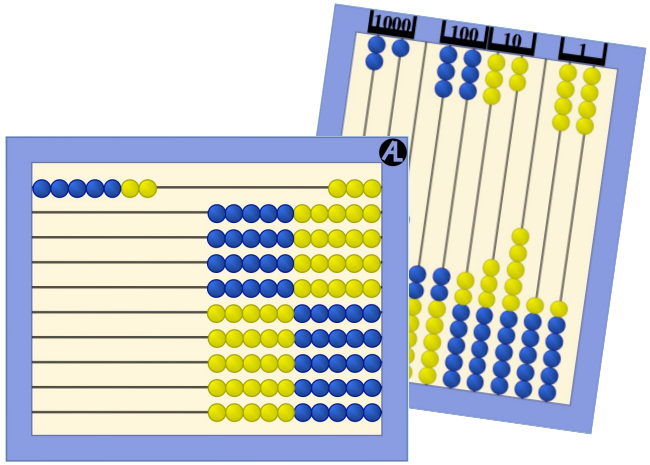
Unlock the Puzzle with RightStart™ Math



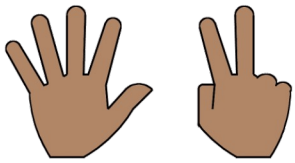
based on the work of Dr. Joan A. Cotter

Unlock the Puzzle

2

Subitizing

- Subitizing is quick recognition of quantity without counting.



3

Grouping

Try to visualize 8 apples without grouping.

4

Grouping

Now try to visualize 5 as red and 3 as green.

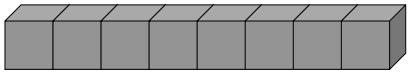
5

Grouping by 5s

Need grouping to visualize quantities.

6

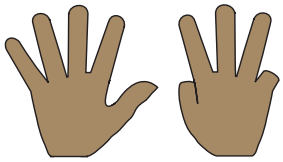
Grouping by 5s



Need grouping to visualize quantities.

7

Grouping by 5s



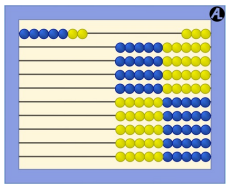
Need grouping to visualize quantities.

8

Unlock the Puzzle

9

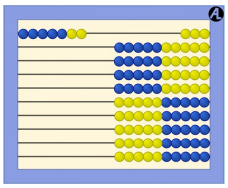
Cotter Abacus



- Visual and tactile manipulative
- Develops mental images of
  - Quantities
  - Strategies
  - Mathematical Operations

10

Cotter Abacus

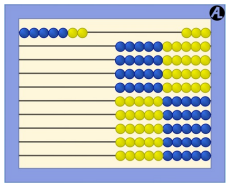


"The role of physical manipulatives is to help the child form those visual images and thus to eliminate the need for the physical manipulatives."

—Ginsberg and others

11

Cotter Abacus

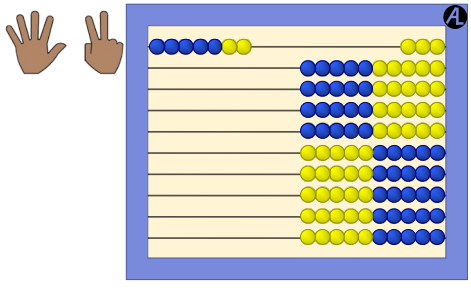


"Think in pictures, because the brain remembers images better than it does anything else."

