Counting
and
ReCounting
before
Adding

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BundleCounting and NextTo Addition roots Linearity and Integration

”How old next time?” “Four” the child said and showed 4 fingers. “Four?” I asked and showed 4 fingers held together 2 by 2. “No, that is not four, that is two twos!” the child replied thus insisting upon what exists, bundles of twos, and two of them. From this observation we can ask:

What kind of mathematical learning can take place when children count in bundles less than ten?

The methodology mixes French skepticism and American pragmatism: Traditions are deconstructed and grounded theory creates categories freely when working with the physical fact Many. Thus adding 2 5s and 4 3s on-top means changing units by recounting 4 3s in 5s; and 2 5s and 4 3s are added next-to in 8s by their area. So bundle-counting and next-to addition allows preschoolers to learn proportionality and integration, to be tested by designing appropriate preschool micro-curricula.

In the first micro-curriculum M1 children learn to use sticks to build the number icons up to nine, and to use strokes to draw them, thus realizing there are as many sticks and strokes in the icon as the number it represents, if written less sloppy. In the second, children learn to count a given total in bundles manually, using an abacus and by using a calculator. In the third, children learn to recount a total in the same unit. In the fourth, children learn to recount a total in a different unit. In the fifth, children learn to add two bundle-numbers on top of each other. In the sixth, children learn to add two bundle-numbers next to each other. In the seventh, children learn to reverse on-top addition. And in the eights, children learn to reverse next-to addition.

In most cases a calculator (to the right) predicts the result of the counting and re-counting jobs.

Some of the curricula can use silent education where the instructor is allowed to demonstrate and guide through actions, but not through words; or by using words form a foreign language not understood by the child.

M1	I II III IIII IIIII IIIIII IIIIIII IIIIIIII IIIIIIIII 1 2 3 4 5 6 7 8 9	
M2	7 1s is how many 3s? I I I I I I I → III III I → B B I → 2B1 3s → 2.1 3s	**7/3** **2.some** **7 – 2x3** **1**
M3	‘2.7 5s is also how many 5s?’ 2.7 5s = 3.2 5s = 4.-3 5s IIIII IIIII IIIIIII = IIIII IIIII IIIII II = V V V II III = V V V V III	
M4	2 5s is also how many 4s?’ IIIII IIIII = IIII I IIII I = IIII IIII I I so 2 5s = 2.2 4s	**2x5 / 4** **2.some** **2x5 – 2 x 4** **2**
M5	‘2 5s and 4 3s total how many 5s?’ IIIII IIIII III III III III = V V V V I I so 2 5s + 4 3s = 4.2 5s	**(2x5+4x3) /5** **4.some** **2x5+4x3 – 4x5** **2**
M6	‘2 5s and 4 3s total how many 8s?’ IIIII IIIII III III III III = IIIIIIII IIIIIIII III III so 2 5s + 4 3s = 2.6 8s	**(2x5+4x3) /8** **2.some** **2x5+4x3 – 2x8** **6**
M7	‘2 5s and ? 3s total 4 5s?’ IIIII IIIII IIIII IIIII = IIIII IIIII III III III I so 2 5s + 3.1 3s = 4 5s	**(4x5 – 2x5)/3** **3.some** **4x5 – 2x5 – 3x5** **1**
M8	‘2 5s and ? 3s total how 2.1 8s?’ IIIIIIII IIIIIIII I = IIIII III IIIII III I so 2 5s + 2.1 3s = 2.1 8s	**(4x5 – 2x5)/3** **3.some** **4x5 – 2x5 – 3x5** **1**

An abacus can show how next-to addition of 2.2 5s and 1.2 3s gives 2.1 8s

M1

Creating Icons

Mathematics as MANYmatics

A Natural Science about Many

Material for

MicroCurriculum 1

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Curricula

Micro-curriculum 1. Creating Icon-numbers

Micro-curriculum 2. Counting in Bundles

Micro-curriculum 3. Re-counting Bundle-numbers in the Same Bundle

Micro-curriculum 4. Re-counting Bundle-numbers in a Different Bundle

Micro-curriculum 5. Adding Bundle-numbers OnTop

Micro-curriculum 6. Adding Bundle-numbers NextTo

Micro-curriculum 7. Reversing Adding Bundle-numbers OnTop

Micro-curriculum 8. Reversing Adding Bundle-numbers NextTo

Preface

M1, Creating Icons, is the first of a series of 8 micro-curricula in mathematics for preschool and home schooling. They present mathematics as MANYmatics, a natural science about the physical fact Many. They all build upon the following observation:

”How old will you be next time?” I asked the child. “Four”, he answered and showed me four fingers. “Four, you said?” I asked and showed him four fingers held together two by two. “No, that is not four, that is two twos!” the child replied thus insisting upon what exists, bundles of twos, and two of them. Likewise, preschool children have no difficulties counting in other units than ten, even if they only learn how to count in tens.

The micro-curricula use activities with concrete material to obtain its learning goals in accordance with Piaget’s principle ‘greifen vor begrifen’ (grasp to grasp).

In the first, children learn to use sticks to build the number icons up to nine, and to use strokes to draw them, thus realizing there are as many sticks and strokes in the icon as the number it represents, if written less sloppy. In the second, children learn to count a given total in icons manually, using an abacus and by using a calculator. In the third, children learn to recount a total in the same unit. In the fourth, children learn to recount a total in a different unit. In the fifth, children learn to add two bundle-numbers on top of each other. In the sixth, children learn to add two bundle-numbers next to each other. In the seventh, children learn to reverse on-top addition. And in the eights, children learn to reverse next-to addition

As to concrete material, anything goes in the first micro-curriculum. The others will use sticks and strokes, beads on an abacus, LEGO-like blocks and squares, and a calculator respecting the priority of the operations. Fingers, pegs on a pegboard and other concrete material might also be used.

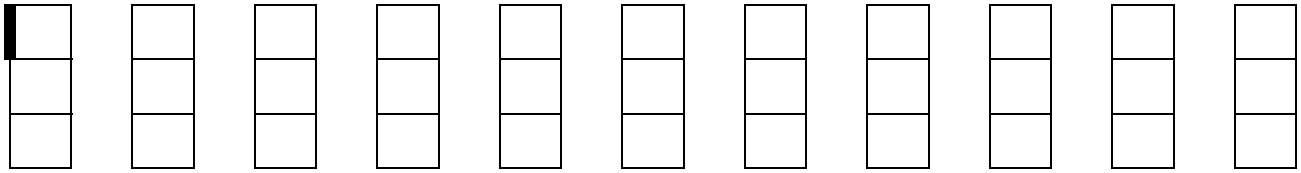
Some of the curricula can use silent education where the instructor is allowed to demonstrate and guide through actions, but not through words; or by using words form a foreign language not understood by the child.

1

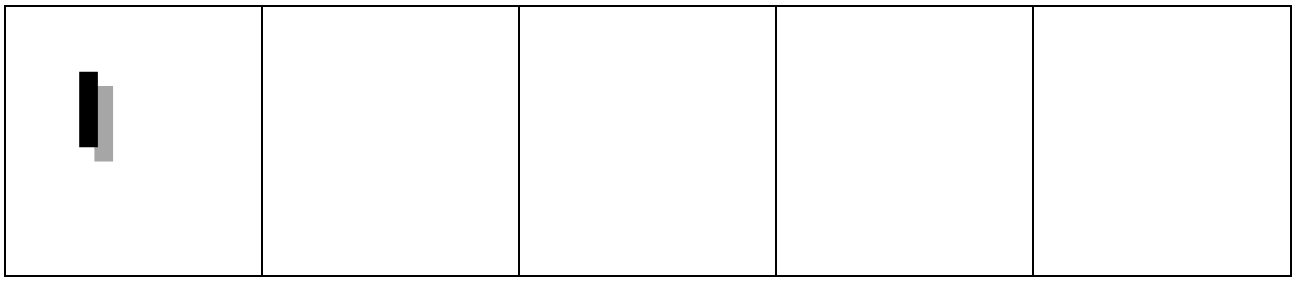
Say it

I	I	A	I	I	1
One	1 ones	Greek	Roman	Icon	Arabic

Write it



Stamp and Shade it



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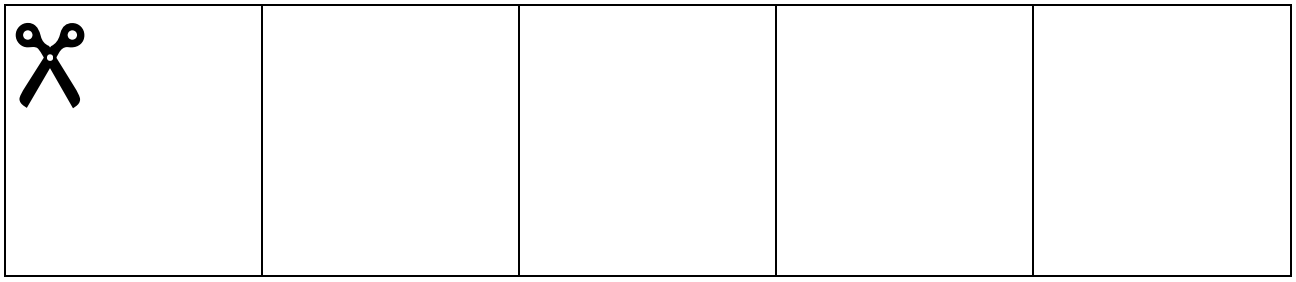


Repeat it

1	**2**	3	4	5	6	7	8	9

1

Round it up & Color it

					D	D	D		
					D	D	D		

Clap, Sing, Walk, Act & Letter it

				A

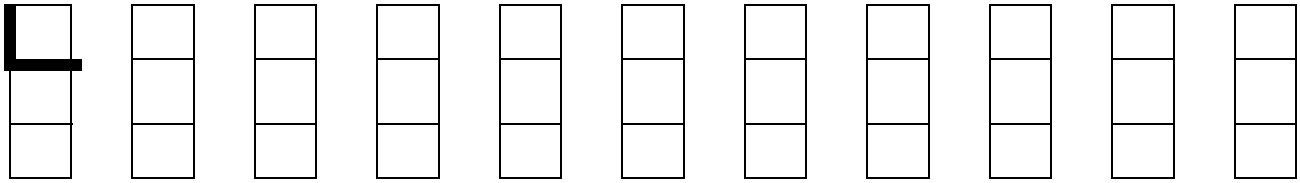
Reward: Stickers, each counting two

2

Say it

I I	II	B	II	ㄴ	2
Two 1s	1 twos	Greek	Roman	Icon	Arabic

Write it



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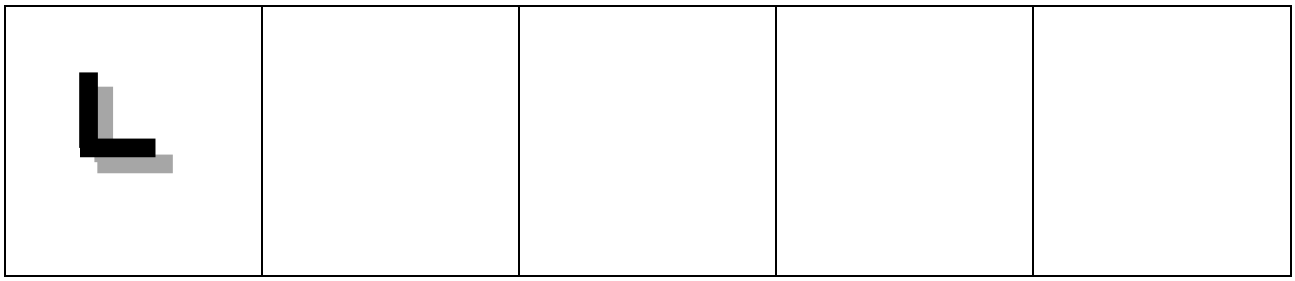

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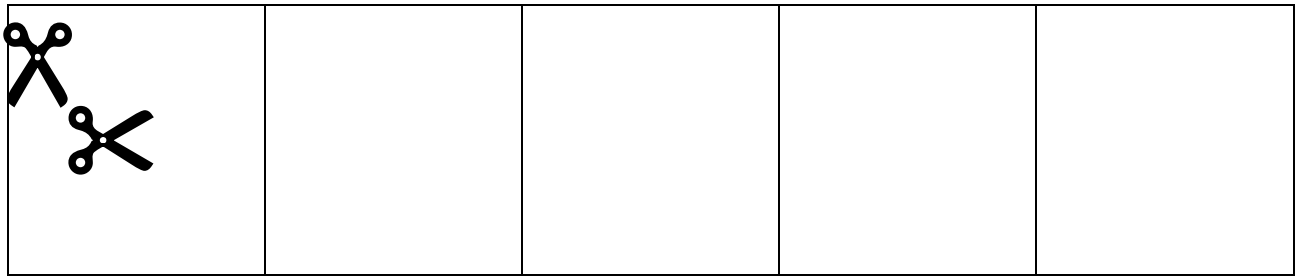

Repeat it

1	**2**	3	4	5	6	7	8	9

2

Round it up & Color it

✂	✂	🖌	)	)	D	D	D	🔔	🔔
✂	✂	🖌	)	)	D	D	D	🔔	🔔
✂	✂	🖌	)	)	✈	✈	✈	✈	✈
✂	✂	🖌	🖌	)	✈	✈	✈	✈	✈
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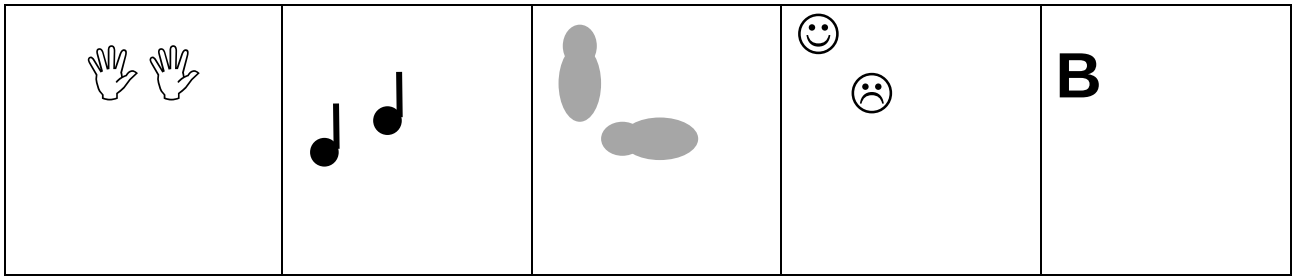
Clap, Sing, Walk, Act & Letter it



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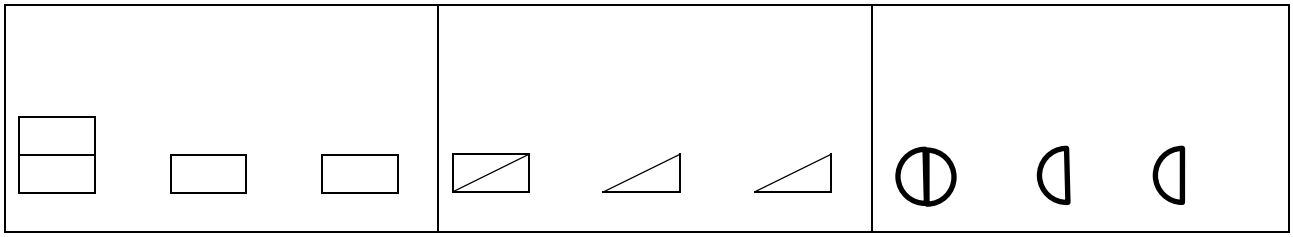
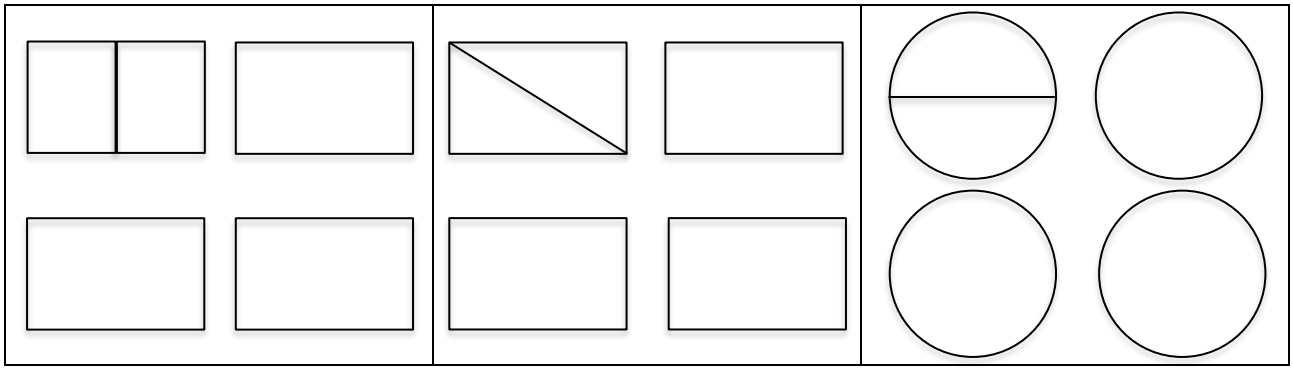


Split it



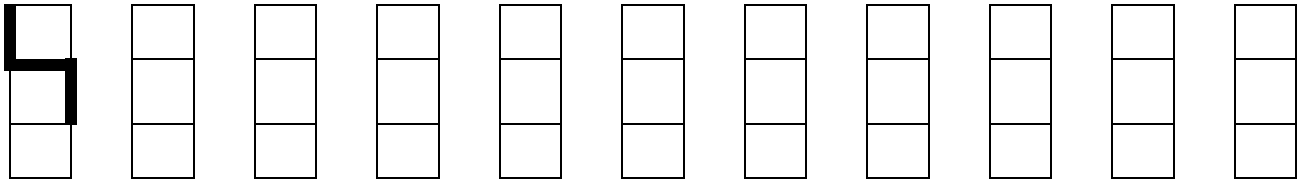
Reward: Stickers, each counting two

3

Say it

I I I	III	C	III	ϟ	3
Three 1s	1 threes	Greek	Roman	Icon	Arabic

Write it



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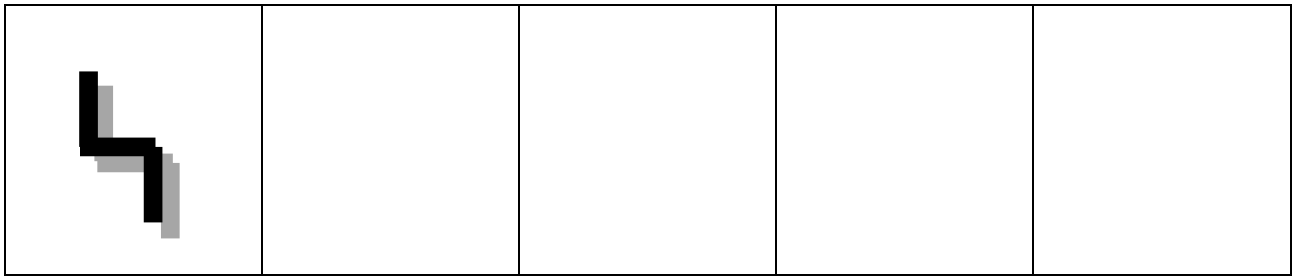

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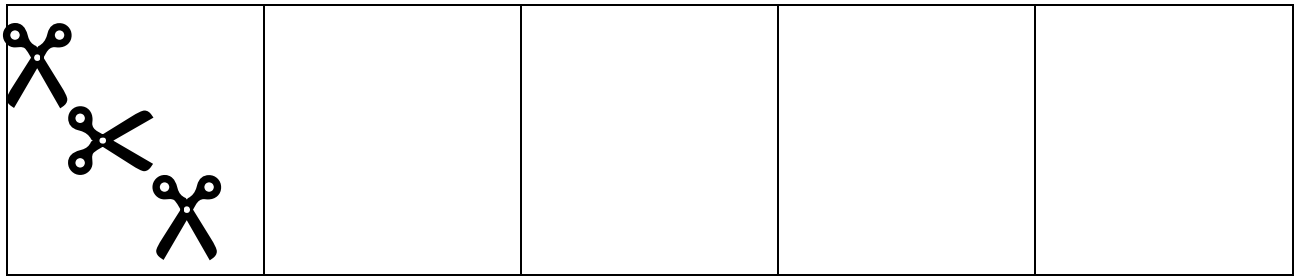

Repeat it

1	**2**	**3**	4	5	6	7	8	9

3

Round it up & Color it

✂	✂	🖌	)	)	D	D	D	🔔	🔔
✂	✂	🖌	)	)	D	D	D	🔔	🔔
✂	✂	🖌	)	)	✈	✈	✈	✈	✈
✂	✂	🖌	🖌	)	✈	✈	✈	✈	✈
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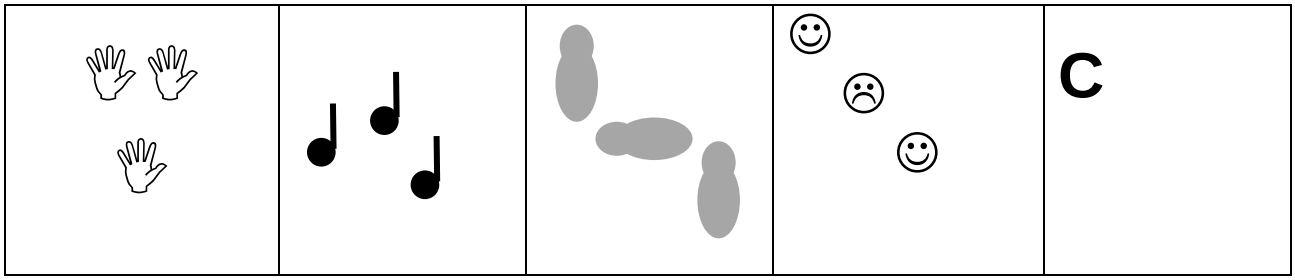
Clap, Sing, Walk, Act & Letter it



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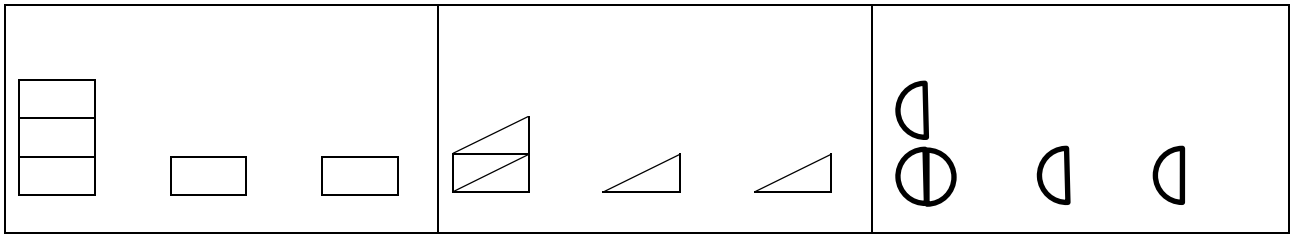
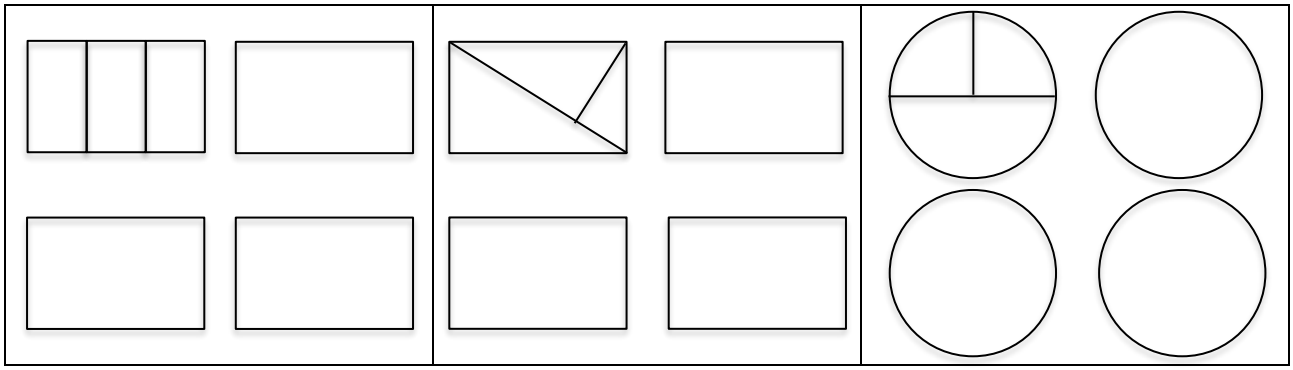


Split it



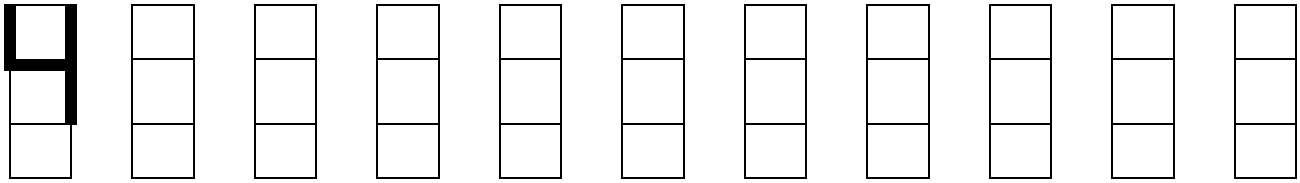
Reward: Stickers, each counting two

4

Say it

I I I I	IIII	D	IIII	ㄐ	4
Four 1s	1 fours	Greek	Roman	Icon	Arabic

Write it



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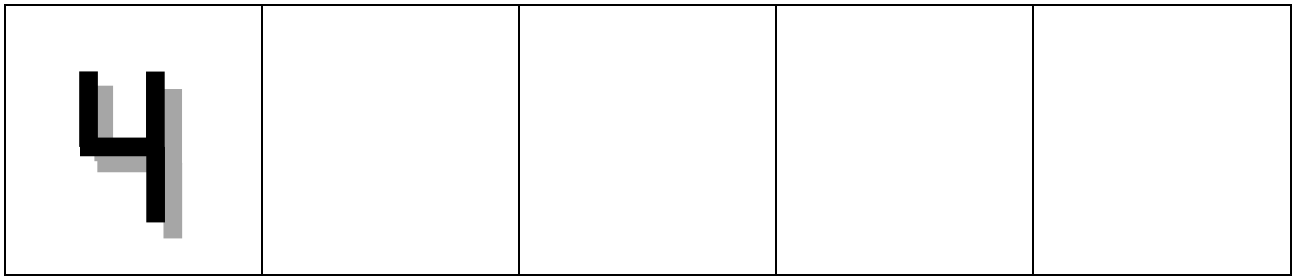

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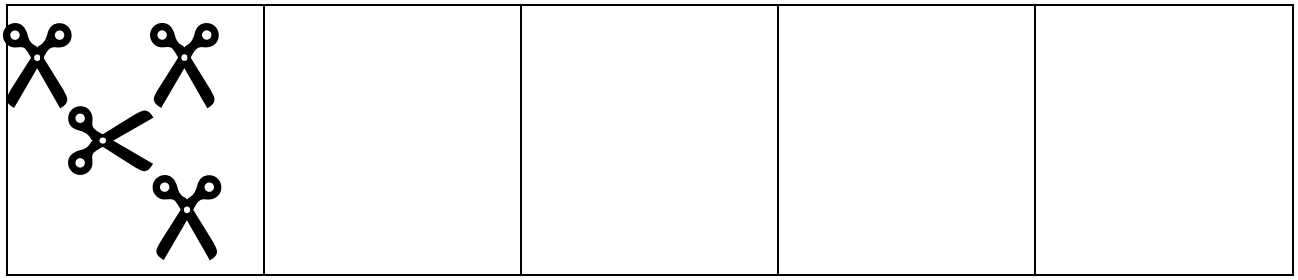
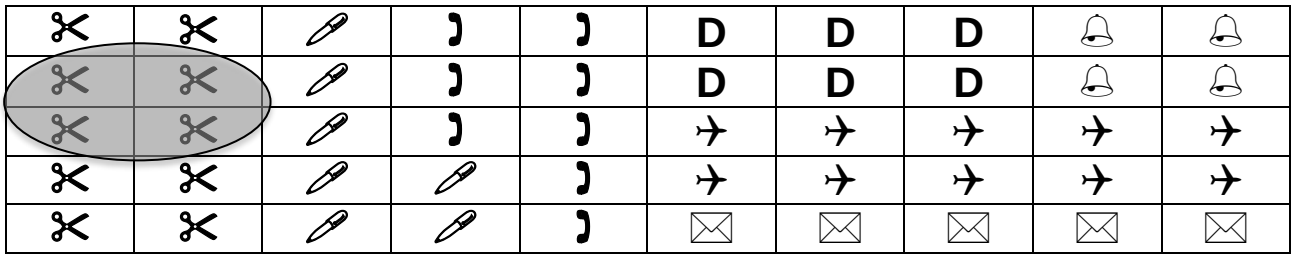


Repeat it

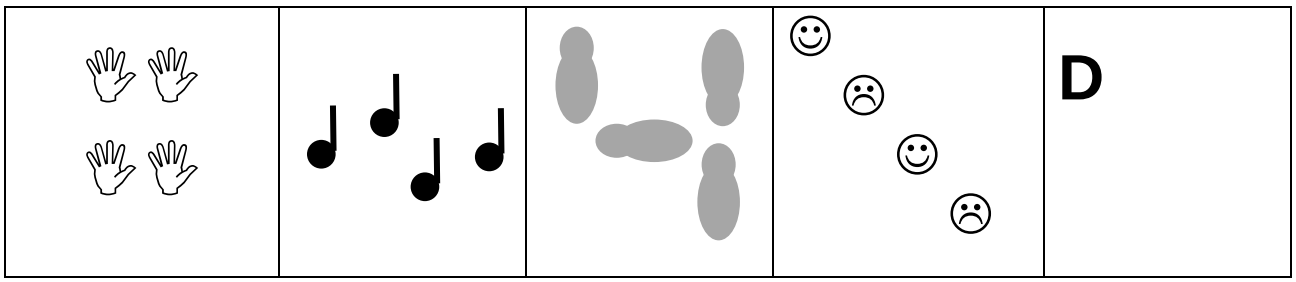
1	**2**	**3**	**4**	5	6	7	8	9

4

Round it up & Color it



Clap, Sing, Walk, Act & Letter it



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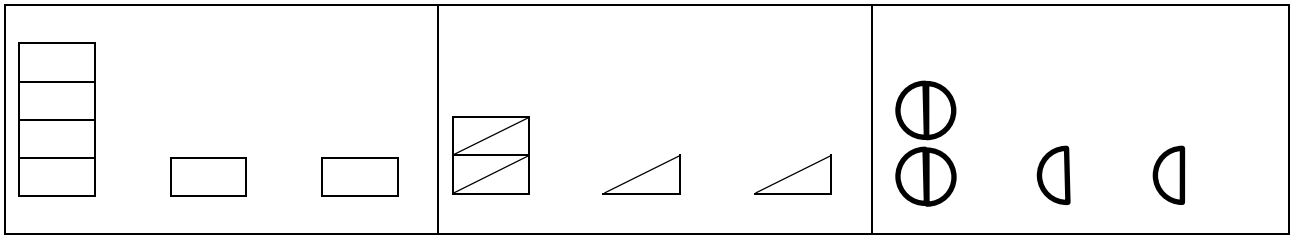
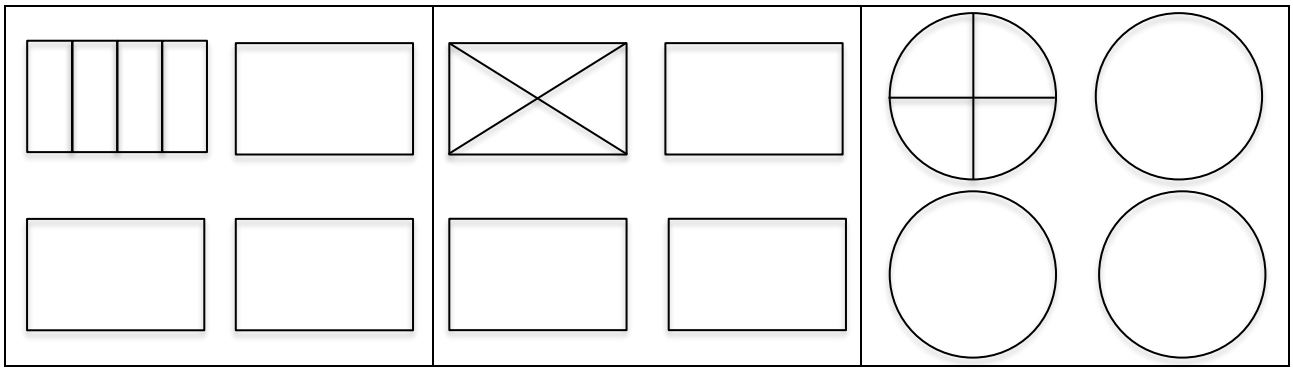


Split it



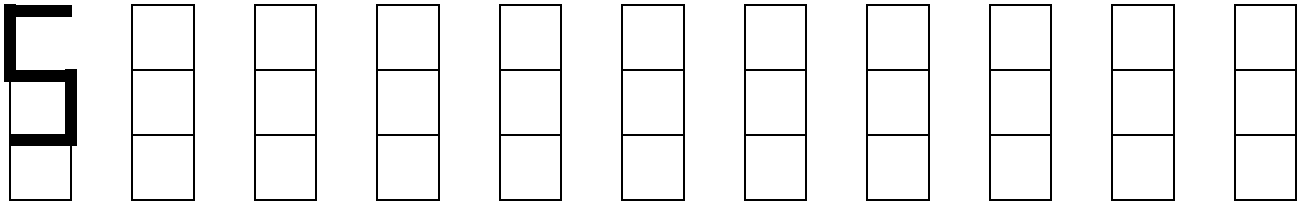
Reward: Stickers, each counting two

5

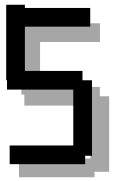
Say it

I I I I I	IIIII	E	V	5	5
Five 1s	1 fives	Greek	Roman	Icon	Arabic

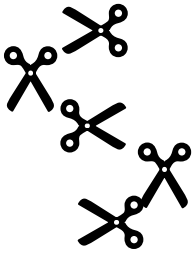
Write it



Stamp and Shade it

Form it

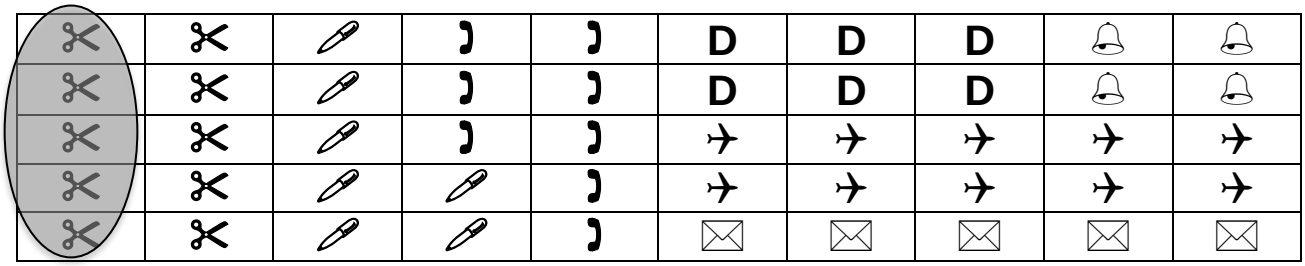
				

Repeat it

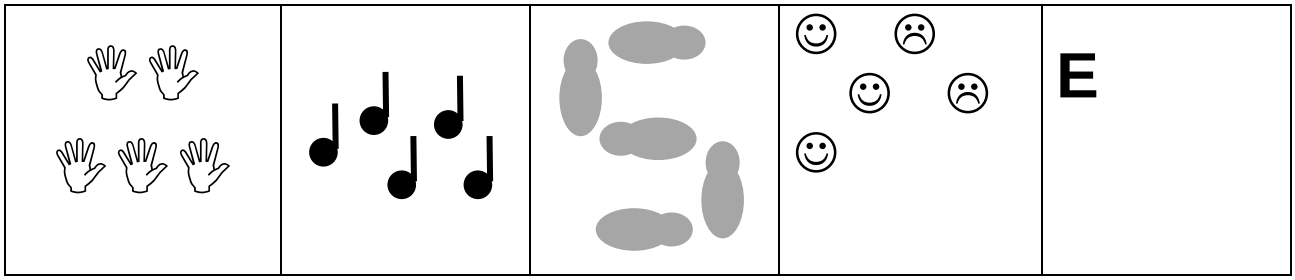
1	**2**	**3**	**4**	**5**	6	7	8	9

5

Round it up & Color it



Clap, Sing, Walk, Act & Letter it



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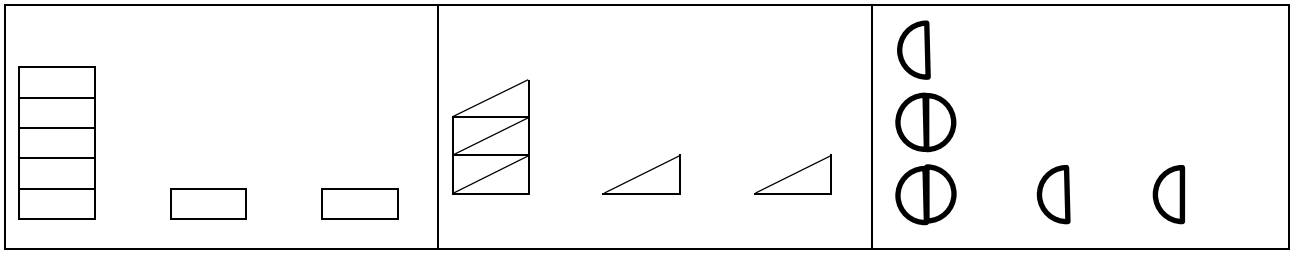
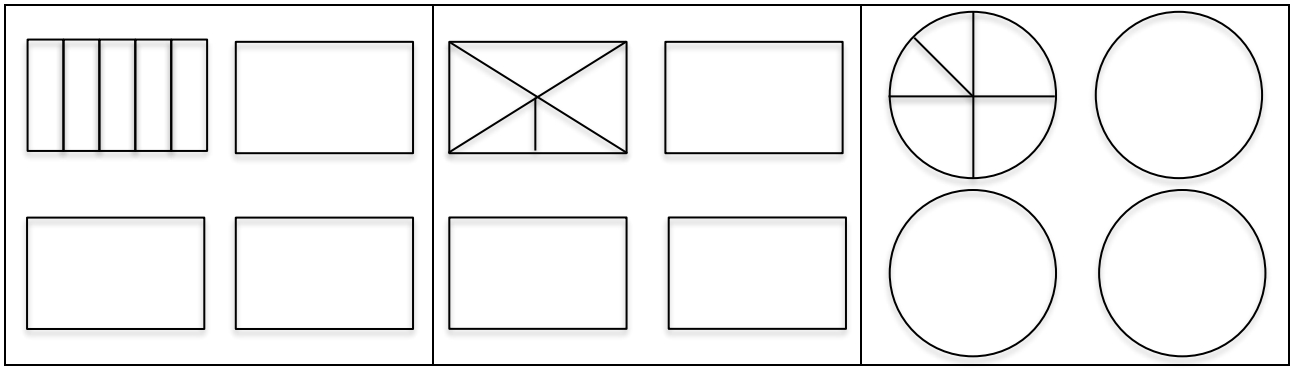


Split it



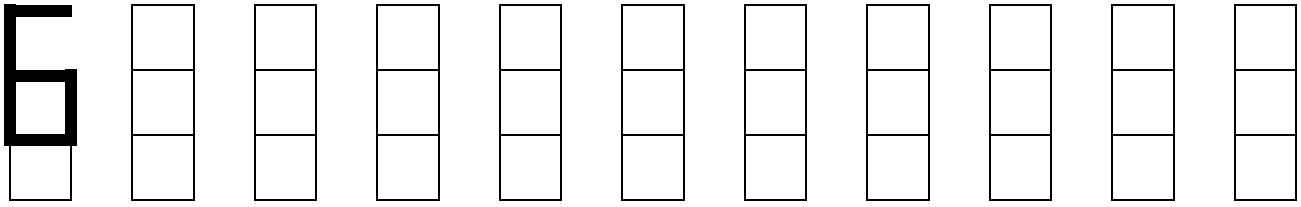
Reward: Stickers, each counting two

6

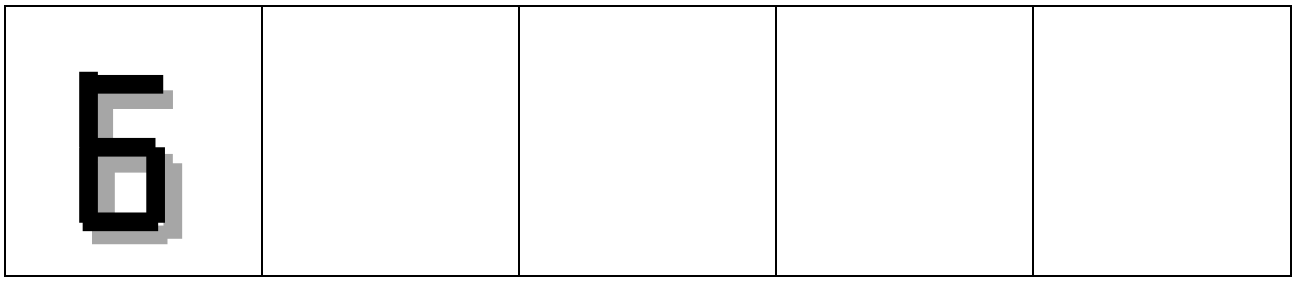
Say it

I I I I I I	IIIIII	F	VI	6	6
Six 1s	1 sixs	Greek	Roman	Icon	Arabic

Write it



Stamp and Shade it



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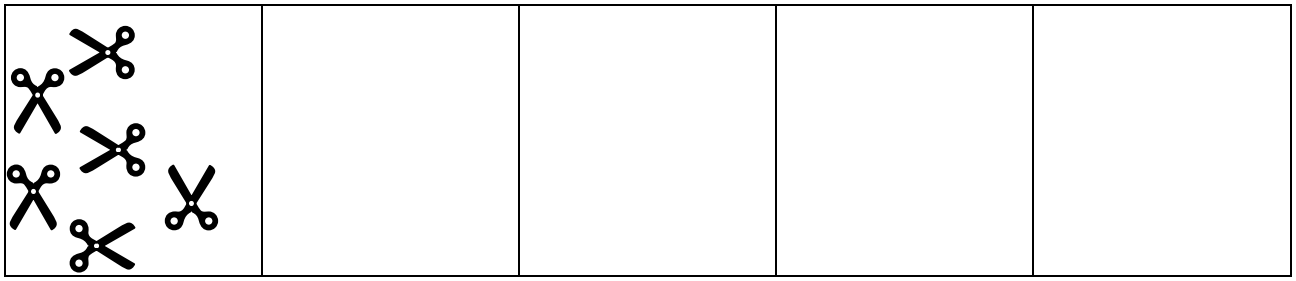
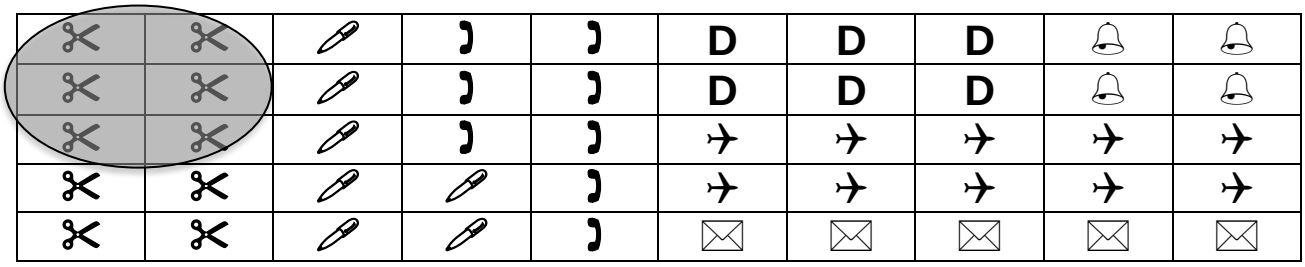


