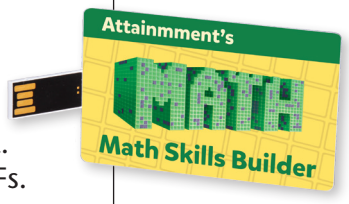
IMPLEMENTATION GUIDE

ALICIA SAUNDERS JENNY ROOT DIANE BROWDER

Math Skills Builder Flash Drive

The flash drive contains an
Image Library and printable PDF files of
teaching resources and the student workbook.
PDF reader software is required to view the PDFs.



Math Skills Builder
Implementation Guide

By Alicia Saunders, Jenny Root, Diane Browder

Editing: Linda Schreiber
Graphic design: Elizabeth Ragsdale
Cover design: Josh Eacret
Art direction: Beverly Sanders

An Attainment Company publication

Printed in the United States of America
ISBN: 978-1-57861-250-5

Attainment Company, Inc.

P.O. Box 930160
Verona, Wisconsin 53593-0160 USA
1-800-327-4269
www.AttainmentCompany.com

Contents

Overview

Math Skills Builder is a curriculum for teaching students with disabilities to solve mathematical story problems. Problem solving is the most important outcome for mathematical learning. By considering how to apply emerging math skills to real-life scenarios, students learn the critical functional skills of *when* and *why* to use their skills. Often, for students with disabilities, math instruction has only focused on "what" to do (math mechanics). Students learn to "plug and chug" to get an answer, but may have no idea how this math operation relates to real life. For example, a student may learn to add numbers, but never generalize this skill to a real-life problem-solving situation (such as knowing how much stock is on hand as new supplies are added in his or her job setting); or a student may learn to write the answers on a subtraction worksheet, but never realize that this operation is relevant to knowing how many dollars are left after some are spent. *Math Skills Builder* uses authentic mathematical story problems as the focus of all instruction so that students learn to apply their new skills from the onset.

Math Skills Builder includes eight units of instruction with five lessons each, including over 500 story problems that are theme based. These problems were written by teachers, to represent a variety of students' interests, preferences, and community contexts. The eight units teach students to solve addition and subtraction story problems using three problem-solving strategies: group, change, and compare. Each lesson is scripted, making it teacher friendly and easy to use. The scripts suggest feedback responses for prompting, error correction, and praise. The problems are presented using various media, including a workbook, software/iPad app, and video simulations.

Math Skills Builder was primarily written for students who have already acquired foundational or early numeracy skills and who are now ready for the next level of mathematics. However, *Math Skills Builder* does include a unit to develop early numeracy skills for students who have not previously mastered them. Ideas are also provided for developing early numeracy skills while participating in math problem-solving lessons. Many teachers find problem solving to be one of the most difficult skills to teach to any student, especially to those with disabilities. This curriculum was specially designed and validated to teach mathematical problem solving to elementary and middle school students with developmental disabilities including those with an intellectual disability and/or autism. Students with mild-to-moderate cognitive disabilities and those with established early numeracy foundational skills may progress through the lessons quickly, possibly mastering all units within a school year.

Students with a moderate-to-severe intellectual disability and more intensive levels of autism spectrum disorders (ASD) may make steady progress but may need multiple years to achieve mastery. Students with more severe disabilities may also participate in problem-solving lessons by continuing to practice their early numeracy skills within the context of the story problems. For example, they may work on creating sets of objects to represent the quantities in the story problems or practice rote counting skills when the group is counting the total number of objects.

The curriculum addresses the adaptations required for instruction of students who are nonverbal, have visual impairments, have physical limitations, or have hearing impairments. Students with disabilities who are English Language Learners may also benefit from the supports included in this curriculum.

The *Math Skills Builder* curriculum is designed to be taught in small groups of two to four students for ease of instruction and practicality. However, *Math Skills Builder* can easily be taught to individual students as well. The curriculum teaches problem

solving in an explicit and systematic manner to students who have cognitive challenges. Students with intellectual disabilities, ASD, and other cognitive challenges often lack mathematical problem-solving skills or have been taught methods for solving problems, such as the key word strategy, that are ineffective for them. Because problem solving is applied across all domains of mathematics in the Common Core State Standards, as well as in functional applications of math, these deficits can interfere with a student's ability to access the general curriculum and solve real-world mathematical problems.

Math Skills Builder is designed to build mathematical problem-solving skills so students are better able to access grade-aligned mathematics and to solve mathematical problems in their everyday lives. For students to generalize their mathematical problem-solving skills to real-world scenarios and situations in their everyday lives, practicing the skills across a variety of contexts, with different materials and platforms; with different numbers, sums, and differences; and across different instructors is of utmost importance. *Math Skills Builder* provides teachers with the resources needed to promote generalization throughout the lesson plans.

Principles and Practices Supported

The *Math Skills Builder* curriculum combines principles of schema-based instruction with evidence-based practices for teaching students with moderate-to-severe disabilities (Browder et al., 2008; Spooner et al., 2017). Four main components comprise the curriculum (see Figure 1).