—Ben Pridmore
World Memory Champion, 2009

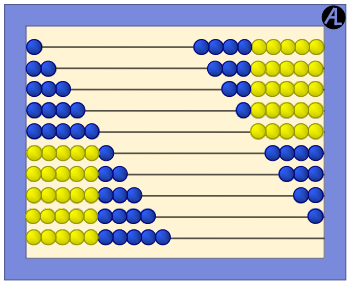
12

Entering Quantities



13

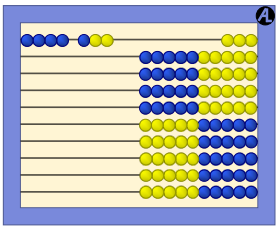
Entering Quantities



14

Adding

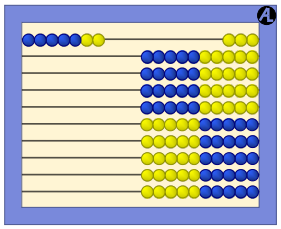
4 + 3 = ___



15

Adding

4 + 3 = 7

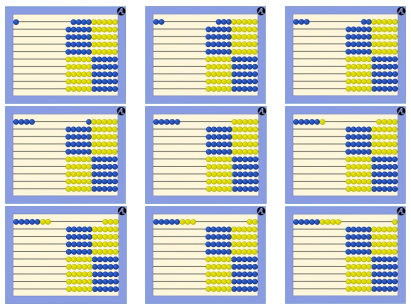


16

Typical Worksheet

17

Facts Equaling 10



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Unlock the Puzzle

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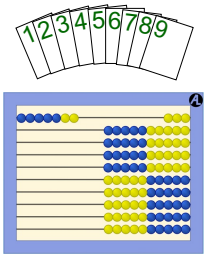
Go to the Dump Game

A "Go Fish" type of game where the pairs are:

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



20

Go to the Dump Game

- App for your device

Go to Ten

21

Why Games

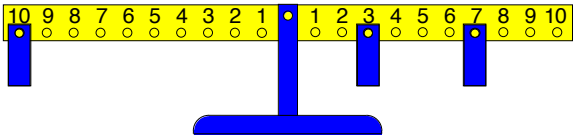
$$\frac{\text{Games}}{\text{Math}} = \frac{\text{Books}}{\text{Reading}}$$

Games provide interesting repetition needed for automatic responses in a social setting.

More importantly, games provide an application for the new information!

22

Math Balance



23

Unlock the Puzzle

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Place Value

- The author of *Treviso Arithmetic of 1478*, written over 500 years ago, considered place value so important that it was listed first among the "five" operations of arithmetic.
- Place value organizes numbers into neat packets.
- Without place value, computational algorithms make little sense.

25

Place Value

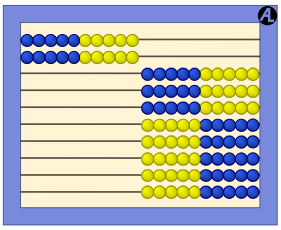
Yet, people often think
of 14 as 14 ones,
not ten and 4 ones.

The pattern that is needed to make
sense of tens and ones is hidden
because of the English language!

26

Transparent Place Value

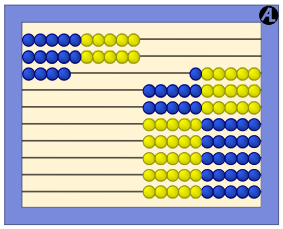
2-ten



27

Transparent Place Value

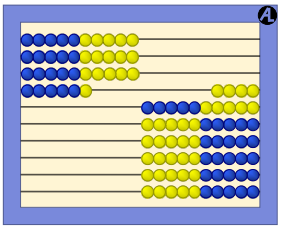
2-ten 4



28

Transparent Place Value

3-ten 6



29

Transparent Number Naming

10 = ten	20 = 2-ten
11 = ten 1	21 = 2-ten 1
12 = ten 2	22 = 2-ten 2
13 = ten 3	23 = 2-ten 3
14 = ten 4	. . . .
. . . .	. . . .
19 = ten 9	99 = 9-ten 9

30

Transparent Number Naming

- Use this for two reasons:
  1. Patterning

3 million
3 thousand
3 hundred
3 ten

31

Transparent Number Naming

- Use this for two reasons:
  1. Patterning
  2. Place value

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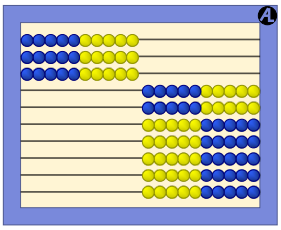
Transparent Number Naming

