

What's Fluency?

Time to Stop the Debate

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3 Questions

1 Billion Circles

100 circles : minute

144,000 circles : day

1,000,000,000 would take 6944 days

19+ years with no sleep



Mark Chubb @MarkChubb3 · 16m
[@gfletchy](#)



Where does 1 billion go?



Where does 1 billion go on the number line?



Where does 1 billion go on the number line?





Are You Fluent

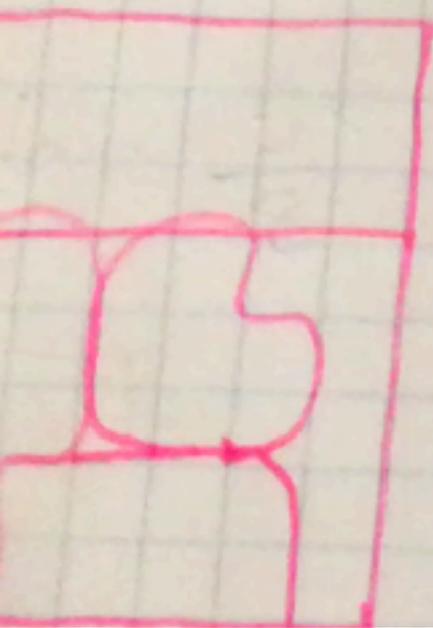
6 x 518

$$60 \overline{) \begin{array}{r} 10 + 3 + 5/8 \\ 600 \mid 180 \mid \end{array}}$$

$$6 \times 5/8 = 3 \frac{6}{8}$$

$$\begin{array}{r} 10 + 3 + 5/8 \\ \hline 600 \mid 180 \end{array}$$

$$6 \times 5/8 = 3 \frac{6}{8}$$



$$6 \times \frac{5}{8}$$



8



Is Emma Fluent

3 Goals

Goals

1. Define *fluency*. What it *IS* and what it *IS NOT*.
2. Identify ways we can build and support students who are *fluent*
3. Evaluate the ways we assess fluency and how we can do better.



Defining Fluency

fīōōənsē

flu·en·cy

/ˈflʊənsē/ 

noun

noun: **fluency**

the quality or condition of being fluent, in particular.

- the ability to speak or write a foreign language easily and accurately.
"fluency in Spanish is essential"
- the ability to express oneself easily and articulately.
- gracefulness and ease of movement or style.
"the horse was jumping with breathtaking fluency"

Examples of FLUENCY in a sentence:

- She speaks with great *fluency*.
- Students must demonstrate *fluency* in a foreign language to earn a degree.
- She is a dancer known for her *fluency* and grace
- He plays the piano with speed and *fluency*.

speed and *fluency*

speed and *fluency*

fluency



Fluency

Fluency = Speed

Simplify your team's workflow.

slack GET STARTED

Does Speeding Really Get You There Any Faster?

 Eric Ravenscraft
4/02/14 1:00pm • Filed to: ASK LIFEHACKER

 235.6K  566  17



You may also like



Dear Lifehacker,
I have a simple question: does speeding really get you to your destination any

 Share  Tweet

2.OA.2 - **Fluently** add and subtract within 20 using mental strategies. By end of Grade 2, know *from memory* all sums of two one-digit numbers.

2.NBT.5 - **Fluently** add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.

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$$1764 \div 119$$

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3.OA.7 - **Fluently** multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that $8 \times 5 = 40$, one knows $40 \div 5 = 8$) or properties of operations. By the end of Grade 3, know *from memory* all products of two one-digit numbers.

3.NBT.2 - **Fluently** add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.

4.NBT.4 - **Fluently** add and subtract multi-digit whole numbers using the standard algorithm.

MGSE.5.NBT.5 - **Fluently** multiply multi-digit whole numbers using the standard algorithm (or other strategies demonstrating understanding of multiplication) up to a 3 digit by 2 digit factor.

MGSE.5.NBT.6. - **Fluently** divide up to 4-digit dividends and 2-digit divisors by using at least one of the following methods: strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations or concrete models. (e.g., rectangular arrays, area models)

 1764 : 119

Fluency \neq Speed

MGSE2.OA.2 - *Fluently* add and subtract within 20 using mental strategies. By end of Grade 2, know **from memory** all sums of two one-digit numbers.