As illustrated in Figure 1, each component of *Math Skills Builder* reflects strategies shown to be effective for learners with disabilities. They include:

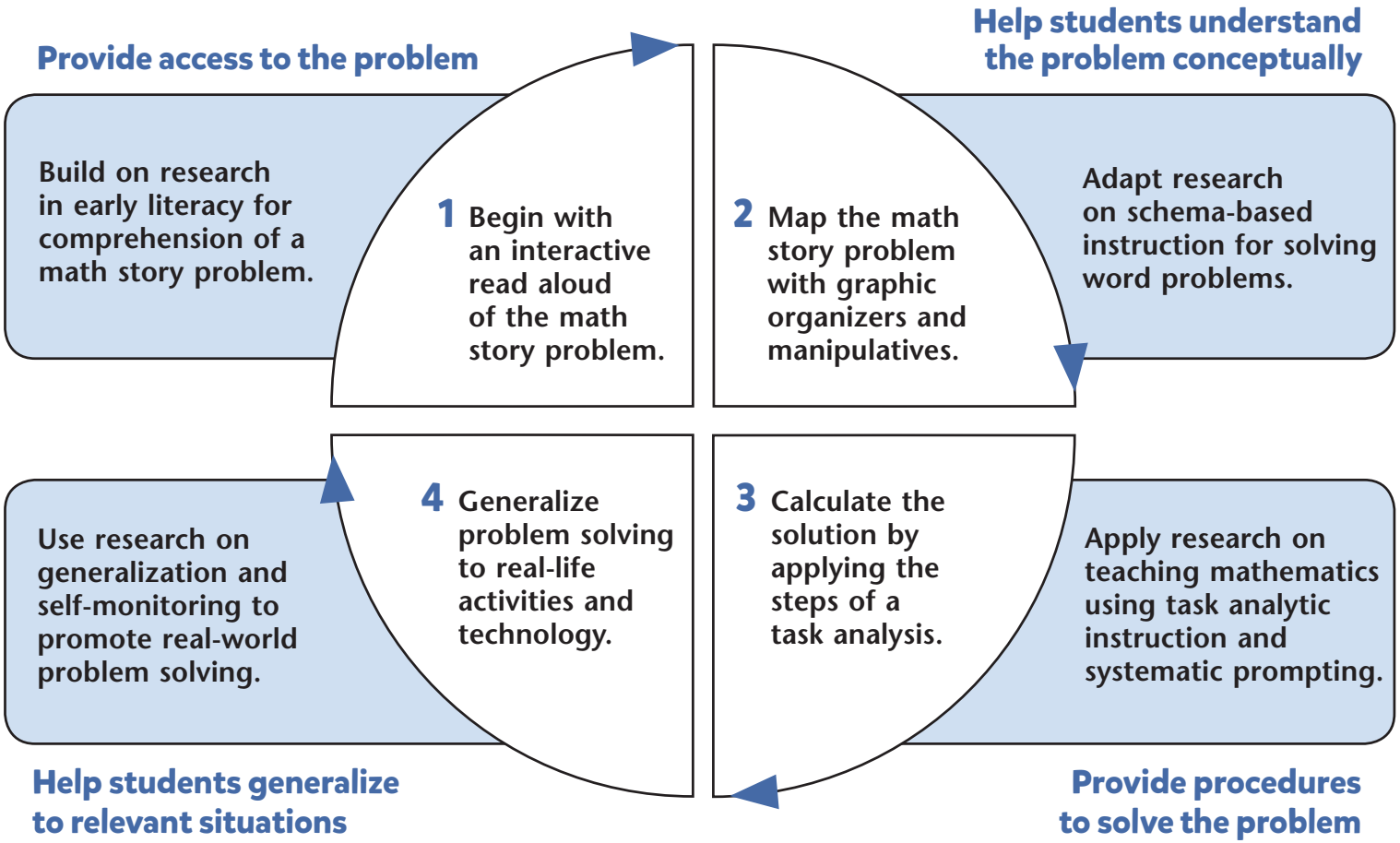
1. creating access to the math story problem for nonreaders or emerging readers using a **read aloud approach;**
2. teaching students to conceptually understand the problem types by **mapping the math story grammar** (the elements or parts of the story), using graphic organizers, and representing the information in the story problem with concrete or virtual manipulatives;
3. teaching students to procedurally solve the problem using **task analytic instruction** (using a task analysis) and **self-monitoring strategies** with the manipulatives; and
4. teaching students to **generalize** in multiple ways to promote real-world problem solving.

In addition, to teach mathematical problem solving in a highly structured manner, the *Math Skills Builder* curriculum is based on principles of direct and systematic instruction. For more detail on each of these principles, see the Background and Research Foundation of *Math Skills Builder* beginning on page 29.

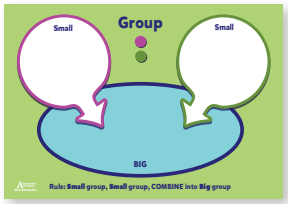
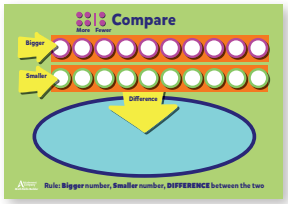
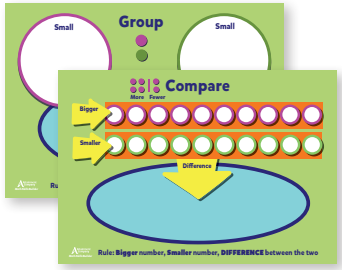
Scope and Sequence

The scope and sequence of the *Math Skills Builder* curriculum begins on page 4.

