Instruction

STAMS® series Teacher Guide A

STAMS

Strategies to Achieve Mathematics Success

Curriculum Associates

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OVERVIEW

LESSON PLANS

Number, Operations, and Algebraic Thinking

Addition and Subtraction

Base Ten—Counting

Base Ten—Place Value

Addition and Subtraction—Place Value

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Shapes and Attributes

Measurement and Data

CAMS® and STAMS® Program Overview

The *CAMS*® and *STAMS*® program is a powerful integrated program of assessment and data-driven instruction. The program focuses on the critical math concepts and skills that students need to advance to the next grade level. The *CAMS*® *Series* and the *STAMS*® *Series* work together effectively to ensure that your students gain a solid understanding of the key math concepts and skills. This knowledge will ultimately help them become independent problem solvers and succeed on high-stakes state tests.

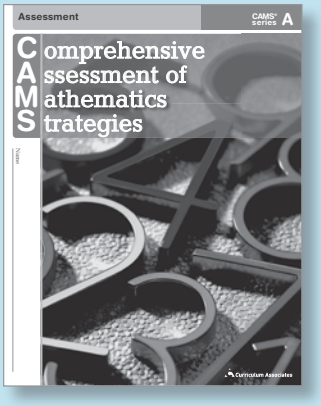
Features

Data-driven instruction with a pretest, a post test, and benchmarks
(see page 7)

Emphasis on errors as opportunities for learning
(see pages 19 and 23)

Highly scaffolded lessons with gradual release of responsibility
(see pages 14–25)

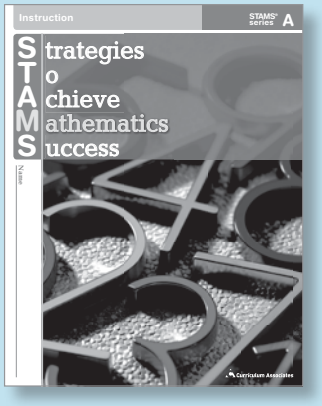
Embedded professional development in supportive easy-to-use teacher guide
(see pages 14–25)



Books A–H (Grades 1–8)

Assessment

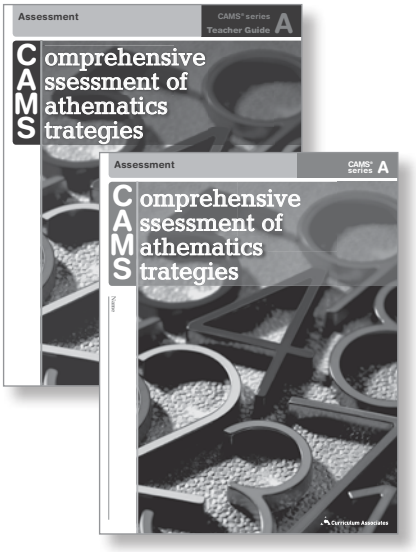
Use the *CAMS*® *Assessment Series* to gather information for targeting instruction and measuring progress.



Books A–H (Grades 1–8)

Instruction

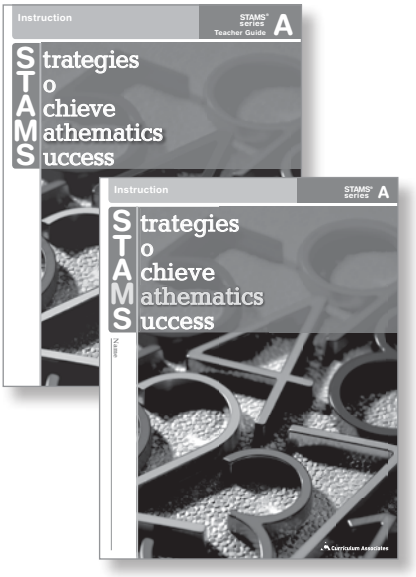
Use the *STAMS*® *Instruction Series* for in-depth teaching of the 16 concepts and skills that will help students succeed at grade level.



Assessment with CAMS® Series

Quickly identify which of the 16 foundational math concepts and skills your students find most difficult and use the results to monitor progress.

- A pretest diagnoses students' strengths and weaknesses and guides their placement in the *STAMS® Instruction Series.*
- Four benchmarks assess class progress throughout the year.
- A post test assesses students' mastery of concepts and skills following instruction with the *STAMS® Series.*
- Tracking forms and charts facilitate data collection and student self-assessment encourages reflection.



Instruction with STAMS® Series

Provide students with explicit instruction of the 16 foundational math concepts and skills—those topics identified as the most important instructional goals for each grade level.

Student Book

Designed for the struggling student, lessons are highly visual, engaging, and clearly presented. Each five-part lesson uses three levels of scaffolding to make sure students master the critical math concepts and skills.

1. *Scaffolded student support*—Instructional support is removed gradually to build student independence as they move through each lesson.
2. *Scaffolded student accountability*—Practice problems build student accountability by requiring students to use increasing degrees of higher-level thinking to analyze and explain their answers.
3. *Scaffolded problem-solving experience*—Practice problems slowly increase in difficulty to build student proficiency and confidence.

Teacher Guide

Step-by-step support helps teachers easily differentiate instruction and present each lesson most effectively.

- Modeling helps teachers introduce each skill simply and confidently.
- Useful tips and embedded professional development guide instruction.
- Detailed easy-to-follow instructions minimize planning time.

Addresses Common Core State Standards

- *STAMS* was created to support Common Core State Standards (CCSS). See Correlations chart on page 31.
- Builds conceptual understanding and procedural fluency, as emphasized by CCSS
- Helps students make connections between related concepts and skills

Implementing CAMS® Assessments and STAMS® Lessons

Option 1: Data-Driven Instruction

1 Diagnose with CAMS® Pretest

- Use the *CAMS*® Pretest to place students in the *STAMS*® Series. Results identify which *STAMS*® lessons students need.

2 Instruct with STAMS® Lessons

- Pinpoint a specific lesson in the *STAMS*® student book to remediate an area that needs improvement.

3 Monitor Progress with CAMS® Benchmarks

- Assess progress in all 16 foundational topics with the four 16-item *CAMS*® Benchmarks at four points during the year.

4 Assess Mastery with CAMS® Post Test

- Use the *CAMS*® Post Test to assess students' mastery of the 16 math concepts and skills following instruction with *STAMS*®.

Option 2: Comprehensive Instruction

For implementation of *CAMS*® and all 16 *STAMS*® lessons, follow this suggested pacing chart. Allocate 19 weeks, with each *STAMS*® lesson spanning 5 days. (See the Week at a Glance on page 10 for more details.)

