

Tutor Micro-Training: Growth Mentality in Math Facilitator's Guide [15 minutes]

<p>Learning Goals:</p> <ul style="list-style-type: none">● Understand what number sense is and why it matters.● Practice using using mental math and being creative and visual while solving a problem.● Attendees be able to solve the same question in multiple ways.	<p>Materials Needed:</p> <ul style="list-style-type: none">● Pencils/Pens● Scratch paper● White board● Dry-erase markers	<p>Assignment:</p> <ul style="list-style-type: none">● Reframe common misconception that some people are naturally good at math and others are not.● Show how there are multiple ways to solve a math problem and students are encouraged to solve in multiple ways.
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Introduction (1-2 minutes): Are you a math person?

- **Share:** a brief story about your own history and relationship with math.
- **Ask:** Who enjoyed math growing up? Who doesn't see themselves as 'a math person'? Turn and share with a partner next to you. (presenter walk around and listen in on what people are saying)
- **Share:** There is no such thing as a 'math person' - no one is born with a 'math brain'.
 - Anyone can grow their skills and confidence in math with the right teaching and messaging.

Explanation (5 minutes): Number Sense and Growth Mindset

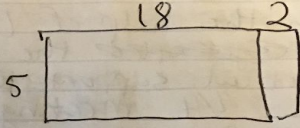
- **Share:** There is no such thing as a "math person". Math is creative, expirementive, and can be done by anyone. It is also very visual. Students use manipulatives like counters and their fingers, and draw out situations which helps them build number sense. Number sense is more useful for a student than rote memory. Number sense makes students interact with numbers instead of trying to plug them into a specific equation. Number sense includes the ability to:
 - Understand quantities.
 - Grasp concepts like *more* and *less*, or *larger* and *smaller*.
 - Recognize relationships between single items and groups of items (for example, *seven* means one group of seven items).
 - Understand symbols that represent quantities (for example, *7* means the same thing as *seven*).
 - Make number comparisons (for example, 12 is greater than 10, and 4 is half of 8).
 - Understand the order of numbers in a list: 1st, 2nd, 3rd, etc.

- **Ask:** Can anyone think of other abilities a student may have if they have number sense? (estimation, recognizing patterns, being able to explain a solution in multiple ways, are able to relate a question to real life)
- **Share:** The way for students to gain number sense and confidence in math is through a growth mindset. Growth Mindset relates to everything, not just math or STEM. People with growth mindsets believe that their most basic abilities can be developed through dedication and hard work. Also it important is the language of “YET”. Change from “I don’t get this” to “I don’t get this YET”. This is also admitting that sheer effort will not always get the job done. You also need to learn the correct strategies (language of “yet”). This view creates a love of learning and a resilience that is essential for great accomplishment. This is a very good way to live your life and always be open to new ideas and experiences. The brain is like a muscle, the more you challenge it, the stronger it gets.

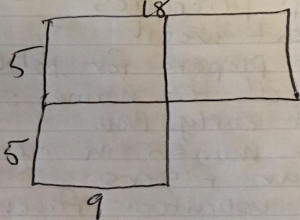
Short Activity (10 minutes): Number Talk

- **Share:** Write the equation 18×5 on the board. Then ask the volunteers to solve this in their heads. Once they have solved this in their heads have them put a thumb up. Say, “Once you have solved it try to solve it another way. If you find another way put a finger up.”
- **Ask:** Would someone like to share what they got for an answer? (ask multiple people and write down all answers given no matter if it is correct or not) . Then ask “Who would like to share their thinking or how they answered to arrive at this number?”
- **Share:** Write down what they are saying and draw a picture (area models) to try to visually show what they are thinking. Then explain that this is what a modern math class is like. Explain this is what a modern classroom is like or tries to be like. It is sharing, teamwork, creativity, explanation, and visualization. Also say that what I am doing is how we should be working with the students. Asking questions, writing down what they are saying (regardless if it is correct), and drawing what they are saying to help visualize. Also, you can do this for the student you are working with. Have your student do it or do it for your student.
- Here is an example of what the number talk could look like:

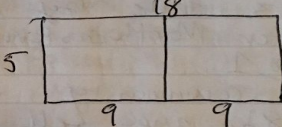
18×5 :
 $20 \times 5 = 100$
 $2 \times 5 = 10$
 $100 - 10 = 90$



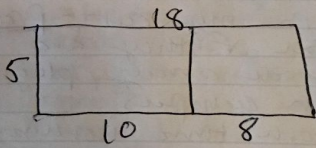
18×5 :
 $18 \times 5 = 9 \times 10$
 $= 90$



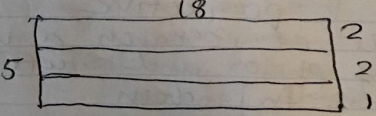
18×5 :
 $9 \times 5 = 45$
 $9 \times 5 = 45$
 $45 + 45 = 90$



18×5 :
 $10 \times 5 = 50$
 $8 \times 5 = 40$
 $50 + 40 = 90$



18×5 :
 $18 \times 2 = 36$
 $18 \times 2 = 36$
 $18 \times 1 = 18$
 $36 + 36 + 18 = 90$



Wrap-Up (1-2) minutes : Conclusions & Questions

- Share:** Don't be discouraged or worried if a student comes up to you with math homework. Embrace maybe not knowing the right answer. Use that curiosity to work with the student. If you genuinely curious about the work and want to find the answer. This will motivate the student to work too. Also, remember that the students are actually in the class for the homework you are working on. They have the knowledge and notes to know how to do whatever you're working on. Feel free to look through their notes to help you. It is okay to not know everything, you just need to be open to learning and trying. Mentality can be very contagious. If you are enthusiastic about the work, the student will be too.