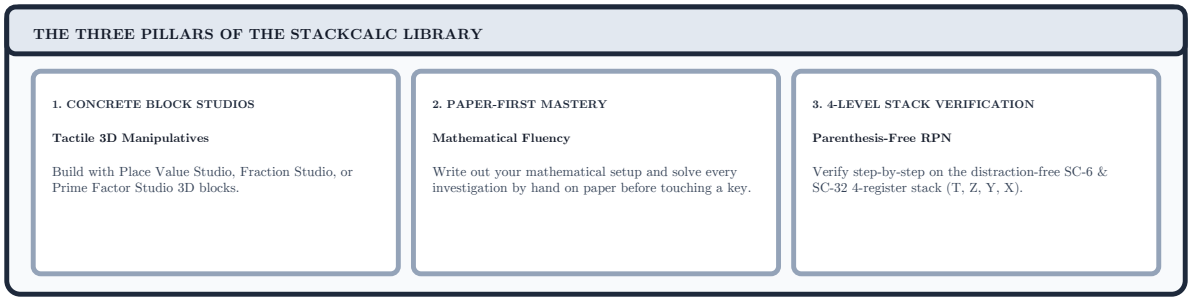
THE STACKCALC LIBRARY • CURRICULUM SERIES — BOOK 2A

EARLY ELEMENTARY MATH LAB

Counting, Number Bonds, Make-10 Regrouping & Early Multiplication (Grades K–2)

A self-contained, open-and-go Grades K–2 student exploration and practice workbook for homeschooling families and classrooms. Every 11-page unit connects tactile manipulative models—Place Value Studio 6×2 trays, digit blocks (0–9), and gold [+1] carry tokens—with Core & Extension Concept Labs, Misconception Spotters, 4-Problem Lab Investigations, six leveled Worked-Example & Practice Worksheets (Practice A through F), a 100-Point Unit Mastery Check, an Applied STEM Lab Case, and 4 Cumulative Mastery Exams (840 active problems), verified step-by-step on the StackCalc SC-6 calculator.



StackCalc

stackcalc.io

First Edition

BOOKS, BLOCKS & INSTRUMENTS IN THE STACKCALC LIBRARY

Illustrated Companion Trade Books (History of Mathematics & Stack Thinking)

- Volume I — From Blocks to the Stack: How Hands-On Blocks Make Numbers Click (Grades K–6 / StackCalc SC-6)
- Volume II — Thinking in the Stack: The Art of Calculating Without Parentheses (Grades 7–12, AP & Engineers / StackCalc SC-32)

K–12 Concept-First Curriculum & Grade-Band Student Workbooks (US Letter 8.5" × 11" Editions)

- Book 1 — Teaching with the Stack: Unified K–12 Master Teacher's Guide, Concept Facilitation & Coaching Notes
- Book 2A — Early Elementary Math Lab: Grades K–2 SC-6 Student Workbook (10 Eleven-Page Units + 4 Exams • 840 Problems • 128 Pages)
- Book 2B — Upper Elementary Math Lab: Grades 3–5 SC-6 Student Workbook (10 Eleven-Page Units + 4 Exams • 840 Problems • 128 Pages)
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- Book 5 — Stack Speed & Fluency: Full-Year Speed Lessons, Playbooks & 180 Progressive Practice Tests (3,690 Problems • 128 Pages)
- Complete Online Answer Keys & Keystroke Verification Portal: https://stackcalc.io/curriculum/answers

Three Published Physical Manipulative Block Studios & Four-Line Stack Calculators (stackcalc.io)

- Place Value Studio: 6×2 Whole & Decimal Trays, Digit Blocks (0–9) & Stackable Gold [+1] Carry Tokens
- Fraction Studio: 84.0 mm Proportional Fraction Towers (1 Whole to 1/12) & 12-Socket Comparator Lid
- Prime Factor Studio: Logarithmic Prime Blocks (2, 3, 5, 7 where equal products stand flush) & GCF/LCM Comparator
- StackCalc Calculators: SC-6 Elementary/Middle School Calculator & SC-32 Scientific Calculator (Hardware, iOS, iPadOS, watchOS & Web)

Automated Unit-Test Verification & 36-Week Open-Education Pacing Architecture

- 100% Unit-Tested Problems: Every mathematical solution and RPN keystroke sequence across the curriculum is verified by automated Python and Swift RPNCore unit tests.
- Flexible Pacing: Compatible with Singapore Math, Saxon, RightStart, Beast Academy/AoPS, Eureka, Illustrative Math, Big Ideas, and Bridges.

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EARLY ELEMENTARY MATH LAB: Counting, Number Bonds, Make-10 Regrouping & Early Multiplication (Grades K–2)

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State & District Curriculum Alignment:

Designed to supplement state-mandated mathematics standards—including Common Core State Standards (CCSS-M), Texas Essential Knowledge and Skills (TEKS), Florida B.E.S.T., Virginia SOL, and AP Mathematics / Computer Science—alongside district basal textbooks (Eureka Math / EngageNY, Illustrative Mathematics / Open Up, enVision Mathematics, Big Ideas Math, HMH Into Math, McGraw-Hill Reveal, Bridges in Mathematics, and Singapore Dimensions Math).

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Physical calculator instruments that utilize coin or button cell batteries must maintain a captive, tool-secured battery compartment compliant with UL 4200A. 3D-printed manipulative blocks constitute small parts under 16 CFR Part 1501; adult supervision is required for children under 6 years of age.

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Check off each 11-page unit as you complete the Labs, Practice A–F, Mastery Quiz, and STEM Case.

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Unit 02: Number Bonds to 5 & 10 Block Studio: Place Value Studio (Number Bond Stage & Digit Blocks 0–9)	**Kindergarten – Grade 1** CCSS.MATH.K.OA.A.3	**Core/Ext • Inv • Practice A–F • Quiz • STEM** Two Hands, One Workbench & The Domino Bond	**pp. 16–26 [ ]**
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APPENDICES A–D: CERTIFICATE & TRACKER (PP. 115–116), CUMULATIVE EXAMS (PP. 117–120) & 3D BLOCK STUDIOS (PP. 121–124)

Complete verified answer keys & keystroke traces are hosted online at https://stackcalc.io/curriculum/answers#early-elementary!

Preface: Welcome to the Hands-On Math Lab!

Why we build with blocks and solve on paper first—and how each 11-page unit builds complete mastery.

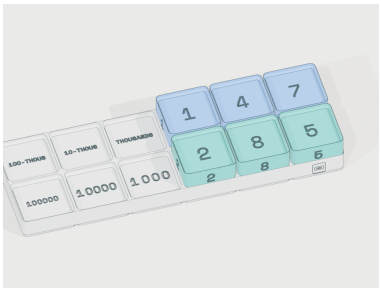
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1. PAPER & BLOCKS FIRST: WHY THIS LAB MAKES YOU STRONGER AT MATH (NEVER A CRUTCH!)

Whether you are learning at your homeschool kitchen table or in a classroom, this workbook was built on one simple rule: a calculator should NEVER replace your brain! In every unit, you build Place Value, Fraction, and Prime Factor concepts with physical blocks and solve every problem by hand on paper first. Only after you write your paper prediction do you pick up your distraction-free StackCalc calculator to check your work.
Why does your calculator have an [ENTER] key instead of [=]? Think about how you calculate on paper: first you write your first number on the top line (Waiting Shelf, Line Y). Next you write your second number below it (Workbench, Line X). Only after both quantities are in place do you apply your operation (+, −, ×, ÷) to combine them—just like paper math!

2. HANDS-ON TACTILE MODELS & VERIFICATION FOR EARLY ELEMENTARY MATH LAB

1. Place Value Blocks



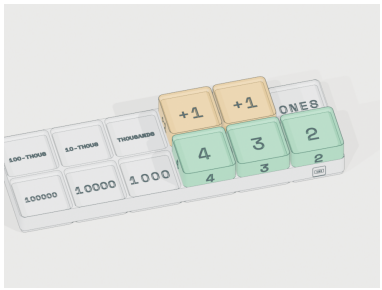
2-Row Tray (Y & X), Digits 0–9 & Place Columns

2. Gold [+1] Carry Tokens



10-for-1 Carry Trade Across Place Columns

3. Two-Row Addition & Unbundling



Hands-On Regrouping & Fact Families

3. 5-DAY PACING & 3-TIER PROGRESSION ACROSS EVERY 11-PAGE UNIT

Every unit in Early Elementary Math Lab follows a structured 11-page progression (ideal for a 5-day rhythm or 3-tier differentiation):
• Day 1 (Pages 1–3): Core Concept Lab, Extension & Misconception Spotter, and 4-Problem Hands-On Lab Investigation.
• Day 2 (Pages 4–5 • Tier 1 Foundation): Practice A & B — Physical block pairing, step-by-step paper setups, and core 2-step fluency.
• Day 3 (Pages 6–7 • Tier 2 Grade-Level Core): Practice C & D — Word problems, mental math shortcuts, and error diagnostics.
• Day 4 (Pages 8–9 • Tier 3 Challenge): Practice E & F — Multi-step synthesis and fast-finisher championship problems.
• Day 5 (Pages 10–11): 100-Point Unit Mastery Check Assessment & Applied Real-World STEM Engineering Case Study.

• Online Answer Key & Keystroke Portal: https://stackcalc.io/curriculum/answers#early-elementary

Recommended Kit for Book 2A (Grades K–2) & Try-Before-You-Buy Simulator (stackcalc.io)

• Core Kit for Book 2A: StackCalc SC-6 Calculator + Place Value Studio + Volume I: From Blocks to the Stack.
• Waiting for your physical SC-6 to arrive? Practice every lesson today on our free interactive web simulator or iOS/watchOS app at https://stackcalc.io!

Hands-On Starter: Touch the Math Before the Keys

Why tactile models make arithmetic, fractions, and algebra click before using a calculator.

1. THE CONCRETE-REPRESENTATIONAL-ABSTRACT (CRA) PATHWAY

Mathematics is not a collection of abstract symbols to memorize—it is the study of real patterns and quantities. In this workbook, you always follow the three-stage CRA learning sequence before touching a calculator key:

STAGE 1: CONCRETE

Build with 3D Block Studios

Snap Digit Blocks, 84 mm Fraction Towers, or Logarithmic Prime Blocks into the studio tray.

STAGE 2: REPRESENTATIONAL

Solve by Hand on Paper

Write your mathematical setup and paper prediction step-by-step.

STAGE 3: ABSTRACT

Verify on SC-6 Stack

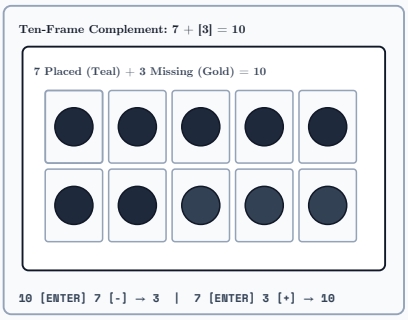
Push quantities onto Registers Y and X to confirm your paper math matches!

2. YOUR 3D MANIPULATIVE BLOCK STUDIOS & PAPER-FIRST PROBLEM SOLVING

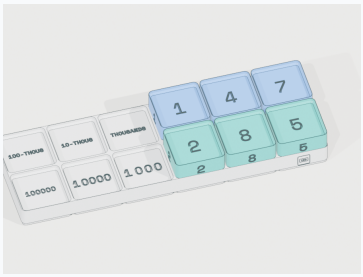
- Place Value Studio (6×2 Whole Number Tray): Row 1 holds waiting quantities (Register Y) and Row 0 holds active workbench quantities (Register X). Each column holds one Digit Block [0]–[9]; when a column reaches 10, snap a Gold [+1] Carry Token one column left!
- Number Bonds & Ten-Frames: Split addends to bridge cleanly through 10 (e.g., $8 + 5 = (8 + 2) + 3 = 13$).
- Twin-Row Block Arrays & Doubling: Placing equal rows on Row 1 (Y) and Row 0 (X) makes doubling and arrays visible by touch.

TACTILE ECOSYSTEM BRIDGE: Place Value Tray Row 1 = Waiting Shelf Y • Row 0 = Workbench X • Gold [+1] Carry Token = 10-for-1 Column Trade

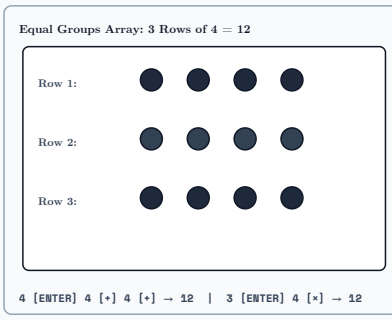
Ten-Frame Complements



Place Value Regrouping



Equal-Group Arrays



Paper Steps First — The Universal Lab Rule

Never touch a calculator key until you have built with blocks or written your paper steps. The StackCalc instrument is your personal laboratory verification tool—not an answer generator!

SC-6 Calculator Dynamics: Calculating Without Parentheses

How the Waiting Shelf [Y] and Workbench [X] make calculations natural and transparent.

1. MEET THE FOUR-LEVEL STACK (T, Z, Y, X)

Ordinary calculators force you to type parentheses or rely on invisible hidden memory. The StackCalc calculator displays up to 4 lines on screen simultaneously (T, Z, Y, X):

- Register X (Floor 1): Active Workbench where you type your current number.
- Register Y (Floor 2): Waiting Shelf holding your first number after [ENTER].
- Registers Z & T (Floors 3 & 4): Upper memory levels that lift & drop automatically.



2. ESSENTIAL SC-6 STACK ELEVATOR DYNAMICS

1. Basic Addition (8 + 5 = 13):

8 lifts to Shelf Y; 5 enters Workbench X; [+] combines them into 13.

8 ENTER 5 +

2. Chained Operations (12 + 6 − 4 = 14):

12 + 6 produces 18 in X; typing 4 and pressing [−] gives 14.

1 2 ENTER 6 + 4 -

3. Doubling Any Number (7 × 2 = 14):

[ENTER] duplicates 7 into Y; [+] adds 7 + 7 = 14 without retyping!

7 ENTER +

4. Equal Groups & Division (24 ÷ 6 = 4):

24 waits on Shelf Y; 6 enters Workbench X; [÷] partitions 24 into 4.

2 4 ENTER 6 ÷

Elevator Lift & Drop Rule • Try It Live on Your SC-6 or Web/iOS Simulator

Every binary operation (+, −, ×, ÷) combines Waiting Shelf Y and Workbench X into X while upper registers drop automatically. Key the 4 sequences above on your physical SC-6 calculator (or the free interactive simulator & StackCalc 32 iOS/watchOS app at stackcalc.io) before turning to Page 3!

Hardware Tour: Meet Your SC-6 Instrument

Understanding keycaps, shift layers, LCD annunciators, and error recovery.

1. THE SC-6 KEYBOARD ARCHITECTURE & LAYERS

The StackCalc SC-6 features a streamlined distraction-free interface designed for primary and elementary mathematics:
• Primary Digits & Decimal: High-contrast mechanical keys that map 1-to-1 with Digit Blocks [0]–[9] on the Place Value Tray.
• [ENTER] Key: The stack-lift key that pushes the current number from Workbench X (Tray Row 0) up to Waiting Shelf Y (Tray Row 1).
• Four Basic Operations (+, −, ×, ÷): Combine registers Y and X instantly with no hidden equal sign or parentheses.
• Two-Dot Fraction Entry: Typing [.] [1] [.] [2] enters 1/2 directly (matching the 42.0 mm Fraction Studio block); [2] [.] [1] [.] [3] enters 2 1/3!

PHYSICAL BLOCK & KEYPAD BRIDGE: Tray Row 1 = Register Y • Tray Row 0 = Register X • Two Dots [.][a][.][b] = 84 mm Fraction Tower

Stack Lift & Digits



Four Operations



Fraction & Edit



2. ESSENTIAL HARDWARE RECOVERY & STACK MANAGEMENT RULES

• Stack Swap [$x \rightleftarrows y$]: Made a mistake in operand order (for subtraction or division)? Press [$x \rightleftarrows y$] to swap Workbench X and Shelf Y!
• Stack Drop [DROP]: Discards the number in Register X; Register Y drops down to take its place.
• Stack Duplication: Pressing [ENTER] when no new number is typed copies Register X into Register Y (great for doubling and squaring!).
• Division by Zero Protection: Dividing by zero displays 'Error: Div by 0' without clearing your upper stack memory.

2-SECOND STACK AUDIT: Always verify Waiting Shelf *Y* = First Quantity (Minuend / Dividend) and Workbench *X* = Second Quantity!

SWAP ORDER [$x \rightleftarrows y$]



Flips Register Y and Register X before pressing [−] or [÷].

ROLL DOWN [DROP]



Removes an unwanted entry in X and pulls Shelf Y down to X.

DUPLICATE [ENTER]



Copies X into Y so [+] doubles or [×] squares instantly.

Simulator Quick-Start

You can practice all hardware key sequences right now in your web browser at stackcalc.io before proceeding to the diagnostic test.

Diagnostic Baseline: Test Your Readiness

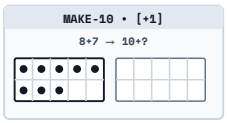
Solve these four baseline problems on paper first, then verify on your calculator.

DIAGNOSTIC BASELINE WARM-UP — SOLVE ON PAPER FIRST, THEN VERIFY ON THE STACK

Complete these 4 diagnostic problems on paper first in the dot-grid workspace, then run the verification keycap sequence on your stack.

Diagnostic 1: Addition Across a Ten

Solve 8 + 7 on your Ten-Frame and Place Value Tray by making a 10 first:

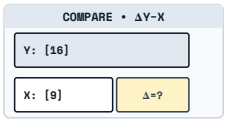


My Paper Prediction: _____ [ ] Verified on SC-6

8 ENTER 7 +

Diagnostic 2: Subtraction as Take-Away

Solve 16 − 9 on paper. Show your ten-frame unbundling step:



My Paper Prediction: _____ [ ] Verified on SC-6

1 6 ENTER 9 -

Diagnostic 3: Twin-Row Doubling Shortcut

Place 14 on both rows of your Place Value Tray to double 14, then verify on the stack:

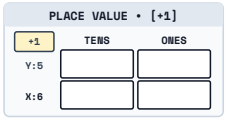


My Paper Prediction: _____ [ ] Verified on SC-6

1 4 ENTER +

Diagnostic 4: Three-Addend Chained Sum

Solve 5 + 6 + 7 on paper using inside-out chained addition:



My Paper Prediction: _____ [ ] Verified on SC-6

5 ENTER 6 + 7 +

Counting, Cardinality & The One-More Step Counter

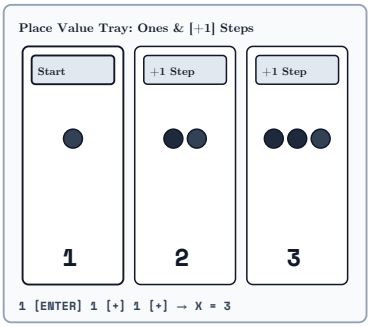
Hands-On Block Studio: Place Value Studio (Digit Blocks 0–9 & Gold [+1] Step Tokens) • Standards: CCSS.MATH.K.CC.A.1, CCSS.MATH.K.CC.B.4

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1. MATHEMATICAL CONCEPT & INSIDE-OUT APPROACH (1-to-1 Correspondence: Stepping Up by One):

Counting by ones is repeated addition of the unit 1 ($n \to n + 1$). On the Place Value Tray and the stack, your current count waits first while you bring in 1 more step, then both combine into the new total.

Companion Book (Vol. I: From Blocks to the Stack (SC-6 Manual) — Ch. 1: Meet Your SC-6 & Math Blocks + App. B: Station F.1) • Tally Pebbles (Calculi) & Brahmagupta's Zero [0]: Ancient shepherds counted flocks with clay pebbles ('calculi') before Indian mathematician Brahmagupta gave the empty tray socket its own number: Zero ([0])!



2. HANDS-ON BLOCKS & CONCEPT RULES: HOW COUNTING & PLACE VALUE WORK TOGETHER

- Numbers show quantity: the Digit Block in the Ones socket shows how many items you counted.
- Adding 1 more item steps the count up by 1 ($n \to n + 1$): 1 becomes 2, 2 becomes 3, 3 becomes 4.
- An empty tray has zero items, represented by the [0] Digit Block in the Ones socket.
- When checking on the SC-6, Line Y holds your starting count and Line X adds the next [+1] step.

3. STEP-BY-STEP VERIFICATION WALKTHROUGH ON THE SC-6

Hands-On Block Setup: Place the [1] Digit Block into the Ones socket of the Place Value Tray. Keep Gold [+1] step tokens ready beside the tray. Question: When we place 1 Gold [+1] step token and step the Ones block up by 1, what digit block replaces [1]? (Prediction: [2])

Verification Keystrokes: `1` `ENTER` `1` `+` `1` `+`

Button Pressed	Screen (X)	How the 4-Level Stack Mirrors Your Mathematical Steps (T, Z, Y, X)
`1`	1	First count placed: 1 enters register X
`ENTER`	1	1 copied to register Y: holds the current count
`1`	1	Gold [+1] step token added: 1 enters register X
`+`	2	Press [+]: 1 + 1 = 2! Swap Ones block to [2]
`1`	1	Next Gold [+1] step token added: 1 enters X
`+`	3	Press [+]: 2 + 1 = 3! Tray [3] and screen match perfectly

STACK SHORTCUT & BLOCK STUDIO TIP (SC-6):

[1] [ENTER] [1] [+] = 2, then [1] [+] = 3, [1] [+] = 4... • Numbers show quantity: the Digit Block in the Ones socket shows how many items you counted.

WARM-UP CHECK A: SOLVE ON PAPER FIRST, THEN VERIFY ON YOUR CALCULATOR!

Core Investigation: Place the [4] Digit Block in the Ones column of your Place Value Tray and add 1 Gold [+1] step token. What total quantity do you have now?

1. First Quantity / Inner Step: _____

2. Second Quantity / Operation: _____

3. My Paper Prediction: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)

Block Sketch / Paper Workspace:



Extension: More, Less & Zero: Finding Differences

Deepening Concepts • Standards: CCSS.MATH.K.CC.C.6

1. EXTENSION CONCEPT & SETUP (More, Less & Zero: Finding Differences):

Comparison subtraction finds the difference ('how many more?') between two quantities. Placing the larger group on the top row (Shelf Y) and the smaller group on the bottom row (Shelf X) shows how much remains when the matching part is taken away.

Hands-On Extension Setup: Place the [5] Digit Block in Row 1 (top row) and the [2] Digit Block in Row 0 (bottom row) of the Ones column on the Place Value Tray. • Question: Look at the two rows on the tray. Which row has the larger quantity? How many more is 5 than 2?

2. EXTENSION STACK SEQUENCE (SC-6): 5 ENTER 2 -

Button Pressed	Screen (X)	Extension Stack Dynamics (T, Z, Y, X)
5	5	Row 1 quantity (5) enters register X
ENTER	5	5 lifted to register Y (first set)
2	2	Row 0 quantity (2) enters register X
-	3	Minus subtracts X from Y: Row 1 has 3 more!

3. PARENT & TEACHER COACHING: TARGET MISCONCEPTIONS & 3D BLOCK STUDIO REMEDIATIONS

Misconception 1: Reciting number names faster than placing physical step tokens (losing 1-to-1 correspondence).

Hands-On Block Studio Remediation: Have the student place 1 Gold [+1] token on the Place Value Tray and step the Ones Digit Block first, say the number aloud, and only then press [1] [+] so the tray and Register X stay locked in step.

Misconception 2: Confusing the action of adding 1 more with the total quantity on the tray (cardinality).

Hands-On Block Studio Remediation: Ask the student to point to the Digit Block in the Ones socket of the Place Value Tray and verify that its numeral matches Register X on the screen.

4. STACK SHORTCUT & PARTNER EXPLAIN-WHY CHALLENGE (SC-6)

Calculator Shortcut: [1] [ENTER] [1] [+] = 2, then [1] [+] = 3, [1] [+] = 4...

Explain-Why Reflection: How do your Place Value, Fraction, or Prime blocks prove why Misconception 1 is wrong?

WARM-UP CHECK B (EXTENSION): SOLVE ON PAPER FIRST, THEN VERIFY ON YOUR CALCULATOR!

Extension Challenge: Row 1 holds [6] and Row 0 holds [2] on your Place Value Tray. Which row has more, and how many more does it have?

1. First Quantity / Inner Step: _____

2. Second Quantity / Operation: _____

3. My Paper Prediction: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)

Block Sketch / Paper Workspace:



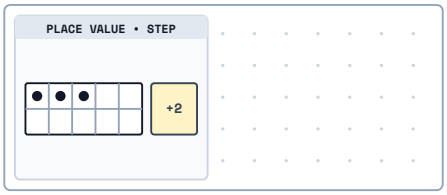
Unit 01 Lab: Counting, Cardinality & The One-More Step Counter

Name: _____ Date: _____ Score: _____ / 4

DIRECTIONS: (1) Build with your Place Value blocks & draw in Box 1. (2) Write the two quantities & math in Box 2.
(3) Write your Prediction BEFORE pressing keys, then check with your partner or teacher on the SC-6!

Investigation 1: Place [3] in the top row and [2] in the bottom row of your Place Value Tray. Combine both groups—what is the total?

1. Draw Your Blocks on the Tray:



2. Number Bond & Two Quantities:

First Quantity (Top Row):

Second Quantity (Bottom Row):

Combine (+, −, or ×):

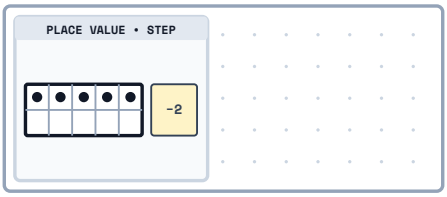
3. My Prediction:

Final Verified Answer:

[ ] Verified on SC-6 Stack

Investigation 2: You have 5 ones on the tray and take away 2. What Digit Block shows how many ones remain?

1. Draw Your Blocks on the Tray:



2. Number Bond & Two Quantities:

First Quantity (Top Row):

Second Quantity (Bottom Row):

Combine (+, −, or ×):

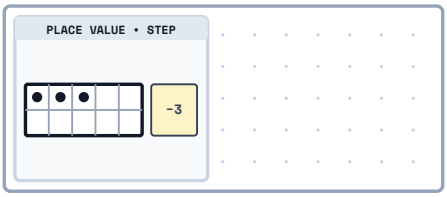
3. My Prediction:

Final Verified Answer:

[ ] Verified on SC-6 Stack

Investigation 3: You have 3 blocks on the tray and take away all 3. How many blocks are left, and which Digit Block shows an empty tray?

1. Draw Your Blocks on the Tray:



2. Number Bond & Two Quantities:

First Quantity (Top Row):

Second Quantity (Bottom Row):

Combine (+, −, or ×):

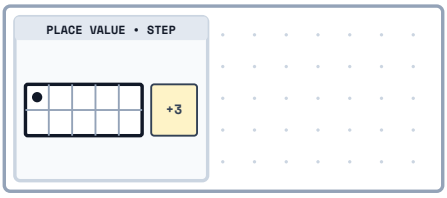
3. My Prediction:

Final Verified Answer:

[ ] Verified on SC-6 Stack

Investigation 4: Start with [1] in the Ones socket and add one more [+1] token three times in a row. What count do you reach?

1. Draw Your Blocks on the Tray:



2. Number Bond & Two Quantities:

First Quantity (Top Row):

Second Quantity (Bottom Row):

Combine (+, −, or ×):

3. My Prediction:

Final Verified Answer:

[ ] Verified on SC-6 Stack

MY LAB REFLECTION: Draw or tell how your Place Value blocks matched the numbers on your SC-6 screen!

Unit 01 Practice A — Counting, Cardinality & One-More Steps

Name: _____ Date: _____ Score: _____ / 10

TIER 1 • LEVEL 1: BUILDER FOUNDATION • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE A (#1–#10) ON PAPER FIRST

EXAMPLE 1 **Count 5 dots, then add 1 more [+1] token.**

Start at 5 in Ones socket → step up 1 → 5 + 1 = 6.

Verified Answer: 6

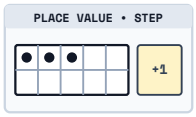
EXAMPLE 2 **Start at 7 on the tray and step up 2 times (+1, +1).**

7 + 1 = 8, then 8 + 1 = 9. Key: [7] [ENTER] [1] [+] [1] [+].

Verified Answer: 9

1 Tier 1 • Builder

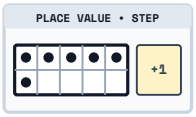
Count 3 blocks and add 1 more: 3 + 1 =



Paper Step: _____ [ ] SC-6 Ans: _____

2 Tier 1 • Builder

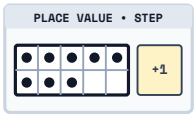
Count 6 blocks and add 1 more: 6 + 1 =



Paper Step: _____ [ ] SC-6 Ans: _____

3 Tier 1 • Builder

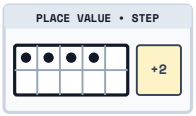
Count 8 blocks and add 1 more: 8 + 1 =



Paper Step: _____ [ ] SC-6 Ans: _____

4 Tier 1 • Builder

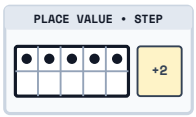
Start at 4 and step up 2 times: 4 + 1 + 1 =



Paper Step: _____ [ ] SC-6 Ans: _____

5 Tier 1 • Builder

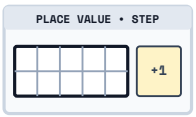
Start at 5 and step up 2 times: 5 + 1 + 1 =



Paper Step: _____ [ ] SC-6 Ans: _____

6 Tier 1 • Builder

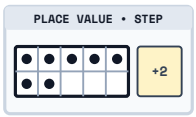
An empty tray has 0 blocks. Add 1 block: 0 + 1 =



Paper Step: _____ [ ] SC-6 Ans: _____

7 Tier 1 • Builder

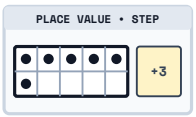
Count 7 dots in the ten-frame and add 2 more: 7 + 2 =



Paper Step: _____ [ ] SC-6 Ans: _____

8 Tier 1 • Builder

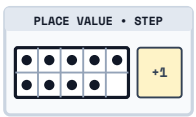
Start at 6 and step up 3 times: 6 + 1 + 1 + 1 =



Paper Step: _____ [ ] SC-6 Ans: _____

9 Tier 1 • Builder

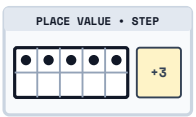
Count 9 blocks and add 1 more to fill the ten-frame: 9 + 1 =



Paper Step: _____ [ ] SC-6 Ans: _____

10 Tier 1 • Builder

Start at 5 and add 3 step tokens: 5 + 1 + 1 + 1 =



Paper Step: _____ [ ] SC-6 Ans: _____

Unit 01 Practice B — One-Less Steps, Counting Back & Missing Steps

Name: _____ Date: _____ Score: _____ / 10

TIER 1 • LEVEL 1: BUILDER FOUNDATION • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE B (#1–#10) ON PAPER FIRST

EXAMPLE 1 Start with 8 blocks and take 1 block away: 8 - 1.

Removing 1 counter from 8 leaves 7. Key: [8] [ENTER] [1] [-].

Verified Answer: 7

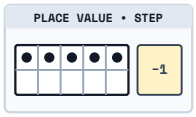
EXAMPLE 2 Find the missing step: 5 + [?] = 7.

Step from 5 to 7: 5 → 6 (+1) → 7 (+2). Missing step is 2.

Verified Answer: 2

1 Tier 1 • Builder

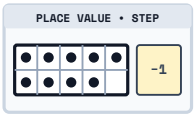
Start with 5 blocks and remove 1 block:



Paper Step: _____ [ ] SC-6 Ans: _____

2 Tier 1 • Builder

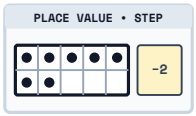
Start with 9 blocks and remove 1 block:



Paper Step: _____ [ ] SC-6 Ans: _____

3 Tier 1 • Builder

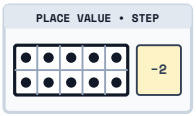
Start with 7 blocks and step back 2 times:



Paper Step: _____ [ ] SC-6 Ans: _____

4 Tier 1 • Builder

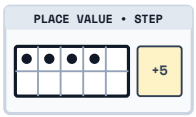
Start with 10 blocks and step back 2 times:



Paper Step: _____ [ ] SC-6 Ans: _____

5 Tier 1 • Builder

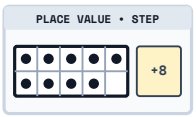
Find the missing number in the count: 4, 5, 6, [?], 8



Paper Step: _____ [ ] SC-6 Ans: _____

6 Tier 1 • Builder

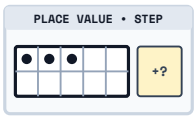
Find the missing number in the count: 9, 8, 7, [?], 5



Paper Step: _____ [ ] SC-6 Ans: _____

7 Tier 1 • Builder

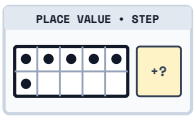
How many [+1] steps from 3 to 6? 3 + [?] = 6



Paper Step: _____ [ ] SC-6 Ans: _____

8 Tier 1 • Builder

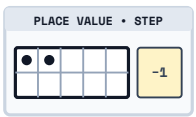
How many [+1] steps from 6 to 10? 6 + [?] = 10



Paper Step: _____ [ ] SC-6 Ans: _____

9 Tier 1 • Builder

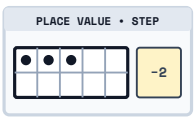
Step up 2 and step back 1 from 6 on your tray:



Paper Step: _____ [ ] SC-6 Ans: _____

10 Tier 1 • Builder

Step up 3 and step back 2 from 5 on your tray:



Paper Step: _____ [ ] SC-6 Ans: _____

Unit 01 Practice C — Real-World Counting Stories & Error Check

Name: _____ Date: _____ Score: _____ / 10

TIER 2 • LEVEL 2: STORY & DETECTIVE LAB • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE C (#1–#10) ON PAPER FIRST

EXAMPLE 1 Maya puts 4 apples in a basket, then adds 1 more apple twice.

