



West Side University:

Strengthening Tier 1 Instruction  
with Number Talks

Denver Huffstutler, M. Ed.  
Academic Coach

<https://www.youtube.com/watch?v=kibaFBgaPx4>

What is 45% of 63?

Mentally solve  
 $85 - 29$

# Possible solution strategies

$$\underline{\underline{85 - 29}}$$

①

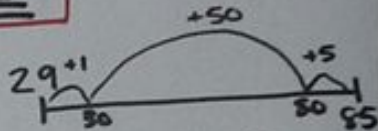
$$85 \rightarrow 70 + 15$$

$$\underline{\underline{20 - 9}}$$

$$50 + 6$$

$$\swarrow \quad \searrow$$
$$56$$

PLACE  
VALUE  
WITH  
REGROUPING



②

$$1 + 50 + 5$$
$$\quad \quad \quad \searrow \quad \swarrow$$
$$\quad \quad \quad 56$$

Think addition  
or reversibility

constant difference

③

$$85 - 29$$

$$\begin{array}{r} \pm 1 \quad \pm 1 \\ \hline 86 - 30 \end{array}$$

$$\swarrow \quad \searrow$$
$$56$$

④

removal in parts

$$\downarrow$$
$$85 - 20 = 65$$

$$65 - 5 = 60$$

$$60 - 4 = 56$$

$$29$$

## Why?

"Our classrooms are filled with students and adults who think of mathematics as rules and procedures to memorize without understanding the numerical relationships that provide the foundation for these rules."

- Sherry Parrish, author of Number Talks



# Why?

- Math makes sense
- Develop understanding
- Make connections among ideas/strategies
- Grow confidence
- Engages students in learning
- Builds community within the classroom
- Builds fluency, number sense, mental math computation, problem solving skills





# The Big Picture



Number Talks are a student centered approach that give students the opportunity to:

- correct their own misconceptions
- explain their thinking aloud, they can explain their thinking in writing
- understand learning happens when connections are made



## What?

- Brief conversation among students
- Teacher acts as facilitator
- Students share strategies
- Students learn/accept different strategies
- Determine most efficient strategies
- Teacher assesses gaps/misconceptions through questioning

Number Talk Video: Whole Number Computation

[https://players.brightcove.net/5387496875001/default\\_default/index.html?videoId=5441080643001](https://players.brightcove.net/5387496875001/default_default/index.html?videoId=5441080643001)



# Standards for Mathematical Practice

## **Mathematically Proficient Students can.....**

### **1. Make sense of problems and persevere in solving them**

- doing mathematics means solving problems and discussing how they solved them
- plan a solution pathway and adjust as needed as they work through the problem
- persevere ("First, I drew a diagram, and it didn't help, so I tried to make a table. That worked much better because I found a pattern.")
- explain thinking through equations, verbal descriptions, tables, graphs, diagrams and search for trends in data

### **2. Reason abstractly and quantitatively**

- numbers represent quantities and these quantities can be represented with symbols
- generalize based on what they observe
- "I know that rectangles are parallelograms with four right angles ....so that means this square must be a rectangle because ..."

### **3. Construct viable arguments and critique the reasoning of others**

- make conjectures with support and reason through the use of objects, drawings, diagrams and actions
- ask and respond to questions like, "How did you get that?" and "Why is that true?"

### **4. Model with mathematics**

- put mathematics in the context of real world situations and identify those relationships
- use organizational strategies such as making a table, creating a number line, drawing diagrams, use objects, etc.

### **5. Use appropriate tools strategically**

- use familiar, grade appropriate tools and know when they can be helpful
- recognize both the strengths and limitations of the tool being used

### **6. Attend to precision**

- communicate precisely to others through my language, models and representations
- calculate accurately and efficiently, and show flexibility with strategies

### **7. Look for and make use of structure**

- look closely at patterns and structure
- identify and understand the make-up and inclusion of number (commutative and distributive properties)

### **8. Look for and express regularity in repeating reasoning**

- continually evaluate the reasonableness of intermediate results ("I notice when I divide 4 by 11, I get 0.36, then I keep dividing the same numbers over and over.")
- students continually check their work by asking themselves, "Does this make sense?"

