

Mental Math and Computational Fluency



Deep Run Elementary

A Tale of a Dog & Two Bears



The Importance of Mental Math

- Built on patterns and relationships, not rote procedures

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$$26 + 57$$

$$25 + 58$$

$$24 + 59$$

$$23 + 60$$

The Importance of Mental Math

- Built on patterns and relationships, not rote procedures

$$3 + 4 + 7 \longrightarrow \begin{array}{l} (3 + 7) = 10 \\ 10 + 4 = 14 \end{array}$$

$$23 + 17 \longrightarrow \begin{array}{l} 3 + 7 = 10 \\ 10 + 10 + 20 = 40 \end{array}$$

The Importance of Mental Math

- Built on patterns and relationships, not rote procedures

$$17 \times 32$$

$$6.25 \times 400$$

$$34 \times 16$$

$$62.5 \times 40$$

$$68 \times 8$$

$$625 \times 4$$

$$136 \times 4$$

$$272 \times 2$$

The Importance of Mental Math

- Provides a way to evaluate answers for reasonableness

$$78 \times 59 = ?$$

$$\begin{array}{r} \overset{7}{78} \\ \times 59 \\ \hline 422 \end{array} \leftarrow$$
$$\begin{array}{r} \overset{4}{7} \\ 78 \\ \times 59 \\ \hline 702 \\ + 390 \\ \hline 1,092 \end{array} \leftarrow$$

$$\begin{array}{r} 78 \times 59 = ? \\ \downarrow \quad \downarrow \\ \approx 80 \quad \approx 60 \\ 78 \times 59 = ? \\ \approx 80 \times 60 = 4,800 \\ 78 \times 59 \approx 4,800 \end{array}$$

The Importance of Mental Math

- Reflects the kind of math adults do on a daily basis



The Importance of Mental Math

- Can be “the easy way”



Doing Math the Easy Way?

Let's take a look at a couple problems:

1st/2nd grades

$$14 - 6 = \underline{\quad}$$

4th/5th grades

$$600 \times 100 = \underline{\quad}$$

- How would **you** solve these problems?
- How do you think **a child** would solve these problems?

Traditional Algorithm: The Easy Way?

$$14 - 6 = \underline{\quad}$$



$$\begin{array}{r} \overset{0}{\cancel{1}}4 \\ - \quad 6 \\ \hline 08 \end{array}$$



$$14 - 6 = \underline{\quad}$$

$$(14 - 4) - 2 = \underline{\quad}$$

$$10 - 2 = \underline{\mathbf{8}}$$



$$14 - 6 = \underline{\quad}$$

$$6 + \underline{\mathbf{8}} = 14$$

Traditional Algorithm: The Easy Way?

$$600 \times 100 = \underline{\hspace{2cm}}$$



$$\begin{array}{r} 600 \\ \times 100 \\ \hline 000 \\ 0000 \\ + 60000 \\ \hline 60,000 \end{array}$$