Figure 1. Conceptual Model for Teaching Math Problem Solving to Students with an Intellectual Disability

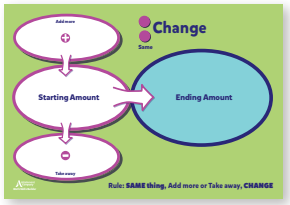
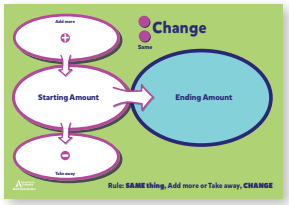
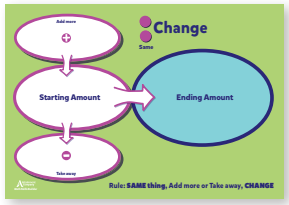
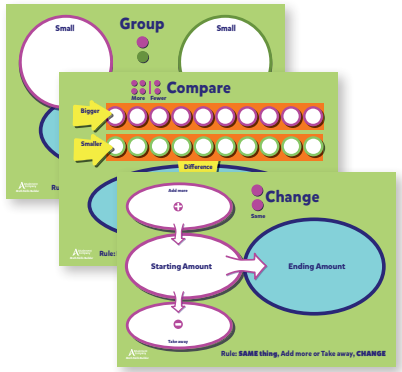


Math Skills Builder Scope and Sequence

	Unit 1: Early Numeracy Skills	Unit 2: Group-Type Problem Solving	Unit 3: Compare-Type Problem Solving	Unit 4: Discrimination of Problem Types
Problem Type Description	N/A	Group problems combine two or more distinct groups into one large group. The two or more distinct groups in the problem must be related (e.g., apples, bananas, fruits; the large group, fruit, is the related category). This problem type targets a part-whole relationship and is static.	Compare problems have objects/people with contrasting quantities and the difference is found. These problems involve comparison of two items: two people comparing quantities of one thing (e.g., John and Sarah compare amount of stickers each has) or one person comparing quantities of two things (e.g., Alicia compares the number of stickers to stamps).	Problems require discrimination of Group and Compare (More) or Compare (Fewer) problems.
Operation	N/A	Addition only (+)	Subtraction only (–)	Either addition or subtraction (+ or –)
Schematic Diagram/ Graphic Organizer	N/A			

(continues)

Math Skills Builder Scope and Sequence (continued)

	Unit 5: Change (Addition)-Type Problem Solving	Unit 6: Change (Subtraction)-Type Problem Solving	Unit 7: Discrimination of Problem Types	Unit 8: Discrimination of Problem Types
Problem Type Description	Change problems are a dynamic problem type. The entire problem is about one thing, the same thing. The starting amount of that item is increased (+), based on the action occurring in the problem, resulting in a changed ending quantity.	Change problems are a dynamic problem type. The entire problem is about one thing, the same thing. The starting amount of that item is decreased (–), based on the action occurring in the problem, resulting in a changed ending quantity.	Problems require discrimination of Change (Addition) and Change (Subtraction) problem types.	Problems require discrimination of Group, Compare, and Change problem types.
Operation	Addition (+)	Subtraction (–)	Either addition (+) or subtraction (–)	Either addition (+) or subtraction (–)
Schematic Diagram/ Graphic Organizer				

(continues)

Math Skills Builder Scope and Sequence (continued)

	Unit 1: Early Numeracy Skills	Unit 2: Group Type Problem Solving	Unit 3: Compare Type Problem Solving	Unit 4: Discrimination of Problem Types
Rule to Remember for Problem-Solving Type	N/A	Small group, Small group, COMBINE into Big group	Bigger number, Smaller number, DIFFERENCE between the two	See individual columns.
Procedure Using Graphic Organizer	N/A	**1** Create sets representing two small groups of different things. **2** Combine sets into the big group and count to solve.	**1** Create sets in arrays with larger number in top array, smaller number in bottom array. **2** Find the difference between the two arrays by dragging quantity to the difference oval and counting to solve.	**1** Determine problem type and select corresponding graphic organizer. **2** Sort problem attributes on T-chart by problem type. **3** Solve the problem using procedures described for each problem type.

(continues)

Math Skills Builder Scope and Sequence (continued)

	Unit 5: Change (Addition) Type Problem Solving	Unit 6: Change (Subtraction) Type Problem Solving	Unit 7: Discrimination of Problem Types	Unit 8: Discrimination of Problem Types
Rule to Remember for Problem-Solving Type	SAME thing, Add more or Take away, CHANGE	SAME thing, Add more or Take away, CHANGE	See individual columns.	See individual columns.
Procedure Using Graphic Organizer	**1** Create starting amount set in oval. **2** Add more to the set for additive change action. **3** Drag total or remaining Counting Cubes to the end oval and count to solve.	**1** Create starting amount set in oval. **2** Remove quantity from starting set for subtraction change action. **3** Drag total or remaining Counting Cubes to the end oval and count to solve.	**1** Determine problem type and select corresponding graphic organizer. **2** Sort problem attributes on T-chart by problem type. **3** Solve the problem using procedures described for each problem type.	**1** Determine problem type and select corresponding graphic organizer. **2** Sort problem attributes on T-chart by problem type. **3** Solve the problem using procedures described for each problem type.

