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IT'S ALL ABOUT NUMBER TALKS!

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ABACUS CO-EDITORS



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IN THIS ISSUE

In this issue, we share what researchers are saying about Number Talks, our experiences with Number Talks, and how one Grade 6-8 teacher does Number Talks in her classroom.

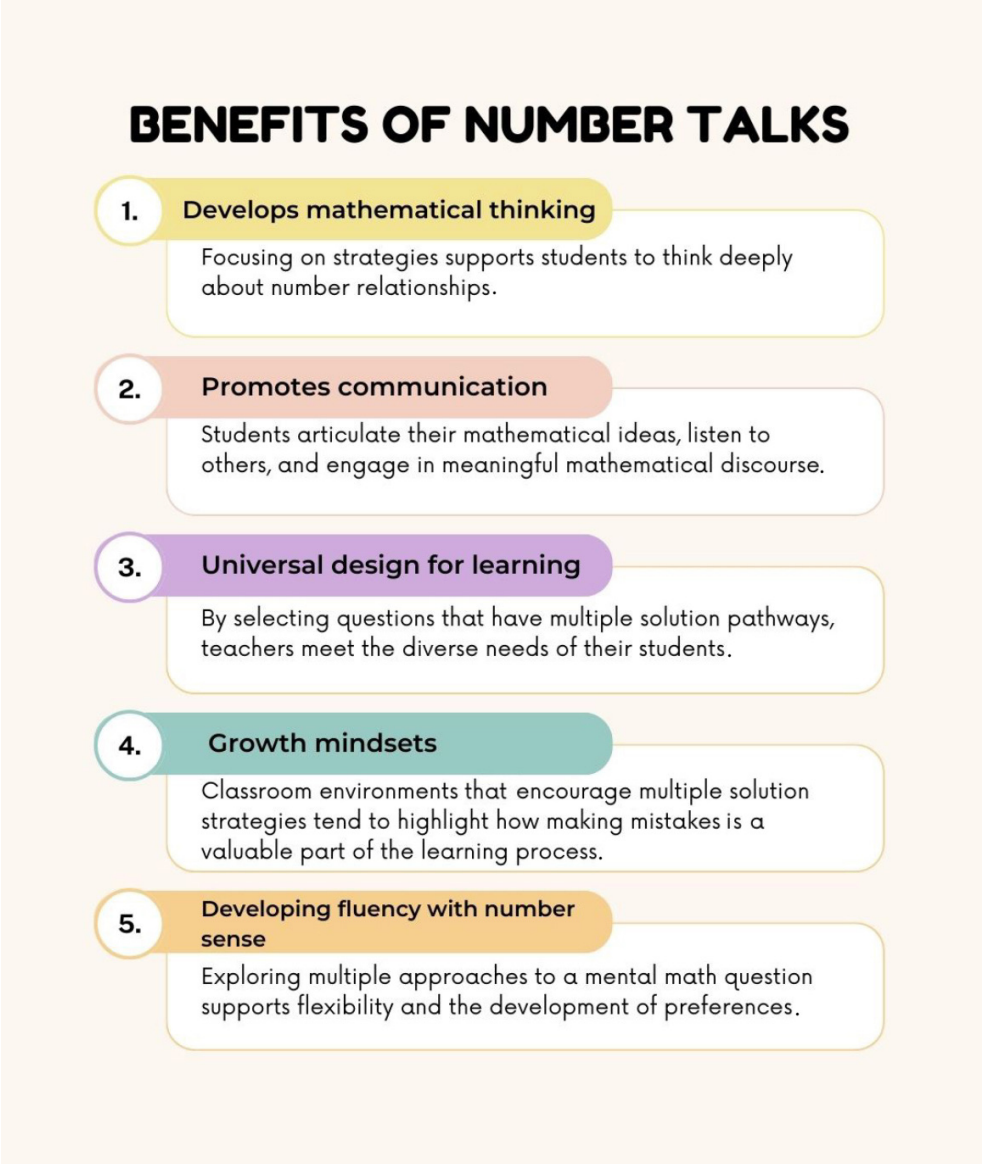
We hope that readers will find their own variations and ideas about Number Talks in this issue, and will write to us and share more CONCRETE ideas about how we can make Number Talks even better in mathematics classrooms and in future *Abacus* issues.