Start with 4 → +1 = 5 → +1 = 6 apples in the basket.

Verified Answer: 6 apples

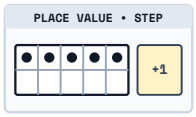
EXAMPLE 2 Spot the Mistake: Leo counted 6 blocks, added 1 more, and wrote 6.

Adding 1 more increases the count by 1: 6 + 1 = 7, not 6.

Verified Answer: 7

1 Tier 2 • Detective

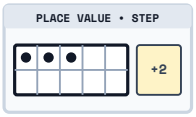
Noah has 5 toy cars. He puts 1 more car on the track. How many cars now?



Paper Step: _____ | | SC-6 Ans: _____

2 Tier 2 • Detective

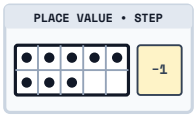
A bird nest has 3 eggs. The mother bird lays 2 more eggs. How many eggs in all?



Paper Step: _____ | | SC-6 Ans: _____

3 Tier 2 • Detective

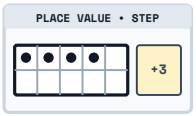
There are 8 frogs on a log. 1 frog jumps into the pond. How many frogs stay?



Paper Step: _____ | | SC-6 Ans: _____

4 Tier 2 • Detective

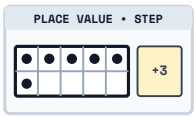
Sofia claps 4 times, pauses, and claps 3 more times. Total claps?



Paper Step: _____ | | SC-6 Ans: _____

5 Tier 2 • Detective

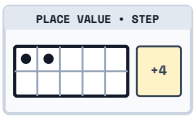
A ten-frame has 6 dots on top and bottom rows. Add 3 more dots. Total dots?



Paper Step: _____ | | SC-6 Ans: _____

6 Tier 2 • Detective

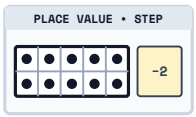
Liam starts at Floor 2 on the elevator and goes up 4 floors. Which floor?



Paper Step: _____ | | SC-6 Ans: _____

7 Tier 2 • Detective

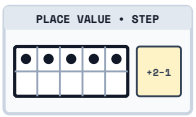
A tray holds 10 blocks. Mia removes 1 block, then removes 1 more. How many left?



Paper Step: _____ | | SC-6 Ans: _____

8 Tier 2 • Detective

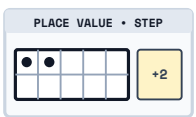
Priya counts 5 shells, finds 2 more, then gives 1 to her brother. How many left?



Paper Step: _____ | | SC-6 Ans: _____

9 Tier 2 • Detective

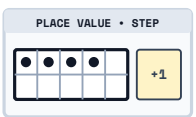
Bean Sprout Lab: A seed grows 2 cm on Monday and 2 cm on Tuesday. Total height?



Paper Step: _____ | | SC-6 Ans: _____

10 Tier 2 • Detective

Spot the Mistake: Sam pressed [4] [ENTER] [1] [+] and said the answer is 41. Fix it!



Paper Step: _____ | | SC-6 Ans: _____

Unit 01 Practice D — Stepping Across 5 & 10 on the Ten-Frame

Name: _____ Date: _____ Score: _____ / 10

TIER 2 • LEVEL 2: STORY & DETECTIVE LAB • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE D (#1–#10) ON PAPER FIRST

EXAMPLE 1 **Start at 5 (one full top row) and add 2 more dots: 5 + 2.**

5 + 1 = 6, 6 + 1 = 7. Key: [5] [ENTER] [2] [+].

Verified Answer: 7

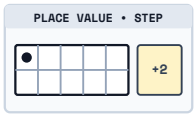
EXAMPLE 2 **Start with 10 dots (full ten-frame) and take 3 away: 10 - 3.**

Count back 3 from 10 → 7 dots remain. Key: [10] [ENTER] [3] [-].

Verified Answer: 7

1 Tier 2 • Detective

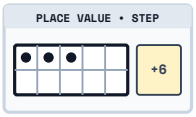
Five-frame + 1 more: 5 + 1 =



Paper Step: _____ [ ] SC-6 Ans: _____

2 Tier 2 • Detective

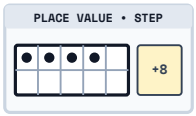
Five-frame + 3 more: 5 + 3 =



Paper Step: _____ [ ] SC-6 Ans: _____

3 Tier 2 • Detective

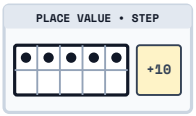
Five-frame + 4 more: 5 + 4 =



Paper Step: _____ [ ] SC-6 Ans: _____

4 Tier 2 • Detective

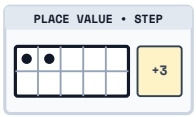
Five-frame + 5 more: 5 + 5 =



Paper Step: _____ [ ] SC-6 Ans: _____

5 Tier 2 • Detective

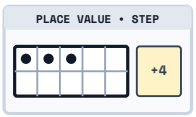
Step up from 2 by 3: 2 + 1 + 1 + 1 =



Paper Step: _____ [ ] SC-6 Ans: _____

6 Tier 2 • Detective

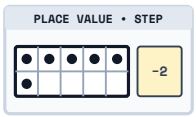
Step up from 3 by 4: 3 + 4 =



Paper Step: _____ [ ] SC-6 Ans: _____

7 Tier 2 • Detective

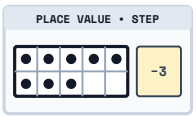
Step back from 6 by 2: 6 - 1 - 1 =



Paper Step: _____ [ ] SC-6 Ans: _____

8 Tier 2 • Detective

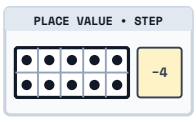
Step back from 8 by 3: 8 - 3 =



Paper Step: _____ [ ] SC-6 Ans: _____

9 Tier 2 • Detective

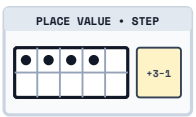
Step back from 10 by 4: 10 - 4 =



Paper Step: _____ [ ] SC-6 Ans: _____

10 Tier 2 • Detective

Start at 4, add 3, then take 1 away: 4 + 3 - 1 =



Paper Step: _____ [ ] SC-6 Ans: _____

Unit 01 Practice E — Comparing Quantities (How Many More?) & Stack Verification

Name: _____ Date: _____ Score: _____ / 10

TIER 3 • LEVEL 3: BOSS CHALLENGE • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE E (#1–#10) ON PAPER FIRST

EXAMPLE 1 Row 1 has 7 blocks and Row 0 has 4 blocks. How many more in Row 1?

Compare 7 and 4: 7 - 4 = 3 more blocks. Key: [7] [ENTER] [4] [-].

Verified Answer: 3 more

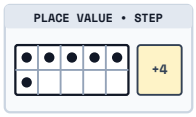
EXAMPLE 2 Start with 0 blocks, add 4, then add 2 more: 0 + 4 + 2.

0 + 4 = 4, then 4 + 2 = 6 blocks.

Verified Answer: 6

1 Tier 3 • Challenge

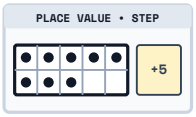
Row 1 has 6 blocks and Row 0 has 4 blocks. How many more blocks are in Row 1?



Paper Step: _____ [ ] SC-6 Ans: _____

2 Tier 3 • Challenge

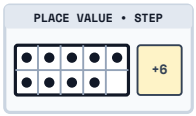
Row 1 has 8 blocks and Row 0 has 5 blocks. How many more blocks are in Row 1?



Paper Step: _____ [ ] SC-6 Ans: _____

3 Tier 3 • Challenge

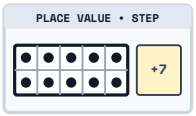
Row 1 has 9 blocks and Row 0 has 6 blocks. How many more blocks are in Row 1?



Paper Step: _____ [ ] SC-6 Ans: _____

4 Tier 3 • Challenge

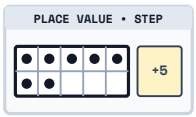
Row 1 has 10 blocks and Row 0 has 7 blocks. How many more blocks are in Row 1?



Paper Step: _____ [ ] SC-6 Ans: _____

5 Tier 3 • Challenge

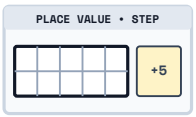
Which is greater: 7 blocks or 5 blocks? By how many blocks?



Paper Step: _____ [ ] SC-6 Ans: _____

6 Tier 3 • Challenge

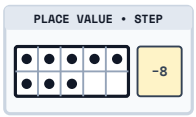
Start at 0 and add [+1] five times: 0 + 5 =



Paper Step: _____ [ ] SC-6 Ans: _____

7 Tier 3 • Challenge

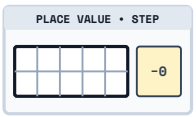
Have 8 blocks and remove all 8 blocks: 8 - 8 =



Paper Step: _____ [ ] SC-6 Ans: _____

8 Tier 3 • Challenge

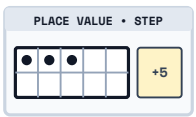
Add 0 blocks to 9 blocks: 9 + 0 =



Paper Step: _____ [ ] SC-6 Ans: _____

9 Tier 3 • Challenge

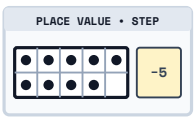
Step up and back: 3 + 3 + 2 =



Paper Step: _____ [ ] SC-6 Ans: _____

10 Tier 3 • Challenge

Step up and back: 9 - 2 - 3 =



Paper Step: _____ [ ] SC-6 Ans: _____

Unit 01 Practice F — Multi-Step Counting Paths, Number Lines & Challenge Stories

Name: _____ Date: _____ Score: _____ / 10

TIER 3 • LEVEL 3: BOSS CHALLENGE • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE F (#1–#10) ON PAPER FIRST

EXAMPLE 1 **Start at 3, step forward 4, then step back 2: 3 + 4 - 2.**

3 + 4 = 7, then 7 - 2 = 5. Key: [3] [ENTER] [4] [+] [2] [-].

Verified Answer: 5

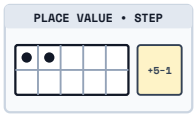
EXAMPLE 2 **How many steps from 2 to 9 on the number track? (2 + [?] = 9)**

Count up from 2 to 9 (or subtract 9 - 2): 7 steps.

Verified Answer: 7

1 Tier 3 • Challenge

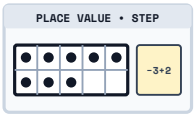
Step path on the number track: 2 + 5 - 1 =



Paper Step: _____ [ ] SC-6 Ans: _____

2 Tier 3 • Challenge

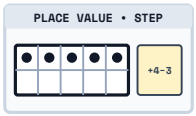
Step path on the number track: 8 - 3 + 2 =



Paper Step: _____ [ ] SC-6 Ans: _____

3 Tier 3 • Challenge

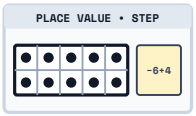
Step path on the number track: 5 + 4 - 3 =



Paper Step: _____ [ ] SC-6 Ans: _____

4 Tier 3 • Challenge

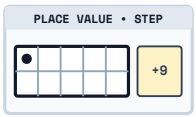
Step path on the number track: 10 - 6 + 4 =



Paper Step: _____ [ ] SC-6 Ans: _____

5 Tier 3 • Challenge

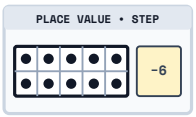
Three-step climb: 1 + 2 + 3 + 4 =



Paper Step: _____ [ ] SC-6 Ans: _____

6 Tier 3 • Challenge

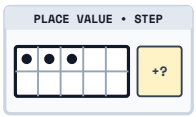
Count back three steps: 10 - 1 - 2 - 3 =



Paper Step: _____ [ ] SC-6 Ans: _____

7 Tier 3 • Challenge

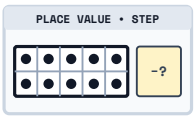
Find the missing jump: 3 + [?] = 9



Paper Step: _____ [ ] SC-6 Ans: _____

8 Tier 3 • Challenge

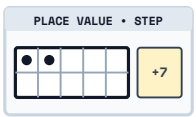
Find the missing jump: 10 - [?] = 3



Paper Step: _____ [ ] SC-6 Ans: _____

9 Tier 3 • Challenge

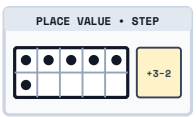
A frog starts at lily pad 2, hops +4, then +3. Which lily pad does it land on?



Paper Step: _____ [ ] SC-6 Ans: _____

10 Tier 3 • Challenge

Two-Step Tray Puzzle: Start with 6 blocks on Row 0, add 3 more blocks, then remove 2 blocks. How many remain?



Paper Step: _____ [ ] SC-6 Ans: _____

Unit 01 Mastery Check: Step Counting & Number Sequences

Name: _____ Date: _____ Score: _____ / 100

100-POINT UNIT MASTERY ASSESSMENT — 10 UNSCAFFOLDED PROBLEMS (10 POINTS EACH)

Solve each problem on paper first in the dot-grid workspace. Write your final answer on the line, then verify your result on the SC-6 stack. Record your total score in Appendix B (Score Tracker) and verify complete worked keystrokes online at stackcalc.io/curriculum/answers.

1 Core Fluency • 10 pts

Step up 1 more on the Ten-Frame: 6 + 1 =

[ ] +10 pts [ ] SC-6 **Ans:** _____

2 Core Fluency • 10 pts

Step up 2 times on the number track: 8 + 1 + 1 =

[ ] +10 pts [ ] SC-6 **Ans:** _____

3 Core Fluency • 10 pts

Remove 1 block from the tray: 9 - 1 =

[ ] +10 pts [ ] SC-6 **Ans:** _____

4 Core Fluency • 10 pts

Step back 2 times on the tray: 7 - 1 - 1 =

[ ] +10 pts [ ] SC-6 **Ans:** _____

5 Core Fluency • 10 pts

Find the missing [+1] steps: 5 + [?] = 8

[ ] +10 pts [ ] SC-6 **Ans:** _____

6 Core Fluency • 10 pts

Follow the 2-step tray path: 4 + 3 - 1 =

[ ] +10 pts [ ] SC-6 **Ans:** _____

7 Application • 10 pts

Emma has 6 crayons and gets 2 more. How many crayons in all?

[ ] +10 pts [ ] SC-6 **Ans:** _____

8 Application • 10 pts

A shelf holds 9 books. 2 books are checked out. How many books remain?

[ ] +10 pts [ ] SC-6 **Ans:** _____

9 Application • 10 pts

An ant walks 5 steps forward, 2 more forward, and 1 step back. Total steps from start?

[ ] +10 pts [ ] SC-6 **Ans:** _____

10 Error Analysis • 10 pts

Error Analysis: Ben says 1 more than 8 is 7 because he counted backward. Give the right answer.

[ ] +10 pts [ ] SC-6 **Ans:** _____

Unit 01 STEM: The Garden Stepping Stone Trail

Name: _____ Date: _____ Score: _____ / 4

REAL-WORLD STEM APPLICATION & WORKSHOP: THE GARDEN STEPPING STONE TRAIL

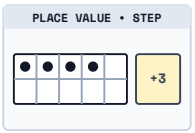
A landscape gardener designs a walking path with stone markers spaced 1 meter apart. Students calculate steps, distances, and total stones needed.

Companion Book (Vol. I: From Blocks to the Stack (SC-6 Manual) — Ch. 1: Meet Your SC-6 & Math Blocks + App. B: Station F.1) • Tally Pebbles (Calculi) & Brahmagupta's Zero |0|: Ancient shepherds counted flocks with clay pebbles ('calculi') before Indian mathematician Brahmagupta gave the empty tray socket its own number: Zero (|0|)!

Block Studio: Place Value Studio (Digit Blocks 0–9 & Gold [+1] Step Tokens) • Stack Shortcut: [1] [ENTER] [1] [+] = 2, then [1] [+] = 3, [1] [+] = 4...

CASE INVESTIGATION 1 STEM Modeling

Start at Stone 4 and lay 3 more stones. What stone number are you on?



1. Draw or Count Blocks: _____

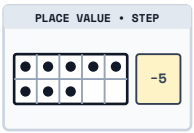
2. My Number Sentence: _____

3. My Answer: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)

CASE INVESTIGATION 2 STEM Modeling

A trail has 8 stones. A bird lands on stone 5. How many stones remain to the end?



1. Draw or Count Blocks: _____

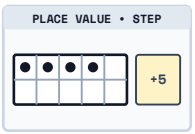
2. My Number Sentence: _____

3. My Answer: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)

CASE INVESTIGATION 3 Applied Calculation

Two parallel paths have 4 stones and 5 stones. How many stones total?



1. Draw or Count Blocks: _____

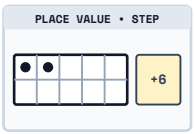
2. My Number Sentence: _____

3. My Answer: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)

CASE INVESTIGATION 4 Error Analysis Workshop

Error Analysis: Leo says stepping forward 2 stones from 6 gives stone 9. Find the true stone.



1. Draw or Count Blocks: _____

2. My Number Sentence: _____

3. My Answer: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)

Hands-On Math Explorers & Builders Note

Young builders, chefs, and nature explorers use physical blocks and paper math to solve real-world mysteries! Always build or write your paper setup first, write your number sentence, and check on your SC-6. Parents & teachers: full keys at stackcalc.io/curriculum/answers.

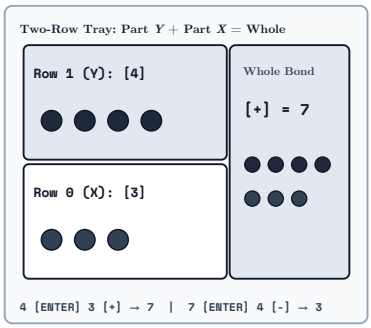
Part-Part-Whole & Number Bonds on the Place Value Tray

Hands-On Block Studio: Place Value Studio (Number Bond Stage & Digit Blocks 0–9) • Standards: CCSS.MATH.K.OA.A.3, CCSS.MATH.1.OA.B.3

1. MATHEMATICAL CONCEPT & INSIDE-OUT APPROACH (Composing Numbers: Part + Part = Whole):

Every addition problem composes two independent parts into a single whole (Part 1 + Part 2 = Whole). Placing Part 1 on the top row (Shelf Y) and Part 2 on the bottom row (Shelf X) makes both parts visible before they are joined.

Companion Book (Vol. I: From Blocks to the Stack (SC-6 Manual) — Ch. 3: Ten-Frames & Number Bonds + App. B: Station F.2) • Two Hands, One Workbench & The Domino Bond: Your left hand places Part 1 on Row 1 (Shelf Y) and your right hand places Part 2 on Row 0 (Workbench X)—splitting and fusing wholes like two halves of a domino!



2. HANDS-ON BLOCKS & CONCEPT RULES: HOW PARTS MAKE A WHOLE ON THE TRAY

- A whole quantity splits into two parts: Part 1 + Part 2 = Whole.
- Number bonds work in reverse: Whole − Part 1 = Part 2.
- Line Y holds Part 1, Line X holds Part 2, and [+] fuses them into the Whole.
- Number bonds help you see addition and subtraction as two sides of the exact same bond.

3. STEP-BY-STEP VERIFICATION WALKTHROUGH ON THE SC-6

Hands-On Block Setup: Place the [4] Digit Block in Row 1 (Part 1) and the [3] Digit Block in Row 0 (Part 2) of the Ones column on your Place Value Tray.
Question: Combine both parts in the Ones column: 4 + 3 = 7 (swap to the [7] Digit Block).

Verification Keystrokes: [4] [ENTER] [3] [+]

Button Pressed	Screen (X)	How the 4-Level Stack Mirrors Your Mathematical Steps (T, Z, Y, X)
[4]	4	Part 1 (4) enters register X
[ENTER]	4	4 copied up to register Y; represents Row 1 (Part 1)
[3]	3	Part 2 (3) enters register X; represents Row 0 (Part 2)
[+]	7	Plus combines Part 1 (*Y*) + Part 2 (*X*) = Whole (7) in X!

3. 3D BLOCK STUDIO & SC-6 STACK LEARNING GUIDE & SELF-CHECK

- Physical Block Studio Rule: A whole quantity splits into two parts: Part 1 + Part 2 = Whole.
- Stack Shortcut & Pattern: Part 1 [ENTER] Part 2 [+] = Whole; Whole [ENTER] Part 1 [-] = Part 2 — Number bonds help you see addition and subtraction as two sides of the exact same bond.
- 2-Second Tray-to-Screen Audit: Confirm your physical 3D Block Studio setup matches Register Y (Waiting Shelf) and Register X (Workbench) before pressing the operator key.

WARM-UP CHECK A: SOLVE ON PAPER FIRST, THEN VERIFY ON YOUR CALCULATOR!

Core Investigation: Place [5] in Row 1 (Part 1) and [4] in Row 0 (Part 2) of your Place Value Tray. Combine the two parts to find the Whole.

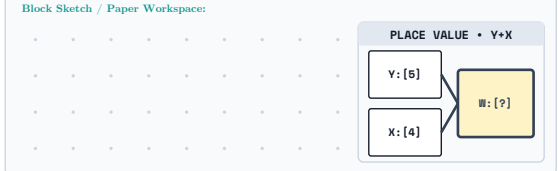
1. First Quantity / Inner Step: _____

2. Second Quantity / Operation: _____

3. My Paper Prediction: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)

Block Sketch / Paper Workspace:



Extension: Decomposing the Whole: Finding the Missing Part

Deepening Concepts • Standards: CCSS.MATH.1.OA.B.4

1. EXTENSION CONCEPT & SETUP (Decomposing the Whole: Finding the Missing Part):

Finding a missing addend (6 + ? = 10) is the inverse of composing a sum. By placing the known Whole (10) on the top shelf and subtracting the known Part (6), you isolate the unknown part.

Hands-On Extension Setup: Place [1][0] in Row 1 of the Place Value Tray (Whole = 10) and [6] in Row 0 (Known Part 1 = 6). • Question: What missing part combines with 6 to make 10? (10 - 6 = 4).

2. EXTENSION STACK SEQUENCE (SC-6): [1] [0] [ENTER] [6] [-]

Button Pressed	Screen (X)	Extension Stack Dynamics (T, Z, Y, X)
[1]	1	Enter Whole (10)
[0]	10	10 in register X
[ENTER]	10	Whole (10) lifted to register Y
[6]	6	Known Part 1 (6) enters register X
[-]	4	Minus subtracts known Part from Whole: Missing Part is 4!

3. PARENT & TEACHER COACHING: TARGET MISCONCEPTIONS & 3D BLOCK STUDIO REMEDIATIONS

Misconception 1: Pressing [+] immediately after the first number without pressing [ENTER] to separate Part 1 and Part 2.

Hands-On Block Studio Remediation: Point to the two rows of the Place Value Tray: pressing [ENTER] is the physical divider that lifts Row 1 (Part 1) up to Register Y before Row 0 (Part 2) is typed into Register X.

Misconception 2: Adding the whole and the known part when solving for a missing addend (e.g., computing 10 + 6 instead of 10 − 6).

Hands-On Block Studio Remediation: Place [1][0] in Row 1 (Whole) and [6] in Row 0 (Known Part) of the Place Value Tray; show that the Whole (10) goes into Register Y, the known part (6) enters X, and [−] reveals the missing part.

4. STACK SHORTCUT & PARTNER EXPLAIN-WHY CHALLENGE (SC-6)

Calculator Shortcut: Part 1 [ENTER] Part 2 [+] = Whole; Whole [ENTER] Part 1 [-] = Part 2

Explain-Why Reflection: How do your Place Value, Fraction, or Prime blocks prove why Misconception 1 is wrong?

WARM-UP CHECK B (EXTENSION): SOLVE ON PAPER FIRST, THEN VERIFY ON YOUR CALCULATOR!

Extension Challenge: A number bond has a Whole of 8 and a known Part of 5. Find the missing Part 2.

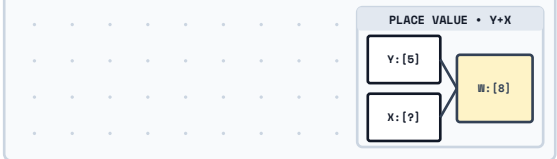
1. First Quantity / Inner Step: _____

2. Second Quantity / Operation: _____

3. My Paper Prediction: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)

Block Sketch / Paper Workspace:



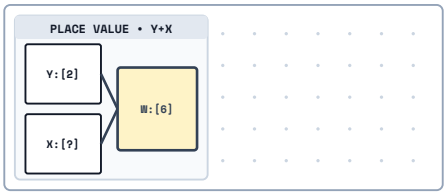
Unit 02 Lab: Part-Part-Whole & Number Bonds on the Place Value Tray

Name: _____ Date: _____ Score: _____ / 4

DIRECTIONS: (1) Build with your Place Value blocks & draw in Box 1. (2) Write the two quantities & math in Box 2.
(3) Write your Prediction BEFORE pressing keys, then check with your partner or teacher on the SC-6!

Investigation 1: To make a Whole of 6, Part 1 is 2. What is the missing Part 2?

1. Draw Your Blocks on the Tray:



2. Number Bond & Two Quantities:

First Quantity (Top Row): _____

Second Quantity (Bottom Row): _____

Combine (+, –, or ×): _____

3. My Prediction:

_____

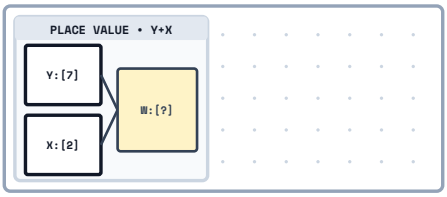
Final Verified Answer:

_____

[ ] Verified on SC-6 Stack

Investigation 2: In a number bond, Part 1 is 7 and Part 2 is 2. What is the Whole when you combine both parts?

1. Draw Your Blocks on the Tray:



2. Number Bond & Two Quantities:

First Quantity (Top Row): _____

Second Quantity (Bottom Row): _____

Combine (+, –, or ×): _____

3. My Prediction:

_____

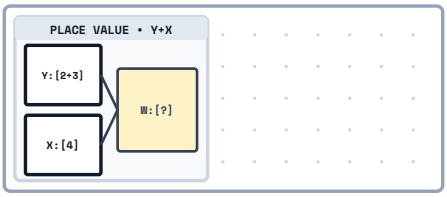
Final Verified Answer:

_____

[ ] Verified on SC-6 Stack

Investigation 3: Three parts join together: first combine 2 and 3, then add 4 to that sum. What is the Whole?

1. Draw Your Blocks on the Tray:



2. Number Bond & Two Quantities:

First Quantity (Top Row): _____

Second Quantity (Bottom Row): _____

Combine (+, –, or ×): _____

3. My Prediction:

_____

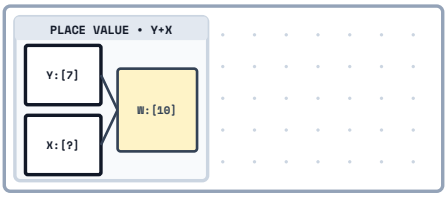
Final Verified Answer:

_____

[ ] Verified on SC-6 Stack

Investigation 4: Ten birds sit on a fence. Seven fly to a tree. How many stay on the fence?

1. Draw Your Blocks on the Tray:



2. Number Bond & Two Quantities:

First Quantity (Top Row): _____

Second Quantity (Bottom Row): _____

Combine (+, –, or ×): _____

3. My Prediction:

_____

Final Verified Answer:

_____

[ ] Verified on SC-6 Stack

MY LAB REFLECTION: Draw or tell how your Place Value blocks matched the numbers on your SC-6 screen!

_____

Unit 02 Practice A — Part-Part-Whole Number Bonds Within 10

Name: _____ Date: _____ Score: _____ / 10

TIER 1 • LEVEL 1: BUILDER FOUNDATION • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE A (#1–#10) ON PAPER FIRST

EXAMPLE 1 **Combine Part 1 = 4 (Row 1) and Part 2 = 3 (Row 0).**

Whole = Part 1 + Part 2 = 4 + 3 = 7. Key: [4] [ENTER] [3] [+].

Verified Answer: 7

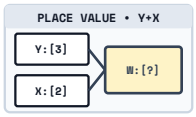
EXAMPLE 2 **Write both addition facts for the bond (6, 2 → 8).**

6 + 2 = 8 and 2 + 6 = 8 (Commutative Property).

Verified Answer: 8

1 Tier 1 • Builder

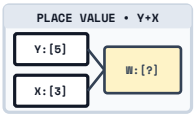
Part 1 = 3, Part 2 = 2. Find the Whole:



Paper Step: _____ [ ] SC-6 Ans: _____

2 Tier 1 • Builder

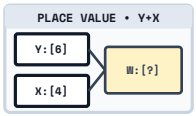
Part 1 = 5, Part 2 = 3. Find the Whole:



Paper Step: _____ [ ] SC-6 Ans: _____

3 Tier 1 • Builder

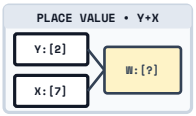
Part 1 = 6, Part 2 = 4. Find the Whole:



Paper Step: _____ [ ] SC-6 Ans: _____

4 Tier 1 • Builder

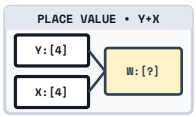
Part 1 = 2, Part 2 = 7. Find the Whole:



Paper Step: _____ [ ] SC-6 Ans: _____

5 Tier 1 • Builder

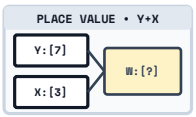
Part 1 = 4, Part 2 = 4. Find the Whole:



Paper Step: _____ [ ] SC-6 Ans: _____

6 Tier 1 • Builder

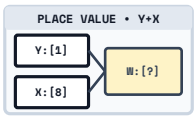
Part 1 = 7, Part 2 = 3. Find the Whole:



Paper Step: _____ [ ] SC-6 Ans: _____

7 Tier 1 • Builder

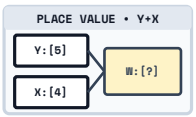
Part 1 = 1, Part 2 = 8. Find the Whole:



Paper Step: _____ [ ] SC-6 Ans: _____

8 Tier 1 • Builder

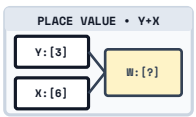
Part 1 = 5, Part 2 = 4. Find the Whole:



Paper Step: _____ [ ] SC-6 Ans: _____

9 Tier 1 • Builder

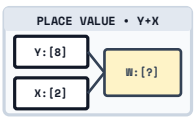
Part 1 = 3, Part 2 = 6. Find the Whole:



Paper Step: _____ [ ] SC-6 Ans: _____

10 Tier 1 • Builder

Part 1 = 8, Part 2 = 2. Find the Whole:



Paper Step: _____ [ ] SC-6 Ans: _____

Unit 02 Practice B — Missing Addends & Subtraction Fact Families

Name: _____ Date: _____ Score: _____ / 10

TIER 1 • LEVEL 1: BUILDER FOUNDATION • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE B (#1–#10) ON PAPER FIRST

EXAMPLE 1 **Whole = 9, Known Part = 4. Find the missing part: 4 + [?] = 9.**

Subtract Whole - Part: 9 - 4 = 5. Key: [9] [ENTER] [4] [-].

Verified Answer: 5

EXAMPLE 2 **Whole = 10, Known Part = 7. Find the missing part: [?] + 7 = 10.**

10 - 7 = 3. Check: 3 + 7 = 10.