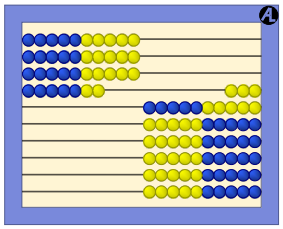
3-ten 30



33

Transparent Number Naming

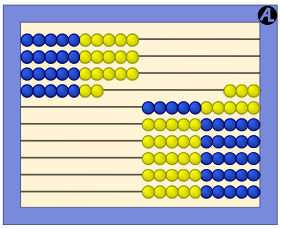
3-ten 7 30 7



34

Transparent Number Naming

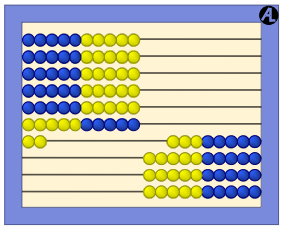
3-ten 7 37



35

Transparent Number Naming

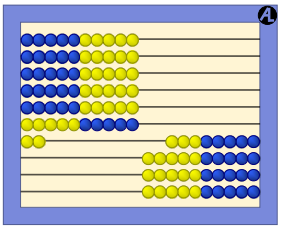
6-ten 2 60 2



36

Transparent Number Naming

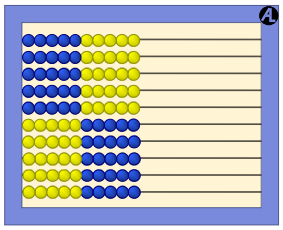
6-ten 2 62



37

Transparent Number Naming

1 hundred 100



38

Transparent Number Naming

80

8 - ten

800

8 hun-dred

8000

8 th-ou-sand

39

Transparent Number Naming

3000
600
50
8

3000
600
50
8

3658

40

Transparent Number Naming

4000
90
2

4000
90
2

4092

41

Transparent Number Naming

- Just as reciting the alphabet doesn't teach reading, counting doesn't teach arithmetic.
- Just as we first teach the *sound* of the letters, we first teach the *name* of the quantity (math way).

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Transparent Number Naming

- Asian languages use the math way of number naming.
- The children understand place value in first grade; only half of U.S. children understand place value at the end of fourth grade.
- Mathematics is the science of patterns. The patterned math way of number naming greatly helps children learn number sense.

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Unlock the Puzzle

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Strategies

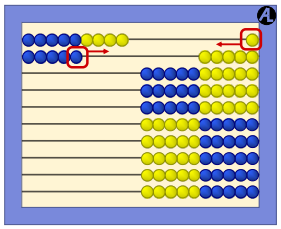
A strategy is a way to learn a new fact or recall a forgotten fact.

A visual representation is a powerful strategy.