Repeat it

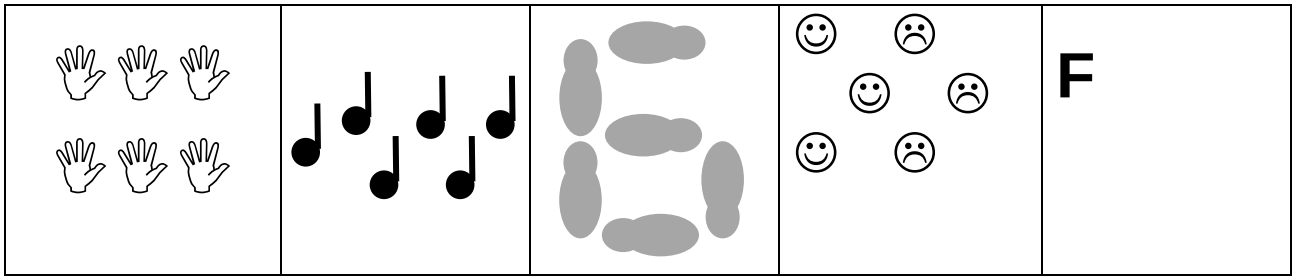
1	**2**	**3**	**4**	**5**	**6**	7	8	9

6

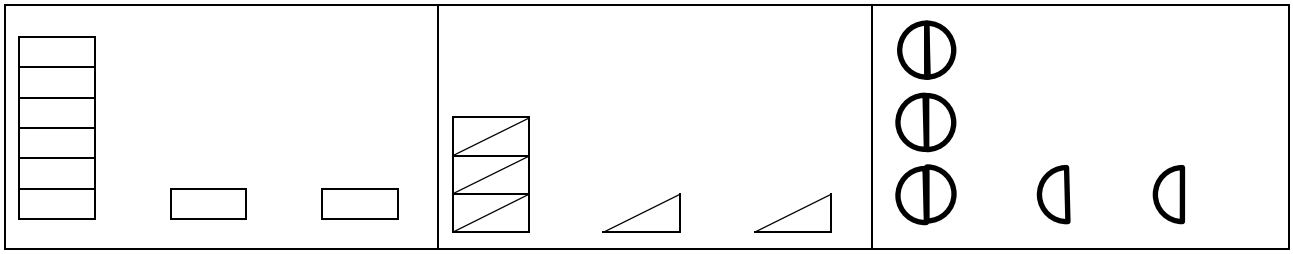
Round it up & Color it



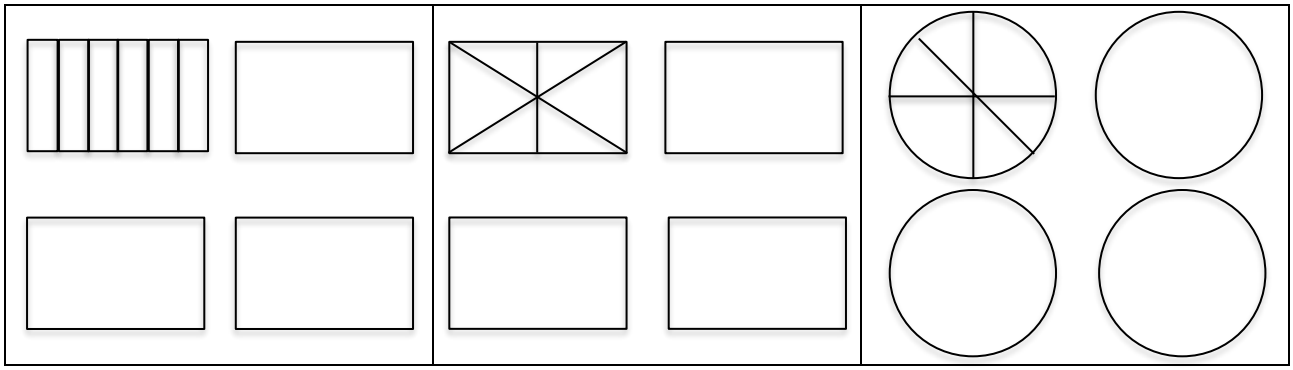
Clap, Sing, Walk, Act & Letter it



Unite it



Split it



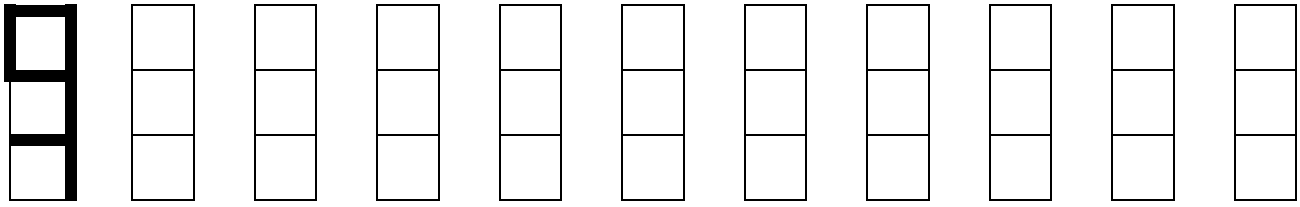
Reward: Stickers, each counting two

7

Say it

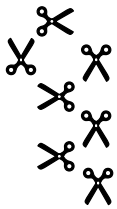
I I I I I I I	IIIIIII	G	VII	𓏺	7
Seven 1s	1 sevens	Greek	Roman	Icon	Arabic

Write it



Stamp and Shade it

Form it

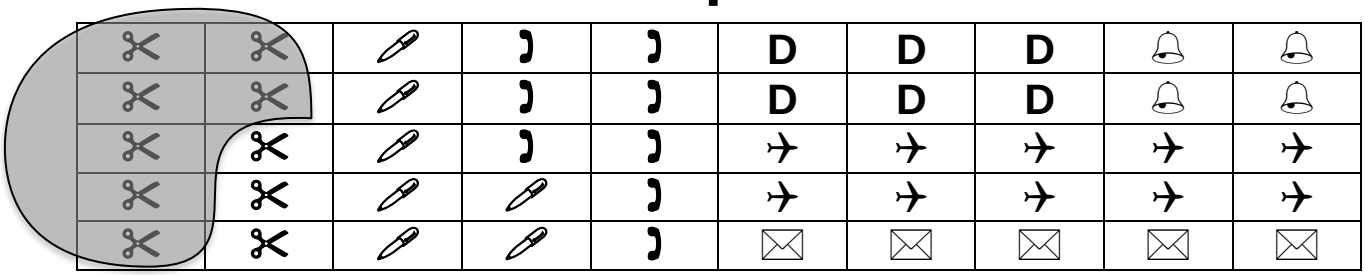


Repeat it

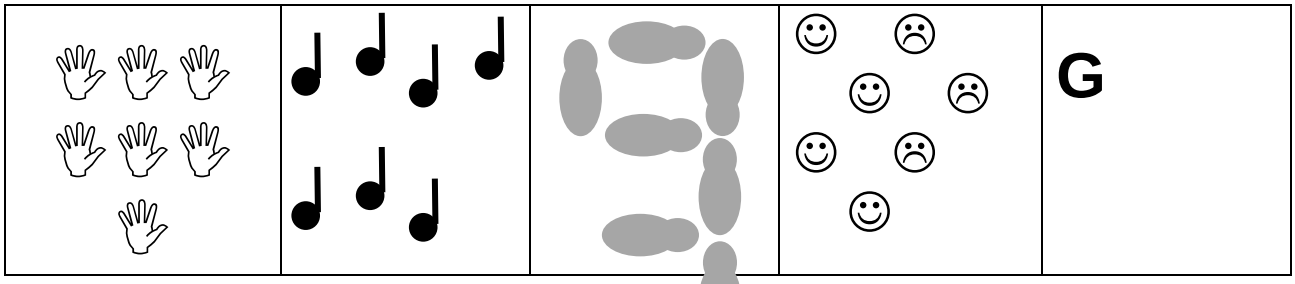
1	**2**	**3**	**4**	**5**	**6**	**7**	8	9

7

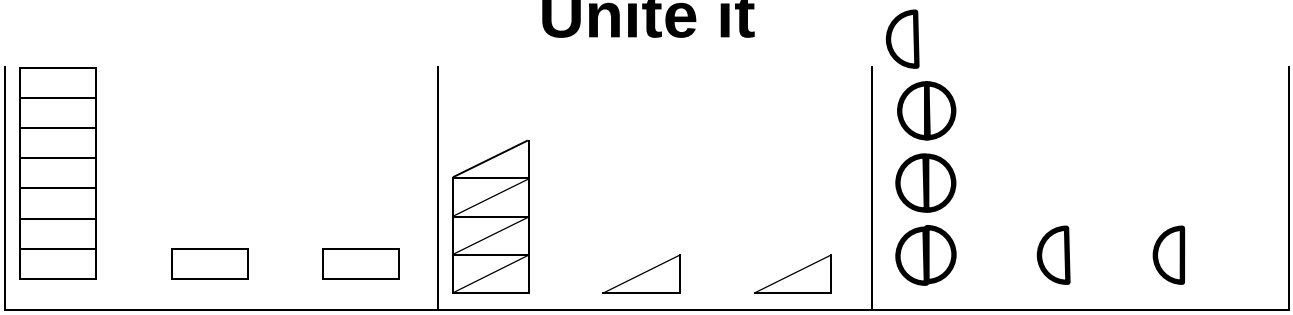
Round it up & Color it



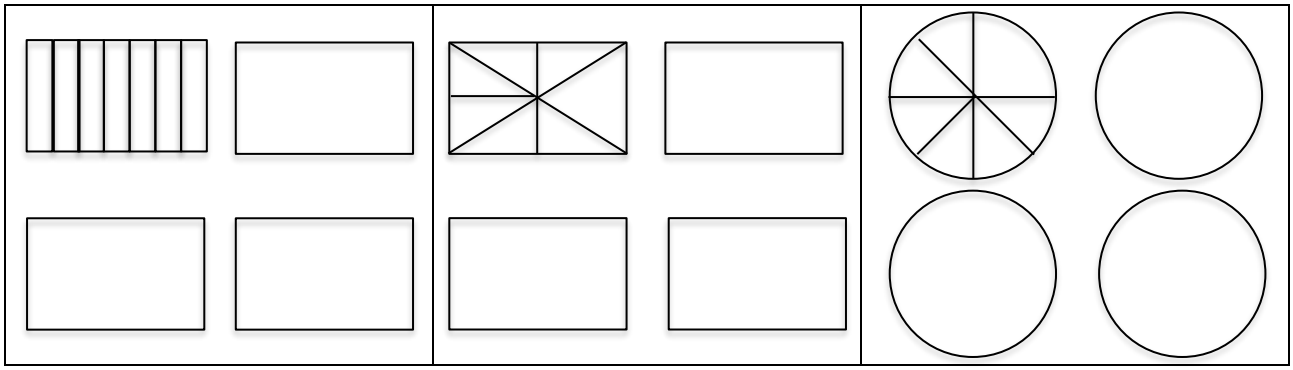
Clap, Sing, Walk, Act & Letter it



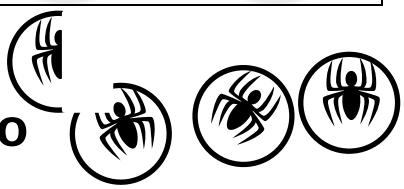
Unite it



Split it



Reward: Stickers, each counting two

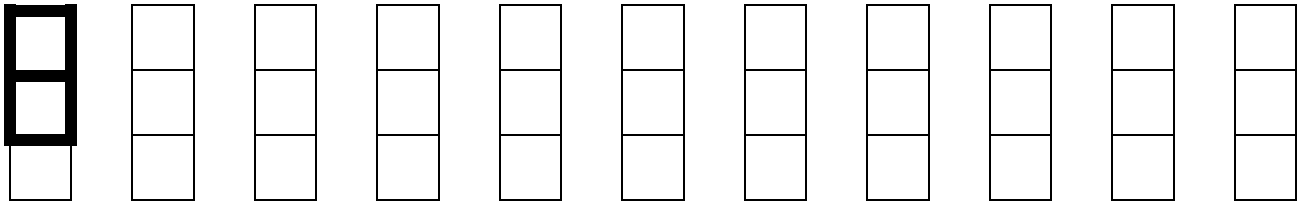


8

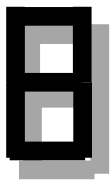
Say it

I I I I I I I I	IIIIIIII	H	VIII	𓐄	8
Eight 1s	1 eights	Greek	Roman	Icon	Arabic

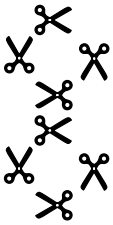
Write it



Stamp and Shade it



Form it

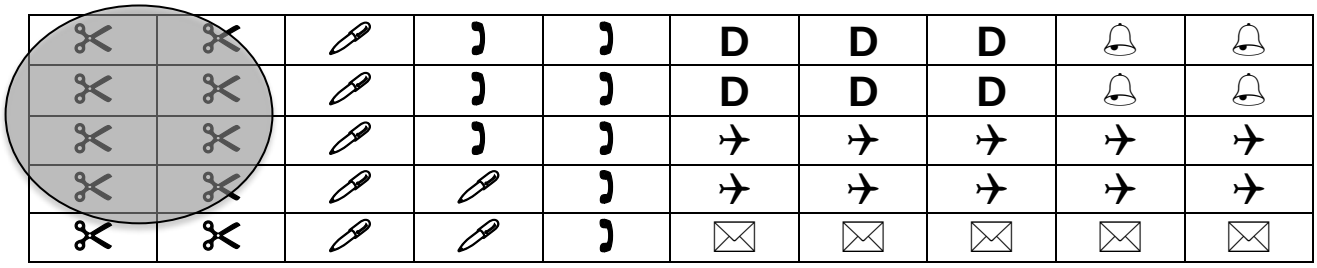


Repeat it

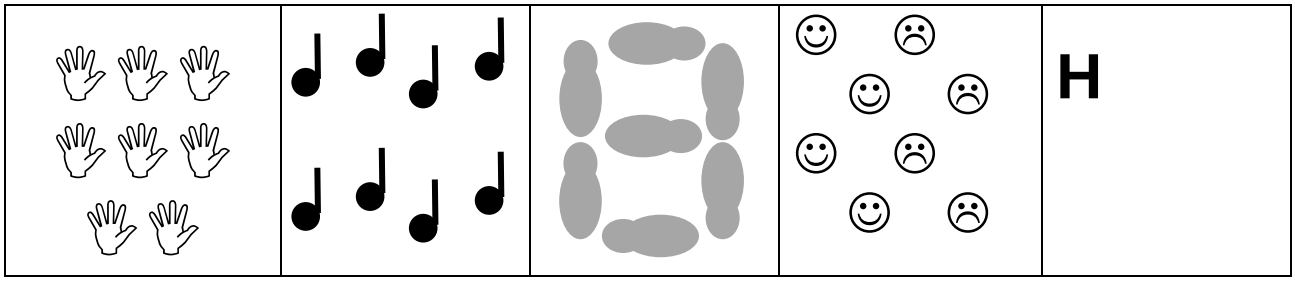
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	9

8

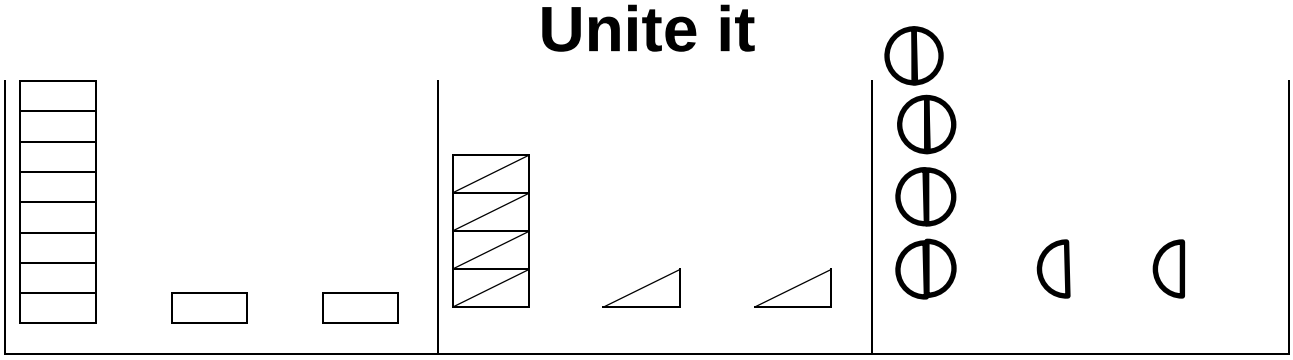
Round it up & Color it



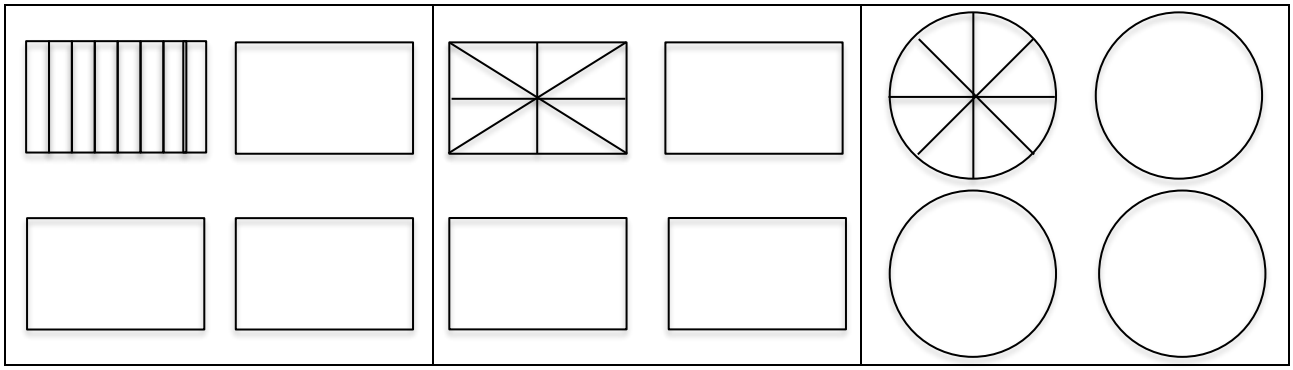
Clap, Sing, Walk, Act & Letter it



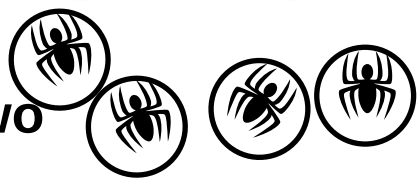
Unite it



Split it



Reward: Stickers, each counting two

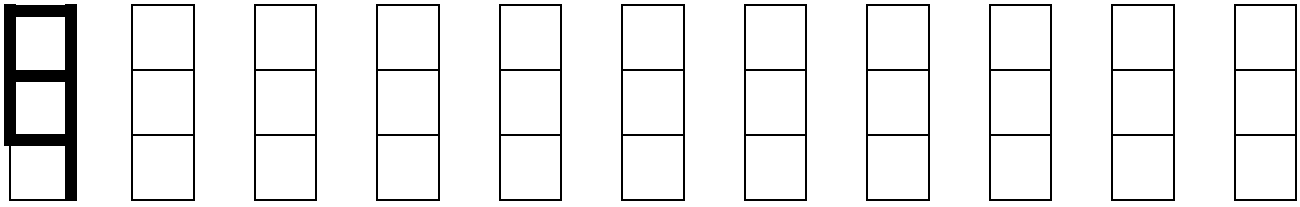


9

Say it

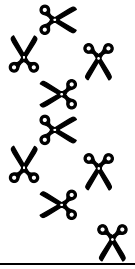
I I I I I I I I I	IIIIIIIII	I	IX	𓍢	9
Nine 1s	1 nines	Greek	Roman	Icon	Arabic

Write it



Stamp and Shade it

Form it

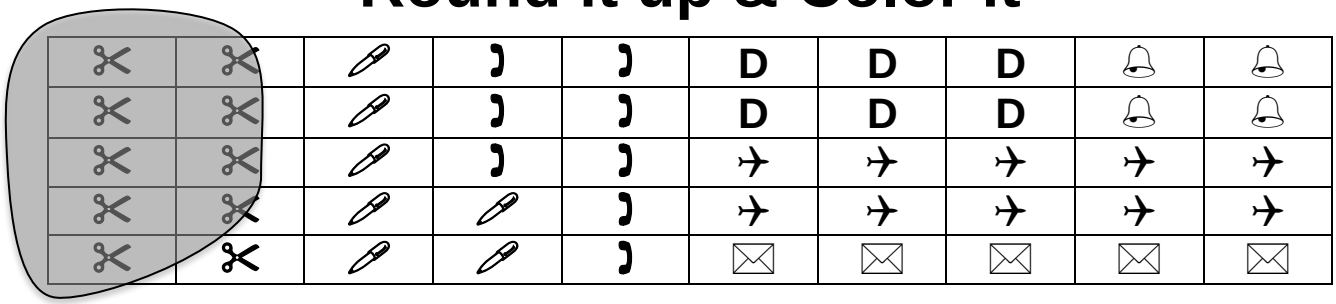


Repeat it

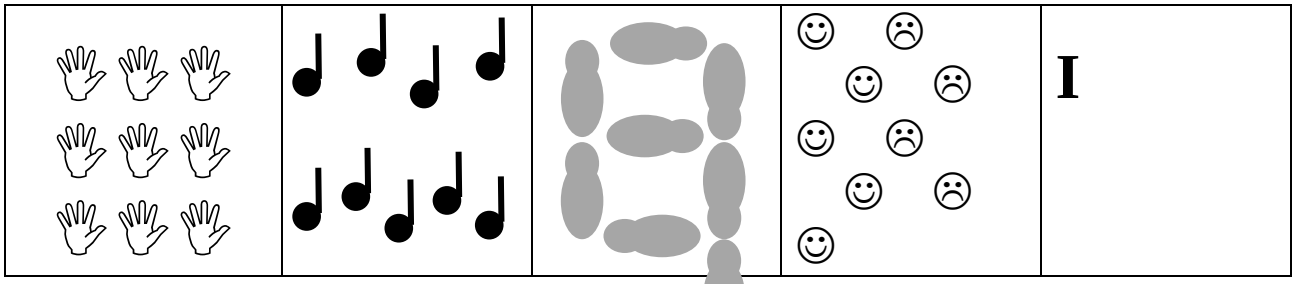
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**

9

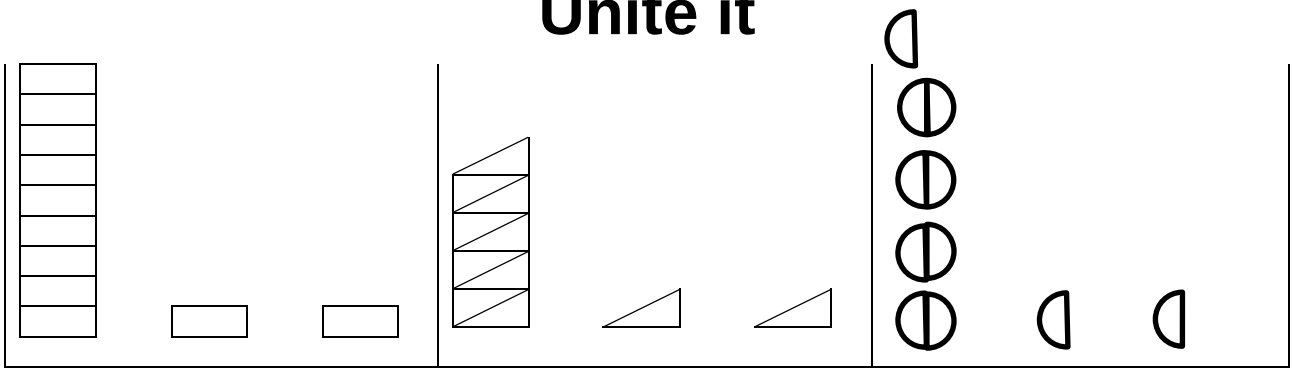
Round it up & Color it



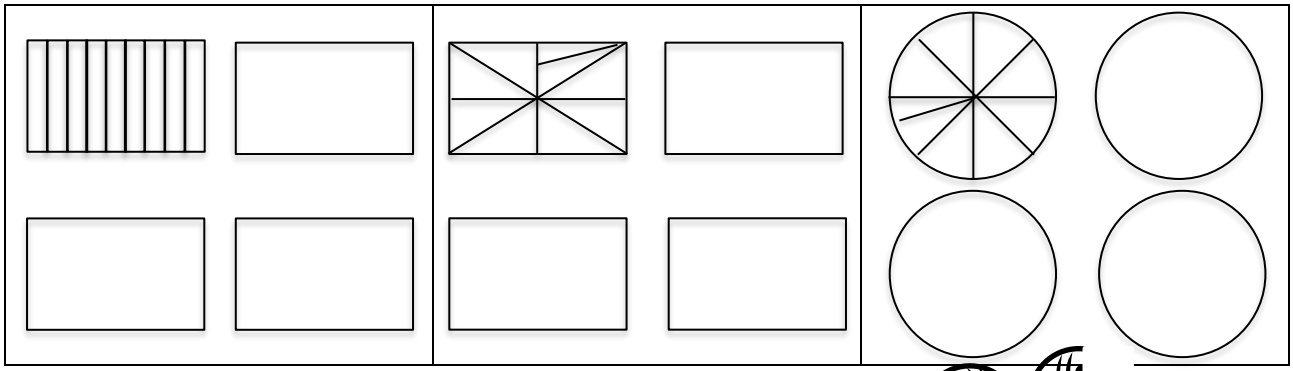
Clap, Sing, Walk, Act & Letter it



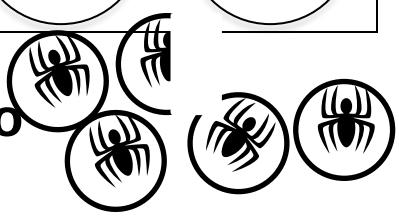
Unite it



Split it



Reward: Stickers, each counting two

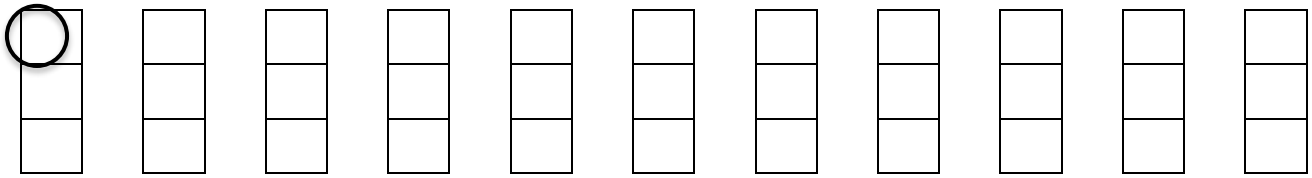


0

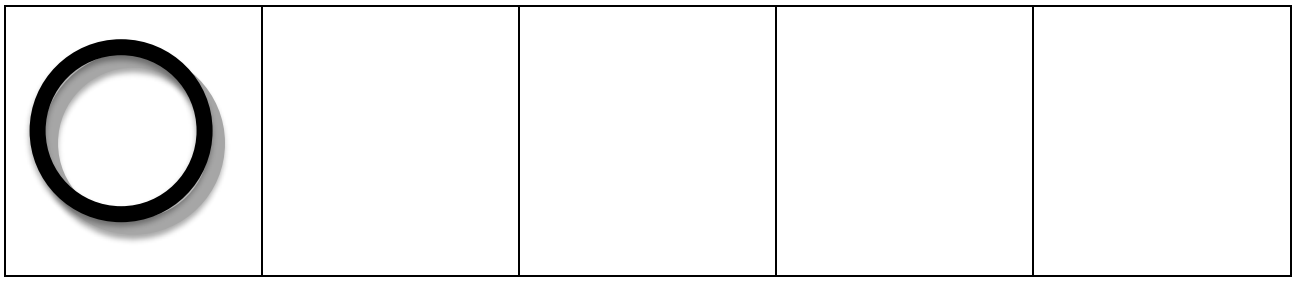
Say it

				o	0
None	Zero	Greek	Roman	Icon	Arabic

Write it



Stamp and Shade it



Form it

Repeat it

1	**2**	3	4	5	6	7	8	9

0

Round it up & Color it

					D	D	D		
					D	D	D		

Clap, Sing, Walk, Act & Letter it

Reward: Stickers, each counting two

M2

Counting in Bundles

Mathematics as MANYmatics

A Natural Science about Many

Material for

MicroCurriculum 2

Allan.Tarp

@MATHeCADEMY.net

Curricula

Micro-curriculum 1. Creating Icon-numbers

Micro-curriculum 2. Counting in Bundles

Micro-curriculum 3. Re-counting Bundle-numbers in the Same Bundle

Micro-curriculum 4. Re-counting Bundle-numbers in a Different Bundle

Micro-curriculum 5. Adding Bundle-numbers OnTop

Micro-curriculum 6. Adding Bundle-numbers NextTo

Micro-curriculum 7. Reversing Adding Bundle-numbers OnTop

Micro-curriculum 8. Reversing Adding Bundle-numbers NextTo

Preface

M2, Counting in Icons, is the second of a series of 8 micro-curricula in mathematics for preschool and home schooling. They present mathematics as MANYmatics, a natural science about the physical fact Many. They all build upon the following observation:

”How old will you be next time?” I asked the child. “Four”, he answered and showed me four fingers. “Four, you said?” I asked and showed him four fingers held together two by two. “No, that is not four, that is two twos!” the child replied thus insisting upon what exists, bundles of twos, and two of them. Likewise, preschool children have no difficulties counting in other units than ten, even if they only learn how to count in tens.

The micro-curricula use activities with concrete material to obtain its learning goals in accordance with Piaget’s principle ‘greifen vor begrifen’ (grasp to grasp).

In the first, children learn to use sticks to build the number icons up to nine, and to use strokes to draw them, thus realizing there are as many sticks and strokes in the icon as the number it represents, if written less sloppy. In the second, children learn to count a given total in icons manually, using an abacus and by using a calculator. In the third, children learn to recount a total in the same unit. In the fourth, children learn to recount a total in a different unit. In the fifth, children learn to add two bundle-numbers on top of each other. In the sixth, children learn to add two bundle-numbers next to each other. In the seventh, children learn to reverse on-top addition. And in the eights, children learn to reverse next-to addition

As to concrete material, anything goes in the first micro-curriculum. The others will use sticks and strokes, beads on an abacus, LEGO-like blocks and squares, and a calculator respecting the priority of the operations. Fingers, pegs on a pegboard and other concrete material might also be used.

Some of the curricula can use silent education where the instructor is allowed to demonstrate and guide through actions, but not through words; or by using words form a foreign language not understood by the child.

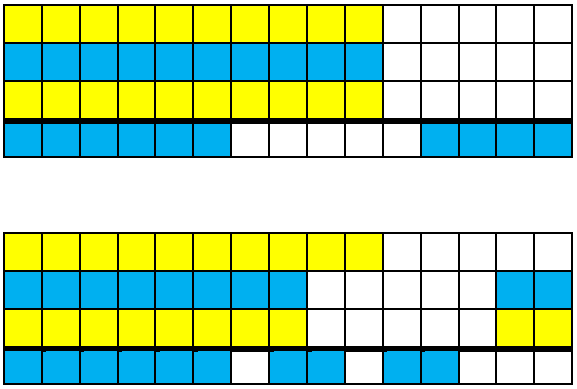
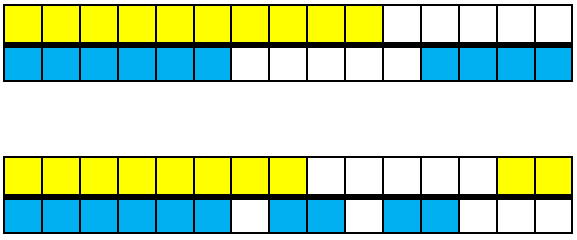
G stands for Geometry and A stands for Algebra.

4 Counted in 2s

Sticks

G-counting		A-counting	
I I I I	*lay out*	I I I I	*lay out*
𝍸 𝍸	*bundle*	𝍸 𝍸	*bundle*
𝍸		**2B**	*bundle-writing*
𝍸	*stack*		
T = 2 2s	Total	**T = 2 2s**	*Total*

Abacus

G-mode	A-mode
	

Calculator

4 / 2	2
4 – 2 x 2	0

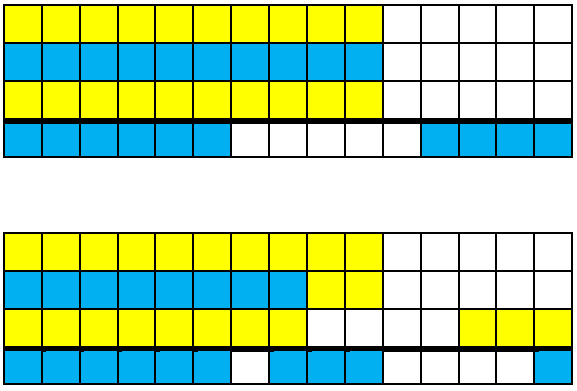
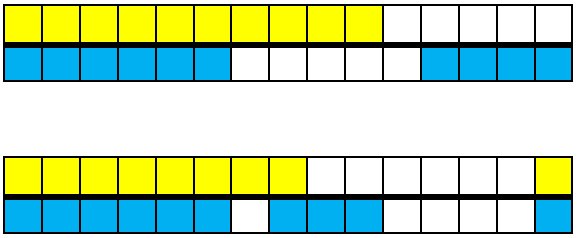
T = 4 = 2 2s

4 Counted in 3s

Sticks

G-counting		A-counting	
I I I I	*lay out*	I I I I	*lay out*
~~I I I~~ I	*bundle*	~~I I I~~ I	*bundle*
		1B1	*bundle-writing*
~~I I I~~ I	*stack*		
T = 1.1 3s	Total	**T = 1.1 3s**	*Total*

Abacus

G-mode	A-mode
	

Calculator

4 / 3	1.some
4 – 1 x 3	1

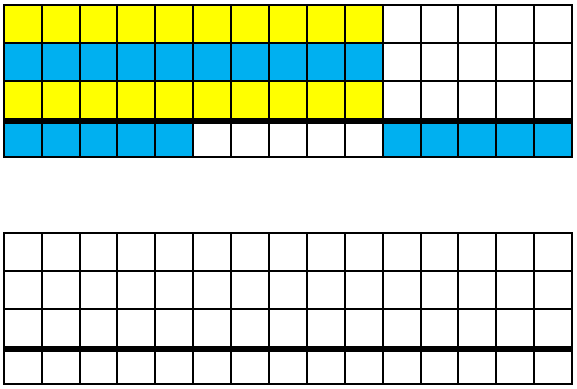
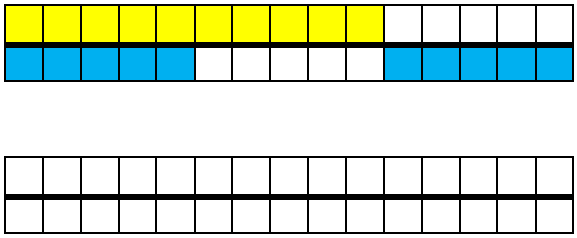
T = 4 = 1.1 3s

5 Counted in 2s

Sticks

G-counting		A-counting	
I	*lay out*	**I**	*lay out*
~~H~~	*bundle*	**~~H~~**	*bundle*
		B	*bundle-writing*
	stack		
T =	Total	**T =**	*Total*

Abacus

G-mode	A-mode
	

Calculator

5 / 2

5 –

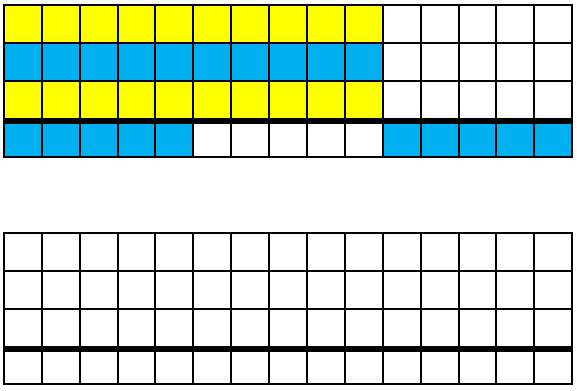
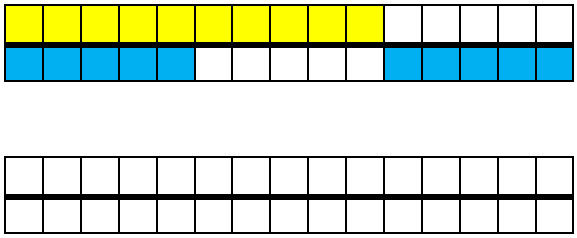
T = 5 = 2s

5 Counted in 3s

Sticks

G-counting	A-counting
lay out *bundle* *stack* **T =** Total	*lay out* *bundle* **B** *bundle-writing* **T =** *Total*

Abacus

G-mode	A-mode
	

Calculator

5 / 3

5 –

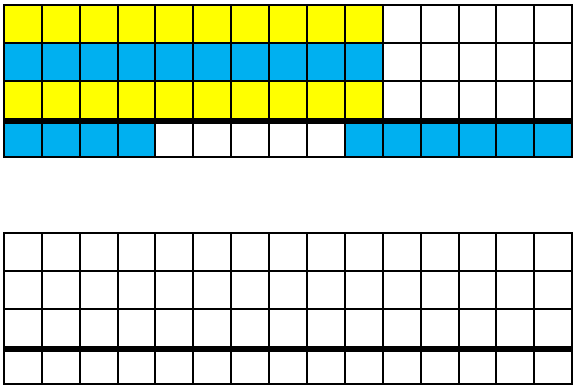
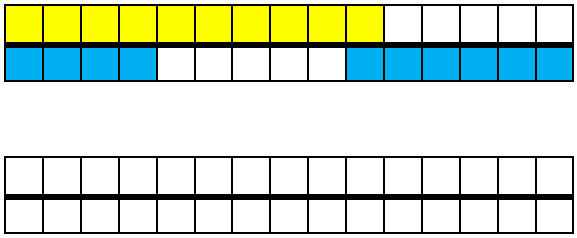
T = 5 = 3s

6 Counted in 2s

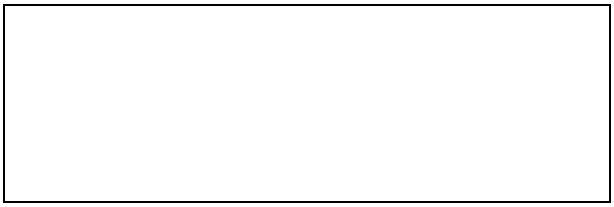
Sticks

G-counting	A-counting
lay out	*lay out*
bundle	*bundle*
	B *bundle-writing*
stack	
T = Total	**T =** *Total*

Abacus

G-mode	A-mode
	

Calculator



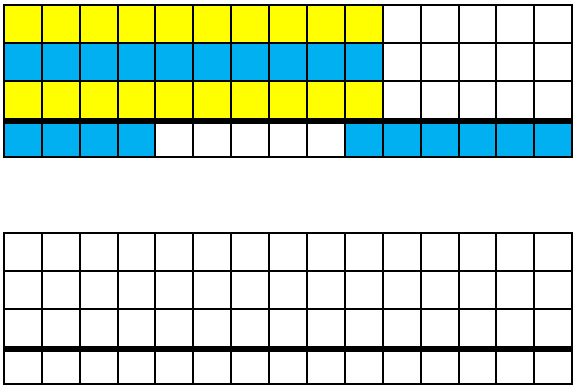
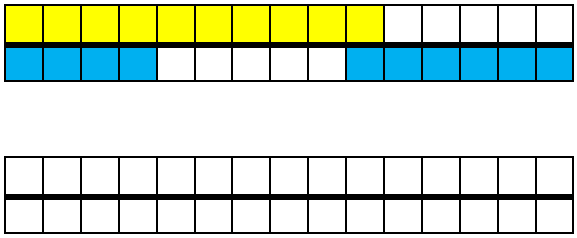
T = 6 =

6 Counted in 3s

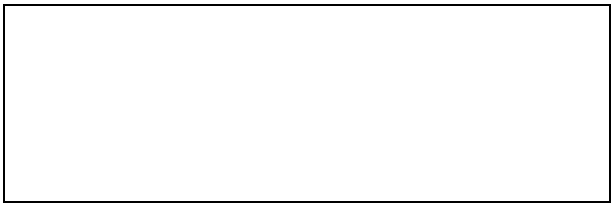
Sticks

G-counting	A-counting
lay out *bundle* *stack* **T =** Total	*lay out* *bundle* **B** *bundle-writing* **T =** *Total*

Abacus

G-mode	A-mode
	

Calculator



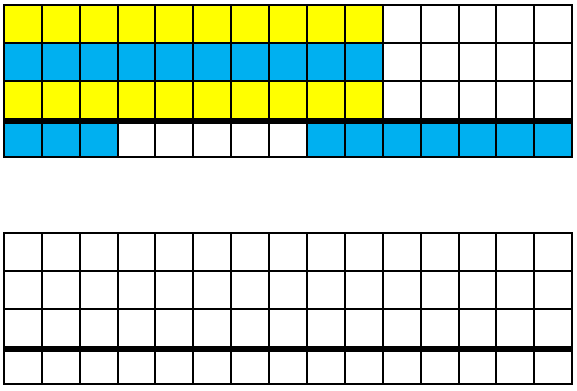
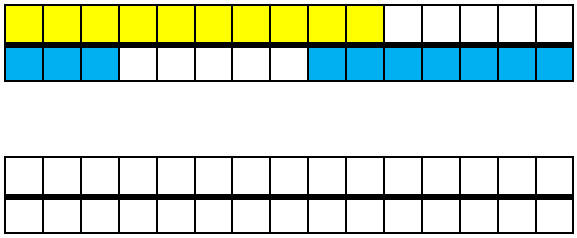
T = 6 =

7 Counted in 2s

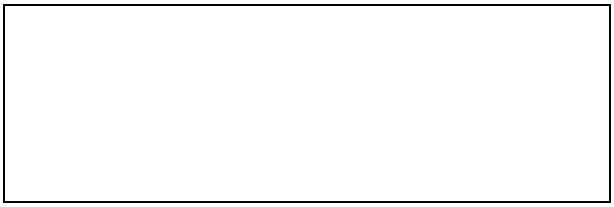
Sticks

G-counting	A-counting
lay out *bundle* *stack* **T =** Total	*lay out* *bundle* **B** *bundle-writing* **T =** *Total*

Abacus

G-mode	A-mode
	

Calculator



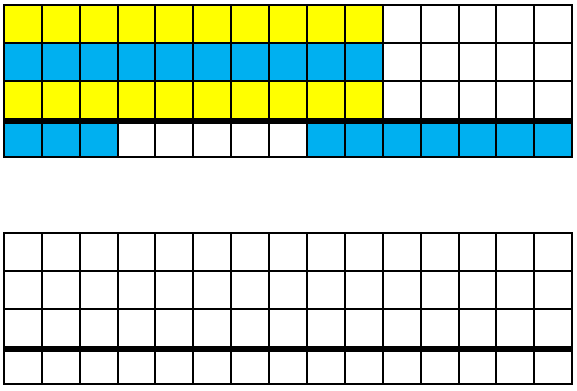
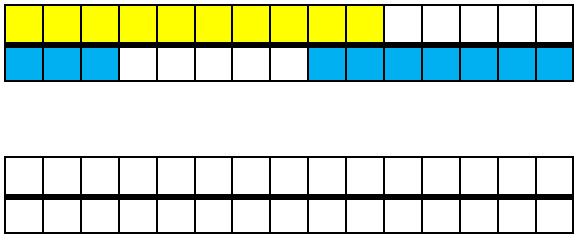
T = 7 =

7 Counted in 3s

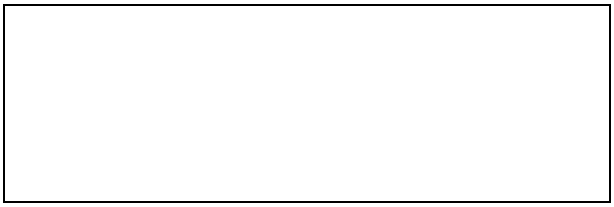
Sticks

G-counting	A-counting
lay out *bundle* *stack* **T =** Total	*lay out* *bundle* **B** *bundle-writing* **T =** *Total*

Abacus

G-mode	A-mode
	

Calculator



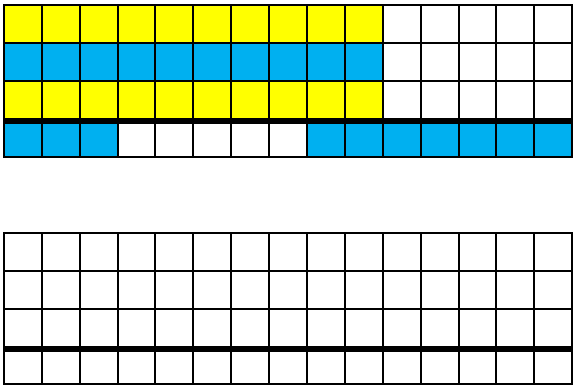
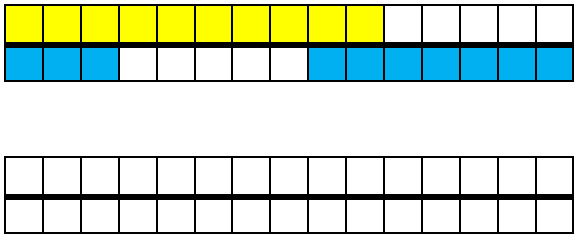
T = 7 =

