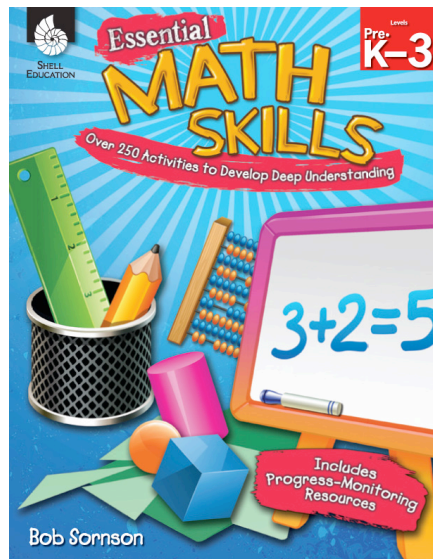


Sample Pages from

**Essential Math Skills: Over 250 Activities to
Develop Deep Understanding**



The following sample pages are included in this download:

- Table of Contents
- Introduction excerpt
- Sample chapter selection

For correlations to Common Core and State Standards, please visit
<http://www.teachercreatedmaterials.com/correlations>.



SHELL
EDUCATION

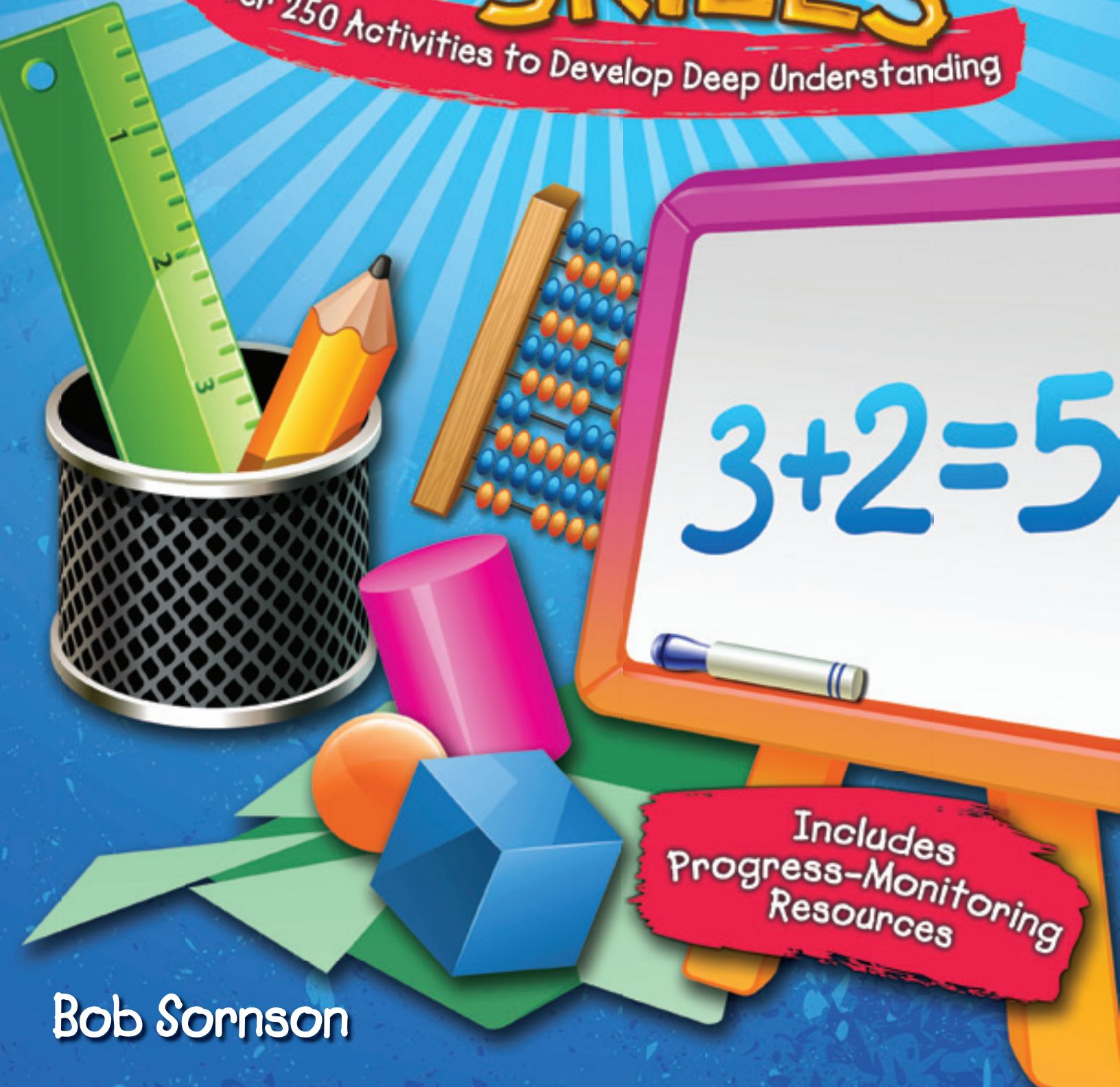
Essential

MATH SKILLS

Levels

Pre.
K-3

Over 250 Activities to Develop Deep Understanding

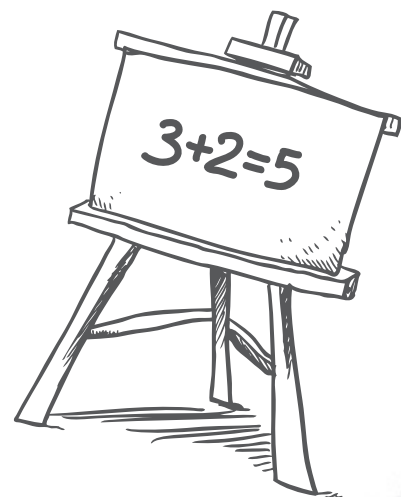


Includes
Progress-Monitoring
Resources

Bob Sornson

Table of Contents

Introduction	4
Research	4
The Essential Math Skills for Grades Pre-K–3	6
Implementing <i>Essential Math Skills</i> in the Classroom	7
How to Use This Book	10
Tips for Planning Instruction and Assessment in Mathematics	12
Correlation to Standards	14
About the Author	19
Skills and Activities for Proficiency in Pre-Kindergarten	21
Skills and Activities for Proficiency in Kindergarten	37
Skills and Activities for Proficiency in Grade 1	55
Skills and Activities for Proficiency in Grade 2	75
Skills and Activities for Proficiency in Grade 3	97
Appendices	135
Appendix A: Assessment Tools	135
Appendix B: Student Resources	148
Appendix C: Additional Resources	165
Appendix D: References Cited	167
Appendix E: Contents of the Digital Resource CD	168



The Essential Math Skills for Grades Pre–K–3

Pre-Kindergarten Skills	
<p>Skill 1: Demonstrates one-to-one correspondence for numbers 1–10, with steps</p> <p>Skill 2: Demonstrates one-to-one correspondence for numbers 1–10, with manipulatives</p>	<p>Skill 3: Adds on, using numbers 1–10, with steps</p> <p>Skill 4: Adds on, using numbers 1–10, with manipulatives</p>
Kindergarten Skills	