Verified Answer: 3

1 Tier 1 • Builder

Find the missing part: 3 + [?] = 7

PLACE VALUE • Y+X
Y: [3]
X: [?]
W: [7]

Paper Step: _____ [ ] SC-6 Ans: _____

2 Tier 1 • Builder

Find the missing part: 5 + [?] = 9

PLACE VALUE • Y+X
Y: [5]
X: [?]
W: [9]

Paper Step: _____ [ ] SC-6 Ans: _____

3 Tier 1 • Builder

Find the missing part: 6 + [?] = 10

PLACE VALUE • Y+X
Y: [6]
X: [?]
W: [10]

Paper Step: _____ [ ] SC-6 Ans: _____

4 Tier 1 • Builder

Find the missing part: [?] + 2 = 8

PLACE VALUE • Y+X
Y: [2]
X: [?]
W: [8]

Paper Step: _____ [ ] SC-6 Ans: _____

5 Tier 1 • Builder

Find the missing part: [?] + 4 = 10

PLACE VALUE • Y+X
Y: [4]
X: [?]
W: [10]

Paper Step: _____ [ ] SC-6 Ans: _____

6 Tier 1 • Builder

Find the missing part: 8 - 5 =

PLACE VALUE • Y+X
Y: [5]
X: [?]
W: [8]

Paper Step: _____ [ ] SC-6 Ans: _____

7 Tier 1 • Builder

Find the missing part: 9 - 6 =

PLACE VALUE • Y+X
Y: [6]
X: [?]
W: [9]

Paper Step: _____ [ ] SC-6 Ans: _____

8 Tier 1 • Builder

Find the missing part: 10 - 3 =

PLACE VALUE • Y+X
Y: [3]
X: [?]
W: [10]

Paper Step: _____ [ ] SC-6 Ans: _____

9 Tier 1 • Builder

Fact Family Check: If 4 + 5 = 9, then 9 - 5 =

PLACE VALUE • Y+X
Y: [4]
X: [?]
W: [5]

Paper Step: _____ [ ] SC-6 Ans: _____

10 Tier 1 • Builder

Fact Family Check: If 3 + 7 = 10, then 10 - 3 =

PLACE VALUE • Y+X
Y: [3]
X: [?]
W: [7]

Paper Step: _____ [ ] SC-6 Ans: _____

Unit 02 Practice C — Real-World Number Bond Stories & Error Analysis

Name: _____ Date: _____ Score: _____ / 10

TIER 2 • LEVEL 2: STORY & DETECTIVE LAB • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE C (#1–#10) ON PAPER FIRST

EXAMPLE 1 A box holds 10 markers in all. 6 are red and the rest are blue. How many blue?

Whole = 10, Part = 6 → 10 - 6 = 4 blue markers.

Verified Answer: 4 blue

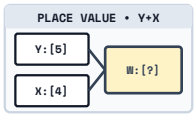
EXAMPLE 2 Spot the Mistake: For 4 + [?] = 10, Ava added 10 + 4 = 14.

10 is the Whole, not a part! Subtract 10 - 4 = 6.

Verified Answer: 6

1 Tier 2 • Detective

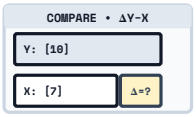
There are 5 red apples and 4 green apples in a bowl. How many apples in all?



Paper Step: _____ [ ] SC-6 Ans: _____

2 Tier 2 • Detective

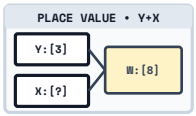
A team needs 10 players. 7 players are on the field. How many more are needed?



Paper Step: _____ [ ] SC-6 Ans: _____

3 Tier 2 • Detective

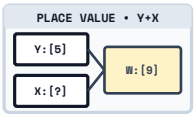
Chloe has 8 stickers. She gives 3 to her friend. How many stickers does she keep?



Paper Step: _____ [ ] SC-6 Ans: _____

4 Tier 2 • Detective

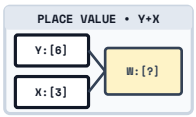
A bicycle rack holds 9 bikes. 5 slots are full. How many empty slots are left?



Paper Step: _____ [ ] SC-6 Ans: _____

5 Tier 2 • Detective

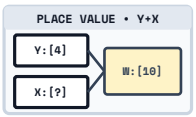
Owen has 6 pennies in his left pocket and 3 in his right pocket. Total pennies?



Paper Step: _____ [ ] SC-6 Ans: _____

6 Tier 2 • Detective

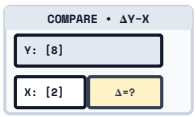
A pet shop has 10 puppies. 4 are spotted and the rest are solid brown. How many brown?



Paper Step: _____ [ ] SC-6 Ans: _____

7 Tier 2 • Detective

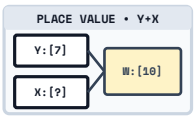
Mia needs 8 blocks to build a bridge. She has 2 blocks. How many more does she need?



Paper Step: _____ [ ] SC-6 Ans: _____

8 Tier 2 • Detective

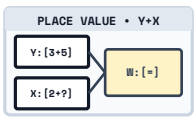
7 birds sit on a wire. Some more land, making 10 birds in all. How many landed?



Paper Step: _____ [ ] SC-6 Ans: _____

9 Tier 2 • Detective

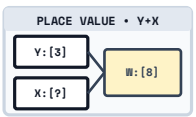
Balance Scale: Left pan has [3] and [5]. Right pan has [2] and [?]. Balance it!



Paper Step: _____ [ ] SC-6 Ans: _____

10 Tier 2 • Detective

Spot the Mistake: For [?] + 3 = 8, Eli wrote 8 + 3 = 11. Find the true missing part!



Paper Step: _____ [ ] SC-6 Ans: _____

Unit 02 Practice D — Complements to 10 & Three-Part Number Bonds

Name: _____ Date: _____ Score: _____ / 10

TIER 2 • LEVEL 2: STORY & DETECTIVE LAB • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE D (#1–#10) ON PAPER FIRST

EXAMPLE 1 **Combine three parts on the stack: 3 + 2 + 4.**

First combine 3 + 2 = 5 (in Y), then add 4 → 9. Key: [3] [ENTER] [2] [+] [4] [+].

Verified Answer: 9

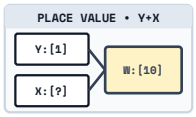
EXAMPLE 2 **Whole = 10, Part 1 = 3, Part 2 = 2. Find Part 3: 10 - 3 - 2.**

10 - 3 = 7, then 7 - 2 = 5.

Verified Answer: 5

1 Tier 2 • Detective

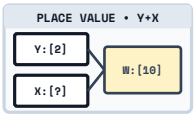
Friends of 10: 1 + [?] = 10



Paper Step: _____ [ ] SC-6 Ans: _____

2 Tier 2 • Detective

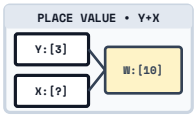
Friends of 10: 2 + [?] = 10



Paper Step: _____ [ ] SC-6 Ans: _____

3 Tier 2 • Detective

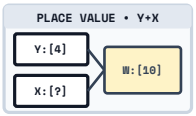
Friends of 10: 3 + [?] = 10



Paper Step: _____ [ ] SC-6 Ans: _____

4 Tier 2 • Detective

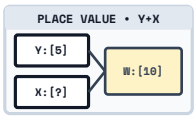
Friends of 10: 4 + [?] = 10



Paper Step: _____ [ ] SC-6 Ans: _____

5 Tier 2 • Detective

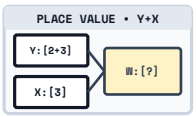
Friends of 10: 5 + [?] = 10



Paper Step: _____ [ ] SC-6 Ans: _____

6 Tier 2 • Detective

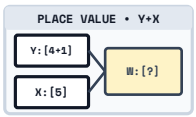
Three-part bond: 2 + 3 + 3 =



Paper Step: _____ [ ] SC-6 Ans: _____

7 Tier 2 • Detective

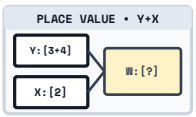
Three-part bond: 4 + 1 + 5 =



Paper Step: _____ [ ] SC-6 Ans: _____

8 Tier 2 • Detective

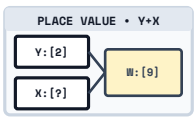
Three-part bond: 3 + 4 + 2 =



Paper Step: _____ [ ] SC-6 Ans: _____

9 Tier 2 • Detective

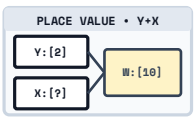
Decompose twice: 9 - 2 - 4 =



Paper Step: _____ [ ] SC-6 Ans: _____

10 Tier 2 • Detective

Decompose twice: 10 - 3 - 5 =



Paper Step: _____ [ ] SC-6 Ans: _____

Unit 02 Practice E — Balance Scales & Missing-Part Equations

Name: _____ Date: _____ Score: _____ / 10

TIER 3 • LEVEL 3: BOSS CHALLENGE • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE E (#1–#10) ON PAPER FIRST

EXAMPLE 1 Balance the scale: $4 + 5 = 6 + [\ ?\ ]$.

Left side is $4 + 5 = 9$. Subtract 6 from 9: $9 - 6 = 3$!

Verified Answer: 3

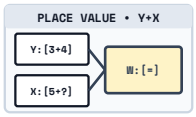
EXAMPLE 2 Balance the scale: $10 - 2 = 3 + [\ ?\ ]$.

Left side is $10 - 2 = 8$. Subtract 3 from 8: $8 - 3 = 5$!

Verified Answer: 5

1 Tier 3 • Challenge

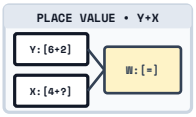
Balance the equation: $3 + 4 = 5 + [\ ?\ ]$



Paper Step: _____ [ ] SC-6 Ans: _____

2 Tier 3 • Challenge

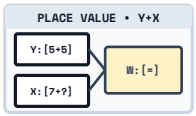
Balance the equation: $6 + 2 = 4 + [\ ?\ ]$



Paper Step: _____ [ ] SC-6 Ans: _____

3 Tier 3 • Challenge

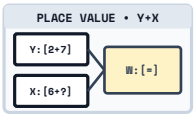
Balance the equation: $5 + 5 = 7 + [\ ?\ ]$



Paper Step: _____ [ ] SC-6 Ans: _____

4 Tier 3 • Challenge

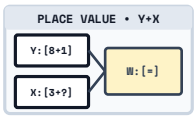
Balance the equation: $2 + 7 = 6 + [\ ?\ ]$



Paper Step: _____ [ ] SC-6 Ans: _____

5 Tier 3 • Challenge

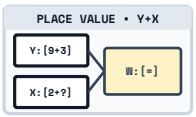
Balance the equation: $8 - 1 = 3 + [\ ?\ ]$



Paper Step: _____ [ ] SC-6 Ans: _____

6 Tier 3 • Challenge

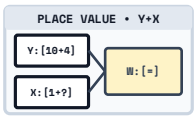
Balance the equation: $9 - 3 = 2 + [\ ?\ ]$



Paper Step: _____ [ ] SC-6 Ans: _____

7 Tier 3 • Challenge

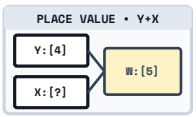
Balance the equation: $10 - 4 = 1 + [\ ?\ ]$



Paper Step: _____ [ ] SC-6 Ans: _____

8 Tier 3 • Challenge

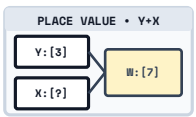
Find the Whole: $[\ ?\ ] - 4 = 5$



Paper Step: _____ [ ] SC-6 Ans: _____

9 Tier 3 • Challenge

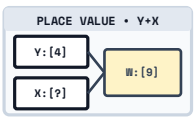
Find the Whole: $[\ ?\ ] - 3 = 7$



Paper Step: _____ [ ] SC-6 Ans: _____

10 Tier 3 • Challenge

Find the missing subtrahend: $9 - [\ ?\ ] = 4$



Paper Step: _____ [ ] SC-6 Ans: _____

Unit 02 Practice F — Fact Family Triangles, Mystery Number Bonds & Stack Verification

Name: _____ Date: _____ Score: _____ / 10

TIER 3 • LEVEL 3: BOSS CHALLENGE • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE F (#1–#10) ON PAPER FIRST

EXAMPLE 1 **Fact Family (3, 7, 10): If 3 + 7 = 10, what is 10 - 7?**

Since 3 and 7 are the two parts of 10, removing 7 leaves 3.

Verified Answer: 3

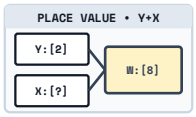
EXAMPLE 2 **Mystery Bond: I am a number. Add 4 to me and you get 9. Who am I?**

9 - 4 = 5. Key: [9] [ENTER] [4] [-].

Verified Answer: 5

1 Tier 3 • Challenge

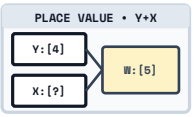
Fact Family (2, 8, 10): 2 + 8 = 10, so 10 - 8 =



Paper Step: _____ [ ] SC-6 Ans: _____

2 Tier 3 • Challenge

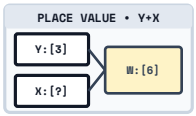
Fact Family (4, 5, 9): 4 + 5 = 9, so 9 - 4 =



Paper Step: _____ [ ] SC-6 Ans: _____

3 Tier 3 • Challenge

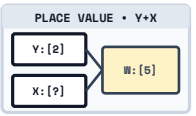
Fact Family (3, 6, 9): 3 + 6 = 9, so 9 - 6 =



Paper Step: _____ [ ] SC-6 Ans: _____

4 Tier 3 • Challenge

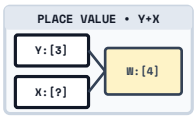
Three-part missing bond: 2 + 5 + [?] = 10



Paper Step: _____ [ ] SC-6 Ans: _____

5 Tier 3 • Challenge

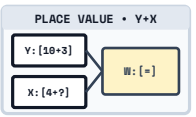
Three-part missing bond: 4 + 3 + [?] = 9



Paper Step: _____ [ ] SC-6 Ans: _____

6 Tier 3 • Challenge

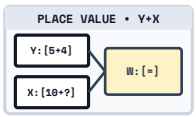
Two-pan balance: 10 - 3 = 4 + [?]



Paper Step: _____ [ ] SC-6 Ans: _____

7 Tier 3 • Challenge

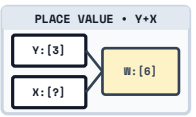
Two-pan balance: 5 + 4 = 10 - [?]



Paper Step: _____ [ ] SC-6 Ans: _____

8 Tier 3 • Challenge

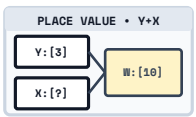
Mystery Number: Subtract 3 from me and 6 is left. What Whole am I?



Paper Step: _____ [ ] SC-6 Ans: _____

9 Tier 3 • Challenge

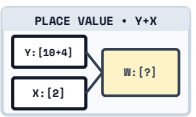
A box has 10 crayons: 3 red, 4 blue, and the rest green. How many green?



Paper Step: _____ [ ] SC-6 Ans: _____

10 Tier 3 • Challenge

Three-Part Ten-Frame Puzzle: A full Ten-Frame holds 10 blocks. Remove 4 red and 2 blue blocks. How many remain?



Paper Step: _____ [ ] SC-6 Ans: _____

Unit 02 Mastery Check: Number Bonds to 5 & 10

Name: _____ Date: _____ Score: _____ / 100

100-POINT UNIT MASTERY ASSESSMENT — 10 UNSCAFFOLDED PROBLEMS (10 POINTS EACH)

Solve each problem on paper first in the dot-grid workspace. Write your final answer on the line, then verify your result on the SC-6 stack. Record your total score in Appendix B (Score Tracker) and verify complete worked keystrokes online at stackcalc.io/curriculum/answers.

1 Core Fluency • 10 pts

Combine the parts: 6 + 3 =

[ ] +10 pts [ ] SC-6 **Ans:** _____

2 Core Fluency • 10 pts

Combine the parts: 4 + 6 =

[ ] +10 pts [ ] SC-6 **Ans:** _____

3 Core Fluency • 10 pts

Subtract to find the part: 8 - 3 =

[ ] +10 pts [ ] SC-6 **Ans:** _____

4 Core Fluency • 10 pts

Subtract to find the part: 10 - 8 =

[ ] +10 pts [ ] SC-6 **Ans:** _____

5 Core Fluency • 10 pts

Find the missing addend: 5 + [?] = 8

[ ] +10 pts [ ] SC-6 **Ans:** _____

6 Core Fluency • 10 pts

Find the missing addend: [?] + 7 = 10

[ ] +10 pts [ ] SC-6 **Ans:** _____

7 Application • 10 pts

There are 9 bees in a hive. 4 fly out. How many bees are still inside?

[ ] +10 pts [ ] SC-6 **Ans:** _____

8 Application • 10 pts

Lucas has 3 blue marbles and 7 yellow marbles. How many marbles altogether?

[ ] +10 pts [ ] SC-6 **Ans:** _____

9 Application • 10 pts

A carton holds 10 eggs. 6 eggs are left. How many eggs were used?

[ ] +10 pts [ ] SC-6 **Ans:** _____

10 Error Analysis • 10 pts

Error Analysis: Zoe solved 6 + [?] = 9 by adding 6 + 9 = 15. Explain & give the right number.

[ ] +10 pts [ ] SC-6 **Ans:** _____

Unit 02 STEM: The Space Station Cargo Balancing Tray

Name: _____ Date: _____ Score: _____ / 4

REAL-WORLD STEM APPLICATION & WORKSHOP: THE SPACE STATION CARGO BALANCING TRAY

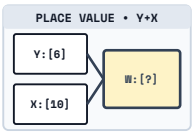
Astronauts balance payloads on the supply shuttle. Each cargo tray holds exactly 10 kg across two compartments (Part 1 and Part 2).

Companion Book (Vol. I: From Blocks to the Stack (SC-6 Manual) — Ch. 3: Ten-Frames & Number Bonds + App. B: Station F.2) • Two Hands, One Workbench & The Domino Bond: Your left hand places Part 1 on Row 1 (Shelf Y) and your right hand places Part 2 on Row 0 (Workbench X)—splitting and fusing wholes like two halves of a domino!

Block Studio: Place Value Studio (Number Bond Stage & Digit Blocks 0–9) • Stack Shortcut: Part 1 [ENTER] Part 2 [+] = Whole; Whole [ENTER] Part 1 [-] = Part 2

CASE INVESTIGATION 1 STEM Modeling

Compartment A holds 6 kg. How many kg fit into Compartment B to make 10 kg?



1. Draw or Count Blocks: _____

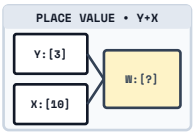
2. My Number Sentence: _____

3. My Answer: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)

CASE INVESTIGATION 2 STEM Modeling

Compartment A holds 3 kg. What is the missing cargo weight for a 10 kg tray?



1. Draw or Count Blocks: _____

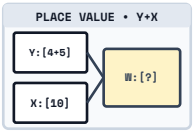
2. My Number Sentence: _____

3. My Answer: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)

CASE INVESTIGATION 3 Applied Calculation

Two small containers weigh 4 kg and 5 kg. Can they both fit in a 10 kg tray?



1. Draw or Count Blocks: _____

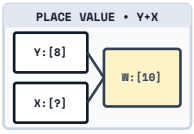
2. My Number Sentence: _____

3. My Answer: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)

CASE INVESTIGATION 4 Error Analysis Workshop

Error Analysis: Sam says 10 − 8 = 3. Use the number bond to find the correct missing part.



1. Draw or Count Blocks: _____

2. My Number Sentence: _____

3. My Answer: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)

Hands-On Math Explorers & Builders Note

Young builders, chefs, and nature explorers use physical blocks and paper math to solve real-world mysteries! Always build or write your paper setup first, write your number sentence, and check on your SC-6. Parents & teachers: full keys at stackcalc.io/curriculum/answers.

Complements to 10 & Make-10 Regrouping with Carry Tokens

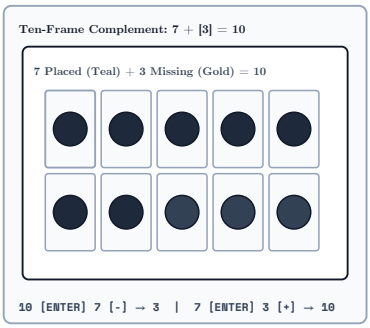
Hands-On Block Studio: Place Value Studio (Ten-Frame Trays & Gold [+1] Carry Tokens) • Standards: CCSS.MATH.1.OA.C.6, CCSS.MATH.1.NBT.B.2

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1. MATHEMATICAL CONCEPT & INSIDE-OUT APPROACH (Complements to 10: Making Ten & Carry Trade):

Our base-10 system regroups every collection of 10 ones into 1 ten. Finding a number's complement to 10 (10 - 7 = 3) places the target base (10) on Shelf Y and the current ones digit (7) on Workbench X.

Companion Book (Vol. I: From Blocks to the Stack (SC-6 Manual) — Ch. 3: Making a Ten First & Trading 10 Ones ([☒])) • Ten Fingers & Bridging the 5-Rib Ten-Frame: Humans count in base-10 because of our 10 fingers! When the 10-socket frame fills up, we snap a Gold [+1] Carry Token into Tens and start a fresh frame.



2. HANDS-ON BLOCKS & CONCEPT RULES: HOW TEN-FRAMES FORM THE TEN-BASE

- Ten ones cubes fill a ten-frame rod completely: 10 Ones = 1 Ten.
- To add across 10 (e.g. 8 + 5), split 5 into 2 + 3: (8 + 2) fills the 10-frame, leaving 3 ones (13).
- When the ten-frame fills, trade it for 1 Gold [+1] Carry Token in the Tens socket.
- On the SC-6, typing [8] [ENTER] [5] [+] lifts 8 to Shelf Y and produces 13 in Register X.

3. STEP-BY-STEP VERIFICATION WALKTHROUGH ON THE SC-6

Hands-On Block Setup: Place the [7] Digit Block into the Ones socket of the Place Value Tray and hold a Gold [+1] Carry Token beside the Tens socket. Question: How many more ones must be added to [7] to reach 10 and trigger the Gold [+1] Carry Token? (7 + 3 = 10).

Verification Keystrokes: `1` `0` `ENTER` `7` `-`

Button Pressed	Screen (X)	How the 4-Level Stack Mirrors Your Mathematical Steps (T, Z, Y, X)
`1`	1	Enter 1
`0`	10	Target ten (10) in X
`ENTER`	10	10 lifted to Y
`7`	7	Current Ones digit (7) in X
`-`	3	10 - 7 = 3: Adding 3 completes 10 and triggers the [+1] Carry!

STACK SHORTCUT & BLOCK STUDIO TIP (SC-6):

[8] [ENTER] [2] [+] = 10, then [3] [+] = 13 • Ten ones cubes fill a ten-frame rod completely: 10 Ones = 1 Ten.

WARM-UP CHECK A: SOLVE ON PAPER FIRST, THEN VERIFY ON YOUR CALCULATOR!

Core Investigation: The Ones socket holds [6]. How many more ones are needed to complete a full 10 and trade for 1 Ten?

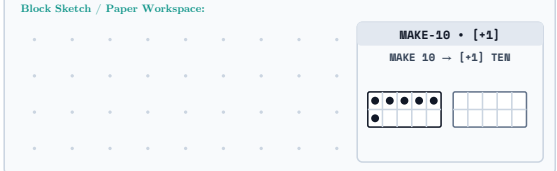
1. First Quantity / Inner Step: _____

2. Second Quantity / Operation: _____

3. My Paper Prediction: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)

Block Sketch / Paper Workspace:



Extension: Bridging Through 10: The Make-Ten & Carry Strategy

Deepening Concepts • Standards: CCSS.MATH.1.OA.C.6

1. EXTENSION CONCEPT & SETUP (Bridging Through 10: The Make-Ten & Carry Strategy):

Bridging across 10 decomposes the second addend so its first part completes a full ten ($8 + 5 = (8 + 2) + 3 = 10 + 3$). Completing the ten first turns any teen addition into an easy $10 + n$ fact.

Hands-On Extension Setup: Place [8] in Row 1 and [5] in Row 0 of the Ones column on the Place Value Tray. • Question: Take 2 from the 5 to bring 8 up to 10. Place a Gold [+1] Carry Token in the Tens socket and [3] in the Ones socket: 10 + 3 = 13.

2. EXTENSION STACK SEQUENCE (SC-6): [8] [ENTER] [2] [+] [3] [+]

Button Pressed	Screen (X)	Extension Stack Dynamics (T, Z, Y, X)
[8]	8	8 in Ones socket
[ENTER]	8	8 lifted to Y
[2]	2	2 borrowed from 5 to make 10
[+]	10	8 + 2 = 10 (Gold [+1] Carry Token placed in Tens column!)
[3]	3	Remaining 3 ones
[+]	13	10 + 3 = 13 total ([1] Ten, [3] Ones)!

3. PARENT & TEACHER COACHING: TARGET MISCONCEPTIONS & 3D BLOCK STUDIO REMEDIATIONS

Misconception 1: Counting on by ones across 10 (e.g., 8 + 5 as 9, 10, 11, 12, 13) instead of decomposing 5 into 2 + 3 to complete 10 first.

Hands-On Block Studio Remediation: Have the student bridge [8] to 10 on the Place Value Tray, place a Gold [+1] Carry Token in the Tens socket with [3] in the Ones socket, and key [8] [ENTER] [2] [+] [3] [+].

Misconception 2: Reading teen numbers as two separate single digits (seeing 14 as 1 and 4 rather than 1 Ten plus 4 Ones).

Hands-On Block Studio Remediation: Place [1] in the Tens socket and [4] in the Ones socket of the Place Value Tray and key [10] [ENTER] [4] [+] so students see 14 formed from 10 in Register Y and 4 in Register X.

4. STACK SHORTCUT & PARTNER EXPLAIN-WHY CHALLENGE (SC-6)

Calculator Shortcut: [8] [ENTER] [2] [+] = 10, then [3] [+] = 13

Explain-Why Reflection: How do your Place Value, Fraction, or Prime blocks prove why Misconception 1 is wrong?

WARM-UP CHECK B (EXTENSION): SOLVE ON PAPER FIRST, THEN VERIFY ON YOUR CALCULATOR!

Extension Challenge: Use the Make-Ten strategy on your Place Value Tray to add 9 + 6. What is the sum?

1. First Quantity / Inner Step: _____

2. Second Quantity / Operation: _____

3. My Paper Prediction: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)

Block Sketch / Paper Workspace:



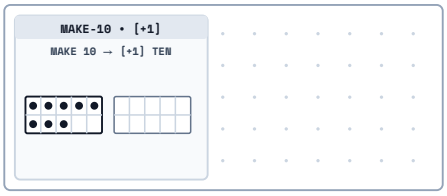
Unit 03 Lab: Complements to 10 & Make-10 Regrouping with Carry Tokens

Name: _____ Date: _____ Score: _____ / 4

DIRECTIONS: (1) Build with your Place Value blocks & draw in Box 1. (2) Write the two quantities & math in Box 2.
(3) Write your Prediction BEFORE pressing keys, then check with your partner or teacher on the SC-6!

Investigation 1: You have 4 ones on your tray. How many more ones do you need to make a full 10?

1. Draw Your Blocks on the Tray:



2. Number Bond & Two Quantities:

First Quantity (Top Row):

Second Quantity (Bottom Row):

Combine (+, −, or ×):

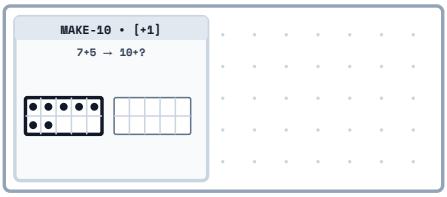
3. My Prediction:

Final Verified Answer:

[ ] Verified on SC-6 Stack

Investigation 2: Solve 7 + 5 by bridging through 10 on your Place Value Tray.

1. Draw Your Blocks on the Tray:



2. Number Bond & Two Quantities:

First Quantity (Top Row):

Second Quantity (Bottom Row):

Combine (+, −, or ×):

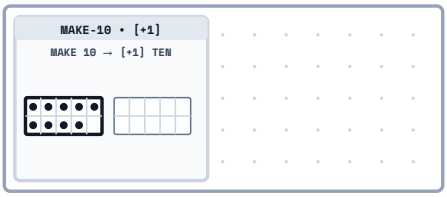
3. My Prediction:

Final Verified Answer:

[ ] Verified on SC-6 Stack

Investigation 3: The Ones socket holds [9]. How many more ones are needed to complete 10 and regroup into 1 Ten?

1. Draw Your Blocks on the Tray:



2. Number Bond & Two Quantities:

First Quantity (Top Row):

Second Quantity (Bottom Row):

Combine (+, −, or ×):

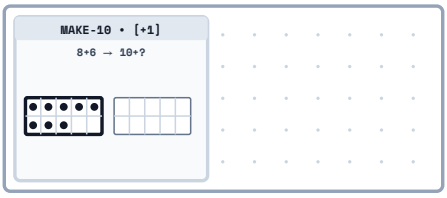
3. My Prediction:

Final Verified Answer:

[ ] Verified on SC-6 Stack

Investigation 4: Solve 8 + 6 by bridging through 10 on your Place Value Tray.

1. Draw Your Blocks on the Tray:



2. Number Bond & Two Quantities:

First Quantity (Top Row):

Second Quantity (Bottom Row):

Combine (+, −, or ×):

3. My Prediction:

Final Verified Answer:

[ ] Verified on SC-6 Stack

MY LAB REFLECTION: Draw or tell how your Place Value blocks matched the numbers on your SC-6 screen!

Unit 03 Practice A — Complements to 10 & Make-10 Regrouping

Name: _____ Date: _____ Score: _____ / 10

TIER 1 • LEVEL 1: BUILDER FOUNDATION • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE A (#1–#10) ON PAPER FIRST

EXAMPLE 1 **Evaluate 8 + 5 by Making 10 first.**

8 needs 2 to make 10. Split 5 into 2 + 3 → (8 + 2) + 3 = 10 + 3 = 13.

Verified Answer: 13

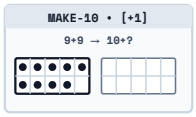
EXAMPLE 2 **Evaluate 7 + 6 by Making 10 first.**

7 needs 3 to make 10. Split 6 into 3 + 3 → (7 + 3) + 3 = 10 + 3 = 13.

Verified Answer: 13

1 Tier 1 • Builder

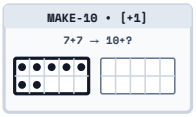
Complete the 10-bond: 9 + [?] = 10



Paper Step: _____ [ ] SC-6 Ans: _____

2 Tier 1 • Builder

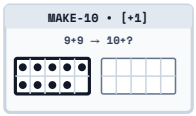
Complete the 10-bond: 7 + [?] = 10



Paper Step: _____ [ ] SC-6 Ans: _____

3 Tier 1 • Builder

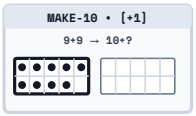
Make 10 to add: 9 + 4 =



Paper Step: _____ [ ] SC-6 Ans: _____

4 Tier 1 • Builder

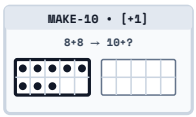
Make 10 to add: 9 + 7 =



Paper Step: _____ [ ] SC-6 Ans: _____

5 Tier 1 • Builder

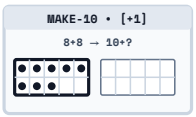
Make 10 to add: 8 + 4 =



Paper Step: _____ [ ] SC-6 Ans: _____

6 Tier 1 • Builder

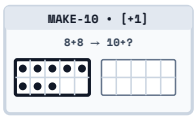
Make 10 to add: 8 + 6 =



Paper Step: _____ [ ] SC-6 Ans: _____

7 Tier 1 • Builder

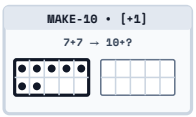
Make 10 to add: 8 + 7 =



Paper Step: _____ [ ] SC-6 Ans: _____

8 Tier 1 • Builder

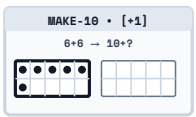
Make 10 to add: 7 + 5 =



Paper Step: _____ [ ] SC-6 Ans: _____

9 Tier 1 • Builder

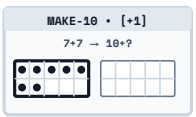
Make 10 to add: 6 + 5 =



Paper Step: _____ [ ] SC-6 Ans: _____

10 Tier 1 • Builder

Make 10 to add: 7 + 8 =



Paper Step: _____ [ ] SC-6 Ans: _____

Unit 03 Practice B — Teen Numbers (10 + n) & Subtracting Across 10

Name: _____ Date: _____ Score: _____ / 10

TIER 1 • LEVEL 1: BUILDER FOUNDATION • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE B (#1–#10) ON PAPER FIRST

EXAMPLE 1 **Decompose 14 into Tens and Ones.**

1 Ten ([+1] Carry Token) + 4 Ones = 10 + 4 = 14.

Verified Answer: 14

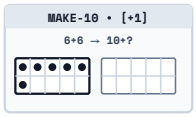
EXAMPLE 2 **Subtract 13 - 5 by bridging back through 10.**

Subtract 3 to reach 10 (13 - 3 = 10), then subtract 2 more (10 - 2 = 8).