**What SMPs are  
addressed through  
Number Talks?**



# Expectations

## Teachers

- Pose a problem
- Allow think time
- Facilitate discussion
- Record thinking
- Give praise
- Encourage discovery of learning opportunities
- Ask critical thinking questions

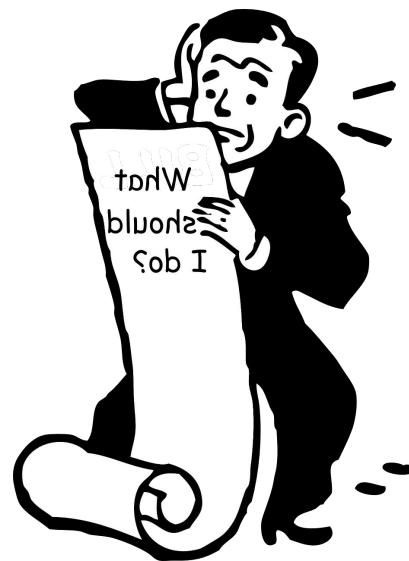
## Students

- No blurting
- Thinking only
- Use hand signals
- Share strategies
- Listen carefully
- Revoice/restate other's thinking
- Give praise to support other's ideas

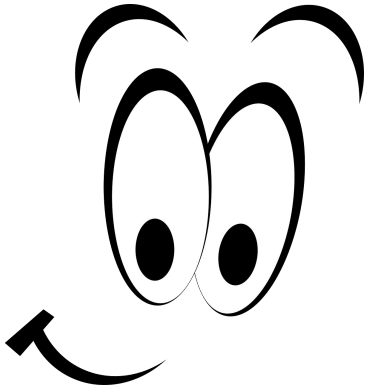
Let's give it a try!

# What to do if...

- You are struggling with time
  - ~ set your timer
  - ~ let students help hold you accountable
  - ~ find another time for your number talks
- You notice specific students not participating
  - ~ use revoice/restate
  - ~ turn and talk after initial think time
  - ~ small group number talks using chart paper & sticky notes
- You see gaps in learning
  - ~ create small groups to remediate
  - ~ purposely pair students for turn and talk time



# Number Talks in K-2



## Areas of focus

- Subitizing
- Composing/decomposing numbers (especially 10)
- Patterns (doubles, doubles + 1, adding to a friendly ten)
- Fluency with small numbers

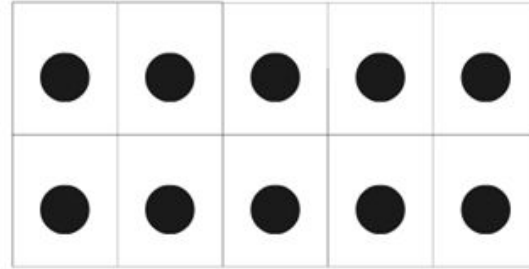
<https://www.youtube.com/watch?v=X18cQkKMIhs> (starting number talks)

<https://www.youtube.com/watch?v=R4m6soJDVq8> (rekenreks)

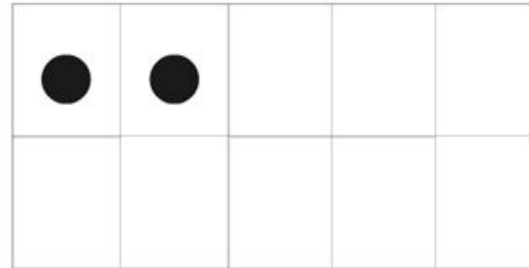
<https://www.youtube.com/watch?v=EWyDGUUUDJE> (Kinder- ten frames and dot cards)

<https://www.youtube.com/watch?v=85LznWF7P4> (1st- ten frame)

# K-2 Number Talks: dot cards, ten frames, Rekenreks



what do you see or know about the number 12?





12 dots, 8 empty  
6 groups of 2 = 12

$6 \times 2 = 12$   
 $2 \times 6 = 12$  Brandon



2 ten frames and equals 20! Michael (Nick)

\* $5 + 1 + 5 + 1 = 12$

These are the dots Connor saw!  $15 - 3 = 12$  (Brandon)

A dime + 2 pennies = 12

Brandon saw it with money.  $12$  is even! Lynette Mikey

$10 + 2 = 12$

$4 + 4 + 4 = 12$

$3 \times 4 = 12$  (3 sets of 4) Jayden

$0 + 12 = 12$

There is 1 group of ten (10). Lindsey Lou saw this

$12 + 0 = 12$

There are 12 ones in 12! Lindsey Lou saw the flip flop!

6 is half of 12. It is a double.

