A special thank you to Kathleen Cotter Lawler for all her work on the preparation of this manual.

Copyright © 2014 by Activities for Learning, Inc.

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without written permission of Activities for Learning, Inc.

The publisher hereby grants permission to reproduce the worksheets and appendix for a single teacher's use only.

Printed in the United States of America

www.RightStartMath.com

For more information: info@RightStartMath.com
Supplies may be ordered from: www.RightStartMath.com

Activities for Learning, Inc.
PO Box 468, 321 Hill Street
Hazelton, ND 58544-0468
United States of America
888-775-6284 or 701-782-2000
701-782-2007 fax

June 2015
## Numeration
- Can skip count by 2s, by 5s, by 10s, and by 100s to 1000
- Can compare numbers up to 1000 using <, =, and >
- Can read and construct Roman numerals to 1000
- Understands place value and can write numbers to 9999 with numerals, words, and expanded form

## Addition
- Knows addition facts
- Can add 2-digit numbers mentally
- Can add 4-digit numbers

## Subtraction
- Understands subtraction
- Knows subtraction facts
- Can subtract 2-digit numbers mentally
- Can subtract 4-digit numbers

## Multiplication
- Understands multiplication as arrays
- Knows multiplication facts to 5 × 5

## Problem Solving
- Solves problems in more than one way
- Persists in solving problems
- Can solve addition and subtraction problems
- Can solve compare problems

## Time and Money
- Can tell time to the minute
- Can find the value of up to five coins and make change

## Measurement
- Can measure in inches, feet, centimeters, and meters
- Can find perimeter and area in customary and metric
- Can read a ruler to halves

## Geometry
- Can identify basic 2D and 3D shapes
- Can determine number of angles, sides, and faces in shapes

## Fractions
- Understands fractions as a type of division
- Knows unit fractions up to 1/10

## Data
- Gathers and shows data with line plots and interprets results

## Calculator
- Can add, subtract, and multiply whole numbers
- Can solve two-step problems

---

<table>
<thead>
<tr>
<th>Name</th>
<th>Year</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Quarter 1</th>
<th>Quarter 2</th>
<th>Quarter 3</th>
<th>Quarter 4</th>
</tr>
</thead>
</table>

---

**RightStart™ Mathematics Objectives for Second Grade**
Dear Educator,

The following are some of the principles that make the RightStart™ approach different from traditional primary mathematics as taught in the U.S.

• **Minimizing counting.** We know from research that 5-month-old babies are able to add and subtract up to 3. This they do, not by counting, but by visualizing quantities. Japanese teachers believe that rote counting does not further a child's mathematical ability. In other words, counting to 100 is no more helpful in learning math than reciting the alphabet helps in learning to read. In RightStart™, visualization is emphasized.

• **Grouping in fives.** It is relatively easy to detect up to five objects—five can be distinguished from four because it has a middle while four does not. Beyond five, very few people can identify or visualize objects. Thus, the Romans grouped their numerals in fives; consider VIII (8). Orchestral arrangers grouped the 10 lines of music into two staffs with five lines. RightStart™ groups in fives and tens.

• **Naming numbers explicitly.** In the U.S. children speaking English experience considerable difficulty learning place value. Indeed, only half of them master it by the end of the fourth grade. On the other hand, Asian children master place value in the first grade. Asian languages support this understanding through explicit number naming. For example, numbers 11-13 are called “ten-1, ten-2, ten-3” and 20-22 are “2 ten, 2 ten-1, 2 ten-2.” RightStart™ introduces the explicit number naming in the early grades, then transitions to traditional names.

• **Overlapping place-value cards.** Children have difficulty with the concept that the 3 in 32 actually means 3 tens. RightStart™ uses place-value cards. For example, the card with “30” is read 3-ten. To build 32, the child places the 2-card on the 0 of the 30-card, forming 32. Note these cards encourage reading numbers in the normal left to right order.

• **Working with the AL Abacus.** To continue developing the visualization skills they possessed as infants, children use the AL Abacus. The beads are grouped in fives to allow quick recognition and subsequent visualization. The reverse side teaches trading in the thousands. To learn their facts, the AL Abacus provides children with visual strategies. Children enjoy using the AL Abacus, but it doesn't become a crutch. When 5-year-old Stan was asked, “How much is 11 + 6?” He said 17. He was asked how he knew. He replied, “I've got the abacus in my mind.”

• **Playing games.** Flash cards are not part of RightStart™. With flash cards, students do not learn better methods; they merely practice their old habits, albeit faster. Frequently, they merely become faster counters. Flash cards and timed tests come with a tremendous cost: the stress takes the joy out of learning mathematics. We have millions of people in this country who avoid math whenever possible; many have said that is the reason. Instead, the children using RightStart™ play games to become fluent with their facts and computation. Parents are encouraged to play games with their child.

• **Introducing thousands in the first grade.** To understand the never-ending pattern that ten ones equals 10, ten tens equals 100, ten hundreds equals 1000, and so forth, children must work with thousands. This gives the child the whole picture before working with details. In first grade with RightStart™, the children learn to add four-digit numbers with trading early.

• **Computing mentally.** Most people when adding 24 + 38 compute it mentally, rather than resorting to paper and pencil or a calculator. Therefore, in RightStart™, first graders learn to add two-digit numbers mentally. They use the efficient method of starting at the left.

• **Learning fractions with a linear model.** The linear model gives children an overview of fractions and allows them to see the relationship between fractions and allows understanding of fractions greater than one.

• **Using correct vocabulary.** RightStart™ stresses correct terminology. Equation, which indicates equality, is used rather than “number sentence.” The phrase “take away” is avoided because it limits students' understanding of subtraction—sometimes subtraction is going up as in making change. Trading is used instead of “regrouping” because the latter does not imply equality to children as does trading.