45

Strategy: Complete the Ten

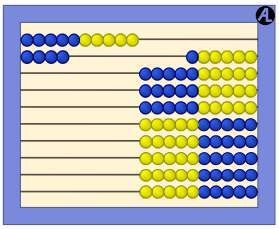
$9 + 5 =$ ___



46

Strategy: Complete the Ten

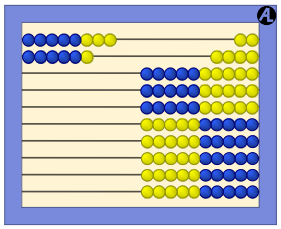
$9 + 5 = 14$



47

Strategy: Two Fives

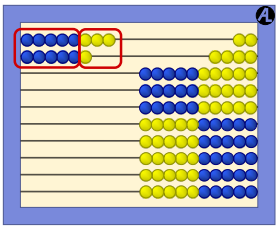
$8 + 6 =$ ___



48

Strategy: Two Fives

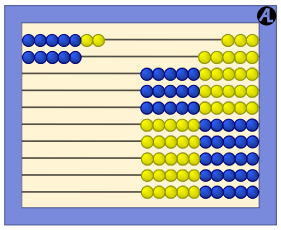
$8 + 6 = 14$



49

Strategy: Two Fives

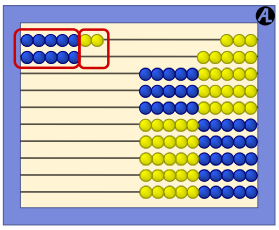
7 + 5 = ___



50

Strategy: Two Fives

7 + 5 = 12



51

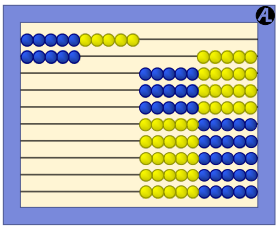
Subtraction Strategies

- Part from Ten
- All from Ten
- Going Up

52

Strategy: Part from Ten

15 – 9 = ___

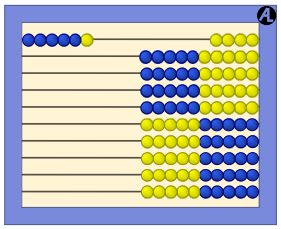


Subtract 5, then 4

53

Strategy: Part from Ten

15 – 9 = 6

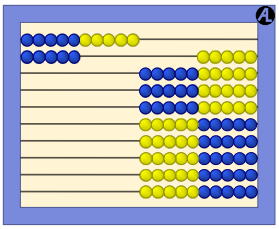


Subtract 5, then 4

54

Strategy: All from Ten

15 – 9 = ___

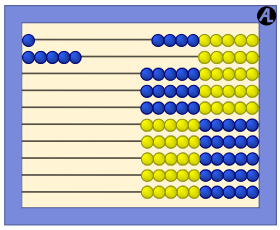


Subtract 9 from the 10

55

Strategy: All from Ten

15 – 9 = 6

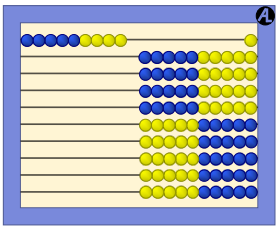


Subtract 9 from the 10

56

Strategy: Going Up

15 – 9 = ___

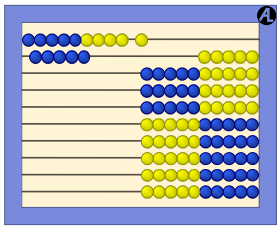


Start at 9; go up to 15

57

Strategy: Going Up

15 – 9 = 6

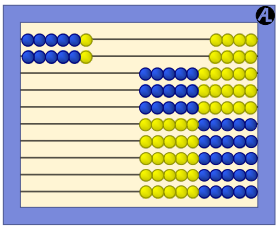


Start at 9; go up to 15

58

Multiplication

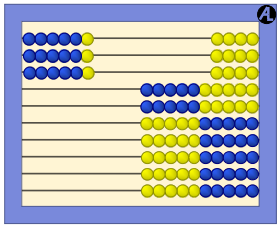
6 taken 2 times; 6 × 2



59

Multiplication

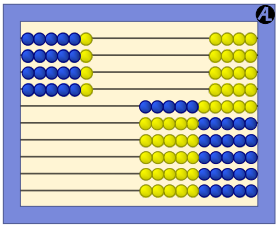
6 taken 3 times; 6 × 3



60

Multiplication

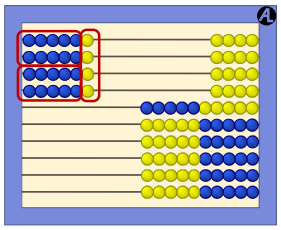