(continues)

Math Skills Builder Scope and Sequence (continued)

	Unit 1: Early Numeracy Skills	Unit 2: Group Type Problem Solving	Unit 3: Compare Type Problem Solving	Unit 4: Discrimination of Problem Types
Early Numeracy Skills Targeted	■ Rote count to 10 ■ Identify and name numerals 1–10 ■ Identify and name *more than* and *fewer than* ■ Identify and name *same* and *different* ■ Count 1–10 objects: • in a line movable • in a line and nonmovable • scattered and movable • scattered and nonmovable ■ Make sets of 1–10 ■ Identify plus (+), minus (–), and equal (=) symbols ■ Write plus (+), minus (–), and equal (=) symbols ■ Read an addition number sentence ■ Read a subtraction number sentence ■ Add with sets ■ Subtract with sets	■ Number ID to 10 ■ Symbol recognition (+) and (=) ■ Counting with 1:1 correspondence ■ Concept of *different* ■ Creating sets of up to 9 objects ■ Combining sets to add up to 10 objects ■ Creating an addition number sentence	■ Number ID to 10 ■ Symbol recognition (–) and (=) ■ Counting with 1:1 correspondence ■ Creating sets of up to 10 objects using arrays ■ Concepts of *more* and *fewer* ■ Finding the difference between two sets ■ Creating a subtraction number sentence	See individual columns.
Mathematical Language		Common addition vocabulary: *add, join, group, combine*	Comparative words: *more than, fewer than* Common subtraction vocabulary: *difference*	

(continues)

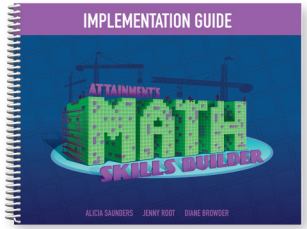
Math Skills Builder Scope and Sequence (continued)

	Unit 5: Change (Addition) Type Problem Solving	Unit 6: Change (Subtraction) Type Problem Solving	Unit 7: Discrimination of Problem Types	Unit 8: Discrimination of Problem Types
Early Numeracy Skills Targeted	■ Number ID to 10 ■ Symbol recognition (+), (–), and (=) ■ Counting with 1:1 correspondence ■ Creating sets of up to 10 objects ■ Composing sets ■ Creating addition number sentences ■ Concept of *same*	■ Number ID to 10 ■ Symbol recognition (+), (–), and (=) ■ Counting with 1:1 correspondence ■ Creating sets of up to 10 objects ■ Decomposing sets ■ Creating subtraction number sentences ■ Concept of *same*	See individual columns.	See individual columns.
Mathematical Language	Common addition vocabulary: *add, plus, more* Action verbs that show adding more: *gathers, makes, picks, adds more, buys*	Common subtraction vocabulary: *minus, take away* Action verbs that show taking away: *sells, eats, finds, gives away, breaks, makes, pays*	See individual columns.	See individual columns.

Math Skills Builder Materials

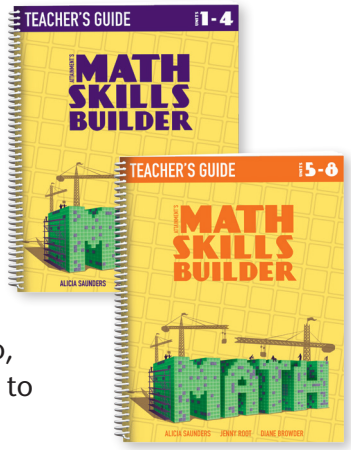
The *Math Skills Builder* curriculum comes with everything you need to get started teaching problem solving and application to real-world problems.

Implementation Guide



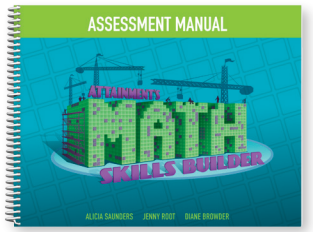
The **Implementation Guide** describes the underlying principles of the curriculum, the scope and sequence, how to determine if students have the numeracy foundational skills they will need to start solving problems, how to teach using the *Math Skills Builder* curriculum, how to measure progress, and the background and research that supports the curriculum.

Teacher's Guides



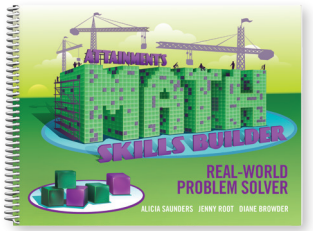
Two **Teacher's Guides** with scripted lessons are included in the *Math Skills Builder* curriculum—one for Units 1–4, and the other for Units 5–8. The Teacher's Guides provide scripted lessons for teaching all eight units in the curriculum. The scripts help you know exactly what to say and what to do, what to expect of the students, and how to adapt for an individual student's needs.

Assessment Manual



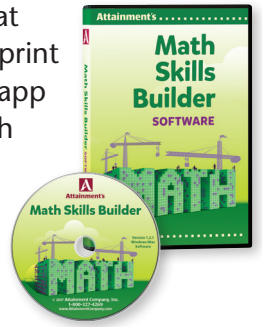
The **Assessment Manual** includes a pretest for the curriculum, a pretest focusing on early numeracy skills, and several options for posttesting at the completion of the curriculum.

Student Workbook



The student workbook—titled **Real-World Problem Solver**—is used during Lessons 2 and 3 of Units 2–8 to give students opportunities to practice solving problems of each problem type. The workbook is consumable; however, pages can be printed from the PDF file on the flash drive to give students repeated opportunities to solve the problems.