Helping children understand, apply, and enjoy mathematics.
We have been hearing for years that Japanese students do better than U.S. students in math in Japan. The Asian students are ahead by the middle of first grade. And the gap widens every year thereafter.

Many explanations have been given, including less diversity and a longer school year. Japanese students attend school 240 days a year.

A third explanation given is that the Asian public values and supports education more than we do. A first grade teacher has the same status as a university professor. If a student falls behind, the family, not the school, helps the child or hires a tutor. Students often attend after-school classes.

A fourth explanation involves the philosophy of learning. Asians and Europeans believe anyone can learn mathematics or even play the violin. It is not a matter of talent, but of good teaching and hard work. Although these explanations are valid, I decided to take a careful look at how mathematics is taught in Japanese first grades. Japan has a national curriculum, so there is little variation among teachers.

I found some important differences. One of these is the way the Asians name their numbers. In English we count ten, eleven, twelve, thirteen, and so on, which doesn’t give the child a clue about tens and ones. But in Asian languages, one counts by saying ten-1, ten-2, ten-3 for the teens, and 2-ten 1, 2-ten 2, and 2-ten 3 for the twenties.

Still another difference is their criteria for manipulatives. Americans think the more the better. Asians prefer very few, but insist that they be imaginable, that is, visualizable. That is one reason they do not use colored rods. You can imagine the one and the three, but try imagining a brown eight—the quantity eight, not the color. It cannot be done without grouping.

Another important difference is the emphasis on non-counting strategies for computation. Japanese children are discouraged from counting; rather they are taught to see quantities in groups of fives and tens. For example, when an American child wants to know 9 + 4, most likely the child will start with 9 and count up 4. In contrast, the Asian child will think that if he takes 1 from the 4 and puts it with the 9, then he will have 10 and 3, or 13. Unfortunately, very few American first-graders at the end of the year even know that 10 + 3 is 13.

I decided to conduct research using some of these ideas in two similar first grade classrooms. The control group studied math in the traditional workbook-based manner. The other class used the lesson plans I developed. The children used that special number naming for three months.

They also used a special abacus I designed, based on fives and tens. I asked 5-year-old Stan how much is 11 + 6. Then I asked him how he knew. He replied, “I have the abacus in my mind.”

The children were working with thousands by the sixth week. They figured out how to add 4-digit numbers on paper after learning how on the abacus. Every child in the experimental class, including those enrolled in special education classes, could add numbers like 9 + 4, by changing it to 10 + 3.

I asked the children to explain what the 6 and 2 mean in the number 26. Ninety-three percent of the children in the experimental group explained it correctly while only 50% of third graders did so in another study.

I gave the children some base ten rods (none of them had seen them before) that looked like ones and tens and asked them to make 48. Then I asked them to subtract 14. The children in the control group counted 14 ones, while the experimental class removed 1 ten and 4 ones. This indicated that they saw 14 as 1 ten and 4 ones and not as 14 ones. This view of numbers is vital to understanding algorithms, or procedures, for doing arithmetic.

I asked the experimental class to mentally add 64 + 20, which only 52% of nine-year-olds on the 1986 National test did correctly; 56% of those in the experimental class could do it.

Since children often confuse columns when taught traditionally, I wrote 2304 + 86 = horizontally and asked them to find the sum any way they liked. Fifty-six percent did so correctly, including one child who did it in his head.

The following year I revised the lesson plans and both first grade classes used these methods. I am delighted to report that on a national standardized test, both classes scored at the 98th percentile.

Joan A. Cotter, Ph.D.
Some General Thoughts on Teaching Mathematics

1. Only five percent of mathematics should be learned by rote; 95 percent should be understood.

2. Real learning builds on what the child already knows. Rote teaching ignores it.

3. Contrary to the common myth, “young children can think both concretely and abstractly. Development is not a kind of inevitable unfolding in which one simply waits until a child is cognitively ‘ready.’” —Foundations for Success NMAP

4. What is developmentally appropriate is not a simple function of age or grade, but rather is largely contingent on prior opportunities to learn.” —Duschl & others

5. Understanding a new model is easier if you have made one yourself. So, a child needs to construct a graph before attempting to read a ready-made graph.

6. Good manipulatives cause confusion at first. If a new manipulative makes perfect sense at first sight, it is not needed. Trying to understand and relate it to previous knowledge is what leads to greater learning. —Richard Behr & others.

7. According to Arthur Baroody, ”Teaching mathematics is essentially a process of translating mathematics into a form children can comprehend, providing experiences that enable children to discover relationships and construct meanings, and creating opportunities to develop and exercise mathematical reasoning.”

8. Lauren Resnick says, “Good mathematics learners expect to be able to make sense out of rules they are taught, and they apply some energy and time to the task of making sense. By contrast, those less adept in mathematics try to memorize and apply the rules that are taught, but do not attempt to relate these rules to what they know about mathematics at a more intuitive level.”

9. Mindy Holte puts learning the facts in proper perspective when she says, “In our concern about the memorization of math facts or solving problems, we must not forget that the root of mathematical study is the creation of mental pictures in the imagination and manipulating those images and relationships using the power of reason and logic.” She also emphasizes the ability to imagine or visualize, an important skill in mathematics and other areas.

10. The only students who like flash cards are those who do not need them.

11. Mathematics is not a solitary pursuit. According to Richard Skemp, solitary math on paper is like reading music, rather than listening to it: “Mathematics, like music, needs to be expressed in physical actions and human interactions before its symbols can evoke the silent patterns of mathematical ideas (like musical notes), simultaneous relationships (like harmonies) and expositions or proofs (like melodies).”

12. “More than most other school subjects, mathematics offers special opportunities for children to learn the power of thought as distinct from the power of authority. This is a very important lesson to learn, an essential step in the emergence of independent thinking.” —Everybody Counts
13. The role of the teacher is to encourage thinking by asking questions, not giving answers. Once you give an answer, thinking usually stops.

