



# Enjoy curing Math Dislike by BundleCounting 5 fingers



$$\begin{aligned}
 5 &= \# \quad | \quad | \quad | &= 1 \text{ B } 3 \quad 2s && \text{overload} \\
 &= \# \quad \# \quad | &= 2 \text{ B } 1 \quad 2s && \text{normal} \\
 &= \# \quad \# \quad \# &= 3 \text{ B } -1 \quad 2s && \text{underload}
 \end{aligned}$$

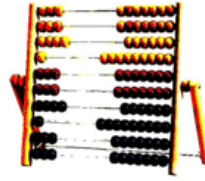
Bundle before you calculate:

$$\begin{aligned}
 \bullet \quad 65 + 27 &= 6 \text{ B } 5 + 2 \text{ B } 7 &= 8 \text{ B } 12 &= 9 \text{ B } 2 &= 92 \\
 \bullet \quad 65 - 27 &= 6 \text{ B } 5 - 2 \text{ B } 7 &= 4 \text{ B } -2 &= 3 \text{ B } 8 &= 38 \\
 \bullet \quad 7 * 48 &= 7 * 4 \text{ B } 8 &= 28 \text{ B } 56 &= 33 \text{ B } 6 &= 336 \\
 \bullet \quad 336 / 7 &= 33 \text{ B } 6 / 7 &= 28 \text{ B } 56 / 7 &= 4 \text{ B } 8 &= 48
 \end{aligned}$$

# Download the BundleCounting Worksheet



- Count
- ReCount
- DoubleCount
- Predict
- Add on-top
- Add next-to

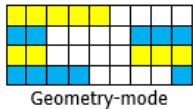


**BundleCount** 'fore you **Add**  
 MatheMatics as **ManyMatics**  
 a Natural Science about **MANY**

MATHeCADEMY.net Cures **MathDislike** by 1 Cup & 5 sticks: 5 =  $\text{||||}$  | =  $\text{|||}$  | = 2) 1 2s

<b>Count</b> In Icons In <u>BundleCups</u>	$T = \text{    } = \mathbf{4} = 4$ $T = \text{       } = \text{   } \text{   }   = \text{   }   = 2) 1 \mathbf{3s} = 2.1 \mathbf{3s} = 2 \frac{1}{3} \mathbf{3s}$
<b>ReCount</b> In same Unit In new Unit	$T = \text{       } = 2 \mathbf{B} 1 = 1 \mathbf{B} 4 = 3 \mathbf{B} - 2 \mathbf{3s}$ $T = 2\mathbf{B} 1 \mathbf{3s} = 1\mathbf{B} 3 \mathbf{4s} = 1\mathbf{B} 2 \mathbf{5s} = 3\mathbf{B} 1 \mathbf{2s} = 1\mathbf{B} 1\mathbf{B} 1 \mathbf{2s}$
<b>ReCount</b> In Tens From Tens	$T = 3 \mathbf{7s} = ? \mathbf{tens}$ Answer: $T = 3 \times 7 = 21 = 2.1 \mathbf{tens}$ $T = 47 = ? \mathbf{6s}$ Answer: $T = 47/6 \times 6 = 7 \mathbf{6s} \ \& \ 2$
<b>DoubleCount</b> in <u>PerNumbers</u> in <u>PerFive</u> , 3/5 in <u>PerHundred</u> , %	With 4\$ per 5kg, $T = 20\text{kg} = (20/5) \times 5\text{kg} = (20/5) \times 4\$ = 16\$$ 3 per 5 of 200\$ = ?\$. $200\$ = (200/5) \times 5\$$ gives $(200/5) \times 3\$ = 120\$$ 70% of 300\$ = ?\$. $300\$ = (300/100) \times 100\$$ gives $(300/100) \times 70\$ = 210\$$
<b>Calculator</b> Prediction <u>RecountFormula</u>	$T = 2 \mathbf{4s} = ? \mathbf{5s} = 1.3 \mathbf{5s}$ since $\frac{2 \times 4}{5} = 1.\text{some}$ $T = (T/B) \times B$ i.e. $T = T/B \ \mathbf{Bs}$ $\frac{2 \times 4 - 1 \times 5}{3}$
<b>Add</b> <u>OnTop</u> <u>NextTo</u>	$T = 4 \mathbf{5s} + 2 \mathbf{3s} = 4 \mathbf{5s} + 1.1 \mathbf{5s} = 5.1 \mathbf{5s}$ $T = 4 \mathbf{5s} + 2 \mathbf{3s} = 3.2 \mathbf{8s}$
<b>Multiply, Divide</b> Use <u>BundleWriting</u>	$7 \times 463 = 7 \times 4\mathbf{B}6\mathbf{B}3 = 28\mathbf{B}42\mathbf{B}21 = 28\mathbf{B}44\mathbf{B}1 = 32\mathbf{B}4\mathbf{B}1 = 3241$ $3241 / 7 = 32\mathbf{B}4\mathbf{B}1 / 7 = 28\mathbf{B}44\mathbf{B}1 / 7 = 28\mathbf{B}42\mathbf{B}21 / 7 = 4\mathbf{B}6\mathbf{B}3 = 463$