MGSE3.OA.7 - *Fluently* multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that $8 \times 5 = 40$, one knows $40 \div 5 = 8$) or properties of operations. By the end of Grade 3, know **from memory** all products of two one-digit numbers.

From Memory



Memorization

3

3rd Grade Teacher

Awards

GA Math Frameworks



How do we build fluency



How do we build number

Number Sense Trajectory

1. Cut apart the headers and descriptors.
2. Match the correct header to the correct descriptor.
3. Place the headers and descriptors in order. The order should be in the trajectory that students build and learn number.

Process NOT Product

Number Sense Trajectory

Comparison

Counting

Hierarchical Inclusion

Subitizing

Cardinality

Number Conservation

1-to-1 Correspondence

Number Sense Trajectory

Subitizing

Comparison

Rote Counting

1-to-1 Correspondence

Cardinality

Hierarchical Inclusion

Number Conservation

Number Sense Trajectory –Putting It All Together

Trajectory	Subitizing Being able to visually recognize a quantity of 5 or less.	Comparison Being able to compare quantities by identifying which has more and which has less.	Counting Rote procedure of counting. The meaning attached to counting is developed through one-to-one correspondence.	One-to-One Correspondence Students can connect one number with one object and then count them with understanding.	Cardinality Tells how many things are in a set. When counting a set of objects, the last word in the counting sequence names the quantity for that set.	Hierarchical Inclusion Numbers are nested inside of each other and that the number grows by one each count. 9 is inside 10 or 10 is the same as $9 + 1$.	Number Conservation The number of objects remains the same when they are rearranged spatially. 5 is 4&1 OR 3&2.
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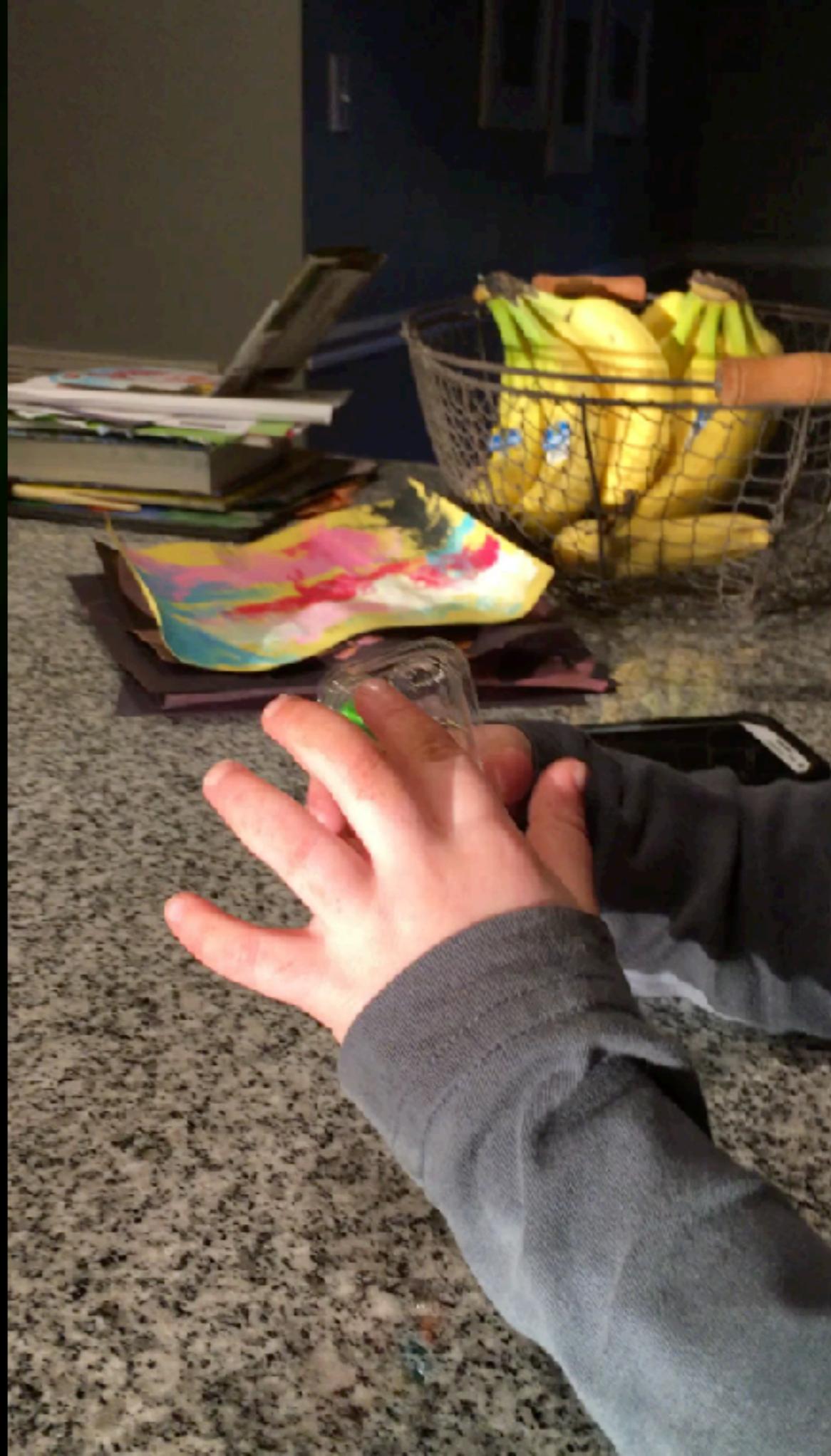
Each concept builds on the previous idea and students should explore and construct concepts in such a sequence