14. Putting thoughts into words helps the learning process.

15. Help the children realize that it is their responsibility to ask questions when they do not understand. Do not settle for “I don’t get it.”

16. The difference between a novice and an expert is that an expert catches errors much more quickly. A violinist adjusts pitch so quickly that the audience does not hear it.

17. Europeans and Asians believe learning occurs not because of ability, but primarily because of effort. In the ability model of learning, errors are a sign of failure. In the effort model, errors are natural. In Japanese classrooms, the teachers discuss errors with the whole class.

18. For teaching vocabulary, be sure either the word or the concept is known. For example, if a child is familiar with six-sided figures, we can give him the word, hexagon. Or, if he has heard the word, multiply, we can tell him what it means. It is difficult to learn a new concept and the term simultaneously.

19. Introduce new concepts globally before details. This lets the children know where they are headed.

20. Informal mathematics should precede paper and pencil work. Long before a child learns how to add fractions with unlike denominators, she should be able to add one half and one fourth mentally.

21. Some pairs of concepts are easier to remember if one of them is thought of as dominant. Then the non-dominant concept is simply the other one. For example, if even is dominant over odd; an odd number is one that is not even.

22. Worksheets should also make the child think. Therefore, they should not be a large collection of similar exercises, but should present a variety. In RightStart™ Mathematics, they are designed to be done independently.

23. Keep math time enjoyable. We store our emotional state along with what we have learned. A person who dislikes math will avoid it and a child under stress stops learning. If a lesson is too hard, stop and play a game. Try the lesson again later.

24. In Japan students spend more time on fewer problems. Teachers do not concern themselves with attention spans as is done in the U.S.

25. In Japan the goal of the math lesson is that the student has understood a concept, not necessarily has done something (a worksheet).

26. The calendar must show the entire month, so the children can plan ahead. The days passed can be crossed out or the current day circled.

27. A real mathematical problem is one in which the procedures to find the answer is not obvious. It is like a puzzle, needing trial and error. Emphasize the satisfaction of solving problems and like puzzles, of not giving away the solution to others.
Ten major characteristics make this research-based program effective:

1. Refers to quantities of up to 5 as a group; discourages counting individually. Uses fingers and tally sticks to show quantities up to 10; teaches quantities 6 to 10 as 5 plus a quantity, for example 6 = 5 + 1.

2. Avoids counting procedures for finding sums and remainders. Teaches five- and ten-based strategies for the facts that are both visual and visualizable.

3. Employs games, not flash cards, for practice.

4. Once quantities 1 to 10 are known, proceeds to 10 as a unit. Temporarily uses the “math way” of naming numbers; for example, “1 ten-1” (or “ten-1”) for eleven, “1-ten 2” for twelve, “2-ten” for twenty, and “2-ten 5” for twenty-five.

5. Uses expanded notation (overlapping) place-value cards for recording tens and ones; the ones card is placed on the zero of the tens card. Encourages a child to read numbers starting at the left and not backward by starting at the ones.

6. Proceeds rapidly to hundreds and thousands using manipulatives and place-value cards. Provides opportunities for trading between ones and tens, tens and hundreds, and hundreds and thousands with manipulatives.

7. Teaches mental computation. Investigates informal solutions, often through story problems, before learning procedures.

8. Teaches four-digit addition on the abacus, letting the child discover the paper and pencil algorithm.

9. Introduces fractions with a linear visual model, including all fractions from 1/2 to 1/10. “Pies” are not used initially because they cannot show fractions greater than 1. Later, the tenths will become the basis for decimals.

10. Teaches short division (where only the answer is written down) for single-digit divisors, before long division.

Second Edition

Many changes have occurred since the first RightStart™ lessons were begun in 1994. First, mathematics is used more widely in many fields, for example, architecture, science, technology, and medicine. Today, many careers require math beyond basic arithmetic. Second, research has given us new insights into how children learn mathematics. Third, kindergarten has become much more academic, and fourth, most children are tested to ensure their preparedness for the next step. This second edition is updated to reflect new research and applications. RightStart™ Mathematics Second Edition, incorporates the Common Core State Standards as the basic minimum. Topics within a grade level are always taught with the most appropriate method using the best approach with the child and teacher in mind.
Daily Lessons

**Objectives.** The objectives outline the purpose and goal of the lesson. Some possibilities are to introduce, to build, to learn a term, to practice, or to review.

**Materials.** The Math Set of manipulatives includes the specially crafted items needed to teach RightStart™ Mathematics. Occasionally, common objects such as scissors will be needed. These items are indicated by boldface type.

**Warm-up.** The warm-up time is the time for quick review, memory work, and sometimes an introduction to the day’s topics. The dry erase board makes an ideal slate for quick responses.

**Activities.** The Activities for Teaching section is the heart of the lesson; it starts on the left page and continues to the right page. These are the instructions for teaching the lesson. The expected answers from the child are given in square brackets.

Establish with the children some indication when you want a quick response and when you want a more thoughtful response. Research shows that the quiet time for thoughtful response should be about three seconds. Avoid talking during this quiet time; resist the temptation to rephrase the question. This quiet time gives the slower child time to think and the quicker child time to think more deeply.

Encourage the child to develop persistence and perseverance. Avoid giving hints or explanations too quickly. Children tend to stop thinking once they hear the answer.

**Explanations.** Special background notes for the teacher are given in Explanations.

**Worksheets.** The worksheets are designed to give the children a chance to think about and to practice the day’s lesson. The children are to do them independently. Some lessons, especially in the early levels, have no worksheet.

**Games.** Games, not worksheets or flash cards, provide practice. The games, found in the Math Card Games book, can be played as many times as necessary until proficiency or memorization takes place. They are as important to learning math as books are to reading. The Math Card Games book also includes extra games for the child needing more help, and some more challenging games for the advanced child.

