



AN EEF SCHOOL CASE STUDY: MINIMISING MISCONCEPTIONS IN MATHEMATICS

Montgomery Academy, Blackpool



School context:



Montgomery Academy is a secondary school in Blackpool, and is part of the Fylde Coast Academy Trust. It serves around 1300 pupils aged 11–16, with 42% of the intake being eligible for the Pupil Premium. Blackpool is currently home to eight of the ten most deprived neighbourhoods in England (MHCLG English Indices of Deprivation, 2019).

1 What problem were you looking to solve?



We identified via an audit a need to develop practice in line with Recommendation 1 of the EEF maths guidance report: "Assessment should be used not only to track pupils' learning but also to provide teachers with information about what pupils do and do not know".

Through exploring this evidence, we decided to focus on 'in class' assessment using hinge questions and discussion which linked to identified common misconceptions.

Covid restrictions limited teachers' opportunities to quickly check 'in-the-moment' understanding in the classroom through conversations and walking the room as they usually would, so an alternative approach to this was needed.

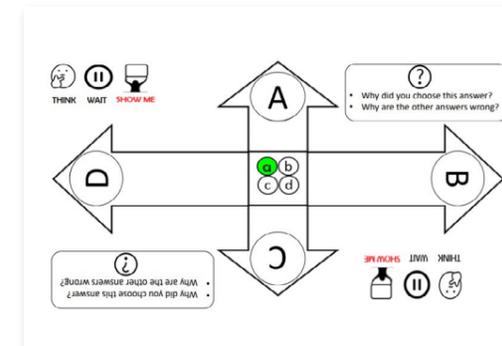
2 What were the anticipated barriers/challenges?



The lending and sharing of equipment is restricted under Covid restrictions and this means effective use of mini-whiteboards, an obvious solution to our issue, is not always possible. One solution explored was a 'book cover' to respond to multiple-choice hinge questions.

Department time was used to discuss what makes an effective hinge diagnostic question as well as strategies for addressing identified misconceptions.

Maths leaders supported the development and quality assurance of curriculum resources, ensuring that all teachers shared high-quality multiple-choice questions that elicit misconceptions and provide opportunities for follow-up discussion and exploration.

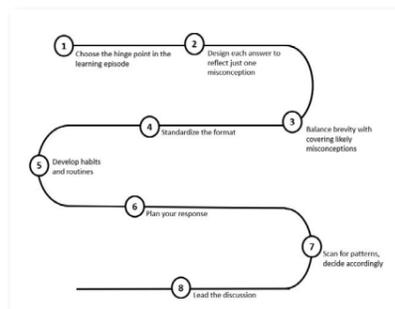


3 What did you do?



We decided to use multiple-choice questions at hinge points in our lessons. These were used according to following principles:

1. Choose the hinge point
2. Incorrect answers are plausible and based upon common misconceptions
3. Ensure that brevity and coverage are well balanced



To support with delivery, multiple choice book covers were provided to all students. This standardises the format, and supports good routines and habits. Students hold up their book with their chosen response (A, B, C, D) at the top.

Teachers are also provided with an instructional 'walk-thru' to accompany training and provide clarity around the key aspects of the implementation process.

4 How do you monitor/evaluate that the intervention is working?



Lesson drop-ins are showing growing evidence of the use of diagnostic questioning. This, triangulated with centrally created resources that include hinge questions, along with conversations with students about how and why we use the book covers, means that there is confidence that the issue is being addressed.

Leaders can see increased engagement in lessons due to the number of students answering questions simultaneously, as well as more responsive teaching which reacts to the misconceptions uncovered.

Next steps include developing the use of classroom conversations to elicit and fix misconceptions.

Additional:

Suggested reading:

- *Improving Mathematics in Key Stages 2 and 3* eef.li/maths-ks2-ks3/
- *EEF blog: 'Three practical approaches to help pupils learn from mathematical mistakes': Simon Cox considers practical approaches that can teachers use to translate the evidence into classroom-based methods for confronting pupil misconceptions head on* educationendowmentfoundation.org.uk/news/
- *The EEF Guide to Supporting School Planning— A Tiered Approach to 2021* eef.li/school-planning/



Reflection questions



- How are you ensuring that teachers have the opportunity to develop their understanding of common misconceptions in mathematics and why they persist?
- How are you planning tasks which effectively address misconceptions based on assessment of your pupils' strengths and weaknesses?