Suggested Pacing Chart for Book A of the CAMS® *and* STAMS® *Program*

Day(s)	Lesson	*CAMS*® *Assessment Series*	*STAMS*® *Instruction Series*	Minutes
1–5		*CAMS*® Pretest		30–45/day
6–10	1	Understand Addition and Subtraction		30–45/day
11–15	2	Fact Families		30–45/day
16–20	3	Make Tens to Add and Subtract		30–45/day
21–25	4	Solve Word Problems		30–45/day
26		*CAMS*® Benchmark 1		30–45
27–31	5	Add Three Numbers		30–45/day
32–36	6	Count to 120		30–45/day
37–41	7	Place Value		30–45/day
42–46	8	Compare Numbers		30–45/day
47		*CAMS*® Benchmark 2		30–45
48–52	9	Add and Subtract Ten		30–45/day
53–57	10	Add 2-Digit Numbers		30–45/day
58–62	11	Subtract Tens		30–45/day
63–67	12	Shapes		30–45/day
68		*CAMS*® Benchmark 3		30–45
69–73	13	Equal Parts		30–45/day
74–78	14	Length		30–45/day
79–83	15	Time		30–45/day
84–88	16	Data		30–45/day
89		*CAMS*® Benchmark 4		30–45
90–94		*CAMS*® Post Test		30–45/day

Note: Allocate 15 minutes more per day if *STAMS*® additional activities are used in conjunction with each lesson.

CAMS® and STAMS® Grade-Level Foundational Skills

The focus of the *STAMS® Series* progresses from number sense and computational skills in early grades to pre-algebra in later grades.

All 16 concepts and skills covered in each level of the *STAMS® Series* align to NCTM Focal Points and Connections for that grade. Lesson topics have been carefully sequenced so students move from basic skills to more complex content within each grade and between grades as well.

Book A (Grade 1)

Understand Addition and Subtraction
Fact Families
Make Tens to Add and Subtract
Solve Word Problems
Add Three Numbers
Count to 120
Place Value
Compare Numbers
Add and Subtract Tens
Add 2-Digit Numbers
Subtract Tens
Shapes
Equal Parts
Length
Time
Data

Book B (Grade 2)

Counting Patterns
Place Value
Compare Numbers
Mental Math
Addition Strategies
Subtraction Strategies
Solve Word Problems
Add and Subtract to 1,000
Arrays
Equal Parts of Shapes
Length
Add and Subtract Length
Time
Money
Data and Line Plots
Graphs

Book E (Grade 5)

Multiply 3-Digit Numbers
Divide Mentally
Estimate Quotients
1-Digit Divisors
Zeros in the Quotient
2-Digit Divisors
Understand Mixed Numbers
Add and Subtract Like Fractions
Compare Unlike Fractions
Add and Subtract Unlike Fractions
Add and Subtract Mixed Numbers
Add and Subtract Decimals
Area
Surface Area
Understand Volume
Line Graphs

Book F (Grade 6)

Multiply Whole Numbers by Fractions
Multiply Fractions
Divide Whole Numbers by Fractions
Divide Fractions by Fractions
Multiply and Divide by Powers of Ten
Multiply Decimals
Divide Decimals by Whole Numbers
Divide by Decimals
Understand Ratios
Understand Percent
Unit Rates
Ratios in Tables of Data
Solve Equations Using Number Sense
Solve Equations Using Inverse Operations
Use Formulas
Volume

Addresses Common Core State Standards

- *STAMS* was created to support Common Core State Standards (CCSS). See Correlations chart on page 31.
- Builds conceptual understanding and procedural fluency, as emphasized by CCSS
- Helps students make connections between related concepts and skills

Book C (Grade 3)

Place Value
Add and Subtract
Multiplication Concepts
Fact Strategies
More Fact Strategies
Division Concepts
Fact Families
Fraction Concepts
Model Equivalent Fractions
Benchmark Fractions
Comparing Fractions
Fractions Greater Than 1
Plane Figures
Length
Perimeter
Pictographs and Bar Graphs

Book D (Grade 4)

Multiplication Properties
Multiply Mentally
Multiply by 1-Digit Numbers
Multiply by 2-Digit Numbers
Relate Division to Multiplication
Divide Without Regrouping
Divide with Regrouping
Equivalent Fractions
Simplify Fractions
Decimal Place Value
Compare and Order Decimals
Relate Decimals to Fractions
Angles
Understand Area
Area of Rectangles
Line Plots

Book G (Grade 7)

Understand Integers
Add and Subtract Integers
Multiply and Divide Integers
Evaluate Expressions
Solve Linear Equations
Equations with Rational Numbers
Proportional Relationships
Solve Proportions
Rate Problems
Percent as a Ratio
Percent Problems
Similarity
Circles
Cylinders
Circle Graphs
Theoretical Probability

Book H (Grade 8)

Exponents
Square Roots
Solve Two-Step Equations
Two-Step Equations with Rational Numbers
Linear and Nonlinear Equations
Slope
Graph Linear Equations
Solve Systems Graphically
Solve Systems Algebraically
Special Pairs of Angles
Angle Sums
Triangle Similarity
Pythagorean Theorem
Distance Formula
Mean, Median, Range
Scatter Plots

STAMS® *Instruction Overview*

Each level of the *STAMS® Series* has 16 interrelated lessons designed to help students build mathematical competency. Emphasizing depth over breadth, each five-day, five-part lesson targets two closely-related aspects of a single concept or skill. Highly scaffolded lessons offer gradual release of responsibility from the teacher to the student. Part One and Part Two introduce the skill with modeled and guided instruction. Part Three and Part Four (modeled and guided practice) and Part Five (independent practice) have students work with growing accountability for their learning as they practice and apply the skills taught.

STAMS® lessons are optimally designed to be used in conjunction with the *CAMS®* assessments, as described on page 9. (See the *CAMS®* teacher guide for more detail.) However, teachers have found that the built-in flexibility also makes *STAMS®* lessons perfect for a variety of other uses.

Tip: *STAMS®* lessons are best used with teacher guidance, as students learn best when they are directed by knowledgeable, supportive teachers. However, the student book lessons are written to be inviting and accessible even to struggling students. If you do assign *STAMS®* lessons as independent class work, be sure to circulate and monitor students as they work.

Week at a Glance

Suggested Lesson Pacing

	Monday	Tuesday
	modeled and guided instruction	
	Part One	Part Two
Direct instruction	Introduce new skill with student book pages. **20 minutes**	Introduce new skill with student book pages. **20 minutes**
Independent work Your Turn	Practice new skill. **10 minutes**	Practice new skill. **10 minutes**
Assessment	Check *Your Turn* answer.	Check *Your Turn* answer.
Additional Activity (***optional***)	*Hands-on Activity* **15 minutes**	*Reteaching Activity* **15 minutes**

Wednesday	Thursday	Friday
modeled and guided practice		independent practice
Part Three	**Part Four**	**Part Five**
Model multiple-choice problem; analyze answers. **10 minutes**	Model extended-response problem. **10 minutes**	
Practice solving multiple-choice problems. **20 minutes**	Practice solving extended-response problem. **20 minutes**	Solve problems in test-prep format. **30 minutes**
Check *Your Turn* answers.	Check *Your Turn* answer.	Check *Your Turn* answers. Use *Assessment and Remediation*. **15 minutes**
Vocabulary Activity **15 minutes**	*Real-World Connection* plus *School-Home Connection* **15 minutes**	*Challenge Activity* **15 minutes**

Alternative Implementations

Other scenarios for using the *STAMS*® lessons with your class include the following:

Whole Group (at grade level)

State test review—Use the *STAMS*® lessons as a review for the entire class. The 16 weeks of lessons allow you to finish well before your state test date.