**In conclusion.** Each lesson ends with a short summary called, “In conclusion,” where the child answers a few short questions based on the day’s learning.

**Number of lessons.** Generally, each lesson is be done in one day and each manual, in one school year. Complete each manual before going on to the next level. Other than Level A, the first lesson in each level is an introductory test with references to review lessons if needed.

**Comments.** We really want to hear how this program is working. Please let us know any improvements and suggestions that you may have.

Joan A. Cotter, Ph.D.
info@RightStartMath.com
www.RightStartMath.com
SECOND GRADE: TABLE OF CONTENTS

Lesson 1  Review Subitizing Quantities 1 to 7
Lesson 2  Review Subitizing Quantities 8 to 10
Lesson 3  Review Tens and Ones on the Abacus
Lesson 4  Review Hundreds on the Abacus
Lesson 5  Review The Math Balance
Lesson 6  Review Part-Whole Circle Sets
Lesson 7  Ones Strategy on the Addition Table
Lesson 8  Twos Strategy on the Addition Table
Lesson 9  Tens and Near Tens on the Addition Table
Lesson 10 Two-Fives Strategy on the Addition Table
Lesson 11 Doubles Strategies on the Addition Table
Lesson 12 Making Ten Strategy on the Addition Table
Lesson 13 The Completed Addition Table
Lesson 14 Evens and Odds
Lesson 15 Early Roman Numerals from 1 to 49
Lesson 16 Early Roman Numerals from 1 to 499
Lesson 17 Roman Numerals from 1 to 4999
Lesson 18 Trading on Side 2 of the AL Abacus
Lesson 19 Adding on Side 2 of the AL Abacus
Lesson 20 Adding 2-Digit Numbers
Lesson 21 Mental Addition
Lesson 22 Adding Several 2-Digit Numbers
Lesson 23 Review and Games 1
Lesson 24 Composing Numbers in the Thousands
Lesson 25 Adding 1, 10, and 100 to Numbers
Lesson 26 Comparing Numbers
Lesson 27 Adding with Base-10 Picture Cards
Lesson 28 More Adding with Base-10 Picture Cards
Lesson 29 Adding 4-Digit Numbers on the AL Abacus
Lesson 30 Adding 4-Digit Numbers on Paper
Lesson 31 Review and Games 2
Lesson 32 Introducing Arrays
Lesson 33 Multiplication through Arrays
Lesson 34 Comparing Addition and Multiplication
Lesson 35 Multiplication Equations
# Second Grade: Table of Contents

<table>
<thead>
<tr>
<th>Lesson 36</th>
<th>Multiples of 2 to 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lesson 37</td>
<td>Area</td>
</tr>
<tr>
<td>Lesson 38</td>
<td>Area and Perimeter</td>
</tr>
<tr>
<td>Lesson 39</td>
<td>Assessment Review 1</td>
</tr>
<tr>
<td>Lesson 40</td>
<td>Review Games</td>
</tr>
<tr>
<td>Lesson 41</td>
<td>Assessment 1</td>
</tr>
<tr>
<td>Lesson 42</td>
<td>Solving Missing Addend Problems</td>
</tr>
<tr>
<td>Lesson 43</td>
<td>Ones and Twos Subtraction Strategies</td>
</tr>
<tr>
<td>Lesson 44</td>
<td>Consecutive Numbers Subtraction Strategies</td>
</tr>
<tr>
<td>Lesson 45</td>
<td>Tens and Near Tens Subtraction Strategies</td>
</tr>
<tr>
<td>Lesson 46</td>
<td>Subtracting from Five Strategy</td>
</tr>
<tr>
<td>Lesson 47</td>
<td>Subtracting from Ten Strategies</td>
</tr>
<tr>
<td>Lesson 48</td>
<td>Subtraction Facts Practice</td>
</tr>
<tr>
<td>Lesson 49</td>
<td>More Subtraction Facts Practice</td>
</tr>
<tr>
<td>Lesson 50</td>
<td>Completing the Subtraction Table</td>
</tr>
<tr>
<td>Lesson 51</td>
<td>Review and Games 4</td>
</tr>
<tr>
<td>Lesson 52</td>
<td>Subtracting Fives and Tens</td>
</tr>
<tr>
<td>Lesson 53</td>
<td>Subtracting 1-Digit Numbers</td>
</tr>
<tr>
<td>Lesson 54</td>
<td>Subtracting 2-Digit Numbers</td>
</tr>
<tr>
<td>Lesson 55</td>
<td>Finding and Correcting Errors</td>
</tr>
<tr>
<td>Lesson 56</td>
<td>Subtracting from One Hundred</td>
</tr>
<tr>
<td>Lesson 57</td>
<td>More Subtracting 2-Digit Numbers</td>
</tr>
<tr>
<td>Lesson 58</td>
<td>Tens and Subtracting 2-Digit Numbers</td>
</tr>
<tr>
<td>Lesson 59</td>
<td>Review and Games 5</td>
</tr>
<tr>
<td>Lesson 60</td>
<td>Drawing Five-Sided Stars</td>
</tr>
<tr>
<td>Lesson 61</td>
<td>Drawing Horizontal Lines</td>
</tr>
<tr>
<td>Lesson 62</td>
<td>Drawing Vertical Lines</td>
</tr>
<tr>
<td>Lesson 63</td>
<td>Drawing Diagonals in a Hexagon</td>
</tr>
<tr>
<td>Lesson 64</td>
<td>Dividing Equilateral Triangles into Halves</td>
</tr>
<tr>
<td>Lesson 65</td>
<td>Dividing Equilateral Triangles into Thirds</td>
</tr>
<tr>
<td>Lesson 66</td>
<td>Dividing Equilateral Triangles into Fourths</td>
</tr>
<tr>
<td>Lesson 67</td>
<td>Making Pyramids</td>
</tr>
<tr>
<td>Lesson 68</td>
<td>Dividing Equilateral Triangles into Twelfths</td>
</tr>
<tr>
<td>Lesson 69</td>
<td>Dividing Equilateral Triangles into Sixths</td>
</tr>
<tr>
<td>Lesson 70</td>
<td>Enrichment More Dividing Triangles</td>
</tr>
</tbody>
</table>
**Second Grade: Table of Contents**