Verified Answer: 8

1 Tier 1 • Builder

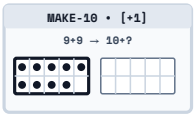
Compose the teen number: 10 + 6 =



Paper Step: _____ [ ] SC-6 Ans: _____

2 Tier 1 • Builder

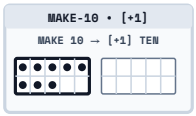
Compose the teen number: 10 + 9 =



Paper Step: _____ [ ] SC-6 Ans: _____

3 Tier 1 • Builder

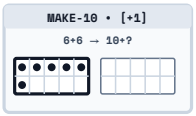
Find the missing ones digit: 10 + [?] = 17



Paper Step: _____ [ ] SC-6 Ans: _____

4 Tier 1 • Builder

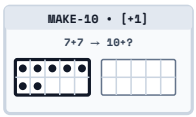
Add three numbers by making 10 first: 6 + 4 + 8 =



Paper Step: _____ [ ] SC-6 Ans: _____

5 Tier 1 • Builder

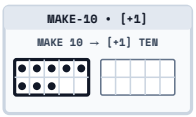
Add three numbers by making 10 first: 7 + 5 + 3 =



Paper Step: _____ [ ] SC-6 Ans: _____

6 Tier 1 • Builder

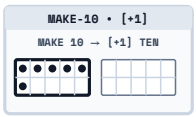
Bridge back through 10: 12 - 4 =



Paper Step: _____ [ ] SC-6 Ans: _____

7 Tier 1 • Builder

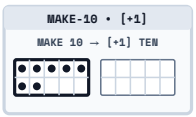
Bridge back through 10: 14 - 6 =



Paper Step: _____ [ ] SC-6 Ans: _____

8 Tier 1 • Builder

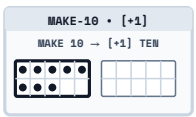
Bridge back through 10: 15 - 7 =



Paper Step: _____ [ ] SC-6 Ans: _____

9 Tier 1 • Builder

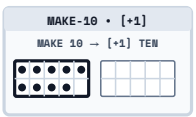
Bridge back through 10: 13 - 8 =



Paper Step: _____ [ ] SC-6 Ans: _____

10 Tier 1 • Builder

Bridge back through 10: 16 - 9 =



Paper Step: _____ [ ] SC-6 Ans: _____

Unit 03 Practice C — Real-World Regrouping Problems & Error Check

Name: _____ Date: _____ Score: _____ / 10

TIER 2 • LEVEL 2: STORY & DETECTIVE LAB • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE C (#1–#10) ON PAPER FIRST

EXAMPLE 1 A tray has 8 red marbles. Noah adds 6 blue marbles. How many Ten Rods and Ones?

8 + 6 = 14 → 1 full Ten Rod (10) and 4 leftover Ones.

Verified Answer: 14 (1 Ten, 4 Ones)

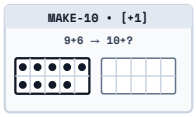
EXAMPLE 2 Spot the Mistake: Sam wrote that 15 is made of 1 + 5 = 6 blocks.

The 1 in 15 is in the Tens column (10), so 15 = 10 + 5, not 1 + 5!

Verified Answer: 10 + 5 = 15

1 Tier 2 • Detective

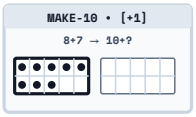
Elena picks 9 strawberries in Row A and 6 in Row B. How many in all?



Paper Step: _____ | | SC-6 Ans: _____

2 Tier 2 • Detective

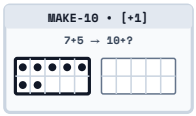
A bus has 8 passengers. At the next stop, 7 more get on. Total passengers?



Paper Step: _____ | | SC-6 Ans: _____

3 Tier 2 • Detective

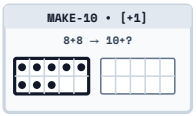
David has 7 gold stars on Monday and earns 5 more on Tuesday. Total stars?



Paper Step: _____ | | SC-6 Ans: _____

4 Tier 2 • Detective

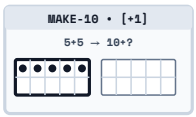
A baker packs 10 muffins in a full box and has 8 loose muffins. Total muffins?



Paper Step: _____ | | SC-6 Ans: _____

5 Tier 2 • Detective

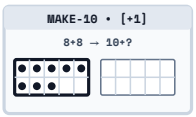
There are 14 ducks in a pond. 5 ducks fly away. How many ducks are left?



Paper Step: _____ | | SC-6 Ans: _____

6 Tier 2 • Detective

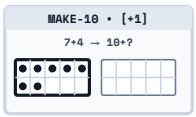
Maya has 16 beads and uses 8 beads to make a bracelet. How many beads remain?



Paper Step: _____ | | SC-6 Ans: _____

7 Tier 2 • Detective

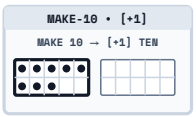
Three baskets hold 7, 4, and 3 pinecones. Pair the 10-partners first to find the total!



Paper Step: _____ | | SC-6 Ans: _____

8 Tier 2 • Detective

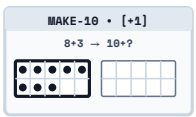
How many more ones do you need to add to 8 to reach 15?



Paper Step: _____ | | SC-6 Ans: _____

9 Tier 2 • Detective

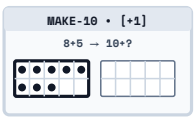
Place Value Check: What number has 1 Gold [+1] Ten Token and 3 Ones blocks?



Paper Step: _____ | | SC-6 Ans: _____

10 Tier 2 • Detective

Spot the Mistake: To solve 8 + 5, Leo split 5 into 2 + 3, got 10, and forgot the 3. Fix it!



Paper Step: _____ | | SC-6 Ans: _____

Unit 03 Practice D — Adding & Subtracting Within 20 by Bridging 10

Name: _____ Date: _____ Score: _____ / 10

TIER 2 • LEVEL 2: STORY & DETECTIVE LAB • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE D (#1–#10) ON PAPER FIRST

EXAMPLE 1 **Evaluate 14 - 5 by bridging through 10.**

14 - 4 = 10, then 10 - 1 = 9. Key: [14] [ENTER] [5] [-].

Verified Answer: 9

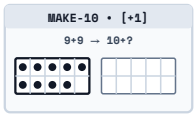
EXAMPLE 2 **Evaluate 7 + 8 + 3 by pairing 10-partners first.**

Pair 7 + 3 = 10 first, then 10 + 8 = 18!

Verified Answer: 18

1 Tier 2 • Detective

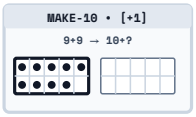
Make 10 to add: 9 + 5 =



Paper Step: _____ | | SC-6 Ans: _____

2 Tier 2 • Detective

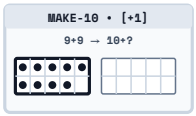
Make 10 to add: 9 + 8 =



Paper Step: _____ | | SC-6 Ans: _____

3 Tier 2 • Detective

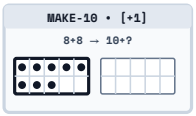
Make 10 to add: 9 + 9 =



Paper Step: _____ | | SC-6 Ans: _____

4 Tier 2 • Detective

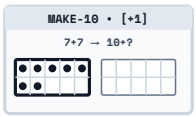
Make 10 to add: 8 + 3 =



Paper Step: _____ | | SC-6 Ans: _____

5 Tier 2 • Detective

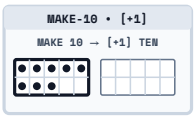
Make 10 to add: 7 + 6 =



Paper Step: _____ | | SC-6 Ans: _____

6 Tier 2 • Detective

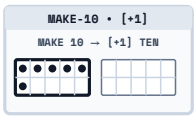
Bridge back through 10: 11 - 3 =



Paper Step: _____ | | SC-6 Ans: _____

7 Tier 2 • Detective

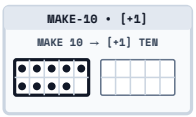
Bridge back through 10: 13 - 6 =



Paper Step: _____ | | SC-6 Ans: _____

8 Tier 2 • Detective

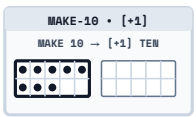
Bridge back through 10: 15 - 9 =



Paper Step: _____ | | SC-6 Ans: _____

9 Tier 2 • Detective

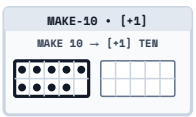
Bridge back through 10: 17 - 8 =



Paper Step: _____ | | SC-6 Ans: _____

10 Tier 2 • Detective

Bridge back through 10: 18 - 9 =



Paper Step: _____ | | SC-6 Ans: _____

Unit 03 Practice E — Adding to 20, Missing Teen Addends & Two-Digit Jumps

Name: _____ Date: _____ Score: _____ / 10

TIER 3 • LEVEL 3: BOSS CHALLENGE • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE E (#1–#10) ON PAPER FIRST

EXAMPLE 1 **Find the missing addend: 8 + [?] = 15.**

2 more makes 10, plus 5 more makes 15 → 2 + 5 = 7. Key: [15] [ENTER] [8] [-].

Verified Answer: 7

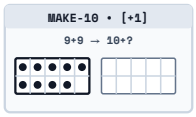
EXAMPLE 2 **Add across the next ten: 18 + 5.**

18 + 2 = 20 (2 Tens), plus 3 = 23.

Verified Answer: 23

1 Tier 3 • Challenge

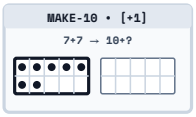
Missing addend across 10: 9 + [?] = 16



Paper Step: _____ [ ] SC-6 Ans: _____

2 Tier 3 • Challenge

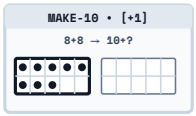
Missing addend across 10: 7 + [?] = 14



Paper Step: _____ [ ] SC-6 Ans: _____

3 Tier 3 • Challenge

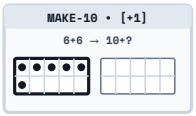
Missing addend across 10: 8 + [?] = 17



Paper Step: _____ [ ] SC-6 Ans: _____

4 Tier 3 • Challenge

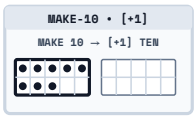
Missing addend across 10: 6 + [?] = 13



Paper Step: _____ [ ] SC-6 Ans: _____

5 Tier 3 • Challenge

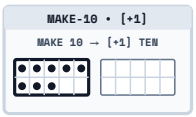
Complement to 20: 14 + [?] = 20



Paper Step: _____ [ ] SC-6 Ans: _____

6 Tier 3 • Challenge

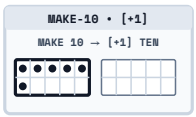
Complement to 20: 17 + [?] = 20



Paper Step: _____ [ ] SC-6 Ans: _____

7 Tier 3 • Challenge

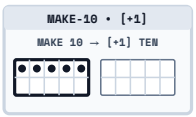
Bridge across 20: 18 + 6 =



Paper Step: _____ [ ] SC-6 Ans: _____

8 Tier 3 • Challenge

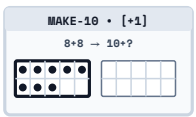
Bridge across 20: 19 + 5 =



Paper Step: _____ [ ] SC-6 Ans: _____

9 Tier 3 • Challenge

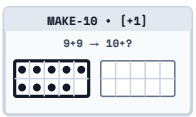
Pair 10-partners first: 8 + 6 + 2 =



Paper Step: _____ [ ] SC-6 Ans: _____

10 Tier 3 • Challenge

Pair 10-partners first: 9 + 7 + 1 =



Paper Step: _____ [ ] SC-6 Ans: _____

Unit 03 Practice F — Two-Digit Regrouping Within 50 & Carry Token Mastery

Name: _____ Date: _____ Score: _____ / 10

TIER 3 • LEVEL 3: BOSS CHALLENGE • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE F (#1–#10) ON PAPER FIRST

EXAMPLE 1 **Evaluate 28 + 7 using a Gold [+1] Carry Token.**

8 + 7 = 15 → trade 10 ones for [+1] Ten → 2 Tens + 1 Ten + 5 Ones = 35.

Verified Answer: 35

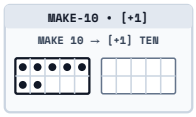
EXAMPLE 2 **Evaluate 32 - 5 by ungrouping 1 Ten.**

Borrow 1 Ten from 30 → 20 + (12 - 5) = 27. Key: [32] [ENTER] [5] [-].

Verified Answer: 27

1 Tier 3 • Challenge

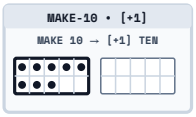
Add across 20: 16 + 7 =



Paper Step: _____ [ ] SC-6 Ans: _____

2 Tier 3 • Challenge

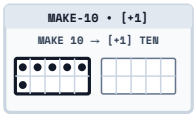
Add across 20: 17 + 8 =



Paper Step: _____ [ ] SC-6 Ans: _____

3 Tier 3 • Challenge

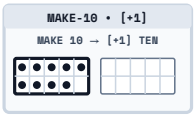
Add across 30: 28 + 6 =



Paper Step: _____ [ ] SC-6 Ans: _____

4 Tier 3 • Challenge

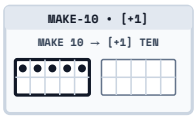
Add across 30: 25 + 9 =



Paper Step: _____ [ ] SC-6 Ans: _____

5 Tier 3 • Challenge

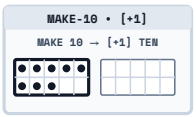
Subtract across 20: 22 - 5 =



Paper Step: _____ [ ] SC-6 Ans: _____

6 Tier 3 • Challenge

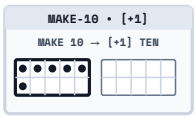
Subtract across 20: 24 - 8 =



Paper Step: _____ [ ] SC-6 Ans: _____

7 Tier 3 • Challenge

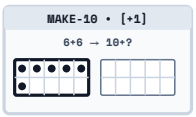
Subtract across 30: 31 - 6 =



Paper Step: _____ [ ] SC-6 Ans: _____

8 Tier 3 • Challenge

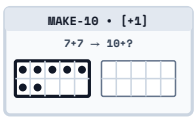
Three-addend Make-10: 6 + 9 + 4 =



Paper Step: _____ [ ] SC-6 Ans: _____

9 Tier 3 • Challenge

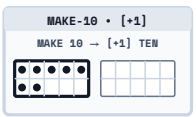
Three-addend Make-10: 7 + 8 + 3 + 2 =



Paper Step: _____ [ ] SC-6 Ans: _____

10 Tier 3 • Challenge

Make-10 Transfer Puzzle: Tray A has 18 blocks. Add 7 blocks with a [+1] Carry Token, then remove 6. How many remain?



Paper Step: _____ [ ] SC-6 Ans: _____

Unit 03 Mastery Check: Ten-Frames & Regrouping Foundations

Name: _____ Date: _____ Score: _____ / 100

100-POINT UNIT MASTERY ASSESSMENT — 10 UNSCAFFOLDED PROBLEMS (10 POINTS EACH)

Solve each problem on paper first in the dot-grid workspace. Write your final answer on the line, then verify your result on the SC-6 stack. Record your total score in Appendix B (Score Tracker) and verify complete worked keystrokes online at stackcalc.io/curriculum/answers.

1 Core Fluency • 10 pts

Make 10 with a [+1] Carry Token: 8 + 5 =

[ ] +10 pts [ ] SC-6 **Ans:** _____

2 Core Fluency • 10 pts

Make 10 on the Ten-Frame: 9 + 6 =

[ ] +10 pts [ ] SC-6 **Ans:** _____

3 Core Fluency • 10 pts

Split to fill the Ten-Frame: 7 + 6 =

[ ] +10 pts [ ] SC-6 **Ans:** _____

4 Core Fluency • 10 pts

Compose 1 Ten and 8 Ones: 10 + 8 =

[ ] +10 pts [ ] SC-6 **Ans:** _____

5 Core Fluency • 10 pts

Bridge back through 10: 14 - 5 =

[ ] +10 pts [ ] SC-6 **Ans:** _____

6 Core Fluency • 10 pts

Unbundle 1 Ten to subtract: 15 - 8 =

[ ] +10 pts [ ] SC-6 **Ans:** _____

7 Application • 10 pts

A shelf holds 9 science books and 8 history books. How many books in all?

[ ] +10 pts [ ] SC-6 **Ans:** _____

8 Application • 10 pts

Liam has 13 apple slices and eats 6 of them. How many slices are left?

[ ] +10 pts [ ] SC-6 **Ans:** _____

9 Application • 10 pts

Find the sum by pairing the 10-bond first: 8 + 7 + 2 =

[ ] +10 pts [ ] SC-6 **Ans:** _____

10 Error Analysis • 10 pts

Error Analysis: Mia says the '1' in 16 means 1 One. What does the '1' actually represent?

[ ] +10 pts [ ] SC-6 **Ans:** _____

Unit 03 STEM: The Farm Fresh Egg Carton Packaging

Name: _____ Date: _____ Score: _____ / 4

REAL-WORLD STEM APPLICATION & WORKSHOP: THE FARM FRESH EGG CARTON PACKAGING

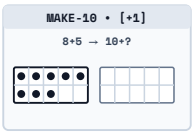
A poultry farm packages organic eggs into cartons of 10. When a carton fills, workers close the lid and pack a new carton.

Companion Book (Vol. I: From Blocks to the Stack (SC-6 Manual) — Ch. 3: Making a Ten First & Trading 10 Ones ([⊠])) • Ten Fingers & Bridging the 5-Rib Ten-Frame: Humans count in base-10 because of our 10 fingers! When the 10-socket frame fills up, we snap a Gold [+1] Carry Token into Tens and start a fresh frame.

Block Studio: Place Value Studio (Ten-Frame Trays & Gold [+1] Carry Tokens) • Stack Shortcut: [8] [ENTER] [2] [+] = 10, then [3] [+] = 13

CASE INVESTIGATION 1 STEM Modeling

A basket has 8 brown eggs and 5 white eggs. How many full 10-cartons and loose eggs?



1. Draw or Count Blocks: _____

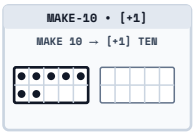
2. My Number Sentence: _____

3. My Answer: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)

CASE INVESTIGATION 2 STEM Modeling

A carton has 7 eggs. How many more eggs are needed to fill the 10-frame carton?



1. Draw or Count Blocks: _____

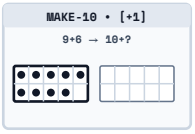
2. My Number Sentence: _____

3. My Answer: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)

CASE INVESTIGATION 3 Applied Calculation

Two nests have 9 eggs and 6 eggs. What is the total egg harvest?



1. Draw or Count Blocks: _____

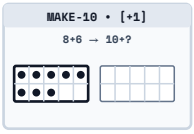
2. My Number Sentence: _____

3. My Answer: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)

CASE INVESTIGATION 4 Error Analysis Workshop

Error Analysis: A student writes 8 + 6 = 15. Count the dots to find the true sum.



1. Draw or Count Blocks: _____

2. My Number Sentence: _____

3. My Answer: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)

Hands-On Math Explorers & Builders Note

Young builders, chefs, and nature explorers use physical blocks and paper math to solve real-world mysteries! Always build or write your paper setup first, write your number sentence, and check on your SC-6. Parents & teachers: full keys at stackcalc.io/curriculum/answers.

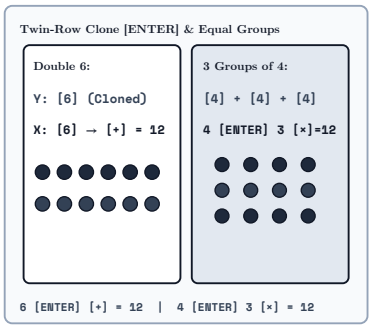
Doubles, Near-Doubles & Addition Facts within 20

Hands-On Block Studio: Place Value Studio (Twin-Row Doubling Mat & Digit Blocks) • Standards: CCSS.MATH.1.OA.C.6, CCSS.MATH.2.OA.B.2

1. MATHEMATICAL CONCEPT & INSIDE-OUT APPROACH (Twin-Row Doubles: Adding Two Equal Groups):

Doubling a quantity means adding two identical copies of the same number ($n + n = 2n$). Seeing matching quantities in the top and bottom rows of the tray anchors mental doubles facts.

Companion Book (Vol. I: From Blocks to the Stack (SC-6 Manual) — Ch. 2: Stacking Numbers Just Like Blocks ([ENTER] Doubling)) • Young Carl Friedrich Gauss & Twin-Row Symmetry: In 1784, 7-year-old Gauss paired numbers into symmetric twin rows—and on the SC-6, pressing [ENTER] [+] clones Row 0 onto Row 1 to double in two clicks!



2. HANDS-ON BLOCKS & CONCEPT RULES: DOUBLES & NEAR-DOUBLES ON THE WAITING SHELF

- Doubling means adding a quantity to itself: $6 + 6 = 12$, $7 + 7 = 14$, $8 + 8 = 16$.
- Use doubles to solve near-doubles: $7 + 8$ is just $(7 + 7) + 1 = 14 + 1 = 15$.
- On the SC-6, press [7] [ENTER] [+] to double instantly without retyping digits!
- Chained addition lifts earlier sums up the stack: [4] [ENTER] [6] [+] [5] [+] = 15.

3. STEP-BY-STEP VERIFICATION WALKTHROUGH ON THE SC-6

Hands-On Block Setup: Place a [6] Digit Block in Row 1 (top) and a matching [6] Digit Block in Row 0 (bottom) of the Ones column on the Place Value Tray. Question: Observe the matching rows: $6 + 6 = 12$ (1 Ten and 2 Ones on the tray).

Verification Keystrokes: [6] [ENTER] [+]

Button Pressed	Screen (X)	How the 4-Level Stack Mirrors Your Mathematical Steps (T, Z, Y, X)
[6]	6	Top row quantity (6) enters register X
[ENTER]	6	ENTER duplicates 6 into register Y! Both rows now on stack
[+]	12	Plus combines top and bottom rows: $6 + 6 = 12$!

3. 3D BLOCK STUDIO & SC-6 STACK LEARNING GUIDE & SELF-CHECK

- Physical Block Studio Rule: Doubling means adding a quantity to itself: $6 + 6 = 12$, $7 + 7 = 14$, $8 + 8 = 16$.
- Stack Shortcut & Pattern: [7] [ENTER] [+] = 14 (Instant Doubling Shortcut) — Chained addition lifts earlier sums up the stack: [4] [ENTER] [6] [+] [5] [+] = 15.
- 2-Second Tray-to-Screen Audit: Confirm your physical 3D Block Studio setup matches Register Y (Waiting Shelf) and Register X (Workbench) before pressing the operator key.

WARM-UP CHECK A: SOLVE ON PAPER FIRST, THEN VERIFY ON YOUR CALCULATOR!

Core Investigation: Place [7] in both rows of your Place Value Tray to build a twin-row double. What is the sum of two 7*s*?

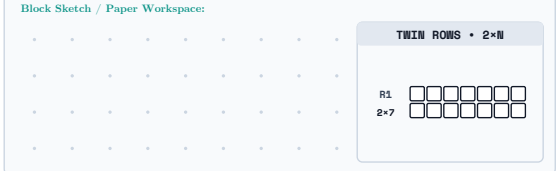
1. First Quantity / Inner Step: _____

2. Second Quantity / Operation: _____

3. My Paper Prediction: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)

Block Sketch / Paper Workspace:



Extension: Near-Doubles: Doubles Plus One

Deepening Concepts • Standards: CCSS.MATH.2.OA.B.2

1. EXTENSION CONCEPT & SETUP (Near-Doubles: Doubles Plus One):

A near-double (such as 7 + 8) is a double plus or minus 1 ((7 + 7) + 1). Evaluating the known double first (14) makes adding the remaining +1 effortless.

Hands-On Extension Setup: Place [7] in Row 1 (top) and [8] in Row 0 (bottom) of the Place Value Tray. • Question: 7 and 8 is double 7 plus 1 more: 14 + 1 = 15.

2. EXTENSION STACK SEQUENCE (SC-6): 7 ENTER + 1 +

Button Pressed	Screen (X)	Extension Stack Dynamics (T, Z, Y, X)
7	7	Enter base number 7
ENTER	7	Duplicate 7
+	14	Double: 7 + 7 = 14
1	1	Near-double difference (1)
+	15	14 + 1 = 15!

3. PARENT & TEACHER COACHING: TARGET MISCONCEPTIONS & 3D BLOCK STUDIO REMEDIATIONS

Misconception 1 — Retyping the Addend When Doubling: Typing 7 [ENTER] 7 [+] instead of 7 [ENTER] [+].

Hands-On Block Studio Remediation: Show how [ENTER] duplicates Register X into Register Y so both twin rows hold 7.

Misconception 2 — Adjusting in the Wrong Direction on Near-Doubles: Computing 7 + 6 as (7 + 7) + 1 = 15 instead of (7 + 7) − 1 = 13.

Hands-On Block Studio Remediation: Place twin rows of 7 on the mat and remove 1 unit block from Row 0.

4. STACK SHORTCUT & PARTNER EXPLAIN-WHY CHALLENGE (SC-6)

Calculator Shortcut: [7] [ENTER] [+] = 14 (Instant Doubling Shortcut)

Explain-Why Reflection: How do your Place Value, Fraction, or Prime blocks prove why Misconception 1 is wrong?

WARM-UP CHECK B (EXTENSION): SOLVE ON PAPER FIRST, THEN VERIFY ON YOUR CALCULATOR!

Extension Challenge: Use the known double 6 + 6 to solve the near-double 6 + 7.

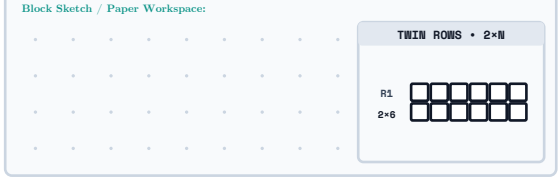
1. First Quantity / Inner Step: _____

2. Second Quantity / Operation: _____

3. My Paper Prediction: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)

Block Sketch / Paper Workspace:



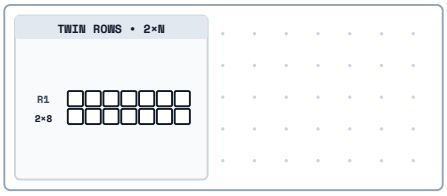
Unit 04 Lab: Doubles, Near-Doubles & Addition Facts within 20

Name: _____ Date: _____ Score: _____ / 4

DIRECTIONS: (1) Build with your Place Value blocks & draw in Box 1. (2) Write the two quantities & math in Box 2.
(3) Write your Prediction BEFORE pressing keys, then check with your partner or teacher on the SC-6!

Investigation 1: Two matching rows on the Place Value Tray each hold 8. What is double 8?

1. Draw Your Blocks on the Tray:



2. Number Bond & Two Quantities:

First Quantity (Top Row):

Second Quantity (Bottom Row):

Combine (+, –, or ×):

3. My Prediction:

Final Verified Answer:

[ ] Verified on SC-6 Stack

Investigation 2: Use the double 8 + 8 to solve the near-double 8 + 9.

1. Draw Your Blocks on the Tray:



2. Number Bond & Two Quantities:

First Quantity (Top Row):

Second Quantity (Bottom Row):

Combine (+, –, or ×):

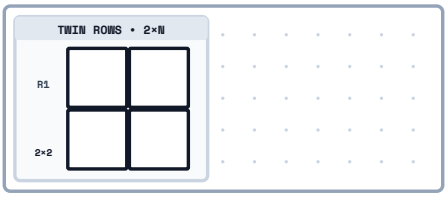
3. My Prediction:

Final Verified Answer:

[ ] Verified on SC-6 Stack

Investigation 3: A carton has two equal rows of 9 eggs. How many eggs are in the carton?

1. Draw Your Blocks on the Tray:



2. Number Bond & Two Quantities:

First Quantity (Top Row):

Second Quantity (Bottom Row):

Combine (+, –, or ×):

3. My Prediction:

Final Verified Answer:

[ ] Verified on SC-6 Stack

Investigation 4: Use the double 5 + 5 to solve the near-double 5 + 6.

1. Draw Your Blocks on the Tray:



2. Number Bond & Two Quantities:

First Quantity (Top Row):

Second Quantity (Bottom Row):

Combine (+, –, or ×):

3. My Prediction:

Final Verified Answer:

[ ] Verified on SC-6 Stack

MY LAB REFLECTION: Draw or tell how your Place Value blocks matched the numbers on your SC-6 screen!

Unit 04 Practice A — Twin-Row Doubles & Near-Doubles (+1 / -1)

Name: _____ Date: _____ Score: _____ / 10

TIER 1 • LEVEL 1: BUILDER FOUNDATION • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE A (#1–#10) ON PAPER FIRST

EXAMPLE 1 **Clone 7 on the Twin-Row Tray: 7 + 7.**

Row 1 = 7, Row 0 = 7 → 7 + 7 = 14. Key: [7] [ENTER] [+].

Verified Answer: 14

EXAMPLE 2 **Use a Double to solve the Near-Double 7 + 8.**

Think 7 + 7 = 14, plus 1 more = 15. Key: [7] [ENTER] [+] [1] [+].

Verified Answer: 15

1 Tier 1 • Builder

Twin-Row Double: 4 + 4 =



Paper Step: _____ [ ] SC-6 Ans: _____

2 Tier 1 • Builder

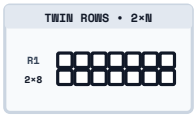
Twin-Row Double: 6 + 6 =



Paper Step: _____ [ ] SC-6 Ans: _____

3 Tier 1 • Builder

Twin-Row Double: 8 + 8 =



Paper Step: _____ [ ] SC-6 Ans: _____

4 Tier 1 • Builder

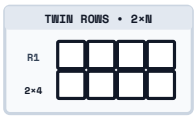
Twin-Row Double: 9 + 9 =



Paper Step: _____ [ ] SC-6 Ans: _____

5 Tier 1 • Builder

Twin-Row Double: 12 + 12 =



Paper Step: _____ [ ] SC-6 Ans: _____

6 Tier 1 • Builder

Near-Double (Double + 1): 5 + 6 =



Paper Step: _____ [ ] SC-6 Ans: _____

7 Tier 1 • Builder

Near-Double (Double + 1): 6 + 7 =



Paper Step: _____ [ ] SC-6 Ans: _____

8 Tier 1 • Builder

Near-Double (Double + 1): 8 + 9 =



Paper Step: _____ [ ] SC-6 Ans: _____

9 Tier 1 • Builder

Near-Double (Double - 1): 7 + 6 =



Paper Step: _____ [ ] SC-6 Ans: _____

10 Tier 1 • Builder

Near-Double (Double + 2): 6 + 8 =



Paper Step: _____ [ ] SC-6 Ans: _____

Unit 04 Practice B — Hidden Doubles (Compensation +2) & Halving Twin Rows

Name: _____ Date: _____ Score: _____ / 10

TIER 1 • LEVEL 1: BUILDER FOUNDATION • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE B (#1–#10) ON PAPER FIRST

EXAMPLE 1 **Slide 1 block from 8 to 6 on the Twin-Row Tray: 6 + 8.**

Moving 1 block turns 6 + 8 into the hidden double 7 + 7 = 14!

Verified Answer: 14

EXAMPLE 2 **Split 16 blocks into two equal Twin-Row halves: 16 - 8.**

Since 8 + 8 = 16, removing one row of 8 leaves the matching half 8!

Verified Answer: 8

1 Tier 1 • Builder

Hidden Double (slide 1 block to make 4 + 4): 3 + 5 =



Paper Step: _____ [ ] SC-6 Ans: _____

2 Tier 1 • Builder

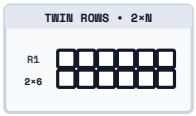
Hidden Double (slide 1 block to make 5 + 5): 4 + 6 =



Paper Step: _____ [ ] SC-6 Ans: _____

3 Tier 1 • Builder

Hidden Double (slide 1 block to make 6 + 6): 5 + 7 =



Paper Step: _____ [ ] SC-6 Ans: _____

4 Tier 1 • Builder

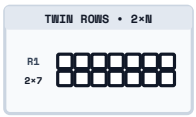
Hidden Double (slide 1 block to make 7 + 7): 6 + 8 =



Paper Step: _____ [ ] SC-6 Ans: _____

5 Tier 1 • Builder

Hidden Double (slide 1 block to make 8 + 8): 7 + 9 =



Paper Step: _____ [ ] SC-6 Ans: _____

6 Tier 1 • Builder

Halve the Twin-Row Double (10 = 5 + 5): 10 - 5 =



Paper Step: _____ [ ] SC-6 Ans: _____

7 Tier 1 • Builder

Halve the Twin-Row Double (12 = 6 + 6): 12 - 6 =



Paper Step: _____ [ ] SC-6 Ans: _____

8 Tier 1 • Builder

Halve the Twin-Row Double (14 = 7 + 7): 14 - 7 =



Paper Step: _____ [ ] SC-6 Ans: _____

9 Tier 1 • Builder

Halve the Twin-Row Double (16 = 8 + 8): 16 - 8 =



Paper Step: _____ [ ] SC-6 Ans: _____

10 Tier 1 • Builder

Halve the Twin-Row Double (18 = 9 + 9): 18 - 9 =



Paper Step: _____ [ ] SC-6 Ans: _____

Unit 04 Practice C — Real-World Twin-Row Doubles & Near-Doubles Word Problems

Name: _____ Date: _____ Score: _____ / 10

TIER 2 • LEVEL 2: STORY & DETECTIVE LAB • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE C (#1–#10) ON PAPER FIRST

EXAMPLE 1 An egg carton has 2 matching rows of 6 eggs. How many eggs in all?