<p>Skill 5: Demonstrates counting to 100</p> <p>Skill 6: Has one-to-one correspondence for numbers 1–30</p>	<p>Skill 7: Understands combinations (within 10)</p> <p>Skill 8: Recognizes number groups without counting (2–10)</p>
Grade 1 Skills	
<p>Skill 9: Counts objects with accuracy to 100</p> <p>Skill 10: Replicates visual or movement patterns</p> <p>Skill 11: Understands concepts of adding on or taking away (within 30), with manipulatives</p>	<p>Skill 12: Adds/subtracts single-digit numbers on paper</p> <p>Skill 13: Shows a group of objects by number (to 100)</p>
Grade 2 Skills	
<p>Skill 14: Quickly recognizes groups of objects (to 100)</p> <p>Skill 15: Adds to/subtracts from a group of objects (within 100)</p> <p>Skill 16: Adds/subtracts two-digit numbers on paper</p>	<p>Skill 17: Counts by 2, 3, 4, 5, and 10, using manipulatives</p> <p>Skill 18: Solves written and oral story problems using the correct operations (<i>addition and subtraction</i>)</p> <p>Skill 19: Understands/identifies place value to 1,000</p>
Grade 3 Skills	
<p>Skill 20: Reads and writes numbers to 10,000 in words and numerals</p> <p>Skill 21: Uses common units of measurement: length, weight, time, money, and temperature</p> <p>Skill 22: Adds/subtracts three-digit numbers on paper with regrouping</p> <p>Skill 23: Rounds numbers to the nearest 10</p> <p>Skill 24: Rounds numbers to the nearest 100</p>	<p>Skill 25: Adds/subtracts two-digit numbers mentally</p> <p>Skill 26: Counts by 5, 6, 7, 8, 9, and 10 using manipulatives</p> <p>Skill 27: Uses arrays to visually represent multiplication</p> <p>Skill 28: Recognizes basic fractions</p> <p>Skill 29: Solves written and oral story problems using the correct operation (<i>addition, subtraction, and grouping</i>)</p>

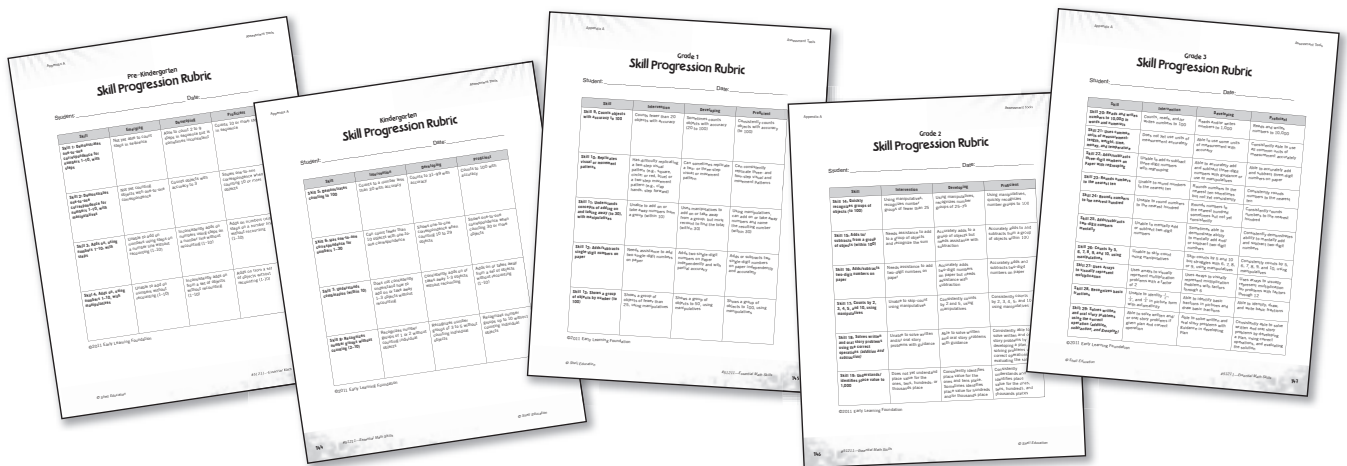
Implementing *Essential Math Skills* in the Classroom