6 taken 4 times; 6 × 4



61

Multiplication

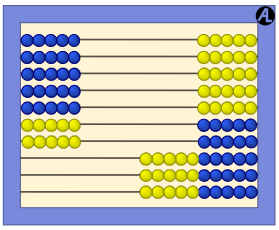
6 taken 4 times; 6 × 4



62

Multiplication

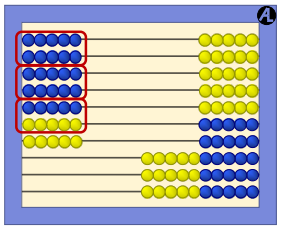
5 × 7



63

Multiplication

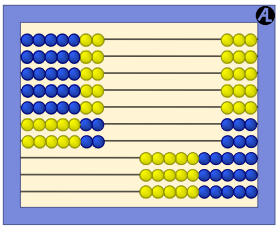
5 × 7 = 35



64

Multiplication

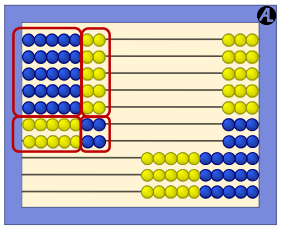
7 × 7



65

Multiplication

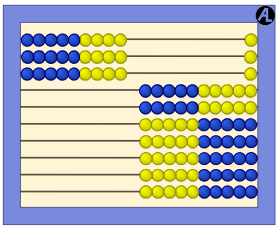
7 × 7 = 49



66

Multiplication

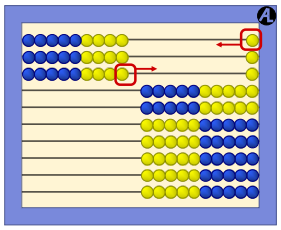
9 × 3



67

Multiplication

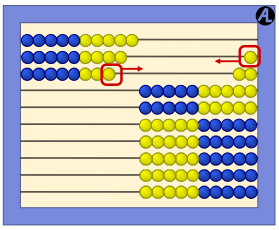
9×3



68

Multiplication

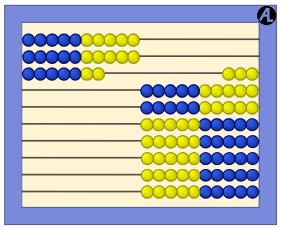
9×3



69

Multiplication

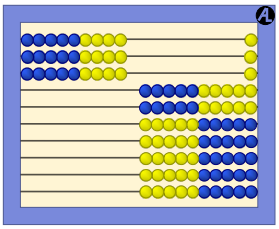
$9 \times 3 = 27$



70

Multiplication

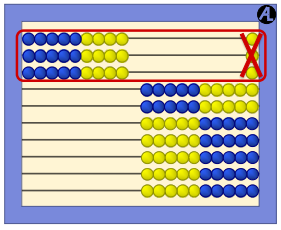
9×3



71

Multiplication

$9 \times 3 = 30 - 3 = 27$



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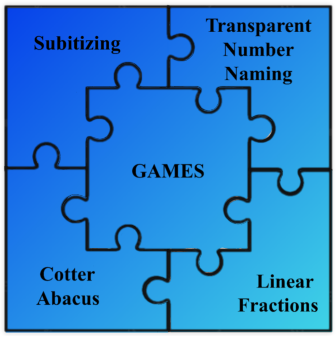
Ring Around the Product Game

2	6	3	5	1
8	54	12	42	7
5	50	15	9	8
9	1	6	8	3

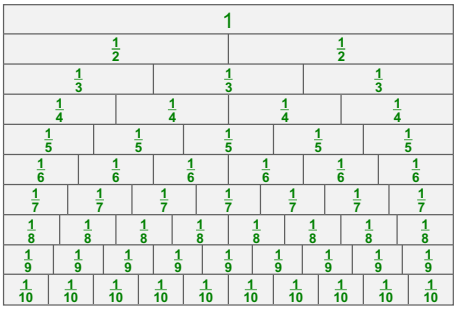
73

Unlock the Puzzle



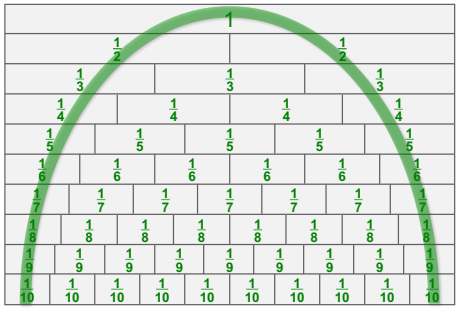
74

Fractions



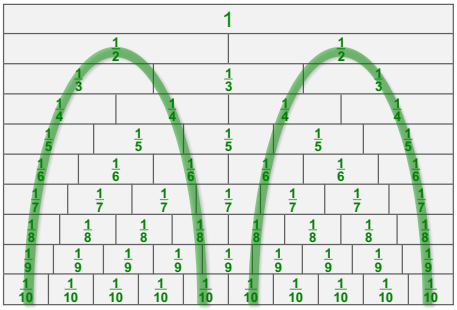
75

Fractions



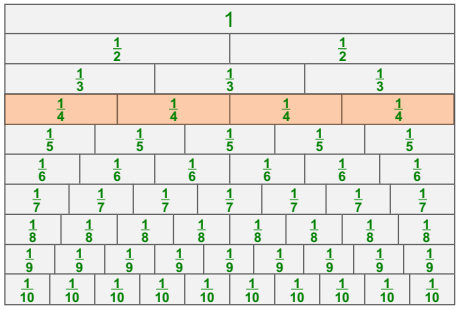
76

Fractions



77

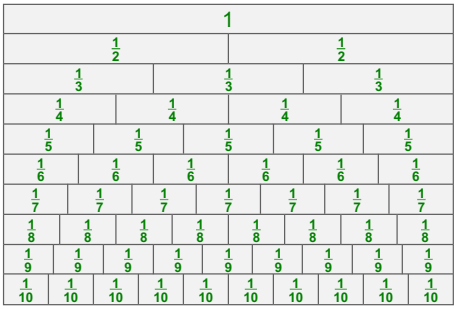
Fractions



How many fourths in a whole?

78

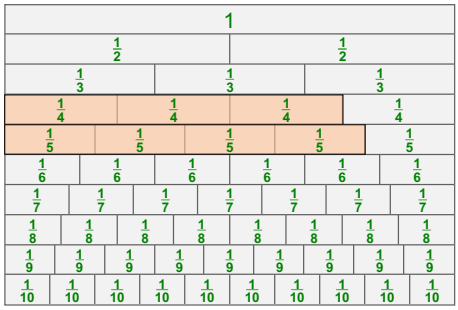
Fractions



How many fourths in a whole? How many fifths? Eighths?