Double 6 on the Twin-Row Tray: 6 + 6 = 12 eggs. Key: [6] [ENTER] [+].

Verified Answer: 12 eggs

EXAMPLE 2 Spot the Mistake: For 7 + 8, Noah doubled 8 to get 16 and added 1 more to get 17.

7 + 8 is 1 LESS than 8 + 8 (or 1 MORE than 7 + 7): 15, not 17!

Verified Answer: 15

1 Tier 2 • Detective

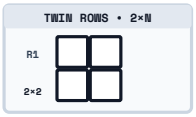
A spider has 4 legs on its left side and 4 legs on its right side. Total legs?



Paper Step: _____ [ ] SC-6 Ans: _____

2 Tier 2 • Detective

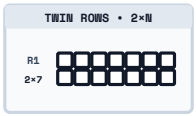
Two baking trays each hold 9 cupcakes. How many cupcakes are there altogether?



Paper Step: _____ [ ] SC-6 Ans: _____

3 Tier 2 • Detective

Ava scored 8 points in Game 1 and 9 points in Game 2. Total points?



Paper Step: _____ [ ] SC-6 Ans: _____

4 Tier 2 • Detective

A paint box has 7 warm colors in Row 1 and 7 cool colors in Row 0. Total colors?



Paper Step: _____ [ ] SC-6 Ans: _____

5 Tier 2 • Detective

5 red bicycles sit in Row 1 and 6 blue bicycles sit in Row 0. Total bicycles?



Paper Step: _____ [ ] SC-6 Ans: _____

6 Tier 2 • Detective

Mia found 6 shells in the morning and 7 shells in the afternoon. Total shells?



Paper Step: _____ [ ] SC-6 Ans: _____

7 Tier 2 • Detective

Two branches hold 6 birds and 8 birds. Slide 1 bird over to make a double! Total?



Paper Step: _____ [ ] SC-6 Ans: _____

8 Tier 2 • Detective

A twin-row LEGO brick has 8 studs on the left and 8 studs on the right. Total studs?



Paper Step: _____ [ ] SC-6 Ans: _____

9 Tier 2 • Detective

14 socks are sorted into 2 equal piles (left feet and right feet). How many pairs?



Paper Step: _____ [ ] SC-6 Ans: _____

10 Tier 2 • Detective

Spot the Mistake: Lily solved 8 + 9 by doubling 8 to get 16 and subtracting 1 to get 15. Find 8 + 9!



Paper Step: _____ [ ] SC-6 Ans: _____

Unit 04 Practice D — Two-Digit Twin-Row Doubles & Even/Odd Symmetry

Name: _____ Date: _____ Score: _____ / 10

TIER 2 • LEVEL 2: STORY & DETECTIVE LAB • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE D (#1–#10) ON PAPER FIRST

EXAMPLE 1 **Double 15 on the stack: 15 + 15.**

10 + 10 = 20, 5 + 5 = 10 → 20 + 10 = 30. Key: [15] [ENTER] [+].

Verified Answer: 30

EXAMPLE 2 **Split 20 blocks equally into 2 matching Twin Rows: 20 - 10.**

Since 10 + 10 = 20, each row holds 10 blocks!

Verified Answer: 10

1 Tier 2 • Detective

Two-digit double: 10 + 10 =



Paper Step: _____ [ ] SC-6 Ans: _____

2 Tier 2 • Detective

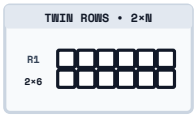
Two-digit double: 11 + 11 =



Paper Step: _____ [ ] SC-6 Ans: _____

3 Tier 2 • Detective

Two-digit double: 13 + 13 =



Paper Step: _____ [ ] SC-6 Ans: _____

4 Tier 2 • Detective

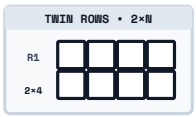
Two-digit double: 14 + 14 =



Paper Step: _____ [ ] SC-6 Ans: _____

5 Tier 2 • Detective

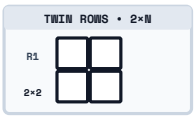
Two-digit double: 15 + 15 =



Paper Step: _____ [ ] SC-6 Ans: _____

6 Tier 2 • Detective

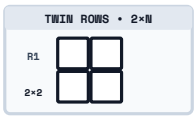
Halve the even number: 12 ÷ 2 =



Paper Step: _____ [ ] SC-6 Ans: _____

7 Tier 2 • Detective

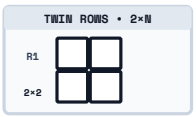
Halve the even number: 16 ÷ 2 =



Paper Step: _____ [ ] SC-6 Ans: _____

8 Tier 2 • Detective

Halve the even number: 20 ÷ 2 =



Paper Step: _____ [ ] SC-6 Ans: _____

9 Tier 2 • Detective

Near-Double with Tens: 10 + 11 =



Paper Step: _____ [ ] SC-6 Ans: _____

10 Tier 2 • Detective

Near-Double with Tens: 12 + 13 =



Paper Step: _____ [ ] SC-6 Ans: _____

Unit 04 Practice E — Three-Addend Doubles Chains & Twin-Row Balance Equations

Name: _____ Date: _____ Score: _____ / 10

TIER 3 • LEVEL 3: BOSS CHALLENGE • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE E (#1–#10) ON PAPER FIRST

EXAMPLE 1 **Spot the double inside 6 + 6 + 5 on the stack.**

Double 6 first: 6 + 6 = 12, then add 5 = 17. Key: [6] [ENTER] [+] [5] [+].

Verified Answer: 17

EXAMPLE 2 **Balance the Twin-Row scale: 7 + 7 = 6 + [?].**

Left side is 7 + 7 = 14. Subtract 6 from 14 → 8!

Verified Answer: 8

1 Tier 3 • Challenge

Double plus extra: 5 + 5 + 4 =



Paper Step: _____ [ ] SC-6 Ans: _____

2 Tier 3 • Challenge

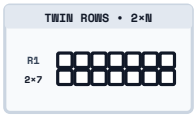
Double plus extra: 6 + 6 + 3 =



Paper Step: _____ [ ] SC-6 Ans: _____

3 Tier 3 • Challenge

Double plus extra: 7 + 7 + 5 =



Paper Step: _____ [ ] SC-6 Ans: _____

4 Tier 3 • Challenge

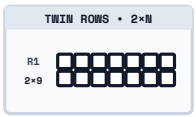
Double plus extra: 8 + 8 + 4 =



Paper Step: _____ [ ] SC-6 Ans: _____

5 Tier 3 • Challenge

Double minus removed blocks: 9 + 9 - 5 =



Paper Step: _____ [ ] SC-6 Ans: _____

6 Tier 3 • Challenge

Balance the Twin-Row scale: 6 + 6 = 5 + [?]



Paper Step: _____ [ ] SC-6 Ans: _____

7 Tier 3 • Challenge

Balance the Twin-Row scale: 8 + 8 = 9 + [?]



Paper Step: _____ [ ] SC-6 Ans: _____

8 Tier 3 • Challenge

Balance the Twin-Row scale: 7 + 8 = 10 + [?]



Paper Step: _____ [ ] SC-6 Ans: _____

9 Tier 3 • Challenge

Balance the Twin-Row scale: 9 + 9 = 10 + [?]



Paper Step: _____ [ ] SC-6 Ans: _____

10 Tier 3 • Challenge

Two-branch doubles sum: (4 + 4) + (5 + 5) =



Paper Step: _____ [ ] SC-6 Ans: _____

Unit 04 Practice F — Young Gauss Rainbow Pairing, Double-Doubles & Mastery

Name: _____ Date: _____ Score: _____ / 10

TIER 3 • LEVEL 3: BOSS CHALLENGE • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE F (#1–#10) ON PAPER FIRST

EXAMPLE 1 **Young Gauss Rainbow Pairing: Add 1 + 2 + 3 + 4 + 5 + 6.**

Pair outside-in: (1+6) + (2+5) + (3+4) = 7 + 7 + 7 = 21!

Verified Answer: 21

EXAMPLE 2 **Double a number twice on the stack: Start with 4, press [ENTER] [+] twice.**

4 + 4 = 8, then 8 + 8 = 16! Key: [4] [ENTER] [+] [ENTER] [+].

Verified Answer: 16

1 Tier 3 • Challenge

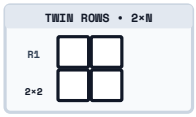
Double twice on the stack (3 → 6 → 12): 3 + 3 + 6 =



Paper Step: _____ [ ] SC-6 Ans: _____

2 Tier 3 • Challenge

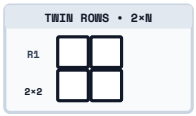
Double twice on the stack (4 → 8 → 16): 4 + 4 + 8 =



Paper Step: _____ [ ] SC-6 Ans: _____

3 Tier 3 • Challenge

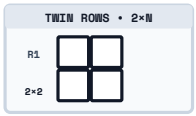
Double twice on the stack (5 → 10 → 20): 5 + 5 + 10 =



Paper Step: _____ [ ] SC-6 Ans: _____

4 Tier 3 • Challenge

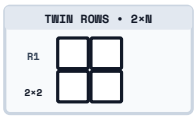
Young Gauss stair-step sum: 1 + 2 + 3 + 4 =



Paper Step: _____ [ ] SC-6 Ans: _____

5 Tier 3 • Challenge

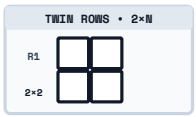
Young Gauss stair-step sum: 1 + 2 + 3 + 4 + 5 =



Paper Step: _____ [ ] SC-6 Ans: _____

6 Tier 3 • Challenge

Young Gauss even-stair sum: 2 + 4 + 6 + 8 =



Paper Step: _____ [ ] SC-6 Ans: _____

7 Tier 3 • Challenge

Difference of Twin-Row Doubles: (8 + 8) - (5 + 5) =



Paper Step: _____ [ ] SC-6 Ans: _____

8 Tier 3 • Challenge

Difference of Twin-Row Doubles: (9 + 9) - (6 + 6) =



Paper Step: _____ [ ] SC-6 Ans: _____

9 Tier 3 • Challenge

Three suitcases hold 6, 7, and 6 shirts. Spot the double first! Total shirts?



Paper Step: _____ [ ] SC-6 Ans: _____

10 Tier 3 • Challenge

Twin-Row Studio Challenge: Clone 8 on Row 1 and Row 0 ([8] [ENTER] [+]), then add 3 more blocks:



Paper Step: _____ [ ] SC-6 Ans: _____

Unit 04 Mastery Check: Addition Facts within 20 & The Waiting Shelf

Name: _____ Date: _____ Score: _____ / 100

100-POINT UNIT MASTERY ASSESSMENT — 10 UNSCAFFOLDED PROBLEMS (10 POINTS EACH)

Solve each problem on paper first in the dot-grid workspace. Write your final answer on the line, then verify your result on the SC-6 stack. Record your total score in Appendix B (Score Tracker) and verify complete worked keystrokes online at stackcalc.io/curriculum/answers.

1 Core Fluency • 10 pts

Clone on the Twin-Row Tray (Double): 8 + 8 =

[ ] +10 pts [ ] SC-6 Ans: _____

2 Core Fluency • 10 pts

Use Double + 1 (Near-Double): 7 + 8 =

[ ] +10 pts [ ] SC-6 Ans: _____

3 Core Fluency • 10 pts

Use Double + 1 (Near-Double): 8 + 9 =

[ ] +10 pts [ ] SC-6 Ans: _____

4 Core Fluency • 10 pts

Slide 1 block to make a Hidden Double: 6 + 8 =

[ ] +10 pts [ ] SC-6 Ans: _____

5 Core Fluency • 10 pts

Spot the double in the 3-addend chain: 6 + 6 + 5 =

[ ] +10 pts [ ] SC-6 Ans: _____

6 Core Fluency • 10 pts

Halve the Twin-Row Double: 18 - 9 =

[ ] +10 pts [ ] SC-6 Ans: _____

7 Application • 10 pts

A paint box has 2 matching rows of 7 watercolors. How many watercolors are in the box?

[ ] +10 pts [ ] SC-6 Ans: _____

8 Application • 10 pts

Leo read 7 pages on Monday and 8 pages on Tuesday. How many pages in all?

[ ] +10 pts [ ] SC-6 Ans: _____

9 Application • 10 pts

Young Gauss Pairing: Add the stair-step numbers 1 + 2 + 3 + 4 =

[ ] +10 pts [ ] SC-6 Ans: _____

10 Error Analysis • 10 pts

Error Analysis: Sam says 7 + 9 = 15. Slide 1 block from 9 to 7 to show the true Hidden Double!

[ ] +10 pts [ ] SC-6 Ans: _____

Unit 04 STEM: The School Bus Morning Seating Chart

Name: _____ Date: _____ Score: _____ / 4

REAL-WORLD STEM APPLICATION & WORKSHOP: THE SCHOOL BUS MORNING SEATING CHART

A school bus has two identical columns of seats. Children sit in pairs: one on the window side, one on the aisle side.

Companion Book (Vol. I: From Blocks to the Stack (SC-6 Manual) — Ch. 2: Stacking Numbers Just Like Blocks ([ENTER] Doubling)) • Young Carl Friedrich Gauss & Twin-Row Symmetry: In 1784, 7-year-old Gauss paired numbers into symmetric twin rows—and on the SC-6, pressing [ENTER] [+] clones Row 0 onto Row 1 to double in two clicks!

Block Studio: Place Value Studio (Twin-Row Doubling Mat & Digit Blocks) • Stack Shortcut: [7] [ENTER] [+] = 14 (Instant Doubling Shortcut)

CASE INVESTIGATION 1 STEM Modeling

Row 1 through 7 each have 2 students (7 on left, 7 on right). How many students total?



1. Draw or Count Blocks: _____

2. My Number Sentence: _____

3. My Answer: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)

CASE INVESTIGATION 2 STEM Modeling

8 students sit on the left and 9 on the right. Use near-doubles to find total passengers.



1. Draw or Count Blocks: _____

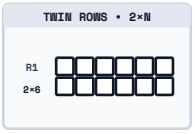
2. My Number Sentence: _____

3. My Answer: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)

CASE INVESTIGATION 3 Applied Calculation

6 boys and 6 girls sit in the front section. How many students in the front section?



1. Draw or Count Blocks: _____

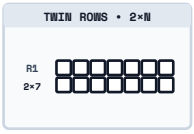
2. My Number Sentence: _____

3. My Answer: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)

CASE INVESTIGATION 4 Error Analysis Workshop

Error Analysis: Mia doubles 9 and gets 17. Use the stack to find double 9.



1. Draw or Count Blocks: _____

2. My Number Sentence: _____

3. My Answer: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)

Hands-On Math Explorers & Builders Note

Young builders, chefs, and nature explorers use physical blocks and paper math to solve real-world mysteries! Always build or write your paper setup first, write your number sentence, and check on your SC-6. Parents & teachers: full keys at stackcalc.io/curriculum/answers.

UNIT 05 CORE CONCEPT LAB (PAGE 1 OF 11) • GRADE 1 – 2 (SC-6)

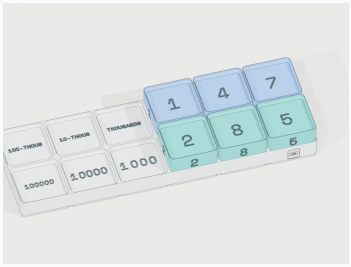
Two-Digit Place Value: Tens & Ones on the Place Value Tray

Hands-On Block Studio: Place Value Studio (6×2 Whole Number Tray & Digit Blocks 0–9) • Standards: CCSS.MATH.1.NBT.B.2, CCSS.MATH.2.NBT.A.1

1. MATHEMATICAL CONCEPT & INSIDE-OUT APPROACH (Building Tens and Ones on the Place Value Studio Tray):

Place value lets us combine like columns on the tray: Tens add to Tens, and Ones add to Ones.

Companion Book (Vol. I: From Blocks to the Stack (SC-6 Manual) — Ch. 3: Ten-Frames, Number Lines & Place Value ([PV])) • Al-Khwarizmi's Positional Columns & Bundling Tens: In 820 CE, Al-Khwarizmi showed that ten Digit Blocks (0–9) can write any number when each socket to the left is worth 10 times more!



Place Value Studio • Two-Row Tens & Ones Tray

2. HANDS-ON BLOCKS & CONCEPT RULES: BUILDING TWO-DIGIT NUMBERS ON THE PLACE VALUE TRAY

- The Tens socket holds groups of 10; the Ones socket holds single units (Digit Blocks 0–9).
- Placing [3] in Tens and [4] in Ones builds 34 on the tray: 30 + 4 = 34.
- Adding 10 steps the Tens Digit Block up by 1 without changing the Ones: 34 + 10 = 44.
- On the SC-6, Row 1 of your tray is Waiting Shelf Y and Row 0 is Workbench X.

3. STEP-BY-STEP VERIFICATION WALKTHROUGH ON THE SC-6

Hands-On Block Setup: Place the [3] Digit Block in the Tens socket and [4] in the Ones socket of Row 1 (Line $Y = 34$). Place [2] in Tens and [0] in Ones of Row 0 (Line $X = 20$). Question: Combine the Tens column ([3] + [2] = [5]) and Ones column ([4] + [0] = [4]). What 2-digit number is formed? (Prediction: 54)

Verification Keystrokes: `3` `4` `ENTER` `2` `0` `+`

Button Pressed	Screen (X)	How the 4-Level Stack Mirrors Your Mathematical Steps (T, Z, Y, X)
`3` `4`	34	3 tens and 4 ones enter Register X
`ENTER`	34	34 lifts to Waiting Shelf Register Y (Row 1)
`2` `0`	20	2 tens (20) enter Workbench Register X (Row 0)
`+`	54	34 + 20 = 54! Tens combine: 3 + 2 = 5 tens

3. 3D BLOCK STUDIO & SC-6 STACK LEARNING GUIDE & SELF-CHECK

- Physical Block Studio Rule: The Tens socket holds groups of 10; the Ones socket holds single units (Digit Blocks 0–9).
- Stack Shortcut & Pattern: [3] [4] [ENTER] [2] [0] [+] = 54 — On the SC-6, Row 1 of your tray is Waiting Shelf Y and Row 0 is Workbench X.
- 2-Second Tray-to-Screen Audit: Confirm your physical 3D Block Studio setup matches Register Y (Waiting Shelf) and Register X (Workbench) before pressing the operator key.

WARM-UP CHECK A: SOLVE ON PAPER FIRST, THEN VERIFY ON YOUR CALCULATOR!

Core Investigation: Build 47 on your Place Value Tray. Add 30. What is the sum?

1. First Quantity / Inner Step: _____

2. Second Quantity / Operation: _____

3. My Paper Prediction: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)

Block Sketch / Paper Workspace:



Extension: Subtracting Multiples of 10 on the Place Value Tray

Deepening Concepts • Standards: CCSS.MATH.1.NBT.C.6

1. EXTENSION CONCEPT & SETUP (Subtracting Multiples of 10 on the Place Value Tray):

Subtracting multiples of 10 only changes the Digit Block in the Tens socket; the Ones socket remains unchanged.

Hands-On Extension Setup: Place [6] in Tens and [5] in Ones (65) on Row 1 (Waiting Shelf Y), and [2][0] (20) on Row 0 (Workbench X) of the Place Value Tray. • Question: Subtract the Tens column ([6] − [2] = [4]) while Ones stays [5]. What number remains? (Prediction: 45)

2. EXTENSION STACK SEQUENCE (SC-6): 6 5 ENTER 2 0 -

Button Pressed	Screen (X)	Extension Stack Dynamics (T, Z, Y, X)
6 5	65	65 enters Register X
ENTER	65	65 lifts to Waiting Shelf Register Y (Row 1)
2 0	20	20 enters Workbench Register X (Row 0)
-	45	65 − 20 = 45! 6 tens − 2 tens = 4 tens

3. PARENT & TEACHER COACHING: TARGET MISCONCEPTIONS & 3D BLOCK STUDIO REMEDIATIONS

Misconception 1 — Reversing Tens and Ones Digits: Students write 43 instead of 34.

Hands-On Block Studio Remediation: Point to the engraved column headers on the Place Value Tray—TENS (10) is always left of ONES (1).

Misconception 2 — Adding Tens to the Ones Socket: Students add 20 to 34 and get 36.

Hands-On Block Studio Remediation: Place [2][0] in Row 0 below [3][4] in Row 1 so [2] aligns directly under the Tens socket [3].

4. STACK SHORTCUT & PARTNER EXPLAIN-WHY CHALLENGE (SC-6)

Calculator Shortcut: [3] [4] [ENTER] [2] [0] [+] = 54

Explain-Why Reflection: How do your Place Value, Fraction, or Prime blocks prove why Misconception 1 is wrong?

WARM-UP CHECK B (EXTENSION): SOLVE ON PAPER FIRST, THEN VERIFY ON YOUR CALCULATOR!

Extension Challenge: Start with 82 on your Place Value Tray. Subtract 40. What number remains?

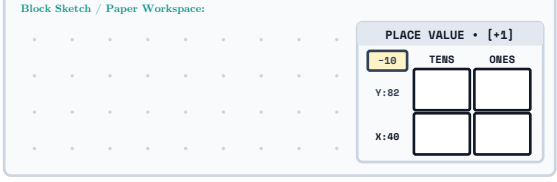
1. First Quantity / Inner Step: _____

2. Second Quantity / Operation: _____

3. My Paper Prediction: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)

Block Sketch / Paper Workspace:



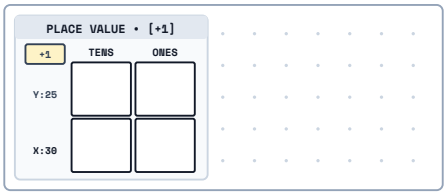
Unit 05 Lab: Two-Digit Place Value: Tens & Ones on the Place Value Tray

Name: _____ Date: _____ Score: _____ / 4

DIRECTIONS: (1) Build with your Place Value blocks & draw in Box 1. (2) Write the two quantities & math in Box 2.
(3) Write your Prediction BEFORE pressing keys, then check with your partner or teacher on the SC-6!

Investigation 1: Build 25 on your Place Value Tray. Add 30: 25 + 30 =

1. Draw Your Blocks on the Tray:



2. Number Bond & Two Quantities:

First Quantity (Top Row):

Second Quantity (Bottom Row):

Combine (+, –, or ×):

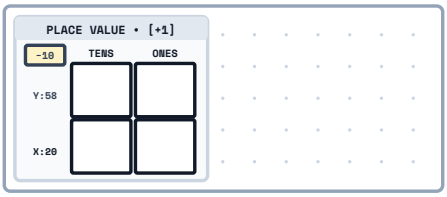
3. My Prediction:

Final Verified Answer:

[ ] Verified on SC-6 Stack

Investigation 2: Build 58 on your Place Value Tray. Subtract 20: 58 – 20 =

1. Draw Your Blocks on the Tray:



2. Number Bond & Two Quantities:

First Quantity (Top Row):

Second Quantity (Bottom Row):

Combine (+, –, or ×):

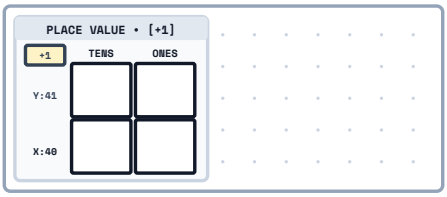
3. My Prediction:

Final Verified Answer:

[ ] Verified on SC-6 Stack

Investigation 3: Build 41 on your Place Value Tray. Add 40: 41 + 40 =

1. Draw Your Blocks on the Tray:



2. Number Bond & Two Quantities:

First Quantity (Top Row):

Second Quantity (Bottom Row):

Combine (+, –, or ×):

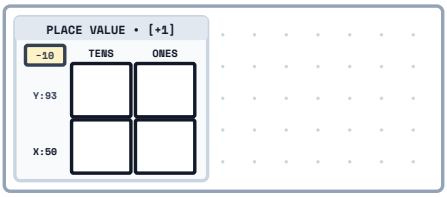
3. My Prediction:

Final Verified Answer:

[ ] Verified on SC-6 Stack

Investigation 4: Build 93 on your Place Value Tray. Subtract 50: 93 – 50 =

1. Draw Your Blocks on the Tray:



2. Number Bond & Two Quantities:

First Quantity (Top Row):

Second Quantity (Bottom Row):

Combine (+, –, or ×):

3. My Prediction:

Final Verified Answer:

[ ] Verified on SC-6 Stack

MY LAB REFLECTION: Draw or tell how your Place Value blocks matched the numbers on your SC-6 screen!

Unit 05 Practice A — Building Two-Digit Numbers from Tens & Ones on the Tray

Name: _____ Date: _____ Score: _____ / 10

TIER 1 • LEVEL 1: BUILDER FOUNDATION • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE A (#1–#10) ON PAPER FIRST

EXAMPLE 1 **Place 3 Tens and 5 Ones on the Place Value Tray: 30 + 5.**

3 Tens = 30, plus 5 Ones = 35. Key: [30] [ENTER] [5] [+].

Verified Answer: 35

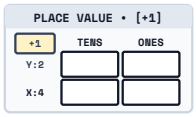
EXAMPLE 2 **Place 6 Tens and 8 Ones on the tray: 60 + 8.**

6 Tens = 60, plus 8 Ones = 68. Key: [60] [ENTER] [8] [+].

Verified Answer: 68

1 Tier 1 • Builder

Build 2 Tens and 4 Ones on the tray: 20 + 4 =



Paper Step: _____ [ ] SC-6 Ans: _____

2 Tier 1 • Builder

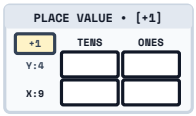
Build 3 Tens and 7 Ones on the tray: 30 + 7 =



Paper Step: _____ [ ] SC-6 Ans: _____

3 Tier 1 • Builder

Build 4 Tens and 9 Ones on the tray: 40 + 9 =



Paper Step: _____ [ ] SC-6 Ans: _____

4 Tier 1 • Builder

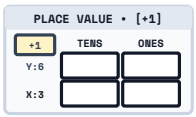
Build 5 Tens and 0 Ones on the tray: 50 + 0 =



Paper Step: _____ [ ] SC-6 Ans: _____

5 Tier 1 • Builder

Build 6 Tens and 3 Ones on the tray: 60 + 3 =



Paper Step: _____ [ ] SC-6 Ans: _____

6 Tier 1 • Builder

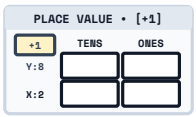
Build 7 Tens and 6 Ones on the tray: 70 + 6 =



Paper Step: _____ [ ] SC-6 Ans: _____

7 Tier 1 • Builder

Build 8 Tens and 2 Ones on the tray: 80 + 2 =



Paper Step: _____ [ ] SC-6 Ans: _____

8 Tier 1 • Builder

Build 9 Tens and 5 Ones on the tray: 90 + 5 =



Paper Step: _____ [ ] SC-6 Ans: _____

9 Tier 1 • Builder

Combine Ten-Rods: 4 Tens + 3 Tens = 40 + 30 =



Paper Step: _____ [ ] SC-6 Ans: _____

10 Tier 1 • Builder

Combine Ten-Rods: 5 Tens + 4 Tens = 50 + 40 =



Paper Step: _____ [ ] SC-6 Ans: _____

Unit 05 Practice B — Adding & Subtracting Multiples of 10 on the Tray

Name: _____ Date: _____ Score: _____ / 10

TIER 1 • LEVEL 1: BUILDER FOUNDATION • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE B (#1–#10) ON PAPER FIRST

EXAMPLE 1 **Start with 34 on the tray and add 2 Tens (+20).**

Ones stay 4; Tens go from 3 to 5 → 34 + 20 = 54.

Verified Answer: 54

EXAMPLE 2 **Start with 78 on the tray and remove 3 Tens (-30).**

Ones stay 8; Tens go from 7 to 4 → 78 - 30 = 48.

Verified Answer: 48

1 Tier 1 • Builder

Add 1 Ten to 45: 45 + 10 =

PLACE VALUE • [+1]

+1	TENS	ONES
Y:1		
X:45		

Paper Step: _____ | | SC-6 Ans: _____

2 Tier 1 • Builder

Add 2 Tens to 32: 32 + 20 =

PLACE VALUE • [+1]

+1	TENS	ONES
Y:2		
X:32		

Paper Step: _____ | | SC-6 Ans: _____

3 Tier 1 • Builder

Add 3 Tens to 26: 26 + 30 =

PLACE VALUE • [+1]

+1	TENS	ONES
Y:3		
X:26		

Paper Step: _____ | | SC-6 Ans: _____

4 Tier 1 • Builder

Add 4 Tens to 51: 51 + 40 =

PLACE VALUE • [+1]

+1	TENS	ONES
Y:4		
X:51		

Paper Step: _____ | | SC-6 Ans: _____

5 Tier 1 • Builder

Subtract 1 Ten from 67: 67 - 10 =

PLACE VALUE • [+1]

-10	TENS	ONES
Y:1		
X:67		

Paper Step: _____ | | SC-6 Ans: _____

6 Tier 1 • Builder

Subtract 2 Tens from 58: 58 - 20 =

PLACE VALUE • [+1]

-10	TENS	ONES
Y:2		
X:58		

Paper Step: _____ | | SC-6 Ans: _____

7 Tier 1 • Builder

Subtract 3 Tens from 84: 84 - 30 =

PLACE VALUE • [+1]

-10	TENS	ONES
Y:3		
X:84		

Paper Step: _____ | | SC-6 Ans: _____

8 Tier 1 • Builder

Subtract 4 Tens from 93: 93 - 40 =

PLACE VALUE • [+1]

-10	TENS	ONES
Y:4		
X:93		

Paper Step: _____ | | SC-6 Ans: _____

9 Tier 1 • Builder

Find the missing multiple of 10: 25 + [?] = 65

PLACE VALUE • [+1]

+1	TENS	ONES
Y:10		
X:25		

Paper Step: _____ | | SC-6 Ans: _____

10 Tier 1 • Builder

Find the missing multiple of 10: 86 - [?] = 36

PLACE VALUE • [+1]

-10	TENS	ONES
Y:10		
X:86		

Paper Step: _____ | | SC-6 Ans: _____

Unit 05 Practice C — Real-World Bundling & Place Value Word Problems

Name: _____ Date: _____ Score: _____ / 10

TIER 2 • LEVEL 2: STORY & DETECTIVE LAB • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE C (#1–#10) ON PAPER FIRST

EXAMPLE 1 A teacher has 4 boxes of 10 pencils (40) and 6 loose pencils. Total?

40 + 6 = 46 pencils. Key: [40] [ENTER] [6] [+].

Verified Answer: 46 pencils

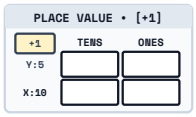
EXAMPLE 2 Spot the Mistake: Leo built '4 Tens and 7 Ones' as 74.

4 Tens is 40 and 7 Ones is 7 → 40 + 7 = 47, not 74!

Verified Answer: 47

1 Tier 2 • Detective

Maya packs 5 bags of 10 marbles and has 8 loose marbles. How many marbles in all?



Paper Step: _____ | | SC-6 Ans: _____

2 Tier 2 • Detective

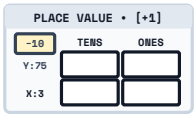
A shelf holds 34 books. The librarian adds 20 more books. How many books now?



Paper Step: _____ | | SC-6 Ans: _____

3 Tier 2 • Detective

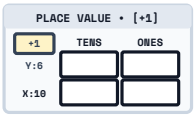
Noah has 75 stickers. He gives 3 sheets of 10 stickers to his sister. How many left?



Paper Step: _____ | | SC-6 Ans: _____

4 Tier 2 • Detective

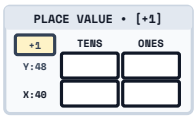
A baker makes 6 trays of 10 rolls and 2 more trays of 10 rolls. Total rolls?



Paper Step: _____ | | SC-6 Ans: _____

5 Tier 2 • Detective

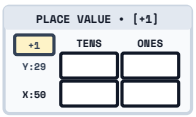
There are 48 crayons in a bin. 40 are inside ten-packs. How many crayons are loose?



Paper Step: _____ | | SC-6 Ans: _____

6 Tier 2 • Detective

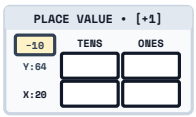
Sofia has 29 beads and buys 50 more beads in ten-packs. How many beads does she have?



Paper Step: _____ | | SC-6 Ans: _____

7 Tier 2 • Detective

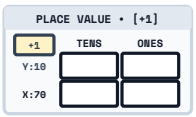
A school bus holds 64 students. 20 students get off at the first stop. How many stay?