Essential Math Skills is designed to help students develop the numeracy skills that will allow them to understand math, love math, and succeed in the information economy. The activities in this book provide a rich menu of mathematical learning experiences that include the use of manipulatives, exploration, inquiry, and play.

Essential Math Skills allows teachers to:

- Understand the sequence of essential early math skills
- Identify the essential early math skills by grade level
- Determine which skills each student has mastered
- Design responsive instruction to meet the needs of each student
- Understand which skills require additional instructional experiences
- Systematically monitor progress toward proficiency in every essential skill
- Advance students as soon as they are ready for more complex instruction
- Help each student develop a solid foundation of mathematical skills and concepts
- Help many more students fall in love with math for life

Using *Essential Math Skills* is simple. The *Skill Progression Rubrics* (see Appendix A) will help the teacher identify the skills that each student has already developed to proficiency, and then the teacher can plan instruction based on the learning readiness of the students. Skill-specific activities offer many different options for engaging students in learning that is challenging but never overwhelming.



How to Use This Book

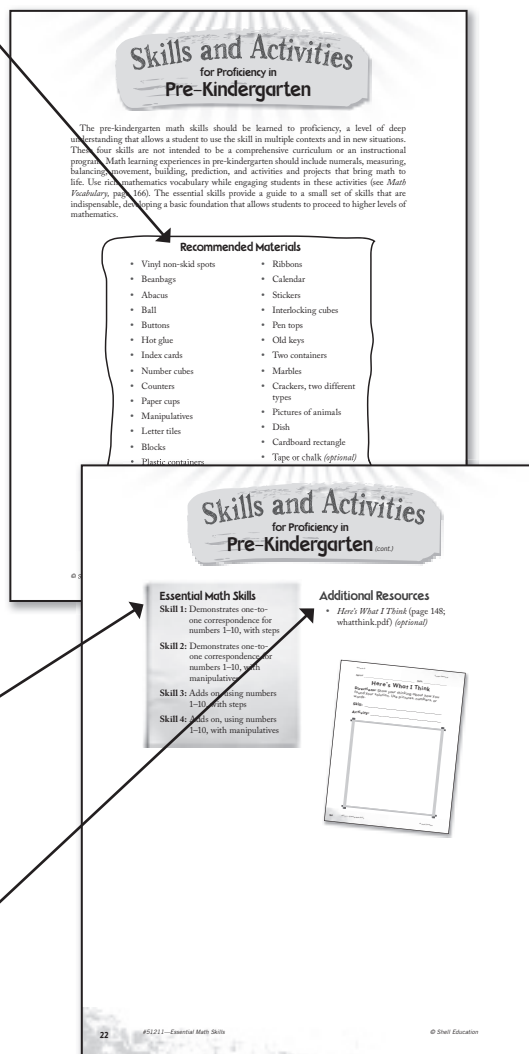
Skills and Activities Overview

The **divider page** at the beginning of each grade-level section offers an overview of the skills and materials needed for the activities.

The **Recommended Materials** lists all resources that are necessary to lead students in the activities for the grade level. **Note:** *Several activities within this resource use a 10-by-10 counting frame, usually called an abacus. This tool is used to learn the value of numbers using a base-ten format and to support a deep understanding of basic computation. The abacus allows students to understand the feeling of moving a number value, see base-ten displays of number values, and see the relationship between number values used in addition, subtraction, and grouping. Some teachers may remember the days when every early childhood classroom had a large classroom abacus. For others, this will be a new and exciting tool that allows students have a kinesthetic, visual, and auditory experience to help them deeply understand basic mathematical processes.*

The **Essential Math Skills** lists the focus skills for each grade level. These are the core skills with which students must be completely proficient so that they can understand and enjoy mathematical learning.

The **Additional Resources** lists activity sheets that are provided in the appendix or on the Digital Resource CD and that support the activities for the grade level.



How to Use This Book *(cont.)*

Skills and Activities Overview

The **Skill Progression** defines proficiency for each skill and provides a concise rubric for evaluating students' progress toward mastery.

The **Activities for Skill Development and Assessment** section offers detailed descriptions of the activities and experiences that will enable students to reach proficiency in a skill.

Variations offer creative modifications that allow activities to be revisited for additional practice.

Activities to Extend Deep Understanding offer ideas to extend the skill after students have shown proficiency through the Activities for Skill Development and Assessment.

The **Digital Resource CD** offers resources such as student activity sheets and data-recording tools.

Grade 2 Skills

Skill 14

Quickly recognizes groups of objects (to 100)

Skill Progression

Proficiency for this skill is demonstrated by the student's ability to name any 10 number values up to 100, each within five seconds, with 100 percent accuracy on three or more days, using three or more different activities.