7 Counted in 4s

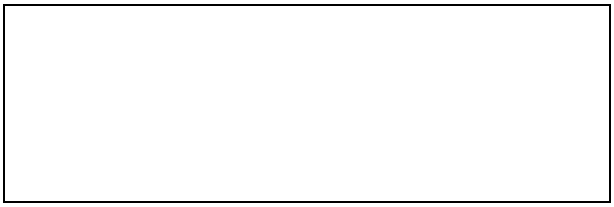
Sticks

G-counting	A-counting
lay out *bundle* *stack* **T =** Total	*lay out* *bundle* **B** *bundle-writing* **T =** *Total*

Abacus

G-mode	A-mode
	

Calculator



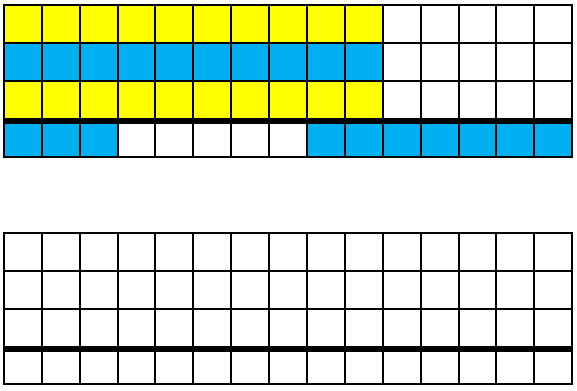
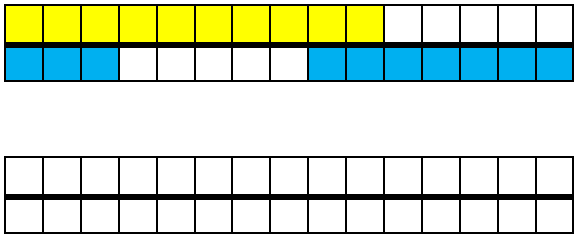
T =

7 Counted in 5s

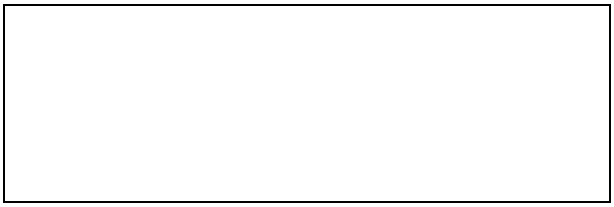
Sticks

G-counting	A-counting
lay out *bundle* *stack* **T =** Total	*lay out* *bundle* **B** *bundle-writing* **T =** *Total*

Abacus

G-mode	A-mode
	

Calculator



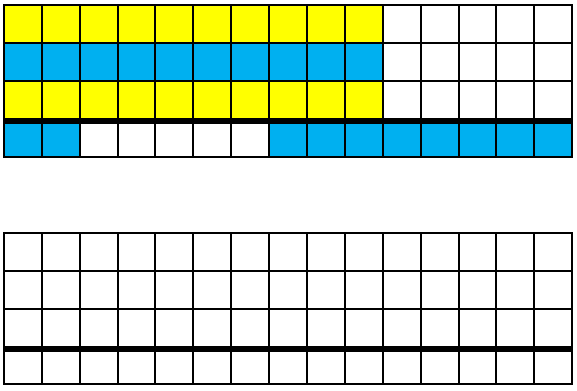
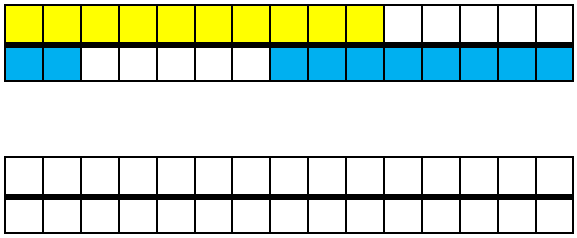
T =

8 Counted in 2s

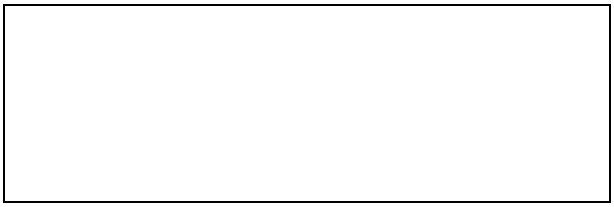
Sticks

G-counting	A-counting
lay out *bundle* *stack* **T =** Total	*lay out* *bundle* **B** *bundle-writing* **T =** *Total*

Abacus

G-mode	A-mode
	

Calculator



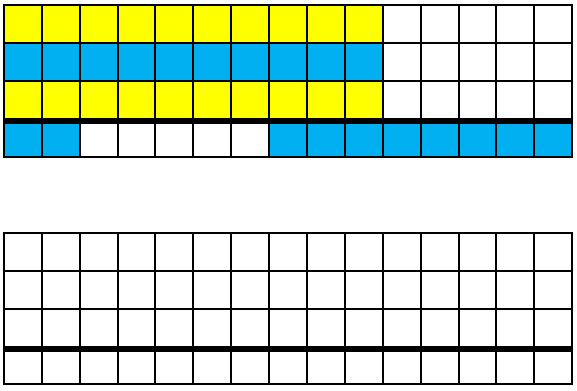
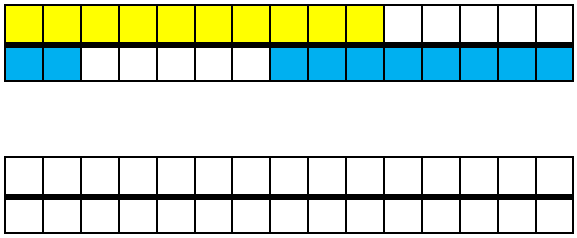
T =

8 Counted in 3s

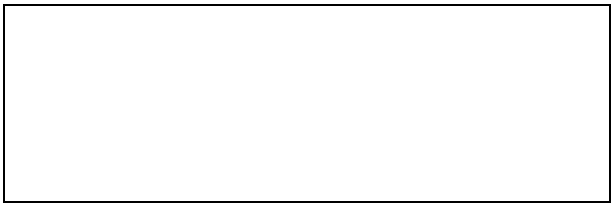
Sticks

G-counting	A-counting
lay out *bundle* *stack* **T =** Total	*lay out* *bundle* **B** *bundle-writing* **T =** *Total*

Abacus

G-mode	A-mode
	

Calculator



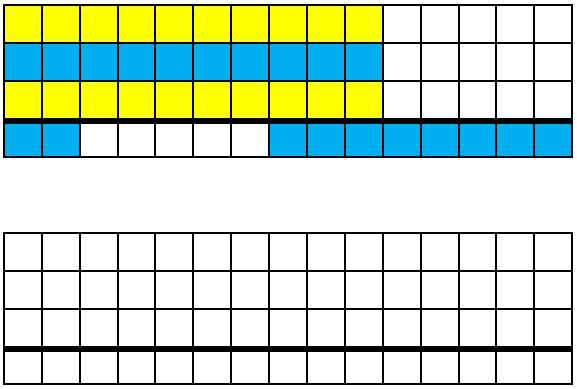
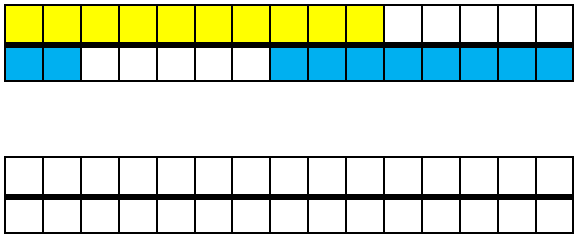
T =

8 Counted in 4s

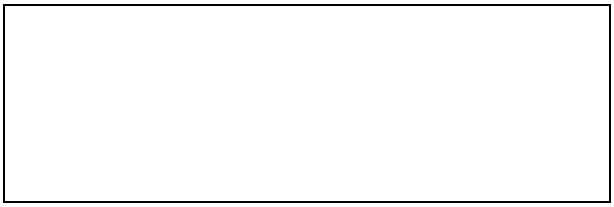
Sticks

G-counting	A-counting
lay out *bundle* *stack* **T =** Total	*lay out* *bundle* **B** *bundle-writing* **T =** *Total*

Abacus

G-mode	A-mode
	

Calculator



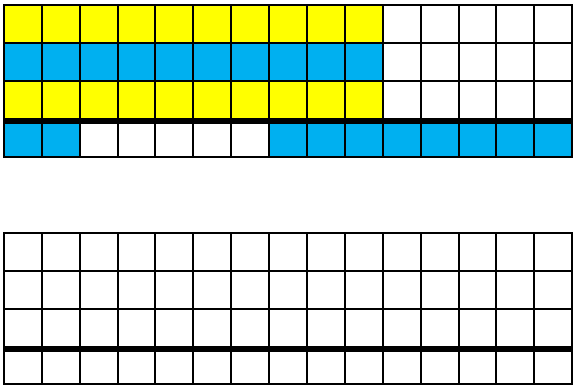
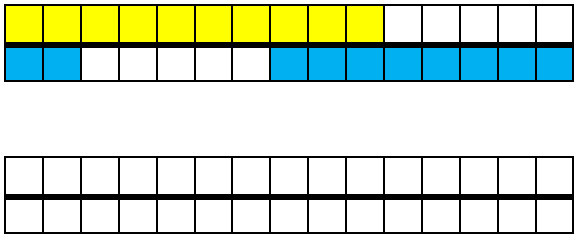
T =

8 Counted in 5s

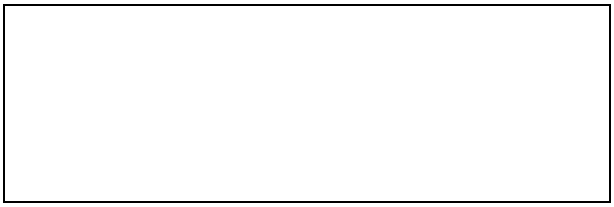
Sticks

G-counting	A-counting
lay out *bundle* *stack* **T =** Total	*lay out* *bundle* **B** *bundle-writing* **T =** *Total*

Abacus

G-mode	A-mode
	

Calculator



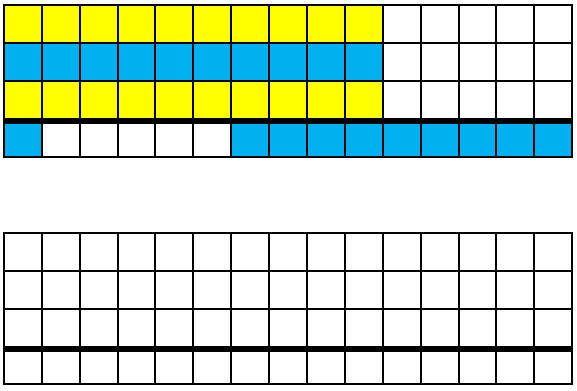
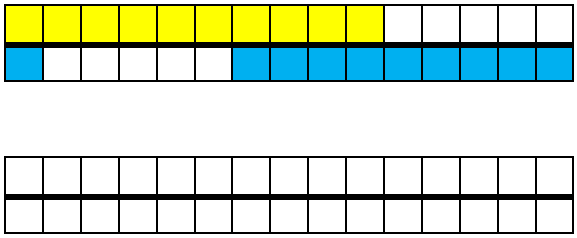
T =

9 Counted in 2s

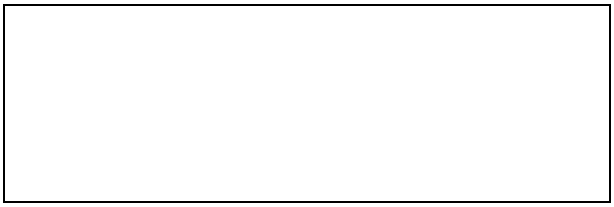
Sticks

G-counting	A-counting
lay out *bundle* *stack* **T =** Total	*lay out* *bundle* **B** *bundle-writing* **T =** *Total*

Abacus

G-mode	A-mode
	

Calculator



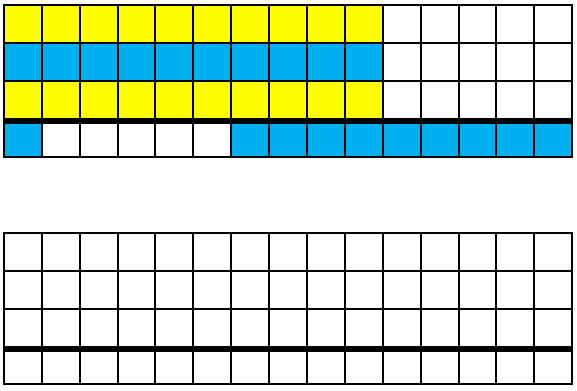
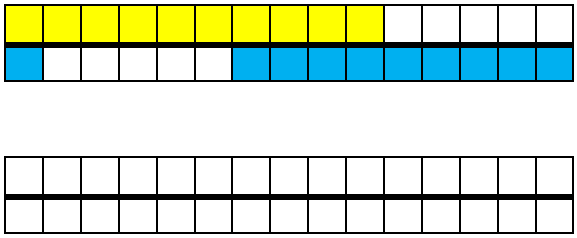
T =

9 Counted in 3s

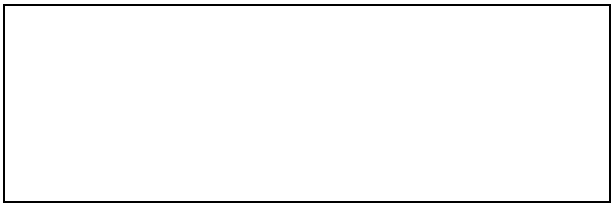
Sticks

G-counting	A-counting
lay out *bundle* *stack* **T =** Total	*lay out* *bundle* **B** *bundle-writing* **T =** *Total*

Abacus

G-mode	A-mode
	

Calculator



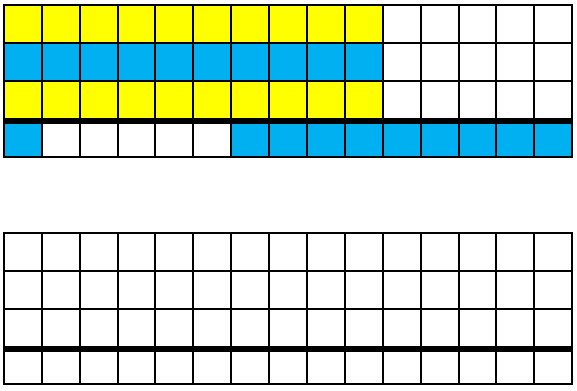
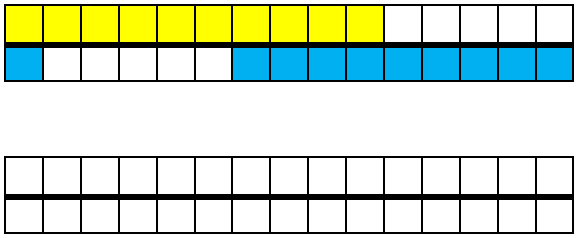
T =

9 Counted in 4s

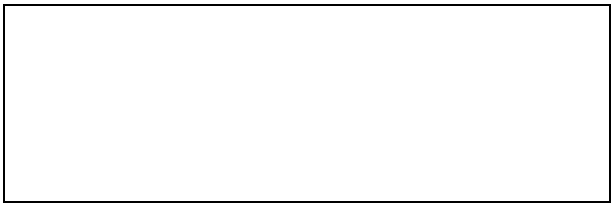
Sticks

G-counting	A-counting
lay out *bundle* *stack* **T =** Total	*lay out* *bundle* **B** *bundle-writing* **T =** *Total*

Abacus

G-mode	A-mode
	

Calculator



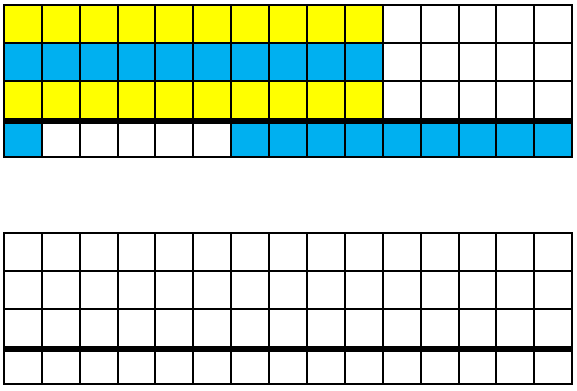
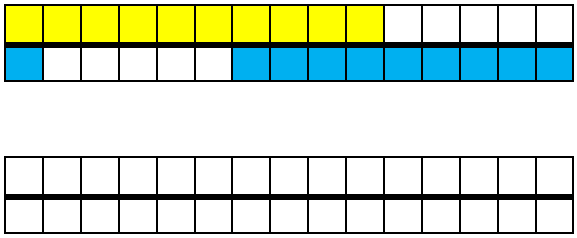
T =

9 Counted in 5s

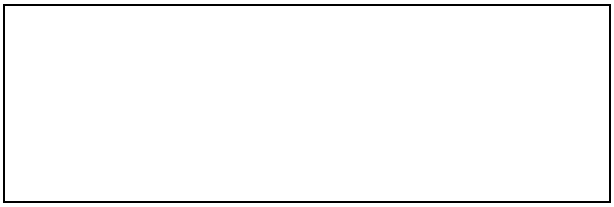
Sticks

G-counting	A-counting
lay out	*lay out*
bundle	*bundle*
	B *bundle-writing*
stack	**T =** *Total*
T = Total	

Abacus

G-mode	A-mode
	

Calculator



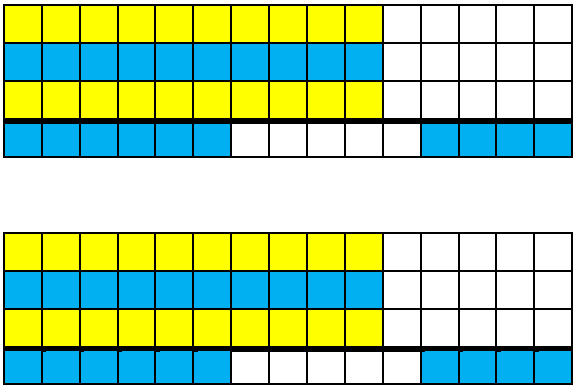
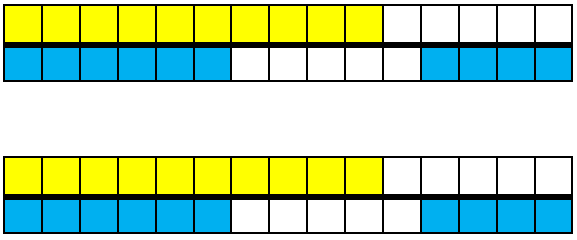
T =

4 Counted in 5s

Sticks

G-counting		A-counting	
I I I I	*lay out*	I I I I	*lay out*
I I I I	*bundle*	I I I I	*bundle*
		0B4	*bundle-writing*
I I I I	*stack*		
T = 0.4 5s	Total	**T = 0.4 5s**	*Total*

Abacus

G-mode	A-mode
	

Calculator

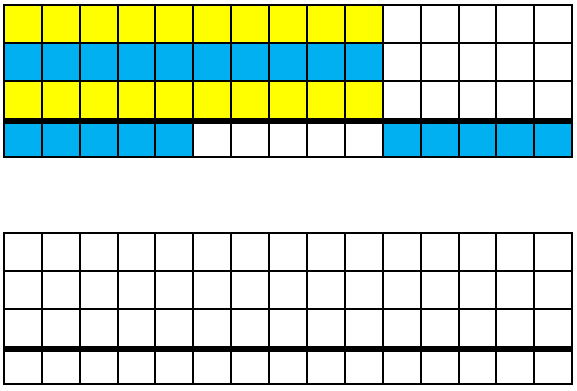
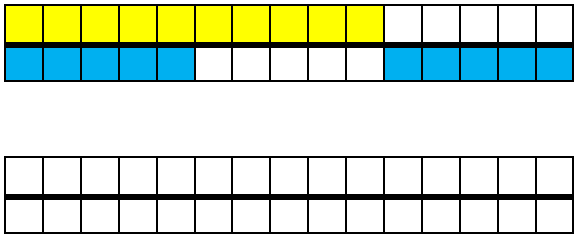
T =

5 Counted in 7s

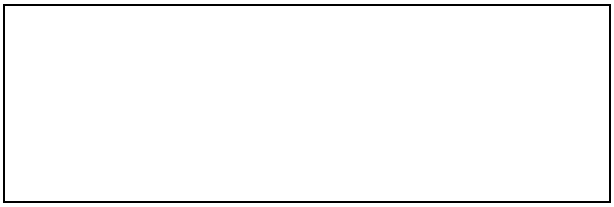
Sticks

G-counting	A-counting
lay out *bundle* *stack* **T =** Total	*lay out* *bundle* **B** *bundle-writing* **T =** *Total*

Abacus

G-mode	A-mode
	

Calculator



T =

3 4s Enumerated

as 5s

I	I	I	I	I	I	I	I	I	I	I	I
1	2	3	4	B	B1	B2	B3	B4	2B	2B1	2B2
1	2	3	4	10	11	12	13	14	20	21	22

as 6s

I	I	I	I	I	I	I	I	I	I	I	I
1	2	3	4	5	10	11	12	13	14	15	20

as 7s

I	I	I	I	I	I	I	I	I	I	I	I
1	2	3	4	5	6	10	11	12	13	14	15

as 8s

I	I	I	I	I	I	I	I	I	I	I	I
1	2	3	4	5	6	7	10	11	12	13	14

as 9s

I	I	I	I	I	I	I	I	I	I	I	I
1	2	3	4	5	6	7	8	10	11	12	13

as tens

I	I	I	I	I	I	I	I	I	I	I	I
1	2	3	4	5	6	7	8	9	10	11	12

4 3s Enumerated

as 5s

1	2	3	4	B							
1	2	3									

as 6s

1	2	3									

as 7s

1	2	3									

as 8s

1	2	3									

as 9s

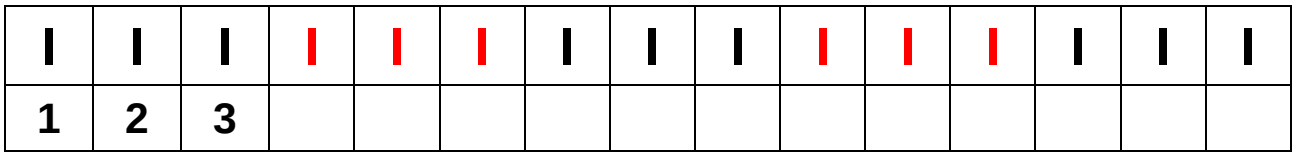
1	2	3									

as tens

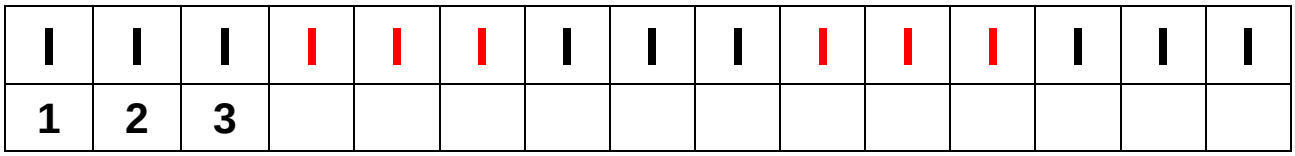
1	2	3									

5 3s Enumerated

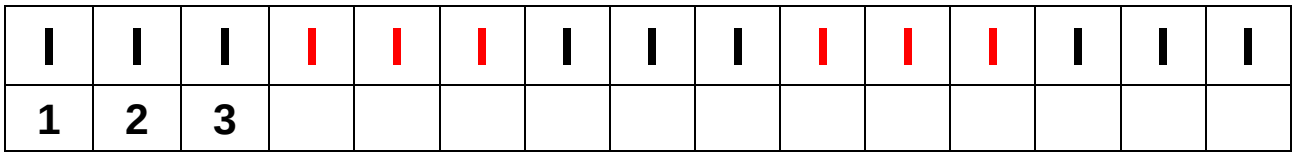
as 5s



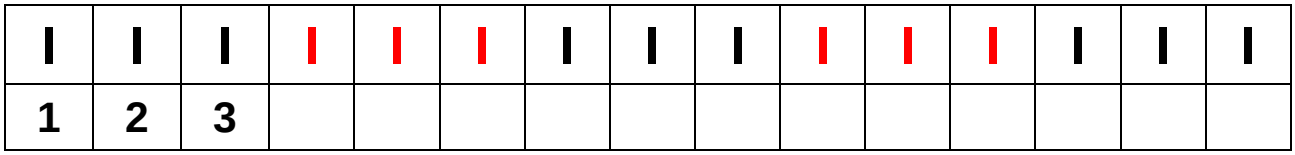
as 6s



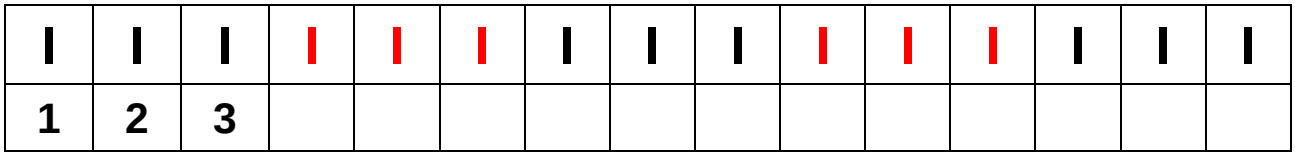
as 7s



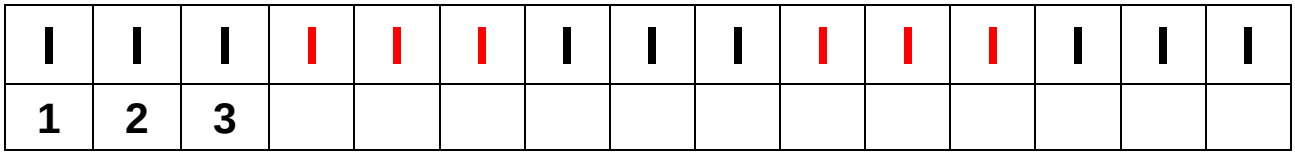
as 8s



as 9s



as tens



3 5s Enumerated

as 4s

1														

as 3s

1														

as 2s

1														

as 5s

1	2	3												

as 7s

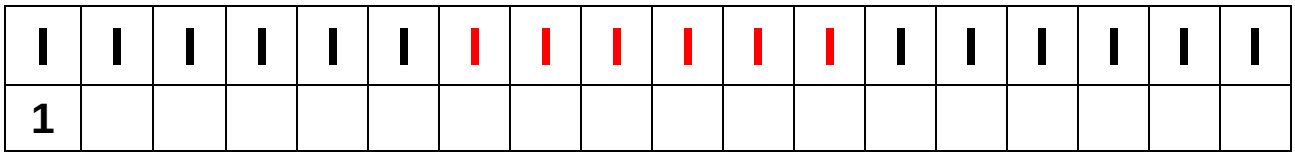
1	2	3												

as tens

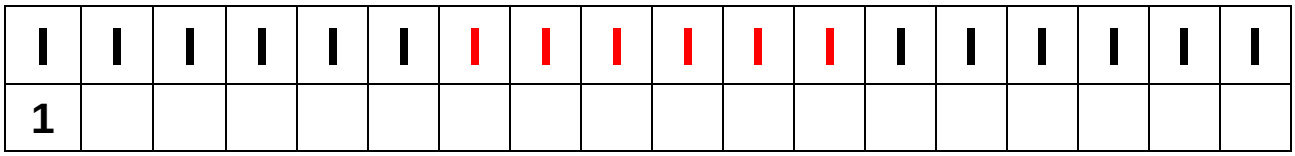
1	2	3												

3 6s Enumerated

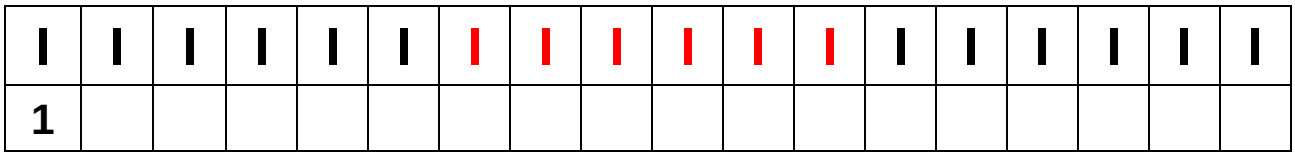
as 2s



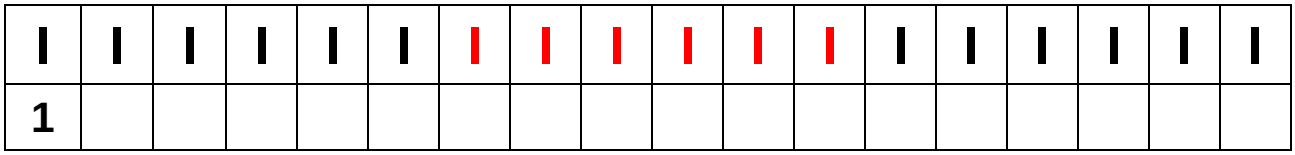
as 3s



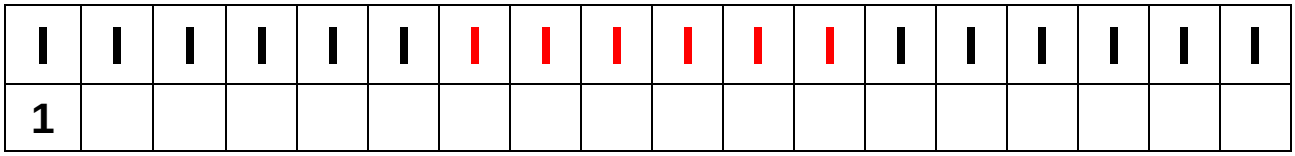
as 4s



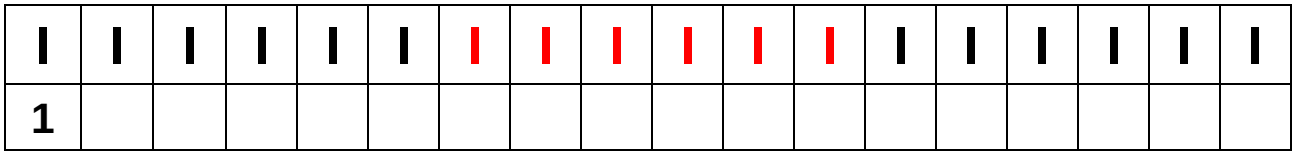
as 5s



as 7s

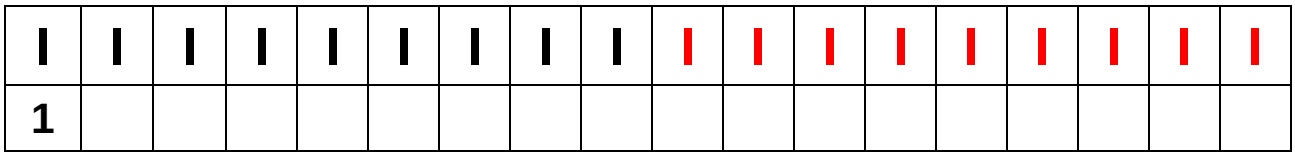


as tens

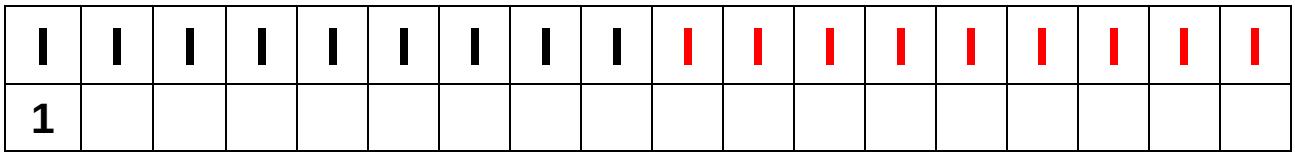


2 9s Enumerated

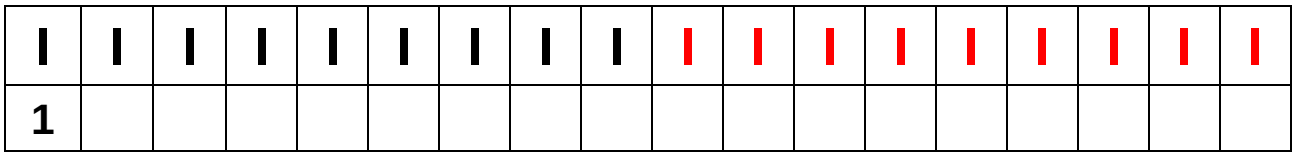
as 2s



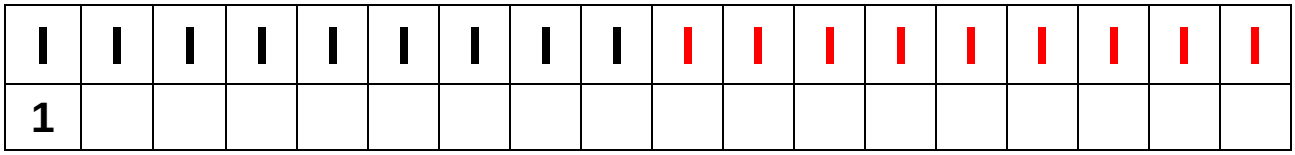
as 3s



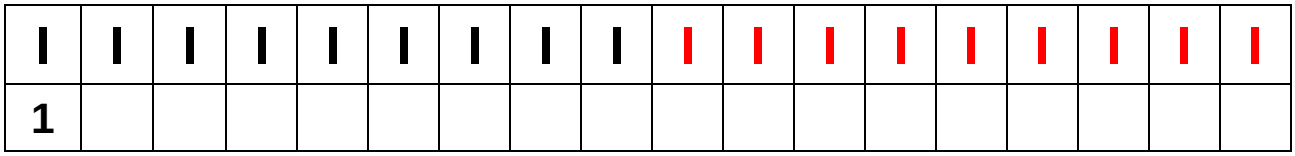
as 4s



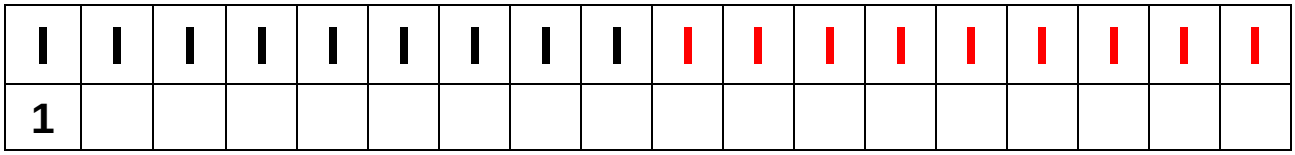
as 5s



as 7s



as tens



3 4s Enumerated

B2 : B less 2

as 5s

1	2	B2	B1	B	B1	B2	2B2	2B1	2B	2B1	2B2
1	2	3	4	10	11	12	13	14	20	21	22

as 6s

1	2	3	B2	B1	10	11	12	13	14	15	20

as 7s

1	2	3	4	B2	B1	10	11	12	13	14	15

as 8s

1	2	3	4	5	B2	B1	10	11	12	13	14

as 9s

1	2	3	4	5	6	B2	B1	10	11	12	13

as tens

1	2	3	4	5	6	7	B2	B1	10	11	12

4 3s Enumerated

as 5s

1	2	B2	B1	B							
1	2	3									

as 6s

1	2	3									

as 7s

1	2	3									

as 8s

1	2	3									

as 9s

1	2	3									

as tens

1	2	3									

M3

ReCounting in the Same Bundle

Mathematics as MANYmatics

A Natural Science about Many

Material for

MicroCurriculum 3

Allan.Tarp

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Curricula

Micro-curriculum 1. Creating Icon-numbers

Micro-curriculum 2. Counting in Bundles

Micro-curriculum 3. Re-counting Bundle-numbers in the Same Bundle

Micro-curriculum 4. Re-counting Bundle-numbers in a Different Bundle

Micro-curriculum 5. Adding Bundle-numbers OnTop

Micro-curriculum 6. Adding Bundle-numbers NextTo

Micro-curriculum 7. Reversing Adding Bundle-numbers OnTop

Micro-curriculum 8. Reversing Adding Bundle-numbers NextTo

Preface

M3, ReCounting in the same bundle, is the third of 8 micro-curricula in mathematics for preschool and home schooling. They present mathematics as MANYmatics, a natural science about the physical fact Many. They all build upon the following observation:

”How old will you be next time?” I asked the child. “Four”, he answered and showed me four fingers. “Four, you said?” I asked and showed him four fingers held together two by two. “No, that is not four, that is two twos!” the child replied thus insisting upon what exists, bundles of twos, and two of them. Likewise, preschool children have no difficulties counting in other units than ten, even if they only learn how to count in tens.

The micro-curricula use activities with concrete material to obtain its learning goals in accordance with Piaget’s principle ‘greifen vor begrifen’ (grasp to grasp).

In the first, children learn to use sticks to build the number icons up to nine, and to use strokes to draw them, thus realizing there are as many sticks and strokes in the icon as the number it represents, if written less sloppy. In the second, children learn to count a given total in icons manually, using an abacus and by using a calculator. In the third, children learn to recount a total in the same unit. In the fourth, children learn to recount a total in a different unit. In the fifth, children learn to add two bundle-numbers on top of each other. In the sixth, children learn to add two bundle-numbers next to each other. In the seventh, children learn to reverse on-top addition. And in the eights, children learn to reverse next-to addition

As to concrete material, anything goes in the first micro-curriculum. The others will use sticks and strokes, beads on an abacus, LEGO-like blocks and squares, and a calculator respecting the priority of the operations. Fingers, pegs on a pegboard and other concrete material might also be used.

Some of the curricula can use silent education where the instructor is allowed to demonstrate and guide through actions, but not through words; or by using words form a foreign language not understood by the child.

G stands for Geometry and A stands for Algebra.

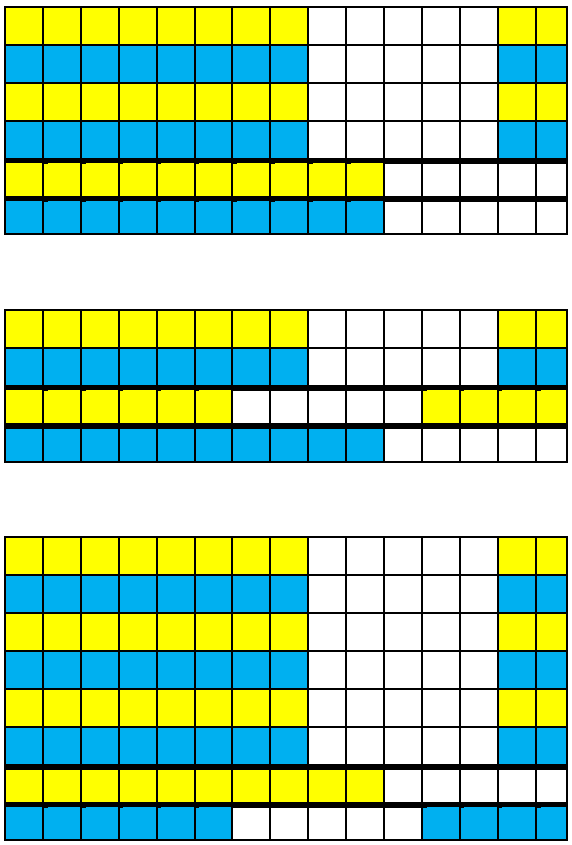
A total of 4 2s can be written as 5.$\underline{2}$ 2s where $\underline{2}$ means ‘less 2’.