Paper Step: _____ | | SC-6 Ans: _____

8 Tier 2 • Detective

How many full bags of 10 can you fill with 70 apples?



Paper Step: _____ | | SC-6 Ans: _____

9 Tier 2 • Detective

Liam has 3 dimes and 9 pennies. How many cents does he have in all?



Paper Step: _____ | | SC-6 Ans: _____

10 Tier 2 • Detective

Spot the Mistake: Sam wrote that 6 Tens and 2 Ones equals 26. Write the true number!



Paper Step: _____ | | SC-6 Ans: _____

Unit 05 Practice D — Expanded Form, Missing Parts & Place-Value Inspection ([PV])

Name: _____ Date: _____ Score: _____ / 10

TIER 2 • LEVEL 2: STORY & DETECTIVE LAB • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE D (#1–#10) ON PAPER FIRST

EXAMPLE 1 **Decompose 74 into expanded form: 74 = [?] + 4.**

Subtract the 4 Ones from 74: 74 - 4 = 70.

Verified Answer: 70

EXAMPLE 2 **What is the value of the digit 8 in 85?**

8 is in the Tens socket → 8 × 10 = 80.

Verified Answer: 80

1 Tier 2 • Detective

Find the missing Tens value: 53 = [?] + 3

PLACE VALUE • [+1]

+1	TENS	ONES
Y:53		
X:3		

Paper Step: _____ [ ] SC-6 Ans: _____

2 Tier 2 • Detective

Find the missing Tens value: 89 = [?] + 9

PLACE VALUE • [+1]

+1	TENS	ONES
Y:89		
X:9		

Paper Step: _____ [ ] SC-6 Ans: _____

3 Tier 2 • Detective

Find the missing Ones value: 67 = 60 + [?]

PLACE VALUE • [+1]

+1	TENS	ONES
Y:67		
X:60		

Paper Step: _____ [ ] SC-6 Ans: _____

4 Tier 2 • Detective

Find the missing Ones value: 94 = 90 + [?]

PLACE VALUE • [+1]

+1	TENS	ONES
Y:94		
X:90		

Paper Step: _____ [ ] SC-6 Ans: _____

5 Tier 2 • Detective

What is the value of the digit 7 in 72?

PLACE VALUE • [+1]

+1	TENS	ONES
Y:7		
X:72		

Paper Step: _____ [ ] SC-6 Ans: _____

6 Tier 2 • Detective

What is the value of the digit 4 in 48?

PLACE VALUE • [+1]

+1	TENS	ONES
Y:4		
X:48		

Paper Step: _____ [ ] SC-6 Ans: _____

7 Tier 2 • Detective

Use [PV] on SC-6: Extract the Tens digit of 86 by typing [86] [ENTER] [10] [PV]:

PLACE VALUE • [+1]

+1	TENS	ONES
Y:86		
X:86		

Paper Step: _____ [ ] SC-6 Ans: _____

8 Tier 2 • Detective

Use [PV] on SC-6: Extract the Ones digit of 86 by typing [86] [ENTER] [1] [PV]:

PLACE VALUE • [+1]

+1	TENS	ONES
Y:86		
X:86		

Paper Step: _____ [ ] SC-6 Ans: _____

9 Tier 2 • Detective

Add in expanded form: (30 + 20) + (4 + 5) =

PLACE VALUE • [+1]

+1	TENS	ONES
Y:30		
X:20		

Paper Step: _____ [ ] SC-6 Ans: _____

10 Tier 2 • Detective

Add in expanded form: (50 + 30) + (6 + 2) =

PLACE VALUE • [+1]

+1	TENS	ONES
Y:50		
X:30		

Paper Step: _____ [ ] SC-6 Ans: _____

Unit 05 Practice E — Comparing Two-Digit Numbers & 10-More / 10-Less Jumps

Name: _____ Date: _____ Score: _____ / 10

TIER 3 • LEVEL 3: BOSS CHALLENGE • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE E (#1–#10) ON PAPER FIRST

EXAMPLE 1 **How much greater is 75 than 45?**

Subtract the Tens: 75 - 45 = 30. Key: [75] [ENTER] [45] [-].

Verified Answer: 30

EXAMPLE 2 **Start at 38, jump +20, then +10.**

38 + 20 = 58, then 58 + 10 = 68.

Verified Answer: 68

1 Tier 3 • Challenge

10 more than 29 is: 29 + 10 =

COMPARE • ΔY-X
Y: [29]
X: [10] Δ=?

Paper Step: _____ [ ] SC-6 Ans: _____

2 Tier 3 • Challenge

10 less than 61 is: 61 - 10 =

COMPARE • ΔY-X
Y: [61]
X: [10] Δ=?

Paper Step: _____ [ ] SC-6 Ans: _____

3 Tier 3 • Challenge

How much greater is 64 than 34?

PLACE VALUE • [+1]

+1	TENS	ONES
Y:64		
X:34		

Paper Step: _____ [ ] SC-6 Ans: _____

4 Tier 3 • Challenge

How much greater is 87 than 27?

PLACE VALUE • [+1]

+1	TENS	ONES
Y:87		
X:27		

Paper Step: _____ [ ] SC-6 Ans: _____

5 Tier 3 • Challenge

How much greater is 58 than 52?

PLACE VALUE • [+1]

+1	TENS	ONES
Y:58		
X:52		

Paper Step: _____ [ ] SC-6 Ans: _____

6 Tier 3 • Challenge

Jump along the Tens column: 15 + 20 + 30 =

PLACE VALUE • [+1]

+1	TENS	ONES
Y:15		
X:20		

Paper Step: _____ [ ] SC-6 Ans: _____

7 Tier 3 • Challenge

Jump along the Tens column: 92 - 30 - 20 =

PLACE VALUE • [+1]

-10	TENS	ONES
Y:92		
X:30		

Paper Step: _____ [ ] SC-6 Ans: _____

8 Tier 3 • Challenge

Jump up and back by Tens: 46 + 30 - 10 =

PLACE VALUE • [+1]

-10	TENS	ONES
Y:46		
X:30		

Paper Step: _____ [ ] SC-6 Ans: _____

9 Tier 3 • Challenge

Jump up and back by Tens: 83 - 40 + 20 =

PLACE VALUE • [+1]

-10	TENS	ONES
Y:83		
X:40		

Paper Step: _____ [ ] SC-6 Ans: _____

10 Tier 3 • Challenge

How many Tens must you add to 18 to reach 78?

PLACE VALUE • [+1]

+1	TENS	ONES
Y:18		
X:78		

Paper Step: _____ [ ] SC-6 Ans: _____

Unit 05 Practice F — Century Chart Puzzles, Multi-Step Place Value & Mastery Review

Name: _____ Date: _____ Score: _____ / 10

TIER 3 • LEVEL 3: BOSS CHALLENGE • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE F (#1–#10) ON PAPER FIRST

EXAMPLE 1 **On a 100-chart, start at 24, move down 3 rows (+30) and right 5 (+5).**

24 + 30 = 54, then 54 + 5 = 59. Key: [24] [ENTER] [30] [+] [5] [+].

Verified Answer: 59

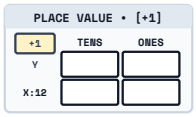
EXAMPLE 2 **I have 3 more Tens than 42. What number am I?**

42 + 30 = 72.

Verified Answer: 72

1 Tier 3 • Challenge

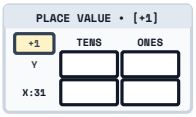
100-Chart Path: Start at 12, move down 4 rows (+40) and right 6 (+6):



Paper Step: _____ | | SC-6 Ans: _____

2 Tier 3 • Challenge

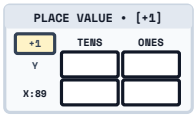
100-Chart Path: Start at 31, move down 5 rows (+50) and right 7 (+7):



Paper Step: _____ | | SC-6 Ans: _____

3 Tier 3 • Challenge

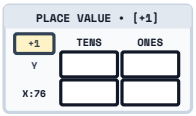
100-Chart Path: Start at 89, move up 3 rows (-30) and left 4 (-4):



Paper Step: _____ | | SC-6 Ans: _____

4 Tier 3 • Challenge

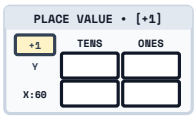
100-Chart Path: Start at 76, move up 5 rows (-50) and right 3 (+3):



Paper Step: _____ | | SC-6 Ans: _____

5 Tier 3 • Challenge

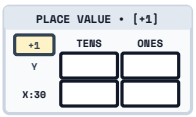
Complement to 100 by Tens: 60 + [?] = 100



Paper Step: _____ | | SC-6 Ans: _____

6 Tier 3 • Challenge

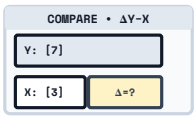
Complement to 100 by Tens: 30 + [?] = 100



Paper Step: _____ | | SC-6 Ans: _____

7 Tier 3 • Challenge

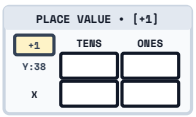
Mystery Number: My Tens digit is 7 and my Ones digit is 3 less than my Tens digit. Who am I?



Paper Step: _____ | | SC-6 Ans: _____

8 Tier 3 • Challenge

Swap the Tens and Ones digits of 38. How much did the number increase?



Paper Step: _____ | | SC-6 Ans: _____

9 Tier 3 • Challenge

Three-basket bundle: 20 + 40 + 35 =



Paper Step: _____ | | SC-6 Ans: _____

10 Tier 3 • Challenge

Place Value Tray Puzzle: Combine 4 Tens in Row 1 and 3 Tens in Row 0, then snap 8 Ones into the Ones socket:



Paper Step: _____ | | SC-6 Ans: _____

Unit 05 Mastery Check: Place Value Studio: Tens & Ones

Name: _____ Date: _____ Score: _____ / 100

100-POINT UNIT MASTERY ASSESSMENT — 10 UNSCAFFOLDED PROBLEMS (10 POINTS EACH)

Solve each problem on paper first in the dot-grid workspace. Write your final answer on the line, then verify your result on the SC-6 stack. Record your total score in Appendix B (Score Tracker) and verify complete worked keystrokes online at stackcalc.io/curriculum/answers.

1 Core Fluency • 10 pts

Compose from Tens and Ones on the tray: 50 + 7 =

[ ] +10 pts [ ] SC-6 **Ans:** _____

2 Core Fluency • 10 pts

Add 2 Tens on the Place Value Tray: 38 + 20 =

[ ] +10 pts [ ] SC-6 **Ans:** _____

3 Core Fluency • 10 pts

Add 4 Tens on the Place Value Tray: 46 + 40 =

[ ] +10 pts [ ] SC-6 **Ans:** _____

4 Core Fluency • 10 pts

Remove 3 Tens from the tray: 74 - 30 =

[ ] +10 pts [ ] SC-6 **Ans:** _____

5 Core Fluency • 10 pts

Find the missing Tens value: 82 = [?] + 2

[ ] +10 pts [ ] SC-6 **Ans:** _____

6 Core Fluency • 10 pts

Follow the Tens-column jump: 25 + 50 - 20 =

[ ] +10 pts [ ] SC-6 **Ans:** _____

7 Application • 10 pts

A crate holds 6 packs of 10 juice boxes and 4 single boxes. Total juice boxes?

[ ] +10 pts [ ] SC-6 **Ans:** _____

8 Application • 10 pts

Elena has 85¢. She spends 3 dimes. How many cents does she have left?

[ ] +10 pts [ ] SC-6 **Ans:** _____

9 Application • 10 pts

On a 100-chart, start at 33, move down 4 rows (+40) and right 5 (+5). Where do you land?

[ ] +10 pts [ ] SC-6 **Ans:** _____

10 Error Analysis • 10 pts

Error Analysis: Eli says the '5' in 58 means 5 Ones. What value does the '5' actually have?

[ ] +10 pts [ ] SC-6 **Ans:** _____

Unit 05 STEM: The Classroom Library Book Cart

Name: _____ Date: _____ Score: _____ / 4

REAL-WORLD STEM APPLICATION & WORKSHOP: THE CLASSROOM LIBRARY BOOK CART

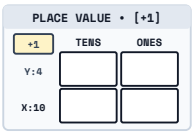
Student librarians organize books onto a rolling cart. Each large bin holds exactly 10 books (1 Ten), and the top rack holds single display books (Ones).

Companion Book (Vol. I: From Blocks to the Stack (SC-6 Manual) — Ch. 3: Ten-Frames, Number Lines & Place Value ([PV])) • Al-Khwarizmi's Positional Columns & Bundling Tens: In 820 CE, Al-Khwarizmi showed that ten Digit Blocks (0–9) can write any number when each socket to the left is worth 10 times more!

Block Studio: Place Value Studio (6×2 Whole Number Tray & Digit Blocks 0–9) • Stack Shortcut: [3] [4] [ENTER] [2] [0] [+] = 54

CASE INVESTIGATION 1 STEM Modeling

Cart A has 4 full bins of 10 books and 7 display books. How many books are on Cart A?



1. Draw or Count Blocks: _____

2. My Number Sentence: _____

3. My Answer: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)

CASE INVESTIGATION 2 STEM Modeling

2 full bins of 10 books are added to Cart A. How many books are on the cart now?



1. Draw or Count Blocks: _____

2. My Number Sentence: _____

3. My Answer: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)

CASE INVESTIGATION 3 Applied Calculation

Cart B starts with 86 books. Classrooms check out 3 full bins of 10 books. How many books remain?



1. Draw or Count Blocks: _____

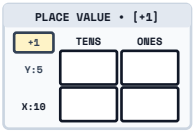
2. My Number Sentence: _____

3. My Answer: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)

CASE INVESTIGATION 4 Error Analysis Workshop

Error Analysis: Mia counts 5 bins of 10 and 3 single books and writes 35. Find the true total!



1. Draw or Count Blocks: _____

2. My Number Sentence: _____

3. My Answer: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)

Hands-On Math Explorers & Builders Note

Young builders, chefs, and nature explorers use physical blocks and paper math to solve real-world mysteries! Always build or write your paper setup first, write your number sentence, and check on your SC-6. Parents & teachers: full keys at stackcalc.io/curriculum/answers.

Subtraction as Take-Away & Comparison on the Tray

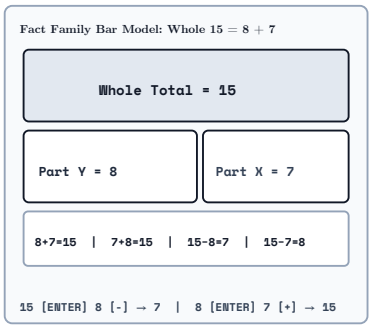
Hands-On Block Studio: Place Value Studio (2-Row Tray, Digit Blocks & Gold [+1] Tokens) • Standards: CCSS.MATH.1.OA.B.4, CCSS.MATH.2.OA.B.2

---

1. MATHEMATICAL CONCEPT & INSIDE-OUT APPROACH (Subtraction on the Stack: Row 1 (Y) Minus Row 0 (X)):

Register Y (Row 1) holds the quantity you started with; Register X (Row 0) holds the amount you subtract.

Companion Book (Vol. I: From Blocks to the Stack (SC-6 Manual) — Ch. 3: Unbundling a Ten & App. B: Station F.3) • Tower Height Differences & Comparison Bar Models: Aligning Row 1 (Shelf Y) above Row 0 (Workbench X) turns your tray into a physical 3D Bar Model so your eyes see the difference $\Delta = Y - X$!



2. HANDS-ON BLOCKS & CONCEPT RULES: TWO WAYS TO MODEL SUBTRACTION ON THE TRAY

- Take-Away: Start with total quantity in Row 1 (Shelf Y) and subtract Row 0 (Workbench X): $Y - X$ leaves the remainder.
- Comparison: Place Quantity A in Row 1 (Y) and Quantity B in Row 0 (X) to find how much larger Row 1 is (e.g. $18 - 11 = 7$).
- On the SC-6, the starting number goes into Y first; the subtrahend enters X, then press [-].
- Fact-Family Check: Subtraction undoes addition—if $8 + 7 = 15$, then $15 - 7 = 8$ and $15 - 8 = 7$.

3. STEP-BY-STEP VERIFICATION WALKTHROUGH ON THE SC-6

Hands-On Block Setup: Place [1][5] in Row 1 (Waiting Shelf Y) and [7] in the Ones socket of Row 0 (Workbench X) on the Place Value Tray. Question: Unbundle the [1] Ten in Row 1 into 10 Ones ($10 - 7 = 3$, plus 5 Ones $= 8$). What Digit Block remains? (Prediction: [8])

Verification Keystrokes: `1` `5` `ENTER` `7` `-`

Button Pressed	Screen (X)	How the 4-Level Stack Mirrors Your Mathematical Steps (T, Z, Y, X)
`1` `5`	**15**	15 (minuend) enters Register X
`ENTER`	**15**	15 lifts to Waiting Shelf Register Y (Row 1)
`7`	**7**	7 (subtrahend) enters Workbench Register X (Row 0)
`-`	**8**	Press [-]: $15 - 7 = 8$! Result in Register X

3. 3D BLOCK STUDIO & SC-6 STACK LEARNING GUIDE & SELF-CHECK

- Physical Block Studio Rule: Take-Away: Start with total quantity in Row 1 (Shelf Y) and subtract Row 0 (Workbench X): $Y - X$ leaves the remainder.
- Stack Shortcut & Pattern: Minuend [ENTER] Subtrahend [-] = Difference — Fact-Family Check: Subtraction undoes addition—if $8 + 7 = 15$, then $15 - 7 = 8$ and $15 - 8 = 7$.
- 2-Second Tray-to-Screen Audit: Confirm your physical 3D Block Studio setup matches Register Y (Waiting Shelf) and Register X (Workbench) before pressing the operator key.

WARM-UP CHECK A: SOLVE ON PAPER FIRST, THEN VERIFY ON YOUR CALCULATOR!

Core Investigation: Place [1][6] in Row 1 of your Place Value Tray and [9] in Row 0. What is 16 − 9?

1. First Quantity / Inner Step: _____

2. Second Quantity / Operation: _____

3. My Paper Prediction: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)



Extension: Subtraction as Comparison: Row 1 vs. Row 0 on the Tray

Deepening Concepts • Standards: CCSS.MATH.2.OA.B.2

1. EXTENSION CONCEPT & SETUP (Subtraction as Comparison: Row 1 vs. Row 0 on the Tray):

Comparing two quantities on the 2-row tray uses the exact same pipeline: Row 1 (Y) − Row 0 (X) = Difference.

Hands-On Extension Setup: Place [1][8] in Row 1 (Waiting Shelf Y) and [1][1] in Row 0 (Workbench X) on the Place Value Tray. • Question: Compare column by column: Tens [1] − [1] = [0], Ones [8] − [1] = [7]. What is the difference? (Prediction: 7)

2. EXTENSION STACK SEQUENCE (SC-6): [1] [8] [ENTER] [1] [1] [-]

Button Pressed	Screen (X)	Extension Stack Dynamics (T, Z, Y, X)
[1] [8]	18	Row 1 quantity (18) enters Register X
[ENTER]	18	18 lifts to Waiting Shelf Register Y
[1] [1]	11	Row 0 quantity (11) enters Workbench Register X
[-]	7	18 − 11 = 7! Row 1 is 7 greater than Row 0

3. PARENT & TEACHER COACHING: TARGET MISCONCEPTIONS & 3D BLOCK STUDIO REMEDIATIONS

Misconception 1 — Subtracting Smaller from Larger Regardless of Row Order: When given 4 − 7, student answers 3.

Hands-On Block Studio Remediation: Place [4] in Row 1 and [7] in Row 0—show that Row 1 is smaller than Row 0!

Misconception 2 — Confusing Minuend and Subtrahend Order: Typing [7] [ENTER] [15] [-] gives −8.

Hands-On Block Studio Remediation: The starting quantity in Row 1 always goes into Waiting Shelf Y first.

4. STACK SHORTCUT & PARTNER EXPLAIN-WHY CHALLENGE (SC-6)

Calculator Shortcut: Minuend [ENTER] Subtrahend [-] = Difference

Explain-Why Reflection: How do your Place Value, Fraction, or Prime blocks prove why Misconception 1 is wrong?

WARM-UP CHECK B (EXTENSION): SOLVE ON PAPER FIRST, THEN VERIFY ON YOUR CALCULATOR!

Extension Challenge: Row 1 holds [1][7] and Row 0 holds [1][2] on your Place Value Tray. Find the difference.

1. First Quantity / Inner Step: _____

2. Second Quantity / Operation: _____

3. My Paper Prediction: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)

Block Sketch / Paper Workspace:



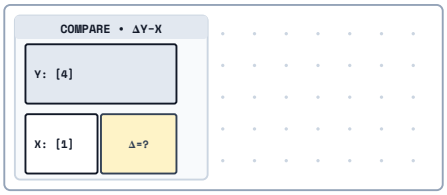
Unit 06 Lab: Subtraction as Take-Away & Comparison on the Tray

Name: _____ Date: _____ Score: _____ / 4

DIRECTIONS: (1) Build with your Place Value blocks & draw in Box 1. (2) Write the two quantities & math in Box 2.
(3) Write your Prediction BEFORE pressing keys, then check with your partner or teacher on the SC-6!

Investigation 1: Place [1][4] in Row 1 and subtract [6] in Row 0: 14 − 6 =

1. Draw Your Blocks on the Tray:



2. Number Bond & Two Quantities:

First Quantity (Top Row):

Second Quantity (Bottom Row):

Combine (+, −, or ×):

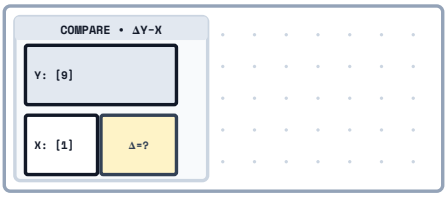
3. My Prediction:

Final Verified Answer:

[ ] Verified on SC-6 Stack

Investigation 2: Compare [1][9] in Row 1 and [1][3] in Row 0: 19 − 13 =

1. Draw Your Blocks on the Tray:



2. Number Bond & Two Quantities:

First Quantity (Top Row):

Second Quantity (Bottom Row):

Combine (+, −, or ×):

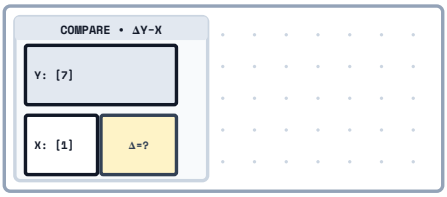
3. My Prediction:

Final Verified Answer:

[ ] Verified on SC-6 Stack

Investigation 3: Place [1][7] in Row 1 and subtract [8] in Row 0: 17 − 8 =

1. Draw Your Blocks on the Tray:



2. Number Bond & Two Quantities:

First Quantity (Top Row):

Second Quantity (Bottom Row):

Combine (+, −, or ×):

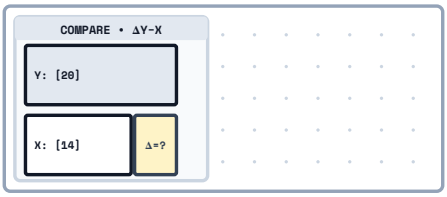
3. My Prediction:

Final Verified Answer:

[ ] Verified on SC-6 Stack

Investigation 4: Find the difference between 20 and 14 on the tray: 20 − 14 =

1. Draw Your Blocks on the Tray:



2. Number Bond & Two Quantities:

First Quantity (Top Row):

Second Quantity (Bottom Row):

Combine (+, −, or ×):

3. My Prediction:

Final Verified Answer:

[ ] Verified on SC-6 Stack

MY LAB REFLECTION: Draw or tell how your Place Value blocks matched the numbers on your SC-6 screen!

Unit 06 Practice A — Take-Away Subtraction Within 20

Name: _____ Date: _____ Score: _____ / 10

TIER 1 • LEVEL 1: BUILDER FOUNDATION • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE A (#1–#10) ON PAPER FIRST

EXAMPLE 1 **Start with 14 blocks on the tray and take away 6.**

Bridge back through 10: 14 - 4 = 10, then 10 - 2 = 8. Key: [14] [ENTER] [6] [-].

Verified Answer: 8

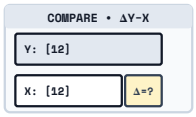
EXAMPLE 2 **Start with 17 blocks and take away 9.**

17 - 9 = 8. Check: 8 + 9 = 17.

Verified Answer: 8

1 Tier 1 • Builder

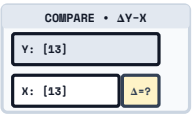
Take away from 12: 12 - 5 =



Paper Step: _____ [ ] SC-6 Ans: _____

2 Tier 1 • Builder

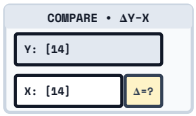
Take away from 13: 13 - 6 =



Paper Step: _____ [ ] SC-6 Ans: _____

3 Tier 1 • Builder

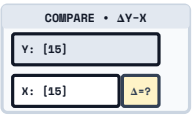
Take away from 14: 14 - 8 =



Paper Step: _____ [ ] SC-6 Ans: _____

4 Tier 1 • Builder

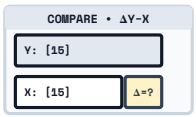
Take away from 15: 15 - 7 =



Paper Step: _____ [ ] SC-6 Ans: _____

5 Tier 1 • Builder

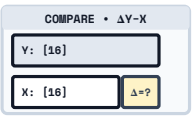
Take away from 15: 15 - 9 =



Paper Step: _____ [ ] SC-6 Ans: _____

6 Tier 1 • Builder

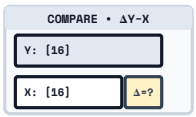
Take away from 16: 16 - 7 =



Paper Step: _____ [ ] SC-6 Ans: _____

7 Tier 1 • Builder

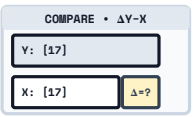
Take away from 16: 16 - 8 =



Paper Step: _____ [ ] SC-6 Ans: _____

8 Tier 1 • Builder

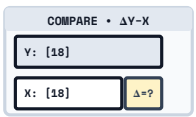
Take away from 17: 17 - 8 =



Paper Step: _____ [ ] SC-6 Ans: _____

9 Tier 1 • Builder

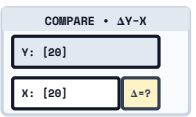
Take away from 18: 18 - 9 =



Paper Step: _____ [ ] SC-6 Ans: _____

10 Tier 1 • Builder

Take away from 20: 20 - 7 =



Paper Step: _____ [ ] SC-6 Ans: _____

Unit 06 Practice B — Distance on the Number Line & Missing Subtrahends

Name: _____ Date: _____ Score: _____ / 10

TIER 1 • LEVEL 1: BUILDER FOUNDATION • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE B (#1–#10) ON PAPER FIRST

EXAMPLE 1 How far is it from 8 to 15 on the number line?

Distance = 15 - 8 = 7 steps. Key: [15] [ENTER] [8] [-].

Verified Answer: 7 steps

EXAMPLE 2 Find the missing number: 16 - [?] = 9.

Subtract 16 - 9 = 7. Check: 16 - 7 = 9.

Verified Answer: 7

1 Tier 1 • Builder

Number line distance from 7 to 13: 13 - 7 =

COMPARE • ΔY-X
Y: [13]
X: [7] Δ=?

Paper Step: _____ [ ] SC-6 Ans: _____

2 Tier 1 • Builder

Number line distance from 9 to 17: 17 - 9 =

COMPARE • ΔY-X
Y: [17]
X: [9] Δ=?

Paper Step: _____ [ ] SC-6 Ans: _____

3 Tier 1 • Builder

Number line distance from 6 to 15: 15 - 6 =

COMPARE • ΔY-X
Y: [15]
X: [6] Δ=?

Paper Step: _____ [ ] SC-6 Ans: _____

4 Tier 1 • Builder

Number line distance from 11 to 19: 19 - 11 =

COMPARE • ΔY-X
Y: [19]
X: [11] Δ=?

Paper Step: _____ [ ] SC-6 Ans: _____

5 Tier 1 • Builder

Number line distance from 8 to 20: 20 - 8 =

COMPARE • ΔY-X
Y: [20]
X: [8] Δ=?

Paper Step: _____ [ ] SC-6 Ans: _____

6 Tier 1 • Builder

Find the missing subtrahend: 14 - [?] = 5

COMPARE • ΔY-X
Y: [14]
X: [5] Δ=?

Paper Step: _____ [ ] SC-6 Ans: _____

7 Tier 1 • Builder

Find the missing subtrahend: 17 - [?] = 11

COMPARE • ΔY-X
Y: [17]
X: [11] Δ=?

Paper Step: _____ [ ] SC-6 Ans: _____

8 Tier 1 • Builder

Find the missing subtrahend: 19 - [?] = 12

COMPARE • ΔY-X
Y: [19]
X: [12] Δ=?

Paper Step: _____ [ ] SC-6 Ans: _____

9 Tier 1 • Builder

Find the starting Whole: [?] - 6 = 8

COMPARE • ΔY-X
Y: [8]
X: [6] Δ=?

Paper Step: _____ [ ] SC-6 Ans: _____

10 Tier 1 • Builder

Find the starting Whole: [?] - 9 = 7

COMPARE • ΔY-X
Y: [9]
X: [7] Δ=?

Paper Step: _____ [ ] SC-6 Ans: _____

Unit 06 Practice C — 'How Many More?' Comparison & Take-Away Word Problems

Name: _____ Date: _____ Score: _____ / 10

TIER 2 • LEVEL 2: STORY & DETECTIVE LAB • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE C (#1–#10) ON PAPER FIRST

EXAMPLE 1 Blue tower has 16 blocks; Red tower has 9 blocks. How many more in Blue?

Compare by subtracting: 16 - 9 = 7 more blocks.

Verified Answer: 7 more

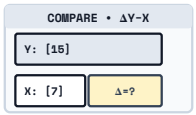
EXAMPLE 2 Spot the Mistake: To compute 15 - 8, Sam typed [8] [ENTER] [15] [-] and got -7.

Put the larger starting number 15 in Register Y first: [15] [ENTER] [8] [-] = 7!

Verified Answer: 7

1 Tier 2 • Detective

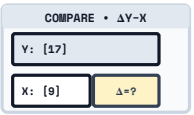
There are 15 birds in a tree. 7 birds fly away. How many birds stay in the tree?



Paper Step: _____ [ ] SC-6 Ans: _____

2 Tier 2 • Detective

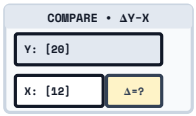
Maya has 17 stickers and Leo has 9 stickers. How many more stickers does Maya have?



Paper Step: _____ [ ] SC-6 Ans: _____

3 Tier 2 • Detective

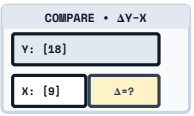
A frog needs to reach lily pad 20. It is on lily pad 12. How many jumps remain?



Paper Step: _____ [ ] SC-6 Ans: _____

4 Tier 2 • Detective

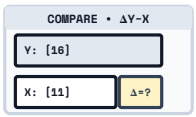
Noah baked 18 cookies and his family ate 9 of them. How many cookies are left?



Paper Step: _____ [ ] SC-6 Ans: _____

5 Tier 2 • Detective

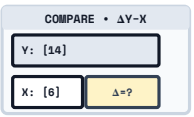
Priya read 16 pages on Monday and 11 pages on Tuesday. How many more pages on Monday?



Paper Step: _____ [ ] SC-6 Ans: _____

6 Tier 2 • Detective

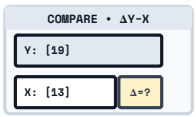
A box holds 14 crayons. 6 are broken. How many crayons are not broken?



Paper Step: _____ [ ] SC-6 Ans: _____

7 Tier 2 • Detective

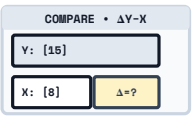
Team A scored 19 points and Team B scored 13 points. By how many points did Team A win?



Paper Step: _____ [ ] SC-6 Ans: _____

8 Tier 2 • Detective

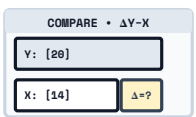
Chloe needs 15 shells for an art project. She has 8 shells. How many more does she need?



Paper Step: _____ [ ] SC-6 Ans: _____

9 Tier 2 • Detective

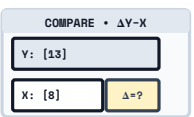
A bus has 20 seats. 14 seats are taken. How many empty seats are left?



Paper Step: _____ [ ] SC-6 Ans: _____

10 Tier 2 • Detective

Spot the Mistake: Ava solved 13 - 8 and wrote 6. Check on your SC-6 to find the true answer!



Paper Step: _____ [ ] SC-6 Ans: _____

Unit 06 Practice D — Bridging Back Through 10 & Related Fact Families

Name: _____ Date: _____ Score: _____ / 10

TIER 2 • LEVEL 2: STORY & DETECTIVE LAB • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE D (#1–#10) ON PAPER FIRST

EXAMPLE 1 **Subtract 13 - 5 by stepping back to 10 first.**

13 - 3 = 10, then 10 - 2 = 8. Key: [13] [ENTER] [3] [-] [2] [-].