Small Group (at or below grade level)

Reteaching support—Use the *STAMS*® lessons with small groups to reteach skills that students are still struggling to master. See pages 12–13 for more information.

Individual (at or below grade level)

Tutoring or independent work—As you become aware of specific gaps in a student's background knowledge, assign the corresponding *STAMS*® lesson.

Knowing how and when to differentiate

Effective differentiation is based on identifying where students are struggling. The ongoing assessment features help you stay informed about student progress.

- Observe student work with *Your Turn* on a daily basis to see which students need additional support or remediation.
- Use *Error Alerts* to help recognize and correct common mistakes and misconceptions as soon as they surface.
- Use Assessment and Remediation to identify misconceptions or gaps in understanding at any point in the lesson. The activities listed here provide suggestions for individual, small-group, or whole class remediation (see page 23).

Using STAMS® *Lesson Features for Differentiation*

STAMS® lessons support several approaches to differentiated instruction. Work with small groups or individuals as needed by taking advantage of these lesson features.

For ELL students

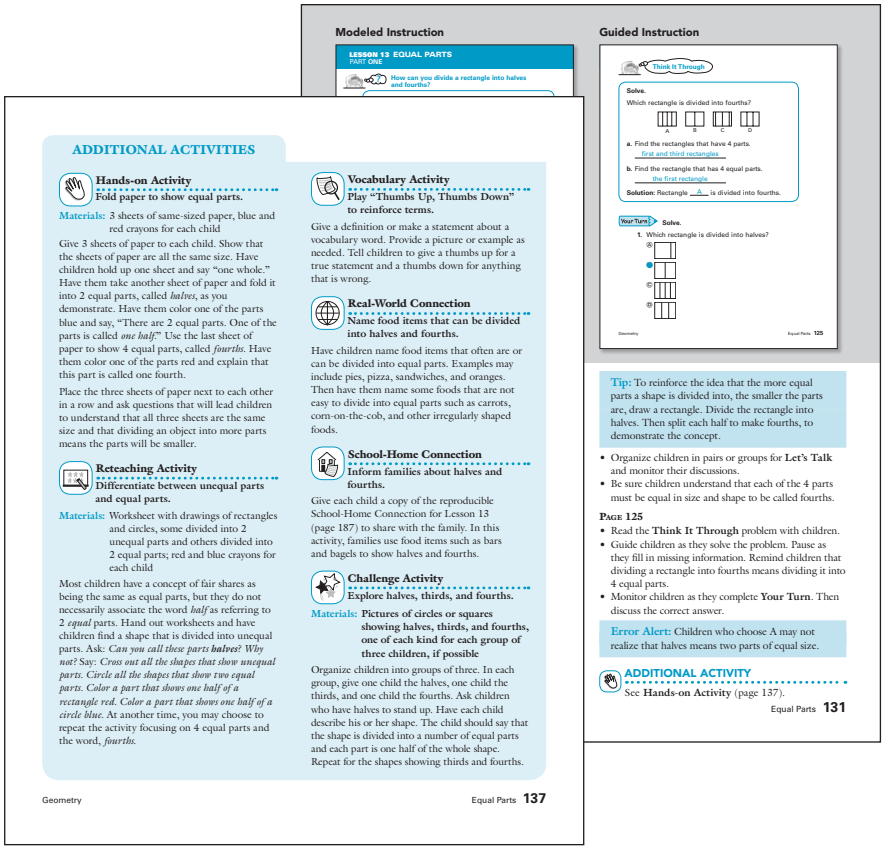
- For any students who struggle with the language of math, preview math vocabulary (see page 15).
- Throughout the instruction, refer to *ELL Support* tips that alert you to potential language obstacles.
- Use the *Vocabulary Activity* to help students tie new math terms to words they already understand.

For struggling students

- Use the *Hands-on Activity, Reteaching Activity,* and *Real-World Connection* to give students other ways to access the skill.

For confident students

- Provide students an opportunity to extend their understanding of the concepts in the lesson with the *Challenge Activity.*



Using Related STAMS® *Lessons to Remediate*

STAMS® lessons are sequenced within each grade, and from grade to grade, to make instruction easy at the appropriate level. For any particular topic, use the Related *STAMS*® Lessons feature in the teacher guide to find a lesson, from the same grade level or from an earlier grade, that meets the student's needs.

Review within the grade level (Books A–H)

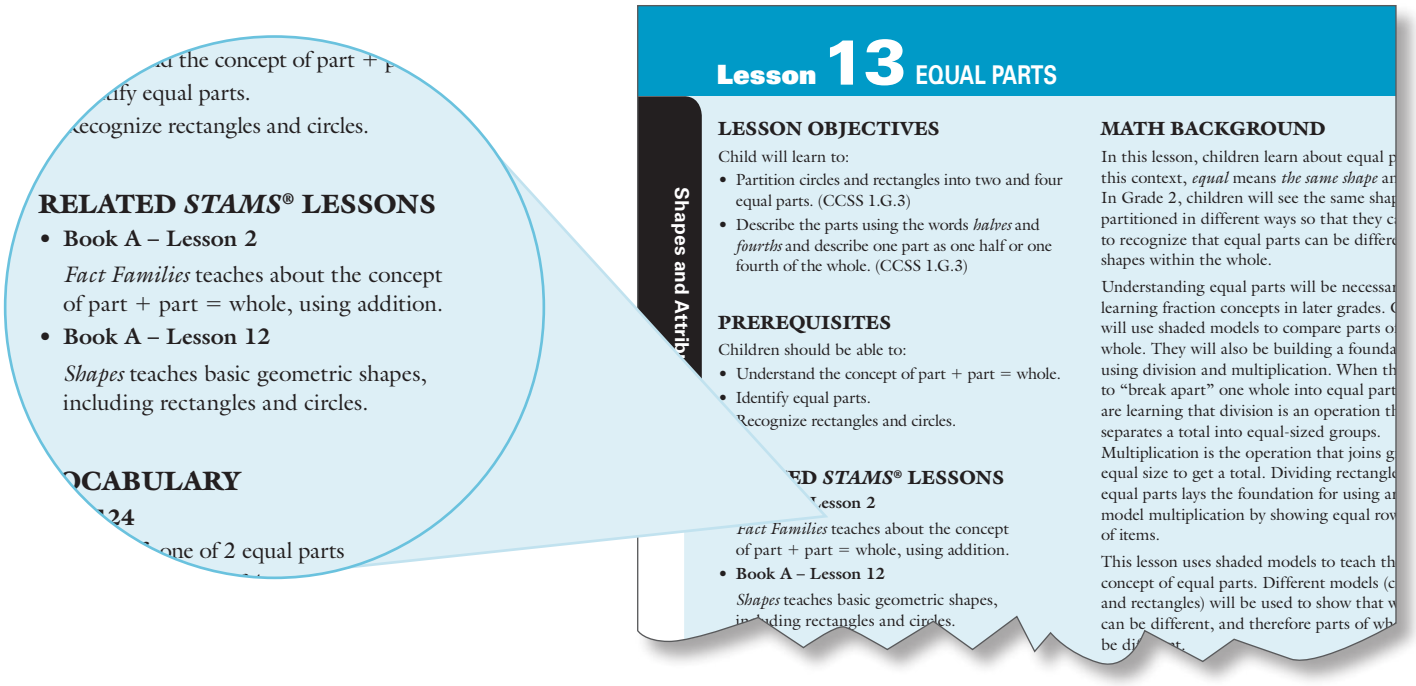
- If a student isn't succeeding with a lesson, your first resource is reviewing prerequisite skills in related lessons in the same book. In most cases these skills were taught in an earlier lesson.
- A careful review of Part One and Part Two of Related *STAMS*® Lessons can help a student quickly get back on track.

