Oracy in mathematics

Oracy exemplified in The Essence of Mathematics Teaching for Mastery[1]

Oracy in maths

Oracy in mathematics involves authentic listening, articulation and development of mathematical thinking. It is an essential skill that supports learning by drawing attention to mathematical structure and enabling all pupils to make connections.

How does oracy relate to maths?

Communication takes many forms and can serve many purposes. More than just a convention, talking, listening and communication in mathematics are fundamental to enabling thinking, establishing meaning, and developing a deep understanding of key mathematical ideas.

Teachers support pupils both in expressing themselves mathematically – learning *to* talk – and in the use of language to reveal mathematical structure – learning *through* talk – which is at the heart of mathematical learning.

Teachers deliberately create opportunities for pupils' purposeful talk, through their design of lessons and tasks, including generalisations, sentence starters, stem sentences, and questions asked by pupils.

A culture of oracy

A culture is intentionally developed, in which pupils learn to think, listen and reflect. This respectful culture relies on teachers' trust that learners will make mathematically worthwhile contributions and, alongside their peers, build and make sense of mathematics – while also learning to disagree agreeably. Oracy is explicitly taught, and every pupil's voice is valued. Ground rules for communication are established, and talk and authentic listening become a natural part of pupil behaviour.

An oracy focus supporting The Essence of Mathematics Teaching for Mastery

The following table details how oracy supports specific aspects of The Essence of Mathematics Teaching for Mastery.

[1] NCETM (2022) The Essence of Mathematics Teaching for Mastery

Underpinning principles	
Mathematics teaching for mastery assumes everyone can learn and enjoy mathematics.	Securing greater equity in education is everyone's responsibility. Oracy is a powerful tool teachers can use to create more equitable classroom experiences. Teachers should ensure that all pupils can access the learning and have sufficient content knowledge and language to talk about the mathematics.
Mathematical learning behaviours are developed such that pupils focus and engage fully as learners who reason and seek to make connections.	Pupils' ability to express themselves and to modify their thinking through interaction with others (their peers and teacher) are key mathematical learning behaviours. Peer-to-peer dialogue and discussions engage all pupils in co-constructing knowledge, making connections, and deepening understanding. Oracy in the maths classroom allows pupils to develop their sense-making, both as they explore new ideas and as they present their current thinking.
Teachers continually develop their specialist knowledge for teaching mathematics, working collaboratively to refine and improve their teaching.	Teachers' understanding of oracy is a key aspect of their specialist knowledge for teaching for mastery. Teachers need to know how to create opportunities for pupil talk, be skilled in noticing significant pupil talk, and adapt lessons accordingly. The teacher listens to and extends purposeful dialogue in a coherent manner to develop learning.

Lesson design	
Lesson design links to prior learning to ensure all can access the new learning and identifies carefully-sequenced steps in progression to build secure understanding.	Maths lessons reflect sequenced learning that is connected, for reasons which are made explicit and discussed during the lesson and understood by all. The teacher plans questions and opportunities for communication that advance the learning. Pupil responses are anticipated so that they can be addressed in the lesson design.
Examples, representations and models are carefully selected to expose the structure of mathematical concepts and emphasise connections, enabling pupils to develop a deep knowledge of mathematics.	Representations are used to promote noticing and play a key role in seeing and talking about mathematical relationships. Oracy in maths - disciplinary oracy - requires pupils to be fluent in the language of maths, and to be able to read meaning into symbolic representations.
It is recognised that practice is a vital part of learning, but the practice must be designed to both reinforce pupils' procedural fluency and develop their conceptual understanding.	Teachers design or adapt tasks which stimulate talk that harnesses learning and deepens understanding. As part of practice, pupils should have opportunities to verbalise their thinking and justify how and why.

In the classroom	
In a typical lesson, the teacher leads back-and-forth interaction, including questioning, short tasks, explanation, demonstration, and discussion, enabling pupils to think, reason and apply their knowledge to solve problems.	The teacher skilfully manages the discourse to address a clear learning point. Based on what they hear pupils say, and drawing on their own specialist knowledge, they guide pupils' focus and support the building of concepts in a coherent manner. All pupils should have opportunities to engage in collaborative problem-solving and reasoning where dialogue is used to enable conjecture, listening to others' ideas, asking questions, and developing logical arguments.
Use of precise mathematical language enables all pupils to communicate their reasoning and thinking effectively.	Teaching of precise mathematical language requires teachers to explicitly plan for the introduction and use of domain specific language, relating mathematical vocabulary to conceptual meaning. It is important that the meaning of words used is well understood – this shared understanding cannot be assumed and is not necessarily present just because particular words are used.
If a pupil fails to grasp a concept or procedure, this is identified quickly, and gaps in understanding are addressed systematically to prevent them falling behind.	Communication is an effective tool for formative assessment, as it enables teachers to plan teaching to build on pupils' current conceptions of maths as the lesson progresses. Teachers design opportunities for pupils to communicate and to listen to what is said. This in-the-moment formative assessment directly informs teachers' adaptive teaching on how to move the learning forward to the intended learning point.