Verified Answer: 8

EXAMPLE 2 **Use 8 + 7 = 15 to solve 15 - 8 instantly.**

Since 8 and 7 make 15, removing 8 leaves 7!

Verified Answer: 7

1 Tier 2 • Detective

Bridge through 10: 11 - 4 =

COMPARE • ΔY-X
Y: [11]
X: [10] Δ=?

Paper Step: _____ [ ] SC-6 Ans: _____

2 Tier 2 • Detective

Bridge through 10: 12 - 7 =

COMPARE • ΔY-X
Y: [12]
X: [10] Δ=?

Paper Step: _____ [ ] SC-6 Ans: _____

3 Tier 2 • Detective

Bridge through 10: 13 - 7 =

COMPARE • ΔY-X
Y: [13]
X: [10] Δ=?

Paper Step: _____ [ ] SC-6 Ans: _____

4 Tier 2 • Detective

Bridge through 10: 14 - 9 =

COMPARE • ΔY-X
Y: [14]
X: [10] Δ=?

Paper Step: _____ [ ] SC-6 Ans: _____

5 Tier 2 • Detective

Bridge through 10: 16 - 9 =

COMPARE • ΔY-X
Y: [16]
X: [10] Δ=?

Paper Step: _____ [ ] SC-6 Ans: _____

6 Tier 2 • Detective

Fact Family: Since 9 + 6 = 15, then 15 - 9 =

COMPARE • ΔY-X
Y: [9]
X: [6] Δ=?

Paper Step: _____ [ ] SC-6 Ans: _____

7 Tier 2 • Detective

Fact Family: Since 8 + 9 = 17, then 17 - 8 =

COMPARE • ΔY-X
Y: [9]
X: [8] Δ=?

Paper Step: _____ [ ] SC-6 Ans: _____

8 Tier 2 • Detective

Fact Family: Since 7 + 6 = 13, then 13 - 7 =

COMPARE • ΔY-X
Y: [7]
X: [6] Δ=?

Paper Step: _____ [ ] SC-6 Ans: _____

9 Tier 2 • Detective

Subtract from 20: 20 - 6 =

COMPARE • ΔY-X
Y: [20]
X: [20] Δ=?

Paper Step: _____ [ ] SC-6 Ans: _____

10 Tier 2 • Detective

Subtract from 20: 20 - 11 =

COMPARE • ΔY-X
Y: [20]
X: [20] Δ=?

Paper Step: _____ [ ] SC-6 Ans: _____

Unit 06 Practice E — Two-Step Number-Line Jumps & Chained Stack Subtraction

Name: _____ Date: _____ Score: _____ / 10

TIER 3 • LEVEL 3: BOSS CHALLENGE • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE E (#1–#10) ON PAPER FIRST

EXAMPLE 1 **Start at 18, subtract 6, then subtract 4: 18 - 6 - 4.**

18 - 6 = 12, then 12 - 4 = 8. Key: [18] [ENTER] [6] [-] [4] [-].

Verified Answer: 8

EXAMPLE 2 **Start at 9, hop forward +7, then hop back -5: 9 + 7 - 5.**

9 + 7 = 16, then 16 - 5 = 11.

Verified Answer: 11

1 Tier 3 • Challenge

Two-step take-away: 17 - 4 - 3 =

COMPARE • ΔY-X
Y: [17]
X: [4] Δ=?

Paper Step: _____ [ ] SC-6 Ans: _____

2 Tier 3 • Challenge

Two-step take-away: 19 - 5 - 6 =

COMPARE • ΔY-X
Y: [19]
X: [5] Δ=?

Paper Step: _____ [ ] SC-6 Ans: _____

3 Tier 3 • Challenge

Two-step take-away: 20 - 8 - 5 =

COMPARE • ΔY-X
Y: [20]
X: [8] Δ=?

Paper Step: _____ [ ] SC-6 Ans: _____

4 Tier 3 • Challenge

Two-step take-away: 16 - 6 - 4 =

COMPARE • ΔY-X
Y: [16]
X: [6] Δ=?

Paper Step: _____ [ ] SC-6 Ans: _____

5 Tier 3 • Challenge

Hop forward then back: 8 + 7 - 6 =

COMPARE • ΔY-X
Y: [8]
X: [7] Δ=?

Paper Step: _____ [ ] SC-6 Ans: _____

6 Tier 3 • Challenge

Hop forward then back: 11 + 6 - 9 =

COMPARE • ΔY-X
Y: [11]
X: [6] Δ=?

Paper Step: _____ [ ] SC-6 Ans: _____

7 Tier 3 • Challenge

Hop back then forward: 15 - 8 + 5 =

COMPARE • ΔY-X
Y: [15]
X: [8] Δ=?

Paper Step: _____ [ ] SC-6 Ans: _____

8 Tier 3 • Challenge

Hop back then forward: 18 - 9 + 4 =

COMPARE • ΔY-X
Y: [18]
X: [9] Δ=?

Paper Step: _____ [ ] SC-6 Ans: _____

9 Tier 3 • Challenge

Hop back then forward: 14 - 7 + 7 =

COMPARE • ΔY-X
Y: [14]
X: [7] Δ=?

Paper Step: _____ [ ] SC-6 Ans: _____

10 Tier 3 • Challenge

Compare two sums: (9 + 8) - (6 + 5) =

COMPARE • ΔY-X
Y: [9]
X: [8] Δ=?

Paper Step: _____ [ ] SC-6 Ans: _____

Unit 06 Practice F — Balance Equations, Mystery Jumps & Subtraction Mastery

Name: _____ Date: _____ Score: _____ / 10

TIER 3 • LEVEL 3: BOSS CHALLENGE • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE F (#1–#10) ON PAPER FIRST

EXAMPLE 1 Balance the scale: 15 - 6 = 4 + [?].

Left side is 15 - 6 = 9. Subtract 4 from 9: 9 - 4 = 5!

Verified Answer: 5

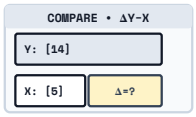
EXAMPLE 2 Balance the scale: 18 - 9 = 14 - [?].

Left side is 9. Since 14 - 5 = 9, the missing number is 5!

Verified Answer: 5

1 Tier 3 • Challenge

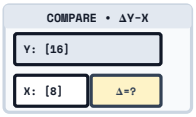
Balance the equation: 14 - 5 = 3 + [?]



Paper Step: _____ [ ] SC-6 Ans: _____

2 Tier 3 • Challenge

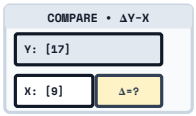
Balance the equation: 16 - 8 = 2 + [?]



Paper Step: _____ [ ] SC-6 Ans: _____

3 Tier 3 • Challenge

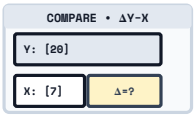
Balance the equation: 17 - 9 = 5 + [?]



Paper Step: _____ [ ] SC-6 Ans: _____

4 Tier 3 • Challenge

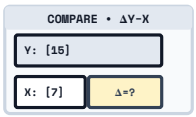
Balance the equation: 20 - 7 = 10 + [?]



Paper Step: _____ [ ] SC-6 Ans: _____

5 Tier 3 • Challenge

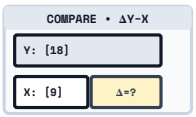
Balance the subtraction: 15 - 7 = 12 - [?]



Paper Step: _____ [ ] SC-6 Ans: _____

6 Tier 3 • Challenge

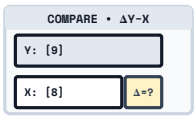
Balance the subtraction: 18 - 9 = 16 - [?]



Paper Step: _____ [ ] SC-6 Ans: _____

7 Tier 3 • Challenge

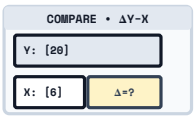
Mystery Number: Subtract 8 from me and you get 9. What number am I?



Paper Step: _____ [ ] SC-6 Ans: _____

8 Tier 3 • Challenge

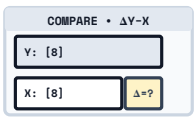
A basket has 20 apples. 6 are eaten Monday and 7 Tuesday. How many remain?



Paper Step: _____ [ ] SC-6 Ans: _____

9 Tier 3 • Challenge

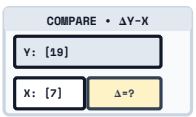
Difference of doubles: (8 + 8) - (5 + 5) =



Paper Step: _____ [ ] SC-6 Ans: _____

10 Tier 3 • Challenge

Working-Backwards Tray Puzzle: Start with 19 blocks on your tray, remove 7 blocks, then remove 5 more. How many remain?



Paper Step: _____ [ ] SC-6 Ans: _____

Unit 06 Mastery Check: Subtraction & Tray Comparison

Name: _____ Date: _____ Score: _____ / 100

100-POINT UNIT MASTERY ASSESSMENT — 10 UNSCAFFOLDED PROBLEMS (10 POINTS EACH)

Solve each problem on paper first in the dot-grid workspace. Write your final answer on the line, then verify your result on the SC-6 stack. Record your total score in Appendix B (Score Tracker) and verify complete worked keystrokes online at stackcalc.io/curriculum/answers.

1 Core Fluency • 10 pts

Compare Row 1 and Row 0 on the tray: 14 - 6 =

[ ] +10 pts [ ] SC-6 **Ans:** _____

2 Core Fluency • 10 pts

Bridge back through 10 to subtract: 16 - 9 =

[ ] +10 pts [ ] SC-6 **Ans:** _____

3 Core Fluency • 10 pts

Find the distance on the number line: 17 - 8 =

[ ] +10 pts [ ] SC-6 **Ans:** _____

4 Core Fluency • 10 pts

Take away from 2 full Ten-Frames: 20 - 13 =

[ ] +10 pts [ ] SC-6 **Ans:** _____

5 Core Fluency • 10 pts

Find the missing subtrahend: 15 - [?] = 6

[ ] +10 pts [ ] SC-6 **Ans:** _____

6 Core Fluency • 10 pts

Follow the 2-step take-away path: 18 - 7 - 4 =

[ ] +10 pts [ ] SC-6 **Ans:** _____

7 Application • 10 pts

Lucas has 16 trading cards and gives 7 to his friend. How many cards does he have left?

[ ] +10 pts [ ] SC-6 **Ans:** _____

8 Application • 10 pts

A sunflower is 19 inches tall and a daisy is 11 inches tall. How much taller is the sunflower?

[ ] +10 pts [ ] SC-6 **Ans:** _____

9 Application • 10 pts

15 ducks swim in a pond. 8 fly away, then 4 new ducks land. How many ducks now?

[ ] +10 pts [ ] SC-6 **Ans:** _____

10 Error Analysis • 10 pts

Error Analysis: Why must 17 be entered BEFORE 9 when computing 17 - 9 on the RPN stack?

[ ] +10 pts [ ] SC-6 **Ans:** _____

Unit 06 STEM: The Frog Jump Number Line Olympics

Name: _____ Date: _____ Score: _____ / 4

REAL-WORLD STEM APPLICATION & WORKSHOP: THE FROG JUMP NUMBER LINE OLYMPICS

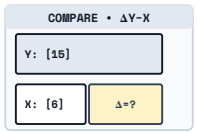
Biologists track tree frogs hopping along a 20-meter measuring tape beside a pond. Students use subtraction to find jump distances and remaining track lengths.

Companion Book (Vol. I: From Blocks to the Stack (SC-6 Manual) — Ch. 3: Unbundling a Ten & App. B: Station F.3) • Tower Height Differences & Comparison Bar Models: Aligning Row 1 (Shelf Y) above Row 0 (Workbench X) turns your tray into a physical 3D Bar Model so your eyes see the difference $\Delta = Y - X$!

Block Studio: Place Value Studio (2-Row Tray, Digit Blocks & Gold [+1] Tokens) • Stack Shortcut: Minuend [ENTER] Subtrahend [-] = Difference

CASE INVESTIGATION 1 STEM Modeling

Frog A starts at meter 6 and lands at meter 15. How long was its jump?



1. Draw or Count Blocks: _____

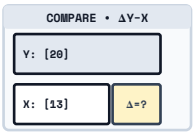
2. My Number Sentence: _____

3. My Answer: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)

CASE INVESTIGATION 2 STEM Modeling

Frog B is at meter 13. How many meters left to reach the finish line at meter 20?



1. Draw or Count Blocks: _____

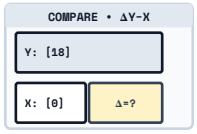
2. My Number Sentence: _____

3. My Answer: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)

CASE INVESTIGATION 3 Applied Calculation

Frog C jumps from 0 to 18, then hops backward 7 meters. What marker is it on now?



1. Draw or Count Blocks: _____

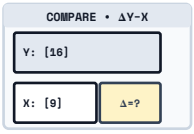
2. My Number Sentence: _____

3. My Answer: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)

CASE INVESTIGATION 4 Error Analysis Workshop

Error Analysis: Leo subtracts 16 − 9 and gets 8. Use the number line to find the true distance.



1. Draw or Count Blocks: _____

2. My Number Sentence: _____

3. My Answer: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)

Hands-On Math Explorers & Builders Note

Young builders, chefs, and nature explorers use physical blocks and paper math to solve real-world mysteries! Always build or write your paper setup first, write your number sentence, and check on your SC-6. Parents & teachers: full keys at stackcalc.io/curriculum/answers.

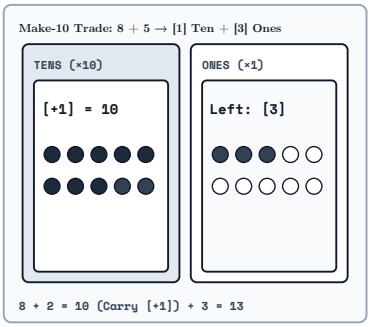
Make-10 Regrouping with Gold [+1] Carry Tokens

Hands-On Block Studio: Place Value Studio (2-Row Tray & Gold [+1] Carry Tokens) • Standards: CCSS.MATH.1.NBT.C.4, CCSS.MATH.2.NBT.B.5

1. MATHEMATICAL CONCEPT & INSIDE-OUT APPROACH (Regrouping Across 10: 28 + 5 on the Place Value Tray):

The physical Gold [+1] Carry Token sits above the Tens column whenever the Ones sum reaches 10 or more.

Companion Book (Vol. I: From Blocks to the Stack (SC-6 Manual) — Ch. 3: Two-Digit Place-Value Addition & Regrouping) • The Overflow Carry Gate & Saturday Morning Bakehouse: When 13 muffins come out of the oven, 10 muffins fill a 10-tray (snapping a Gold [+1] Carry Token into Tens) and 3 muffins remain in Ones!



2. HANDS-ON BLOCKS & CONCEPT RULES: TRADING 10 ONES FOR A GOLD [+1] CARRY TOKEN

- Each socket on the Place Value Tray holds a single Digit Block (0–9). When Ones reach 10 or more, trade 10 Ones for 1 Ten!
- Snap a Gold [+1] Carry Token into the Tens column one socket to the left.
- Example in 28 + 5: 8 + 5 = 13 ([3] in Ones, snap [+1] Carry Token onto Tens) → 2 + 1 = [3] Tens → 33!
- On the SC-6, the 4-level stack verifies your physical Gold [+1] Carry Token trade instantly.

3. STEP-BY-STEP VERIFICATION WALKTHROUGH ON THE SC-6

Hands-On Block Setup: Place [2] in Tens and [8] in Ones (28) on Row 1 (Line Y). Place [5] in the Ones socket of Row 0 (Line X). Question: Combine Ones: 8 + 5 = 13. Place [3] in Ones and snap a Gold [+1] Carry Token onto Tens ([2] + [+1] = [3]). Total? (Prediction: 33)

Verification Keystrokes: 2 8 ENTER 5 +

Button Pressed	Screen (X)	How the 4-Level Stack Mirrors Your Mathematical Steps (T, Z, Y, X)
2 8	28	28 enters Register X
ENTER	28	28 lifts to Waiting Shelf Register Y (Row 1)
5	5	5 enters Workbench Register X (Row 0)
+	33	28 + 5 = 33! 8+5=13, Gold [+1] carry makes 33

3. 3D BLOCK STUDIO & SC-6 STACK LEARNING GUIDE & SELF-CHECK

- Physical Block Studio Rule: Each socket on the Place Value Tray holds a single Digit Block (0–9). When Ones reach 10 or more, trade 10 Ones for 1 Ten!
- Stack Shortcut & Pattern: [2] [8] [ENTER] [5] [+] = 33 — On the SC-6, the 4-level stack verifies your physical Gold [+1] Carry Token trade instantly.
- 2-Second Tray-to-Screen Audit: Confirm your physical 3D Block Studio setup matches Register Y (Waiting Shelf) and Register X (Workbench) before pressing the operator key.

WARM-UP CHECK A: SOLVE ON PAPER FIRST, THEN VERIFY ON YOUR CALCULATOR!

Core Investigation: Build 37 ([3][7]) on your Place Value Tray and add [6] in Ones. Snap a Gold [+1] Carry Token onto Tens. What is 37 + 6?

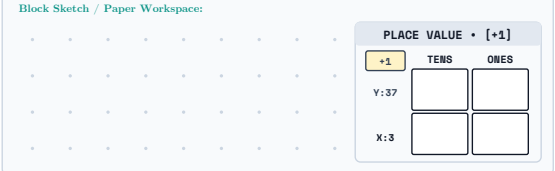
1. First Quantity / Inner Step: _____

2. Second Quantity / Operation: _____

3. My Paper Prediction: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)

Block Sketch / Paper Workspace:



Extension: Two-Digit Regrouping with Gold [+1] Tokens: 47 + 16

Deepening Concepts • Standards: CCSS.MATH.2.NBT.B.5

1. EXTENSION CONCEPT & SETUP (Two-Digit Regrouping with Gold [+1] Tokens: 47 + 16):

Both addends occupy the 2-row tray; the Gold [+1] Carry Token bridges the Ones overflow into the Tens column.

Hands-On Extension Setup: Place [4][7] in Row 1 (Waiting Shelf Y) and [1][6] in Row 0 (Workbench X) on the Place Value Tray. • Question: Ones: 7 + 6 = 13 ([3] in Ones, Gold [+1] token on Tens). Tens: 4 + 1 + 1 = [6]. Total? (Prediction: 63)

2. EXTENSION STACK SEQUENCE (SC-6): 4 7 ENTER 1 6 +

Button Pressed	Screen (X)	Extension Stack Dynamics (T, Z, Y, X)
4 7	47	47 enters Register X
ENTER	47	47 lifts to Waiting Shelf Register Y (Row 1)
1 6	16	16 enters Workbench Register X (Row 0)
+	63	47 + 16 = 63! Full two-digit regrouping sum

3. PARENT & TEACHER COACHING: TARGET MISCONCEPTIONS & 3D BLOCK STUDIO REMEDIATIONS

Misconception 1 — Writing a Two-Digit Sum Inside One Socket (e.g. 28 + 5 = 213): Student writes 13 in Ones.

Hands-On Block Studio Remediation: Show that each socket on the Place Value Tray holds only ONE Digit Block (0–9); the 10 must become a Gold [+1] Carry Token in Tens!

Misconception 2 — Placing the Gold [+1] Carry Token in the Ones Column: Student adds the carry back into Ones.

Hands-On Block Studio Remediation: Every Gold [+1] Carry Token always snaps one column to the LEFT of the column that crossed 10.

4. STACK SHORTCUT & PARTNER EXPLAIN-WHY CHALLENGE (SC-6)

Calculator Shortcut: [2] [8] [ENTER] [5] [+] = 33

Explain-Why Reflection: How do your Place Value, Fraction, or Prime blocks prove why Misconception 1 is wrong?

WARM-UP CHECK B (EXTENSION): SOLVE ON PAPER FIRST, THEN VERIFY ON YOUR CALCULATOR!

Extension Challenge: Add 58 + 25 on your Place Value Tray using a Gold [+1] Carry Token. What is the sum?

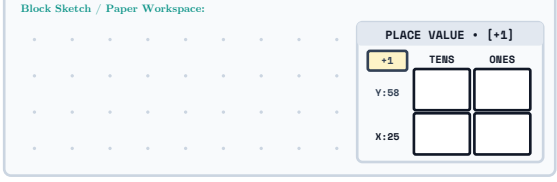
1. First Quantity / Inner Step: _____

2. Second Quantity / Operation: _____

3. My Paper Prediction: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)

Block Sketch / Paper Workspace:



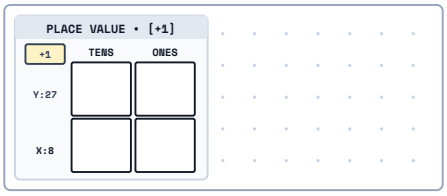
Unit 07 Lab: Make-10 Regrouping with Gold [+1] Carry Tokens

Name: _____ Date: _____ Score: _____ / 4

DIRECTIONS: (1) Build with your Place Value blocks & draw in Box 1. (2) Write the two quantities & math in Box 2.
(3) Write your Prediction BEFORE pressing keys, then check with your partner or teacher on the SC-6!

Investigation 1: Build 27 + 8 on your Place Value Tray with a [+1] token: 27 + 8 =

1. Draw Your Blocks on the Tray:



2. Number Bond & Two Quantities:

First Quantity (Top Row): _____

Second Quantity (Bottom Row): _____

Combine (+, –, or ×): _____

3. My Prediction:

_____

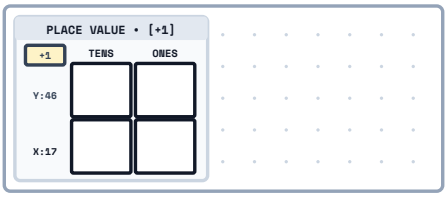
Final Verified Answer:

_____

[ ] Verified on SC-6 Stack

Investigation 2: Build 46 + 17 on your Place Value Tray: 46 + 17 =

1. Draw Your Blocks on the Tray:



2. Number Bond & Two Quantities:

First Quantity (Top Row): _____

Second Quantity (Bottom Row): _____

Combine (+, –, or ×): _____

3. My Prediction:

_____

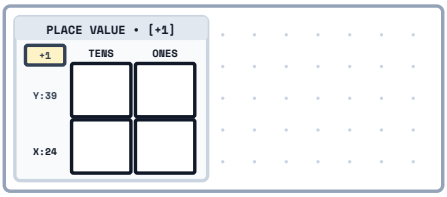
Final Verified Answer:

_____

[ ] Verified on SC-6 Stack

Investigation 3: Build 39 + 24 on your Place Value Tray: 39 + 24 =

1. Draw Your Blocks on the Tray:



2. Number Bond & Two Quantities:

First Quantity (Top Row): _____

Second Quantity (Bottom Row): _____

Combine (+, –, or ×): _____

3. My Prediction:

_____

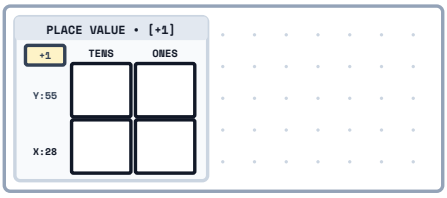
Final Verified Answer:

_____

[ ] Verified on SC-6 Stack

Investigation 4: Build 55 + 28 on your Place Value Tray: 55 + 28 =

1. Draw Your Blocks on the Tray:



2. Number Bond & Two Quantities:

First Quantity (Top Row): _____

Second Quantity (Bottom Row): _____

Combine (+, –, or ×): _____

3. My Prediction:

_____

Final Verified Answer:

_____

[ ] Verified on SC-6 Stack

MY LAB REFLECTION: Draw or tell how your Place Value blocks matched the numbers on your SC-6 screen!

_____

Unit 07 Practice A — Two-Digit + One-Digit Regrouping with Gold [+1] Carry Tokens

Name: _____ Date: _____ Score: _____ / 10

TIER 1 • LEVEL 1: BUILDER FOUNDATION • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE A (#1–#10) ON PAPER FIRST

EXAMPLE 1 **Evaluate 28 + 5 using a Gold [+1] Carry Token.**

8 + 5 = 13 → trade 10 ones for [+1] Ten → 20 + 10 + 3 = 33.

Verified Answer: 33

EXAMPLE 2 **Evaluate 47 + 6 on the Place Value Tray.**

7 + 6 = 13 → 4 Tens + 1 Ten + 3 Ones = 53. Key: [47] [ENTER] [6] [+].

Verified Answer: 53

1 Tier 1 • Builder

Regroup ones to tens: 27 + 6 =

PLACE VALUE • [+1]

+1	TENS	ONES
Y:27		
X:6		

Paper Step: _____ [ ] SC-6 Ans: _____

2 Tier 1 • Builder

Regroup ones to tens: 38 + 5 =

PLACE VALUE • [+1]

+1	TENS	ONES
Y:38		
X:5		

Paper Step: _____ [ ] SC-6 Ans: _____

3 Tier 1 • Builder

Regroup ones to tens: 45 + 8 =

PLACE VALUE • [+1]

+1	TENS	ONES
Y:45		
X:8		

Paper Step: _____ [ ] SC-6 Ans: _____

4 Tier 1 • Builder

Regroup ones to tens: 59 + 4 =

PLACE VALUE • [+1]

+1	TENS	ONES
Y:59		
X:4		

Paper Step: _____ [ ] SC-6 Ans: _____

5 Tier 1 • Builder

Regroup ones to tens: 66 + 7 =

PLACE VALUE • [+1]

+1	TENS	ONES
Y:66		
X:7		

Paper Step: _____ [ ] SC-6 Ans: _____

6 Tier 1 • Builder

Regroup ones to tens: 74 + 9 =

PLACE VALUE • [+1]

+1	TENS	ONES
Y:74		
X:9		

Paper Step: _____ [ ] SC-6 Ans: _____

7 Tier 1 • Builder

Regroup ones to tens: 88 + 6 =

PLACE VALUE • [+1]

+1	TENS	ONES
Y:88		
X:6		

Paper Step: _____ [ ] SC-6 Ans: _____

8 Tier 1 • Builder

Regroup to an exact ten: 36 + 4 =

PLACE VALUE • [+1]

+1	TENS	ONES
Y:36		
X:4		

Paper Step: _____ [ ] SC-6 Ans: _____

9 Tier 1 • Builder

Regroup to an exact ten: 53 + 7 =

PLACE VALUE • [+1]

+1	TENS	ONES
Y:53		
X:7		

Paper Step: _____ [ ] SC-6 Ans: _____

10 Tier 1 • Builder

Regroup to an exact ten: 72 + 8 =

PLACE VALUE • [+1]

+1	TENS	ONES
Y:72		
X:8		

Paper Step: _____ [ ] SC-6 Ans: _____

Unit 07 Practice B — Two-Digit + Two-Digit Regrouping on the Tray

Name: _____ Date: _____ Score: _____ / 10

TIER 1 • LEVEL 1: BUILDER FOUNDATION • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE B (#1–#10) ON PAPER FIRST

EXAMPLE 1 **Evaluate 36 + 27 by bundling 10 ones.**

Ones: 6 + 7 = 13 (1 Ten, 3 Ones). Tens: 30 + 20 + 10 = 60 → 63.

Verified Answer: 63

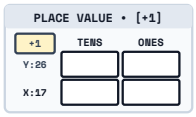
EXAMPLE 2 **Evaluate 48 + 35.**

Ones: 8 + 5 = 13. Tens: 40 + 30 + 10 = 80 → 83. Key: [48] [ENTER] [35] [+].

Verified Answer: 83

1 Tier 1 • Builder

Two-digit regrouping: 26 + 17 =



Paper Step: _____ [ ] SC-6 Ans: _____

2 Tier 1 • Builder

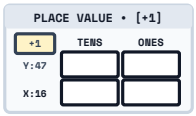
Two-digit regrouping: 35 + 28 =



Paper Step: _____ [ ] SC-6 Ans: _____

3 Tier 1 • Builder

Two-digit regrouping: 47 + 16 =



Paper Step: _____ [ ] SC-6 Ans: _____

4 Tier 1 • Builder

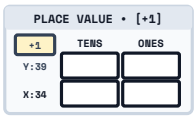
Two-digit regrouping: 58 + 24 =



Paper Step: _____ [ ] SC-6 Ans: _____

5 Tier 1 • Builder

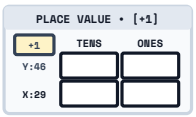
Two-digit regrouping: 39 + 34 =



Paper Step: _____ [ ] SC-6 Ans: _____

6 Tier 1 • Builder

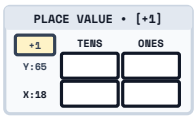
Two-digit regrouping: 46 + 29 =



Paper Step: _____ [ ] SC-6 Ans: _____

7 Tier 1 • Builder

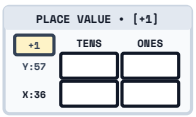
Two-digit regrouping: 65 + 18 =



Paper Step: _____ [ ] SC-6 Ans: _____

8 Tier 1 • Builder

Two-digit regrouping: 57 + 36 =



Paper Step: _____ [ ] SC-6 Ans: _____

9 Tier 1 • Builder

Two-digit regrouping: 44 + 48 =



Paper Step: _____ [ ] SC-6 Ans: _____

10 Tier 1 • Builder

Two-digit regrouping to 100: 63 + 37 =



Paper Step: _____ [ ] SC-6 Ans: _____

Unit 07 Practice C — Real-World Carry-Token Word Problems & Error Analysis

Name: _____ Date: _____ Score: _____ / 10

TIER 2 • LEVEL 2: STORY & DETECTIVE LAB • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE C (#1–#10) ON PAPER FIRST

EXAMPLE 1 **A baker has 38 blueberry muffins and bakes 15 more. Total muffins?**

38 + 15 = 53 muffins (8 + 5 = 13, carry 1 Ten).

Verified Answer: 53 muffins

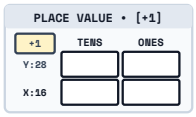
EXAMPLE 2 **Spot the Mistake: For 47 + 26, Sam wrote 63 because he forgot the [+1] Carry Token.**

7 + 6 = 13 adds +1 Ten to 4 + 2 = 6 Tens → 73, not 63!

Verified Answer: 73

1 Tier 2 • Detective

Noah collected 28 seashells on Saturday and 16 on Sunday. How many seashells in all?



Paper Step: _____ | | SC-6 Ans: _____

2 Tier 2 • Detective

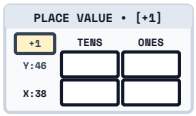
Class 2A has 25 students and Class 2B has 27 students. How many students in both classes?



Paper Step: _____ | | SC-6 Ans: _____

3 Tier 2 • Detective

Maya saved 46¢ in her piggy bank and found 38¢ more. How many cents does she have now?



Paper Step: _____ | | SC-6 Ans: _____

4 Tier 2 • Detective

A gardener planted 39 red tulips and 24 yellow tulips. How many tulips altogether?



Paper Step: _____ | | SC-6 Ans: _____

5 Tier 2 • Detective

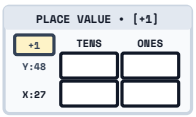
Liam read 37 pages last week and 45 pages this week. How many pages did he read in all?



Paper Step: _____ | | SC-6 Ans: _____

6 Tier 2 • Detective

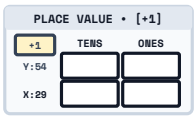
A train car holds 48 passengers, and 27 more board at the station. Total passengers?



Paper Step: _____ | | SC-6 Ans: _____

7 Tier 2 • Detective

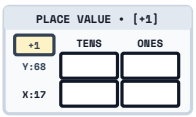
Sofia has 54 red beads and 29 blue beads. How many beads does she have altogether?



Paper Step: _____ | | SC-6 Ans: _____

8 Tier 2 • Detective

An orchard has 68 apple trees and 17 pear trees. How many fruit trees in all?



Paper Step: _____ | | SC-6 Ans: _____

9 Tier 2 • Detective

A box has 45 green blocks and 45 yellow blocks. How many blocks in all?



Paper Step: _____ | | SC-6 Ans: _____

10 Tier 2 • Detective

Spot the Mistake: For 38 + 25, Eli wrote 513 by writing 5 and 13 side-by-side. Fix it!



Paper Step: _____ | | SC-6 Ans: _____

Unit 07 Practice D — Make-the-Next-Ten Mental Strategy & Compensation

Name: _____ Date: _____ Score: _____ / 10

TIER 2 • LEVEL 2: STORY & DETECTIVE LAB • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE D (#1–#10) ON PAPER FIRST

EXAMPLE 1 **Evaluate 38 + 15 by jumping to 40 first.**

38 + 2 = 40, then 40 + 13 = 53. Key: [38] [ENTER] [2] [+] [13] [+].

Verified Answer: 53

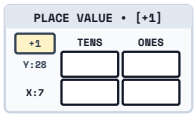
EXAMPLE 2 **Evaluate 49 + 26 using compensation (+30 - 1).**

49 is 1 less than 50: 50 + 26 - 1 = 75!