Review at a lower grade level (Books B–H)

- Sometimes lessons cover prerequisite skills from a previous grade's book.
- Again, a review of Part One and Part Two of Related *STAMS*® Lessons can help a student quickly get back on track.
- A student who frequently needs to review material from a previous level may need consistent instruction at that level before that student can succeed in the core program at grade level.
- Consider administering the *CAMS*® Pretest from the previous level. These results will help you place the student more appropriately.

To review skills from related lessons, you might:

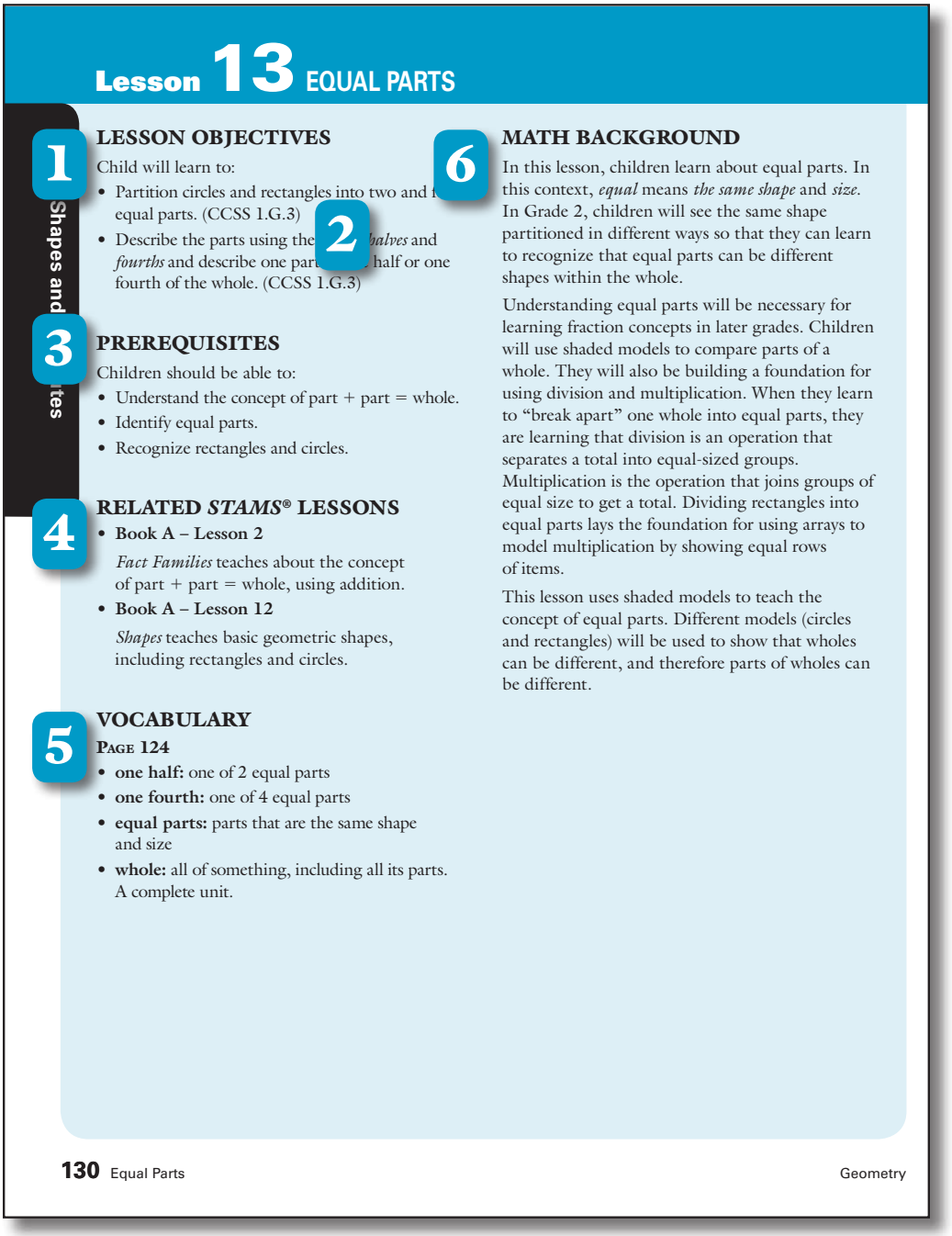
- Use the appropriate student book lesson and work with the student through either Part One and Part Two, or all five parts.



Features of a STAMS® Lesson

This 12-page section guides teachers through a sample lesson plan from the *STAMS*® teacher guide, which shows facsimiles of the student book lesson. Numbered boxes call out and describe the key features in both the teacher guide and student book.

INTRODUCTION



Lesson 13 EQUAL PARTS

Shapes and

1

LESSON OBJECTIVES

Child will learn to:

- Partition circles and rectangles into two and f equal parts. (CCSS 1.G.3)
- Describe the parts using the *halves* and *fourths* and describe one part half or one fourth of the whole. (CCSS 1.G.3)

2

3

PREREQUISITES

Children should be able to:

- Understand the concept of part + part = whole.
- Identify equal parts.
- Recognize rectangles and circles.

4

RELATED *STAMS*® LESSONS

- **Book A – Lesson 2**

  Fact Families teaches about the concept of part + part = whole, using addition.
- **Book A – Lesson 12**

  Shapes teaches basic geometric shapes, including rectangles and circles.

5

VOCABULARY

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- **one half:** one of 2 equal parts
- **one fourth:** one of 4 equal parts
- **equal parts:** parts that are the same shape and size
- **whole:** all of something, including all its parts. A complete unit.

6

MATH BACKGROUND

In this lesson, children learn about equal parts. In this context, *equal* means *the same shape* and *size*. In Grade 2, children will see the same shape partitioned in different ways so that they can learn to recognize that equal parts can be different shapes within the whole.