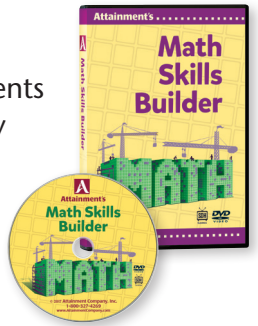
Math Skills Builder Software/iPad app



Math Skills Builder is a blended curriculum in that software and/or an iPad app is integrated with print materials during instruction. The software/iPad app is used during Lesson 4 to provide students with additional opportunities for solving math story problems using a different form of media. The software/iPad app can also be used for end-of-unit assessments or for monitoring progress.

DVD

The DVD contains over 40 video simulations of math story problems. The videos illustrate real-world application and are intended to help students generalize their new skills to math problems they may encounter in their everyday lives. The video simulations are used in Lesson 5 of each unit. In addition, you'll find videos on the DVD for signing and saying the rules for each problem type.



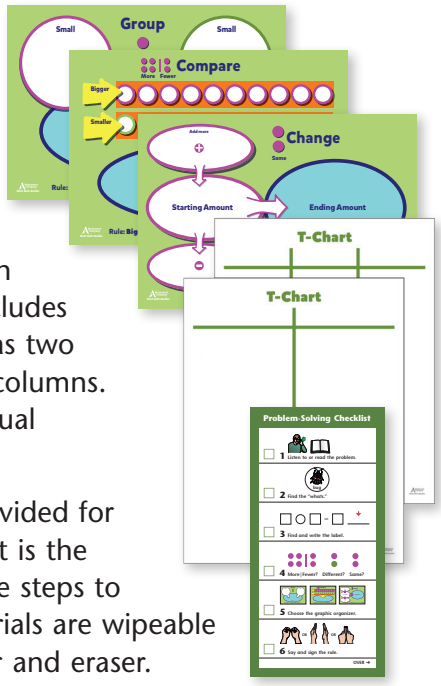
Electronic Files on Flash Drive

The flash drive includes various resources for easy and convenient use. The flash drive can be inserted into the USB port of your computer. The following resources are included on the flash drive:

- The *Math Skills Builder Real-World Problem Solver* student workbook (PDF file)
- Appendixes from the *Math Skills Builder Implementation Guide* (PDF files)
- The *Assessment Manual* (PDF file)
- The three graphic organizers for Group, Compare, and Change (PDF files), which can be projected during teaching
- An Image Library of illustrations used in *Math Skills Builder* (PNG files). The illustrations can be used to create more math stories if you desire, or to use in a student's augmentative and alternative communication (AAC) device.
- PDF files of all cards

Graphic Organizers/ Problem-Solving Checklist

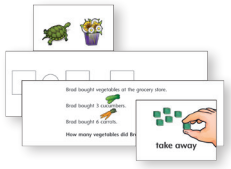
Math Skills Builder includes three graphic organizers to help students organize information they need for solving problems—one of each for Group, Compare, and Change problems. The graphic organizers are provided in two sizes—a large version for teaching and a small version for students. *Math Skills Builder* also includes a large, poster-size T-chart; one side has two columns and the other side has three columns. The T-chart is used for sorting conceptual information in some lessons.



A Problem-Solving Checklist is also provided for students; the Problem-Solving Checklist is the task analysis that guides students in the steps to solving the problem. All of these materials are wipeable if using the proper water-based marker and eraser.

Card Set

Cards are provided that represent vocabulary words, symbols, and concepts, numerals, number sentences, story problems, and some response options (*Read, please; Help;* and *I'm finished*) to help students who are nonverbal communicate their knowledge.



Manipulatives

Counting Cubes in two colors and marking pens and erasers are provided. All supplies can be housed in the *Math Skills Builder* pouch included.

Getting Started with Math Skills Builder

Assessing Early Numeracy Skills

As mentioned earlier, *Math Skills Builder* was primarily written for students who have already acquired foundational or early numeracy skills and who are now ready for the next level of mathematics. To determine if students have these foundational skills, the *Math Skills Builder Assessment Manual* includes a pretest for determining the student's level of early numeracy. This pretest can help determine which skills need further review or whether the student is ready for problem solving. Instructions are provided in the *Assessment Manual,* and a recording form, the Early Numeracy Assessment Form, is provided in Appendix A.

For students who need instruction in early numeracy skills, Unit 1 is provided. After teaching the lessons in Unit 1, posttest the student's early numeracy skills using the posttest found in the *Math Skills Builder Assessment Manual*. Instructions are provided in the *Assessment Manual* and the same recording form, the Early Numeracy Assessment Form, can be used to document performance on the posttest.

Pretesting Math Skills Builder Skills

Before beginning instruction in *Math Skills Builder,* if desired, administer the Math Skills Builder Pretest. The *Math Skills Builder Assessment Manual* includes a pretest for determining the student's level of problem-solving skills. This pretest can help measure baseline performance before beginning the curriculum. Instructions are provided in the *Assessment Manual,* and a recording form, the Math Skills Builder Pretest Assessment Form, is provided in Appendix B.