Emergent	Developing	Proficient
Using manipulatives, recognizes number groups of fewer than 25	Using manipulatives, recognizes number groups of 25–75	Using manipulatives, quickly recognizes number groups of 100

Activities for Skill Development and Assessment

Absolutely Abacus: Name That Number

Beginning with number values that you are sure the student can quickly name, move the beads and ask, "What number is this?" Repeat this activity at least 10 times within a session. Provide plenty of practice with this activity so that the student can develop a deep understanding of the relative values of numbers up to 100. Gradually challenge the student until he or she can recognize any group of beads up to 100 within five seconds.

Find It on the Hundred Chart

Using the *Hundred Chart* (page 150), place one counter on the chart, indicating a number. Ask the student to quickly name that number.

Variation 1: Ask the student to place counters on each square of the chart showing a number value up to 100. Then, ask the student to name the value.

Variation 2: Ask the student to place one counter on the chart at varying number positions. Use the *Blank Hundred Chart* (page 151) for an additional challenge.

Variation 3: Place a counter on the chart and then ask the student to quickly name the value that is 10 more or 10 less.

© Shell Education #51211—Essential Math Skills 11

Grade 2 Skills

Skill 14

Activities to Extend Deep Understanding

More or Less?

Have the student identify the value of a group on the abacus. Then, ask him or her to name the value that is 10 more or 10 less.

Variation: Ask the student to identify the value of a group on the abacus. Then, ask him or her to name the value that is 20, 30, 40, or 50 more or less.

Hundred Closure

Have the student identify the value of a number on the abacus or on the *Hundred Chart* (page 150). Then, ask him or her to name the additional amount needed to reach 100.

Test the Teacher

Allow the student to show a number value using the abacus, *Hundred Chart* (page 150), base-ten blocks, stems and beads, or washers on a string, and have the teacher quickly identify the value of this group.

© Shell Education #51211—Essential Math Skills 19



Skills and Activities

for Proficiency in

Pre-Kindergarten

The pre-kindergarten math skills should be learned to proficiency, a level of deep understanding that allows a student to use the skill in multiple contexts and in new situations. These four skills are not intended to be a comprehensive curriculum or an instructional program. Math learning experiences in pre-kindergarten should include numerals, measuring, balancing, movement, building, prediction, and activities and projects that bring math to life. Use rich mathematics vocabulary while engaging students in these activities (see *Math Vocabulary*, page 166). The essential skills provide a guide to a small set of skills that are indispensable, developing a basic foundation that allows students to proceed to higher levels of mathematics.

Recommended Materials

- Vinyl non-skid spots
- Beanbags
- Abacus
- Ball
- Buttons
- Hot glue
- Index cards
- Number cubes
- Counters
- Paper cups
- Manipulatives
- Letter tiles
- Blocks
- Plastic containers
- Erasers
- Puzzle pieces
- String
- Pencils
- Ribbons
- Calendar
- Stickers
- Interlocking cubes
- Pen tops
- Old keys
- Two containers
- Marbles
- Crackers, two different types
- Pictures of animals
- Dish
- Cardboard rectangle
- Tape or chalk (*optional*)

Skills and Activities

for Proficiency in
Pre-Kindergarten (cont.)

Essential Math Skills

Skill 1: Demonstrates one-to-one correspondence for numbers 1–10, with steps

Skill 2: Demonstrates one-to-one correspondence for numbers 1–10, with manipulatives

Skill 3: Adds on, using numbers 1–10, with steps

Skill 4: Adds on, using numbers 1–10, with manipulatives

Additional Resources

- *Here's What I Think* (page 148; whatthink.pdf) (optional)

Appendix B Student Resources

Name: _____ Date: _____

Here's What I Think

Directions: Show your thinking about how you found your solution. Use pictures, numbers, or words.

Skill: _____

Activity: _____

148 #51211—Essential Math Skills © Shell Education

Skill 1

Demonstrates one-to-one correspondence for numbers 1–10, with steps

Skill Progression

Proficiency for this skill is demonstrated by the student's ability to count out loud and correctly step to the chosen number with 100 percent accuracy for each of 10 attempts on three or more days, using three or more different activities. While not all the following activities involve stepping, they do focus on gross-motor skills similar to taking steps.

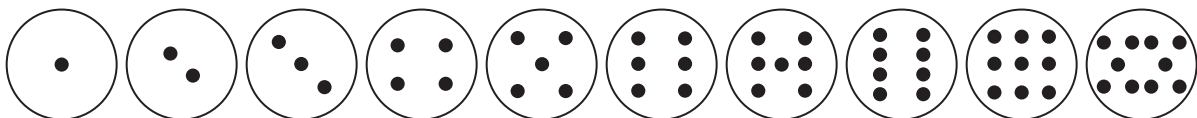
Emerging	Developing	Proficient
Not yet able to count steps in sequence	Able to count 2 to 9 steps in sequence, but is inconsistent	Counts 10 or more steps in sequence

Activities for Skill Development and Assessment

Walk the Line

Place 10 vinyl non-skid spots in a line on the floor. Use a marker or stickers to add 1–10 dots to each spot. Place the spots on the ground, in order. Ask the student to stand on the starting spot. Choose a number between 1 and 10, and model taking that number of forward steps on the spots. Then, ask the student to take any number (1–10) of forward steps, stepping on the next group of dots with each step. For example, say, “Take four steps forward.” As the student steps, have him or her count out loud. Practice 5–10 times per day. Give positive feedback each time the student performs the activity. For example, “Great job. You stopped on the four dots! Now, go back to the start. Try six steps forward.” Allow the student to notice the pattern of dots on the floor without much explanation from you. Celebrate successes.