4 2s ReCounted in 2s

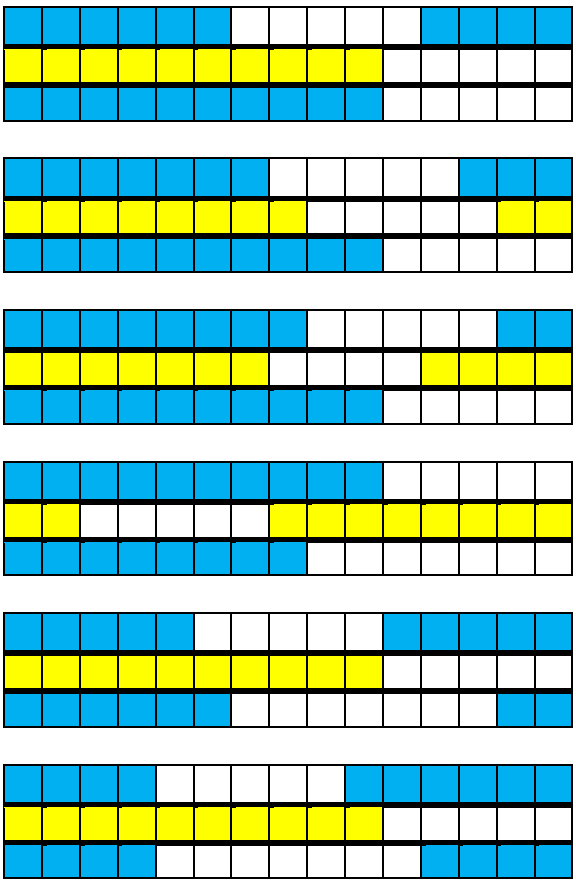
Unbundle Sticks	T =	Calculator	
𝍸 𝍸 𝍸 𝍸	**4.0 2s**		
𝍸 𝍸 𝍸 I I	**3.2 2s**	4x2 – 3x2	2
𝍸 𝍸 I I I I	**2.4 2s**	4x2 – 2x2	4
𝍸 I I I I I I	**1.6 2s**	4x2 – 1x2	6
I I I I I I I I	**0.8 2s**	4x2 – 0x2	8
𝍸 𝍸 𝍸 𝍸 𝍸	**5.2 2s**	4x2 – 5x2	-2
𝍸 𝍸 𝍸 𝍸 𝍸 𝍸	**6.4 2s**	4x2 – 6x2	-4

Abacus (bottom line for the less-numbers)

G-mode



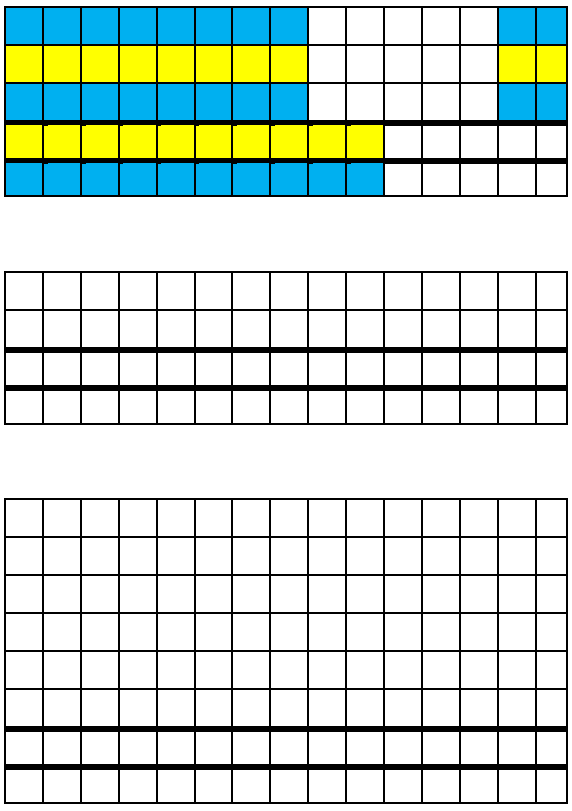
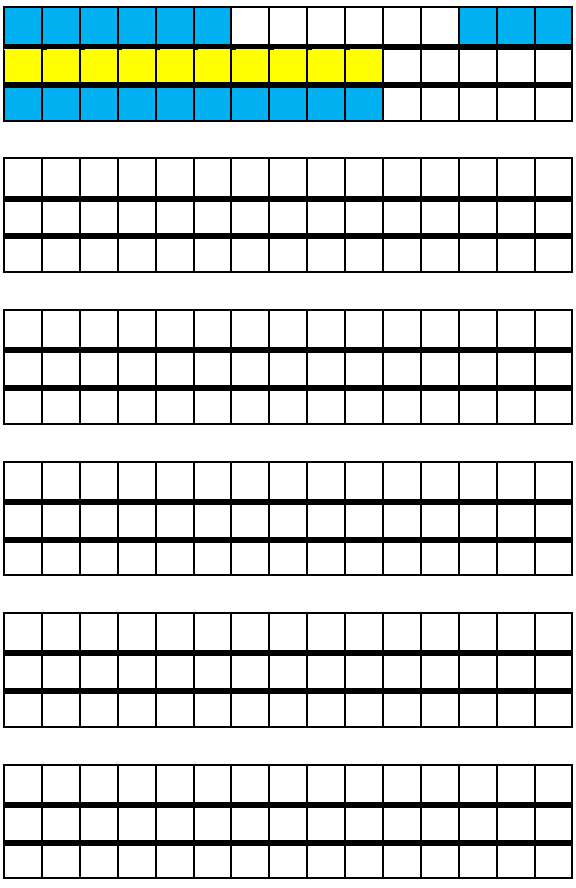
A-mode



3 2s ReCounted in 2s

Unbundle Sticks	T =	Calculator	
𝍸 𝍸 𝍸	3.0 2s		

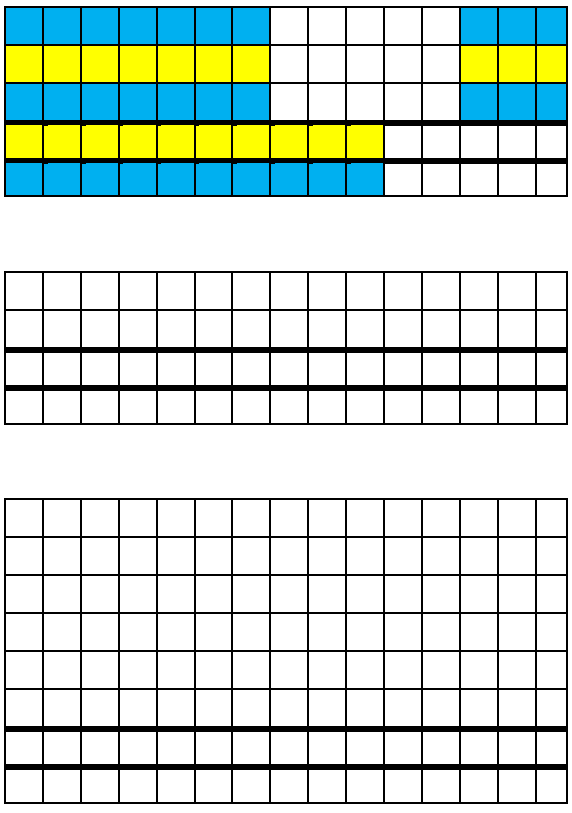
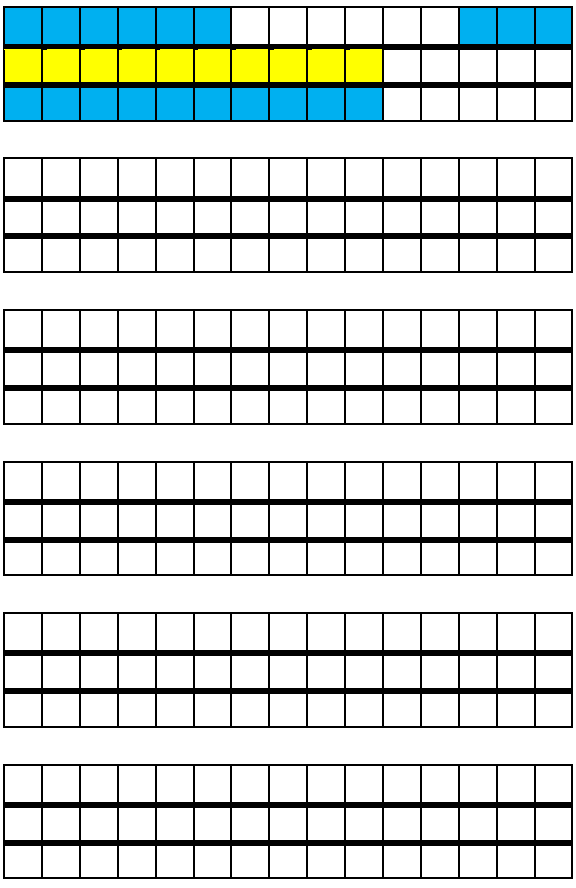
Abacus (bottom line for the less-numbers)

G-mode	A-mode
	

3 3s ReCounted in 3s

Bundle Sticks	T =	Calculator	
𝍸 𝍸 𝍸	3.0 3s		

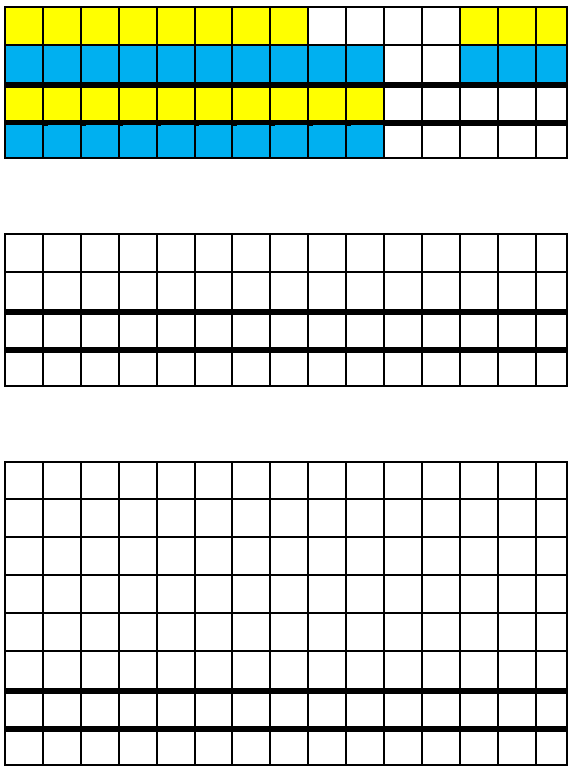
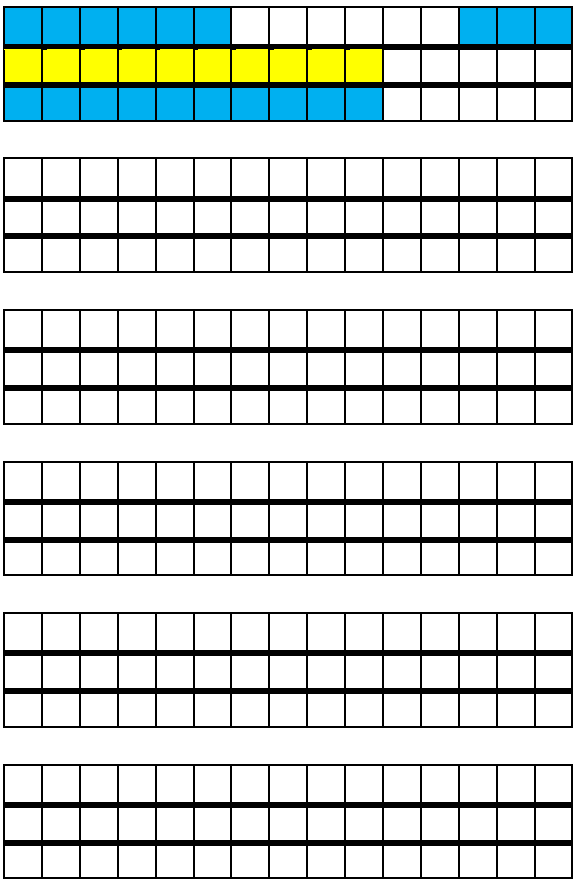
Abacus (bottom line for the less-numbers)

G-mode	A-mode
	

2 3s ReCounted in 3s

Bundle Sticks	T =	Calculator	
𝍸 𝍸	2.0 3s		

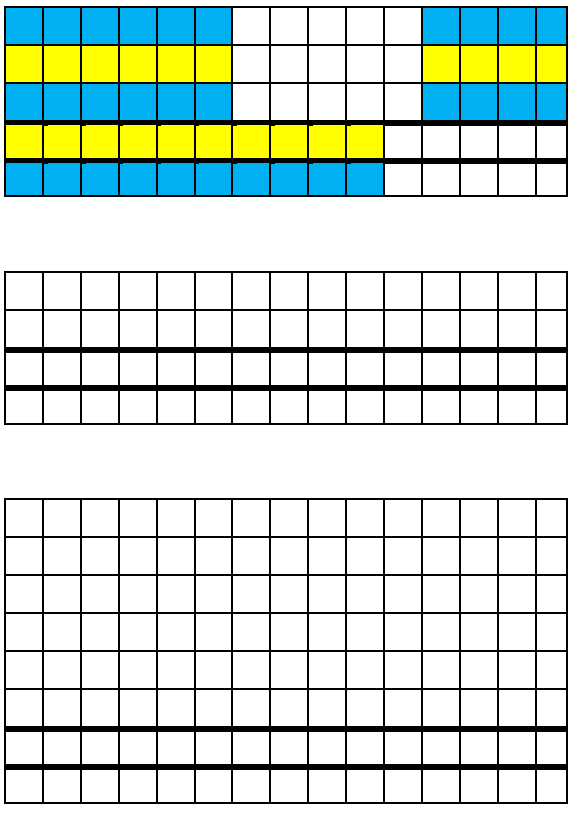
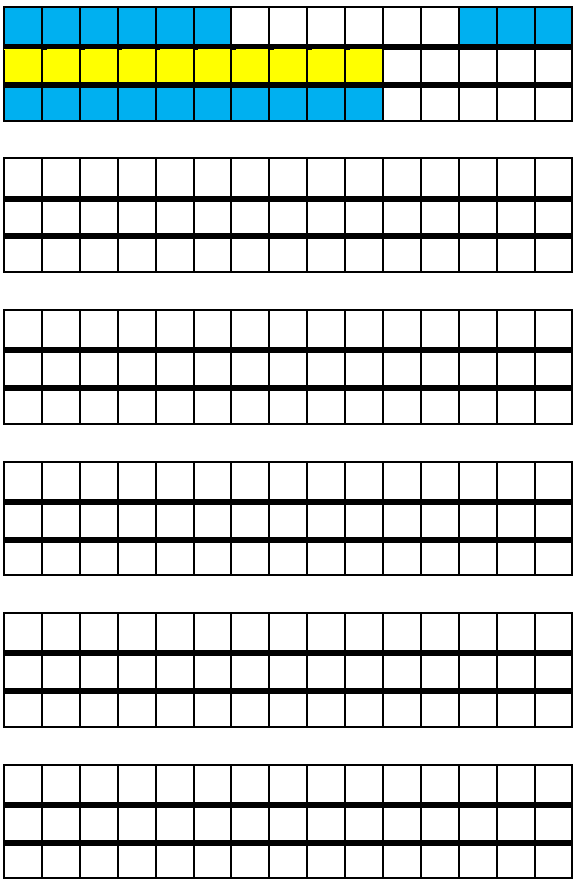
Abacus (bottom line for the less-numbers)

G-mode	A-mode
	

3 4s ReCounted in 4s

Bundle Sticks	T =	Calculator	
𝍸 𝍸 𝍸	3.0 4s		

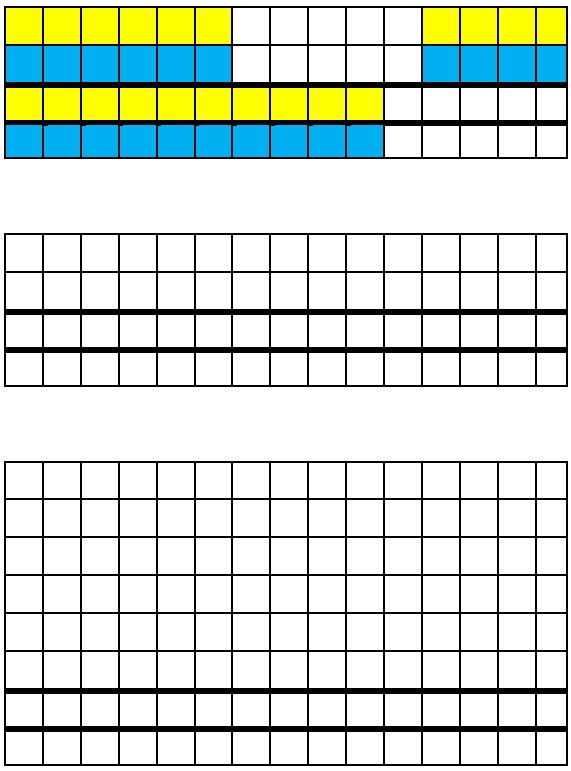
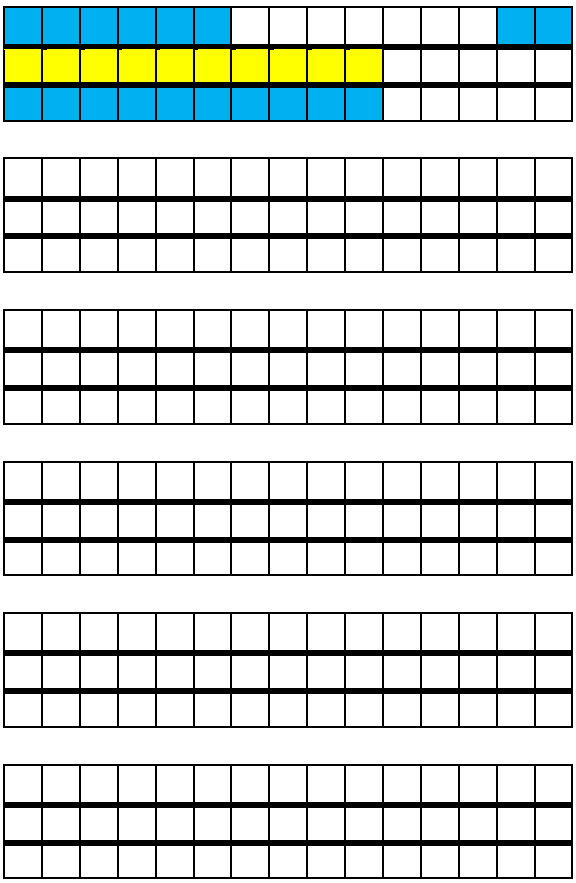
Abacus (bottom line for the less-numbers)

G-mode	A-mode
	

2 4s ReCounted in 4s

Unbundle Sticks	T =	Calculator	
𝍸 𝍸	2.0 4s		

Abacus (bottom line for the less-numbers)

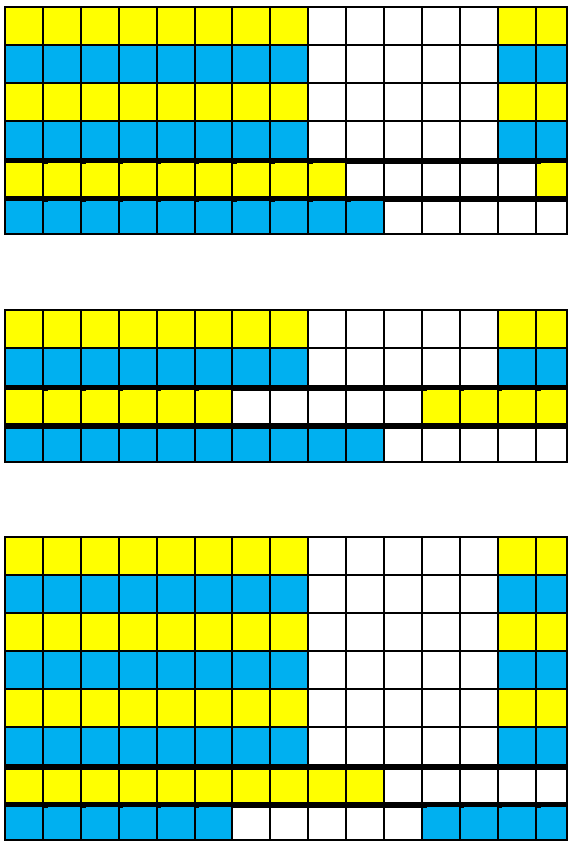
G-mode	A-mode
	

4.1 2s ReCounted in 2s

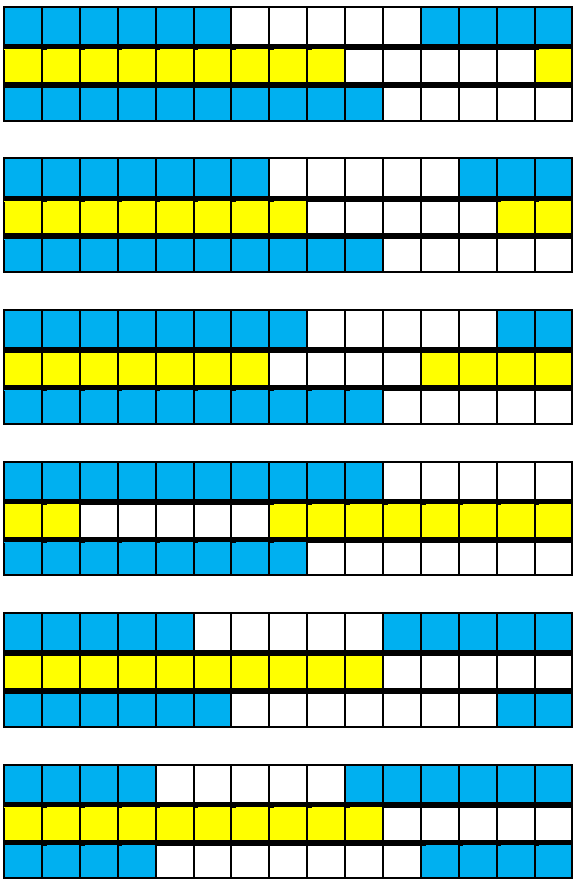
Unbundle Sticks	T =	Calculator	
𝍸 𝍸 𝍸 𝍸 I	**4.1 2s**		
𝍸 𝍸 𝍸 I I I	**3.3 2s**	4x2 + 1 – 3x2	3
𝍸 𝍸 I I I I I	**2.5 2s**	4x2 + 1 – 2x2	5
𝍸 I I I I I I I	**1.7 2s**	4x2 + 1 – 1x2	7
I I I I I I I I I	**0.9 2s**	4x2 + 1 – 0x2	9
𝍸 𝍸 𝍸 𝍸 𝍸	**5.1 2s**	4x2 + 1 – 5x2	-1
𝍸 𝍸 𝍸 𝍸 𝍸 𝍸	**6.3 2s**	4x2 + 1 – 6x2	-3

Abacus (bottom line for the less-numbers)

G-mode



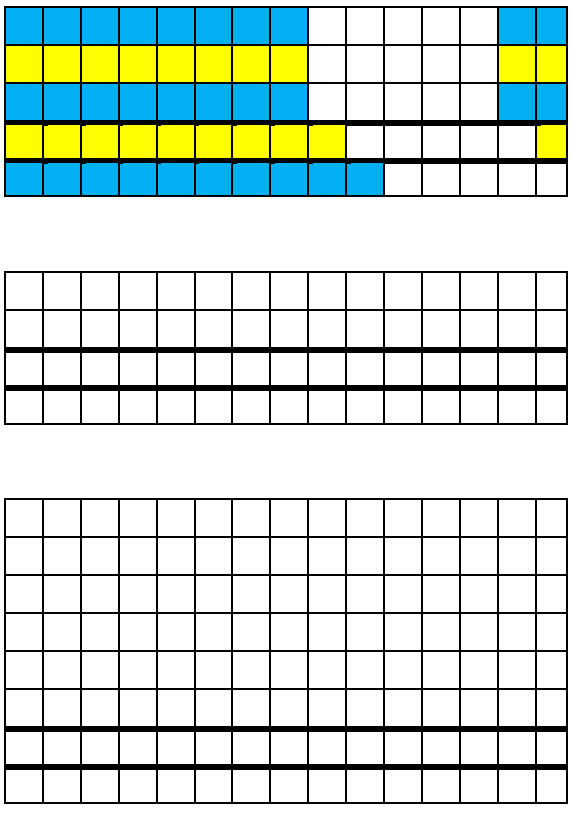
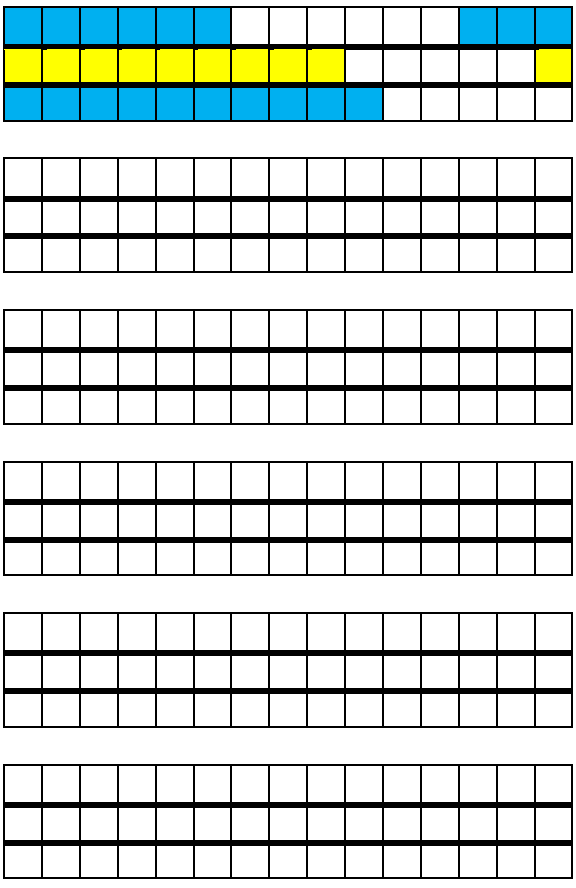
A-mode



3.1 2s ReCounted in 2s

Unbundle Sticks	T =	Calculator	
𝍸 𝍸 𝍸 I	3.1 2s		

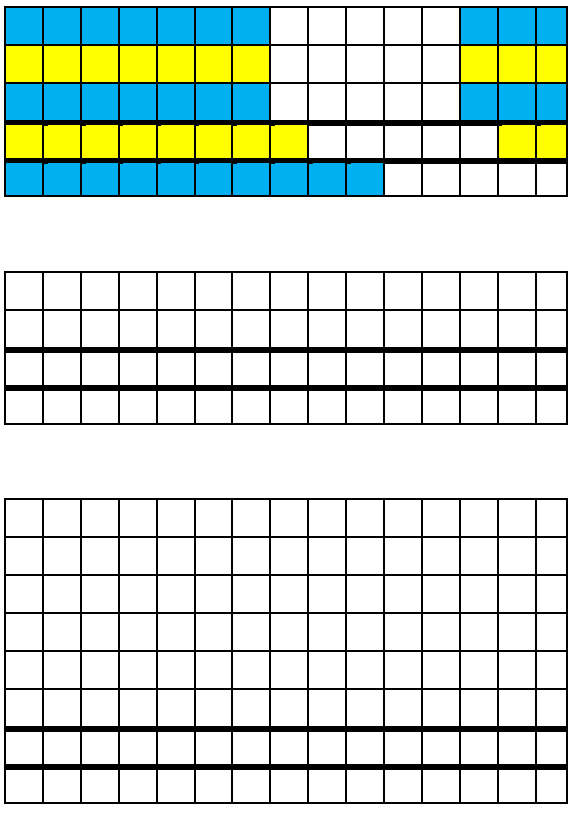
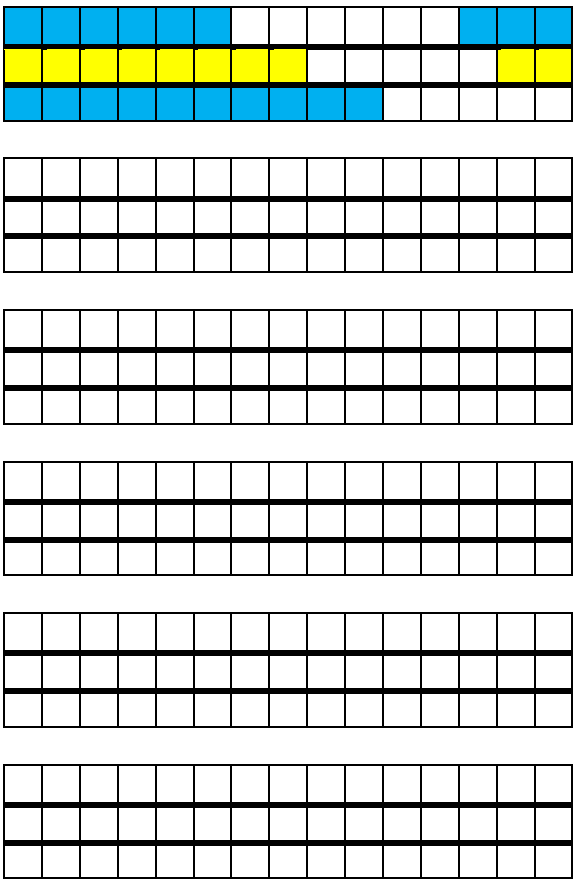
Abacus (bottom line for the less-numbers)

G-mode	A-mode
	

3.2 3s ReCounted in 3s

Bundle Sticks	T =	Calculator	
𝍸 𝍸 𝍸 I I	3.2 3s		

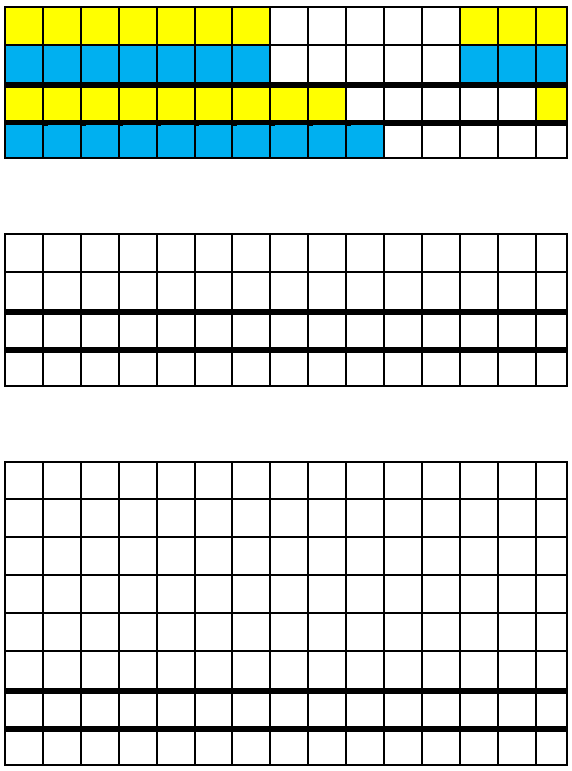
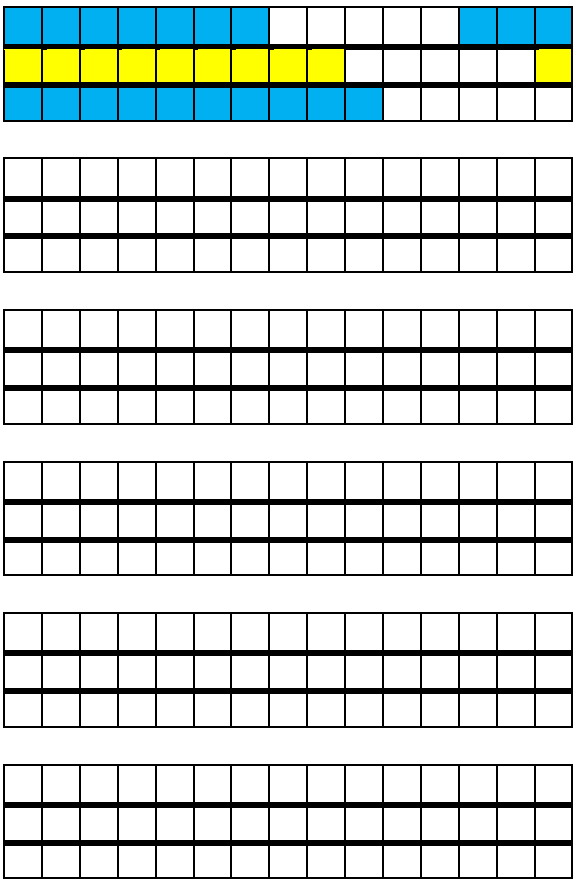
Abacus (bottom line for the less-numbers)

G-mode	A-mode
	

2.1 3s ReCounted in 3s

Bundle Sticks	T =	Calculator	
𝍸 𝍸 I	2.1 3s		

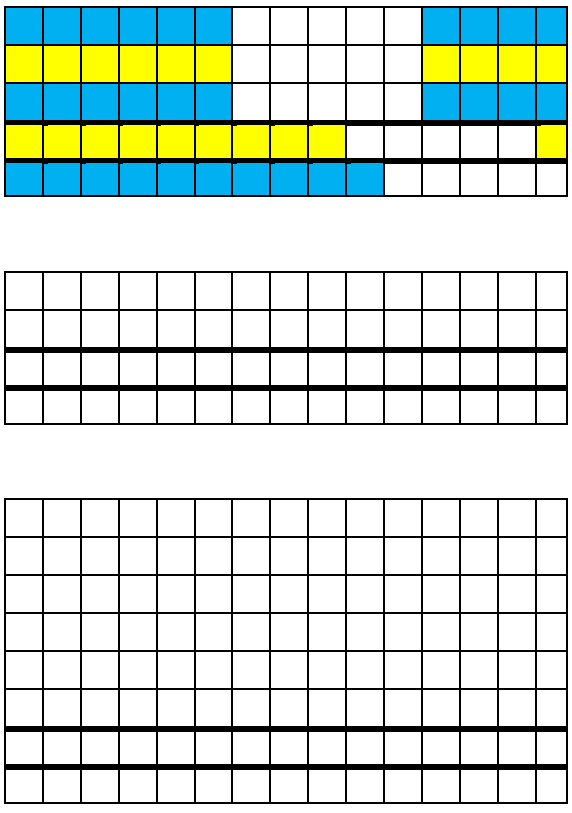
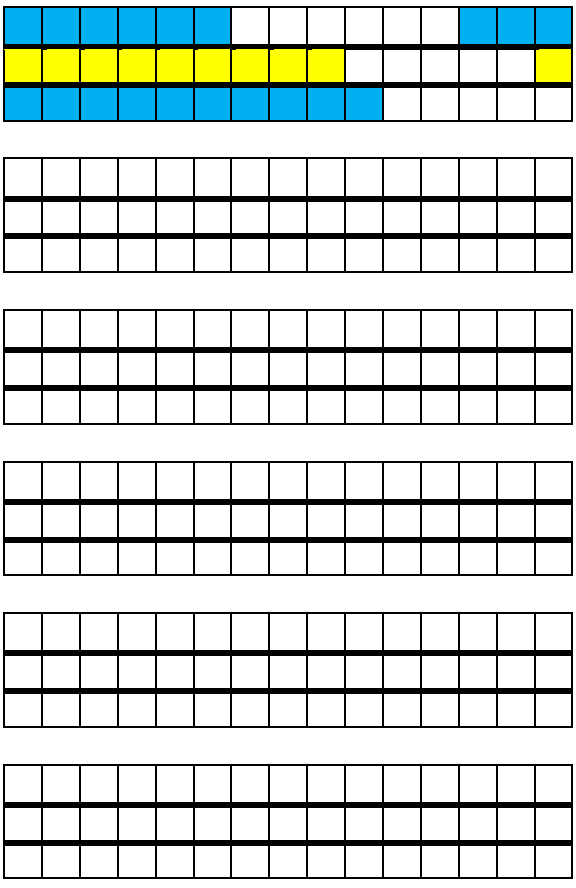
Abacus (bottom line for the less-numbers)

G-mode	A-mode
	

3.1 4s ReCounted in 4s

Bundle Sticks	T =	Calculator	
𝍸 𝍸 𝍸 I	3.1 4s		

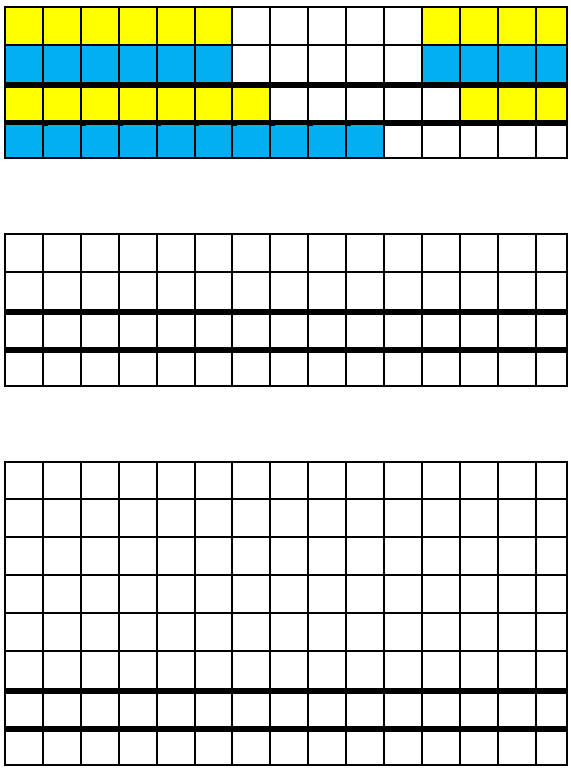
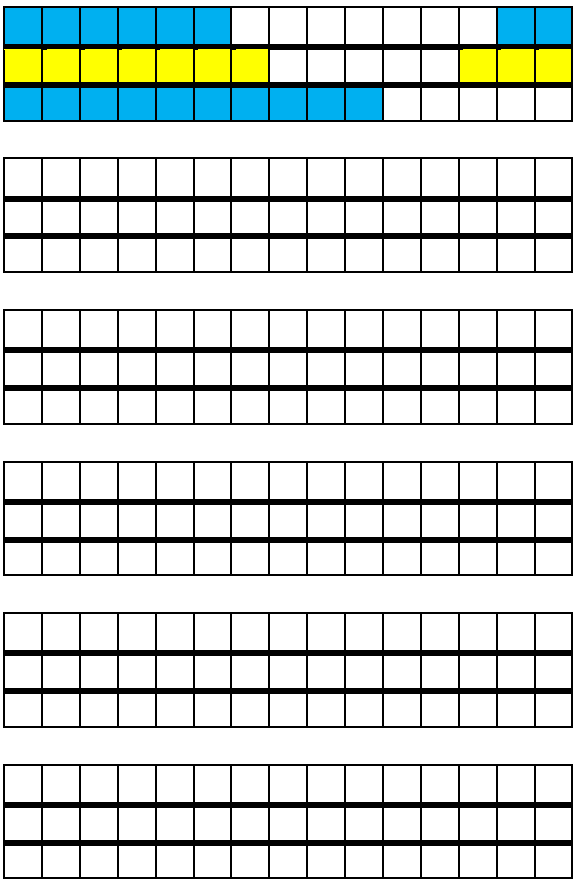
Abacus (bottom line for the less-numbers)

G-mode	A-mode
	

2.3 4s ReCounted in 4s

Unbundle Sticks	T =	Calculator	
𝍸 𝍸 I I I	2.3 4s		

Abacus (bottom line for the less-numbers)

G-mode	A-mode
	

3 4s Enumerated

B2 : B less 2

as 5s

B4	**B3**	**B2**	**B1**	**B**	**2B4**	**2B3**	**2B2**	**2B1**	**2B**	**3B4**	**3B3**

as 3s

B2											

as 7s

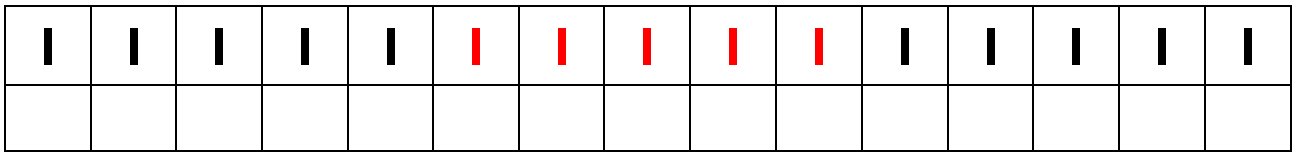
as 2s

as 9s

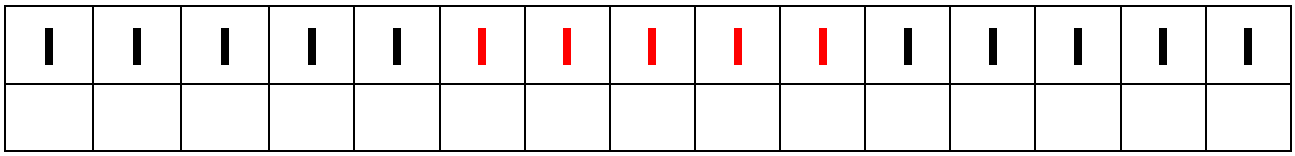
as tens

3 5s Enumerated

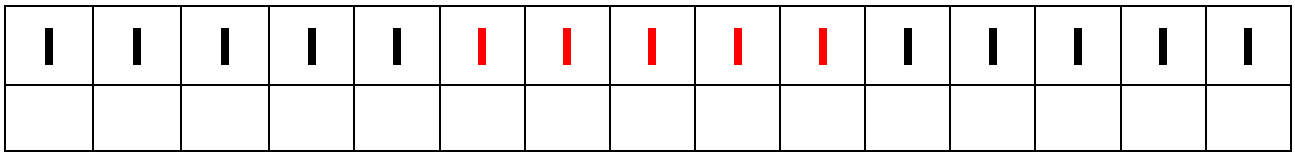
in 2s



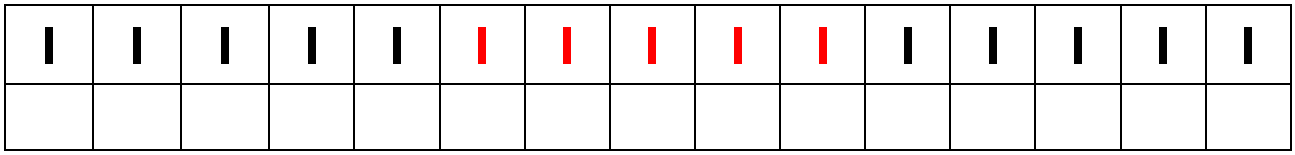
in 3s



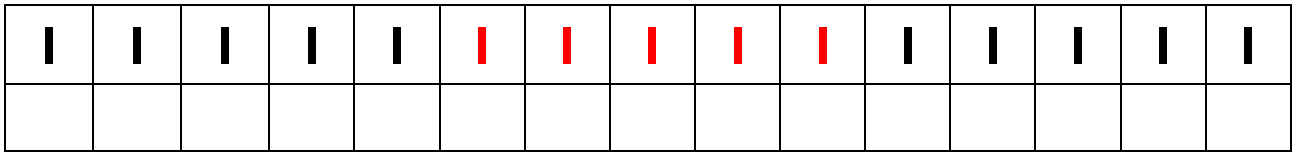
in 4s



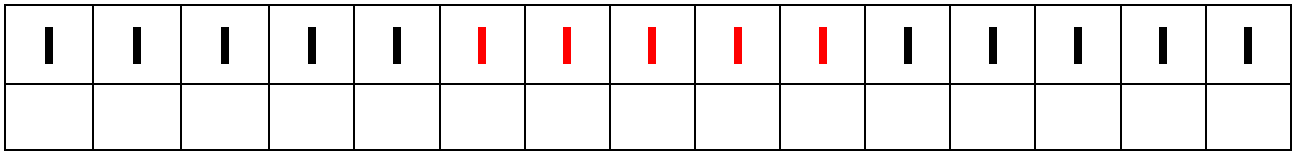
in 6s



in 8s

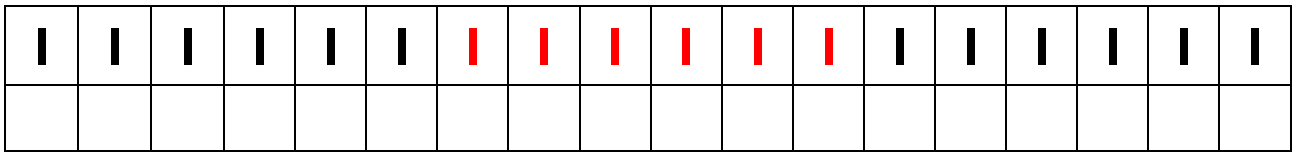


in tens

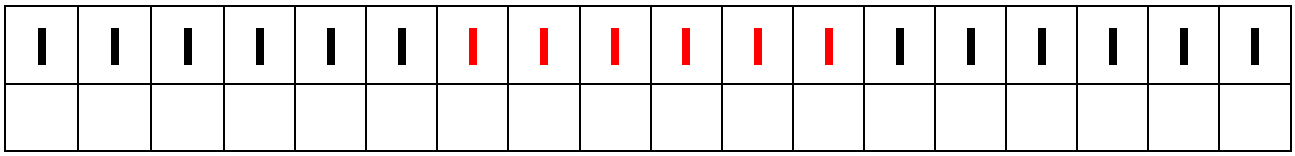


3 6s Enumerated

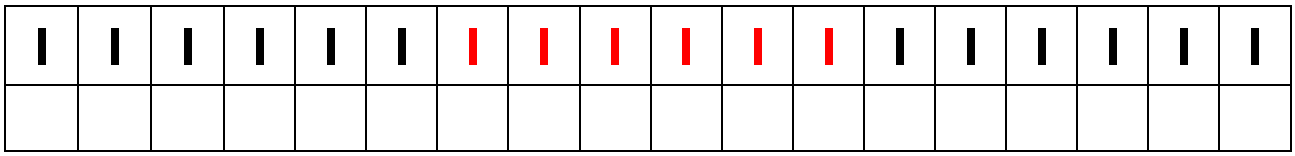
in 2s



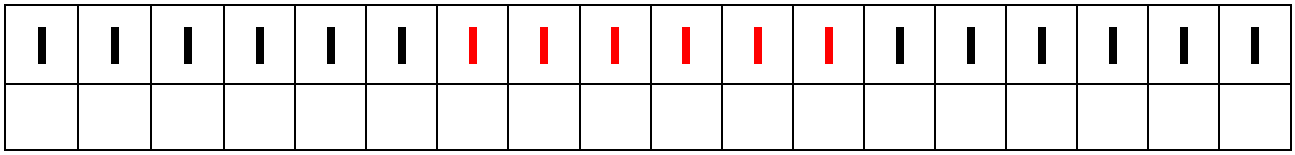
in 3s



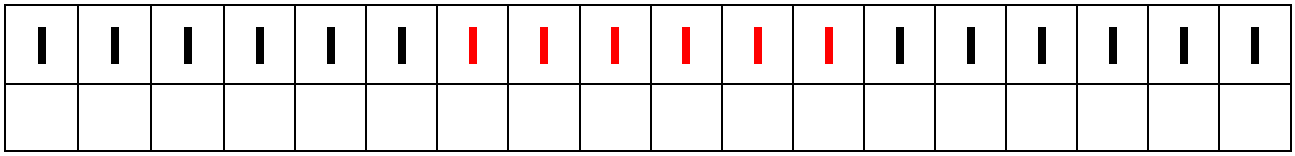
in 4s



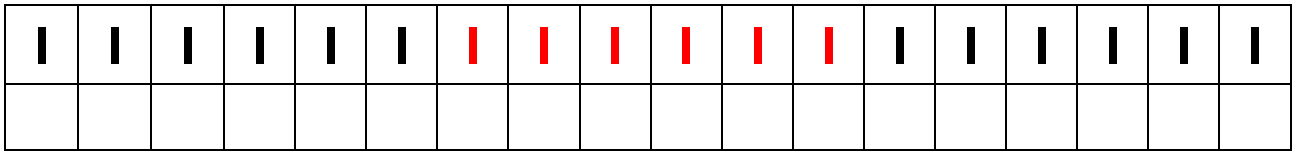
in 7s



in 9s

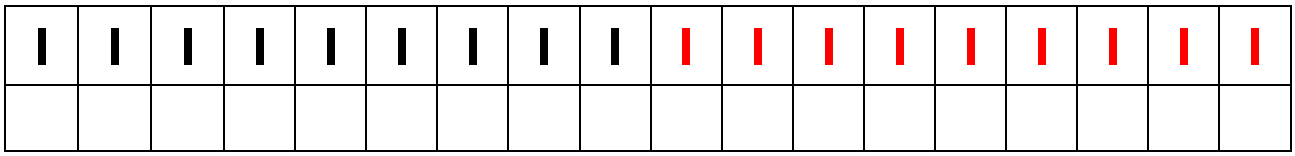


in tens

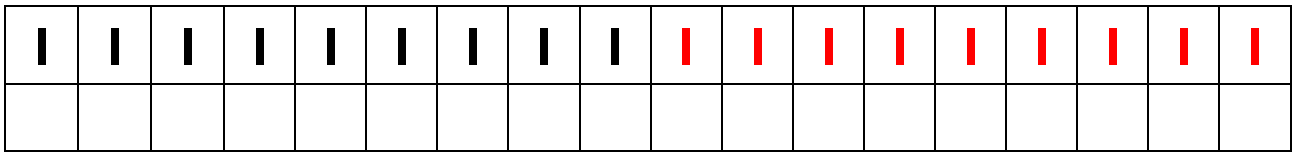


2 9s Enumerated

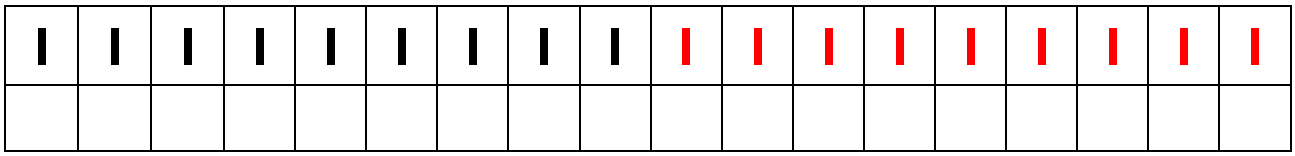
in 2s



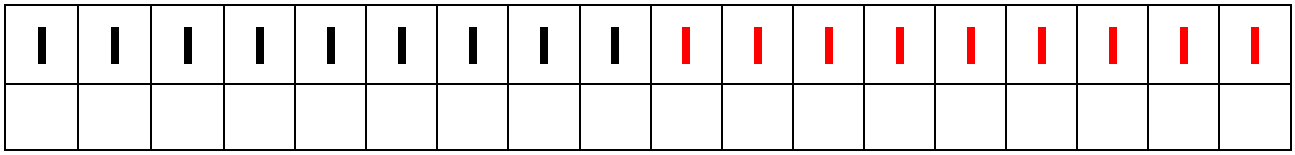
in 4s



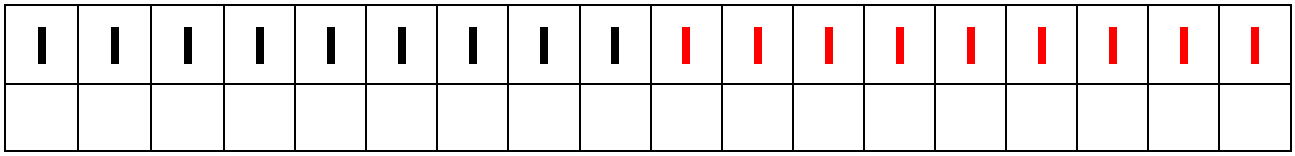
in 5s



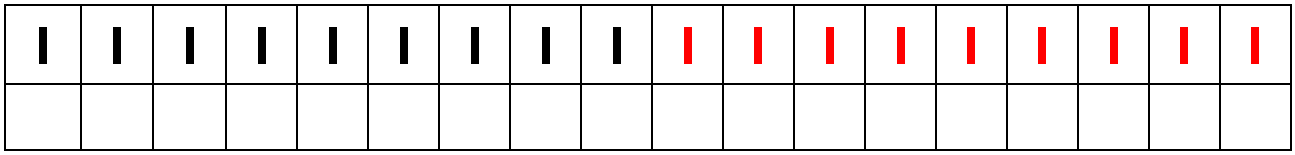
in 6s



in 8s



in tens



M4

ReCounting

Mathematics as MANYmatics

A Natural Science about Many

Material for

MicroCurriculum 4

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Curricula

Micro-curriculum 1. Creating Icon-numbers

Micro-curriculum 2. Counting in Bundles

Micro-curriculum 3. Re-counting Bundle-numbers in the Same Bundle

Micro-curriculum 4. Re-counting Bundle-numbers in a Different Bundle

Micro-curriculum 5. Adding Bundle-numbers OnTop

Micro-curriculum 6. Adding Bundle-numbers NextTo

Micro-curriculum 7. Reversing Adding Bundle-numbers OnTop

Micro-curriculum 8. Reversing Adding Bundle-numbers NextTo

Preface

M4, ReCounting, is the fourth of 8 micro-curricula in mathematics for preschool and home schooling. They present mathematics as MANYmatics, a natural science about the physical fact Many. They all build upon the following observation:

”How old will you be next time?” I asked the child. “Four”, he answered and showed me four fingers. “Four, you said?” I asked and showed him four fingers held together two by two. “No, that is not four, that is two twos!” the child replied thus insisting upon what exists, bundles of twos, and two of them. Likewise, preschool children have no difficulties counting in other units than ten, even if they only learn how to count in tens.