Number Relationships	Spatial Relationship Patterned Set Recognition Students can learn to recognize sets of objects in patterned arrangements and tell how many without counting.	One and Two-More or Less Students need to understand the relationship of number as it relates to \pm one or two. Here students should begin to see that 5 is 1 more than 4 and that it is also 2 less than 7.	Understanding Anchors Students need to see the relationship between numbers and how they relate to 5s and 10s. 3 is 2 away from 5 and 7 away from 10.	Part-Part-Whole Relationship Students begin to conceptualize a number as being made up from two or more parts.
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Perceptual

&

Conceptual

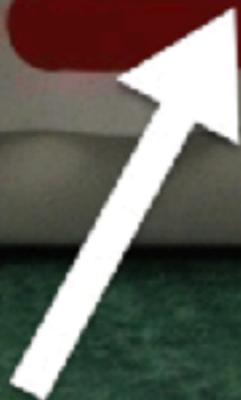




MULTI-USE Paper
Letter / 500 Sheets

92 106 Euro Equivalent BRIGHTNESS	145 Bright White WHITENESS	20 Standard Weight WEIGHT (LB)
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Item

Making Sense Series

the progression of early number & counting

created by Graham Fletcher

 @gfletchy

www.gfletchy.com

PURPOSEFUL WITH DOT CARDS

Subitizing war: one card is flipped over and the first player to say the card gets to keep it

More or less: each player flips over a card and players must say the number that is MORE or LESS

1 more/1 less : one card is flipped over and players must say the number that is 1 less

Addition war: 2 cards flipped over and students must say the sum of the 2 cards

Part-Whole-Head: 3 players needed. 2 players flip over a card and place it on their forehead. The third player says the sum and each player solves for the number value that is on their head.



Assessing Fluency

Ice Cream = Motivation!

Multiplication Sundae

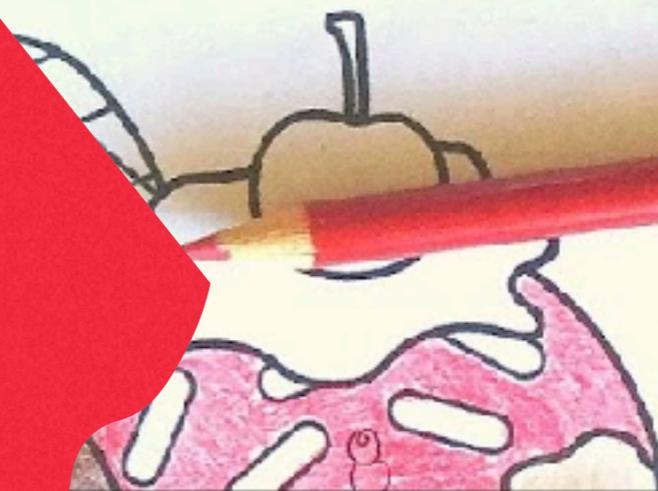


Ice Cream

Innovation!