Teacher Tip: A number line can be made on the floor with tape, drawn with chalk on concrete or asphalt, or painted on non-skid carpet squares.



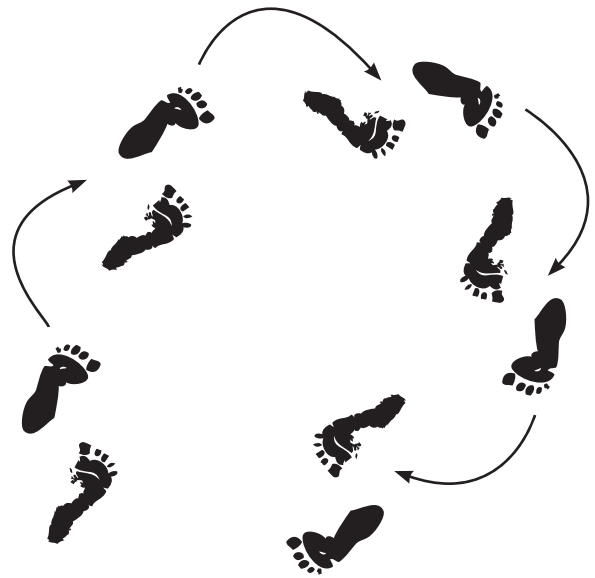
Stepping Stones

Place 10 vinyl non-skid spots on the floor as “stepping stones” (not in a straight line). Say, “Take _____ steps forward.” Practice 5–10 repetitions of this activity in a session, with great enthusiasm for each performance. For example, say, “Great job. You are standing on the five dots. Now, go back to start. Ready? Now count and step to eight.” Vary the difficulty by your placement of the stepping stones. Stretching, crossing midline, and varying distances between “stones” will help the student internalize the sequence and value of numbers. Students also have to actively look for the next stepping stone to determine where to step.

Go the Distance

Identify a destination (e.g., a blue chair, a door) and instruct the student to count aloud his or her steps from a starting point to the destination. Begin with easy missions. For example, “Count aloud your steps from here to the door.” Use short distances of 10 steps or fewer. Repeat the activity 5–10 times in a session so that the student can feel the difference between varying distances.

Variation: Ask the student to count sideward steps or backward steps to reach a destination. Changing the direction of the steps makes the activity seem like a new challenge and keeps students engaged.



Ups and Downs

Practice counting steps on a stairway. Standing at the bottom of the stairs, throw a beanbag partway up the flight of stairs. Ask the student to count the steps as he or she goes to retrieve the beanbag. Repeat the activity 5–10 times in a session so that the student can feel the difference between varying numbers of steps.

Activities to Extend Deep Understanding

Catch

Ask the student to stand and catch a certain number of beanbags. Make this activity fun and easy by throwing the beanbags gently, underhand, directly toward the student's chest. Encourage the student to catch with two hands and then drop the beanbag. When he or she has caught the correct number of beanbags, the student should say *stop*. Some students will count aloud, while others will count silently before saying *stop*. Repeat this activity 5–10 times in a session.



Variation: Catch and Hold—Have the student catch and hold the beanbags until he or she is holding the correct number.

Throw

Ask the student to throw a certain number of beanbags into a crate or toward a target. Have the student count only the beanbags that land in the target. Celebrate successes! Repeat this activity 5–10 times in a session.

Imitation

At the beginning of a whole-group activity, ask students to repeat a movement that you make a certain number of times. You might nod your head three times and ask the students to nod three times.

Follow Me

Swing your arms as you step and count out loud, having students follow and count with you. Stop walking at various numbers. Pause, and then start the process over again, beginning with *one*.

Skill 1

Estimation

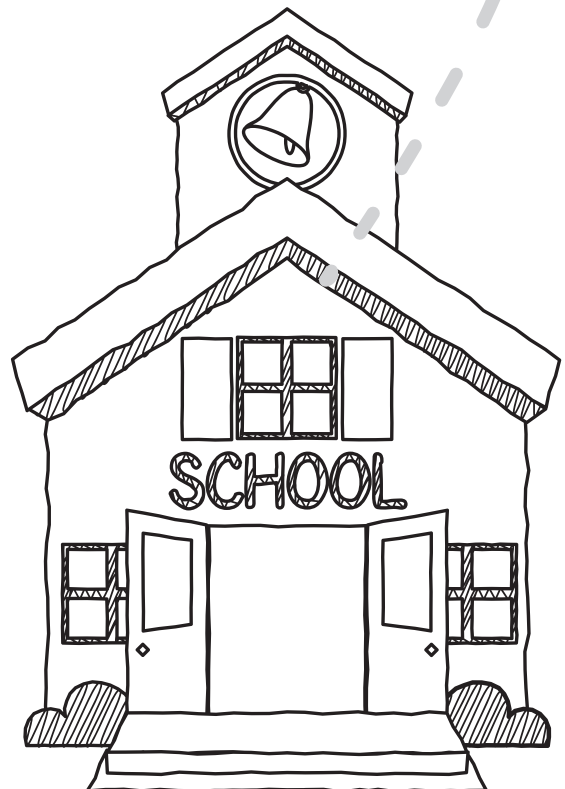
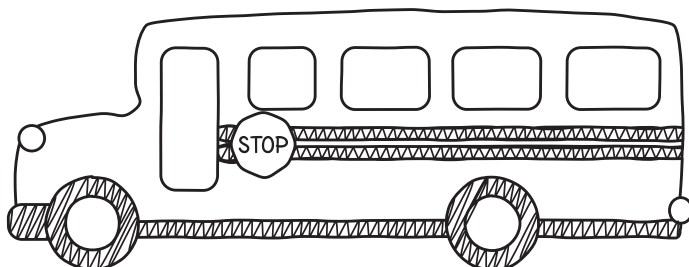
Show students how to carefully toss a beanbag underhand, guess the distance to it in steps, and then count the steps it takes to get to the beanbag. Give a student a beanbag. Ask him or her to toss it, guess the distance to it in steps, and then count the actual number of steps.