<table>
<thead>
<tr>
<th>Lesson</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>71</td>
<td>Drawing a Star in a Hexagon</td>
</tr>
<tr>
<td>72</td>
<td>Drawing Another Star in the Hexagon</td>
</tr>
<tr>
<td>73</td>
<td>Tessellating</td>
</tr>
<tr>
<td>74</td>
<td>Geometry Terms and Symmetry</td>
</tr>
<tr>
<td>75</td>
<td>Assessment Review 2</td>
</tr>
<tr>
<td>76</td>
<td>Tessellation Art and Game Day</td>
</tr>
<tr>
<td>77</td>
<td>Assessment 2</td>
</tr>
<tr>
<td>78</td>
<td>Reading Scales</td>
</tr>
<tr>
<td>79</td>
<td>Drawing a Clock</td>
</tr>
<tr>
<td>80</td>
<td>Hours in a Day</td>
</tr>
<tr>
<td>81</td>
<td>Hours and Minutes on a Clock</td>
</tr>
<tr>
<td>82</td>
<td>Telling Time to Five Minutes</td>
</tr>
<tr>
<td>83</td>
<td>More Telling Time</td>
</tr>
<tr>
<td>84</td>
<td>Telling Time to the Minute</td>
</tr>
<tr>
<td>85</td>
<td>Review and Games 7</td>
</tr>
<tr>
<td>86</td>
<td>Comparison Problems with More</td>
</tr>
<tr>
<td>87</td>
<td>Comparison Problems with Fewer or Less</td>
</tr>
<tr>
<td>88</td>
<td>Subtracting with Base-10 Picture Cards</td>
</tr>
<tr>
<td>89</td>
<td>Subtracting on Side 2 of the AL Abacus</td>
</tr>
<tr>
<td>90</td>
<td>Recording Subtracting on Paper</td>
</tr>
<tr>
<td>91</td>
<td>Subtraction Activities</td>
</tr>
<tr>
<td>92</td>
<td>More Subtraction Activities</td>
</tr>
<tr>
<td>93</td>
<td>Review and Games 8</td>
</tr>
<tr>
<td>94</td>
<td>Pennies, Nickels, and Dimes</td>
</tr>
<tr>
<td>95</td>
<td>Adding the Value of Coins</td>
</tr>
<tr>
<td>96</td>
<td>Making Change from Fifty Cents</td>
</tr>
<tr>
<td>97</td>
<td>Ways to Make a Dollar</td>
</tr>
<tr>
<td>98</td>
<td>Making Change from a Dollar</td>
</tr>
<tr>
<td>99</td>
<td>Dollars and Cents</td>
</tr>
<tr>
<td>100</td>
<td>Money Problems</td>
</tr>
<tr>
<td>101</td>
<td>Review and Games 9</td>
</tr>
<tr>
<td>102</td>
<td>Measuring in Centimeters</td>
</tr>
<tr>
<td>103</td>
<td>Measuring in Centimeters and Inches</td>
</tr>
<tr>
<td>104</td>
<td>Measuring in Feet</td>
</tr>
<tr>
<td>105</td>
<td>Problems Using Feet</td>
</tr>
<tr>
<td>Lesson 106</td>
<td>Measuring with the Meter Stick</td>
</tr>
<tr>
<td>Lesson 107</td>
<td>Estimating Lengths</td>
</tr>
<tr>
<td>Lesson 108</td>
<td>Reading Rulers</td>
</tr>
<tr>
<td>Lesson 109</td>
<td>Measuring Area</td>
</tr>
<tr>
<td>Lesson 110</td>
<td>Area on Geoboards</td>
</tr>
<tr>
<td>Lesson 111</td>
<td>Review and Games 10</td>
</tr>
<tr>
<td>Lesson 112</td>
<td>Introducing Line Plots</td>
</tr>
<tr>
<td>Lesson 113</td>
<td>Addition Sums Line Plot</td>
</tr>
<tr>
<td>Lesson 114</td>
<td>Area Line Plots</td>
</tr>
<tr>
<td>Lesson 115</td>
<td>Making Squares with Tangrams</td>
</tr>
<tr>
<td>Lesson 116</td>
<td>Making Rectangles with Tangrams</td>
</tr>
<tr>
<td>Lesson 117</td>
<td>Making Trapezoids with Tangrams</td>
</tr>
<tr>
<td>Lesson 118</td>
<td>Making Reflections with Tangrams</td>
</tr>
<tr>
<td>Lesson 119</td>
<td>Missing Factors</td>
</tr>
<tr>
<td>Lesson 120</td>
<td>More Missing Factors</td>
</tr>
<tr>
<td>Lesson 121</td>
<td>Introducing Division</td>
</tr>
<tr>
<td>Lesson 122</td>
<td>Unit Fractions</td>
</tr>
<tr>
<td>Lesson 123</td>
<td>Fraction Chart Project</td>
</tr>
<tr>
<td>Lesson 124</td>
<td>Non-Unit Fractions</td>
</tr>
<tr>
<td>Lesson 125</td>
<td>Solving Fractional Problems</td>
</tr>
<tr>
<td>Lesson 126</td>
<td>Two Fractions Equaling One</td>
</tr>
<tr>
<td>Lesson 127</td>
<td>One Made with Halves, Quarters, &amp; Eighths</td>
</tr>
<tr>
<td>Lesson 128</td>
<td>Fractions Games</td>
</tr>
<tr>
<td>Lesson 129</td>
<td>Introducing Negative Numbers</td>
</tr>
<tr>
<td>Lesson 130</td>
<td>More Negative Numbers</td>
</tr>
<tr>
<td>Lesson 131</td>
<td>Building Prisms and Pyramids</td>
</tr>
<tr>
<td>Lesson 132</td>
<td>Comparing Cubes</td>
</tr>
<tr>
<td>Lesson 133</td>
<td>Geometry Review</td>
</tr>
<tr>
<td>Lesson 134</td>
<td>Geometry Assessment</td>
</tr>
<tr>
<td>Lesson 135</td>
<td>Measurement and Data Review and Games</td>
</tr>
<tr>
<td>Lesson 136</td>
<td>Measurement and Data Assessment</td>
</tr>
<tr>
<td>Lesson 137</td>
<td>Numbers &amp; Operations in Base Ten Review</td>
</tr>
<tr>
<td>Lesson 138</td>
<td>Numbers &amp; Operations in Base Ten Assessment</td>
</tr>
<tr>
<td>Lesson 139</td>
<td>Operations &amp; Algebraic Thinking Review</td>
</tr>
<tr>
<td>Lesson 140</td>
<td>Operations &amp; Algebraic Thinking Assessment</td>
</tr>
</tbody>
</table>
## Lesson 26: Comparing Numbers