Units and Themes

As mentioned earlier, there are eight units of instruction in *Math Skills Builder.* After pretesting, begin instruction with Unit 1. Unit 1 reviews early numeracy skills by building or reviewing critical foundational skills and concepts prior to starting problem solving. Having this foundation will help students be more successful when solving problems. The skills within Unit 1 can be reviewed or taught in a massed trial format. This unit can be taught quickly for review or taught with considerable time spent on teaching early numeracy skills. Students who do not master the early numeracy skills within one month may not be successful at problem solving (though they may participate in the lessons while focusing on the needed early numeracy skills). Move students to Unit 2 when ready and then teach each unit in succession. All directions are provided in the lessons.

Units 2, 3, and 5/6 teach students a problem-solving strategy for solving a specific problem type: Group, Compare, or Change. Units 4, 7, and 8 focus on discriminating between or among problem types. Each problem type and discrimination among problem types are taught in a model-lead-test format.

1. First, using Lesson 2, you model the procedures for solving a problem for a few days while the students respond to each step following your model.
2. Then, using Lesson 3, you lead or guide the student to solve the problem—the "lead" phase of instruction. Your assistance is faded during this phase, and students are given a chance to begin to solve the problem independently. The scripts provided suggest praise, error correction, and several levels of prompting—from the least intrusive prompt (least support) to the most intrusive prompt (most support).

3 Finally, using Lesson 4, you provide students the opportunity to independently solve problems for the "test" phase of instruction.

Multiple themes are provided in Units 2–8 to provide a context and personal relevance for the mathematical problem-solving process. Within each theme, there are six problems; the numbers used in the problems across themes can be changed. The themes are designed to be culturally responsive and encompass a wide variety of examples across geographical locations. Table 1 displays the themes used in the *Math Skills Builder* curriculum. Note the themes in **blue** reflect themes in the video scenarios for each unit. You will need more than one instructional day to go through all the problems within each theme. You can also choose to change themes daily or to only do a couple of problems within each theme, saving others for practice later on.

Table 1. Math Skills Builder Unit Themes

Unit 1: Introduction	Unit 2: Group	Unit 3: Compare	Unit 4: Group & Compare Discrimination	Unit 5: Change (Addition)	Unit 6: Change (Subtraction)	Unit 7: Change—Addition and Subtraction Discrimination	Unit 8: All Problem Type Discrimination
(No theme) Review of early numeracy skills and concepts	Baseball Game	Department Store	Zoo	Fair	Art Class	Bus	Chores at Home
	Beach	Museum	Fast Food	Independence Day	Restaurant	Sporting Goods Store	Flower Shop
	Park	Aquarium	Lawn Chores	Classroom Chores	Hardware Store	Gas Station	Airport
	Farm	Arcade	Grocery Shopping	Video Game Store	Library	Garden	School Basketball Game
	Soccer Game	Salon	Pharmacy	School Dance	PE Class	Pet Store	Hotel
	Zoo	**Cat Café**	**Pet Store**	**Car Lot**	**Library**	**Geology Museum**	**Baseball**
	Grocery Store	**Shopping Mall**	**Music Concert**	**Mini Golf**	**Botanical Gardens**	**Salon**	**Carnival**

Lesson Objectives

For Units 2–8, the objectives addressed across units for each lesson are similar but specific to the targeted problem type:

- Lesson 1 always addresses pre-skill objectives for the unit, including a review of the vocabulary needed to be successful in the unit.
- Lesson 2 objectives require students to follow your model for solving the problem.
- Lesson 3 objectives focus on guided practice with a goal of independence in solving the problem.
- Lesson 4 objectives focus on independent problem solving using the software/iPad app.
- Lesson 5 objectives focus on generalizing skills to video-simulation problems.

Materials

Before you begin teaching, look through the materials included with the curriculum. Some materials are optional and depend on the needs of your students. Some materials will be used across units, such as the Problem-Solving Checklist and the student workbook; whereas, others will be specific to units, such as the T-chart used to help discriminate among problem types. The materials are pictured on pages 10–11. The first page of a lesson plan indicates exactly which materials are needed for each lesson. It is important to gather all materials needed for a lesson before teaching so the lesson pace remains rapid.

Key to teaching students to identify the problem type and solving a story problem is the Problem-Solving Checklist. This is a task analysis for students that provides a step-by-step process for problem solving. Each student has a Problem-Solving Checklist to check off steps as they are completed.

The *Real-World Problem Solver* student workbook provides students with story problems to solve. You will need to add numbers to the story problems, but this allows you to control the sums and differences (1–5 versus 1–10) to make problems easier or more difficult. This workbook is also provided as a PDF file on the flash drive so you can print multiple copies for students.

Math Skills Builder curriculum uses graphic organizers to help students organize the problem-solving process. The graphic organizers are more than a simple diagram. They are meant to show students how to visually organize the information in the problem so the problem is concrete. The graphic organizers help show the relationship among numbers in the problem, making the problem easier to solve. These graphic organizers help students develop a deep understanding of the problem type so they can solve novel problems. Students identify numbers and nouns in the problem and use manipulatives to solve for the answer. In *Math Skills Builder,* the problems are set up in a very structured way, making problem solving accessible for the students.

When learning each problem-solving strategy, students are also taught a rule to chant and hand motions to sign. The signs and the chant are provided on the DVD included. These signs and rules are matched to the visual structure of each graphic organizer to help students remember the problem type.