Understanding equal parts will be necessary for learning fraction concepts in later grades. Children will use shaded models to compare parts of a whole. They will also be building a foundation for using division and multiplication. When they learn to "break apart" one whole into equal parts, they are learning that division is an operation that separates a total into equal-sized groups. Multiplication is the operation that joins groups of equal size to get a total. Dividing rectangles into equal parts lays the foundation for using arrays to model multiplication by showing equal rows of items.

This lesson uses shaded models to teach the concept of equal parts. Different models (circles and rectangles) will be used to show that wholes can be different, and therefore parts of wholes can be different.

130 Equal Parts Geometry

1. **Lesson Objectives:** Identifies skills-related goals for students.

2. **Common Core Content Standard:** Identifies the standard(s) covered in this lesson.

3. **Prerequisites:** Lists critical concepts/skills required for success with the lesson.

4. **Related *STAMS*® Lessons:** Identifies precursor lessons that lay the foundation for the concepts/skills students are about to learn.

5. **Vocabulary:** Lists key math terms from the lesson, with definitions.

6. **Math Background:** Supports teacher understanding of why the lesson content is important for students to learn.

Best Practices

Math Vocabulary

Knowledge of math terminology is critical to students' understanding of new concepts and skills. To master math vocabulary, students must see and use the words in context frequently, both orally and in writing. Through consistent modeling of this same behavior as you instruct, students are more likely to adopt this practice.

- As students encounter new terms in text, model the correct pronunciation of each word and have students repeat the word.
- Suggest that students underline math terms they do not understand and review them together.
- Encourage students to use math terms whenever they are communicating their ideas about math.

Part One and Part Two have identical formats and features.

PART ONE

Modeled Instruction

LESSON 13 EQUAL PARTS
PART ONE

1 How can you divide a rectangle into halves and fourths?

Explore
You can divide a rectangle into 2 **equal parts**.
Each part is **one half**.
You can divide a rectangle into 4 **equal parts**.
Each part is **one fourth**.

2 Think
Compare the parts.
Which parts are smaller, the halves or the fourths?
What do you need to find out?
which parts are smaller

Connect
Look at the rectangles. They are the same size.
Circle the rectangle that is divided into more parts.
There are 4 fourths in the **whole** rectangle.
The fourths are smaller than the halves.

3 Let's Talk
Which rectangle is divided into fourths? Tell why the other rectangle is **not** divided into fourths.

124 Equal Parts Geometry

Guided Instruction

4 Think It Through

Solve.
Which rectangle is divided into fourths?
A B C D
a. Find the rectangles that have 4 parts.
first and third rectangles
b. Find the rectangle that has 4 equal parts.
the first rectangle
Solution: Rectangle A is divided into fourths.

5 Your Turn **Solve.**
1. Which rectangle is divided into halves?
Ⓐ ● Ⓒ Ⓓ

Geometry Equal Parts 125

PART TWO

Equal Parts 127

6 AT A GLANCE

Children activate their background knowledge about parts and wholes, and then learn how to partition a rectangle into halves and fourths.

7 STEP BY STEP

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- Introduce the **Question** at the top of the page.
- Have children study the figures shown in **Explore** and ask which figure shows halves? Fourths?

8 **ELL Support:** The word *divide* has several different meanings. Explain that in this lesson, *divide* means to partition into equal parts.

- Read **Think** with children. Make sure children understand that the rectangles are the same size and shape, so they can compare the shaded parts to see which parts are smaller.
- Discuss **Connect** with children. Make sure children understand that the rectangles are the same shape and size. Because the rectangle that is divided into fourths has more parts than the rectangle that is divided into halves, the fourths are smaller.

9 **Tip:** To reinforce the idea that the more equal parts a shape is divided into, the smaller the parts are, draw a rectangle. Divide the rectangle into halves. Then split each half to make fourths, to demonstrate the concept.

- Organize children in pairs or groups for **Let's Talk** and monitor their discussions.
- Be sure children understand that each of the 4 parts must be equal in size and shape to be called fourths.

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- Read the **Think It Through** problem with children.
- Guide children as they solve the problem. Pause as they fill in missing information. Remind children that dividing a rectangle into fourths means dividing it into 4 equal parts.
- Monitor children as they complete **Your Turn**. Then discuss the correct answer.

10 **Error Alert:** Children who choose A may not realize that halves means two parts of equal size.

ADDITIONAL ACTIVITY

See **Hands-on Activity** (page 137).

Geometry Equal Parts **131**

a shape into
the middle
sounds like
half."

Let's Talk
children
rcle that is
he desired part.

with children.
n. Pause for
Then discuss

Turn. Then

ave counted
half.

not change, regardless of the shape of the whole.

See Reteaching Activity (page 137).

132 Equal Parts Geometry

Student Book

1. **Focus Question:** Sets a purpose for student learning. Gets students thinking about the math concept/skill they will investigate in Explore/Think/Connect.

2. **Explore/Think/Connect:** Provide students with a proven routine to apply to all math problems. **Explore** activates students' prior knowledge and introduces the concept/skill. **Think** presents leading questions or statements to get students thinking about the concept/skill. **Connect** answers the focus question.

3. **Let's Talk:** Develops students' ability to communicate effectively about math through an engaging peer-learning activity.

4. **Think It Through:** Walks students through the thinking process for solving an example problem.

5. **Your Turn:** Reinforces instruction with independent practice.

Teacher Guide

6. **At a Glance:** Sums up what students do in each lesson part.

7. **Step by Step:** Provides an explicit walk-through of the steps for guiding students through each lesson part.

8. **ELL Support:** Targets at point-of-contact a language issue that may be affecting English language learners' ability to understand the math.

9. **Tip:** Provides on-the-spot information the teacher can use to build students' understanding of the concept/skill.

10. **Error Alert:** Addresses common errors or misconceptions that lead students to an incorrect answer.

Modeled & Guided Instruction

Teacher Led

After prompting students to tap into their prior knowledge, the teacher uses step-by-step examples to model the new concept/skill and guide instruction.

Best Practices

Think-Aloud

The ability to verbalize mathematical thinking and strategies to others strengthens conceptual understanding and problem-solving skills.

- To foster effective discussion, plan carefully when grouping students for Let's Talk. Consider skill levels, social skills, and English language proficiency.
- Circulate and provide tips or encouragement as students work together to discuss math ideas. Guide the discussion as needed.
- During Think It Through, allow students to work in pairs or small groups and talk aloud as they follow the steps to solve the problem.