$$600 \times 100 = \underline{\hspace{2cm}}$$

$$600 \times 10 = 6,000$$

so

$$600 \times 100 = \underline{\hspace{2cm}}$$

$$600 \times 10 \times 10 = \underline{\hspace{2cm}}$$

$$6,000 \times 10 = \underline{\underline{60,000}}$$



$$600 \times 100 = \underline{\hspace{2cm}}$$

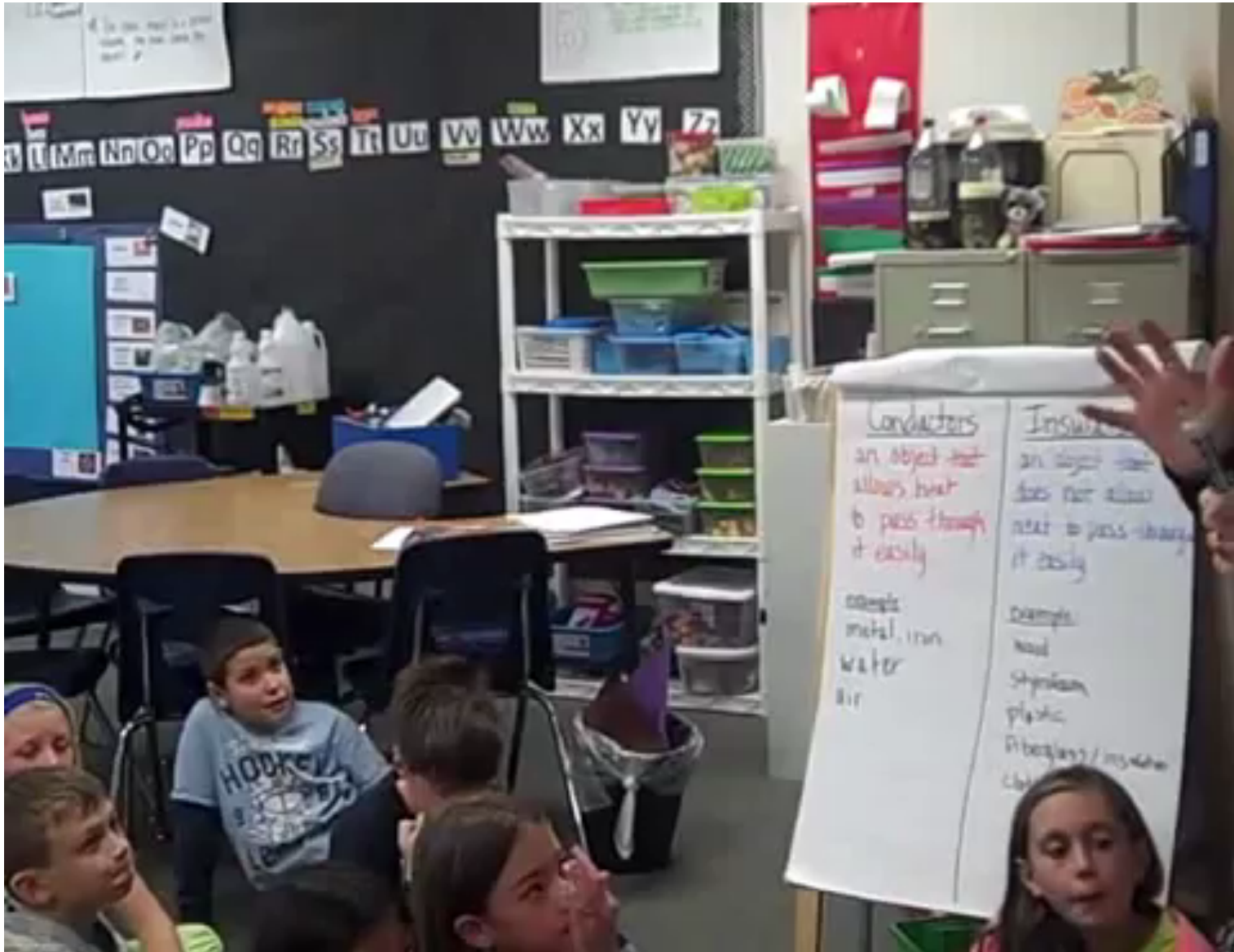
$$\begin{array}{r} \swarrow \searrow \\ \underline{\hspace{1cm}} 600 \\ \underline{\hspace{1cm}} 6,000 \\ \underline{\underline{\hspace{1cm}}} 60,000 \end{array}$$

Talking Numbers: Subtraction

3rd Grade- Math
Number Talk

Jeremiah Curtin
Leadership Academy

Talking Numbers: Division



Mental Math and Fluency Expectations

GRADE	END-OF-YEAR EXPECTATION	EXAMPLES
K	fluently + and – within 5	$4 + 1$ $5 - 2$ $3 + 2$

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1	fluently + and – within 10	$7 - 5$ $4 + 3$ $9 - 6$
	± 10 for any two-digit number	$26 + 10$ $84 - 10$

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	± 10 for any two-digit number	$26 + 10$ $84 - 10$
2	know from memory all sums of two one-digit addends	$6 + 7$ $8 + 3$ $7 + 8$ $2 + 7$ $9 + 5$ $4 + 9$
	± 10 and ± 100 for any three-digit number	$473 - 10$ $816 + 10$ $352 - 100$ $709 + 100$

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	± 10 and ± 100 for any three-digit number	$473 - 10$ $816 + 10$ $352 - 100$ $709 + 100$
3	know from memory all products of one-digit factors	4×9 8×6 5×7 7×3 2×9 4×8

Computation Expectations by Grade

GRADE	END-OF-YEAR EXPECTATION
K	<ul style="list-style-type: none">• add and subtract within 10
1	<ul style="list-style-type: none">• add and subtract within 20• add within 100• subtract two-digit multiples of 10
2	<ul style="list-style-type: none">• add and subtract within 1,000
3	<ul style="list-style-type: none">• add and subtract within 1,000• multiply two one-digit factors• multiply one-digit factors by a multiple of 10
4	<ul style="list-style-type: none">• add and subtract within 1,000,000• multiply: 1 by 4 and 2 by 2• divide: up 4 by 1
5	<ul style="list-style-type: none">• multiply multi-digit numbers• divide: up to 4 by 2• perform all operations on decimals

Working Together to Build Mathematical Thinkers

The school's role...

- offer rich, purposeful mathematical experiences
- provide number strategy instruction & practice

The families' role...

