Math Talks – The process

1. Teacher presents the problem.
A problem is presented to the whole class or a small group. Computation problems are always presented horizontally, so as to discourage fixation on the standard algorithm.

2. Students figure out the answer.
Students are given time (1-4 minutes) to **silently and mentally** figure out the answer. They signal quietly to the teacher (eg. with a thumb up against their chest) when they have an answer. Students are encouraged to think of a different way to solve if they have found one way in the time allotted.

3. Students share their answers.
A few students volunteer to share their answers and the teacher records them on the board. The teacher records all answers that students arrived at without judgement.

4. Students share their thinking.
Students share **how** they got their answers with a partner and/or with the larger group. The **teacher records the student's thinking** and attaches their name to the solution. As the students are sharing their thinking, the teacher asks questions that help them express themselves, understand each other, and clarify their thinking to make sense of the problem and its solution(s). Multiple ways of solving problems and the connections between them are emphasized.

Math talks usually last about 10 minutes.

It's important to give the students the rationale behind the math talk. Let them know that they have such great thinking going on that we can't see and this gives them a chance to share what's going on in their brains. It also gives everyone a chance to learn from each other and informs the teacher on what they know and what we might need to work on.

Teacher should:
- Adjust Math Talks to address the needs of their students
- Design new Math Talks based on issues that arise during math instruction
- Design math instruction based on confusions that arise during Math Talks

See http://www.sfusdmath.org/math-talks.html

Defining Features of Math Talks

Facilitation	**Why?**
Problems are written and read publicly, but students solve mentally (no pencil and paper or whiteboards)	● Students develop efficiency, accuracy and fluency with mathematical thinking using mental math. ● Students move away from a reliance on standard algorithms and strict memorization, and move into sense- making and sharing their reasoning about the mathematics.
Wait time	● All students have time to reflect upon and struggle with mental math and/or come up with multiple ways of thinking about the math.
Ask for silent signals as mode of response Ask for silent validation of who got the same answer *I* who agrees or disagrees with an answer	● Students are not distracted by hands in the air, or by others who have found an answer quickly and want to share immediately. ● Students are motivated to come up with more than one way of solving. Emphasis is placed on the thinking process more than the answer itself. ● Students interact with each other, not just with the teacher.
Surface all answers up front, including mistakes	● Mistakes are treated as learning opportunities. ● Students agree with and/or critique the reasoning of others and support their thinking with mathematical arguments.
Turn and Talk (optional)	● Every student has an opportunity to share her/his way of thinking about and solving the problem. ● Students articulate ideas with a partner before engaging in large group academic discussion.
Teacher records and represents student's strategy without steering student in a particular direction. Teacher confirms with the student that his/her thinking is properly represented. Scribing of computation is done horizontally.	● Multiple strategies are made public. ● Students see different ways to record a mental process. ● Scribing reflects student's actual process, and not a specific, anticipated solution path. ● Students feel ownership of their own strategies. ● Students have an opportunity to make sense of algorithms.
Teacher asks questions that encourage mathematical sense-making and group discourse, such as: ● *Who has a question?* ● *Do you agree? Disagree? Why?* ● *Does anyone have a different way to explain it?* ● *Do you see a pattern?* ● *Does that always work?*	● Students make sense of each other's strategies ● Students see multiple ways of solving problems, make connections between different ways of solving problems ● Students talk about their own and each other's thinking

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