The focus of our lesson insert centres on the mathematical question, 15% of 20 (which can be used for a Number Talk).

The questions we address in this issue are: 1) What is a Number Talk, and why should I do it?; 2) How do I implement a Number Talk in my classroom?; 3) What can I expect my students to say and do during a Number Talk?—an example of 24 divided by 8. Certainly, our collection includes videos demonstrating the concepts of dividing 24 by 8 and finding 15% of 20. Moreover, there is a video that provides an explanation of Number Talks. We firmly believe that leveraging videos for learning can be both enjoyable and a productive use of our time.

1) WHAT ARE NUMBER TALKS AND WHY SHOULD I DO THEM?

A Number Talk is a teaching strategy commonly used in mathematics classrooms to foster students' mathematical thinking, reasoning, and communication skills. During a Number Talk, the teacher and students engage in a structured discussion about a mathematics question that can be solved mentally. The focus is on students sharing their strategies for solving problems and explaining their thinking, while the teacher facilitates the discussion and makes the strategies visual and visible for everyone to see and consider.



2) HOW DO I IMPLEMENT A NUMBER TALK IN MY CLASSROOM?

Select a question for students to calculate mentally, and align the numbers and operation with curriculum expectation. Start with a simple question that you think everyone will be able to engage with.

Present the problem: Read the problem aloud.

Focus on mental strategies: Encourage students to solve the problem mentally and not use calculators or write down their solutions. Give them a few moments to think individually and/or turn and talk to an elbow partner.

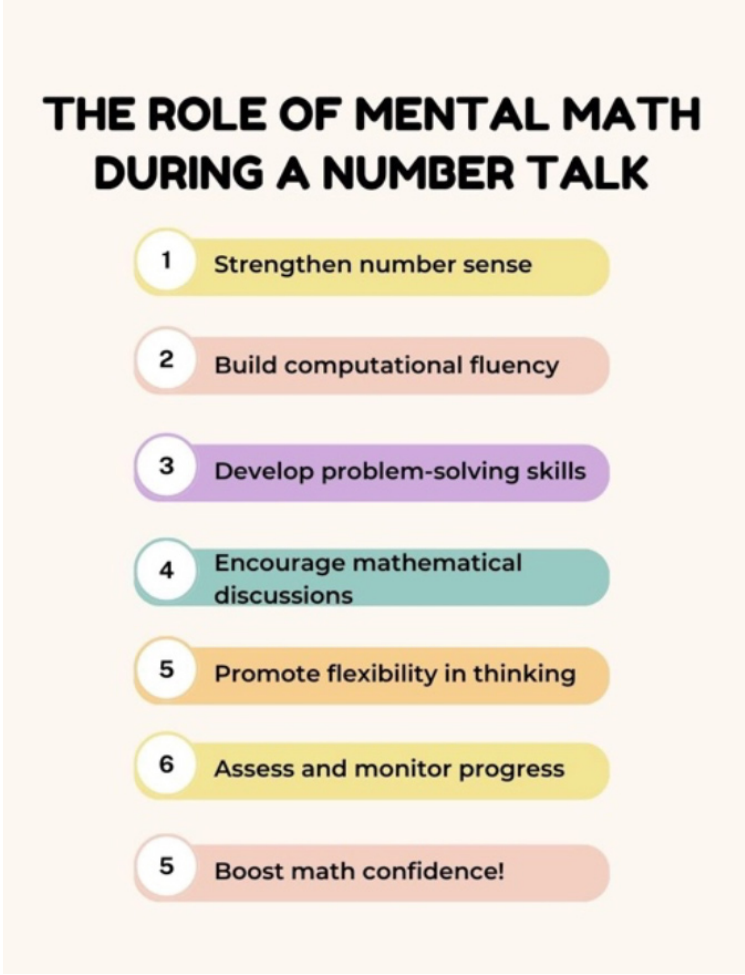
Share strategies: Begin the discussion by asking a student to share their strategy for solving the question.

Use prompts: As the student shares, the teacher may ask probing or clarifying questions.

Make it visual/visible: Record the strategy on the whiteboard, using images/materials and movements so that students can “see” the mental activities.

Elicit difference: Elicit a different strategy by asking another student to share. You will also make their strategy visual and visible for peers to see and compare.

Make connections: Compare and contrast the two strategies by discussing the merits of each approach (e.g., efficiency, preferences) and how to see ideas from one in the other.