COMPONENTS OF MATH INSTRUCTION

Math Strategies	Examples in *STAMS*® *Series*	Research Says
Computational Fluency Computational fluency is having recall of number facts and knowledge, and the ability to apply multiple computational methods.	**Student Book** Problems in each lesson part reinforce grade appropriate methods for computing.	"Efficient, accurate computational fluency is key to students' success in higher-level mathematics necessary for the workplace." — *National Research Council, 2001*
Conceptual Understanding Conceptual understanding is the knowledge of why math processes and rules work.	**Student Book** Students develop conceptual understanding in Part One and Part Two and demonstrate their knowledge in Part Three, Part Four, and Part Five.	"Students with conceptual understanding know more than isolated facts and methods. They understand why a mathematical idea is important and the kinds of context problem-solving in which it is useful." — *National Research Council, 2001*
Error Analysis Error analysis is an explanation of the patterns of mistakes students make. It allows teachers to provide targeted instruction that will help correct the errors.	**Student Book** • Part Three: Check **Teacher Guide** • Part One and Part Two: Error Alert feature • Part Three: Answer Analysis • Assessment and Remediation chart	"Research has shown that building upon students' prior knowledge and directly addressing misconceptions can lead to increased learning." — *Swan, 2002; Askew, 2002*
Math Vocabulary Math vocabulary is the group of content-area words, or Tier 3 words, that are most often specific to math text and used rarely in other contexts. **Controlled Vocabulary** Controlled vocabulary is the use of words at a lower reading level. It allows students to learn new concepts without struggling with reading issues.	**Student Book** • Students must use math language in their explanations for solving the extended-response problems in Part Four and Part Five. • Math vocabulary words are boldfaced. • Key terms are defined explicitly. • The Let's Talk activities in Part One and Part Two provide opportunities for students to use math language in context. • Each lesson uses controlled vocabulary to make new math knowledge more accessible and understandable. **Teacher Guide** • Vocabulary Activity • Definitions of key math terms are provided for each lesson.	"Tier Three words should be taught at point of contact, or as they occur in text." — *Beck, McKeown, & Kagan, 2002* "Without a basic knowledge of these terms, students will have difficulty understanding information they read or hear. Knowledge of important terms is critical to understanding any subject." — *Marzano & Pickering, 2005* "Research has demonstrated that vocabulary learning occurs most successfully through instructional environments that are language-rich, actively involve students in using language, require that students both understand spoken or written words and also express that understanding orally and in writing, and require students to use words in multiple ways over extended periods of time." — *CCSSO/NGA, 2010*

For a full report and bibliography, go to *CurriculumAssociates.com/STAMS/research.*

COMPONENTS OF MATH INSTRUCTION *(continued)*

Math Strategies	Examples in *STAMS® Series*	Research Says
Meaningful Practice Meaningful practice is problem solving that requires students to apply learned concepts and skills.	**Student Book** • Part One through Part Four: Your Turn • Part Five: Independent practice	"Meaningful practice: to gain deeper understanding of topic — practice that focuses on building conceptual understanding related to skills and procedures." *— Marzano et al, 2000*
Multiple Representations Multiple representations are the ways in which a teacher or student represents a math idea, including spoken, written, symbolic, and concrete formats.	**Student Book** Symbolic, pictorial, spoken, and written methods are used throughout each lesson part to instruct students.	"Each of the different types of representation adds a new layer or a new dimension to the understanding of the concept being represented. Some students find some representations easier to understand than others." *— Mendieta, 2006*
Procedural Knowledge Procedural knowledge is the understanding of when and how to use mathematical procedures effectively. It aids in automatic recall of facts, allowing for further study of new math concepts and skills.	**Student Book** Through scaffolding, students develop procedural knowledge in Part One through Part Four. By Part Five they become independent problem solvers.	"Students need to be efficient and accurate in performing basic computation with whole numbers without having to rely on tables or other aids. They also need to know reasonably efficient and accurate ways to add, subtract, multiply, and divide multi-digit numbers, both mentally and with pencil and paper." *— National Research Council, 2001*

ASSESSMENT AND INTERVENTION

Strategies and Features	Examples in *CAMS®* and *STAMS® Series*	Research Says
Data-driven Instruction Data-driven instruction is the use of instructional decisions based on the systematic collection of data that reflects students' understanding.	***CAMS®* and *CAMS®* Online** • 1 Pretest • 4 Benchmarks • 1 Post Test	"Districts and schools that are improving generally show a commitment to the use of student assessment data to diagnose weaknesses and guide improvement efforts." *— U.S. Department of Education, 2010*
Progress Monitoring Progress monitoring is a strategy that involves frequent, in-classroom progress checks of students' understanding and mastery of math concepts and skills.	**Student Book** • Part One through Part Four: Your Turn • Part Five: Independent practice ***CAMS®* and *CAMS®* Online** • 1 Pretest • 4 Benchmarks • 1 Post Test	"Teachers' regular use of formative assessments improves their students' learning, especially if teachers have additional guidance on using the assessment results to design and individualize instruction." *— NMAP, 2008*

NCTM PROCESS STANDARDS

Process Standards	Examples in *STAMS® Series*	Research Says
Communication Students use the language of math to accurately express their mathematical ideas to others, and analyze and evaluate the mathematical thinking and strategies of others.	**Student Book** • Part One and Part Two: Let's Talk • Part Three: Check • Part Four and Part Five: Explanation of solution **Teacher Guide** • ELL Support • School-Home Connection • Vocabulary Activity	"Encouraging math talk so that students can clarify their strategies to themselves and others, and compare the benefits and limitations of alternate approaches to problem solving." *— National Research Council, 2001*
Connections Students recognize and use connections among mathematical ideas, such as linking knowledge of the subtraction of whole numbers to the subtraction of decimals or fractions. Students also connect math concepts to their daily lives, and to other subjects, such as science.	**Student Book** • Part One and Part Two: Explore, Think, and Connect **Teacher Guide** • Math Background • Real-World Connection	"Connections are most useful when they link related concepts and methods in appropriate ways. Appropriate ways include methods of extending the understanding of one math concept to another (using multiple representations). Rote memorization does not lead to understanding and building connections." *— National Research Council, 2001*
Problem Solving Students build new math knowledge through problem solving and use various strategies to solve problems in math and in other contexts.	**Student Book** • Part One, Part Two, Part Three, Part Four: Your Turn • Part Five: Independent practice	"Problem solving is an integral part of all mathematics learning. In everyday life and in the workplace, being able to solve problems can lead to great advantages." *— NCTM, 2000*
Reasoning and Proof Students recognize, use, and evaluate various types of reasoning and methods of proof. Reasoning enables students to make sense of new mathematical ideas. Proofs build a logical argument based on known facts.	**Student Book** • Part One and Part Two: Let's Talk and Think It Through • Part Three: Solve and Check • Part Four and Part Five: Explanation of solution **Teacher Guide** Many teacher tips show how to help students reason through a problem.	"Knowing particular mathematical ideas and procedures as mere fact or routine is insufficient for using those ideas flexibly in diverse cases. Making mathematics reasonable means making it reasoned and, therefore, known in useful and usable ways." *— NCTM, 2003*
Representations Students communicate, clarify, or extend mathematical ideas through concrete or visual models. A representation may be a number sentence, manipulatives, diagrams or graphs and/or symbols.	**Student Book** • Part One and Part Two: Use of visual models • Part Four and Part Five: Show	"Intervention materials should include opportunities for students to work with visual representations of mathematical ideas and interventionists should be proficient in the use of visual representations of mathematical ideas." *— Gersten et al, 2009*

NCTM Focal Points and Connections The chart below indicates the lessons in *STAMS® Book A* that provide instruction for the NCTM Focal Points and related Connections for grade 1. (For correlations between the NCTM Process Standards and the *STAMS® Series*, see page 28 of the teacher guide.)