The *Math Skills Builder* flash drive contains PDF or PNG files of resources, including the graphic organizers, teaching posters, and images used in the math story problems. These PDF files can be projected onto interactive whiteboards, such as a SMARTBoard, for use in group instruction. PDF files are also provided so adaptations can be made for individual students who may need pages enlarged. PNG files of images are provided so you can create more story problems or so you can create response options for students who use eye gaze as their mode of response. The images can also be used for students' AAC devices.

Building Self-Determination Skills

Math Skills Builder encourages self-determination. The curriculum is based on teaching students to self-manage their problem solving by following a checklist (the Problem-Solving Checklist) to check off steps as they are completed. Choice making can also be embedded into the curriculum by allowing students to select the thematic context based on their own interests.

Lesson Scripts

Lessons are scripted (what to say is provided in colored font). Scripted lessons help you keep your language clear and consistent and mathematically sound. The scripts allow opportunities to monitor students while teaching. Rather than worrying about generating prompts and feedback on the spot, the scripts provide a systematic way to prompt students and provide feedback.

Evidence-Based Teaching Procedures Included

Model-Lead-Test Procedure. Evidence-based teaching procedures are embedded within the scripts in each lesson. One procedure included is the direct instruction method of model-lead-test. In model-lead-test, you first model the target behavior ("Watch me"), then you lead the students to practice together with you in unison ("Do it with me"). After you have modeled the target behavior and led students through the process, the last step (test) requires the students to practice the target behavior independently without your assistance ("Your turn"). This procedure is scripted for you in the lessons.

Discrimination Practice. Discrimination practice is also embedded within the lessons to help students discriminate concepts and problem types. In discrimination practice, the students practice sorting examples or nonexamples of a concept or salient features of a problem type onto a T-chart. You model how to discriminate the concept or problem type using a think-aloud process. This procedure is also scripted for you in each lesson.

Constant Time-Delay Procedure. In *Math Skills Builder,* a constant time-delay procedure is used to teach math vocabulary and symbols. To teach a math term or symbol, you first point to the correct response as you are giving the direction to the student to do so (known as Round 1, 0-second time delay). When the student consistently responds with a 0-second time delay, you give the direction to the student but delay prompting (i.e., pointing to the response) for the specified time interval (e.g., 4–5 seconds) to provide the student an opportunity to respond independently (known as Round 2, a 4-second time delay). The amount of time delay can be individualized for students. For example, if a student has a physical limitation that requires more time to respond, the delay time can be increased to provide time to respond.

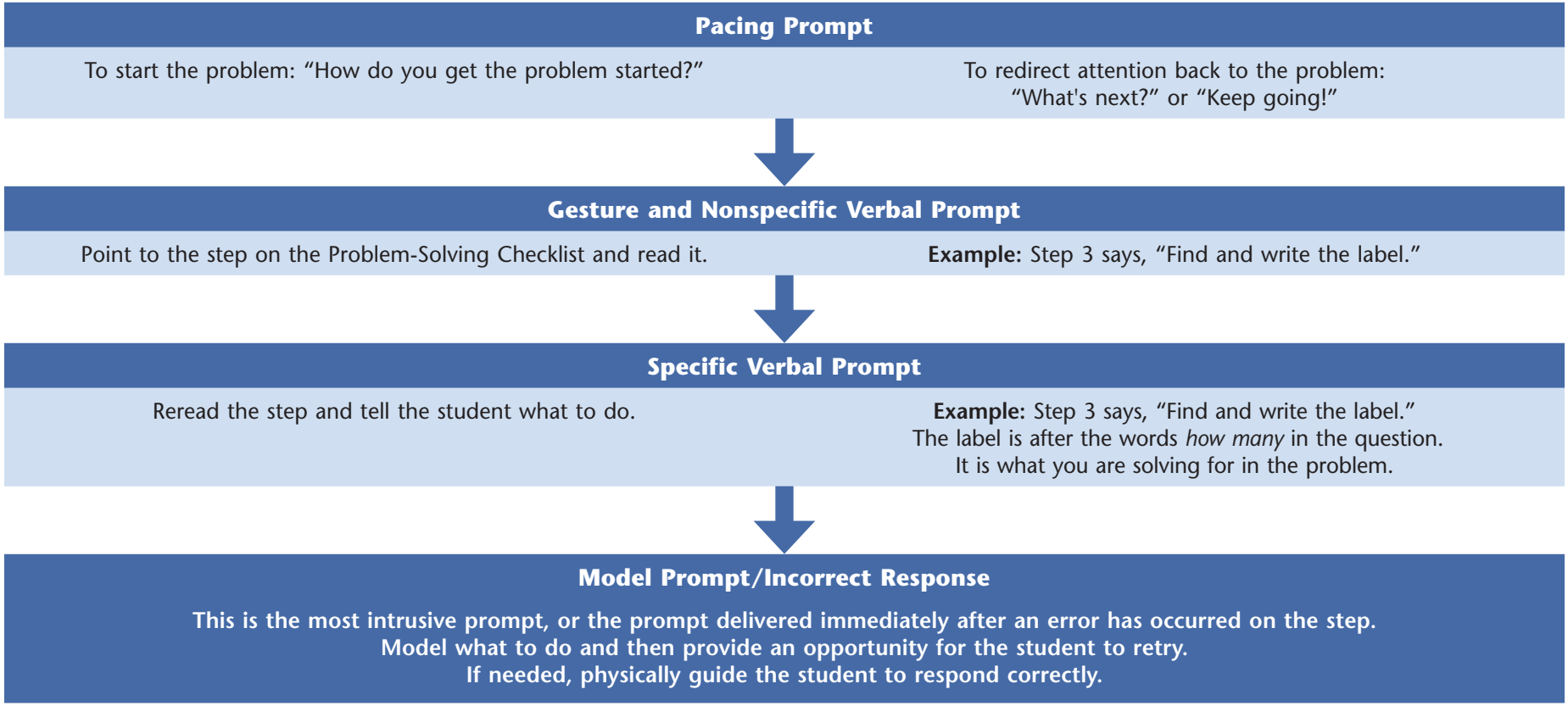
Several questions should be considered for each student when using the constant time-delay procedure:

- What type of response do you want from the student? Point to the answer (receptive)? Say the answer (expressive)? Pull the answer from a choice board? Use eye gaze to answer?
- Will the student respond receptively only or receptively and expressively (e.g., point to the answer only; point to the answer and say it; use an AAC device to respond)?
- How many warm-up trials will you give at 0-second time delay?
- How long will you wait before prompting in Round 2 (e.g., 5 seconds, or start at 4 seconds then progress to 6 seconds)?
- What kind of feedback will you provide?

If a student struggles with Round 2, return to Round 1 for a few trials and then return to Round 2. For students who are consistently responding in Round 2, you can skip Round 1. The constant time-delay procedure is embedded in the teaching scripts of each lesson.

System of Least Intrusive Prompts. A prompting hierarchy is also embedded in the teaching scripts. This hierarchy is shown in Figure 2.

Figure 2. Math Skills Builder Prompting Hierarchy



In this hierarchy, you provide the student with an opportunity to respond correctly and independently. If the student does not initiate a step in the problem-solving process, a pacing prompt is used. If the student does not respond with a correct, independent response within a step, you provide the least intrusive prompt, which in this hierarchy, is a gesture or nonspecific verbal prompt. This is followed by a specific verbal prompt, if needed. You proceed through the prompting hierarchy until the student responds correctly. As shown in Figure 2, prompts given to students are in a hierarchy from the least intrusive and most independent to the most intrusive and least independent. If the student responds incorrectly at any step, provide error correction, which is to model the correct response and then provide the student with an opportunity to retry. This prompting hierarchy is provided for you within the teaching scripts.

Lesson Progression

Units 2 through 8 are comprised of five lessons each. The lessons in each unit are arranged in a progression that leads students to independent problem solving.

Lesson 1: Preteaching and Reviewing Concepts. This lesson prepares students to solve the problem type. The time-delay procedure is used to teach or review key vocabulary, concepts,

and symbols. Students also are taught the process of using manipulatives with a graphic organizer to create sets to represent a number sentence and to solve a problem without the context of a story problem.

Lesson 2: Modeling the Problem-Solving Strategy. This lesson introduces students to solving the targeted problem type. Students learn rules and hand motions as a strategy for remembering how to solve the problem type. These hand motions are especially important as they give students a concrete way to identify the problem type. The process for solving the story problems step-by-step is provided using a think-aloud process. Students follow your step-by-step model immediately after you provide it. Coaching and feedback are provided during this lesson, and the students' responses should be errorless because they are following your model. Lesson 2 is repeated as needed (typically twice but sometimes more repetitions are needed) until students understand how to use each step. Data of the student's performance are not collected during lessons that model the procedure.

Lesson 3: Providing Guided Practice. Once students have general knowledge of how to perform each step of the task analysis for the targeted problem type, this lesson plan gives students an opportunity to practice independently solving problems with planned prompting and feedback. The student workbook (*Real-World Problem Solver*) is used in this lesson. Problems from multiple themes are provided in the workbook. After choosing a theme, you will need to write the numerals in the problems. A mastery target should be set for this lesson; students work toward achieving mastery at solving the story problems. Typically this takes one to two weeks. Students may achieve mastery at different rates. Students who have achieved mastery can move on to Lessons 4 and 5 to build generalization. For students who are making little to no progress (performing very few or no steps independently), backing up and repeating Lesson 2 again until the student shows progress is appropriate. Also see the Troubleshooting section on page 23 for additional ideas.

Lesson 4: Providing Independent Practice via Software. After students have used the task analysis and have knowledge of how to perform each step, this lesson plan gives additional practice using the task analysis independently. A software program and an iPad app are provided for this lesson. Use whichever technology works better for your setting. The software/app provides practice using additional themes. This format is best used individually because data are gathered on individual students. However, you can project the software/app and complete some problems as a group. If you do not have access to a computer or iPad, you can omit this lesson but you should provide more opportunities to practice solving problems using Lesson 3 then.

Lesson 5: Generalizing Skills via Videos. When students have shown mastery of solving story problems of the particular problem type, follow this lesson plan. Lesson 5 is designed to provide real-world video simulations of math story problems. This lesson can be completed in a small group, with students taking turns completing the steps or solving the complete problem. This lesson can also be completed by individual students, especially if students in the group are working at different rates.

Story Problems

In *Math Skills Builder,* careful consideration was given to the structure of the story problems and how the story problems were written. The complexity of language traditionally found in story problems often is a barrier to problem solving for students with cognitive challenges. The *Math Skills Builder* curriculum follows a predictable structure in a four-line format consisting of:

1. an anchor sentence to give context to the problem;
2. two sentences that identify what is happening in the problem and the quantities for solving; and
3. a final question indicating what problem the students are solving.