- ask your child to show you what he or she has learned
- look for ways to apply the learning in real-life situations

Our shared role...

- highlight and build on the students' strengths
- celebrate questions, mistakes, growth, effort, and struggle

Websites

<http://gregtangmath.com/games.html>

The screenshot shows the GregTangMath.com website. At the top left is the logo "GregTangMath.com" in a dark red font. To the right of the logo are links for "Contact" and "Join us". Below the logo is a navigation bar with "Home", "Games", and "Resources" buttons. A promotional banner for "Math Centers!" is displayed, stating "Only \$9.95" and featuring a "Visit Store" button. Below this is a section for "ONLINE GAMES" with a "Download on the App Store" badge. Five game icons are shown: "TEN FRAME MANIA", "NUM TANGA!", "KAKOOMA", "LIMBO", and "MINUS MANIA". Below these are "Coin Bubble" and a "TEACHING GAMES" section with several small icons.

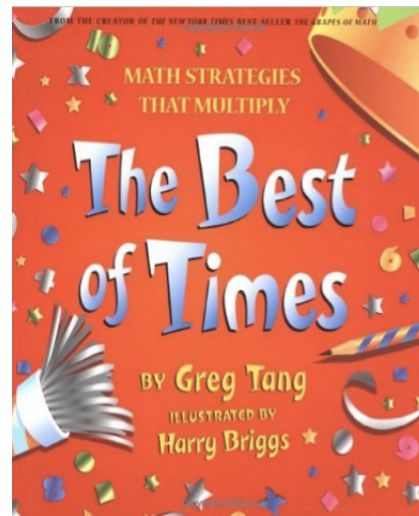
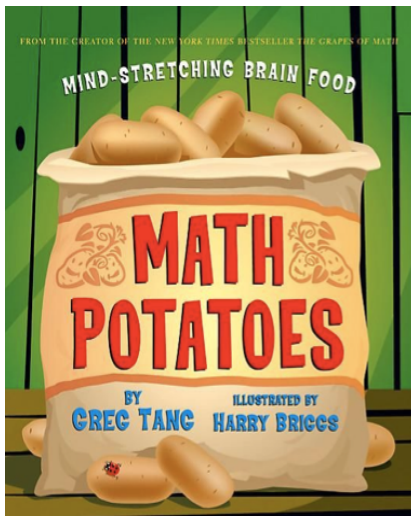
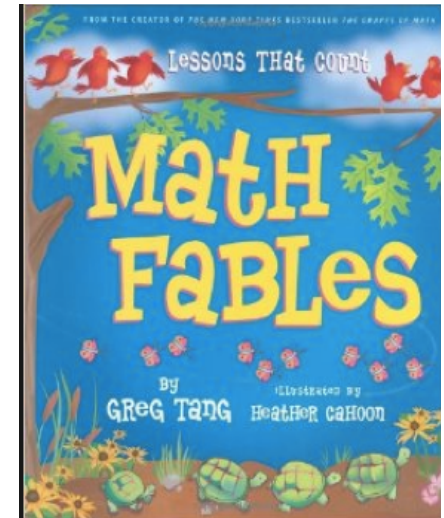
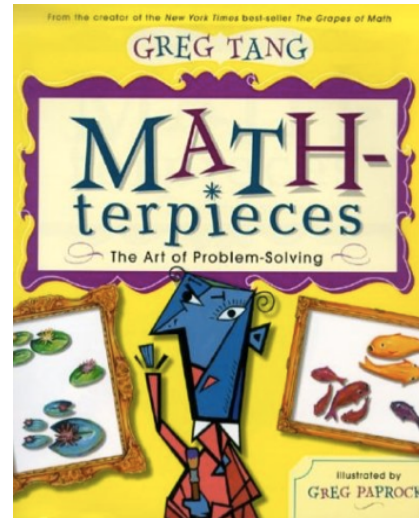
The image shows the "Hit the Button" game interface. The title "Hit the Button" is written in large, orange, 3D-style letters on a blue background. Below the title are several circular buttons with math topics: "Number Bonds" (green), "Doubles" (yellow), "Halves" (yellow), "Times Tables" (orange), "Division Facts" (orange), and "Square Numbers" (orange). The "Topmarks" logo is in the bottom right corner.

<http://www.topmarks.co.uk/maths-games/hit-the-button>

Greg Tang Books

K-2 Primary

- Math-terpieces
- Math Fables



3-5 Intermediate

- Math Potatoes
- The Best of Times

Greg Tang Books

Peruse the books.

Choose one for
your family.



Fill out one of the
book labels.

This book belongs to _____
the _____ family
(family's last name)
children in grade(s) _____

Put it in the
container.