NCTM Focal Points and Connections for Grade 1	*STAMS® Book A* Lessons
FOCAL POINTS	
Number and Operations and Algebra: Children develop strategies for adding and subtracting whole numbers using a variety of models.	3, 4, 5
Number and Operations: Children develop an understanding of whole number relationships, including grouping in tens and ones, to compare and order whole numbers.	6, 7, 8
Geometry: Children recognize figures from different perspectives and orientations, describe their geometric attributes and properties, and determine how they are alike and different.	12, 13
CONNECTIONS	
Number and Operations and Algebra: Children use mathematical reasoning to solve two-digit addition and subtraction problems with strategies that they understand and can explain.	9, 10, 11
Measurement and Data Analysis: Children measure by laying multiple copies of a unit end and then count the units by using groups of tens and ones, and represent measurements and discrete data in picture and bar graphs.	14, 15, 16
Algebra: Through identifying, describing, and applying number patterns and properties in developing strategies for basic facts, children learn about other properties of numbers and operations, such as odd and even.	1, 2

Common Core State Standards The chart below correlates the lessons in *STAMS® Book A* with Common Core State Standards for grade 1 mathematics.

Common Core State Standards for Grade 1 Mathematics		
CCSS	**Description**	***STAMS® Book A* Lessons**
Operations and Algebraic Thinking		
1.OA.1	Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions.	4
1.OA.2	Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20.	5
1.OA.3	Apply properties of operations as strategies to add and subtract.	2, 3
1.OA.4	Understand subtraction as an unknown-addend problem.	1
1.OA.5	Relate counting to addition and subtraction.	1
1.OA.6	Add and subtract within 20, demonstrating fluency for addition and subtraction within 10. Use strategies such as counting on; making ten; decomposing a number leading to a ten; using the relationship between addition and subtraction; and creating equivalent but easier or known sums.	2, 3

Common Core State Standards for Grade 1 Mathematics		
CCSS	**Description**	***STAMS® Book A* Lessons**
Operations and Algebraic Thinking (continued)		
1.OA.7	Understand the meaning of the equal sign, and determine if equations involving addition and subtraction are true or false.	1
1.OA.8	Determine the unknown whole number in an addition or subtraction equation relating to three whole numbers.	2
Number and Operations in Base Ten		
1.NBT.1	Count to 120, starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral.	6
1.NBT.2	Understand that the two digits of a two-digit number represent amounts of tens and ones.	7
1.NBT.3	Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols >, =, and <.	8
1.NBT.4	Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten.	10
1.NBT.5	Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used.	9
1.NBT.6	Subtract multiples of 10 in the range 10–90 from multiples of 10 in the range 10–90 (positive or zero differences), using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.	11
Measurement and Data		
1.MD.1	Order three objects by length; compare the lengths of two objects indirectly by using a third object.	14
1.MD.2	Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps.	14
1.MD.3	Tell and write time in hours and half-hours using analog and digital clocks.	15
1.MD.4	Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.	16
Geometry		
1.G.1	Distinguish between defining attributes versus non-defining attributes; build and draw shapes to possess defining attributes.	12
1.G.3	Partition circles and rectangles into two and four equal shares, describe the shares using the words *halves, fourths,* and *quarters,* and use the phrases *half of, fourth of,* and *quarter of*. Describe the whole as two of, or four of the shares. Understand for these examples that decomposing into more equal shares creates smaller shares.	13

Common Core Standards for Mathematical Practice

Standard	Examples in *STAMS® Series*	
1. Make sense of problems and persevere in solving them.	**Student Book** • Part One and Part Two Focus Question • Part One, Part Two, Part Three, Part Four: Your Turn • Part Five: Independent Practice	**Teacher Guide** • Part Three: Answer Analysis • Challenge Activity
2. Reason abstractly and quantitatively.	**Student Book** • Part One and Part Two: Let's Talk and Think It Through • Part Three: Solve and Check • Part Four and Part Five: Explanation of solution	**Teacher Guide** • Many teacher tips show how to help students reason through a problem.
3. Construct viable arguments and critique the reasoning of others.	**Student Book** • Part One and Part Two: Let's Talk • Part Three: Check • Part Four and Part Five: Explain your answer	**Teacher Guide** • Assessment and Remediation
4. Model with mathematics.	**Student Book** • Part One and Part Two: Your Turn • Part Four and Part Five: Explain your answer	**Teacher Guide** • Many "Step by Step" Tips help students develop models for solving a problem. • Hands-on Activity
5. Use appropriate tools strategically.	**Student Book** • Part Three and Part Four: Your Turn	**Teacher Guide** • Hands-on Activity • Reteaching Activity • Real-World Connection
6. Attend to precision.	**Student Book** • Part One and Part Two: Let's Talk • Part Four: Explain your answer	**Teacher Guide** • Vocabulary in lesson introduction • Vocabulary Activity
7. Look for and make use of structure.	**Student Book** • Lessons 1–11	**Teacher Guide** • Math Background for Lessons 1–11
8. Look for and express regularity in repeated reasoning.	**Student Book** • All lessons	**Teacher Guide** • Tips • Challenge Activity

Lesson 3 MAKE TENS TO ADD AND SUBTRACT

LESSON OBJECTIVES

Children will:

- Make tens to add 3 one-digit numbers. (CCSS 1.OA.6)
- Break apart numbers to make tens to add and subtract. (CCSS 1.OA.6)
- Apply properties of addition to add 3 one-digit numbers. (CCSS 1.OA.3)

PREREQUISITES

Children should be able to:

- Add fluently within 20.
- Subtract fluently within 20.

RELATED *STAMS*® LESSONS

- **Book A – Lesson 1**

  Understand Addition and Subtraction teaches children to count on to add and count back to subtract.

- **Book A – Lesson 2**

  Fact Families introduces strategies to remember addition and subtraction facts.