SCAN ME

NUMBER TALKS 101: Tips for parents and teachers

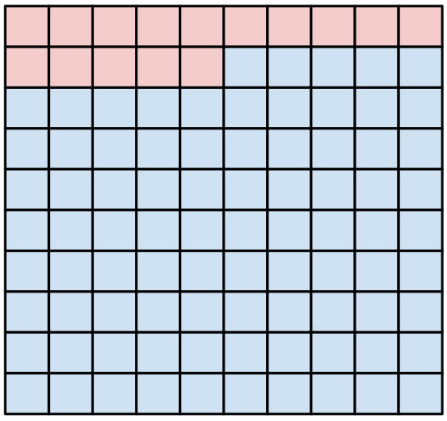
https://www.youtube.com/watch?v=FuwYytjXi_w

LESSON IDEA FOR USING 15% OF 20 AS A NUMBER TALK

Links to Ontario Curriculum Expectations:

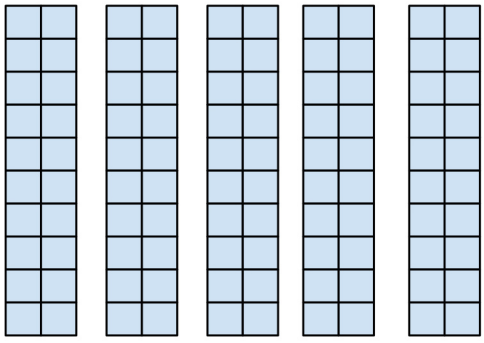
Grade 5	Grade 6	Grade 7
B2.3 use mental math strategies to multiply whole numbers by 0.1 and 0.01, estimate sums and differences of decimal numbers up to hundredths, and explain the strategies used	B2.3 use mental math strategies to calculate percents of whole numbers, including 1%, 5%, 10%, 15%, 25%, and 50%, and explain the strategies used	B2.3 use mental math strategies to increase and decrease a whole number by 1%, 5%, 10%, 25%, 50%, and 100%, and explain the strategies used

Teacher Tip: Percent = per one hundred
Ask: What does "percent" mean? Break "percent" into "per" and "cent," which translates to "per" and "hundred," for example, 15 per 100.

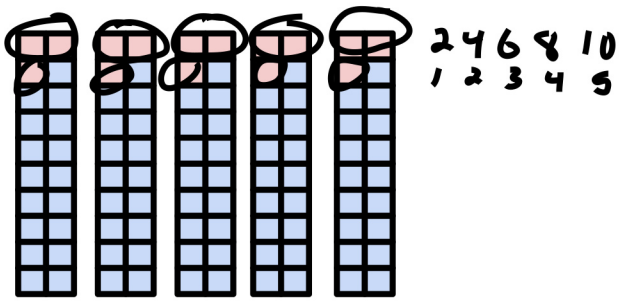


Teaching Tip:
Use a hundred block to represent the whole and show that 15 out of 100 is the same as 15 of a hundred.

Teacher Tip:
Sometimes people may describe a fraction like 15 out of 20. Let's divide the hundred into five equal parts (20, 40, 60, 80, 100).

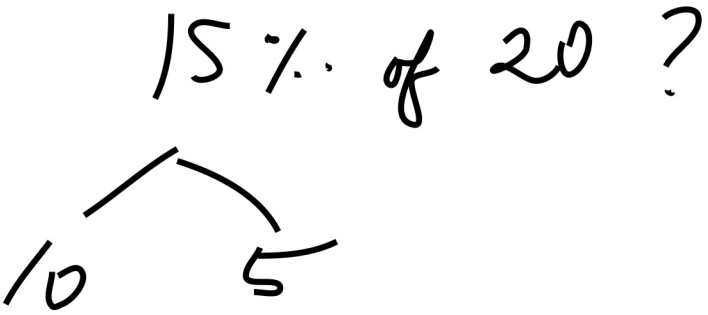


Teacher Prompt:
How can we divide the 15 evenly among the five 20's?



Student says:
"Give 2 for each group of 20, then give 1 more so each group has 3."

Teacher Prompt:
Is there a different way to figure this out?