On Tour

Take a tour around the school. Stop at various places, and ask students to guess how many steps it will take to reach a specific destination such as a stairway, a fire extinguisher, an office door, or a display case. Then, test the students' estimates.

Setting Up

When putting out carpet squares or chairs, ask students to stand beside them and count students and the seats, emphasizing one seat for one student.



Skill 2

Demonstrates one-to-one correspondence for numbers 1–10, with manipulatives

Skill Progression

Proficiency for this skill is demonstrated by the student's ability to count objects out loud correctly to the chosen number with 100 percent accuracy for each of 10 attempts on three or more days, using three or more different activities. The activities provided for this skill focus on fine-motor skills.

Emerging	Developing	Proficient
Not yet counting objects with one-to-one correspondence	Counts objects with accuracy to 3	Shows one-to-one correspondence when counting 10 or more objects

Activities for Skill Development and Assessment

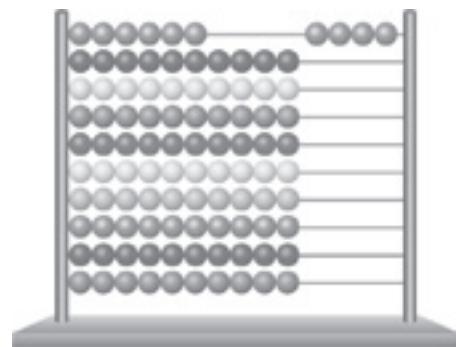
Touch and Count

Put several small objects (e.g., marbles, buttons, small stones, pencils, clothespins) into a dish. Ask the student to count aloud while moving the objects from one dish to another. This exercise supports the relationship between numerals and quantity and provides visual, auditory, and kinesthetic experiences. Repeat this activity 5–10 times in a daily session.

Variation: Have the student estimate before counting, and then count and move the objects.

Absolutely Abacus: How Many?

Place the abacus in front of the student. Using the top row of beads, move a certain number of beads to one side. Ask, "How many is this?" Allow the student to count the beads aloud, one by one. Use numbers that allow the student to quickly find success at least 95 percent of the time. Repeat this activity 5–10 times in a daily session.



Skill 2

Toss Up

Ask the student to toss a ball or a beanbag up in the air up to 10 times, counting with each catch. Keep it fun and successful.

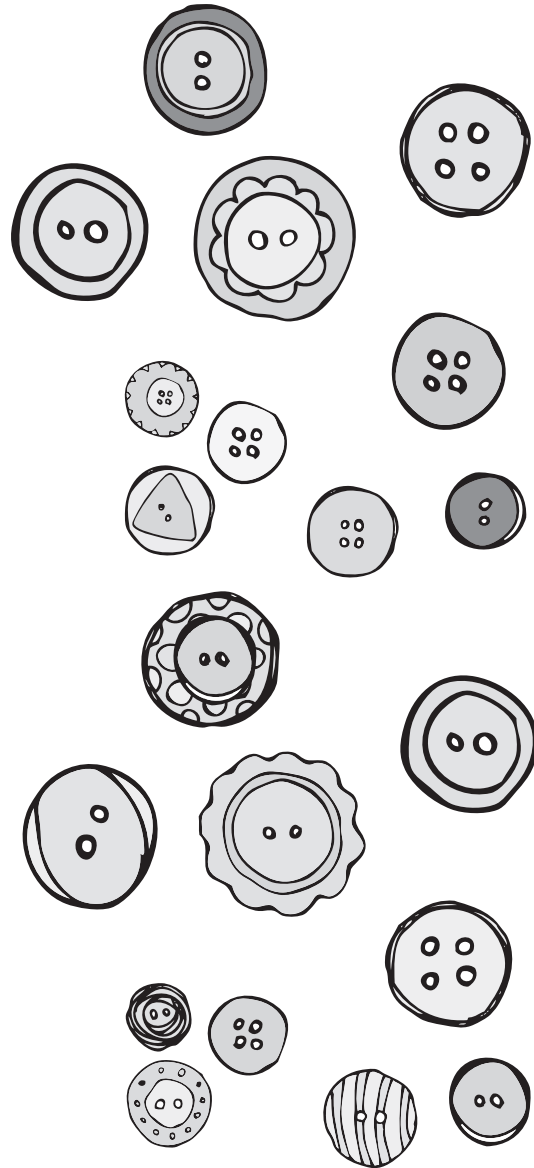
Button Cards

Use hot glue to attach buttons to index cards. Create cards with varying numbers of buttons, up to 10. Flash a card and ask the student to estimate how many buttons are on the card. After the student has estimated, allow him or her to count the buttons to check the estimate.