T = 7 = 2.1 3s on an Abacus:



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 Teaching – not ESSENCE but EXISTENCE

Teaching Teachers to Teach  
**MatheMatics as ManyMatics**

# Watch MrAlTarp YouTube Videos



- Postmodern Mathematics Debate
- BundleCounting removes Math Dislike
- IconCounting & NextTo-Addition
- PreSchool Mathematics
- Fractions
- PreCalculus
- Calculus
- Mandarin Mathematics
- World History

8 Missing Links of Mandarin Math I.avi

$$\begin{aligned}
 T &= | | | | | \\
 &= | | | | | \\
 &= | ) | | ) \\
 &= 1)2) \\
 &= 1.2 \quad 4s
 \end{aligned}$$

MATHeCADEMY.net : Math as MANYmaths about MA

4:37 / 12:10



# 1day Zoom Seminar: To avoid Math Dislike, ReCount in flexible BundleNumbers



Action Learning on the child's own 2D NumberLanguage as observed when showing 4 fingers together 2 by 2 makes a 3-year-old child say 'No, that is not 4, that is 2 2s.'

## 09-11. Listening and Discussing: Good & Bad & Evil MatheMatics

**Bad MatheMatism** is true inside but rarely outside classrooms.

**Evil MetaMatics** presents a concept TopDown as an example instead of BottomUp as an abstraction.

**Good ManyMatics**, a natural science mastering Many by ReCounting & adding OnTop/NextTo.

2D Bundle-Numbers with units as a hidden alternative to the traditional 1D Line Numbers without

## 11-13. Zoom Conference. Lunch.

**13-15. Doing: Trying out the 'ReCount – don't Add' booklet** to experience proportionality & calculus & solving equations as golden LearningOpportunities in ReCounting and NextTo Addition.

## 15-16. Coffee. Zoom Conference.



# ReCount – don't Add Booklet, free to Download

## ReCount don't Add

MatheMatics as ManyMatics  
for NewComers & LateComers & Migrants  
to Avoid DysCalCulia

The Direct Way to Core Mathematics:  
Proportionality & Fractions & Calculus & Solving Equations

Allan.Tarp  
MATHeCADEMY.net

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### 03. ReCounting in Icons

Q?		Do	Calculator
9 in 5s	Line	T =	
	Count	1, 2, 3, 4, 8, 1B1, 1B2, 1B3, <u>1B4</u>	
	Bundle	T =	9/5      1.some
	Stack		9 - 1*5      4
	Answer	T =    1)4 T = 9 = 1.4 5s	
9 in 4s	Line	T =	
	Count	1, 2, 3, 8, 1B1, 1B2, 1B3, 2B, <u>2B1</u>	
	Bundle	T =	9/4      2.some
	Cup	T = 2)1	9 - 2*4      1
	Answer	 T = 9 = 2.1 4s	
9 in 3s	Line		
	Count		
	Bundle		9/
	Cup		9 -
	Answer		
8 in 4s	Line		
	Count		
	Bundle		8
	Cup		8
	Answer		
8 in 3s	Line		
	Count		
	Bundle		8
	Cup		8
	Answer		

# Download Action Learning and Action Research Material



## ReCount

### don't Add

MatheMatics as ManyMatics  
for NewComers & LateComers & Migrants  
to Avoid DysCalCulia

The Direct Way to Core Mathematics:  
Proportionality & Fractions & Calculus & Solving Equations

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## 4

### Round it up & Color it

X	X	✂	↶	↶	D	D	D	⊗	⊗
X	X	✂	↶	↶	D	D	D	⊗	⊗
X	X	✂	↶	↶	→	→	→	→	→
X	X	✂	↶	↶	→	→	→	→	→
X	X	✂	↶	↶	⊗	⊗	⊗	⊗	⊗

### Clap, Sing, Walk, Act & Letter it

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### Unite it

--	--	--

### Split it

--	--	--

**Reward: Stickers, each counting two**

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## 4 Counted in 3s

### Sticks

G-counting		A-counting	
	lay out		lay out
	bundle		bundle
	stack	⊗ ⊗	cups
T = 1.1 3s	Total	1) 1)	cup-writing
		T = 1.1 3s	Total