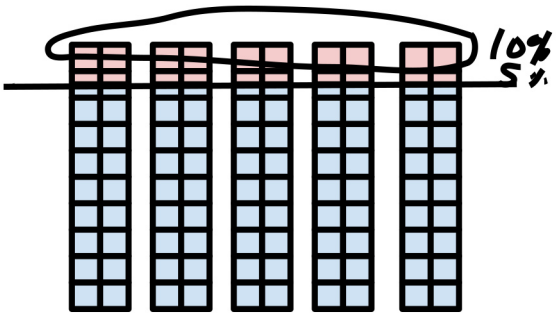


Teacher Prompt:
"So, if we know 10 percent is 2, how could we find out 5 percent?"

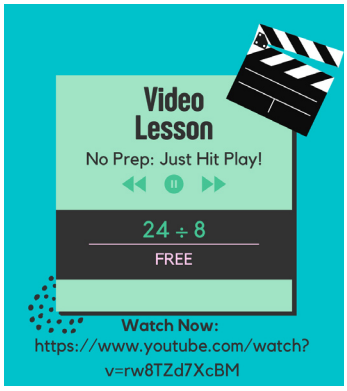
10% of 20 = 2
5% of 20 = 1
15% of 20 = 3

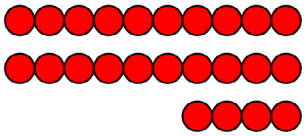
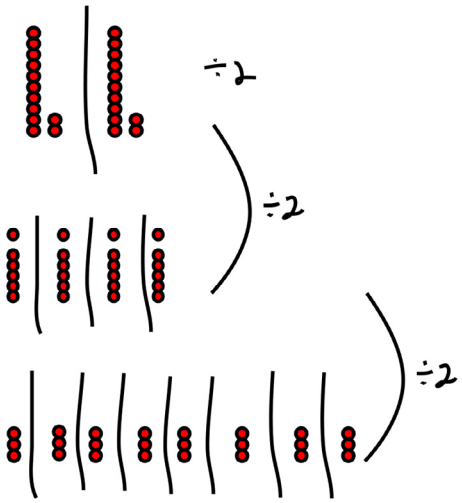
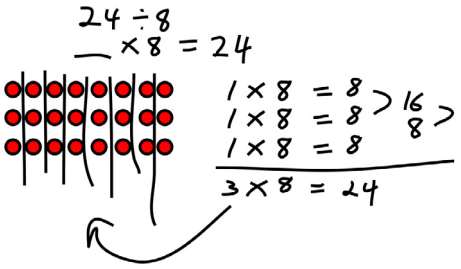
Student says:
"I know that you can find 10 percent of 20 by shifting the decimal point one place to the left, resulting in two."

Student says:
"Divide the 10 percent in half and add it to the original 10 percent, resulting in three."



What can I expect my students to say and do? An example of 24 divided by 8



Number Talk	Teacher says… Student says…	Making mental math strategies visible
• Select a question • Present the problem • Focus on mental strategies • Share strategies	 **Teacher:** How would you think about 24 divided by 8? **Student:** "First you divide 24 by 2, to get 12. Then, divide 12 by 2 again, to get 6. Then divide 6 by 2 one more time, which gives you the final answer of 3."	**Creating equal groups starting with 24** Demonstrates the division visually by using objects to **create equal groups**. Split the 24 into two equal groups, and then split each group in half repeatedly until they end up with eight groups of 3. 
• Elicit difference • Make it visual/visible	**Teacher:** Is there a different way to think about 24 divided by 8? **Student:** "I started with the 8, and I counted by 8's until I reached a total of 24… 8, 16, 24."	**How many times does 8 go into 24?** Represent three **equal groups** of 8, which equals 24. To seed discussion about connections, draw lines to illustrate the eight equal groups within the total of 24. 
• Use prompts • Make connections	**Teacher:** How are the two solutions similar and different? **Student:** "One starts with the 24 and the other starts with the 8." **Student:** "The 24 is repeatedly halved (e.g., 12 +12, 6 + 6 + 6 + 6, 3 + 3 + 3 + 3 + 3 + 3 + 3 + 3) until eight equal groups are reached, whereas the other solution begins with eight equal groups and repeats the equal groups until 24 is reached." **Teacher:** Can you find all the numbers from one solution in the other? **Student:** "You can see doubles and halves in both solutions."	