The micro-curricula use activities with concrete material to obtain its learning goals in accordance with Piaget’s principle ‘greifen vor begrifen’ (grasp to grasp).

In the first, children learn to use sticks to build the number icons up to nine, and to use strokes to draw them, thus realizing there are as many sticks and strokes in the icon as the number it represents, if written less sloppy. In the second, children learn to count a given total in icons manually, using an abacus and by using a calculator. In the third, children learn to recount a total in the same unit. In the fourth, children learn to recount a total in a different unit. In the fifth, children learn to add two bundle-numbers on top of each other. In the sixth, children learn to add two bundle-numbers next to each other. In the seventh, children learn to reverse on-top addition. And in the eights, children learn to reverse next-to addition

As to concrete material, anything goes in the first micro-curriculum. The others will use sticks and strokes, beads on an abacus, LEGO-like blocks and squares, and a calculator respecting the priority of the operations. Fingers, pegs on a pegboard and other concrete material might also be used.

Some of the curricula can use silent education where the instructor is allowed to demonstrate and guide through actions, but not through words; or by using words form a foreign language not understood by the child.

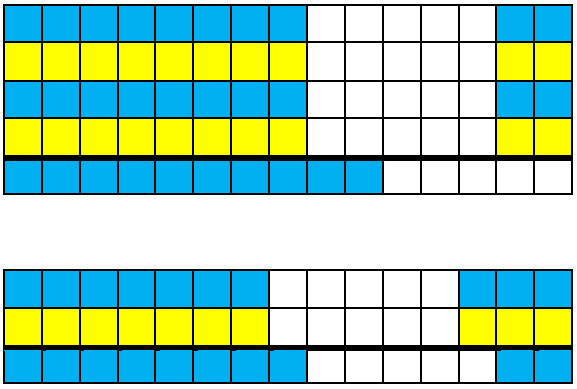
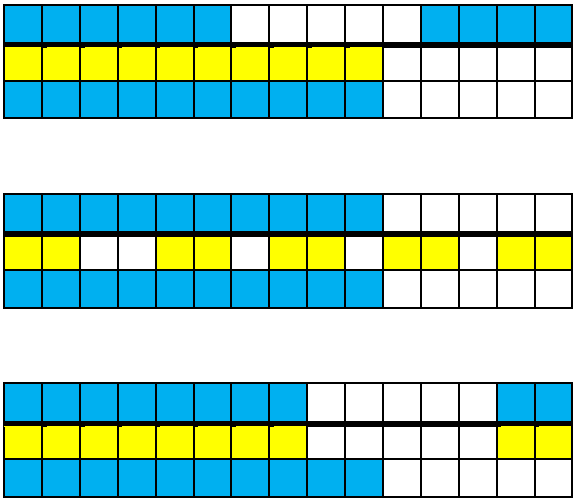
G stands for Geometry and A stands for Algebra.

4 2s ReCounted in 3s

Sticks

G-counting		A-counting	
𝍸 𝍸 𝍸 𝍸	*unbundle*	𝍸 𝍸 𝍸 𝍸	*unbundle*
𝍸 𝍸 𝍸	*rebundle*	𝍸 𝍸 𝍸	*rebundle*
𝍸 | 𝍸 |	*stack*	**2B 2**	*bundle-writing*
T = 2.2 3s	**Total**	**T = 2.2 3s**	**Total**

Abacus

G-mode	A-mode
	

Calculator

4x2 / 3	**2.some**
4x2 – 2x3	**2**

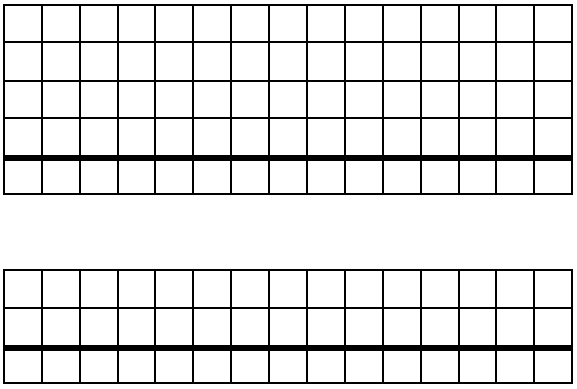
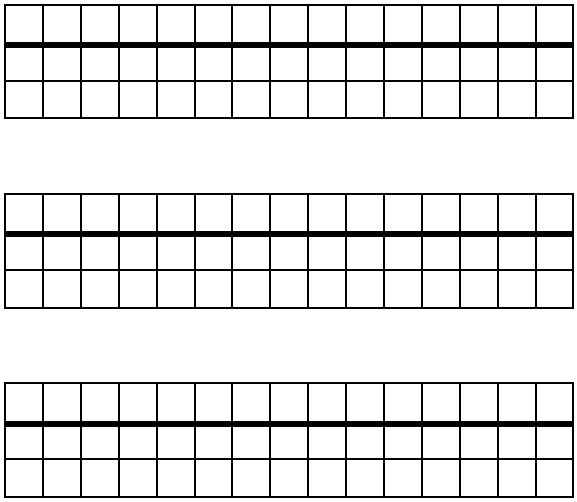
T = 4 2s = 2.2 3s

5 2s ReCounted in 3s

Sticks

G-counting	A-counting
unbundle *rebundle* *stack*	*unbundle* *rebundle* **B** *bundle-writing*
T = 3s Total	**T = 3s Total**

Abacus

G-mode	A-mode
	

Calculator

5x2 / 3

5x2 –

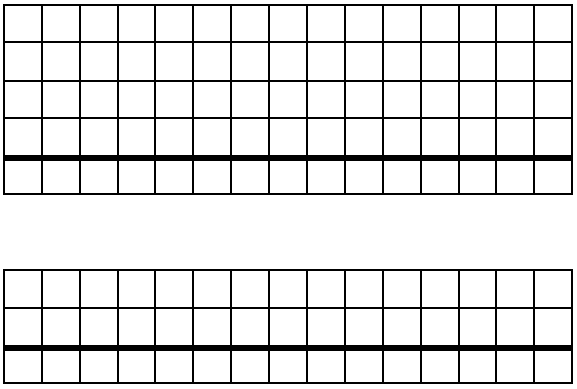
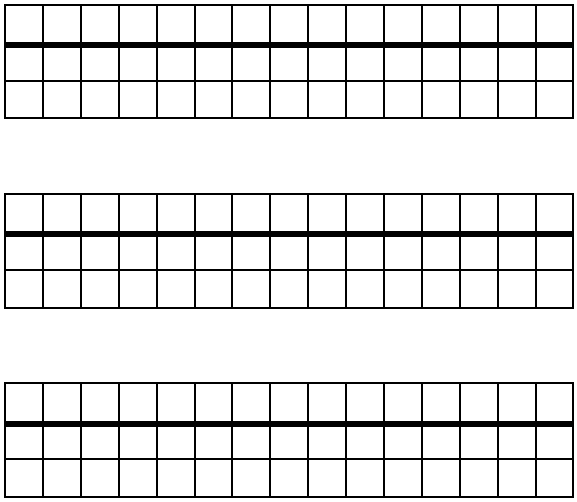
T = 5 2s = 3s

2 3s ReCounted in 4s

Sticks

G-counting	A-counting
unbundle *rebundle* *stack*	*unbundle* *rebundle* **B** *bundle-writing*
T = 3s Total	**T = 3s Total**

Abacus

G-mode	A-mode
	

Calculator

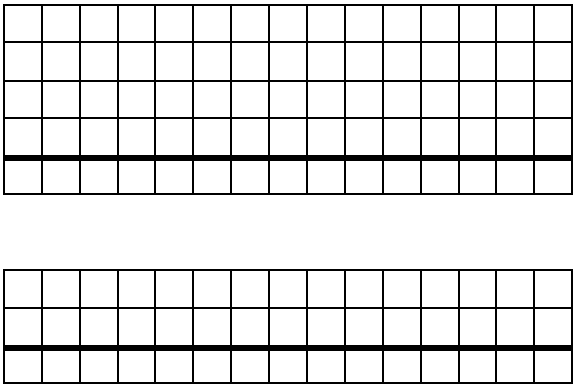
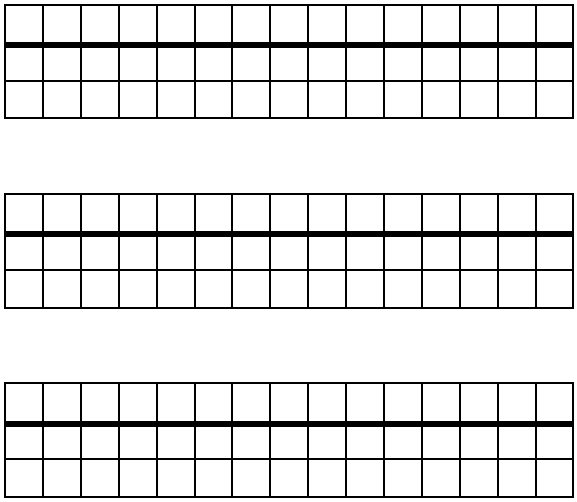
T = 2 3s = 4s

5 3s ReCounted in 4s

Sticks

G-counting	A-counting
unbundle *rebundle* *stack*	*unbundle* *rebundle* **B** *bundle-writing*
T = 3s Total	**T = 3s Total**

Abacus

G-mode	A-mode
	

Calculator

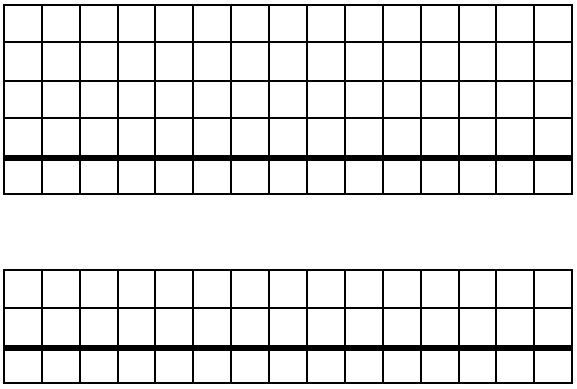
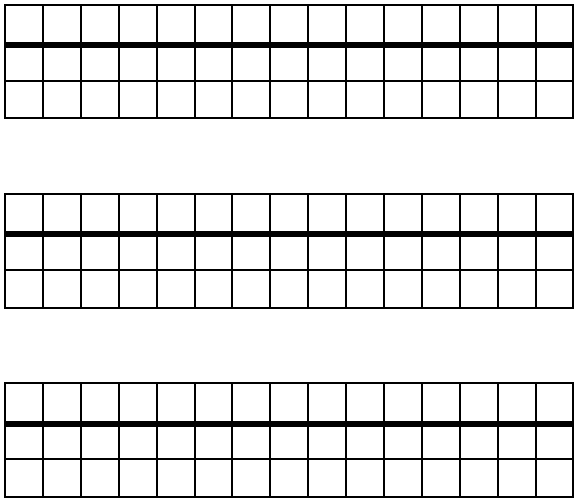
T = 5 3s = 4s

3 4s ReCounted in 5s

Sticks

G-counting	A-counting
unbundle *rebundle* *stack*	*unbundle* *rebundle* **B** *bundle-writing*
T = 3s Total	**T = 3s Total**

Abacus

G-mode	A-mode
	

Calculator

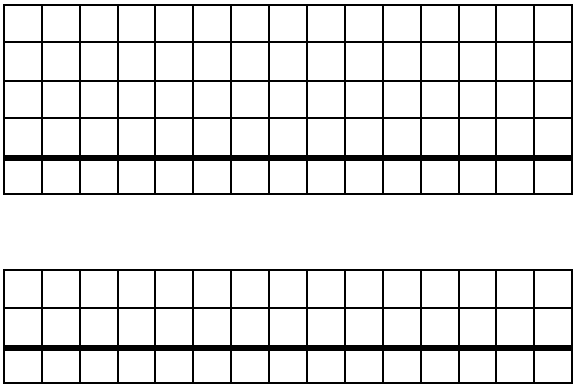
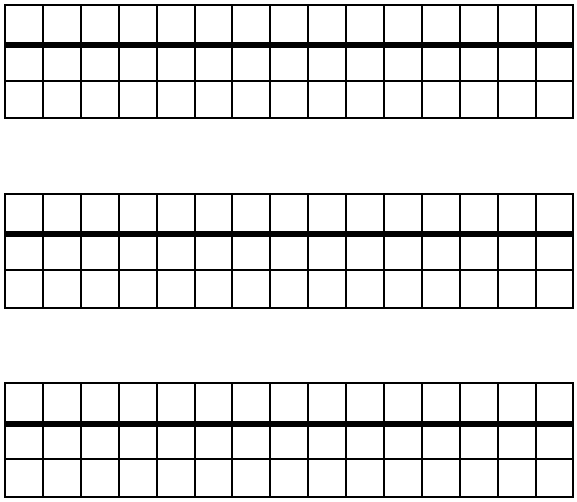
T = 3 4s = 5s

2 4s ReCounted in 5s

Sticks

G-counting	A-counting
unbundle *rebundle* *stack*	*unbundle* *rebundle* **B** *bundle-writing*
T = 3s Total	**T = 3s Total**

Abacus

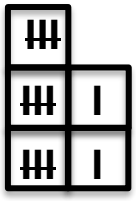
G-mode	A-mode
	

Calculator

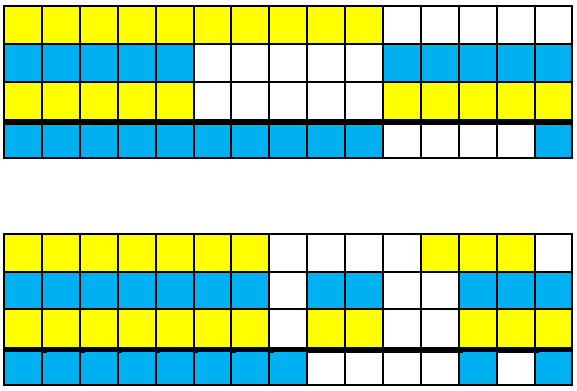
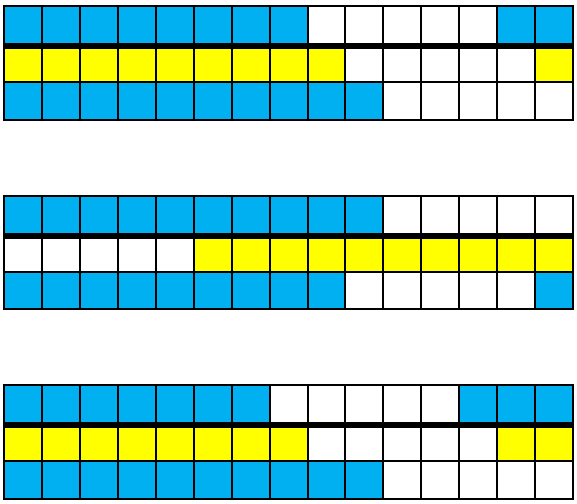
T = 2 4s = 5s

2.1 5s ReCounted in 3s

Sticks

G-counting		A-counting	
IIIII IIIII I	*unbundle*	IIIII IIIII I	*unbundle*
卌 卌 卌 II	*rebundle*	卌 卌 卌 II	*rebundle*
	*stack*	**3B2**	*bundle-writing*
T = 3.2 3s Total		**T = 3.2 3s Total**	

Abacus

G-mode	A-mode
	

Calculator

(2x5+1) / 3	**3.some**
(2x5+1) – 3x3	**2**

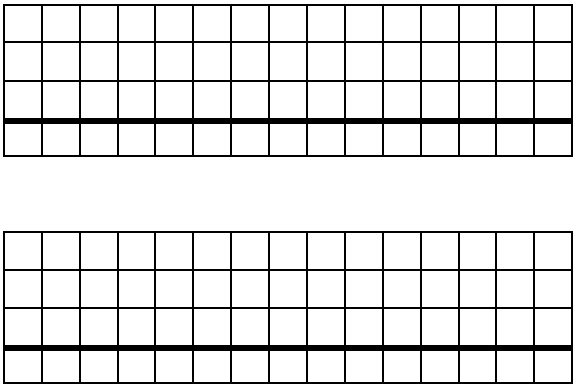
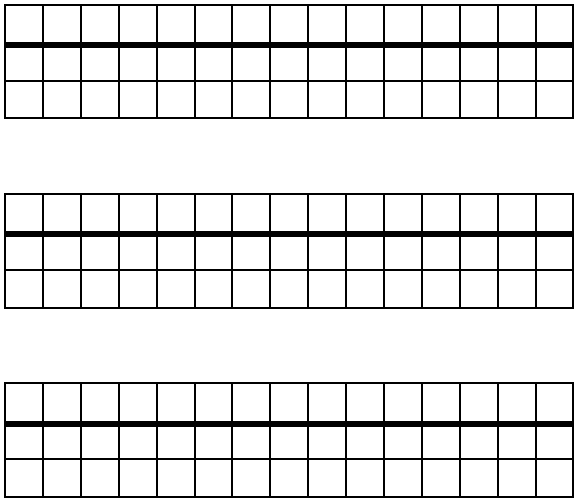
T = 2.1 5s = 3.2 3s

2.4 5s ReCounted in 3s

Sticks

G-counting	A-counting
unbundle *rebundle* *stack*	*unbundle* *rebundle* **B** *bundle-writing*
T = 3s Total	**T = 3s Total**

Abacus

G-mode	A-mode
	

Calculator

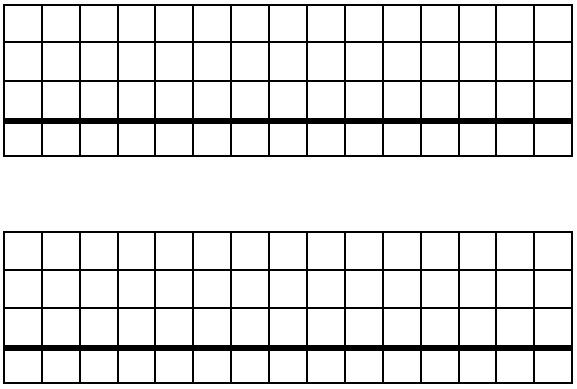
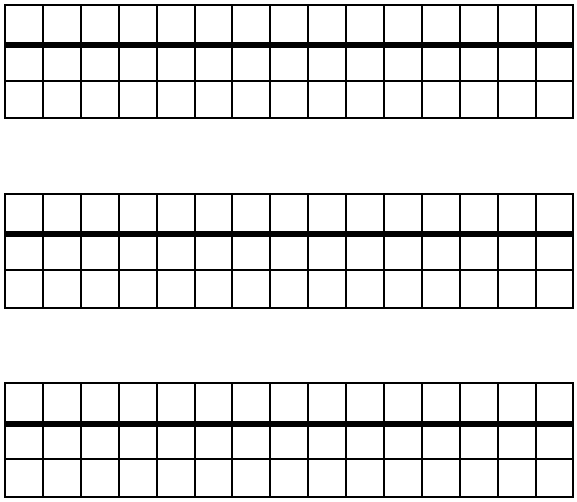
T = 2.4 5s = 3s

2.3 7s ReCounted in 4s

Sticks

G-counting	A-counting
unbundle *rebundle* *stack*	*unbundle* *rebundle* **B** *bundle-writing*
T = 4s Total	**T = 4s Total**

Abacus

G-mode	A-mode
	

Calculator

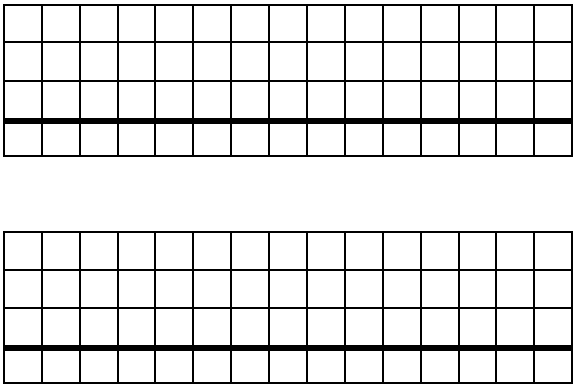
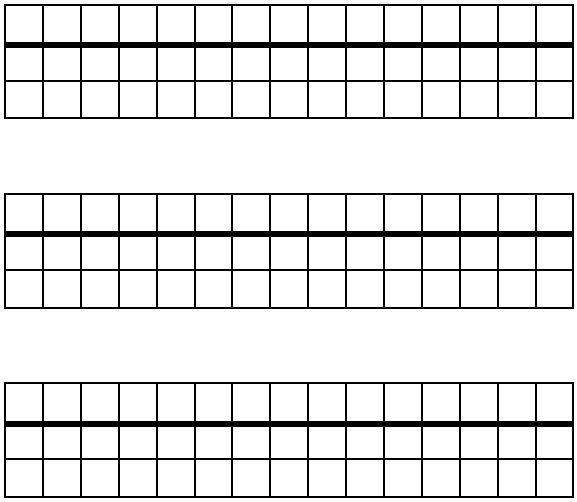
T = 2.3 7s = 4s

2.3 7s ReCounted in 5s

Sticks

G-counting	A-counting
unbundle *rebundle* *stack*	*unbundle* *rebundle* **B** *bundle-writing*
T = 5s Total	**T = 5s Total**

Abacus

G-mode	A-mode
	

Calculator

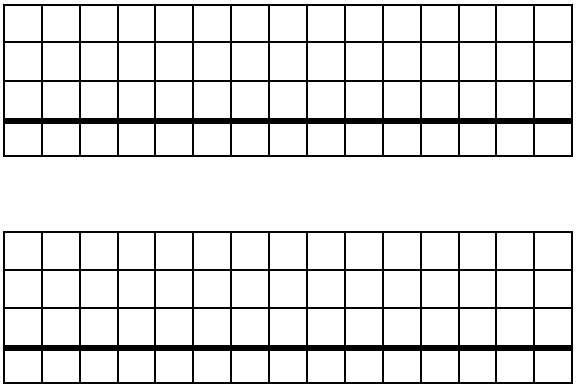
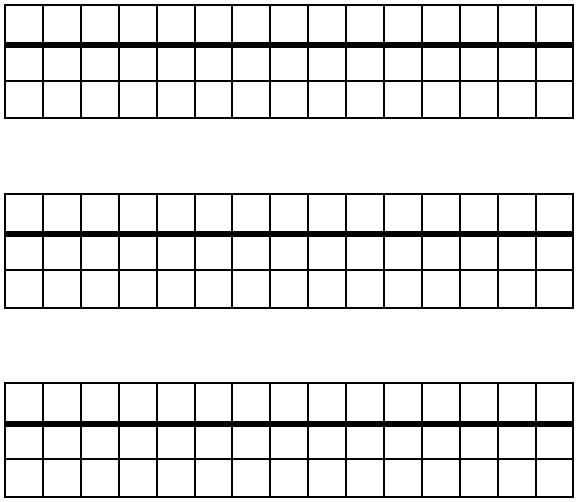
T = 2.3 7s = 5s

2.4 8s ReCounted in 6s

Sticks

G-counting	A-counting
unbundle *rebundle* *stack*	*unbundle* *rebundle* **B** *bundle-writing*
T = 6s Total	**T = 6s Total**

Abacus

G-mode	A-mode
	

Calculator

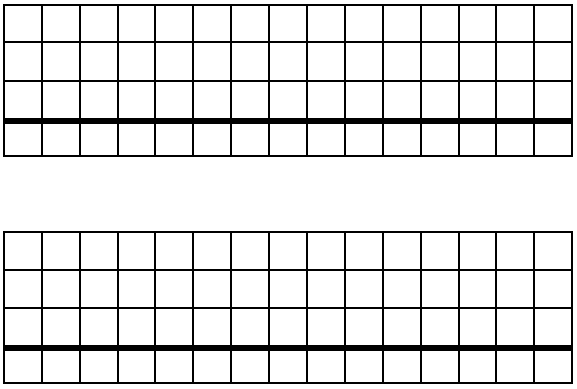
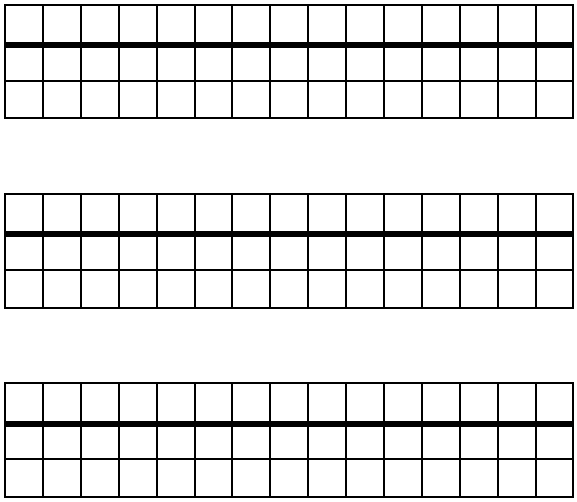
T = 2.4 8s = 6s

1.7 9s ReCounted in 5s

Sticks

G-counting	A-counting
unbundle *rebundle* *stack*	*unbundle* *rebundle* **B** *bundle-writing*
T = 5s Total	**T = 5s Total**

Abacus

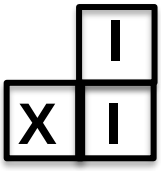
G-mode	A-mode
	

Calculator

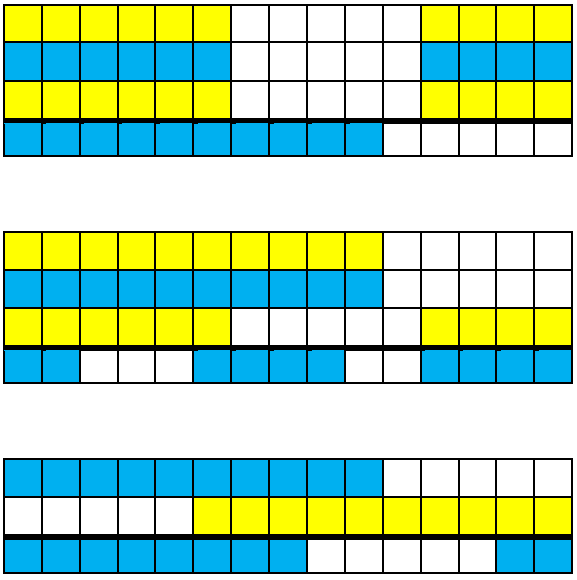
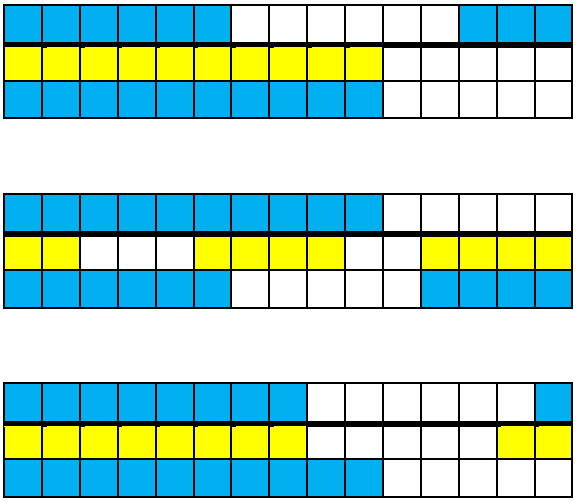
T = 1.7 9s = 5s

3 4s ReCounted in tens

Sticks

G-counting	A-counting
IIII IIII IIII *unbundle*	IIII IIII IIII *unbundle*
~~IIIIIIIII~~ I I *rebundle*	~~IIIIIIIII~~ I I *rebundle*
 *stack*	**1B2** *bundle-writing*
T = 1.2 tens Total	**T = 1.2 tens Total**

Abacus

G-mode	A-mode
	

Calculator

3x4	12

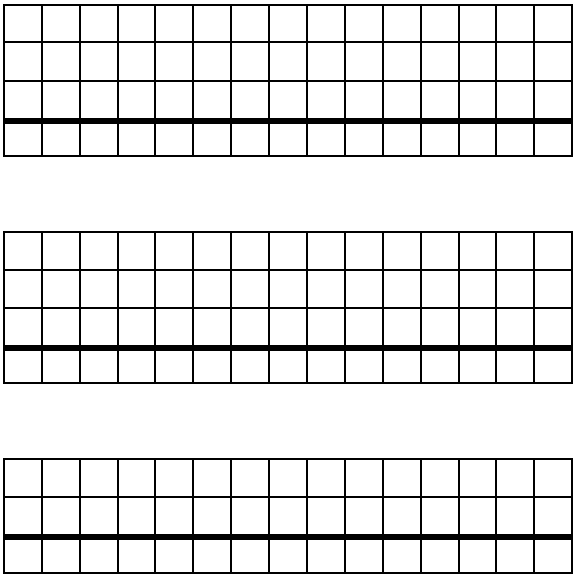
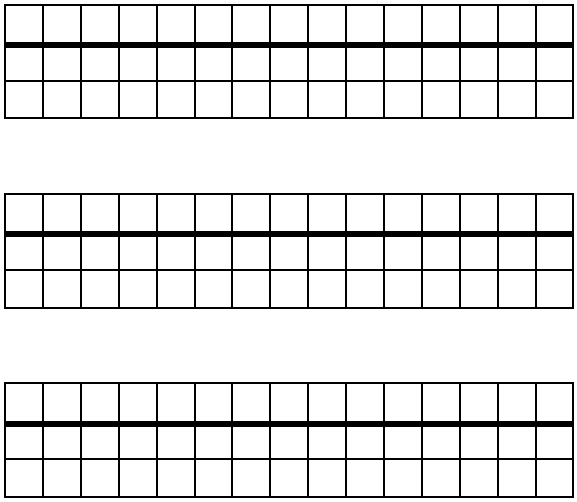
T = 3 4s = 1.2 tens = 12

7 4s ReCounted in tens

Sticks

G-counting	A-counting
unbundle *rebundle* *stack*	*unbundle* *rebundle* **B** *bundle-writing*
T = tens Total	**T = tens Total**

Abacus

G-mode	A-mode
	

Calculator

7x4

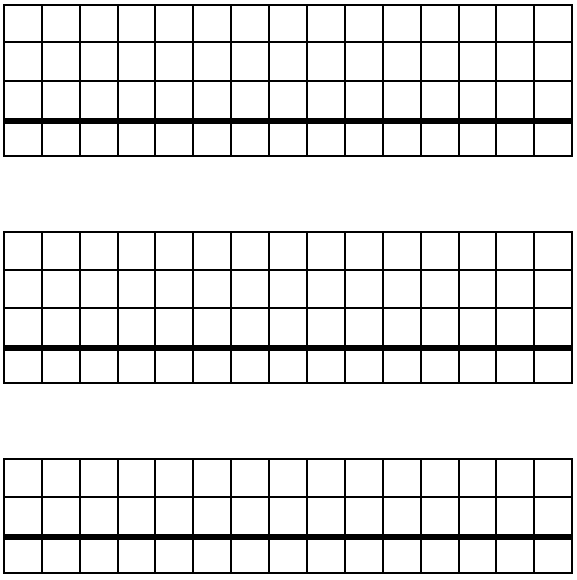
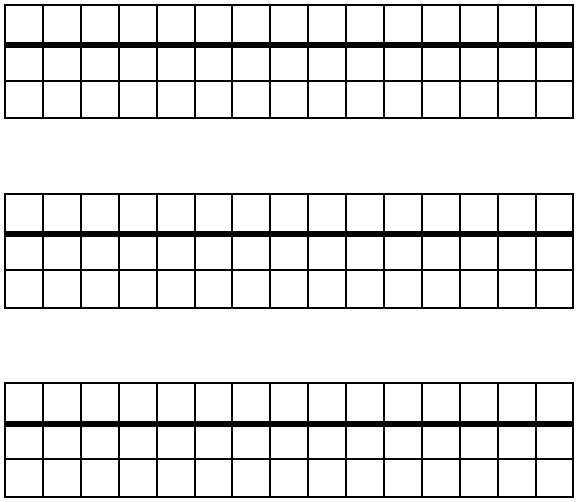
T =

4 7s ReCounted in tens

Sticks

G-counting	A-counting
unbundle *rebundle* *stack*	*unbundle* *rebundle* **B** *bundle-writing*
T = tens Total	**T = tens Total**

Abacus

G-mode	A-mode
	

Calculator

7x4

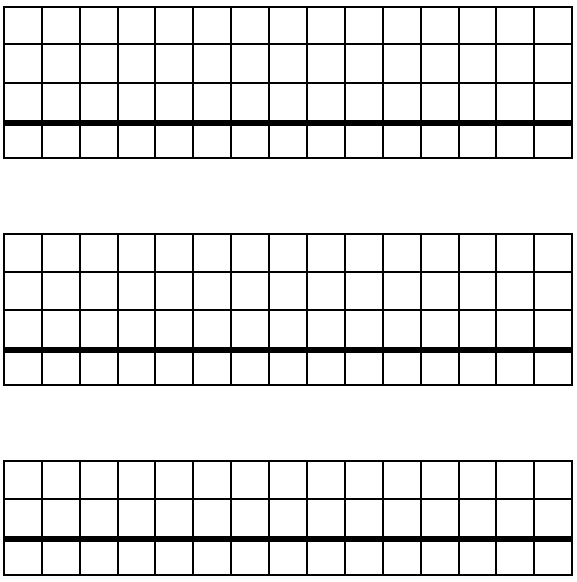
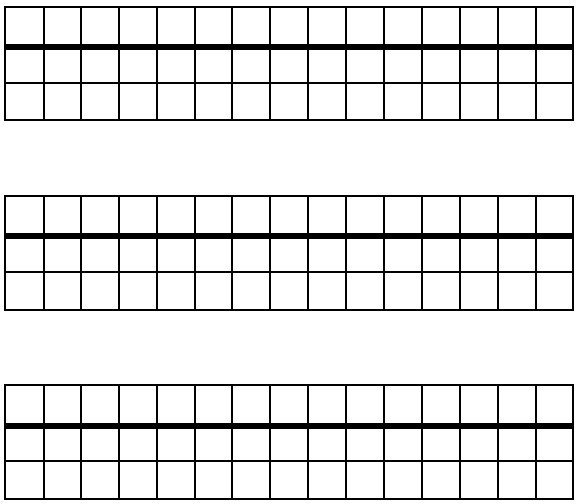
T =

3 8s ReCounted in tens

Sticks

G-counting	A-counting
unbundle *rebundle* *stack*	*unbundle* *rebundle* **B** *bundle-writing*
T = tens Total	**T = tens Total**

Abacus

G-mode	A-mode
	

Calculator

7x4

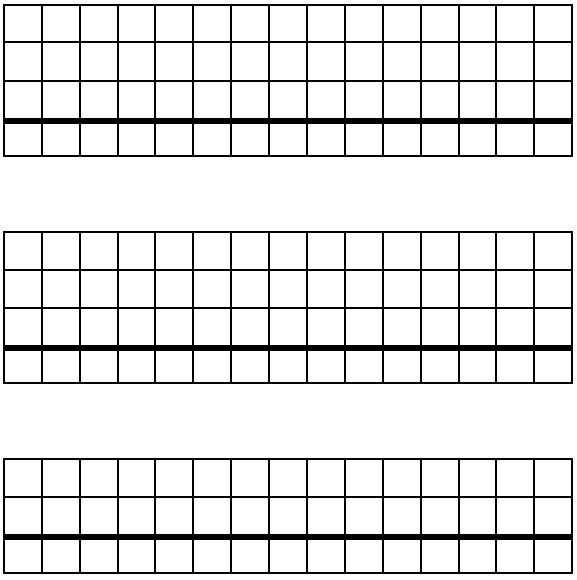
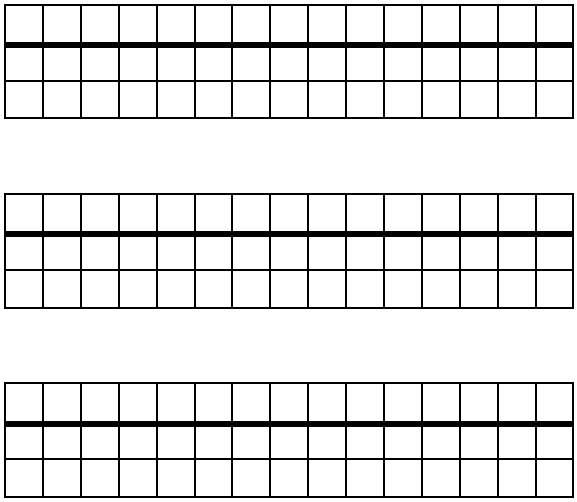
T =

2 4s ReCounted in tens

Sticks

G-counting	A-counting
unbundle *rebundle* *stack*	*unbundle* *rebundle* **B** *bundle-writing*
T = **tens** **Total**	**T =** **tens** **Total**

Abacus

G-mode	A-mode
	

Calculator

7x4

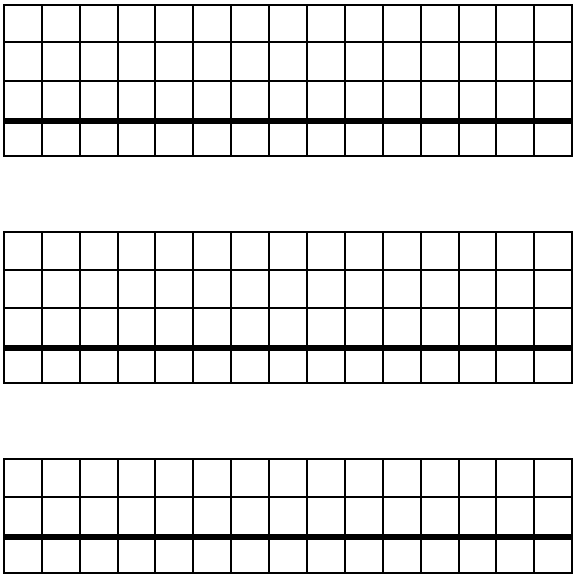
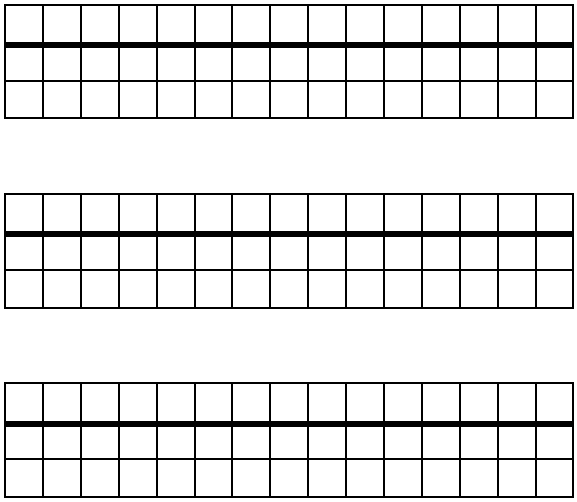
T =

2 9s ReCounted in tens

Sticks

G-counting	A-counting
unbundle *rebundle* *stack*	*unbundle* *rebundle* **B** *bundle-writing*
T = tens Total	**T = tens Total**

Abacus

G-mode	A-mode
	

Calculator

7x4

T =

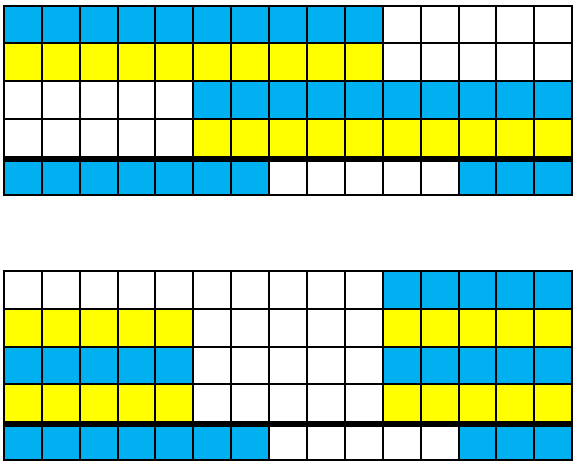
2.3 tens ReCounted in 5s

Sticks

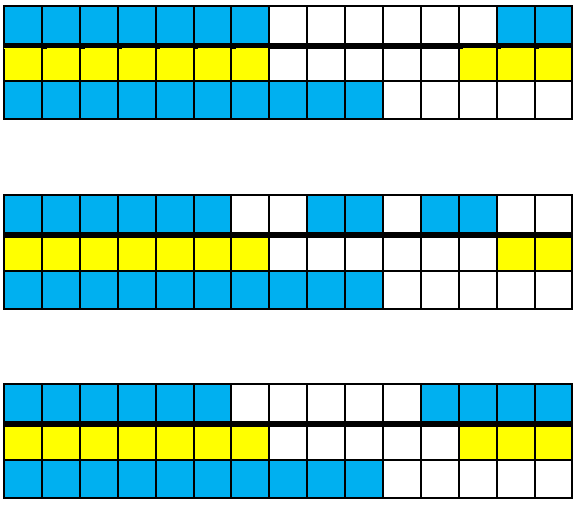
G-counting		A-counting	
X X I I I	*unbundle*	X X I I I	*unbundle*
V V V V I I I	*rebundle*	V V V V I I I	*rebundle*
V V I V I V I	*stack*	4B3	*bundle-writing*
T = 4.3 5s	Total	T = 4.3 5s	Total