79

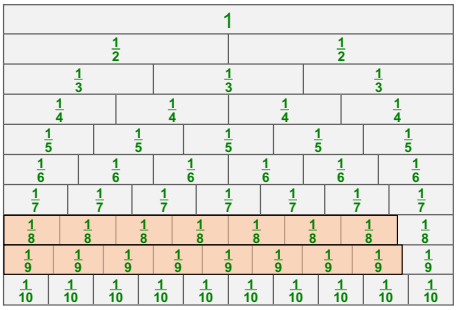
Fractions



Which is more, 3/4 or 4/5?

80

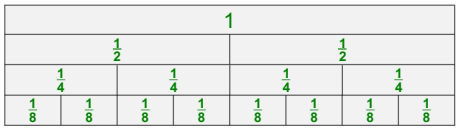
Fractions



Which is more, 7/8 or 8/9?

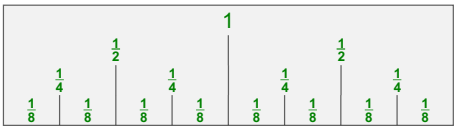
81

Partial Chart



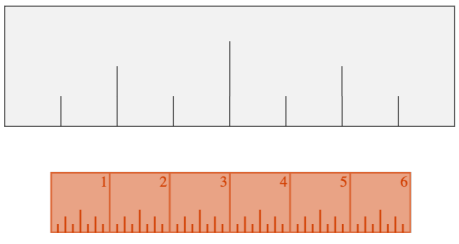
82

Partial Chart



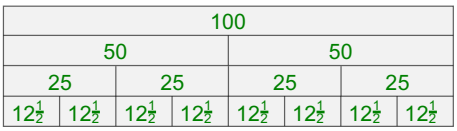
83

Partial Chart



84

Partial Chart



85

Partial Chart

100%							
50%				50%			
25%		25%		25%		25%	
$12\frac{1}{2}\%$	$12\frac{1}{2}\%$	$12\frac{1}{2}\%$	$12\frac{1}{2}\%$	$12\frac{1}{2}\%$	$12\frac{1}{2}\%$	$12\frac{1}{2}\%$	$12\frac{1}{2}\%$

86

Partial Chart

100¢									
50¢					50¢				
25¢				25¢				25¢				25¢			
$12\frac{1}{2}$¢	$12\frac{1}{2}$	$12\frac{1}{2}$	$12\frac{1}{2}$	$12\frac{1}{2}$	$12\frac{1}{2}$	$12\frac{1}{2}$	$12\frac{1}{2}$	$12\frac{1}{2}$	$12\frac{1}{2}$
10¢	10¢	10¢	10¢	10¢	10¢	10¢	10¢	10¢	10¢

87

Partial Chart

60 minutes							
30 minutes				30 minutes			
15 min		15 min		15 min		15 min	

88

Partial Chart

gallon							
half-gallon				half-gallon			
quart		quart		quart		quart	
pint	pint	pint	pint	pint	pint	pint	pint
cup	cup	cup	cup	cup	cup	cup	cup	cup	cup	cup	cup	cup	cup	cup	cup

89

Partial Chart

𝅝							
𝅗𝅥				𝅗𝅥			
♩		♩		♩		♩	
♪	♪	♪	♪	♪	♪	♪	♪

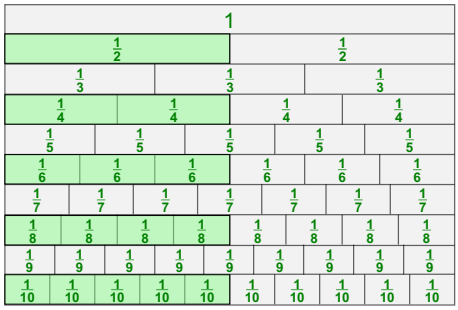
90

Simplifying Fractions

1									
$\frac{1}{2}$					$\frac{1}{2}$				
$\frac{1}{3}$			$\frac{1}{3}$			$\frac{1}{3}$			
$\frac{1}{4}$			$\frac{1}{4}$			$\frac{1}{4}$			$\frac{1}{4}$
$\frac{1}{5}$			$\frac{1}{5}$			$\frac{1}{5}$			$\frac{1}{5}$
$\frac{1}{6}$			$\frac{1}{6}$			$\frac{1}{6}$			$\frac{1}{6}$
$\frac{1}{7}$			$\frac{1}{7}$			$\frac{1}{7}$			$\frac{1}{7}$
$\frac{1}{8}$			$\frac{1}{8}$			$\frac{1}{8}$			$\frac{1}{8}$
$\frac{1}{9}$			$\frac{1}{9}$			$\frac{1}{9}$			$\frac{1}{9}$
$\frac{1}{10}$			$\frac{1}{10}$			$\frac{1}{10}$			$\frac{1}{10}$