Angel

$6 + 6 = 12$

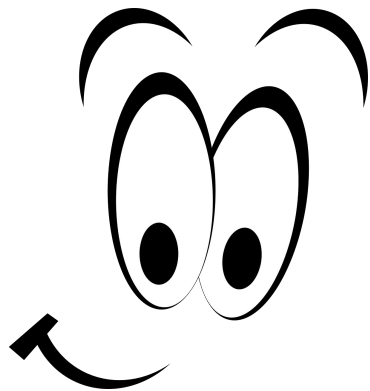
Christy

$8 + 4 = 12$  (Nicholas)  
2 groups of 5.

1 group of 10 + 2.  $10 + 2 = 12$

What 1st grades see in the number 12.

# Number Talks in 3-5



## Areas of focus

- Number Sense
- Place Value
- Fluency
- Properties
- Connecting mathematical ideas

[https://players.brightcove.net/5387496875001/default\\_default/index.html?videoId=5441089505001](https://players.brightcove.net/5387496875001/default_default/index.html?videoId=5441089505001) (multiplication)

<https://www.youtube.com/watch?v=WAhkbSFtvAI> (two-digit addition, regrouping)


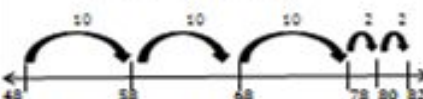
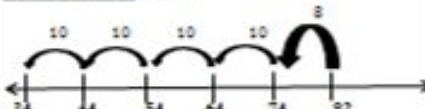


## Subtraction

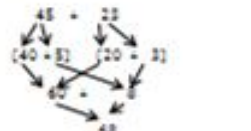
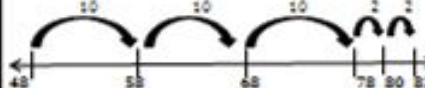

Strategies Supported by Number Talks

## Addition

Strategies Supported by Number Talks

<p><b>Counting Back</b></p> <p><b>Duration:</b> 0-3</p> <p><b>Sample Solution:</b></p> <p>For counting back students would start at 8 and count backward 3 until they arrived at 5.</p> <p>8...7, 6, 5</p>	<p><b>Removal in Parts</b></p> <p><b>Duration:</b> 45 - 23</p> <p><b>Sample Solution:</b></p>  <p>(decompose 23)</p> <p>(separate 20 from 45)</p>								
<p><b>Constant Difference</b></p> <p><b>Duration:</b> 57-22</p> <p><b>Sample Solution:</b></p> <p>Add 3 to each number and the difference remains the same. Only the numbers become friendlier to work with.</p> <p><math>57 + 22</math>  <math>60 + 25</math> (add 3 to each # keeps difference the same)  <math>60 - 25</math></p> <p><math>60 - 25 = 35</math></p>	<p><b>Adding Up to find the Difference</b></p> <p><b>Duration:</b> 82-48</p> <p><b>Sample Solution:</b> 82-48</p> <p><math>48 + (10 + 10 + 10 + 4) = 82</math></p>  <p>Students adds up from 48 to 82 to find the difference of 34.</p>								
<p><b>Part Whole Box Model</b></p> <p><b>Duration:</b> 57-22</p> <p><b>Sample Solution:</b></p> <table border="1" data-bbox="28 655 454 775"> <thead> <tr> <th colspan="2">Whole</th> </tr> </thead> <tbody> <tr> <td colspan="2">57</td> </tr> <tr> <td>Part</td> <td>Part</td> </tr> <tr> <td>22</td> <td>35</td> </tr> </tbody> </table> <p>Students understand the whole and one part of the whole. Because of this, the student is able to identify the other missing part of the whole.</p>	Whole		57		Part	Part	22	35	<p><b>Adjusting 1 Number To Create An Easier Number</b></p> <p><b>Duration:</b> 39 - 24</p> <p><b>Sample Solution:</b></p> <p>Adding one to 39 to make it a 40</p> <p><math>(39 [+1]) + 24</math></p> <p><math>(40) - 24 = 16</math></p> <p><math>16 [-1] = 15</math></p> <p>Added 1 to 39 so 1 was removed from the sum</p>
Whole									
57									
Part	Part								
22	35								
<p><b>Using a Number Line</b></p> <p><b>Duration:</b> 82-48</p> <p><b>Sample Solution:</b> 82-48</p>  <p>Student adds up from 48 to 82 to find the difference</p>									