Abacus

G-mode



A-mode



Calculator

23/5	4.some
23 – 4x5	3

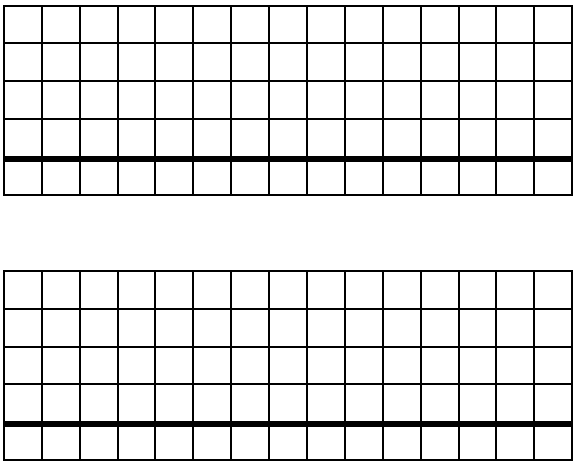
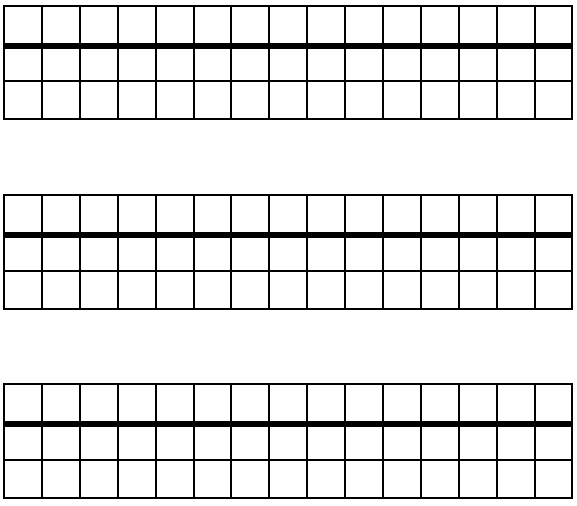
T = 23 = 2.3 tens = 4.3 5s = 4 3/5 5s

2.3 tens ReCounted in 7s

Sticks

G-counting	A-counting
unbundle *rebundle* *stack*	*unbundle* *rebundle* **B** *bundle-writing*
T = **Total**	**T =** **Total**

Abacus

G-mode	A-mode
	

Calculator

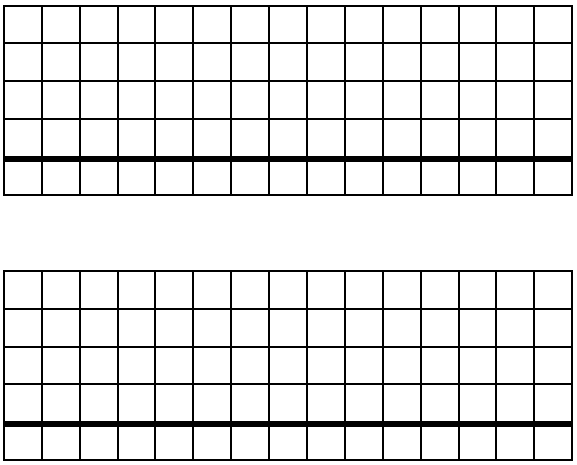
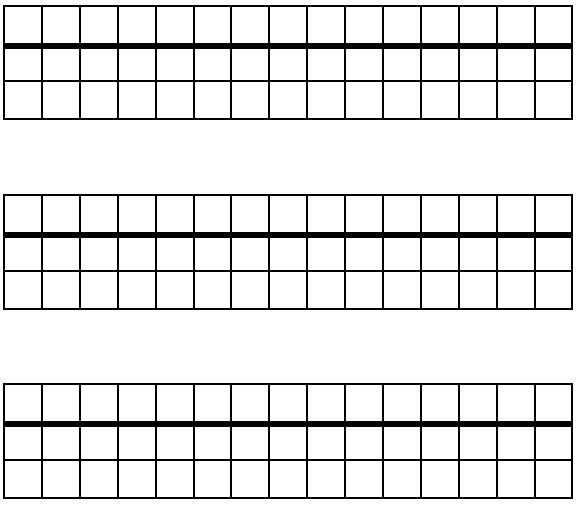
T =

3.5 tens ReCounted in 9s

Sticks

G-counting	A-counting
unbundle *rebundle* *stack*	*unbundle* *rebundle* **B** *bundle-writing*
T = **Total**	**T =** **Total**

Abacus

G-mode	A-mode
	

Calculator

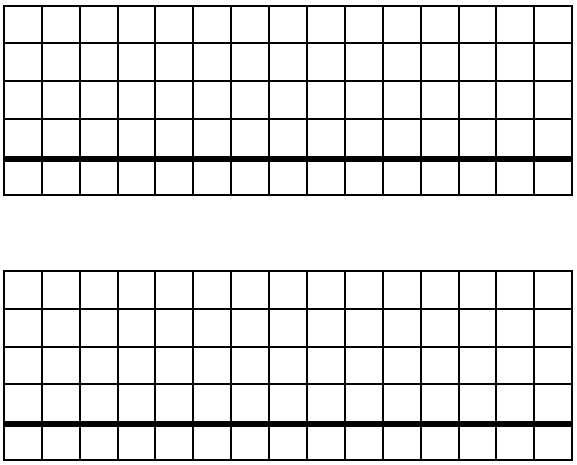
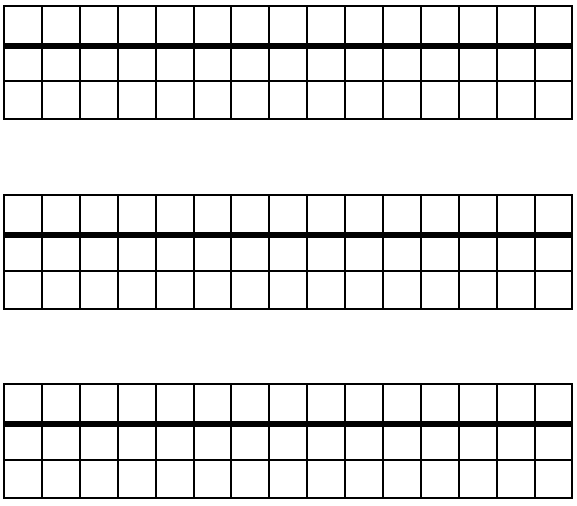
T =

1.9 tens ReCounted in 3s

Sticks

G-counting	A-counting
unbundle *rebundle* *stack*	*unbundle* *rebundle* **B** *bundle-writing*
T = **Total**	**T =** **Total**

Abacus

G-mode	A-mode
	

Calculator

T =

M5

OnTop Addition

Mathematics as MANYmatics

A Natural Science about Many

Material for

MicroCurriculum 5

Allan.Tarp

@MATHeCADEMY.net

Curricula

Micro-curriculum 1. Creating Icon-numbers

Micro-curriculum 2. Counting in Bundles

Micro-curriculum 3. Re-counting Bundle-numbers in the Same Bundle

Micro-curriculum 4. Re-counting Bundle-numbers in a Different Bundle

Micro-curriculum 5. Adding Bundle-numbers OnTop

Micro-curriculum 6. Adding Bundle-numbers NextTo

Micro-curriculum 7. Reversing Adding Bundle-numbers OnTop

Micro-curriculum 8. Reversing Adding Bundle-numbers NextTo

Preface

M5, OnTop Addition, is the fifth of 8 micro-curricula in mathematics for preschool and home schooling. They present mathematics as MANYmatics, a natural science about the physical fact Many. They all build upon the following observation:

”How old will you be next time?” I asked the child. “Four”, he answered and showed me four fingers. “Four, you said?” I asked and showed him four fingers held together two by two. “No, that is not four, that is two twos!” the child replied thus insisting upon what exists, bundles of twos, and two of them. Likewise, preschool children have no difficulties counting in other units than ten, even if they only learn how to count in tens.

The micro-curricula use activities with concrete material to obtain its learning goals in accordance with Piaget’s principle ‘greifen vor begrifen’ (grasp to grasp).

In the first, children learn to use sticks to build the number icons up to nine, and to use strokes to draw them, thus realizing there are as many sticks and strokes in the icon as the number it represents, if written less sloppy. In the second, children learn to count a given total in icons manually, using an abacus and by using a calculator. In the third, children learn to recount a total in the same unit. In the fourth, children learn to recount a total in a different unit. In the fifth, children learn to add two bundle-numbers on top of each other. In the sixth, children learn to add two bundle-numbers next to each other. In the seventh, children learn to reverse on-top addition. And in the eights, children learn to reverse next-to addition

As to concrete material, anything goes in the first micro-curriculum. The others will use sticks and strokes, beads on an abacus, LEGO-like blocks and squares, and a calculator respecting the priority of the operations. Fingers, pegs on a pegboard and other concrete material might also be used.

Some of the curricula can use silent education where the instructor is allowed to demonstrate and guide through actions, but not through words; or by using words form a foreign language not understood by the child.

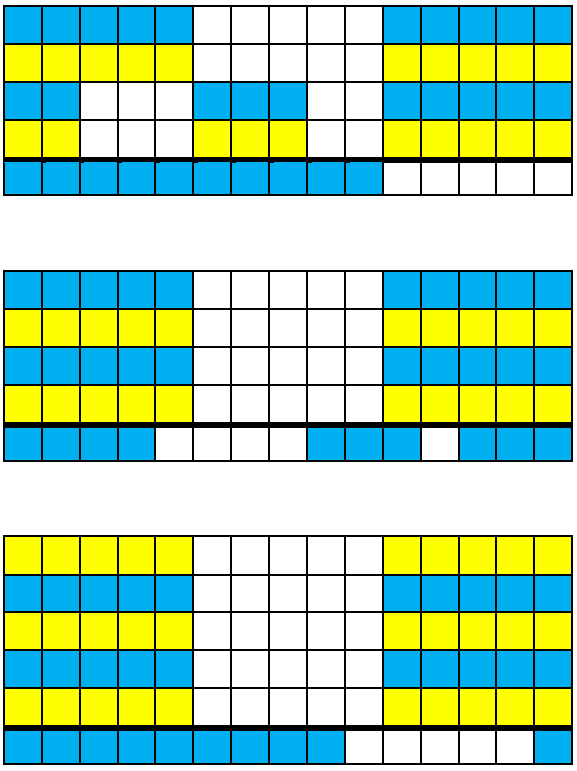
G stands for Geometry and A stands for Algebra.

2 3s + 4 5s = ? 5s

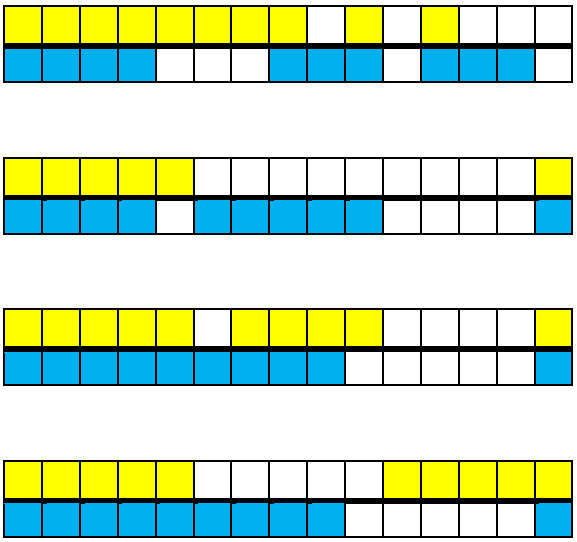
ReCounting	Bundle-writing
III III *unbundle*	T = 2 3s + 4 5s
~~IIII~~ I *rebundle*	T = 1.1 5s + 4 5s
	T = 1B1 + 4B = 5B1
T = 2 3s = 1.1 5s	T = 5.1 5s

Abacus

G-mode



A-mode



Calculator

(2x3+4x5)/5	5.some
(2x3+4x5) – 5x5	1

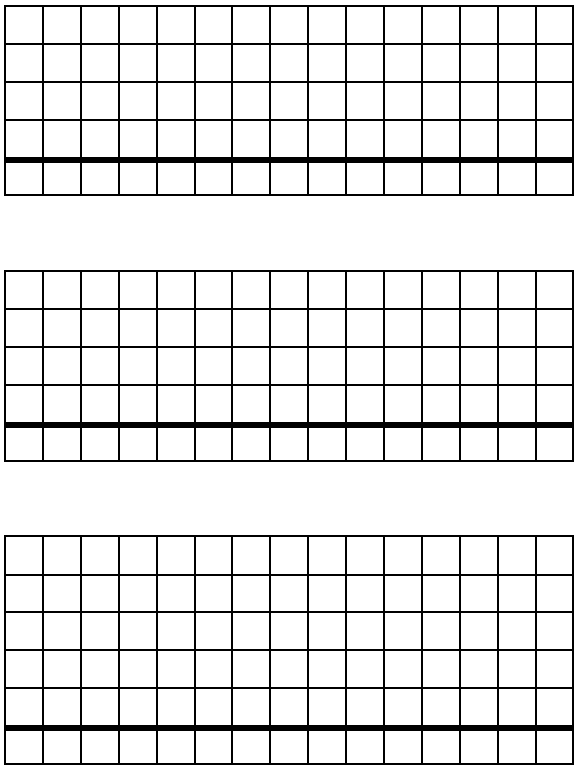
T = 2 3s + 4 5s = 5.1 5s

3 2s + 4 5s = ?5s

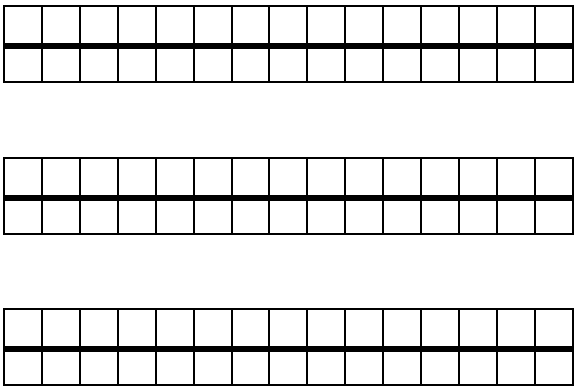
ReCounting	Bundle-writing
unbundle *rebundle* **T = 3 2s = 5s**	**T = 3 2s + 4 5s** **T =**

Abacus

G-mode



A-mode



Calculator

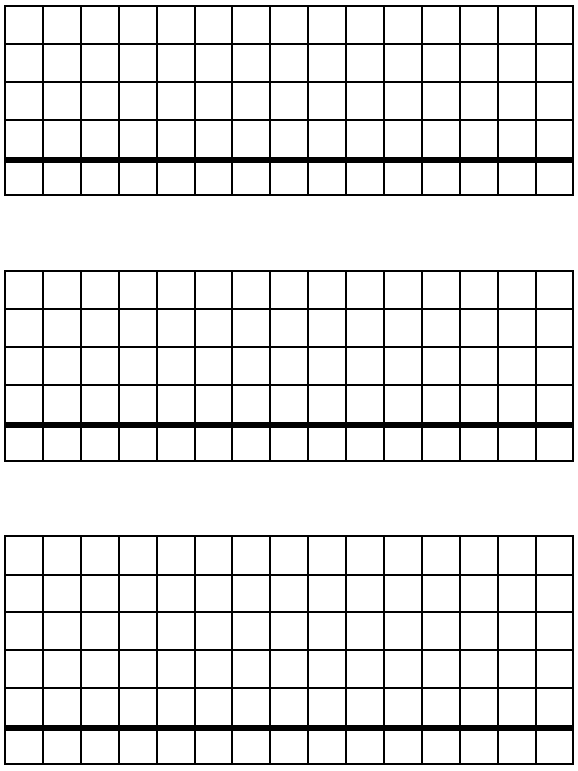
T = 3 2s + 4 5s = 5s

2 3s + 5 4s = ? 4s

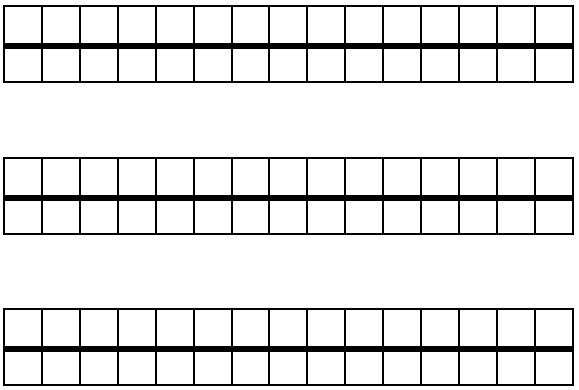
ReCounting	Bundle-writing
unbundle *rebundle* **T = 2 3s = 4s**	**T = 2 3s + 5 4s** **T =**

Abacus

G-mode



A-mode



Calculator

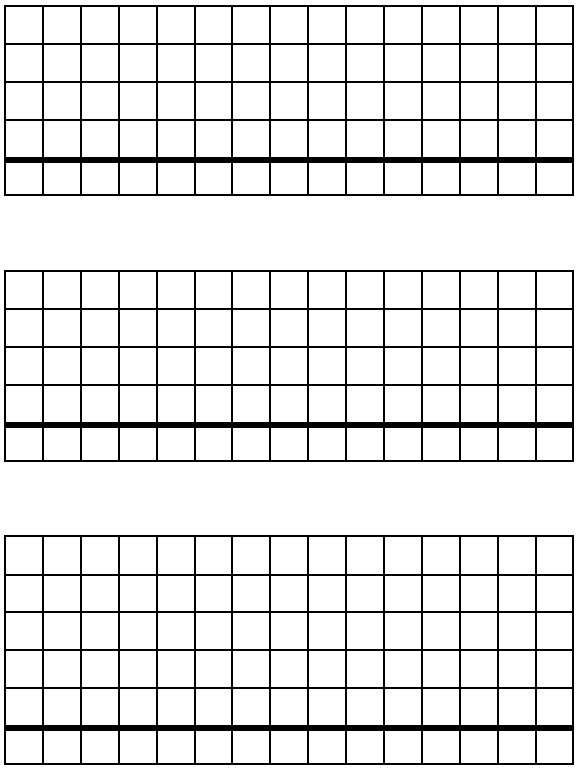
T =

3 2s + 5 4s = ? 4s

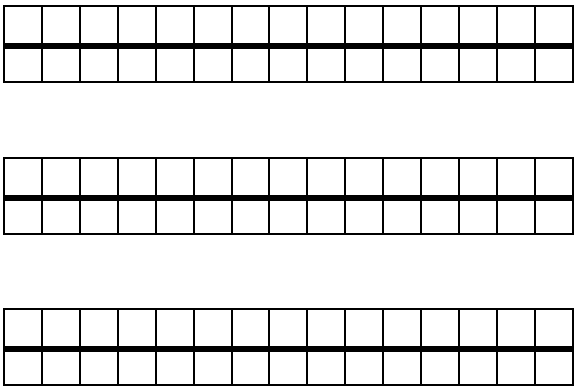
ReCounting	Bundle-writing
unbundle *rebundle* **T = 3 2s = 4s**	**T = 3 2s + 5 4s** **T =**

Abacus

G-mode



A-mode



Calculator

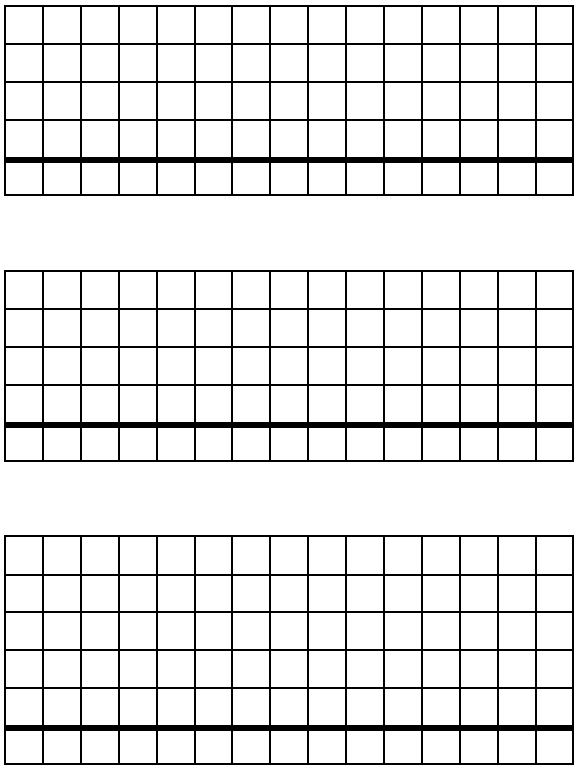
T =

4 3s + 6 5s = ? 5s

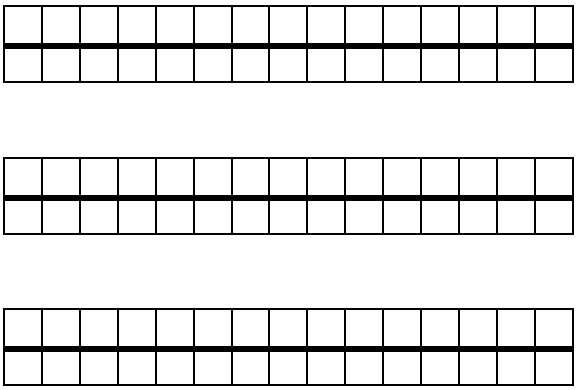
ReCounting	Bundle-writing
unbundle *rebundle*	**T =**

Abacus

G-mode



A-mode



Calculator

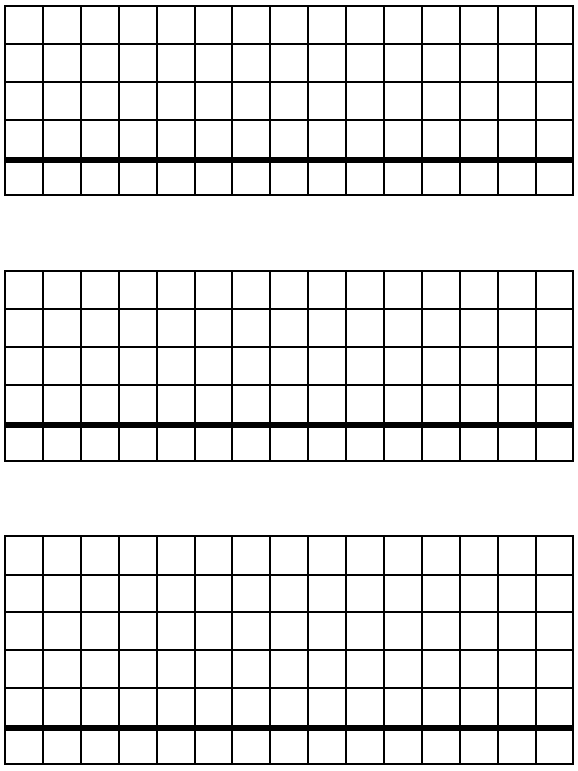
T =

3 4s + 2 5s = ? 4s

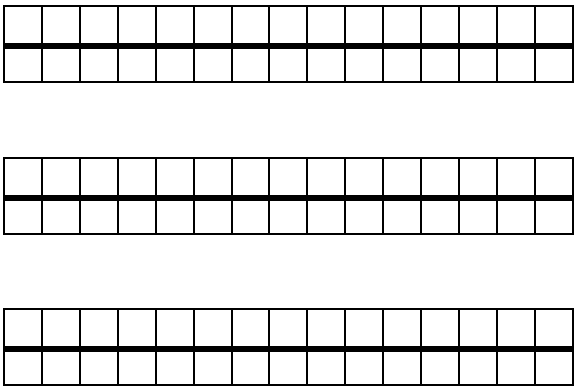
ReCounting	Bundle-writing
unbundle	**T =**
rebundle	**T =**
T =	

Abacus

G-mode



A-mode



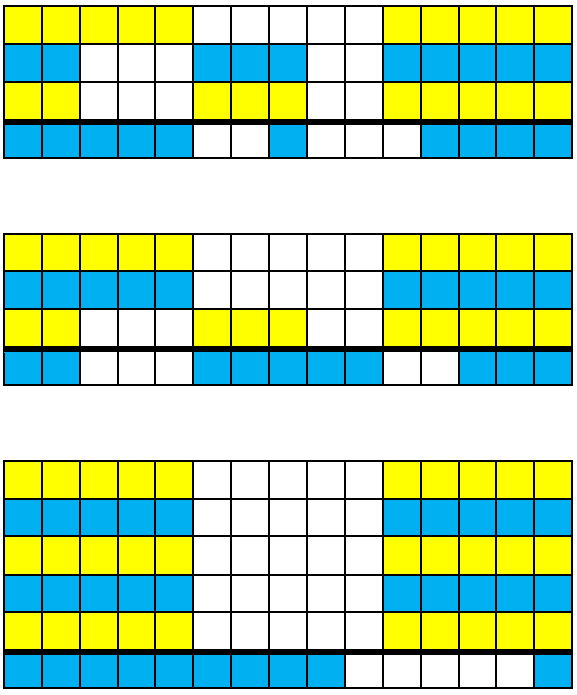
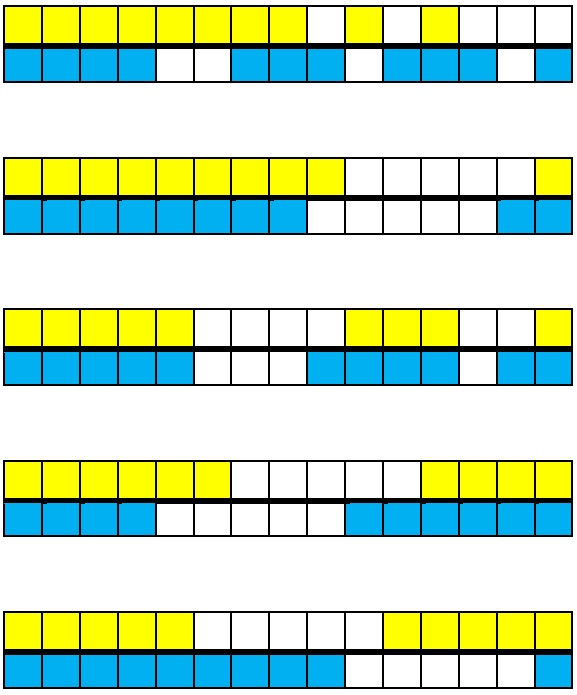
Calculator

T =

2.1 3s + 3.4 5s = ? 5s

ReCounting		Bundle-writing
III III I	*unbundle*	T = 2.1 3s + 3.4 5s
~~IIII~~ I I	*rebundle*	T = 1.2 5s + 3.4 5s
		T = 1B2 + 3B4 = 4B6
T = 2.1 3s = 1.2 5s		T = 4.6 5s = 5.1 5s

Abacus

G-mode	A-mode
	

Calculator

(2x3+1+3x5+4)/5	5.some
(2x3+1+3x5+4) – 5x5	1

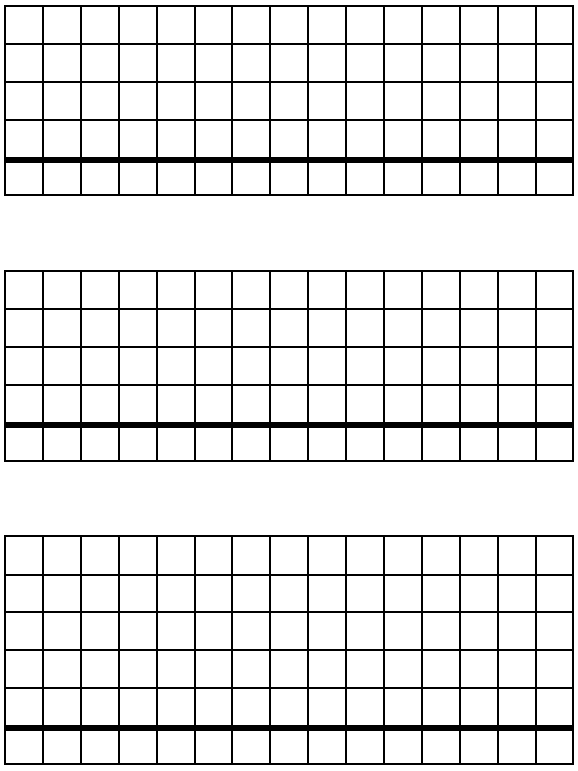
T = 2.1 3s + 3.4 5s = 5.1 5s

4.2 3s + 3.2 5s = ? 5s

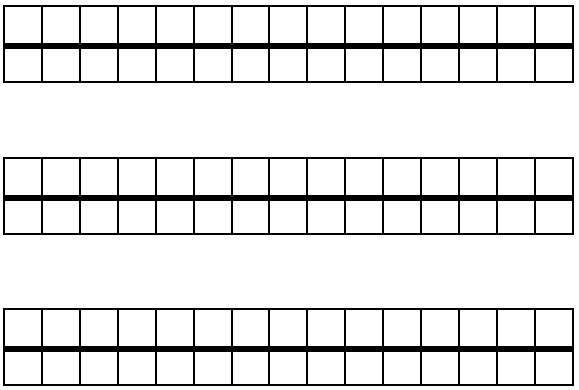
ReCounting	Bundle-writing
unbundle	**T =**
rebundle	**T =**
T =	

Abacus

G-mode



A-mode



Calculator

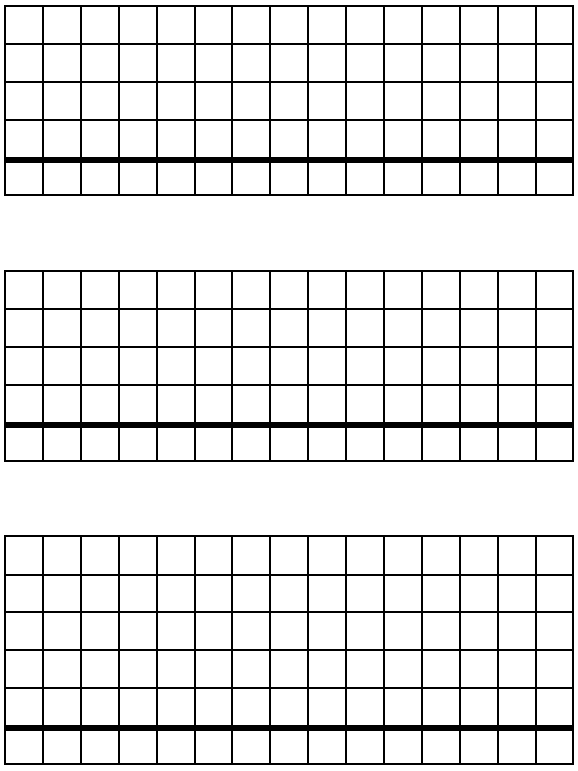
T =

2.1 3s + 3.2 4s = ? 4s

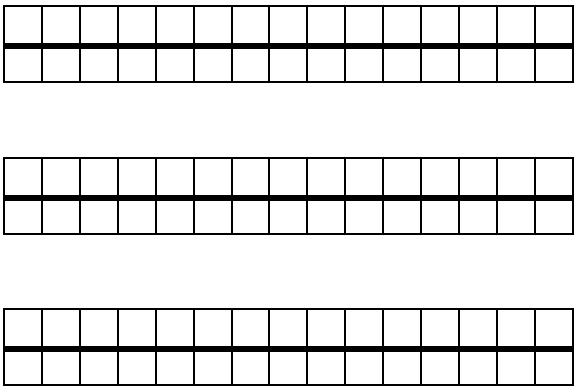
ReCounting	Bundle-writing
unbundle	**T =**
rebundle	**T =**
T =	

Abacus

G-mode



A-mode



Calculator

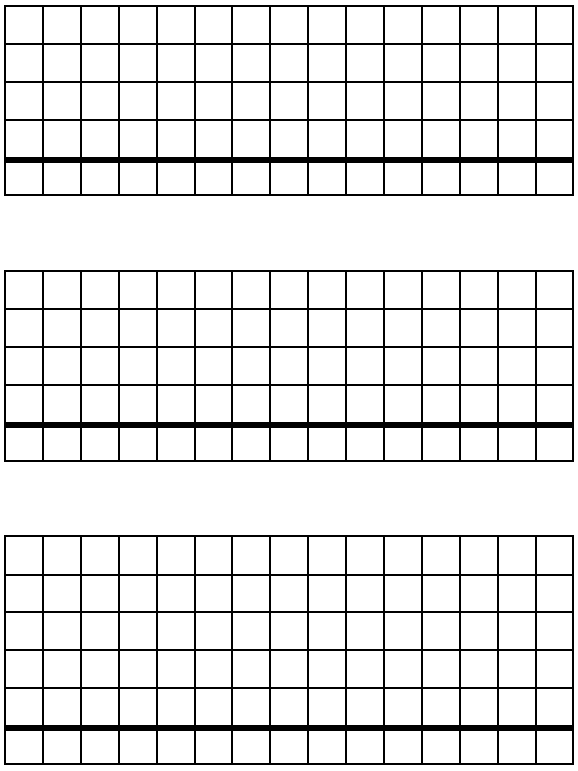
T =

2.2 3s + 3.1 4s = ? 3s

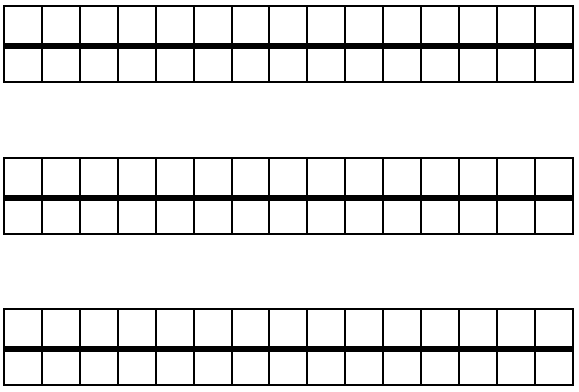
ReCounting	Bundle-writing
unbundle	**T =**
rebundle	**T =**
T =	

Abacus

G-mode



A-mode



Calculator

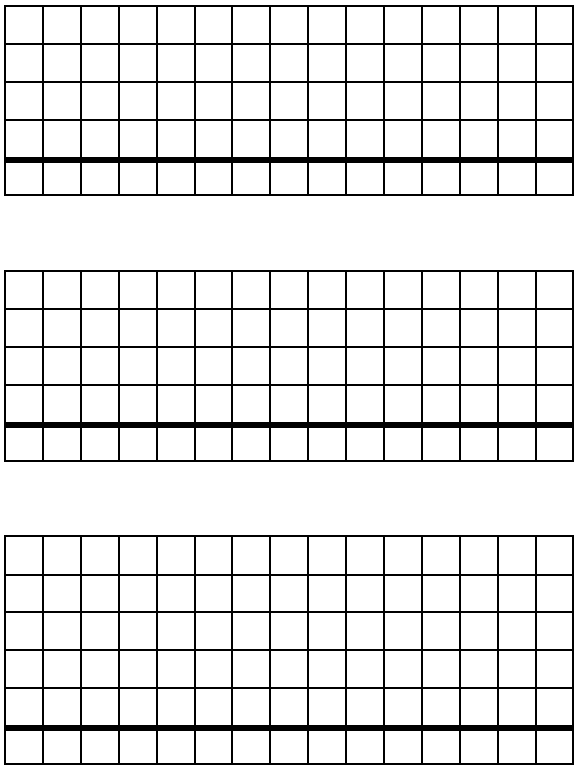
T =

2.1 4s + 3.4 5s = ? 5s

ReCounting	Bundle-writing
unbundle	**T =**
rebundle	**T =**
T =	

Abacus

G-mode



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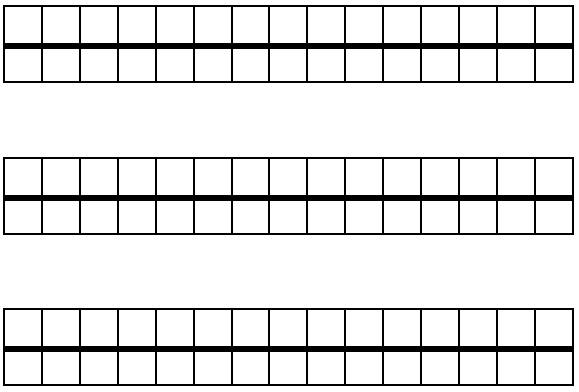


Calculator

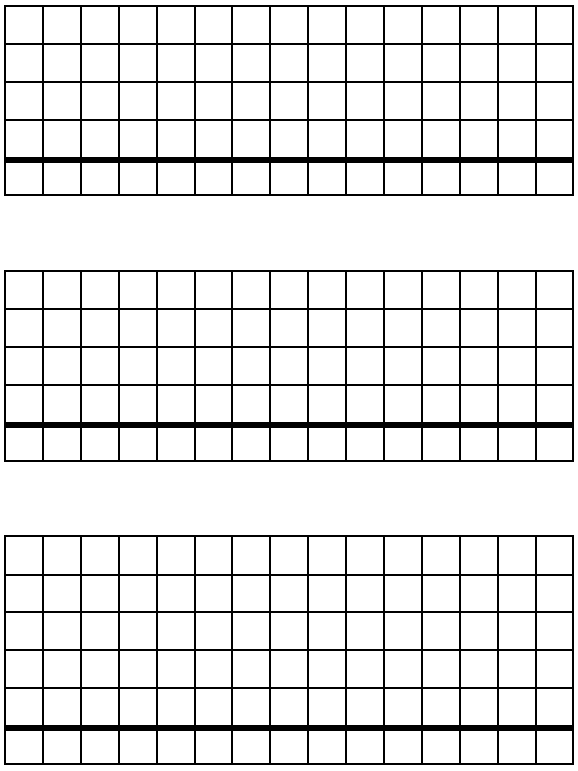
T =

1.3 4s + 3.4 5s = ? 4s

ReCounting	Bundle-writing
unbundle	**T =**
rebundle	**T =**
T =	

Abacus

G-mode



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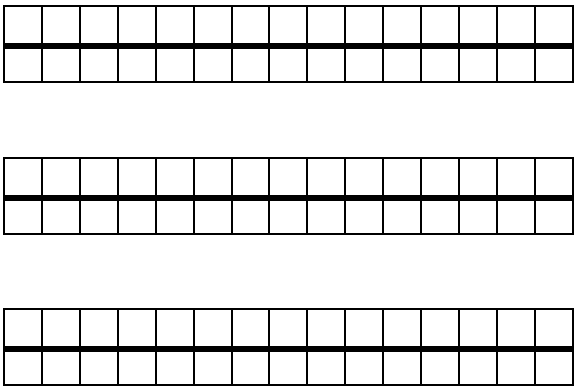


Calculator

T =

M6

NextTo Addition

Mathematics as MANYmatics

A Natural Science about Many

Material for

MicroCurriculum 6

Allan.Tarp

@MATHeCADEMY.net

Curricula

Micro-curriculum 1. Creating Icon-numbers

Micro-curriculum 2. Counting in Bundles

Micro-curriculum 3. Re-counting Bundle-numbers in the Same Bundle

Micro-curriculum 4. Re-counting Bundle-numbers in a Different Bundle

Micro-curriculum 5. Adding Bundle-numbers OnTop

Micro-curriculum 6. Adding Bundle-numbers NextTo

Micro-curriculum 7. Reversing Adding Bundle-numbers OnTop

Micro-curriculum 8. Reversing Adding Bundle-numbers NextTo

Preface

M6, OnTop Addition, is the sixth of 8 micro-curricula in mathematics for preschool and home schooling. They present mathematics as MANYmatics, a natural science about the physical fact Many. They all build upon the following observation:

”How old will you be next time?” I asked the child. “Four”, he answered and showed me four fingers. “Four, you said?” I asked and showed him four fingers held together two by two. “No, that is not four, that is two twos!” the child replied thus insisting upon what exists, bundles of twos, and two of them. Likewise, preschool children have no difficulties counting in other units than ten, even if they only learn how to count in tens.

The micro-curricula use activities with concrete material to obtain its learning goals in accordance with Piaget’s principle ‘greifen vor begrifen’ (grasp to grasp).

In the first, children learn to use sticks to build the number icons up to nine, and to use strokes to draw them, thus realizing there are as many sticks and strokes in the icon as the number it represents, if written less sloppy. In the second, children learn to count a given total in icons manually, using an abacus and by using a calculator. In the third, children learn to recount a total in the same unit. In the fourth, children learn to recount a total in a different unit. In the fifth, children learn to add two bundle-numbers on top of each other. In the sixth, children learn to add two bundle-numbers next to each other. In the seventh, children learn to reverse on-top addition. And in the eights, children learn to reverse next-to addition

As to concrete material, anything goes in the first micro-curriculum. The others will use sticks and strokes, beads on an abacus, LEGO-like blocks and squares, and a calculator respecting the priority of the operations. Fingers, pegs on a pegboard and other concrete material might also be used.

Some of the curricula can use silent education where the instructor is allowed to demonstrate and guide through actions, but not through words; or by using words form a foreign language not understood by the child.

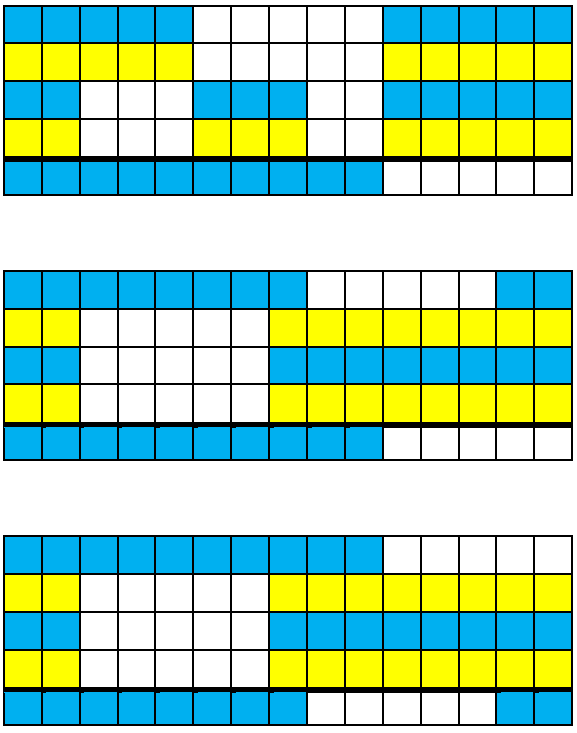
G stands for Geometry and A stands for Algebra.