### Objectives:
1. To compare numbers using =, <, and > symbols

### Materials:
1. Dry erase boards
2. Worksheet 9, Comparing Numbers

### Activities for Teaching:


Write for all to see 1000 + 800 + 30 + 1. Ask the children to write their answer on their dry erase board. [1831]
Repeat for 8000 + 100 + 40 + 5. [8145]

Ask: Which is more, ten hundreds or one thousand? [same] Which is more, one hundred or one thousand? [one thousand]

**Comparing numbers.** Write for the children to see:

\[
\begin{align*}
9 & \quad 6 + 3 \\
10 & \quad 6 + 3 \\
10 & \quad 6 + 3
\end{align*}
\]


Below the first equation, write:

\[
10 \quad 6 + 3
\]

Ask: Is 10 equal to 6 plus 3? [no] Is 10 greater than or less than 6 + 3? [greater]

**The > symbol.** Show them how to write the greater than symbol by starting at the top of the larger number, draw a line to the middle of the smaller number, and finish by drawing to the bottom of the larger number. See below.

\[
10 \quad 6 + 3
\]

**The < symbol.** Tell the children suppose the equation is changed and written as:

\[
6 + 3 \quad 10
\]

Write the equation below the first two equations. Ask: What symbol do we need now? [less than] Tell them we can write it the same way by starting at the larger number. See below.

\[
6 + 3 \quad 10
\]

### Explanations:

The > and < symbols were taught in first grade by drawing two dots at the greater number and one dot at the lesser number, and then connecting the dots.

\[
10 \quad 6 + 3
\]

RightStart™ Mathematics Second Grade Second Edition © Activities for Learning, Inc. 2014
**ACTIVITIES FOR TEACHING:**

**Reading the > and < symbols.** Show the children how to tell the difference when reading the greater than and less than symbols. Write >, cover it, and slowly uncover it from left to right as shown below on the left. Ask: How many points do you see? [2] Say: Two points mean greater than. Repeat for the < symbol, uncovering it from left to right as shown below on the right. Ask: How many points do you see? [1] Say: One point means less than.

![Reading the > symbol.](image)

![Reading the < symbol.](image)

Write the three equations and ask the children to read them aloud.

9 = 6 + 3 [Nine equals six plus three.]
10 > 6 + 3 [Ten is greater than six plus three.]
6 + 3 < 10 [Six plus three is less than ten.]

**More comparisons.** Write the following:

48  40 + 7

Ask: Which symbol do we need? [>] Ask a child to explain their answer. [48 is 40 plus 8, which is more than 40 plus 7.]

Write another example:

201 + 10  211

Ask: Which symbol do we need? [=] Ask a child to explain their answer. [1 plus 10 = 11; 200 plus 11 does equal 211.]

Write a third example:

863 + 1  861 + 10

Ask: Which symbol do we need? [<] Ask a child to explain their answer. [863 plus 1 equals 864; 861 plus 10 equals 871, which is more than 864.]

**Worksheet 9.** Give the children the worksheets and have them complete the equations. The solutions are below.

<table>
<thead>
<tr>
<th>38 + 6 &gt; 30 + 6</th>
<th>99 + 64 &lt; 100 + 64</th>
</tr>
</thead>
<tbody>
<tr>
<td>506 &lt; 560</td>
<td>211 &gt; 200 + 10</td>
</tr>
<tr>
<td>99 + 10 = 109</td>
<td>99 + 100 &gt; 190</td>
</tr>
<tr>
<td>250 + 10 = 251 + 9</td>
<td>89 + 63 &lt; 100 + 73</td>
</tr>
<tr>
<td>700 + 80 &gt; 708</td>
<td>38 = 30 + 8</td>
</tr>
<tr>
<td>1000 = 300 + 700</td>
<td>461 &gt; 400 + 60</td>
</tr>
<tr>
<td>611 + 100 &gt; 611 + 10</td>
<td>95 + 10 + 5 = 110</td>
</tr>
<tr>
<td>455 + 10 + 1 &gt; 100 + 365</td>
<td></td>
</tr>
</tbody>
</table>

**In conclusion.** Ask: What is the mathematical word for more? [greater] What is the opposite of greater? [less] Name all numbers greater than 5 and less than 9. [6, 7, and 8]
Write >, <, or = on the lines to make the equations true.