Fill the Cup

Give the student a number cube and 10 counters. Tell him or her to roll the number cube and count the number rolled. Then, have the student count out that number of counters and put them into a paper cup.

Variation: Use different manipulatives (e.g., interlocking cubes, pasta, beans) to keep the activity interesting for the student.



Counting Letters

Using letter tiles, help the student to spell his or her first name. Ask the student to count the letters. Continue spelling out other names, such as those of siblings, parents, classmates, or pets, and ask the student to count the letters in each name.

Junk in the Trunk

Collect items from around the classroom (e.g., erasers, crayons, blocks, puzzle pieces) and put them into a plastic container. Plan to collect one button, two blocks, three erasers, four puzzle pieces, five paper clips, six bits of string, seven pencils, eight ribbons, nine pen tops, 10 old keys, or any similar combination. Ask the student to sort the items into piles of the same items, and then count how many are in each pile.

Tapping Out

Model counting while tapping on your leg up to 10 times. Then, ask the student to copy your pattern. Sitting across from the student, model a simple one-leg counting pattern (e.g., tapping with one hand on one leg while counting out loud). Vary rhythm and complexity as long as the student is having fun and is successful at least 95 percent of the time. Introduce two-handed patterns (up to 10) when the student is ready.

Activities to Extend Deep Understanding

Block Measurement

Give the student a supply of identical objects (e.g., chenille stems, unused erasers, drinking straws, blocks). Ask him or her to guess and then measure how many objects it will take to cover the distance from one point to another (e.g., from one end of a desk to the other, across the cover of a big book, or from one side of a doorjamb to the other). Model how to accurately measure by properly lining up the objects. Have the student count each object he or she has used to measure.

Fill It Up

Ask the student how many beanbags (or blocks, erasers, pencils, action figures, etc.) he or she thinks will fit into a small box or bag, and then ask him or her to fill the container to capacity and count the total number of objects.

Snack-Time Counting

Ask the student to count the number of students at a table. Then, have him or her count out the number of snacks needed so that each student gets one.

Calendar Counting

Use a calendar to count days. Point to and count all the days in one week, the school days left in the week, or the number of Saturdays in the month.

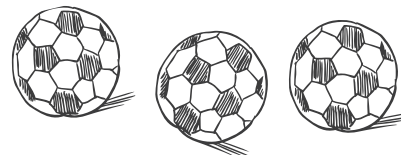
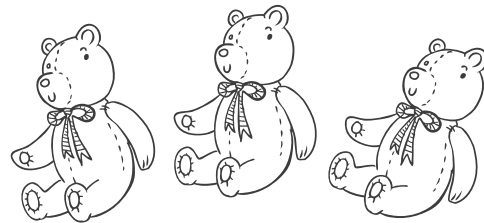


Number and Value

Arrange a row of 3–5 stickers. Arrange a second row with the same number of stickers but with more space between each sticker. Ask the student whether the number of stickers in each row is the same or whether there are more or fewer. Ask the student how he or she can find out, and then allow the student to figure out how to count and compare the two rows of stickers.

Matched Sets

Create a group of 2–10 familiar objects, such as stuffed bears, baseballs, or beanbags. Using a different familiar object, ask the student to create a new set with the same number of objects as the first set.



Value to Value

Build a connected set of 3–5 interlocking cubes. Ask the student to guess how many individual cubes it will take to build another set of the same size. After the student's guess, allow him or her to test the estimate by building a new set.



Skill 22

Adds/subtracts three-digit numbers on paper with regrouping

Skill Progression

Proficiency for this skill is demonstrated by the student's ability to solve three-digit addition and subtraction problems on paper with 100 percent accuracy on three or more days, using three or more activities.

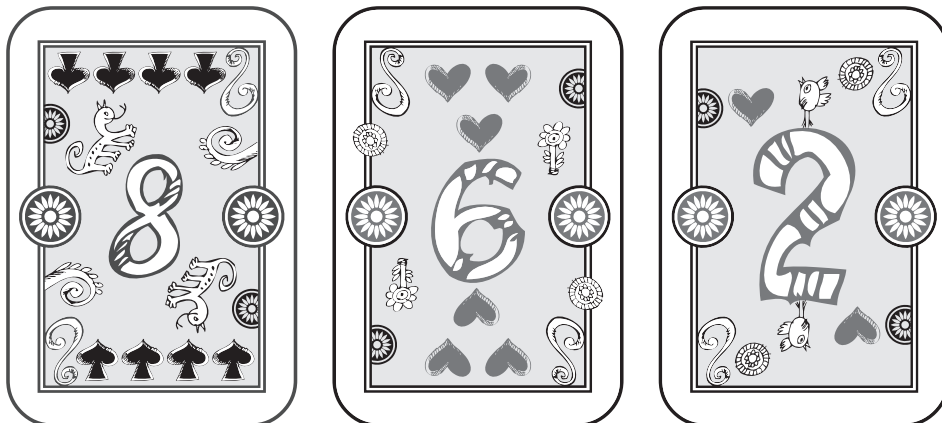
Intervention	Developing	Proficient
Unable to add or subtract three-digit numbers with regrouping	Able to accurately add and subtract three-digit numbers with guidance or use of manipulatives	Able to accurately add and subtract three-digit numbers on paper

Activities for Skill Development and Assessment

Three-Card Sums and Differences

Remove the tens and face cards from a standard deck of cards. Individually, in pairs, or in a small group, have students draw three cards to make a three-digit number. Students then draw a second set of three cards and add the two numbers to find the sum.