2 3s + 4 5s = ? 8s

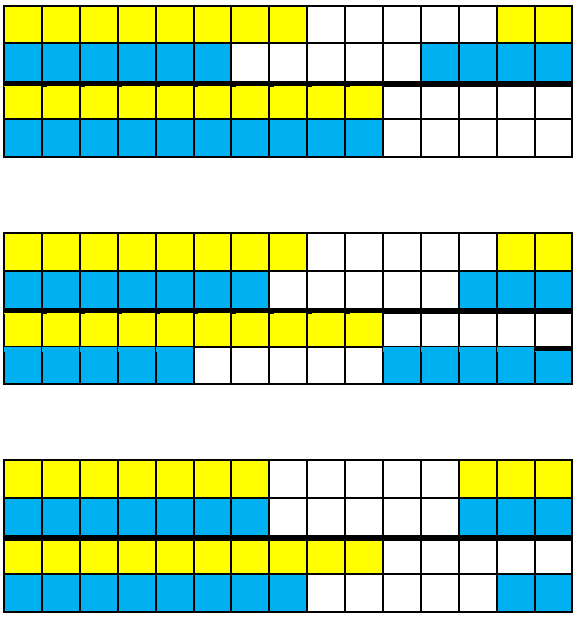
G-counting	Coding
III III + IIIII IIIII IIIII IIIII IIIIIIIIIIIIIIIIIIIIIIII IIIIIIII IIIIIIII IIIIIIII II	CC SSSS, CII = S CC SSSC II ~~SC SC SC~~ II *bundle*
T = 3.2 8s	T = 3.2 8s

Abacus

G-mode



A-mode



Calculator

(2x3 + 4x5)/8	3.some
(2x3 + 4x5) – 3x8	2

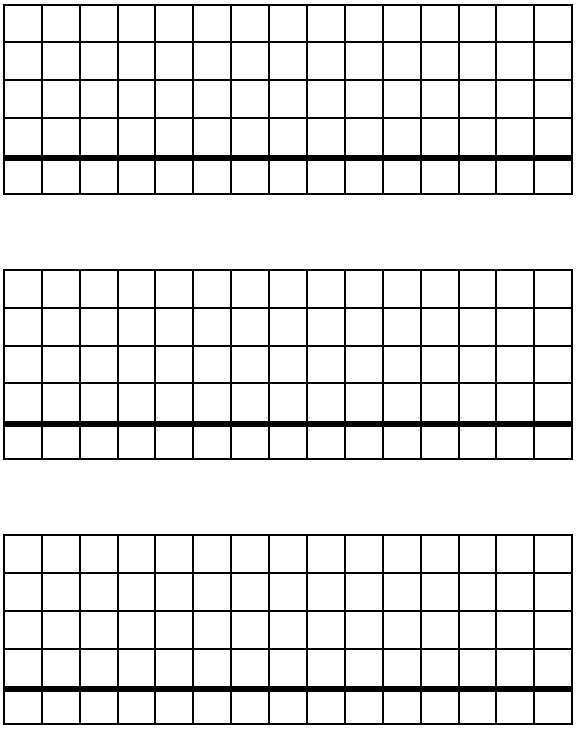
T = 2 3s + 4 5s = 3.2 8s

3 2s + 4 5s = ? 7s

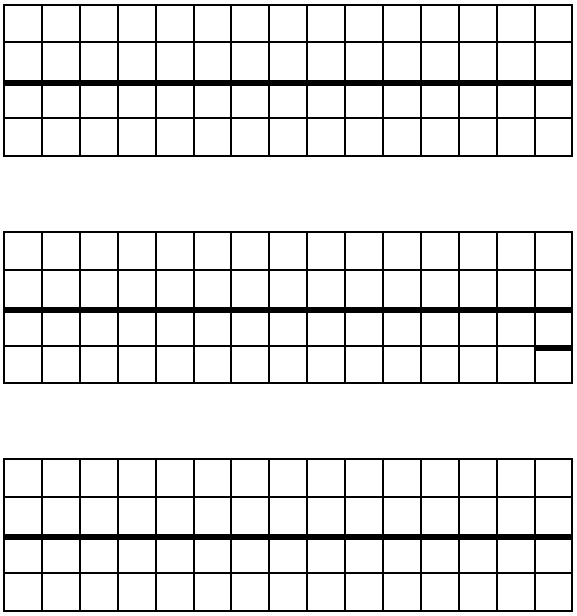
G-counting	Coding

Abacus

G-mode



A-mode



Calculator

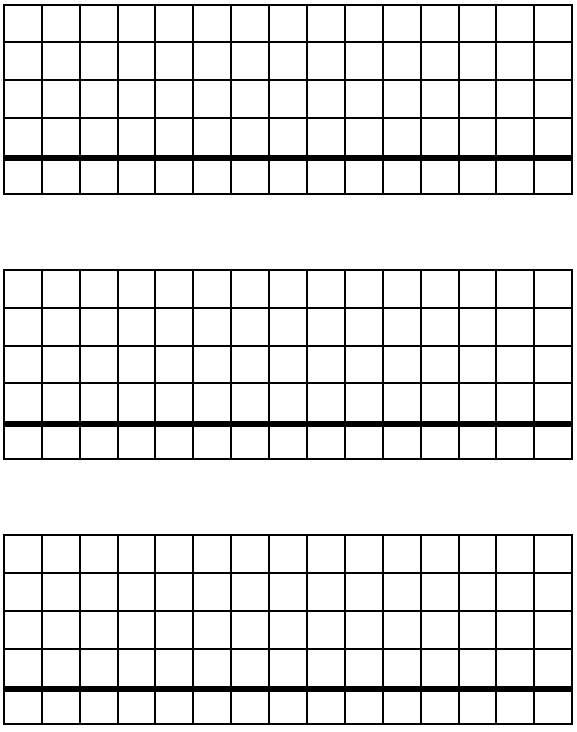
T =

2 3s + 5 4s = ? 7s

G-counting	Coding

Abacus

G-mode



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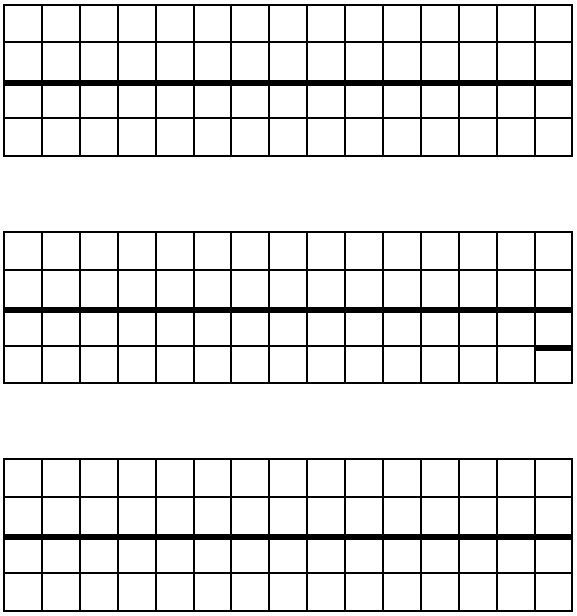


Calculator

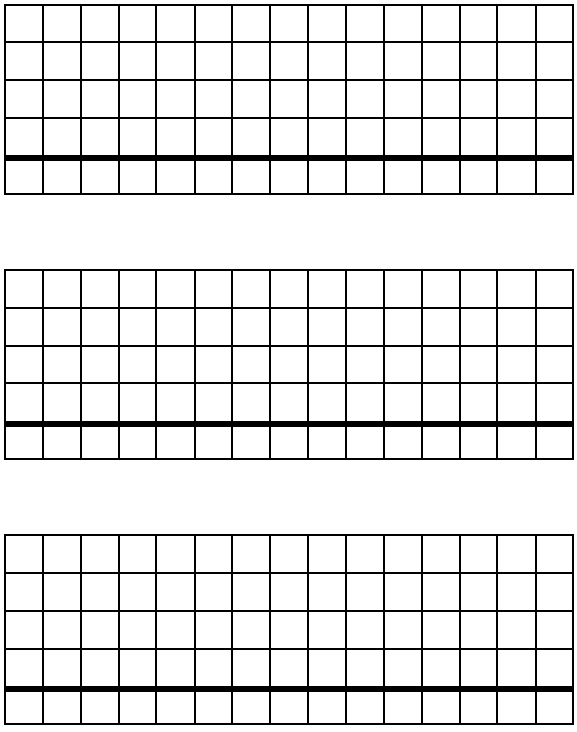
T =

3 2s + 5 4s = ? 6s

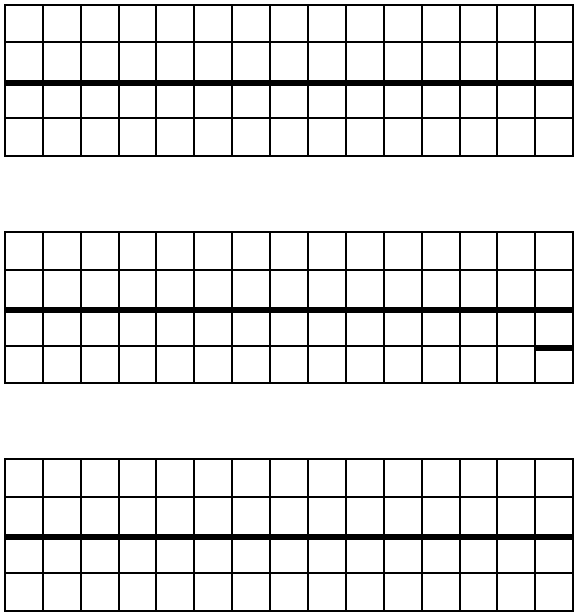
G-counting	Coding

Abacus

G-mode



A-mode



Calculator

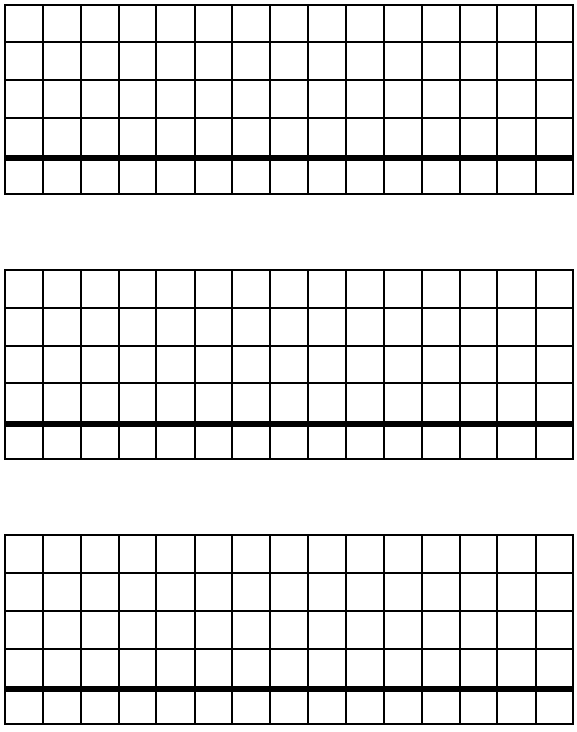
T =

4 3s + 6 5s = ? 8s

G-counting	Coding

Abacus

G-mode



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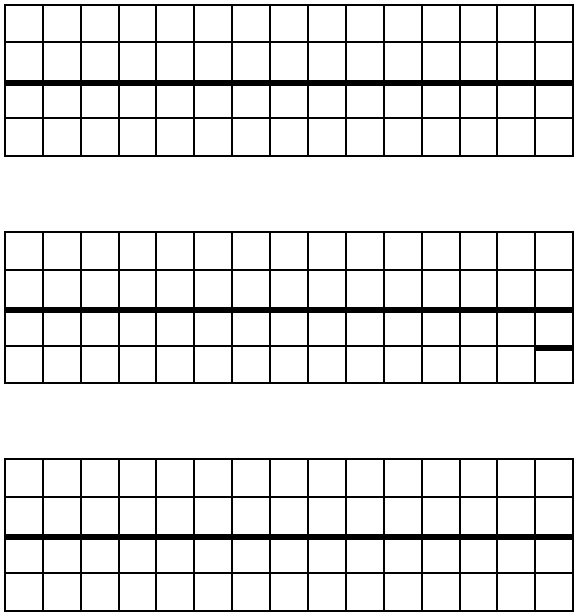


Calculator

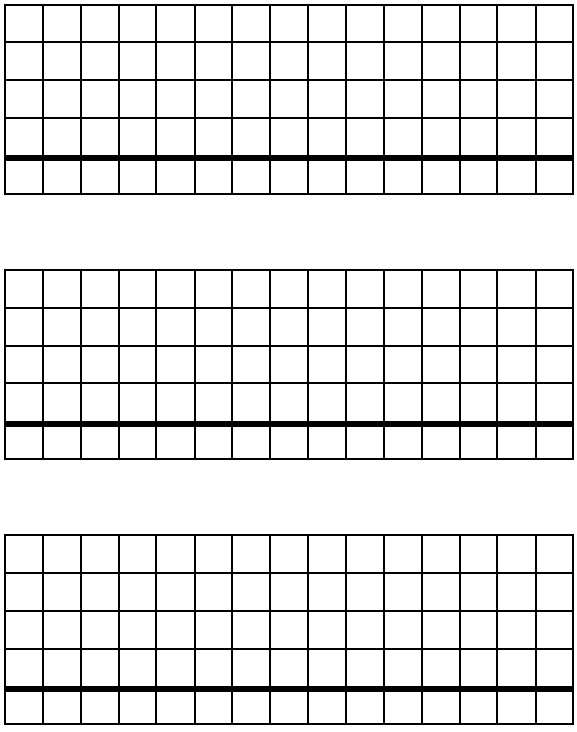
T =

3 4s + 2 5s = ? 9s

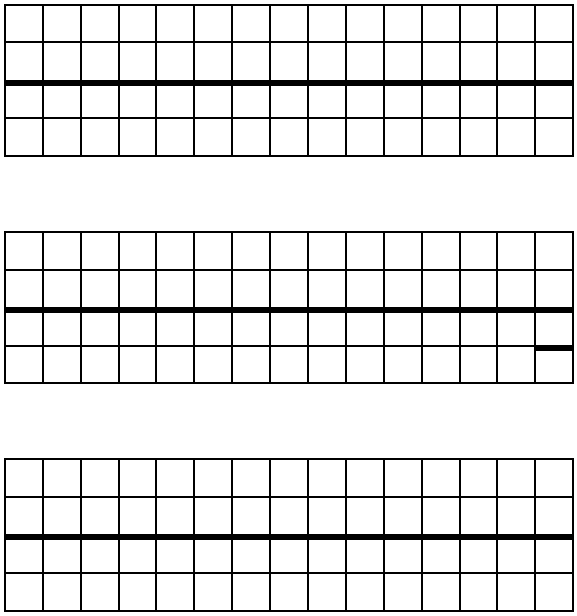
G-counting	Coding

Abacus

G-mode



A-mode



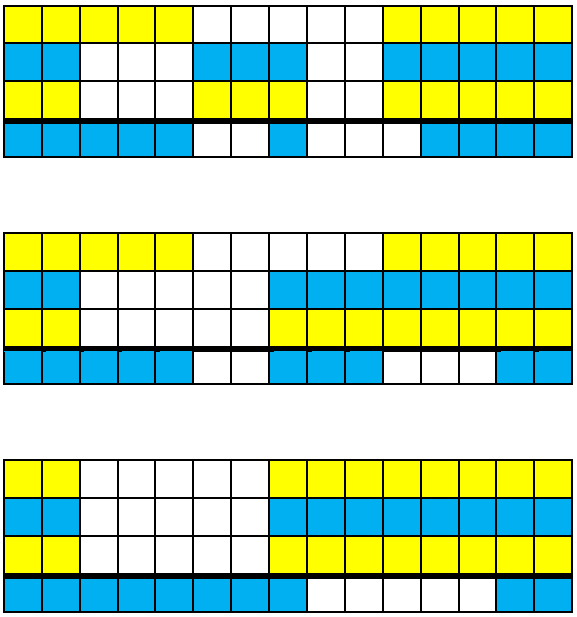
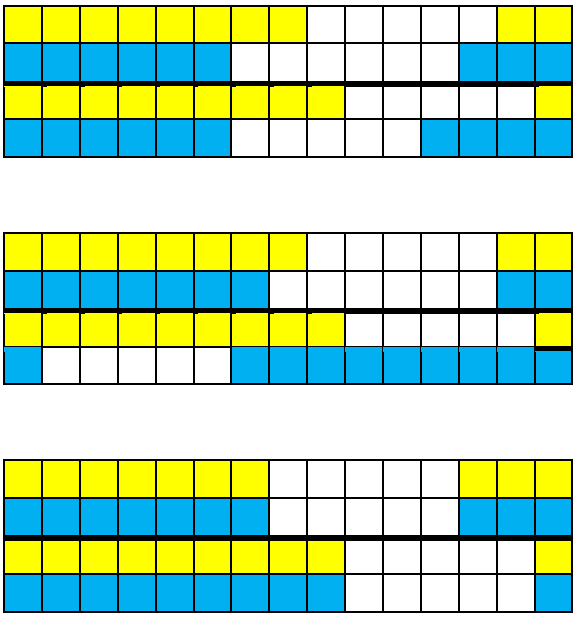
Calculator

T =

2.1 3s + 3.4 5s = ? 8s

G-counting	Coding
III III I + IIIII IIIII IIIII IIII IIIIIIIIIIIIIIIIIIIIIII IIIIIIII IIIIIIII IIIIIIII II	CC I SSS IIII, CII = S CC I SS 8 I ~~SC~~ ~~SC~~ 8 II *bundle*
2.1 3s + 3.4 5s = 3.2 8s	2.1 3s + 3.4 5s = 3.2 8s

Abacus

G-mode	A-mode
	

Calculator

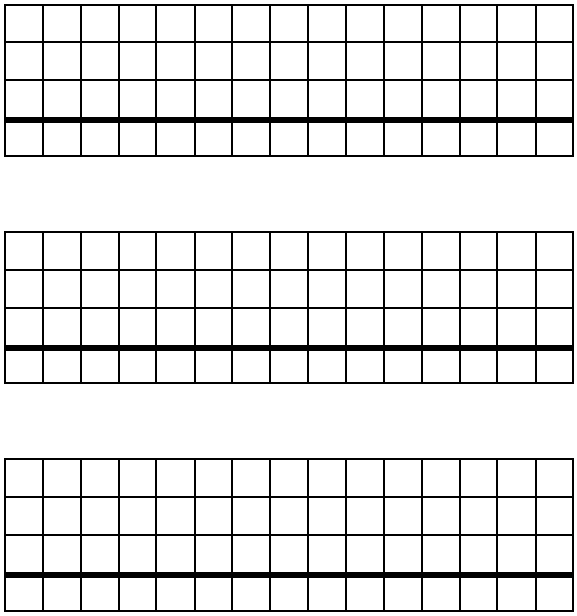
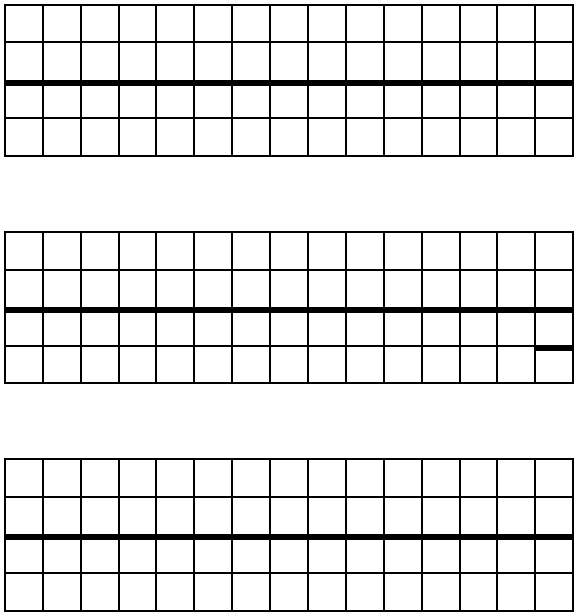
(2x3+1 + 3x5+4)/8	3.some
(2x3+1 + 3x5+4) – 3x8	2

T = 2.1 3s + 3.4 5s = 3.2 8s

2.1 3s + 3.5 4s = ? 7s

G-counting	Coding

Abacus

G-mode	A-mode
	

Calculator

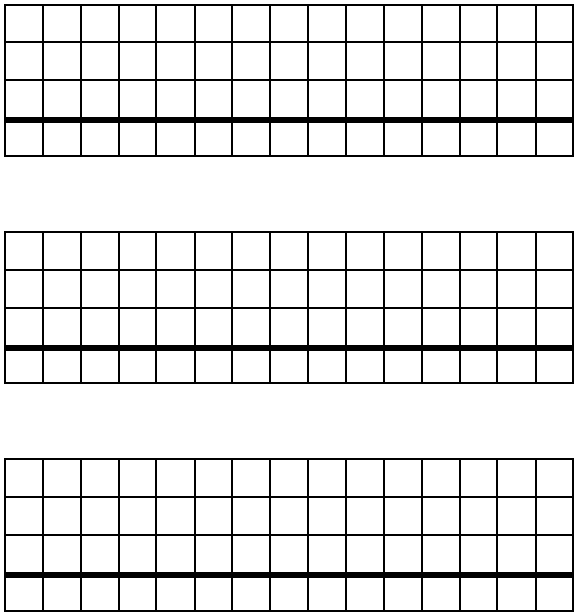
T = 2.1 3s + 3.5 4s = 7s

2.1 3s + 4.2 6s = ? 9s

G-counting	Coding

Abacus

G-mode



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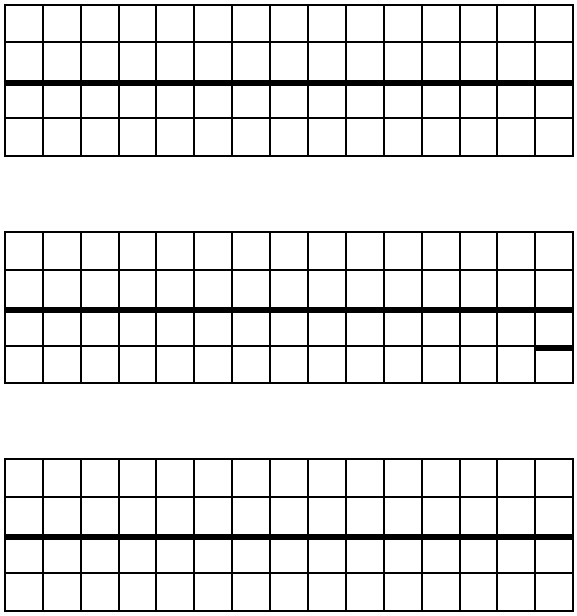


Calculator

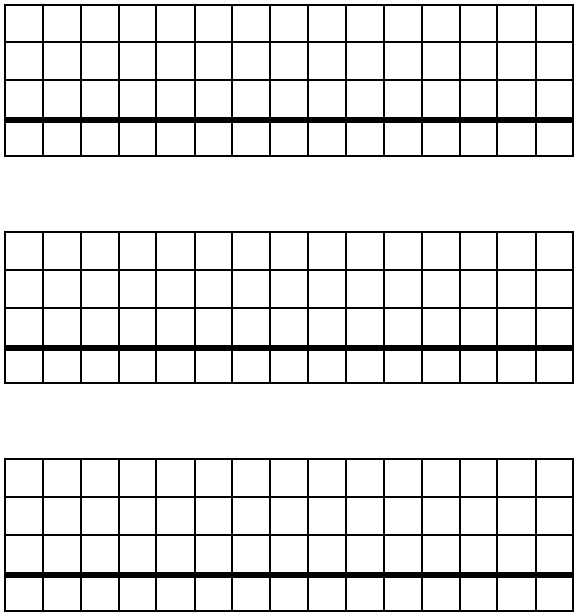
T =

1.1 2s + 2.1 3s = ? 5s

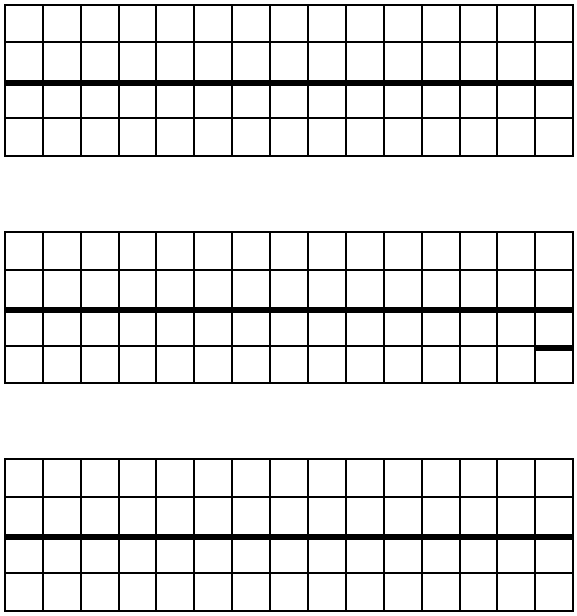
G-counting	Coding

Abacus

G-mode



A-mode



Calculator

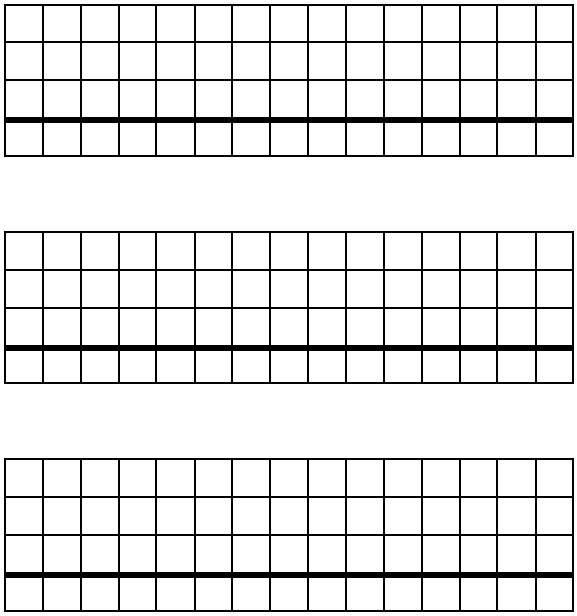
T =

1.3 4s + 2.1 3s = ? 7s

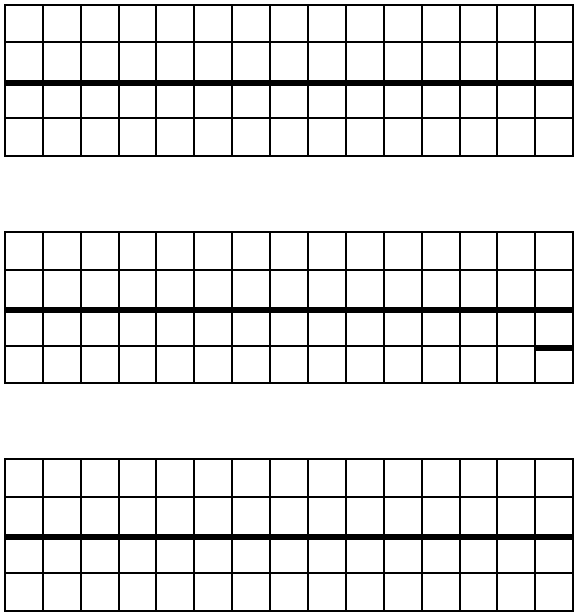
G-counting	Coding

Abacus

G-mode



A-mode



Calculator

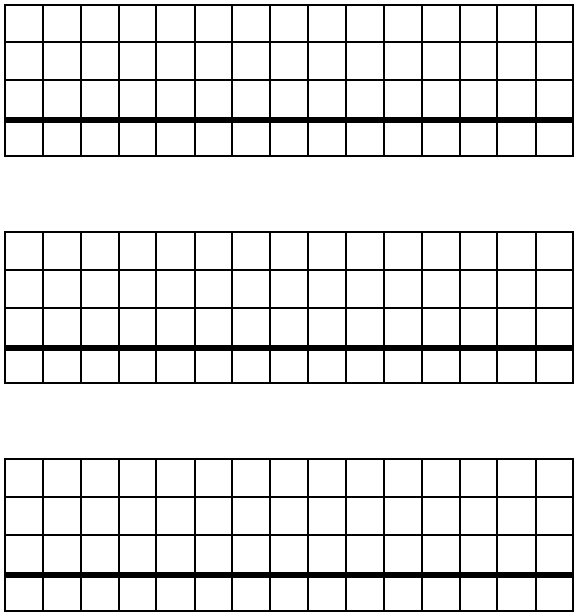
T =

2.1 4s + 3.5 4s = ? 8s

G-counting	Coding

Abacus

G-mode



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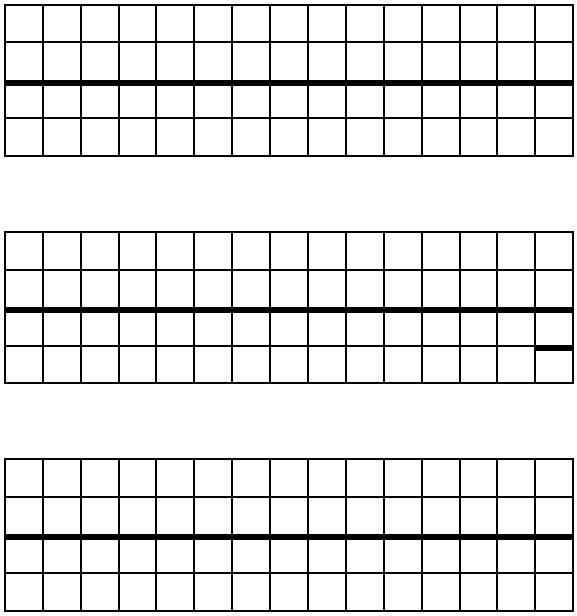

Calculator

T =

M7

Reversing OnTop Addition

Mathematics as MANYmatics

A Natural Science about Many

Material for

MicroCurriculum 7

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Curricula

Micro-curriculum 1. Creating Icon-numbers

Micro-curriculum 2. Counting in Bundles

Micro-curriculum 3. Re-counting Bundle-numbers in the Same Bundle

Micro-curriculum 4. Re-counting Bundle-numbers in a Different Bundle

Micro-curriculum 5. Adding Bundle-numbers OnTop

Micro-curriculum 6. Adding Bundle-numbers NextTo

Micro-curriculum 7. Reversing Adding Bundle-numbers OnTop

Micro-curriculum 8. Reversing Adding Bundle-numbers NextTo

Preface

M7, Reversing OnTop Addition, is the seventh of 8 micro-curricula in mathematics for preschool and home schooling. They present mathematics as MANYmatics, a natural science about the physical fact Many. They all build upon the following observation:

”How old will you be next time?” I asked the child. “Four”, he answered and showed me four fingers. “Four, you said?” I asked and showed him four fingers held together two by two. “No, that is not four, that is two twos!” the child replied thus insisting upon what exists, bundles of twos, and two of them. Likewise, preschool children have no difficulties counting in other units than ten, even if they only learn how to count in tens.

The micro-curricula use activities with concrete material to obtain its learning goals in accordance with Piaget’s principle ‘greifen vor begrifen’ (grasp to grasp).

In the first, children learn to use sticks to build the number icons up to nine, and to use strokes to draw them, thus realizing there are as many sticks and strokes in the icon as the number it represents, if written less sloppy. In the second, children learn to count a given total in icons manually, using an abacus and by using a calculator. In the third, children learn to recount a total in the same unit. In the fourth, children learn to recount a total in a different unit. In the fifth, children learn to add two bundle-numbers on top of each other. In the sixth, children learn to add two bundle-numbers next to each other. In the seventh, children learn to reverse on-top addition. And in the eights, children learn to reverse next-to addition

As to concrete material, anything goes in the first micro-curriculum. The others will use sticks and strokes, beads on an abacus, LEGO-like blocks and squares, and a calculator respecting the priority of the operations. Fingers, pegs on a pegboard and other concrete material might also be used.

Some of the curricula can use silent education where the instructor is allowed to demonstrate and guide through actions, but not through words; or by using words form a foreign language not understood by the child.

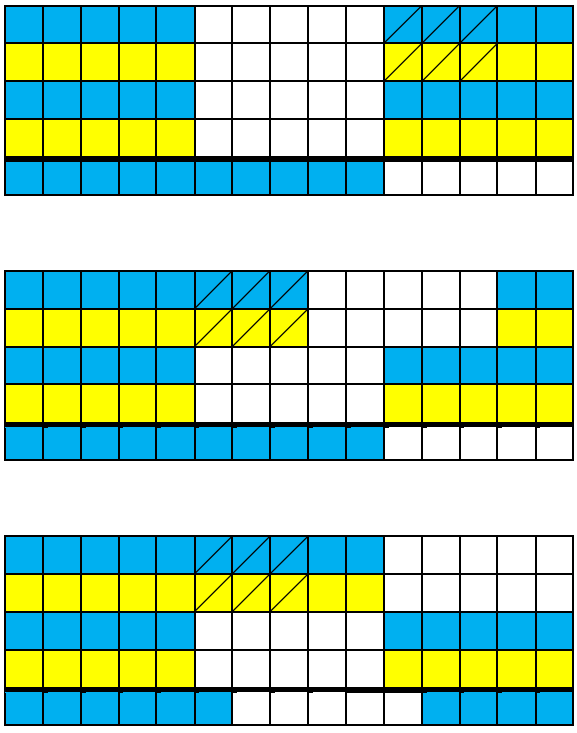
G stands for Geometry and A stands for Algebra.

2 3s + ? 5s = 4 5s

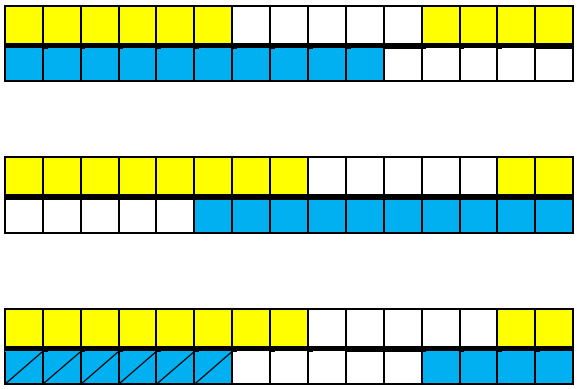
G-counting	Coding
IIIII IIIII IIIII IIIII III III IIII IIIII IIIII	S S S S, CII = S CII CII S S CC IIII SS
T = 4 5s = 2 3s + 2.4 5s	T = 4 5s = 2 3s + 2.4 5s

Abacus

G-mode



A-mode



Calculator

(4x5 – 2x3)/5	2.some
(4x5 – 2x3) – 2x5	4

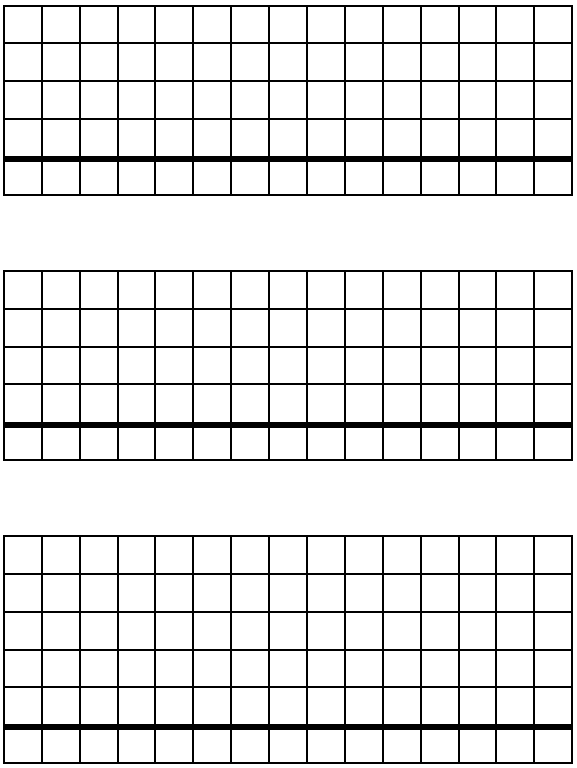
T = 4 5s = 2 3s + 2.4 5s

3 2s + ? 5s = 4 5s

G-counting	Coding

Abacus

G-mode



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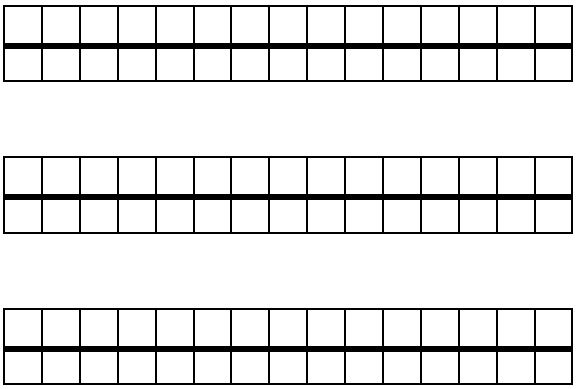


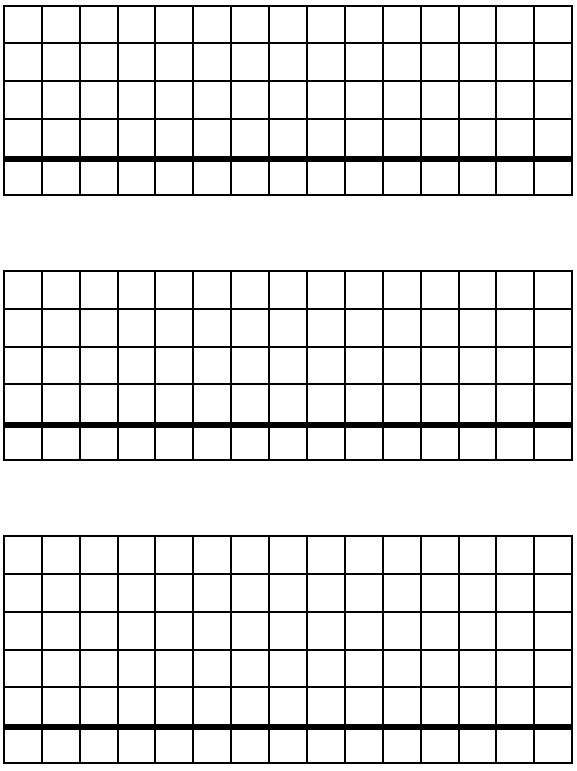
Calculator

? 3s + 5 4s = 7 4s

G-counting	Coding

Abacus

G-mode



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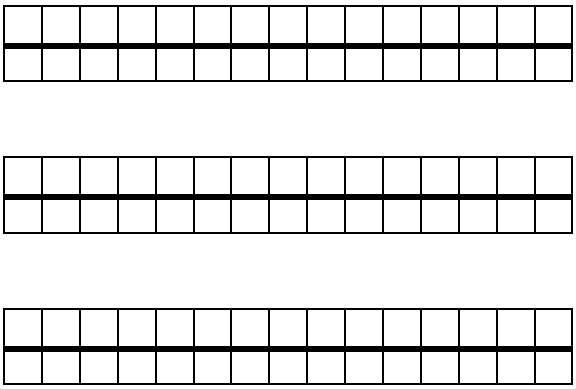


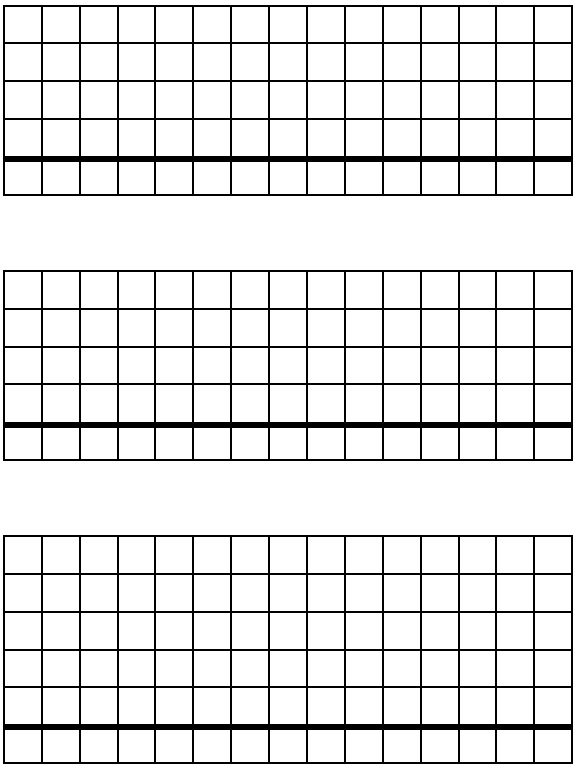
Calculator

3 2s + ? 4s = 4 4s

G-counting	Coding

Abacus

G-mode



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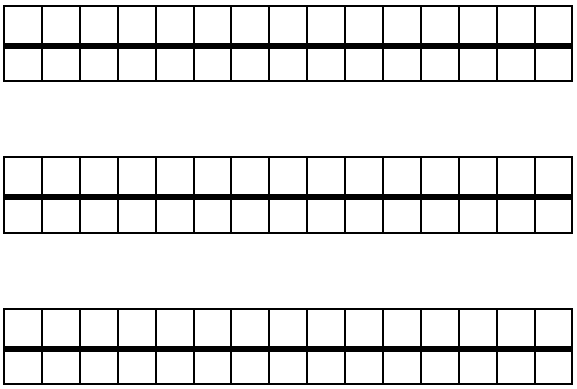


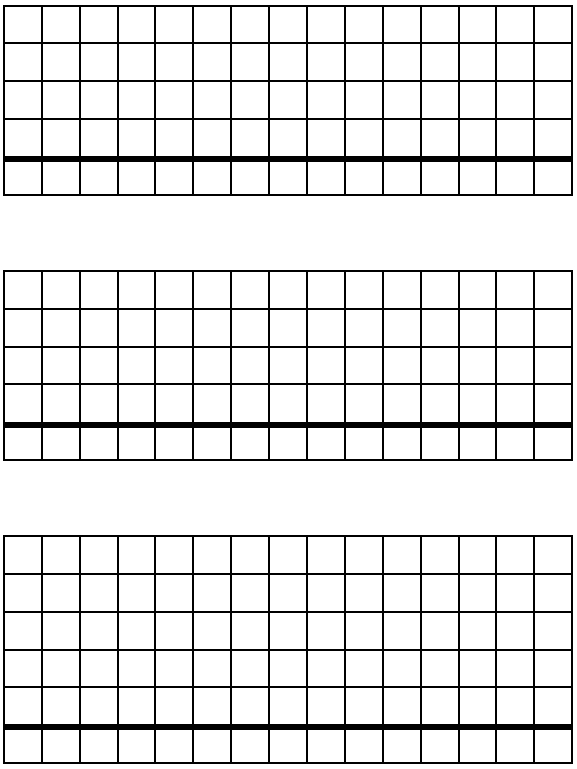
Calculator

4 3s + ? 5s = 5 5s

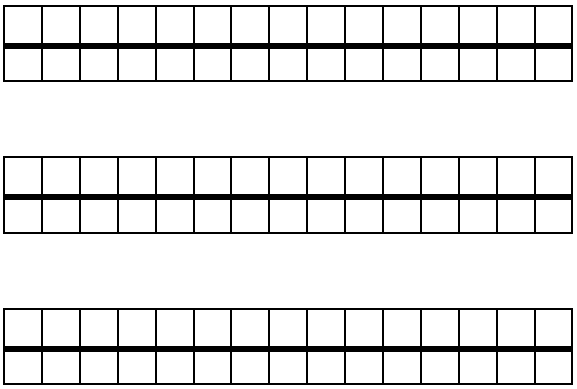
G-counting	Coding

Abacus

G-mode



A-mode



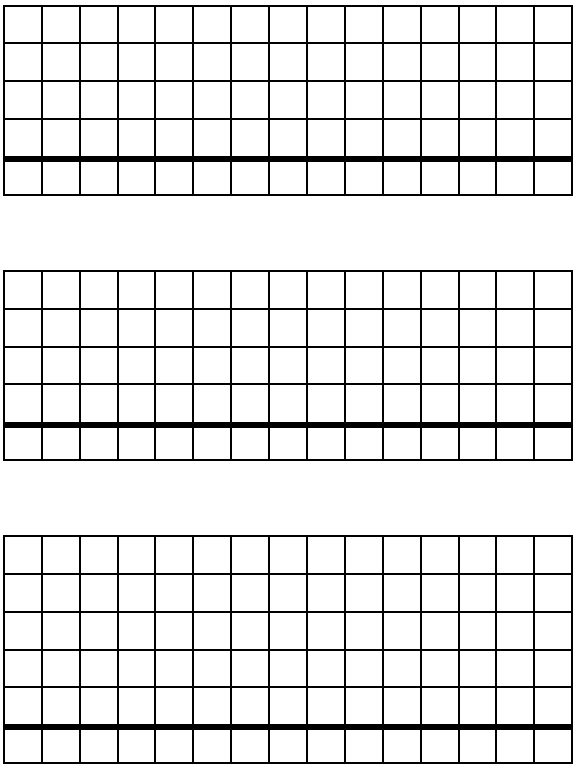
Calculator

? 4s + 2 5s = 6 4s

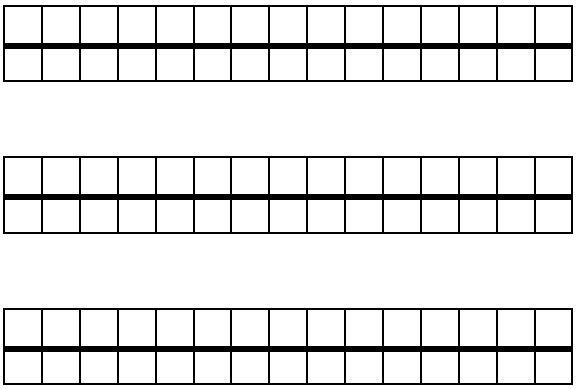
G-counting	Coding

Abacus

G-mode



A-mode



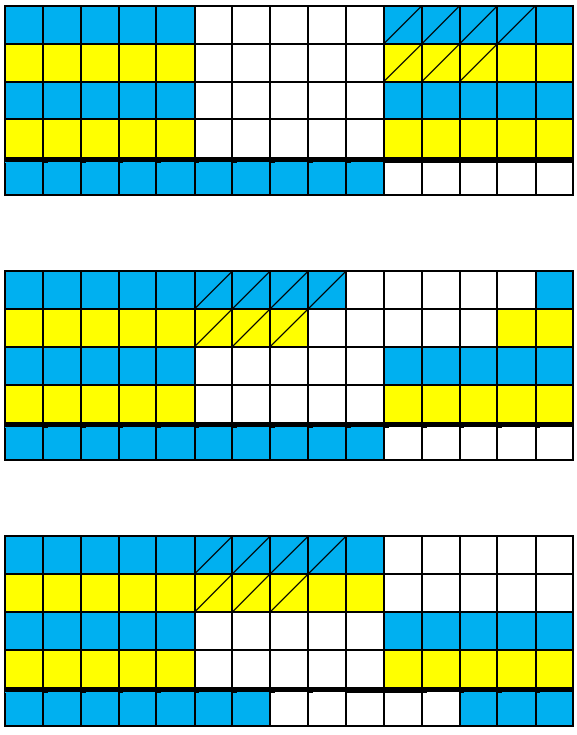
Calculator

2.1 3s + ? 5s = 4 5s

G-counting	Coding
IIIII IIIII IIIII IIIII III III I III IIIII IIIII	S S S S, CII = S CII CII S S CC I III SS
T = 4 5s = 2.1 3s + 2.3 5s	T = 4 5s = 2.1 3s + 2.3 5s

Abacus

G-mode



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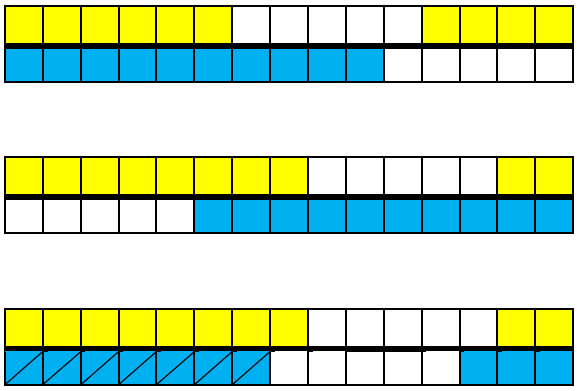


