Number Talks

Topics: Mental math, numerical fluency; argument & critique
Materials: White board or projector
Time: 5 - 15 minutes
Common Core: Variable, but especially MP3

This mental math routine creates powerful positive habits for students.

Why We Love Number Talks

Number talks don't replace other instruction, but they are a powerful complement to it. They get all students involved, help them strengthen fluency, intuition, and mental math strategies, improve students' ability to explain and critique solutions, and allow teachers a valuable window into their students' thinking. A well-run number talk is an excellent example of Common Core Math Practices 1, 2, 3, 6, 7, and 8.

How Number Talks Work

If you implement one type of activity into your class routine, Number Talks might be the most bang for your buck.

In many ways, they're familiar. The teacher writes a simple problem down on the board, and students solve it mentally. The difference is that the students aren't just looking for the answer: *they're trying to find as many different ways to solve the problem as they can*.

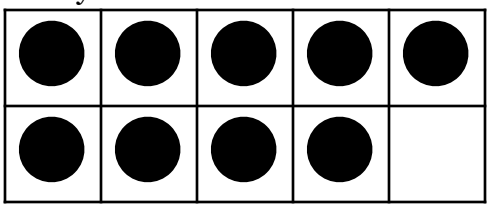
The key elements to number talks are a de-emphasis on speed and right answers and an added emphasis on process and communication. Here's how they work:

1. **The teacher writes a problem on the board.** For Kindergarten, the problem will usually be to count a collection of dots, or do a simple addition or subtraction problem.
2. **Students mentally solve the problem**. They show the teacher whether they have the answer by (quietly) giving a thumbs up at their chest. This prevents a small batch of quick students from shutting everyone else down. If students can come up with a second way to solve the problem, they hold up a second finger at their chest. This means that everyone can keep thinking about the problem even after they have the answer.
3. **Students share their answers**. After enough time has passed that everyone or nearly everyone has a solution, the teacher asks students what their solution are. She writes down all solutions; none are given preferential treatment, and she doesn't say whether they are right or wrong.
4. **Students explain their thinking**. Once all solutions are written down, the teacher asks students to explain how they got their solution. Students explain (from their seat) while the teacher writes the steps they describe on the board.

5. **Discussion and consensus**. Ideally, by the end of the discussion, the class should have a list of 3-6 different approaches to the problem, plus a consensus as to what the correct answer is.
6. **Followup**. If time permits, the teacher has the option to ask a followup questions that builds on the last.

Example Number Talk
[Note: this Number Talk is not necessarily the Number Talk you'll do on any given day. It's just a good example.]

Teacher: Time for our morning Number Talk. I'm going to put up an picture, and you can tell me how many dots you see in it. Remember that your job is to figure out as many different ways to count as you can.



(A student starts waving his arm in the air.) When you have the answer, show me with a thumb at your chest. (The student puts his arm down and holds up a thumb.) If you have one way to count the dots, see if you can find another. Show me by holding up two fingers instead of one.

(She waits for 30 seconds. Several students are holding up two or more fingers, though many have just a thumb. The teacher is noting to see if anyone hasn't solved the problem—this is a great opportunity for formative assessment. Finally, she begins calling on students for their answers, starting with those who have only one solution.)

Teacher: Lucy?
Lucy: 9. (Teacher writes 9 on the board.)
Teacher: Charles?
Charles: 8 (Teacher writes 8 on the board.)
Teacher: Michelle?
Michelle: 9.
Teacher: So you agree with 9. Did anyone get a number that is not 8 or 9? (No one has any.) Who would like to explain how they got their answer? Tyrone?
(The teacher records what the students write as they explain.)
Tyrone: It is a 10 frame, except one is missing, so it's 9.
Teacher: Ah, I see. If you had one more dot, it would be a full ten frame, which is ten dots. But it's actually one dot less than 10, which means it must be 9. Anyone else?
Sarah: I counted by ones.
Teacher: Let's try that together. (Counts with the class) 1,2,3,4,5,6,7,8,9. So you got 9 dots Sarah? (Sarah nods.) Anyone else?

Charles: I'd like to change my answer. I think it's 9.
Teacher: Thanks for letting us know, Charles! You can always change your mind. And great arguments, everyone. We had different ideas about how many dots there were, and we actually managed to convince each other what was really true. Anyone else have another way to count the dots?
Kari: I counted on.
Teacher: How did you do that?
Kari: I know the top is five. So I said 5, 6, 7, 8, 9.
Teacher: Aha. You know that the full row is 5, so you don't need to count them one by one. Let's try that together, everyone. 5… 6, 7, 8, 9.
Teacher: I see that there are still more hands up, but hang on to your ideas. I'm going to show you one more problem, and you can see if you can use your counting method to count the dots. You can also use one of the methods we saw in this talk.

Prompts and Questions

- Who would like to defend this answer?
- I don't quite follow. Do you mean i should count this group first?
- How did you do that/know that?
- Does anyone else think they can explain what Shawn is saying?
- Turn to the person next to you and explain how you counted.

Tips for the Classroom

1. Start with questions that are accessible to everyone
2. Students will be looking to see if you indicate what the right answer is. Don't favor right answers over wrong ones. Make sure that the explanations are what matters.
3. Make sure you emphasize the Number Talk protocol—hands at chests rather than waving in the air, for example. This will pay off, and you can use it in other places.
4. Give students constructive language to use in the discussion, like, "I respectfully disagree, because…" and "I agree with _____, because…"
5. Always keep the environment safe and positive.
6. Don't worry if you don't reach total consensus on every problem. Sometimes a student will need more time to process. You can move on when it feels like it is time.
7. Number Talks can sprawl if you're not careful. Doing short (5 - 10 minute) Number Talks regularly is more powerful than long ones infrequently.

Resources

Check out the PDFs available at
http://onceuponateachingblog.blogspot.com/2011/06/number-talks.html
A quick video is at http://www.youtube.com/watch?v=la3_trsAnMs
More ideas are at http://www.cobbk12.org/bullard/NumberTalksK-2.pdf
and http://www.mathperspectives.com/num_talks.html