38 + 6 ___ 30 + 6  
99 + 64 ___ 100 + 64

506 ___ 560  
211 ___ 200 + 10

99 + 10 ___ 109  
99 + 100 ___ 190

250 + 10 ___ 251 + 9  
89 + 63 ___ 100 + 73

700 + 80 ___ 708  
38 ___ 30 + 8

1000 ___ 300 + 700  
461 ___ 400 + 60

Write >, <, or = and explain your answer.

611 + 100 ___ 611 + 10

95 + 10 + 5 ___ 110

455 + 10 + 1 ___ 100 + 365
Lesson 38: Area and Perimeter

Objectives:
1. To introduce the term perimeter
2. To learn about square inches
3. To learn about square cm

Materials:
1. AL Abacuses
2. Tiles
3. Centimeter cubes
4. Worksheet 17, Area and Perimeter

Activities for Teaching:

Warm-up. Ask: What is area? [the space that something takes up]

Ask the children to say the multiples of 4 as a child moves over groups of 4s on the abacus to 40. [4, 8, 12, . . . , 40]
Ask the children to say the multiples of 3 to 30. [3, 6, 9, . . . , 30]


Inches. Distribute the tiles and centimeter cubes to the children. Tell them to look at one tile. See the left figure below. Remind them that the distance along one edge is 1 inch. Ask: What is the distance around the whole square? [4 inches]

Tell them the math word for distance around a shape is perimeter. Ask: What is the perimeter of one tile? [4 inches] Show them how to write it:

4 inches

Tell them to place another tile next to the first tile as shown above in the second figure. Ask: What is the perimeter now? [6 inches] Ask a child to write it for all to see.

6 inches

Explanations:

To remember the basic meaning of the word perimeter, some children might find it helpful to point to each side of a rectangle while saying “pe-rim-e-ter” as shown below:

pe- rim- e- ter
Worksheet 17, problems 1 and 2. Distribute the worksheets. Tell the children to solve the first two problems. Remind them to write the word inches. See the figures below.

1. \(2 + 2 + 2 + 2 = 8 \text{ inches}\)
2. \(4 + 2 + 4 + 2 = 12 \text{ inches}\)

Ask for explanations on how to solve the problems.

**Square inches.** Tell them to look again at one tile. Say: We can measure area with these tiles. The area of one tile is 1 square inch. Ask: What is the area of 2 tiles? [2 square inches]

**Problems 3 and 4.** Tell the children to solve problems 3 and 4. Remind them to write the words square inches. See the same figures above.

Ask for explanations. The areas are:
3. 2 by 2 = 4 square inches
4. 4 by 2 = 8 square inches

Ask: Do you think rectangle G is twice as large as rectangle F? [Yes, rectangle F is 4 square inches and rectangle G is 8 square inches, which is twice as much.]


**Square centimeters.** Tell them to look at one centimeter cube. Say: We measured area with these cubes in the last lesson. Ask: What do you think we call the area of one cube? [square centimeter]

**Problems 5–8.** Ask the children to finish the worksheet. Tell them that they do not have to fill in the whole rectangles with the cubes if they can figure out the answers without all of them. The solutions are shown below.

5. \(5 + 5 + 5 + 5 = 20 \text{ cm}\)
6. \(10 + 5 + 10 + 5 = 30 \text{ cm}\)
7. \(5 \text{ by } 5 = 25 \text{ sq cm}\)
8. \(10 \text{ by } 5 = 50 \text{ sq cm}\)

**In conclusion.** Ask: What is perimeter? [the distance around] What is area? [the amount of space something takes up]

The term sq cm is used only temporarily. The standard cm² will be introduced later.

2.MD.4, 2.OA.4
Worksheet 17, Area and Perimeter

Name: ____________________________
Date: ____________________________

1. Find the perimeter of rectangle F with tiles.

2. Find the perimeter of rectangle G with tiles.

3. Find the area of rectangle F with tiles.

4. Find the area of rectangle G with tiles.

5. Find the perimeter of rectangle F with centimeter cubes.

6. Find the perimeter of rectangle G with centimeter cubes.

7. Find the area of rectangle F with centimeter cubes.

8. Find the area of rectangle G with centimeter cubes.
# Lesson 86: Comparison Problems with More

## Objectives:
1. To solve word problems that compare using the word *more*

## Materials:
1. Base-10 picture cards
2. Place-value cards
3. Worksheet 54, Comparison Problems with More
4. AL Abacuses

## Activities for Teaching:

### Warm-up.
Show a 10 from the base-10 cards and say: Suppose I had 80 of these cards. Ask: How much would it show? [800] Have a child explain it. [Each group of ten cards is 100, so 8 groups of 10 would be 800.] Show the 800 place-value card and ask: Is it the same? [yes] Why? [it shows 80-ten or 8 hundred]

Ask: Which is more, 2 thousand or 6 hundred? [2 thousand] Which is greater, 1 thousand or 10 hundred? [same] Which is less, 1 hundred or 11? [11]


### Worksheet 54.
Distribute the worksheets and abacuses. Explain to the children that we have done story problems where things were put together or partitioned. The problems for today and in the next lesson are compare problems. This means we will compare two things and think about which is longer, shorter, taller, more, less, fewer, and so on.

**Problem 1.**
Tell the children to read the first problem.

Mr. Black is 6 feet tall. His son is 4 feet tall. How much taller is the father?

Tell them to show it on their abacuses. See the left figure below. Ask: What is the larger amount? [6] Tell the children to write the larger amount in the whole-circle. Ask: What is the smaller amount being compared? [4] Tell them to write it in the left part-circle. Ask: What is the difference? [2] Tell them to write the difference in the right part-circle. See below. Tell the children to write the equation. \[6 - 4 = \boxed{2 \text{ feet}}\]

### Explanations:
This lesson is a mixture of compare problems to discourage the children from memorizing a particular procedure.

The answer is underlined so that the missing portion of the equation is quickly identified.

![Showing the difference of 2.](image)
Model checking. Draw a part-whole circle set as shown on the right. Tell them it is a math model for solving compare problems.