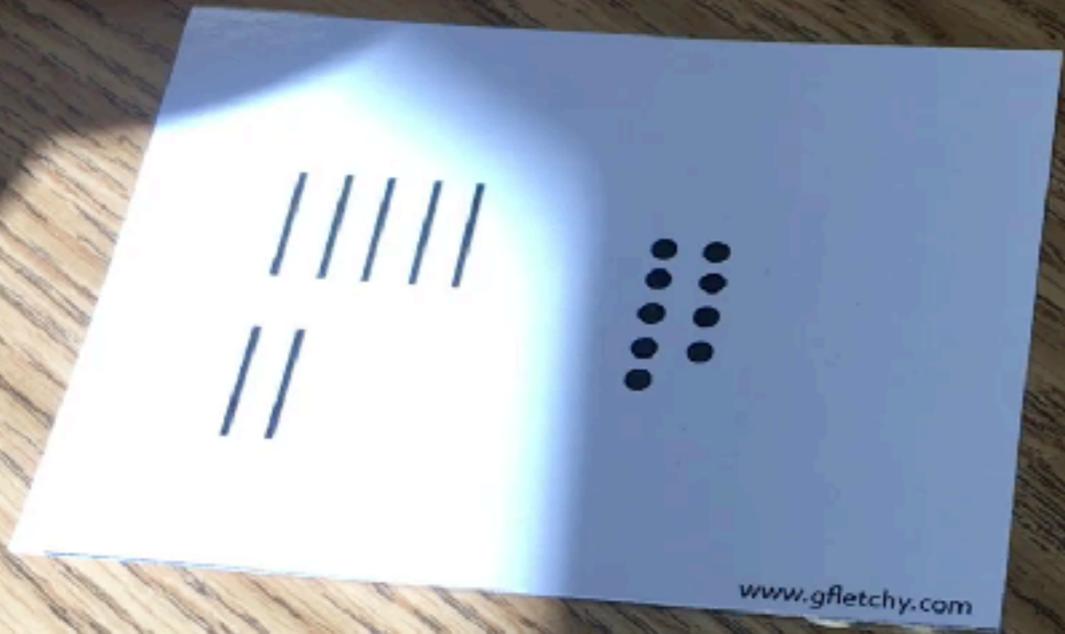
Sundae

Milk









+ 9



kindergarten



2nd grade

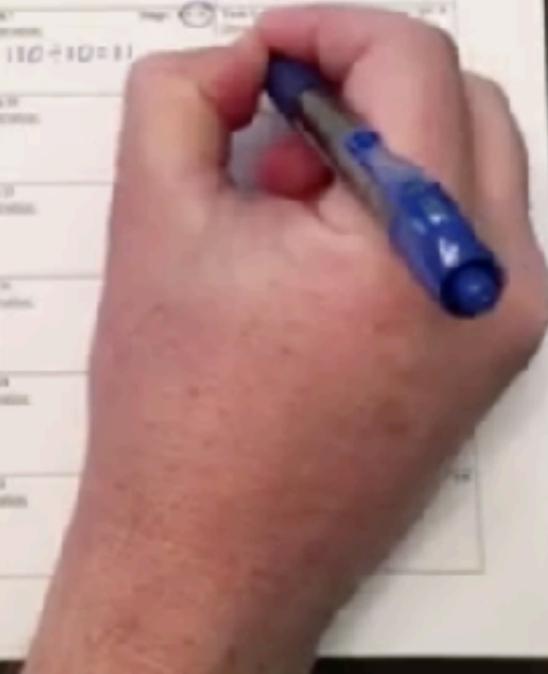
There are 5 blue cars.
That is one-quarter ($\frac{1}{4}$) of the cars.



How many cars are there altogether?



5th grade



Multiplication & Division: $5 \times 5 = 25$

Proportions & Rates: $12 : 4 = 3$
 $\frac{1}{4}$ is quarter

$110 \div 10 = 11$

**Fluency is built purposefully through
intentional teacher moves**

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