91

Simplifying Fractions



92

Simplifying Fractions

1	2	3	4	5	6	7	8	9	10
2	4	6	8	10	12	14	16	18	20
3	6	9	12	15	18	21	24	27	30
4	8	12	16	20	24	28	32	36	40
5	10	15	20	25	30	35	40	45	50
6	12	18	24	30	36	42	48	54	60
7	14	21	28	35	42	49	56	63	70
8	16	24	32	40	48	56	64	72	80
9	18	27	36	45	54	63	72	81	90
10	20	30	40	50	60	70	80	90	100

93

Simplifying Fractions

1	2	3	4	5	6	7	8	9	10
2	4	6	8	10	12	14	16	18	20
3	6	9	12	15	18	21	24	27	30
4	8	12	16	20	24	28	32	36	40
5	10	15	20	25	30	35	40	45	50
6	12	18	24	30	36	42	48	54	60
7	14	21	28	35	42	49	56	63	70
8	16	24	32	40	48	56	64	72	80
9	18	27	36	45	54	63	72	81	90
10	20	30	40	50	60	70	80	90	100

$\frac{21}{28}$

94

Simplifying Fractions

1	2	3	4	5	6	7	8	9	10
2	4	6	8	10	12	14	16	18	20
3	6	9	12	15	18	21	24	27	30
4	8	12	16	20	24	28	32	36	40
5	10	15	20	25	30	35	40	45	50
6	12	18	24	30	36	42	48	54	60
7	14	21	28	35	42	49	56	63	70
8	16	24	32	40	48	56	64	72	80
9	18	27	36	45	54	63	72	81	90
10	20	30	40	50	60	70	80	90	100

$\frac{45}{72}$

95

Simplifying Fractions

1	2	3	4	5	6	7	8	9	10
2	4	6	8	10	12	14	16	18	20
3	6	9	12	15	18	21	24	27	30
4	8	12	16	20	24	28	32	36	40
5	10	15	20	25	30	35	40	45	50
6	12	18	24	30	36	42	48	54	60
7	14	21	28	35	42	49	56	63	70
8	16	24	32	40	48	56	64	72	80
9	18	27	36	45	54	63	72	81	90
10	20	30	40	50	60	70	80	90	100

$\frac{45}{72}$

Why does this work?

96

Simplifying Fractions

1	2	3	4	5	6	7	8	9	10
2	4	6	8	10	12	14	16	18	20
3	6	9	12	15	18	21	24	27	30
4	8	12	16	20	24	28	32	36	40
5	10	15	20	25	30	35	40	45	50
6	12	18	24	30	36	42	48	54	60
7	14	21	28	35	42	49	56	63	70
8	16	24	32	40	48	56	64	72	80
9	18	27	36	45	54	63	72	81	90
10	20	30	40	50	60	70	80	90	100

$\frac{12}{16}$

97

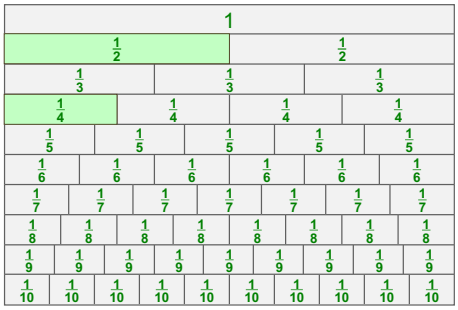
Simplifying Fractions

1	2	3	4	5	6	7	8	9	10
2	4	6	8	10	12	14	16	18	20
3	6	9	12	15	18	21	24	27	30
4	8	12	16	20	24	28	32	36	40
5	10	15	20	25	30	35	40	45	50
6	12	18	24	30	36	42	48	54	60
7	14	21	28	35	42	49	56	63	70
8	16	24	32	40	48	56	64	72	80
9	18	27	36	45	54	63	72	81	90
10	20	30	40	50	60	70	80	90	100

$\frac{12}{16}$

98

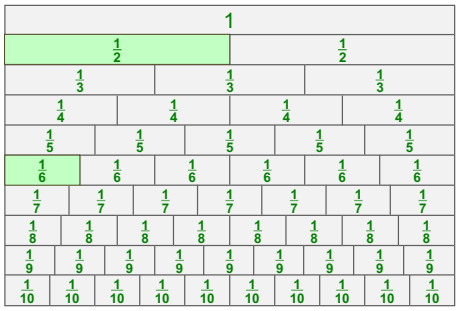
Fraction Chart



What is $\frac{1}{2}$ of $\frac{1}{2}$? $\frac{1}{4}$

99

Fraction Chart



What is $\frac{1}{3}$ of $\frac{1}{2}$? $\frac{1}{6}$ That's multiplying fractions!