### Abacus

G-mode	A-mode

### Calculator

4 / 3	1.some
4 - 1 x 3	1

**T = 4 = 1.1 3s**

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# 8 MicroCurricula for Action Learning & Research



- C1. Create Icons
- C2. Count in Icons (Rational Numbers)
- C3. ReCount in the Same Icon (Negative Numbers)
- C4. ReCount in a Different Icon (Proportionality)
- A1. Add OnTop (Proportionality)
- A2. Add NextTo (Integrate)
- A3. Reverse Adding OnTop (Solve Equations)
- A4. Reverse Adding NextTo (Differentiate)

**4** Counted in 3s

**Sticks**

G-counting		A-counting	
	<i>lay out</i>		<i>lay out</i>
	<i>bundle</i>		<i>bundle</i>
	<i>stack</i>	① ①	<i>cups</i>
<b>T = 1.1 3s</b>	<b>Total</b>	1) 1)	<i>cup-writing</i>
		<b>T = 1.1 3s</b>	<b>Total</b>

**4**

Round it up & Color it

Clap, Sing, Walk, Act & Letter it

Unite it

Split it

Reward: Stickers, each counting two

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**Abacus**

mode	A-mode

**Calculator**

4 / 3	1.some
4 - 1 x 3	1
<b>T = 4 = 1.1 3s</b>	

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# Question Guided Teacher Education



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Teaches Teachers to Teach MatheMatics as ManyMath, a Natural Science about MANY.

To learn Math, **C**ount & **A**dd MANY, using the **CATS** method:

**C**ount & **A**dd in **T**ime & **S**pace

- Primary: **C1** & **A1** & **T1** & **S1**
- Secondary: **C2** & **A2** & **T2** & **S2**

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a VIRUSECADEMY:

*ask Many, not the Instructor*

## SUMMARY

	QUESTIONS	ANSWERS
<b>C1 COUNT</b>	How to count Many? How to recount 8 in 3s: $T = 8 = ? \ 3s$ How to recount 6kg in \$: $T = 6kg = ? \$$ How to count in standard bundles?	By bundling and stacking the total T predicted by $T = (T/b) * b$ $T = 8 = ? * 3 = ? 3s$ , $T = 8 = (8/3) * 3 = 2 * 3 + 2 = 2 * 3 + 2/3 * 3$ If $4kg = 2 \$$ then $6kg = (6/4) * 4kg = (6/4) * 2 \$ = 3 \$$ Bundling bundles gives a multiple stack, a stock or polynomial: $T = 423 = 4 \text{Bundle} \text{Bundle} + 2 \text{Bundle} + 3 = 4 \text{tente} 2 \text{ten} 3 = 4 * B^2 + 2 * B + 3$
<b>C2 COUNT</b>	How can we count possibilities? How can we predict unpredictable numbers?	By using the numbers in Pascal's triangle We 'post-dict' that the average number is 8.2 with the deviation 2.3. We 'pre-dict' that the next number, with 95% probability, will fall in the confidence interval $8.2 \pm 4.6$ (average $\pm 2 * \text{deviation}$ )
<b>A1 ADD</b>	How to add stacks concretely? $T = 27 + 16 = 2 \text{ten} 7 + 1 \text{ten} 6 = 3 \text{ten} 13 = ?$ How to add stacks abstractly?	By restacking overloads predicted by the restack-equation $T = (T-b) + b$ $T = 27 + 16 = 2 \text{ten} 7 + 1 \text{ten} 6 = 3 \text{ten} 13 = 3 \text{ten} 1 \text{ten} 3 = 4 \text{ten} 3 = 43$ Vertical calculation uses carrying. Horizontal calculation uses FOIL
<b>A2 ADD</b>	What is a prime number? What is a per-number? How to add per-numbers?	Fold-numbers can be folded: $10 = 2 \text{fold} 5$ . Prime-numbers cannot: $5 = 1 \text{fold} 5$ Per-numbers occur when counting, when pricing and when splitting. The \$/day-number a is multiplied with the day-number b before added to the total \$-number T: $T_2 = T_1 + a * b$
<b>T1 TIME</b>	How can counting & adding be reversed? Counting ? 3s and adding 2 gave 14. Can all calculations be reversed?	By calculating backward, i.e. by moving a number to the other side of the equation sign and reversing its calculation sign. $x * 3 + 2 = 14$ is reversed to $x = (14 - 2) / 3$ Yes. $x + a = b$ is reversed to $x = b - a$ , $x * a = b$ is reversed to $x = b / a$ , $x^a = b$ is reversed to $x = a \sqrt[b]{b}$ , $a^x = b$ is reversed to $x = \log_b / \log_a$
<b>T2 TIME</b>	How to predict the terminal number when the change is constant?  How to predict the terminal number when the change is variable, but predictable?	By using constant change-equations: If $K_0 = 30$ and $\Delta K / n = a = 2$ , then $K_7 = K_0 + a * n = 30 + 2 * 7 = 44$ If $K_0 = 30$ and $\Delta K / K = r = 2\%$ , then $K_7 = K_0 * (1 + r)^n = 30 * 1.02^7 = 34.46$ By solving a variable change-equation: If $K_0 = 30$ and $dK / dx = K'$ , then $\Delta K = K - K_0 = \int K' dx$
<b>S1 SPACE</b>	How to count plane and spatial properties of stacks and boxes and round objects?	By using a ruler, a protractor and a triangular shape. By the 3 Greek Pythagoras', mini, midi & maxi By the 3 Arabic recount-equations: $\sin A = a / c$ , $\cos A = b / c$ , $\tan A = a / b$
<b>S2 SPACE</b>	How to predict the position of points and lines? How to use the new calculation technology?	By using a coordinate-system: If $P_0(x,y) = (3,4)$ and if $\Delta y / \Delta x = 2$ , then $P_1(8,y) = P_1(x + \Delta x, y + \Delta y) = P_1((8-3) + 3, 4 + 2 * (8-3)) = (8,14)$ Computers can calculate a set of numbers (vectors) and a set of vectors (matrices)
<b>QL</b>	What is quantitative literature? Does quantitative literature also have the 3 different genres: fact, fiction and fiddle?	Quantitative literature tells about Many in time and space The word and the number language share genres: Fact is a since-so calculation or a room-calculation Fiction is an if-then calculation or a rate-calculation Fiddle is a so-what calculation or a risk-calculation