Calculator

(4x5 – 2x3+1)/5	2.some
(4x5 – 2x3+1) – 2x5	4

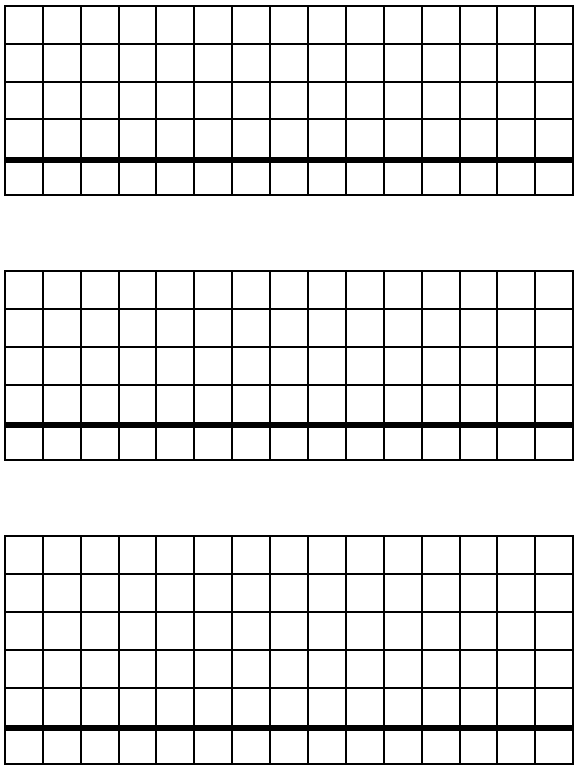
T = 4 5s = 2 3s + 2.4 5s

4.2 3s + ? 5s = 4 5s

G-counting	Coding

Abacus

G-mode



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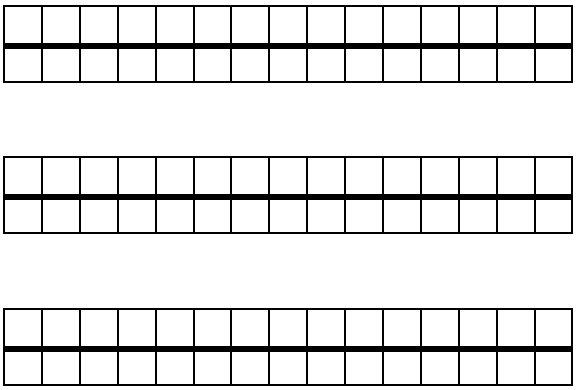


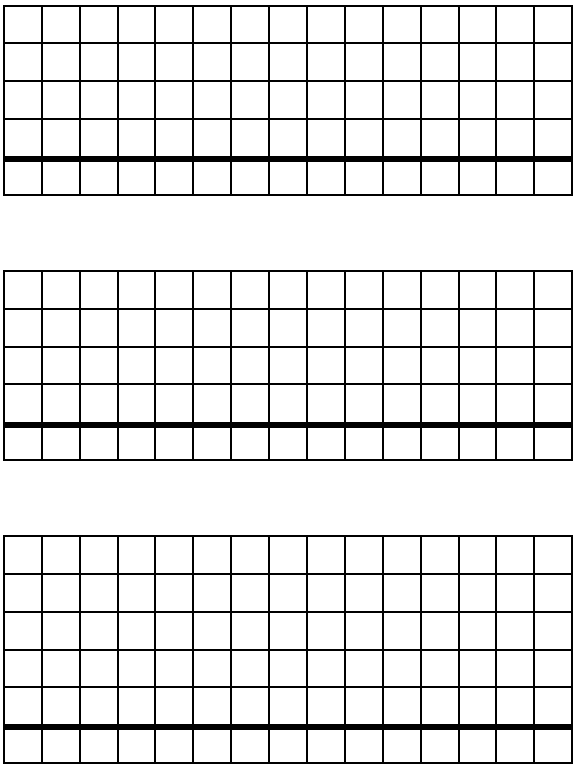
Calculator

2.1 3s + ? 4s = 5 4s

G-counting	Coding

Abacus

G-mode



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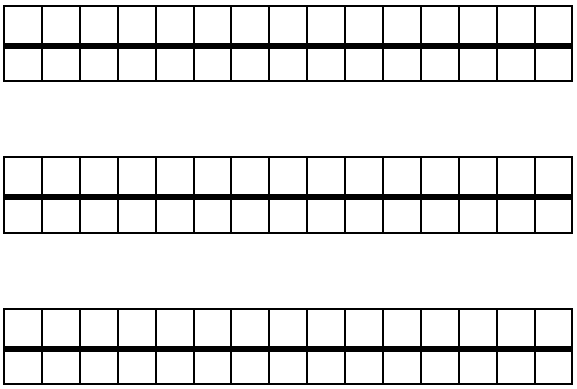


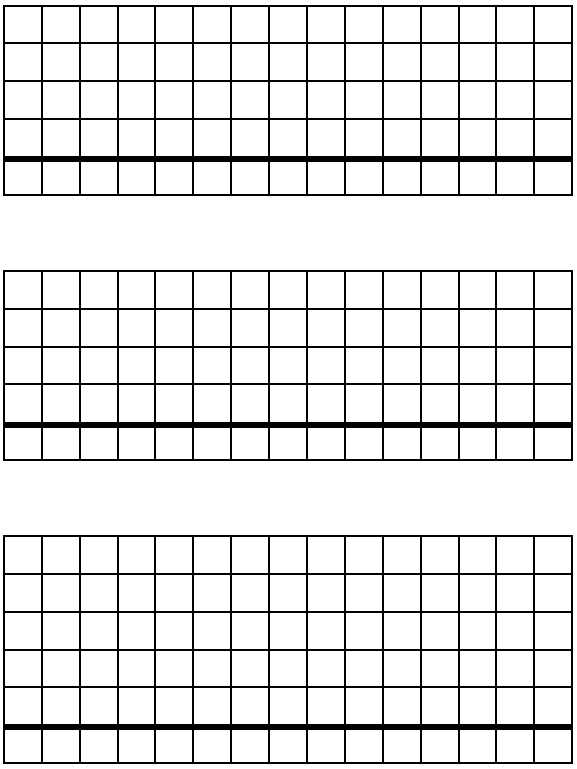
Calculator

2.2 3s + ? 4s = 5 3s

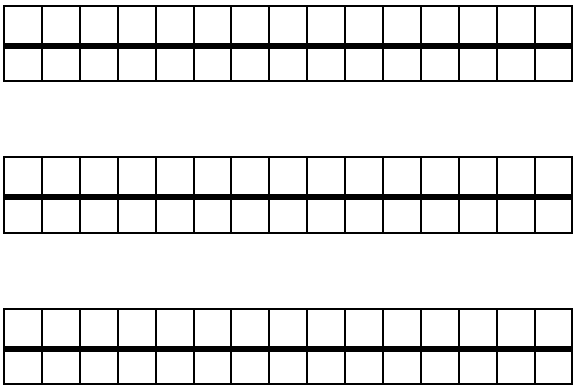
G-counting	Coding

Abacus

G-mode



A-mode



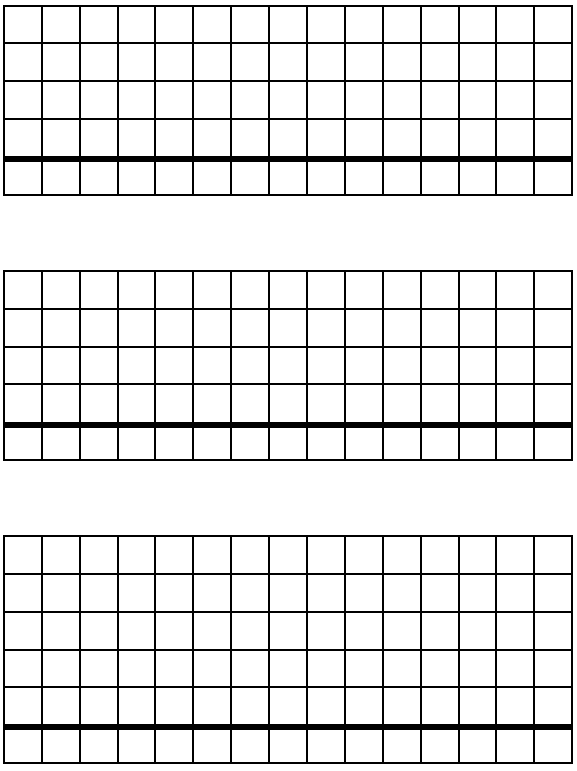
Calculator

2.1 4s + ? 5s = 4 5s

G-counting	Coding

Abacus

G-mode



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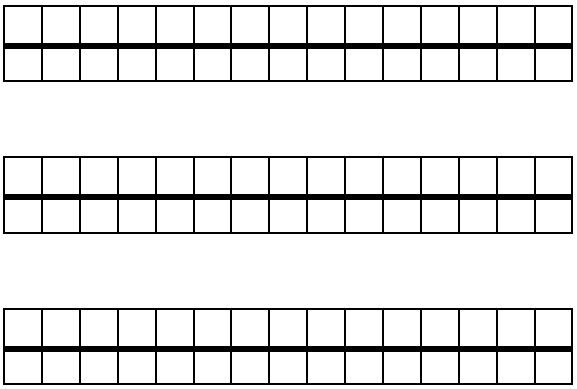


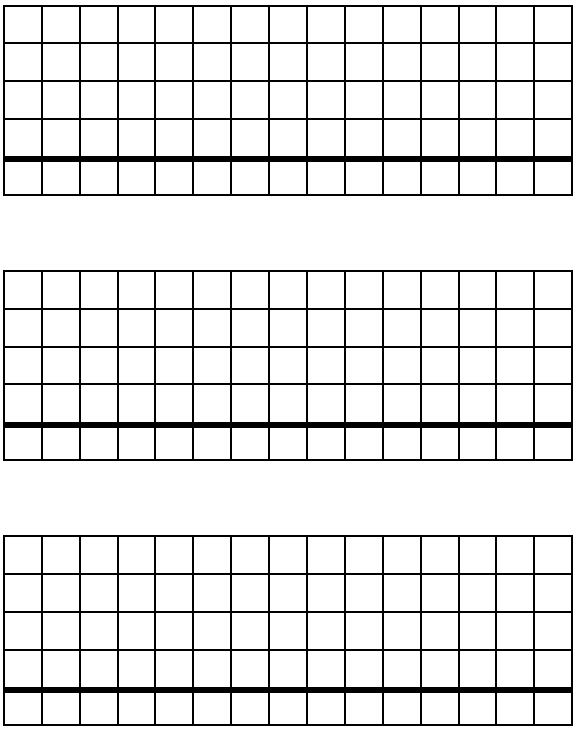
Calculator

? 4s + 1.4 5s = 4 4s

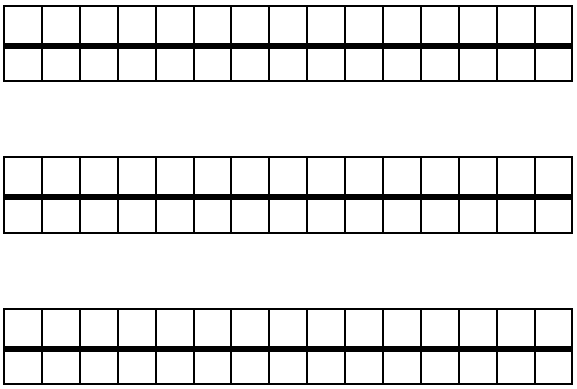
G-counting	Coding

Abacus

G-mode



A-mode



Calculator

M8

Reversing NextTo Addition

Mathematics as MANYmatics

A Natural Science about Many

Material for

MicroCurriculum 8

Allan.Tarp

@MATHeCADEMY.net

Curricula

Micro-curriculum 1. Creating Icon-numbers

Micro-curriculum 2. Counting in Bundles

Micro-curriculum 3. Re-counting Bundle-numbers in the Same Bundle

Micro-curriculum 4. Re-counting Bundle-numbers in a Different Bundle

Micro-curriculum 5. Adding Bundle-numbers OnTop

Micro-curriculum 6. Adding Bundle-numbers NextTo

Micro-curriculum 7. Reversing Adding Bundle-numbers OnTop

Micro-curriculum 8. Reversing Adding Bundle-numbers NextTo

Preface

M8, Reversing NextTo Addition, is the eight of 8 micro-curricula in mathematics for preschool and home schooling. They present mathematics as MANYmatics, a natural science about the physical fact Many. They all build upon the following observation:

”How old will you be next time?” I asked the child. “Four”, he answered and showed me four fingers. “Four, you said?” I asked and showed him four fingers held together two by two. “No, that is not four, that is two twos!” the child replied thus insisting upon what exists, bundles of twos, and two of them. Likewise, preschool children have no difficulties counting in other units than ten, even if they only learn how to count in tens.

The micro-curricula use activities with concrete material to obtain its learning goals in accordance with Piaget’s principle ‘greifen vor begrifen’ (grasp to grasp).

In the first, children learn to use sticks to build the number icons up to nine, and to use strokes to draw them, thus realizing there are as many sticks and strokes in the icon as the number it represents, if written less sloppy. In the second, children learn to count a given total in icons manually, using an abacus and by using a calculator. In the third, children learn to recount a total in the same unit. In the fourth, children learn to recount a total in a different unit. In the fifth, children learn to add two bundle-numbers on top of each other. In the sixth, children learn to add two bundle-numbers next to each other. In the seventh, children learn to reverse on-top addition. And in the eights, children learn to reverse next-to addition

As to concrete material, anything goes in the first micro-curriculum. The others will use sticks and strokes, beads on an abacus, LEGO-like blocks and squares, and a calculator respecting the priority of the operations. Fingers, pegs on a pegboard and other concrete material might also be used.

Some of the curricula can use silent education where the instructor is allowed to demonstrate and guide through actions, but not through words; or by using words form a foreign language not understood by the child.

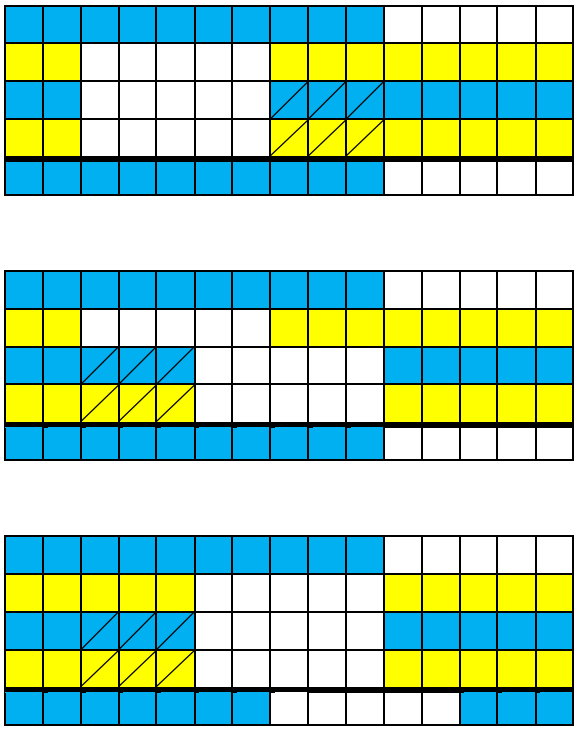
G stands for Geometry and A stands for Algebra.

2 3s + ? 5s = 3 8s

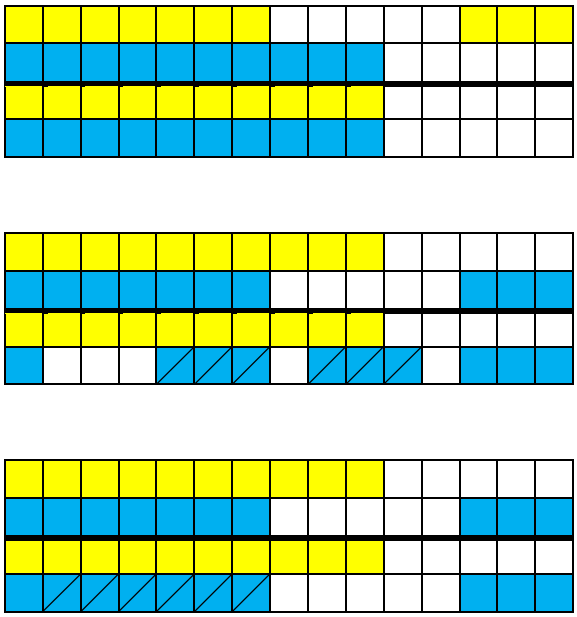
G-counting	Coding
IIIIIIII IIIIIIII IIIIIIII III III II III IIIII IIIII III	CS CS CS, CII = S CC SSCS CC SSS C *bundle*
T = 3 8s = 2 3s + 3.3 5s	T = 3 8s = 2 3s + 3.3 5s

Abacus

G-mode



A-mode



Calculator

(3x8 – 2x3)/5	3.some
(3x8 – 2x3) – 3x5	3

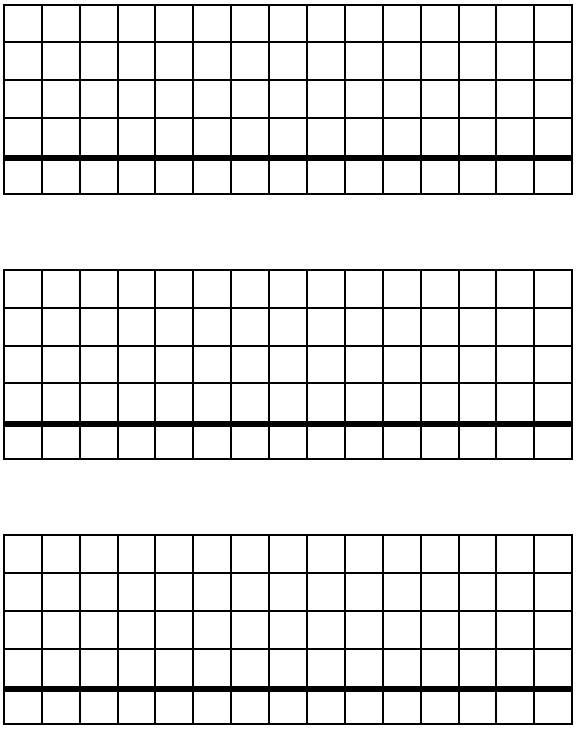
T = 3 8s = 2 3s + 3.3 5s

3 2s + ? 5s = 2 7s

G-counting	Coding

Abacus

G-mode



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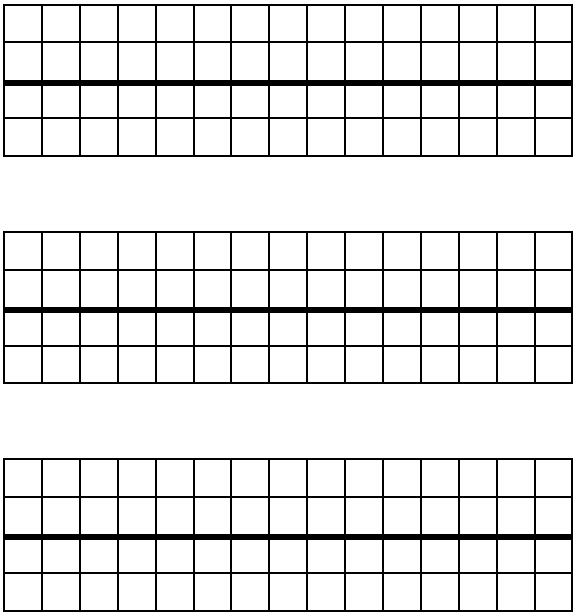


Calculator

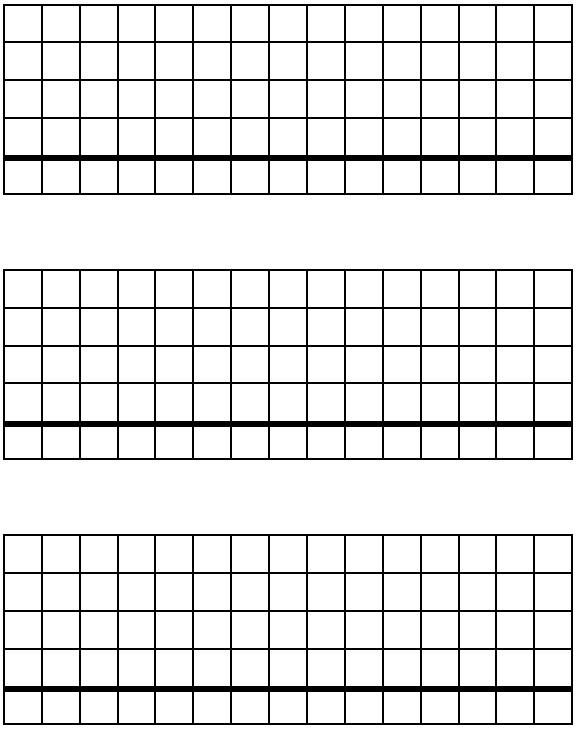
T =

2 3s + ? 4s = 3 7s

G-counting	Coding

Abacus

G-mode



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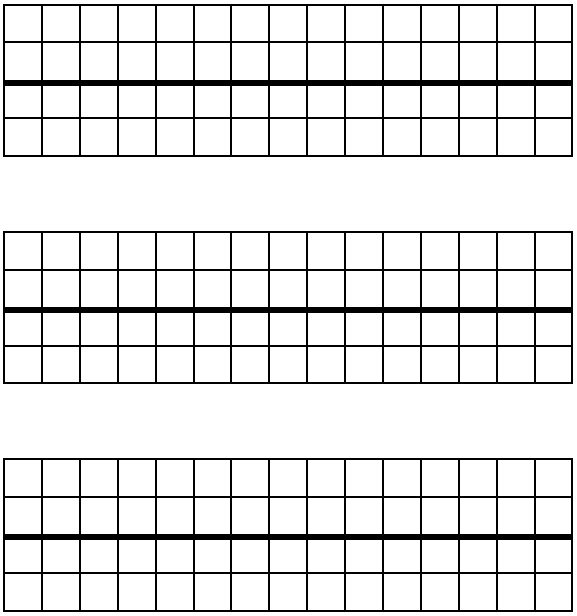


Calculator

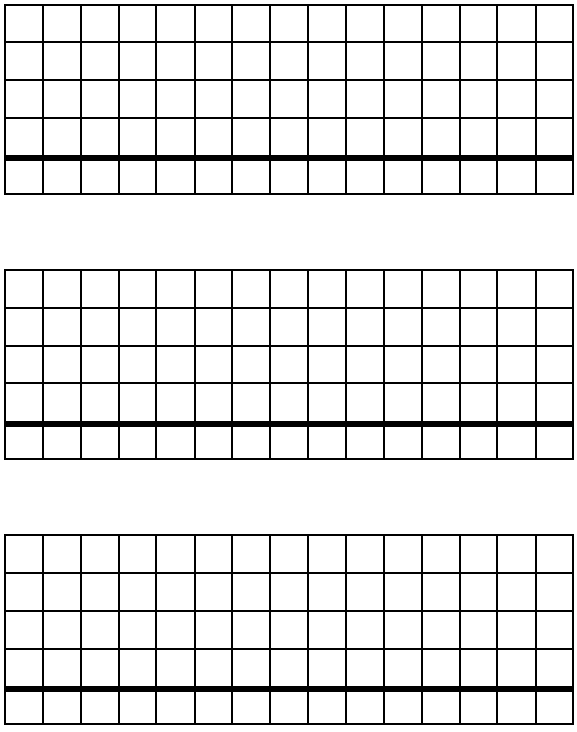
T =

3 2s + ? 4s = 4 6s

G-counting	Coding

Abacus

G-mode



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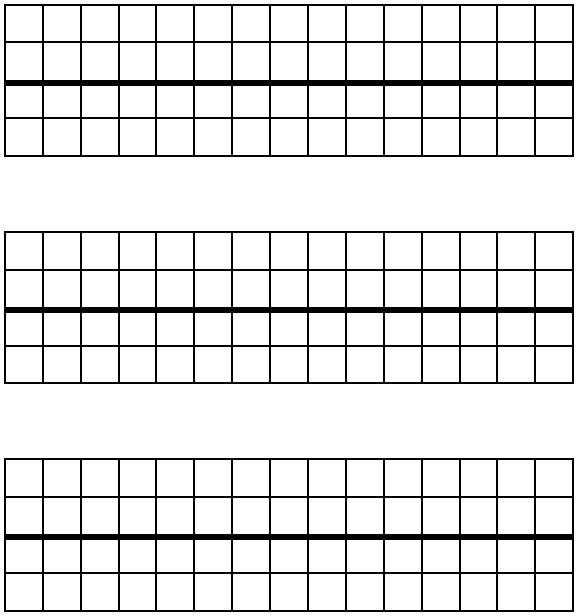


Calculator

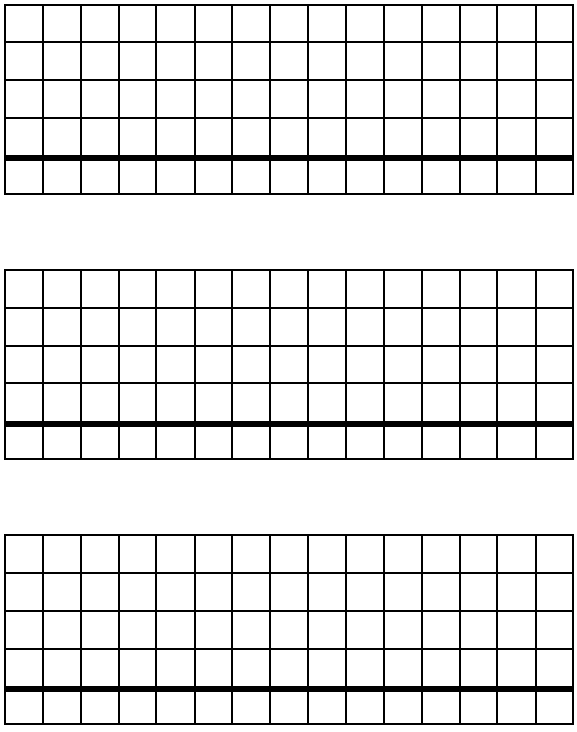
T =

4 3s + ? 5s = 3 8s

G-counting	Coding

Abacus

G-mode



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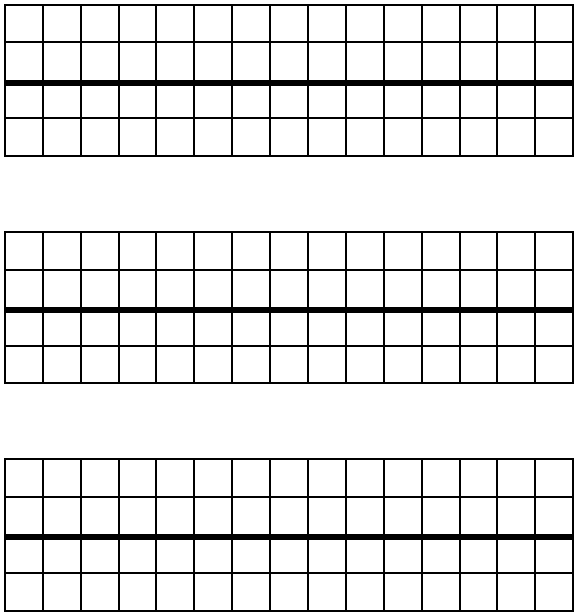


Calculator

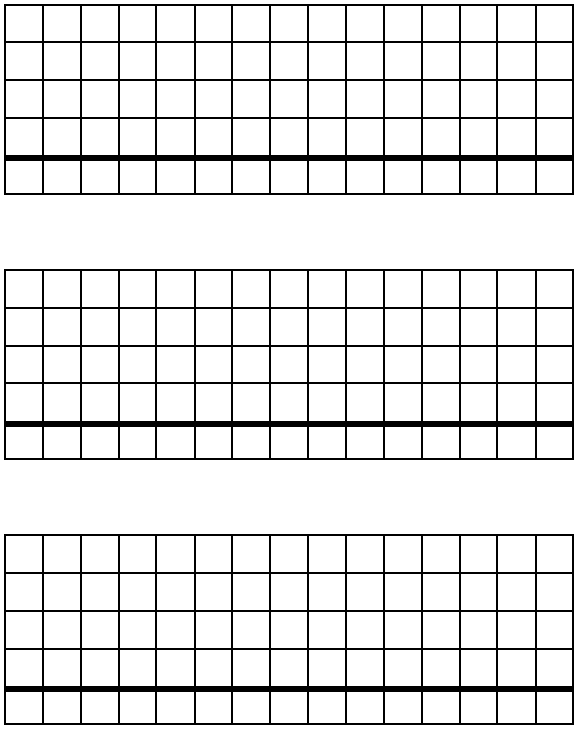
T =

3 4s + ? 5s = 2 9s

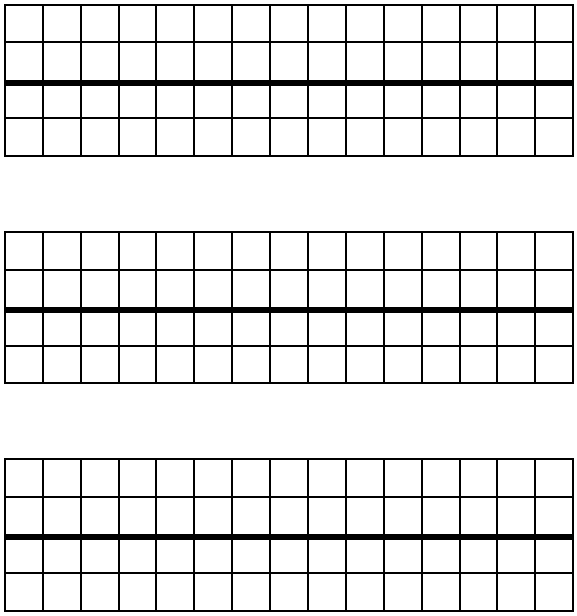
G-counting	Coding

Abacus

G-mode



A-mode



Calculator

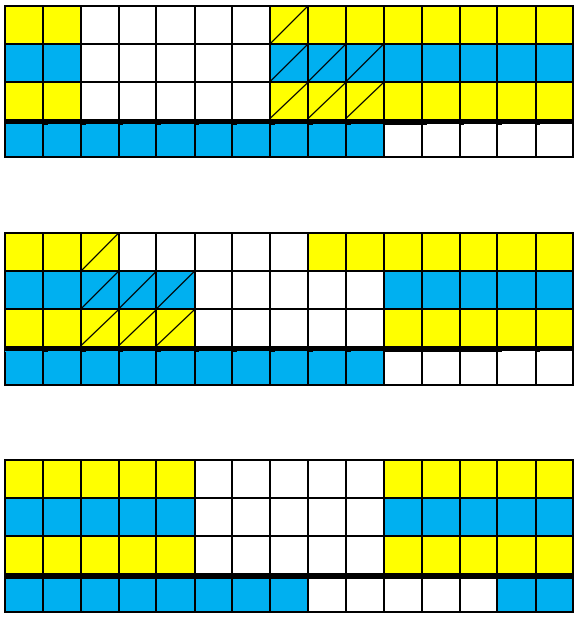
T =

2.1 3s + ? 5s = 3 8s

G-counting	Coding
IIIIIIII IIIIIIII IIIIIIII III III I I IIII IIIII IIIII II	CS CS CS, CII = S CC I II SSS *bundle*
T = 3 8s = 2.1 3s + 3.2 5s	T = 3 8s = 2.1 3s + 3.2 5s

Abacus

G-mode



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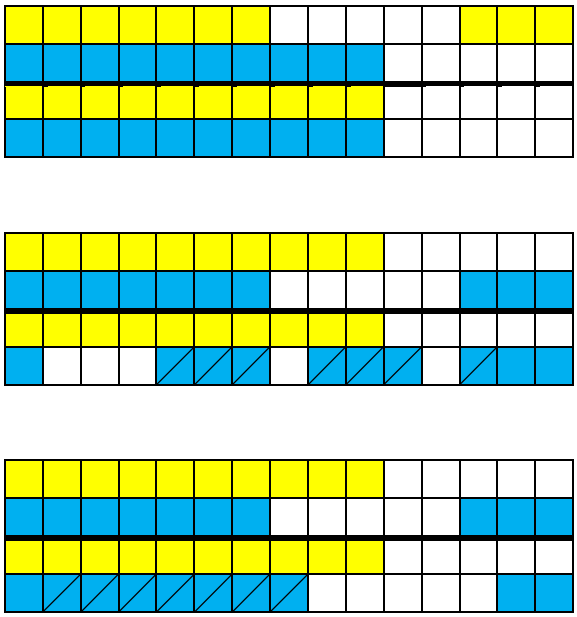


Calculator

(3x8 – (2x3+1))/5	3.some
(3x8 – (2x3+1)) – 3x5	2

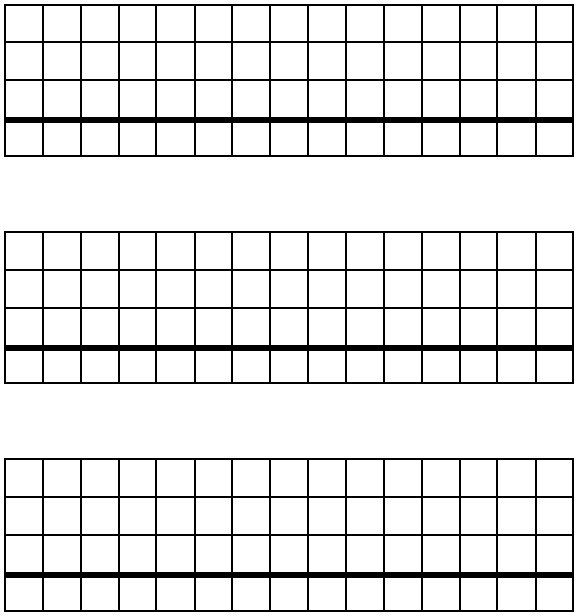
T = 3 8s = 2.1 3s + 3.2 5s

2.1 3s + ? 4s = 3 7s

G-counting	Coding

Abacus

G-mode



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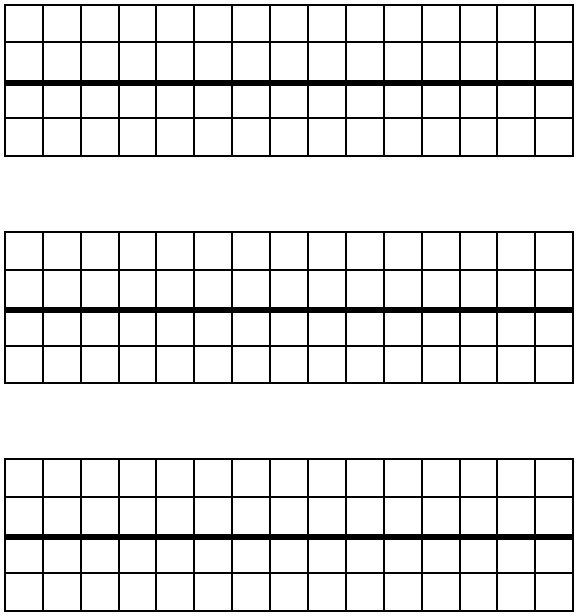


Calculator

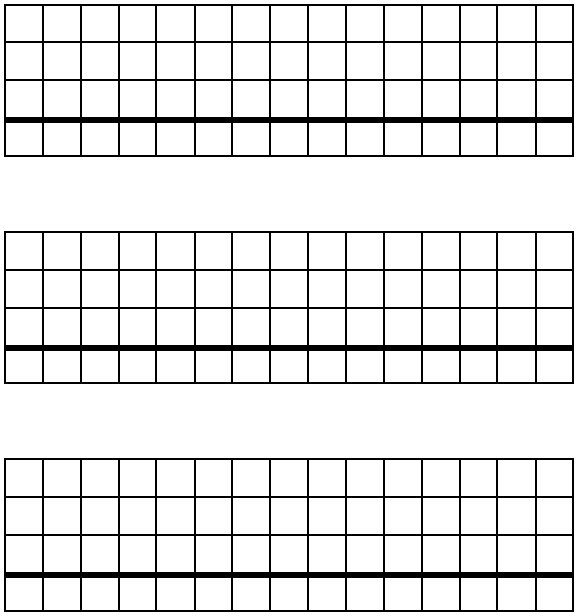
T = 2.1 3s + 3.5 4s = 7s

2.1 3s + ? 6s = 3 9s

G-counting	Coding

Abacus

G-mode



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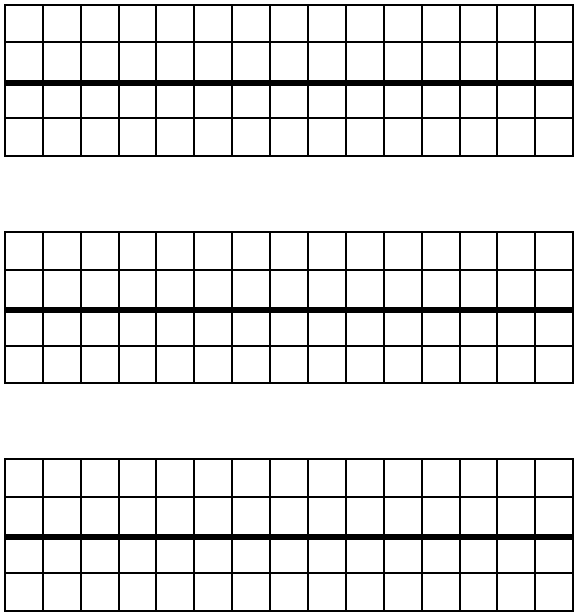


Calculator

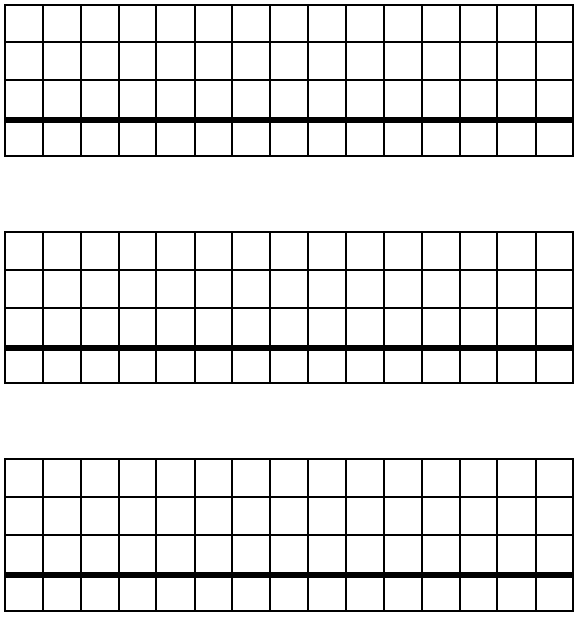
T =

1.1 2s + ? 3s = 2 5s

G-counting	Coding

Abacus

G-mode



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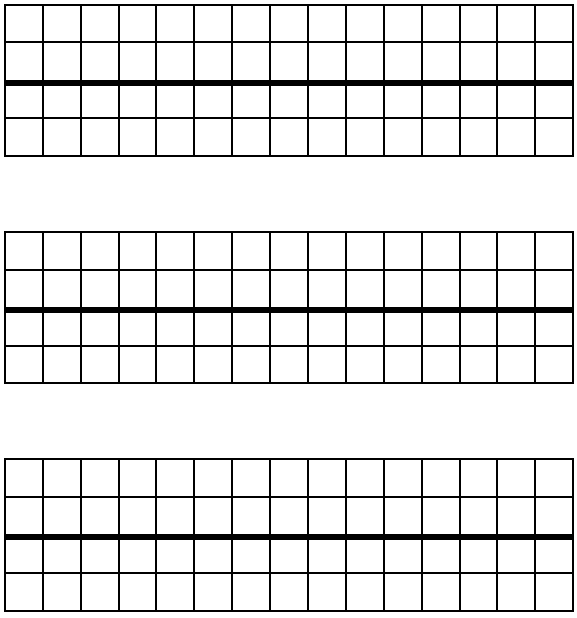


Calculator

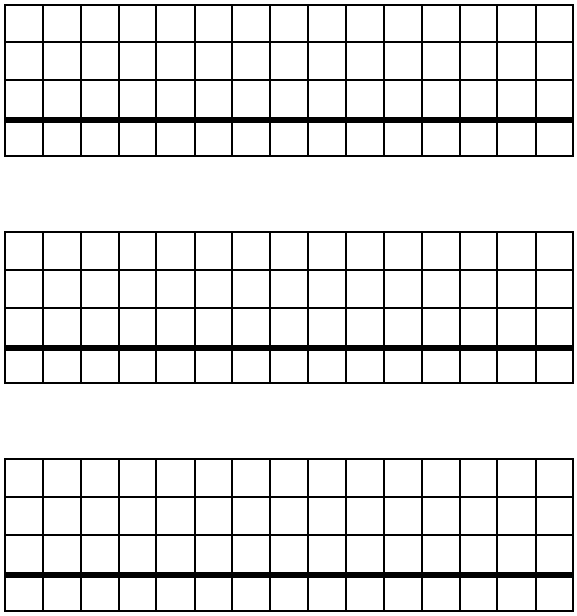
T =

1.3 4s + ? 3s = 2 7s

G-counting	Coding

Abacus

G-mode



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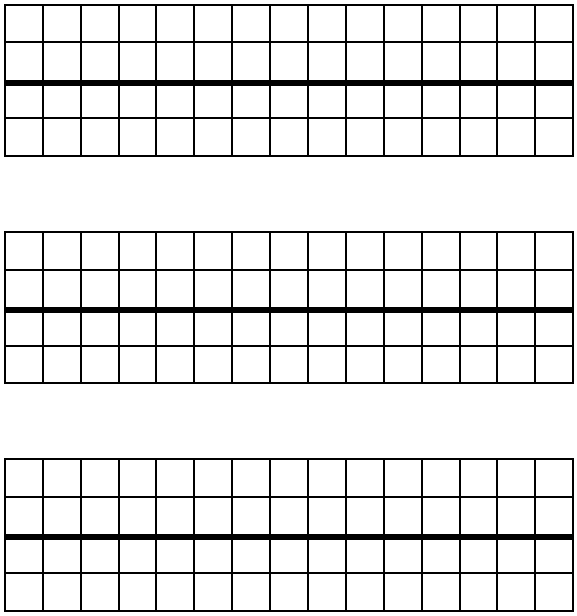


Calculator

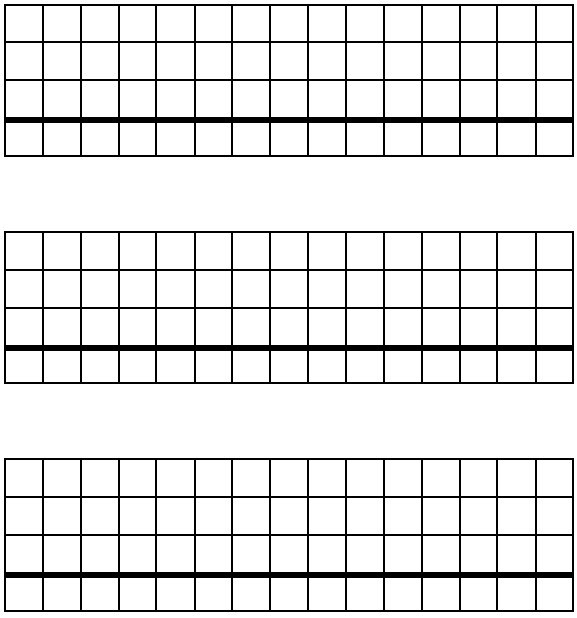
T =

2.1 4s + ? 4s = 3 8s

G-counting	Coding

Abacus

G-mode



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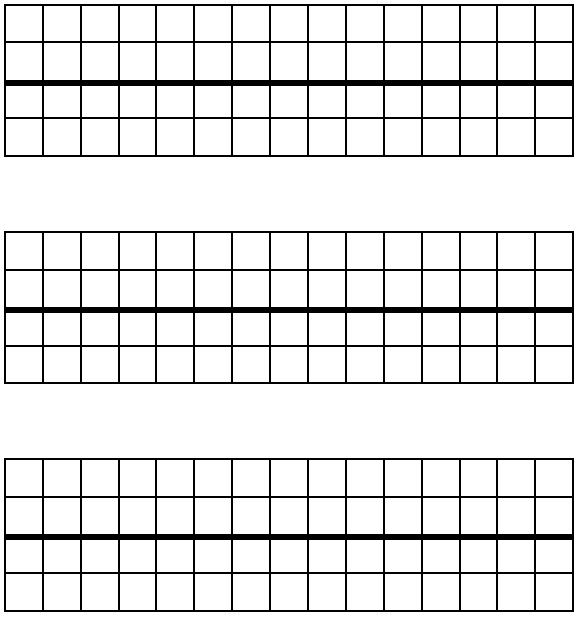

Calculator

T =