<p><b>Counting All/Counting On</b></p> <p><b>Duration:</b> 0-3</p> <p><b>Sample Solution:</b></p> <p>For counting all the students would combine 8 and 3 by counting the set {1, 2, 3, 4, 5, 6, 7, 8...9, 10, 11}</p> <p>For counting on the student could say "8...9, 10, 11"</p>	<p><b>Breaking Up Into Place Value</b></p> <p><b>Duration:</b> 45 + 23</p> <p><b>Sample Solution:</b></p> 
<p><b>Making Tens</b></p> <p><b>Duration:</b> 9+4</p> <p><b>Sample Solution:</b></p> <p>Student could say "I decomposed the 4 (3 and 1) and gave one to the 9 to make a ten and added the remaining 3."</p> <p><math>9 + 4 = 10 + 3</math></p>	<p><b>Adding Up In Chunks</b></p> <p><b>Duration:</b> 48+34</p> <p><b>Sample Solution:</b> 48+34</p> <p><math>48 + (10 + 10 + 10 + 4)</math></p> 
<p><b>Doubles/Near Doubles</b></p> <p><b>Duration:</b> 8+7 (when students use their double facts to solve related problems)</p> <p><b>Sample Solution:</b></p> <p><math>8 + 7 = 7 + 7 + 1</math>  <math>8 + 7 = 8 + 0 + 1</math></p>	<p><b>Compensation</b></p> <p><b>Duration:</b> 49 + 57</p> <p><b>Sample Solution:</b></p> <p><math>49 + 57</math>  <math>51 + 56</math>  <math>40 + 56 = 96</math></p> <p>Compensation: removing one quantity from one addend and adding it to the other addend. Although quantities are manipulated the total sum remains the same.</p>
<p><b>Landmark/Friendly Numbers</b></p> <p><b>Duration:</b> 48+34</p> <p><b>Sample Solution:</b></p> 	<p><b>Adjusting 1 Number To Create An Easier Number</b></p> <p><b>Duration:</b> 39 + 24</p> <p><b>Sample Solution:</b></p> <p>Adding one to 39 to make it a 40</p> <p><math>(39 [+1]) + 24</math></p> <p><math>(40) + 24</math></p> <p><math>64 [-1] = 63</math></p> <p>Added 1 to 39 so 1 was removed from the sum</p>

**Division**

Strategies Supported by Number Talks

**Partial Quotients**

**Duration:** 550 ÷ 15

**Sample Solutions:**

$\begin{array}{r} 15 \overline{) 550} \\ -150 \quad 10 \\ \hline 400 \\ -150 \quad 10 \\ \hline 250 \\ -150 \quad 10 \\ \hline 100 \\ -90 \quad 2 \\ \hline 10 \end{array}$	$\begin{array}{r} 15 \overline{) 550} \\ -300 \quad 20 \\ \hline 250 \\ -150 \quad 10 \\ \hline 100 \\ -75 \quad 5 \\ \hline 25 \\ -15 \quad 1 \\ \hline 10 \end{array}$	$\begin{array}{r} 15 \overline{) 550} \\ -450 \quad 30 \\ \hline 100 \\ -90 \quad 6 \\ \hline 10 \end{array}$
---	--	---

**Multiplying Up**

**Duration:** 550 ÷ 15

**Sample Solution:**

$\begin{array}{l} 15 \times 10 = 150 \\ 15 \times 10 = 150 \\ 15 \times 10 = 150 \\ \hline 15 \times 2 = 30 \\ 15 \times 2 = 30 \\ 15 \times 2 = 30 \\ \hline 15 \times 36 = 540 \\ 550 - 540 = 10 \\ 550 \div 15 = 36 \text{ r } 10 \end{array}$	$\begin{array}{l} 15 \times 20 = 300 \\ 15 \times 10 = 150 \\ 15 \times 5 = 75 \\ \hline 15 \times 1 = 15 \\ 15 \times 36 = 540 \\ 550 - 540 = 10 \\ 550 \div 15 = 36 \text{ r } 10 \end{array}$	$\begin{array}{l} 15 \times 30 = 450 \\ 15 \times 6 = 90 \\ 15 \times 36 = 540 \\ 550 - 540 = 10 \\ 550 \div 15 = 36 \text{ r } 10 \end{array}$
---	--	---