# PYRAMIDeDUCATION



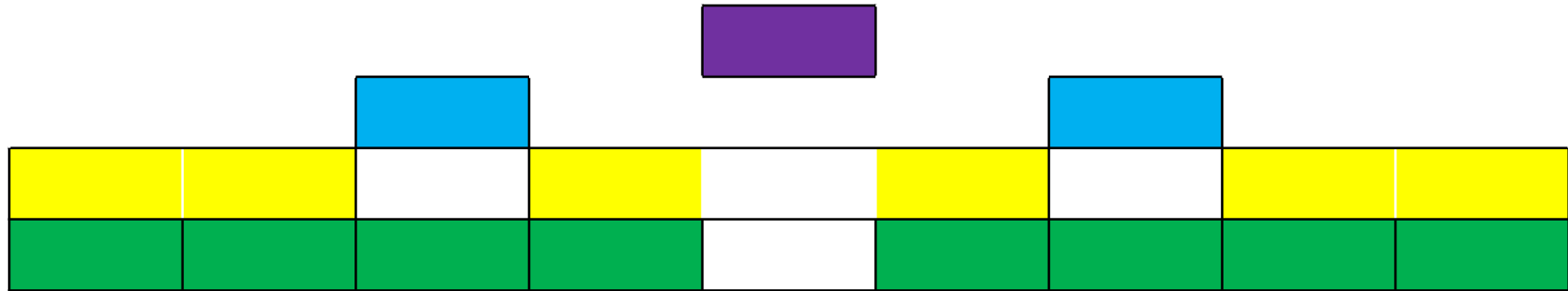
To learn MATH: **C**ount & **A**dd MANY  
*Always ask Many, not the Instructor*

MATHeCADEMY.net - a VIRUS**e**CADEMY

In PYRAMID**e**DUCATION a group of 8 teachers are organized in 2 teams of 4 choosing 2 instructors and 3 pairs by turn.

- Each pair works together to solve **C**ount & **A**dd problems.
- The coach assists the instructors when instructing their team and when correcting the **C**ount & **A**dd assignments.
- Each teacher pays by coaching a new group of 8 teachers.

1 Coach  
 2 Instructors  
 3 Pairs  
 2 Teams





# Theoretical Background

Tarp, A. (2018). Mastering Many by counting and recounting before adding on-top and next-to. *Journal of Math Education, March 2018, 11(1), 103-117.*

Tarp, A. (2020). De-modeling numbers, operations and equations: from inside-inside to outside-inside understanding. *Ho Chi Minh City University of Education Journal of Science 17(3), 453-466.*