**Problem 2.** Ask the children to read and solve problem 2.

Mrs. Jackson is 170 cm tall. Her daughter is 119 cm tall. How much taller is the mother? \[170 - 119 = 51\, \text{cm}\]

Then ask them to compare results with their partners.

**Problem 3.** Tell the children to read problem 3.

Jasmine has five pillows. Oliver has four more pillows than Jasmine. How many pillows does Oliver have?

Ask: Who has more pillows, Jasmine or Oliver? [Oliver] How do you know? [Oliver has four more than Jasmine.] Tell them to show it on the abacus. Then ask: Are the five pillows the larger or smaller set? [smaller] Ask: What is the four? [difference] Tell them to solve the problem on their worksheets. See below. Discuss their solutions.

![Part-whole circle set model for compare problems.](image)

5 pillows and 4 more for Oliver.

Ask: Does the answer make sense? [Jasmine has 5. Oliver has 9, which is 4 more than Jasmine.]

**Problem 4.** Tell them to solve problem 4.

Logan has 12 more cherries than Matt. Matt has 25 cherries. How many cherries does Logan have? \[25 + 12 = 37\]

**Problem 5.** Tell the children to read problem 5.

Shauna has 3 more flowers than Jacob. Shauna has 5 flowers. How many flowers does Jacob have?

Ask: Are the three flowers a difference or the number of flowers somebody has? [difference] Ask them to solve it on their abacuses and on their worksheets. See below. Discuss their solutions.

![Part-whole circle set model for compare problems.](image)

5 flowers; Jacob has 3 more.

**Problem 6.** The equation for this problem is \[20 - 11 = 9\].

In conclusion. Ask: Is the difference a part or a whole? [part]
Write the equations and solve the problems.

1. Mr. Black is 6 feet tall. His son is 4 feet tall. How much taller is the father?

   ______________

2. Mrs. Jackson is 170 cm tall. Her daughter is 119 cm tall. How much taller is the mother?

   ______________

3. Jasmine has five pillows. Oliver has four more pillows than Jasmine. How many pillows does Oliver have?

   ______________

4. Logan has 12 more cherries than Matt. Matt has 25 cherries. How many cherries does Logan have?

   ______________

5. Shauna has 3 more flowers than Jacob. Shauna has 5 flowers. How many flowers does Jacob have?

   ______________

6. James has 20 grapes. James has 11 more grapes than Lily. How many grapes does Lily have?

   ______________
Lesson 126: Two Fractions Equaling One

Objectives: 1. To find pairs of fractions equaling one

Materials: 1. Warm-up Practice 7
2. Fraction pieces
3. Fraction cards, 1 set per pair of children*
5. Worksheet 86, Non-Unit Fractions

Activities for Teaching:

Warm-up. Ask the children to do section 3 on Warm-up Practice 7. The questions and hundred chart are shown below.

102 – 14 = 88  \( \frac{1}{2} \) of 18 = 9
$1.00 – 41¢ = 59¢  8 dimes + 2 nickels = 90¢
31 less than 50 = 19  Half hour – 1 minute = 29
Eighty-two – three = 79  Nine plus nine is 18
10 × 5 + 19 = 69  150 – 100 – 1 = 49
40 – 2 halves = 39  Ten tens minus eleven = 89

Fractions equaling 1. Give the children the fraction pieces and ask them to assemble the charts. When the fraction charts are complete, ask: How many thirds are needed to equal one? [three] If you have two thirds, how much more do you need to equal one? [one third]

Next ask them to separate the one and to lay the fraction pieces for three fifths under the one. Ask: How many more fifths are needed to make one? [two fifths] See the figure below.

```
1
\( \frac{1}{5} \)  \( \frac{1}{5} \)  \( \frac{1}{5} \)  \( \frac{1}{5} \)  \( \frac{1}{5} \)
Three fifths and two fifths make one.
```

Repeat for other fractions, such as one sixth, [five sixths] seven tenths, [three tenths] and one half. [one half]

Write:

\[ \frac{3}{8} \]

Ask what is needed to make one. [five eighths] Repeat for one tenth [nine tenths] and two thirds. [one third]

Explanations:

*Remove the percentage cards before giving them to the children.

To focus the students’ attention on fractions, not arithmetic, avoid teaching the algorithm that the sum of the two numerators equals the denominator.
ACTIVITIES FOR TEACHING:

Finding pairs to equal one. Distribute the fraction cards to pairs of children. Tell them to spread their cards out face up. Next they are to pick up a card and find the match so the two cards equals one. Tell them to find ten different pairs.

Concentrating on One game. Have the children play the Concentrating on One game, found in the Math Card Games book, F3, with the pairs of cards that they found.

Worksheet 86. Distribute the worksheets from a prior lesson and tell the children to complete the worksheet. The solutions are shown below.

![Fraction Cards](image)

In conclusion. Ask: Why does it take 10 tenths to make 1, but only 3 thirds to make 1? [tenths are smaller] How many twelfths do you need to make a whole? [twelve]

EXPLANATIONS:

By finding these matches, the children are sorting the cards they will need to play the Concentrating on One game.

If the children have duplicate pairs, they can still play the game, although it may take a bit longer.

The pairs on the worksheet are fractions not found on the cards, which have only simplified fractions.
Worksheet 86, Non-Unit Fractions

Write the fractions that are circled in each row.

Match the fractions that will be equal to one.

\[
\begin{array}{cccc}
\frac{2}{4} & \frac{4}{6} \\
\frac{2}{10} & \frac{8}{10} \\
\frac{2}{6} & \frac{2}{4} \\
\frac{4}{8} & \frac{5}{10} \\
\frac{6}{9} & \frac{4}{8} \\
\frac{2}{8} & \frac{6}{8} \\
\frac{5}{10} & \frac{3}{9}
\end{array}
\]