**Multiplication**

Strategies Supported by Number Talks

**Making Landmark or Friendly Numbers**

**Duration:** 9 × 29

**Sample Solutions:**

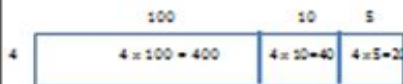
$9 \times 30 = 270$  "that's one group of 9 too much, so..."  
 $270 - 9 = 261$   
 Or  
 $9 \times 25 = 225$  "because 8 25's is 200, so 1 more 25 is 225"  
 $9 \times 2 = 18$   
 $9 \times 2 = 18$  and  $18 + 18 = 36$ .  $225 + 36 = 261$

**Partial Products**

**Duration:** 4 × 115

**Sample Solution:**

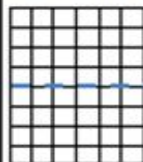
$4 \times 115 = 4 \times 100 + 4 \times 10 + 4 \times 5$   
 $4 \times 100 = 400$   
 $4 \times 10 = 40$   
 $4 \times 5 = 20$   
 $400 + 40 + 20 = 460$



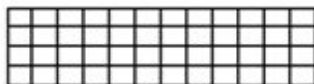
**Doubling and Halving**

**Duration:** 8 × 6

**Sample Solution:** Doubling and Halving can help students relate facts that they are unsure of, to facts with which they are fluent.



Cut the 8 × 8 array in half on the dotted line. Move the bottom section to the top right to make a 4 × 12 array. I know that's 48 because 4 × 10 = 40 and 4 × 2 = 8. 40 + 8 = 48.

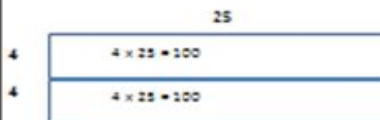


**Breaking Factors into Smaller Factors**

**Duration:** 8 × 25

**Sample Solution:**

$8 = 2 \times 4$   
 $25 \times 4 = 100$   
 $100 \times 2 = 200$ , so  $8 \times 25 = 200$



Classroom content connections

Number Talks  
 $76 + 24$

$76 + 4 = 80$   
 $80 + 24 = 104$   
 $104 - 4 = 100$

$24 + 6 = 30$   
 $30 + 70 = 100$

$70 + 20 = 90$   
 $4 + 6 = 10$   
 $90 + 10 = 100$

$6 + 4 = 10$   
 $10 + 20 = 30$   
 $70 + 30 = 100$

1 2  
3 4

The circled one is the most efficient because...  
We think Number 2 is the most efficient because we only used 2 steps. We think #3 is efficient because we ~~used~~ made 3 tens.

# Questions

1. What strikes you as most useful/valuable/exciting about the Number Talks routine?
2. What parts of the routine are of concern? What do you think will be most difficult for you as the teacher/facilitator?
3. What norms and structures do you need to have in place to be successful with Number Talks?

# Expectations

1. Number Talks begin next week
2. 3x weekly
3. No more than 15 min
4. Should be planned collaboratively

# Resources

Websites:

<https://www.scholastic.com/teachers/blog-posts/alycia-zimmerman/number-talks-grow-mathematical-minds/>

[https://education.fcps.org/gves/sites/gves/files/Number%20Talks%20with%20classroom%20clips\\_0.pdf](https://education.fcps.org/gves/sites/gves/files/Number%20Talks%20with%20classroom%20clips_0.pdf) (the big idea)

[http://www.mathsolutions.com/documents/NumberTalks\\_SParrish.pdf](http://www.mathsolutions.com/documents/NumberTalks_SParrish.pdf) (must read article)

<http://www.meaningfulmathmoments.com/number-talks.html> (getting started)

Books:

[Number Talks: Whole Number Computation, Grades K-5](#) by Sherri Parrish

Posters:

[Math Talk Stems](#)

# Resources

Subitizing videos for K-2:

<https://www.youtube.com/watch?v=ib5Gf3GlzAg> (dot patterns)

<https://www.youtube.com/watch?v=nsScVF6Jo6A> (dot patterns, ten frame, and fingers)

[https://www.youtube.com/watch?v=t8U\\_zZ-rW1E&t=37s](https://www.youtube.com/watch?v=t8U_zZ-rW1E&t=37s) (ten frame)

# **Editable Number Talk Rules**





**Blurting Prohibited**



**Thinking Only**



**Use Hand Signals**



**Listen Carefully**



**Restate/Revoice**



**Aha!**