VOCABULARY

Page 24

- **add:** combine two or more groups
- **make ten:** combine two or more numbers that add to 10

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- **subtract:** take away, remove, or compare
- **break apart:** rewrite a number as the sum of two numbers

MATH BACKGROUND

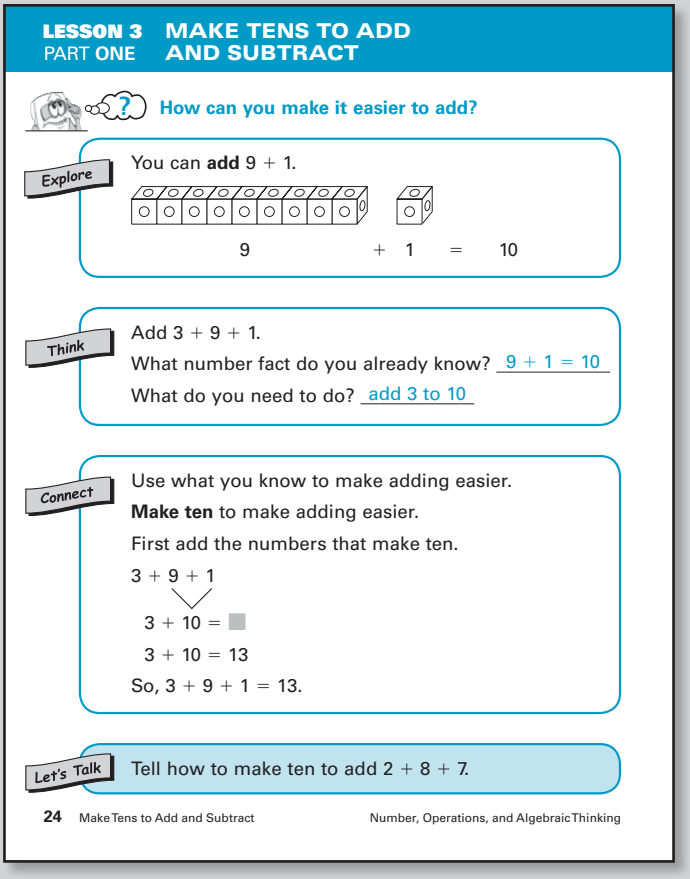
In this lesson, children learn strategies for adding and subtracting based on making ten.

Understanding different ways to make a ten, such as 1 + 9, 2 + 8, 3 + 7, etc. will help children to add and subtract more quickly. Children will begin by making ten to make adding three numbers easier by first adding two numbers to make a ten. To add 5 + 4 + 5, children will first add 5 + 5 to get 10 and then add 4 to get 14.

Children will then build upon this by learning how to break apart addends into numbers that will make a ten. For example, instead of adding 9 + 6, children will break 6 apart into 5 and 1 and then add 1 to 9 to get 10, and then add 5 to 10 to get 15. The same strategy can be used with subtraction. Children will learn to break apart the number they are subtracting so that they can subtract to get 10.

This lesson uses number line models to demonstrate how to break apart a number to subtract.

Modeled Instruction



LESSON 3 PART ONE
MAKE TENS TO ADD AND SUBTRACT

How can you make it easier to add?

Explore

You can **add** 9 + 1.

9 + 1 = 10

Think

Add 3 + 9 + 1.

What number fact do you already know? 9 + 1 = 10

What do you need to do? add 3 to 10

Connect

Use what you know to make adding easier.

Make ten to make adding easier.

First add the numbers that make ten.

3 + 9 + 1

3 + 10 = ■

3 + 10 = 13

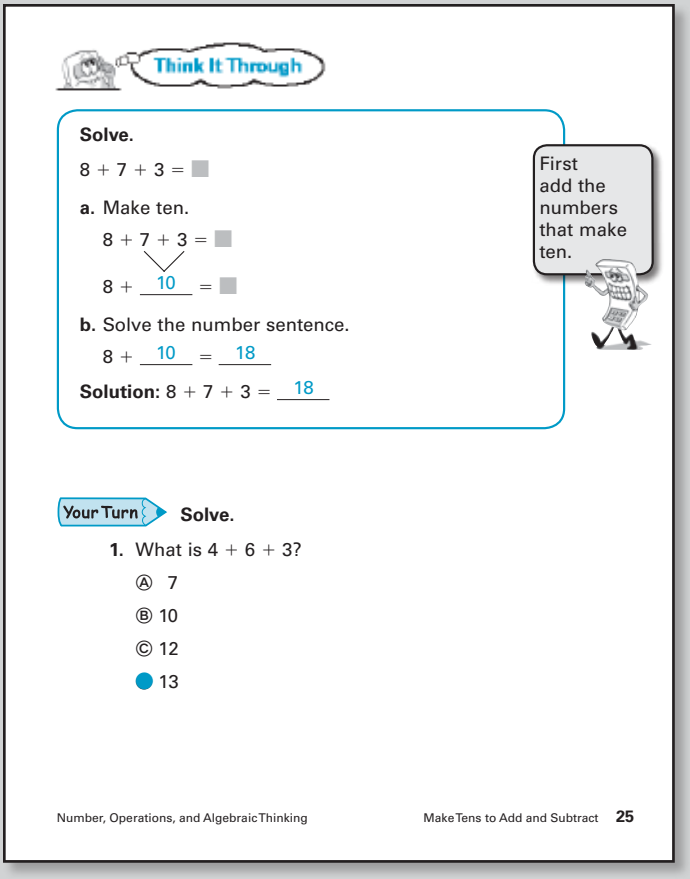
So, 3 + 9 + 1 = 13.

Let's Talk

Tell how to make ten to add 2 + 8 + 7.

24 Make Tens to Add and Subtract Number, Operations, and Algebraic Thinking

Guided Instruction



Think It Through

Solve.

8 + 7 + 3 = ■

a. Make ten.

8 + 7 + 3 = ■

8 + 10 = ■

b. Solve the number sentence.

8 + 10 = 18

Solution: 8 + 7 + 3 = 18

First add the numbers that make ten.

Your Turn **Solve.**

1. What is 4 + 6 + 3?

Ⓐ 7

Ⓑ 10

Ⓒ 12

● 13

Number, Operations, and Algebraic Thinking Make Tens to Add and Subtract 25

AT A GLANCE

Children activate their background knowledge about addition and learn how to make a ten to make adding 3 one-digit numbers easier.

STEP BY STEP

Page 24

- Introduce the **Question** at the top of the page.
- Have children look at the connecting cubes shown in **Explore** and connect them to the number sentence.
- Read **Think** with children. Make sure children understand that numbers can be added in any order.
- Guide children through the steps in **Connect**. Point out to children that they should look for two numbers that make a ten first.

ELL Support: Children may have heard the word *make* used in different ways, so the phrase *make ten* may be confusing. Remind children that they make something when they put parts of something else together, like puzzle pieces. When they *make ten*, they look for numbers that add to ten.

- Organize children in pairs or groups for **Let's Talk** and monitor their discussions.
- Be sure children first make ten, then add the third number.

Tip: Tell children to either circle the two numbers that make ten or draw lines like in Connect so they remember which numbers they have already added.

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- Read the **Think It Through** problem with children.
- Guide children as they solve the problem. Pause for children to fill in missing information. When they are finished, discuss how making ten makes adding 3 numbers easier.
- Monitor children as they complete **Your Turn**. Then discuss the correct answer.

Error Alert: Children who chose B may have forgotten to add 3.

ADDITIONAL ACTIVITY

See **Hands-on Activity** (page 57).