HOW I USE NUMBER TALKS IN MY MIDDLE SCHOOL CLASSROOM

By Cristina De Simone

Number Talks are short whole-class discussions around a mental math problem (Parrish & Dominick, 2016; Gerstenschlager & Strayer, 2019). The YouTube video about Number Talks in this edition of the *Abacus* will go into more detail on the research behind Number Talks. Give it a watch! The last point that Dr. Tina and Dr. Marc discuss in the video is that there are variations of Number Talks that teachers can demonstrate, so I thought it might be helpful for me to share some of the variations I use in my middle school (Grades 6–8) classroom.

It's worth noting that the paper that is reviewed in the video explicitly states, "We offer our research here with the hope of generating conversations between practitioners and researchers about helpful moves to breach chasms between instructional practices and research-based practices" (Matney et. al, 2020, p. 256), which aligns with what I know the *Abacus* endeavours to do as well!

First of all, I start Number Talks the same as Dr. Tina and Dr. Marc describe in the video. I pose the mental math question and give students time to think about it. Students use finger signals to demonstrate they have one or more ideas (instead of hands up). Here is where the variations come into play!

Variation 1: Turn and Talk

In this variation, students have some time to first share their solutions with a partner or small group sitting in close proximity. I remind students that when we discuss the problem as a group, I will ask them to share the strategy they heard from someone else. This increases the sense of safety through students sharing their thinking in a lower-stakes context, and may promote more beneficial math talk. As recommended in Matney et al. (2020), I listen intently to the partner talk and then select and sequence students to share their thinking.

For example, when thinking about 13% of 5, I've heard the following solutions:

- Split 13% into 10% of 5 and three groups of 1% of 5.
- Find 13% of 10 and then split that in half.
- Think about money—imagine thirteen cents for every dollar.

I might sequence these three responses like this:

1) **Visual representation of 13% of 5:** Call on the students who were talking about $0.13 for every dollar and adding up five groups of thirteen.
2) **Decomposition of a number:** Splitting 13% into 10% of 5 and three groups of 1% of 5
3) **Doubling and halving:** Now that students have seen a visual representation, connected it to the decomposition of a number, looking at doubling the 5 to find 13% of 10, and then halving the answer, may help students develop flexibility in their mental math strategies.

Variation 2: Letting Students Think through an Idea with Writing

In this variation, students are given a mini-whiteboard that they can use to map out their mental computation and display their thinking in their own way before the teacher re-presents it. When using this variation, I encourage students to try to "show what is happening in your mind," instead of just working out the calculation.

For example:

When facilitating the conversation, this is a great opportunity to try to build connections among the different strategies and representations of strategies. (For more information on connection making, take a look at the September issue of the *Abacus*.)

I hope this has ignited your interest in trying out a Number Talk in your classroom! Also, as a friendly reminder from one teacher to another, if you're trying this for the first time, be patient with yourself. It requires some time for students to become accustomed to participating in a Number Talk, and it also takes time for you to hone your own skills. Stay committed to the process. I assure you, the results are well worth the effort!

Moving Forward: Check out the following resources to continue your professional learning about Number Talks!

Humphreys, C., & Parker, R. (2019). Making number talks matter (Episode 10) [Audio podcast episode). *Designing Lessons.* Build Math Minds. www.buildmathminds.com/episode-10-making-number-talks-matter/

Humphreys, C., & Parker, R. (2023). *Making number talks matter: Developing mathematical practices and deepening understanding, grades 3–10.* Taylor & Francis.

Parrish, S.D. (2011). Number talks build numerical reasoning. *Teaching Children Mathematics, 18*(3), 198–206. doi.org/10.5951/teacchilmath.18.3.0198

Youcubed at Stanford. (n.d.). *From Stanford online's "How to learn math for teachers and parents": Number talks* [Video]. YouTube. www.youtube.com/watch?v=yXNG6GKFhQM

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Gerstenschlager, N.E., & Strayer, J.F. (2019). Number talks for statistics and probability: Short, mathematical discussions can elicit students' reasoning and focus on foundational ideas. *Mathematics Teaching in the Middle School, 24*(6), 362–367. doi.org/10.5951/mathteacmiddscho.24.6.0362

Matney, G., Lustgarten, A., & Nicholson, T. (2020). Black holes of research on instructional practice: The case of number talks. *Investigations in Mathematics Learning, 12*(4), 246–260.

Parrish, S., & Dominick, A. (2016). Number talks: Fractions, decimals, and percentages. Math Solutions.

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