Variation: For subtraction, have students draw three cards to make a three-digit number and then draw a second set of three cards. Allow students to decide which of the two numbers is smaller and subtract that number from the greater number.



Greatest Sum

Prepare the *Greatest Sum Cards* (greatestsum.pdf) and distribute the *Greatest Sum Board* (sumboard.pdf) to students. Place the cards facedown between two players. Players take turns choosing a card until the six spots on their boards are filled and they have two three-digit numbers. The players should carefully decide where to place each card because they cannot move the cards once placed. After each player has six cards, each player should find the sum of their numbers. The player with the greatest sum wins.

Variation 1: Players can play “Smallest Sum,” in which the object is to be the player with the smallest sum.

Variation 2: Players can play “Greatest Difference,” in which the players will subtract the two numbers and the object is to be the player with the greatest difference.

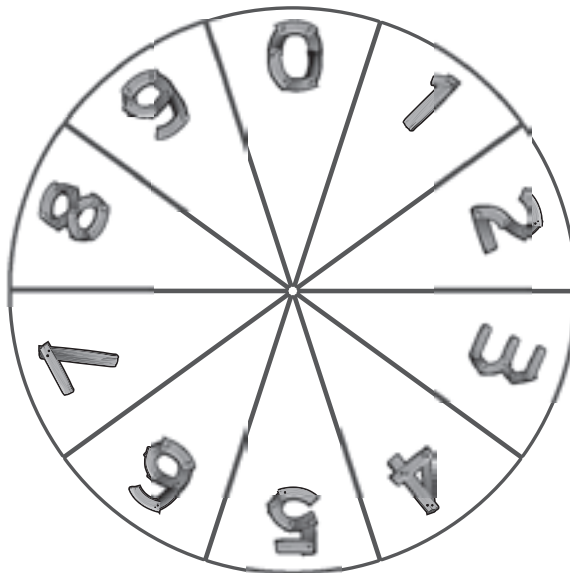
Variation 3: Players can play “Smallest Difference,” in which the object is to be the player with the smallest difference.

Spinner Addition and Subtraction

Using a spinner (spinner.pdf), paper clip, and a pencil to hold the paper clip in the center, have the student spin three times to make a three-digit number. Then, the student should spin a second set of three numbers and add the two numbers to find the sum.

Variation 1: Use the spinner to practice subtraction. Have the student spin three times to make a three-digit number and then spin a second set of three numbers. Allow the student to decide which of the two numbers is greater and then subtract the smaller number from it.

Variation 2: Use a number cube in place of the spinner for a similar activity.



Baseball Batting Averages

Engage a student who is interested in baseball by having him or her track the batting average of a favorite player through the course of the season. Check batting averages at the end of each week, and use subtraction to see the change in a player's performance.

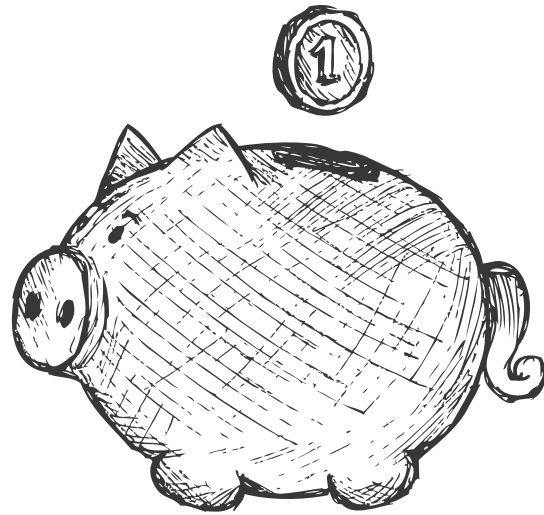
Variation: Have the student choose a favorite team and determine which player has the best batting average and by how much.










Money, Decimals, and Computation

Money problems provide a great opportunity to connect meaning to addition and subtraction. Teach the student to add and subtract dollars, dimes, and pennies. Show him or her the value relationship between hundreds, tens, and ones.

Variation 1: Provide story problems using dollars, dimes, and pennies.

Variation 2: Using the *Dollars, Dimes, and Pennies Array* (page 162), ask the student to draw the bill or coin for each step in a money problem.



Dollars	Dimes	Pennies	Find the Sum
			\$3.21
			+ \$1.21
			\$4.42 total

Estimation Fun

Ask the student to look at a three-digit addition or subtraction problem, quickly estimate the answer, and then carefully solve the problem on paper. Design instruction so that it is just challenging enough to be fun for the student as he or she hones estimation skills.

Story Time

Read the student a story problem. Include one piece of unnecessary information. Have the student figure out which numbers are relevant to the solution, choose the correct operation, and solve the problem. For example: *James and Julianne travelled 205 miles to their grandmother's house for Thanksgiving. They stopped once along the way to pick up Great-Aunt Beatrice, who is 91 years old. They stayed overnight and then drove all the way home, leaving Aunt Beatrice with Grandma. How many miles did they travel in these two days?*