100

Effective Math Users

"…The now well established fact that those who are mathematically effective in daily life seldom make use 'in their heads' of the standard written methods which are taught in the classroom."

W. H. Cockroft, 1982

eminent mathematics educator in England

101

RightStart™ Mathematics

- Uses the abacus to develop visualization.
- Teaches topics in different ways with different approaches.
- Fractions are presented in a linear format.
- Games are the practice and review.
- Uses over 20 different manipulatives.
- Arranged in levels rather than grades.

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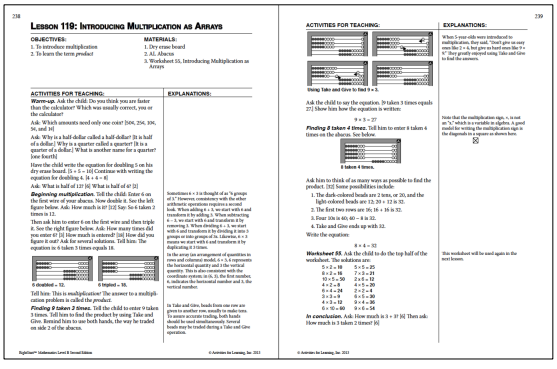
RightStart™ Mathematics



LESSON 119: INTRODUCING MULTIPLICATION AS ARRAYS

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RightStart™ Mathematics

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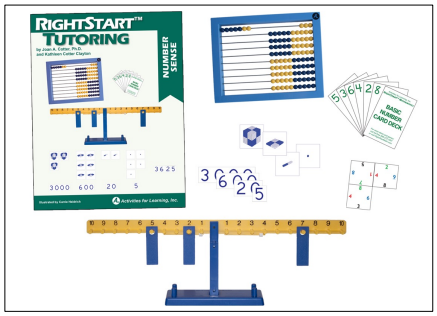
RightStart™ Tutoring



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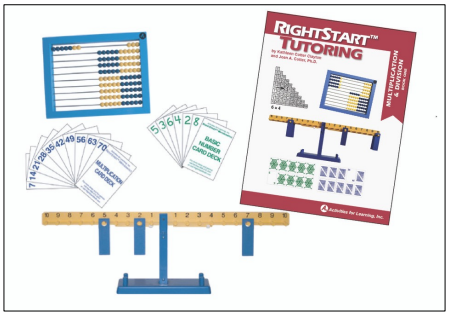
RightStart™ Tutoring



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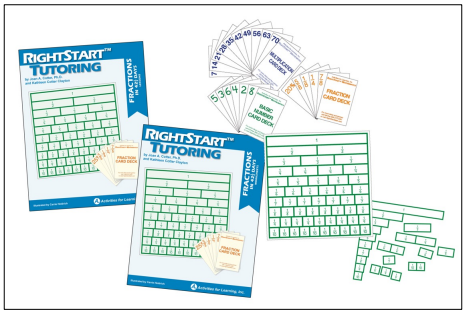
RightStart™ Tutoring



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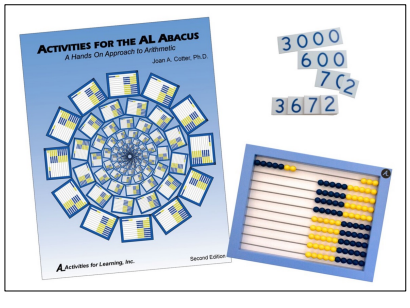

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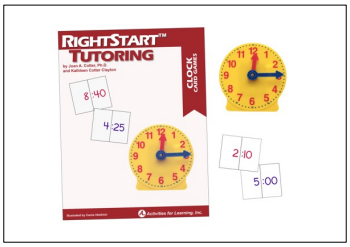

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RightStart™ Tutoring

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Awards

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Awards

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Awards

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In Conclusion …

Math needs to be taught so
95 percent is understood and
only 5 percent memorized.

Richard Skemp
– major pioneer in mathematics education

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In Conclusion …

Our goal as a teacher of mathematics
is to help our children transform,
expand, and refine these beginning ideas
into deeper mathematical thinking.

– Dr. Joan A. Cotter

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Contact Us

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- Email: info@RightStartMath.com
- Phone: 888-272-3291

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