEVELOPMENT AREA** you are focussing on for this observation, what is your teacher already doing well?

Next, go to the previous page and select a **FOCUSED DEVELOPMENT AREA** to further zoom in on. Then select (from the examples) or write one **PRECISE TARGET** (bite-sized action) to coach your teacher on. You can choose to stick with the previous target if your teacher have not made enough progress yet.

How will you model the target to your teacher to show them what good looks like? What questions will you ask to check your teacher understands the model? For example, 'How it is different from your current practice?', 'What impact might it have on your practice and pupils?', 'What links can you see between the model and the module principles (below)?'

Reminder: Your model should help your teacher develop their ability in some of the following:

- > Set tasks that stretch pupils, but which are achievable, within a challenging curriculum.
- > Ensure pupils' thinking is focused on key ideas within the subject, drawing explicit links between new content and core concepts and principles in the subject.
- > Revisit the big ideas of the subject over time and teaching key concepts through a range of examples.
- > Increase challenge with practice and retrieval as knowledge becomes more secure (e.g. by removing scaffolding, lengthening spacing or introducing interacting elements).
- > Use concrete representation of abstract ideas (e.g. making use of analogies, metaphors, examples and non-examples), slowly withdrawing concrete examples and drawing attention to the underlying structure of problems.
- > Include a range of types of questions in class discussions to extend and challenge pupils (e.g. by modelling new vocabulary or asking pupils to justify answers) and provide appropriate wait time between question and response where more developed responses are required.

Next, meet with your teacher to work through the 'Feedback' stage of instructional coaching. See the guidance on the feedback stage in the appendices of the Mentor Handbook for support.

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