Verified Answer: 75

1 Tier 2 • Detective

Make the next ten first: 28 + 7 =



Paper Step: _____ [ ] SC-6 Ans: _____

2 Tier 2 • Detective

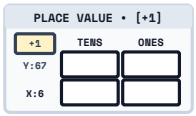
Make the next ten first: 49 + 8 =



Paper Step: _____ [ ] SC-6 Ans: _____

3 Tier 2 • Detective

Make the next ten first: 67 + 6 =



Paper Step: _____ [ ] SC-6 Ans: _____

4 Tier 2 • Detective

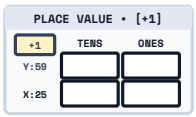
Make the next ten first: 38 + 24 =



Paper Step: _____ [ ] SC-6 Ans: _____

5 Tier 2 • Detective

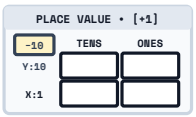
Make the next ten first: 59 + 25 =



Paper Step: _____ [ ] SC-6 Ans: _____

6 Tier 2 • Detective

Add-10-subtract-1 shortcut (+9): 36 + 9 =



Paper Step: _____ [ ] SC-6 Ans: _____

7 Tier 2 • Detective

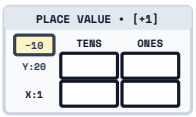
Add-10-subtract-1 shortcut (+9): 57 + 9 =



Paper Step: _____ [ ] SC-6 Ans: _____

8 Tier 2 • Detective

Add-20-subtract-1 shortcut (+19): 45 + 19 =



Paper Step: _____ [ ] SC-6 Ans: _____

9 Tier 2 • Detective

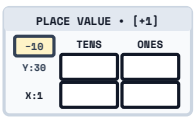
Add-20-subtract-1 shortcut (+19): 68 + 19 =



Paper Step: _____ [ ] SC-6 Ans: _____

10 Tier 2 • Detective

Add-30-subtract-1 shortcut (+29): 54 + 29 =



Paper Step: _____ [ ] SC-6 Ans: _____

Unit 07 Practice E — Missing Addends Across Tens & Three-Addend Regrouping

Name: _____ Date: _____ Score: _____ / 10

TIER 3 • LEVEL 3: BOSS CHALLENGE • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE E (#1–#10) ON PAPER FIRST

EXAMPLE 1 **Pair 10-partners in the Ones place first: 24 + 18 + 16.**

4 + 6 = 10, so 24 + 16 = 40; then 40 + 18 = 58!

Verified Answer: 58

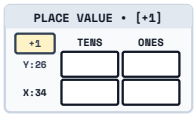
EXAMPLE 2 **Find the missing addend: 37 + [?] = 45.**

Subtract 45 - 37 = 8. Key: [45] [ENTER] [37] [-].

Verified Answer: 8

1 Tier 3 • Challenge

Find the missing addend: 26 + [?] = 34



Paper Step: _____ [ ] SC-6 Ans: _____

2 Tier 3 • Challenge

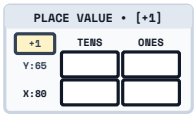
Find the missing addend: 48 + [?] = 55



Paper Step: _____ [ ] SC-6 Ans: _____

3 Tier 3 • Challenge

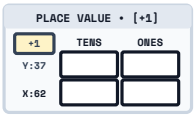
Find the missing addend: 65 + [?] = 80



Paper Step: _____ [ ] SC-6 Ans: _____

4 Tier 3 • Challenge

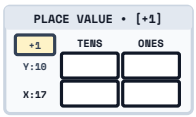
Find the missing addend: 37 + [?] = 62



Paper Step: _____ [ ] SC-6 Ans: _____

5 Tier 3 • Challenge

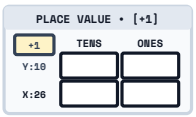
Pair 10-partners first: 17 + 25 + 13 =



Paper Step: _____ [ ] SC-6 Ans: _____

6 Tier 3 • Challenge

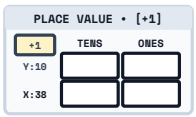
Pair 10-partners first: 26 + 19 + 14 =



Paper Step: _____ [ ] SC-6 Ans: _____

7 Tier 3 • Challenge

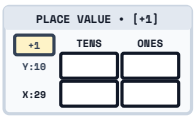
Pair 10-partners first: 38 + 22 + 15 =



Paper Step: _____ [ ] SC-6 Ans: _____

8 Tier 3 • Challenge

Pair 10-partners first: 29 + 31 + 27 =



Paper Step: _____ [ ] SC-6 Ans: _____

9 Tier 3 • Challenge

Three-branch sum: 18 + 24 + 35 =



Paper Step: _____ [ ] SC-6 Ans: _____

10 Tier 3 • Challenge

Three-branch sum: 27 + 27 + 27 =



Paper Step: _____ [ ] SC-6 Ans: _____

Unit 07 Practice F — Regrouping to 100, Mystery Digits & Stack Mastery

Name: _____ Date: _____ Score: _____ / 10

TIER 3 • LEVEL 3: BOSS CHALLENGE • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE F (#1–#10) ON PAPER FIRST

EXAMPLE 1 **Find the missing partner to 100: 64 + [?] = 100.**

64 + 6 = 70, and 70 + 30 = 100 → 36! Key: [100] [ENTER] [64] [-].

Verified Answer: 36

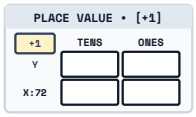
EXAMPLE 2 **Double 38 on the stack using [38] [ENTER] [+].**

30 + 30 = 60, 8 + 8 = 16 → 60 + 16 = 76.

Verified Answer: 76

1 Tier 3 • Challenge

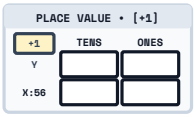
Complement to 100: 72 + [?] = 100



Paper Step: _____ [ ] SC-6 Ans: _____

2 Tier 3 • Challenge

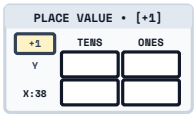
Complement to 100: 56 + [?] = 100



Paper Step: _____ [ ] SC-6 Ans: _____

3 Tier 3 • Challenge

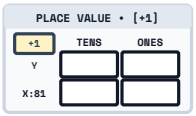
Complement to 100: 38 + [?] = 100



Paper Step: _____ [ ] SC-6 Ans: _____

4 Tier 3 • Challenge

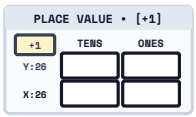
Complement to 100: 81 + [?] = 100



Paper Step: _____ [ ] SC-6 Ans: _____

5 Tier 3 • Challenge

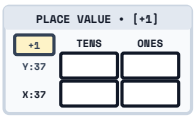
Two-digit double with regrouping: 26 + 26 =



Paper Step: _____ [ ] SC-6 Ans: _____

6 Tier 3 • Challenge

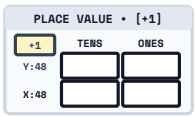
Two-digit double with regrouping: 37 + 37 =



Paper Step: _____ [ ] SC-6 Ans: _____

7 Tier 3 • Challenge

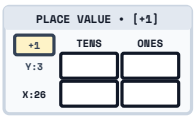
Two-digit double with regrouping: 48 + 48 =



Paper Step: _____ [ ] SC-6 Ans: _____

8 Tier 3 • Challenge

Mystery Digit: In 3[?] + 26 = 64, what is the missing Ones digit?



Paper Step: _____ [ ] SC-6 Ans: _____

9 Tier 3 • Challenge

Four-addend chain: 15 + 25 + 18 + 12 =



Paper Step: _____ [ ] SC-6 Ans: _____

10 Tier 3 • Challenge

Three-Tray Regrouping Puzzle: Combine 47 blocks, 28 blocks, and 15 blocks using Gold [+1] Carry Tokens on your tray:



Paper Step: _____ [ ] SC-6 Ans: _____

Unit 07 Mastery Check: Make-10 Regrouping & [+1] Tokens

Name: _____ Date: _____ Score: _____ / 100

100-POINT UNIT MASTERY ASSESSMENT — 10 UNSCAFFOLDED PROBLEMS (10 POINTS EACH)

Solve each problem on paper first in the dot-grid workspace. Write your final answer on the line, then verify your result on the SC-6 stack. Record your total score in Appendix B (Score Tracker) and verify complete worked keystrokes online at stackcalc.io/curriculum/answers.

1 Core Fluency • 10 pts

Regroup with a Gold [+1] Carry Token: 28 + 7 =

[ ] +10 pts [ ] SC-6 **Ans:** _____

2 Core Fluency • 10 pts

Make the next ten on the tray: 46 + 8 =

[ ] +10 pts [ ] SC-6 **Ans:** _____

3 Core Fluency • 10 pts

Add two-digit numbers with a Carry Token: 37 + 26 =

[ ] +10 pts [ ] SC-6 **Ans:** _____

4 Core Fluency • 10 pts

Combine Tens and Ones with regrouping: 58 + 35 =

[ ] +10 pts [ ] SC-6 **Ans:** _____

5 Core Fluency • 10 pts

Find the missing partner to 100: 67 + [?] = 100

[ ] +10 pts [ ] SC-6 **Ans:** _____

6 Core Fluency • 10 pts

Pair 10-partners first on the stack: 24 + 19 + 16 =

[ ] +10 pts [ ] SC-6 **Ans:** _____

7 Application • 10 pts

A library shelf has 38 fiction books and 27 science books. How many books in all?

[ ] +10 pts [ ] SC-6 **Ans:** _____

8 Application • 10 pts

Maya has 45¢ and earns 39¢ more. How many cents does she have altogether?

[ ] +10 pts [ ] SC-6 **Ans:** _____

9 Application • 10 pts

Double 36 on the stack. What is the total?

[ ] +10 pts [ ] SC-6 **Ans:** _____

10 Error Analysis • 10 pts

Error Analysis: Zoe added 48 + 25 and got 63 because she forgot to carry 1 Ten. Give the true sum!

[ ] +10 pts [ ] SC-6 **Ans:** _____

Unit 07 STEM: The Coin Bank Regrouping Vault

Name: _____ Date: _____ Score: _____ / 4

REAL-WORLD STEM APPLICATION & WORKSHOP: THE COIN BANK REGROUPING VAULT

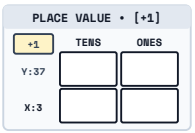
An automated coin sorting machine collects pennies in the Ones chute. Whenever 10 pennies accumulate, it trades them for 1 Dime (10¢) in the Tens chute.

Companion Book (Vol. I: From Blocks to the Stack (SC-6 Manual) — Ch. 3: Two-Digit Place-Value Addition & Regrouping) • The Overflow Carry Gate & Saturday Morning Bakehouse: When 13 muffins come out of the oven, 10 muffins fill a 10-tray (snapping a Gold [+1] Carry Token into Tens) and 3 muffins remain in Ones!

Block Studio: Place Value Studio (2-Row Tray & Gold [+1] Carry Tokens) • Stack Shortcut: [2] [8] [ENTER] [5] [+] = 33

CASE INVESTIGATION 1 — STEM Modeling

The vault holds 37¢ (3 dimes, 7 pennies) and 8 more pennies drop in. What is the new total?



1. Draw or Count Blocks: _____

2. My Number Sentence: _____

3. My Answer: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)

CASE INVESTIGATION 2 — STEM Modeling

Deposit A is 46¢ and Deposit B is 27¢. Combine them and state total cents:



1. Draw or Count Blocks: _____

2. My Number Sentence: _____

3. My Answer: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)

CASE INVESTIGATION 3 — Applied Calculation

Three coin rolls hold 25¢, 38¢, and 17¢. What is the total value in the vault?



1. Draw or Count Blocks: _____

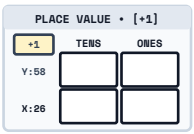
2. My Number Sentence: _____

3. My Answer: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)

CASE INVESTIGATION 4 — Error Analysis Workshop

Error Analysis: A clerk adds 58¢ + 26¢ and writes 74¢. Find the true sum with the carry token!



1. Draw or Count Blocks: _____

2. My Number Sentence: _____

3. My Answer: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)

Hands-On Math Explorers & Builders Note

Young builders, chefs, and nature explorers use physical blocks and paper math to solve real-world mysteries! Always build or write your paper setup first, write your number sentence, and check on your SC-6. Parents & teachers: full keys at stackcalc.io/curriculum/answers.

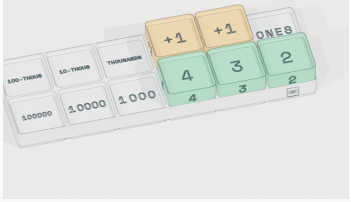
Two-Digit Addition & Subtraction (0–99)

Hands-On Block Studio: Place Value Studio (2-Row Tray, Digit Blocks & [+1] Tokens) • Standards: CCSS.MATH.2.NBT.B.5, CCSS.MATH.2.NBT.B.7

1. MATHEMATICAL CONCEPT & INSIDE-OUT APPROACH (Two-Digit Addition with Regrouping: 38 + 27):

Two-digit addition combines place value columns: 30 + 20 = 50, 8 + 7 = 15, and 50 + 15 = 65.

Companion Book (Vol. I: From Blocks to the Stack (SC-6 Manual) — Ch. 3: Two-Digit Place-Value Subtraction & Unbundling) • Unbundling a Ten-Bar & Constant-Difference Shifts: When Row 1 needs more Ones to subtract Row 0, trade 1 Ten for 10 Ones on the tray—or shift both rows together so their gap never changes!



Place Value Studio • Two-Digit Regrouping

2. HANDS-ON BLOCKS & CONCEPT RULES: MASTERING TWO-DIGIT REGROUPING & UNBUNDLING TO 99

- Addition combines columns: Tens add to Tens, and Ones add to Ones (with a Gold [+1] Carry Token when Ones ≥ 10).
- Subtraction with unbundling: if the top Ones digit in Row 1 is smaller, unbundle 1 Ten from Row 1 into 10 Ones!
- In 52 − 19: step Tens [5] down to [4] and place a Gold [+1] token on Ones to make 12 Ones (12 − 9 = 3; 4 − 1 = 3 → 33).
- On the SC-6: [5] [2] [ENTER] [1] [9] [-] verifies your unbundling trade instantly.

3. STEP-BY-STEP VERIFICATION WALKTHROUGH ON THE SC-6

Hands-On Block Setup: Place [3][8] (38) in Row 1 (Waiting Shelf Y) and [2][7] (27) in Row 0 (Workbench X) of the Place Value Tray. Question: Ones: 8 + 7 = 15 ([5] in Ones, Gold [+1] token on Tens). Tens: 3 + 2 + 1 = [6]. Total? (Prediction: 65)

Verification Keystrokes: 3 8 ENTER 2 7 +

Button Pressed	Screen (X)	How the 4-Level Stack Mirrors Your Mathematical Steps (T, Z, Y, X)
3 8	38	38 enters Register X
ENTER	38	38 lifts to Waiting Shelf Register Y (Row 1)
2 7	27	27 enters Workbench Register X (Row 0)
+	65	38 + 27 = 65! Verified on stack

3. 3D BLOCK STUDIO & SC-6 STACK LEARNING GUIDE & SELF-CHECK

- Physical Block Studio Rule: Addition combines columns: Tens add to Tens, and Ones add to Ones (with a Gold [+1] Carry Token when Ones ≥ 10).
- Stack Shortcut & Pattern: [5] [2] [ENTER] [1] [9] [-] = 33 — On the SC-6: [5] [2] [ENTER] [1] [9] [-] verifies your unbundling trade instantly.
- 2-Second Tray-to-Screen Audit: Confirm your physical 3D Block Studio setup matches Register Y (Waiting Shelf) and Register X (Workbench) before pressing the operator key.

WARM-UP CHECK A: SOLVE ON PAPER FIRST, THEN VERIFY ON YOUR CALCULATOR!

Core Investigation: Solve 45 + 39 on your Place Value Tray and paper first, then verify on your SC-6.

1. First Quantity / Inner Step: _____

2. Second Quantity / Operation: _____

3. My Paper Prediction: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)

Block Sketch / Paper Workspace:



Extension: Two-Digit Subtraction: Unbundling a Ten (52 − 19)

Deepening Concepts • Standards: CCSS.MATH.2.NBT.B.7

1. EXTENSION CONCEPT & SETUP (Two-Digit Subtraction: Unbundling a Ten (52 − 19)):

Unbundling trades 1 Ten from the Tens socket into 10 Ones so subtraction proceeds cleanly in every column.

Hands-On Extension Setup: Place [5][2] (52) in Row 1 (Waiting Shelf Y) and [1][9] (19) in Row 0 (Workbench X) on the Place Value Tray. • Question: Since 2 < 9, step Row 1 Tens [5] → [4] and snap a Gold [+1] token onto Ones to make 12. 12 − 9 = [3]; 4 − 1 = [3]. Total? (Prediction: 33)

2. EXTENSION STACK SEQUENCE (SC-6): [5] [2] [ENTER] [1] [9] [-]

Button Pressed	Screen (X)	Extension Stack Dynamics (T, Z, Y, X)
[5] [2]	52	52 enters Register X
[ENTER]	52	52 lifts to Waiting Shelf Register Y (Row 1)
[1] [9]	19	19 enters Workbench Register X (Row 0)
[-]	33	52 − 19 = 33! Unbundling verified

3. PARENT & TEACHER COACHING: TARGET MISCONCEPTIONS & 3D BLOCK STUDIO REMEDIATIONS

Misconception 1 — Subtracting Smaller Digit from Larger Regardless of Row: In 52 − 19, student does 9 − 2 = 7 and 5 − 1 = 4, answering 47!

Hands-On Block Studio Remediation: Point to Row 1 on the Place Value Tray—[2] is on top, so you must unbundle [5] Tens to [4] Tens and make 12 − 9 = 3.

Misconception 2 — Forgetting to Step Down the Tens Digit Block After Unbundling: Student unbundles 10 Ones but leaves [5] in the Tens socket.

Hands-On Block Studio Remediation: Always swap the [5] Digit Block for [4] at the exact moment you place the Gold [+1] token on Ones.

4. STACK SHORTCUT & PARTNER EXPLAIN-WHY CHALLENGE (SC-6)

Calculator Shortcut: [5] [2] [ENTER] [1] [9] [-] = 33

Explain-Why Reflection: How do your Place Value, Fraction, or Prime blocks prove why Misconception 1 is wrong?

WARM-UP CHECK B (EXTENSION): SOLVE ON PAPER FIRST, THEN VERIFY ON YOUR CALCULATOR!

Extension Challenge: Place [6][4] in Row 1 and [2][8] in Row 0 of your Place Value Tray. Unbundle 1 Ten to solve 64 − 28.

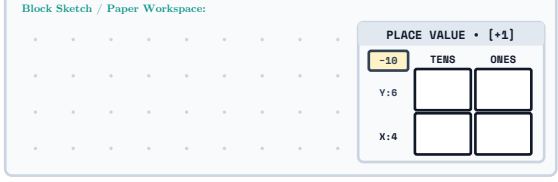
1. First Quantity / Inner Step: _____

2. Second Quantity / Operation: _____

3. My Paper Prediction: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)

Block Sketch / Paper Workspace:



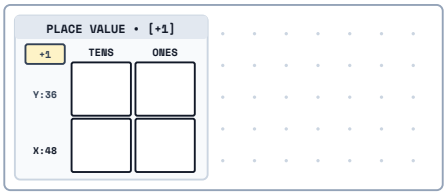
Unit 08 Lab: Two-Digit Addition & Subtraction (0–99)

Name: _____ Date: _____ Score: _____ / 4

DIRECTIONS: (1) Sketch your place-value / bar model in Box 1. (2) Show your step-by-step paper math in Box 2.
(3) Write your Prediction BEFORE pressing keys, then verify your answer on the SC-6!

Investigation 1: Solve 36 + 48 on paper & Place Value Tray, then verify: 36 + 48 =

1. Place-Value / Bar Model Sketch:



2. Step-by-Step Paper Work:

Step 1 (First Group / Product):

Step 2 (Combine / Divide):

Equation & Solution:

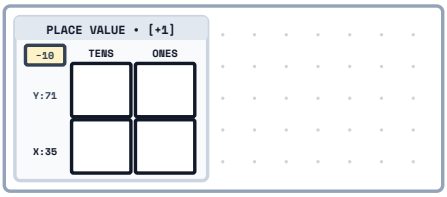
3. My Prediction:

Final Verified Answer:

[ ] Verified on SC-6 Stack

Investigation 2: Solve 71 − 35 on paper with unbundling: 71 − 35 =

1. Place-Value / Bar Model Sketch:



2. Step-by-Step Paper Work:

Step 1 (First Group / Product):

Step 2 (Combine / Divide):

Equation & Solution:

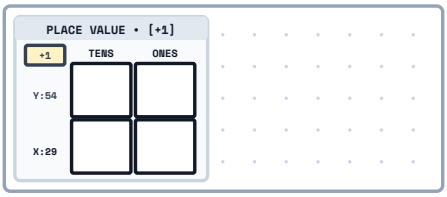
3. My Prediction:

Final Verified Answer:

[ ] Verified on SC-6 Stack

Investigation 3: Solve 54 + 29 on paper & Place Value Tray, then verify: 54 + 29 =

1. Place-Value / Bar Model Sketch:



2. Step-by-Step Paper Work:

Step 1 (First Group / Product):

Step 2 (Combine / Divide):

Equation & Solution:

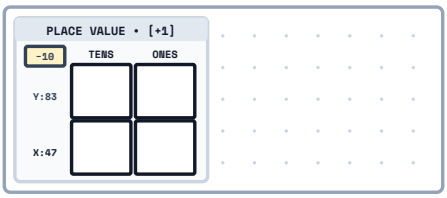
3. My Prediction:

Final Verified Answer:

[ ] Verified on SC-6 Stack

Investigation 4: Solve 83 − 47 on paper with unbundling: 83 − 47 =

1. Place-Value / Bar Model Sketch:



2. Step-by-Step Paper Work:

Step 1 (First Group / Product):

Step 2 (Combine / Divide):

Equation & Solution:

3. My Prediction:

Final Verified Answer:

[ ] Verified on SC-6 Stack

MY LAB REFLECTION: Draw or tell how your Place Value blocks matched the numbers on your SC-6 screen!

Unit 08 Practice A — Two-Digit Addition & Subtraction (No Regrouping vs Regrouping)

Name: _____ Date: _____ Score: _____ / 10

TIER 1 • LEVEL 1: BUILDER FOUNDATION • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE A (#1–#10) ON PAPER FIRST

EXAMPLE 1 **Add 45 + 32 on the Place Value Tray.**

40 + 30 = 70, 5 + 2 = 7 → 77. Key: [45] [ENTER] [32] [+].

Verified Answer: 77

EXAMPLE 2 **Subtract 64 - 28 by unbundling 1 Ten into 10 Ones.**

Unbundle 60 + 4 into 50 + 14 → (50 - 20) + (14 - 8) = 36.

Verified Answer: 36

1 Tier 1 • Builder

Add without regrouping: 34 + 25 =

PLACE VALUE • [+1]

+1	TENS	ONES
Y:34		
X:25		

Paper Step: _____ [ ] SC-6 Ans: _____

2 Tier 1 • Builder

Add without regrouping: 52 + 36 =

PLACE VALUE • [+1]

+1	TENS	ONES
Y:52		
X:36		

Paper Step: _____ [ ] SC-6 Ans: _____

3 Tier 1 • Builder

Subtract without unbundling: 68 - 24 =

PLACE VALUE • [+1]

-10	TENS	ONES
Y:68		
X:24		

Paper Step: _____ [ ] SC-6 Ans: _____

4 Tier 1 • Builder

Subtract without unbundling: 87 - 35 =

PLACE VALUE • [+1]

-10	TENS	ONES
Y:87		
X:35		

Paper Step: _____ [ ] SC-6 Ans: _____

5 Tier 1 • Builder

Add with regrouping: 47 + 38 =

PLACE VALUE • [+1]

+1	TENS	ONES
Y:47		
X:38		

Paper Step: _____ [ ] SC-6 Ans: _____

6 Tier 1 • Builder

Add with regrouping: 56 + 29 =

PLACE VALUE • [+1]

+1	TENS	ONES
Y:56		
X:29		

Paper Step: _____ [ ] SC-6 Ans: _____

7 Tier 1 • Builder

Subtract with unbundling: 52 - 19 =

PLACE VALUE • [+1]

-10	TENS	ONES
Y:52		
X:19		

Paper Step: _____ [ ] SC-6 Ans: _____

8 Tier 1 • Builder

Subtract with unbundling: 63 - 27 =

PLACE VALUE • [+1]

-10	TENS	ONES
Y:63		
X:27		

Paper Step: _____ [ ] SC-6 Ans: _____

9 Tier 1 • Builder

Subtract with unbundling: 71 - 35 =

PLACE VALUE • [+1]

-10	TENS	ONES
Y:71		
X:35		

Paper Step: _____ [ ] SC-6 Ans: _____

10 Tier 1 • Builder

Subtract with unbundling: 82 - 46 =

PLACE VALUE • [+1]

-10	TENS	ONES
Y:82		
X:46		

Paper Step: _____ [ ] SC-6 Ans: _____

Unit 08 Practice B — Unbundling Across Zero & Inverse Addition Checks

Name: _____ Date: _____ Score: _____ / 10

TIER 1 • LEVEL 1: BUILDER FOUNDATION • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE B (#1–#10) ON PAPER FIRST

EXAMPLE 1 **Evaluate 60 - 24 by unbundling 1 Ten from 60.**

60 becomes 5 Tens + 10 Ones → (50 - 20) + (10 - 4) = 36.

Verified Answer: 36

EXAMPLE 2 **Check 73 - 28 = 45 using inverse addition.**

45 + 28 = 73! Key: [45] [ENTER] [28] [+].

Verified Answer: 73

1 Tier 1 • Builder

Subtract from a multiple of 10: 50 - 16 =

PLACE VALUE • [+1]

-10	TENS	ONES
Y:10		
X:50		

Paper Step: _____ [ ] SC-6 Ans: _____

2 Tier 1 • Builder

Subtract from a multiple of 10: 70 - 33 =

PLACE VALUE • [+1]

-10	TENS	ONES
Y:10		
X:70		

Paper Step: _____ [ ] SC-6 Ans: _____

3 Tier 1 • Builder

Subtract from a multiple of 10: 80 - 47 =

PLACE VALUE • [+1]

-10	TENS	ONES
Y:10		
X:80		

Paper Step: _____ [ ] SC-6 Ans: _____

4 Tier 1 • Builder

Subtract from a multiple of 10: 90 - 54 =

PLACE VALUE • [+1]

-10	TENS	ONES
Y:10		
X:90		

Paper Step: _____ [ ] SC-6 Ans: _____

5 Tier 1 • Builder

Subtract from 100: 100 - 38 =

PLACE VALUE • [+1]

-10	TENS	ONES
Y		
X		

Paper Step: _____ [ ] SC-6 Ans: _____

6 Tier 1 • Builder

Subtract with unbundling: 74 - 48 =

PLACE VALUE • [+1]

-10	TENS	ONES
Y:74		
X:48		

Paper Step: _____ [ ] SC-6 Ans: _____

7 Tier 1 • Builder

Subtract with unbundling: 91 - 56 =

PLACE VALUE • [+1]

-10	TENS	ONES
Y:91		
X:56		

Paper Step: _____ [ ] SC-6 Ans: _____

8 Tier 1 • Builder

Find the missing subtrahend: 65 - [?] = 28

PLACE VALUE • [+1]

-10	TENS	ONES
Y:65		
X:28		

Paper Step: _____ [ ] SC-6 Ans: _____

9 Tier 1 • Builder

Find the starting number: [?] - 34 = 49

PLACE VALUE • [+1]

-10	TENS	ONES
Y:34		
X:49		

Paper Step: _____ [ ] SC-6 Ans: _____

10 Tier 1 • Builder

Inverse Check: If 84 - 37 = 47, evaluate 47 + 37 to verify:

PLACE VALUE • [+1]

-10	TENS	ONES
Y:84		
X:37		

Paper Step: _____ [ ] SC-6 Ans: _____

Unit 08 Practice C — Real-World Two-Digit Word Problems & Error Analysis

Name: _____ Date: _____ Score: _____ / 10

TIER 2 • LEVEL 2: STORY & DETECTIVE LAB • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE C (#1–#10) ON PAPER FIRST

EXAMPLE 1 A thermometer reads 72°F at noon and drops 18°F at night. Night temperature?

72 - 18 = 54°F. Key: [72] [ENTER] [18] [-].

Verified Answer: 54°F

EXAMPLE 2 Spot the Mistake: For 63 - 27, Leo did 7 - 3 = 4 in the ones place and got 44.

You cannot subtract 3 - 7 by flipping to 7 - 3! Unbundle 1 Ten: 13 - 7 = 6 → 36.

Verified Answer: 36

1 Tier 2 • Detective

A theater has 85 seats. 58 seats are filled. How many seats are still empty?

PLACE VALUE • [+1]

+1	TENS	ONES
Y:85		
X:58		

Paper Step: _____ | | SC-6 Ans: _____

2 Tier 2 • Detective

Ava has 44 stickers and her brother has 39 stickers. How many stickers do they have together?

PLACE VALUE • [+1]

+1	TENS	ONES
Y:44		
X:39		

Paper Step: _____ | | SC-6 Ans: _____

3 Tier 2 • Detective

A rope is 92 feet long. A climber cuts off 36 feet. How much rope is left?

PLACE VALUE • [+1]

-10	TENS	ONES
Y:92		
X:36		

Paper Step: _____ | | SC-6 Ans: _____

4 Tier 2 • Detective

Noah scored 64 points in Game 1 and 47 points in Game 2. How many more points in Game 1?

COMPARE • ΔY-X

Y: [64]

X: [1] Δ=?

Paper Step: _____ | | SC-6 Ans: _____

5 Tier 2 • Detective

A bakery made 75 bagels in the morning and sold 48 by noon. How many bagels remain?

PLACE VALUE • [+1]

-10	TENS	ONES
Y:75		
X:48		

Paper Step: _____ | | SC-6 Ans: _____

6 Tier 2 • Detective

Priya saved $38 in May and $45 in June. How much did she save in both months?

PLACE VALUE • [+1]

+1	TENS	ONES
Y:38		
X:45		

Paper Step: _____ | | SC-6 Ans: _____

7 Tier 2 • Detective

A book has 90 pages. Liam has read 53 pages so far. How many pages are left to read?

PLACE VALUE • [+1]

-10	TENS	ONES
Y:90		
X:53		

Paper Step: _____ | | SC-6 Ans: _____

8 Tier 2 • Detective

A squirrel hid 52 acorns in Oak Tree A and 29 in Oak Tree B. Total acorns hidden?

PLACE VALUE • [+1]

+1	TENS	ONES
Y:52		
X:29		

Paper Step: _____ | | SC-6 Ans: _____

9 Tier 2 • Detective

A kite flies at 81 meters, then drops 25 meters. How high is the kite now?

PLACE VALUE • [+1]

+1	TENS	ONES
Y:81		
X:25		

Paper Step: _____ | | SC-6 Ans: _____

10 Tier 2 • Detective

Spot the Mistake: Sam solved 72 - 38 by doing 8 - 2 = 6 and wrote 46. Find the true difference!

PLACE VALUE • [+1]

-10	TENS	ONES
Y:72		
X:38		

Paper Step: _____ | | SC-6 Ans: _____

Unit 08 Practice D — Constant-Difference & Friendly-Number Subtraction Shortcuts

Name: _____ Date: _____ Score: _____ / 10

TIER 2 • LEVEL 2: STORY & DETECTIVE LAB • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE D (#1–#10) ON PAPER FIRST

EXAMPLE 1 **Solve 63 - 29 by subtracting 30 and adding 1 back.**

63 - 30 = 33, then 33 + 1 = 34! Key: [63] [ENTER] [30] [-] [1] [+].

Verified Answer: 34

EXAMPLE 2 **Shift both numbers up by +2: 74 - 38 = 76 - 40.**

Adding 2 to both keeps the distance identical: 76 - 40 = 36!

Verified Answer: 36

1 Tier 2 • Detective

Friendly -19 shortcut: 54 - 19 =

PLACE VALUE • [+1]

-10	TENS	ONES
Y:19		
X:54		

Paper Step: _____ [ ] SC-6 Ans: _____

2 Tier 2 • Detective

Friendly -19 shortcut: 76 - 19 =

PLACE VALUE • [+1]

-10	TENS	ONES
Y:19		
X:76		

Paper Step: _____ [ ] SC-6 Ans: _____

3 Tier 2 • Detective

Friendly -29 shortcut: 65 - 29 =

PLACE VALUE • [+1]

-10	TENS	ONES
Y:29		
X:65		

Paper Step: _____ [ ] SC-6 Ans: _____

4 Tier 2 • Detective

Friendly -29 shortcut: 82 - 29 =

PLACE VALUE • [+1]

-10	TENS	ONES
Y:29		
X:82		

Paper Step: _____ [ ] SC-6 Ans: _____

5 Tier 2 • Detective

Friendly -39 shortcut: 93 - 39 =

PLACE VALUE • [+1]

-10	TENS	ONES
Y:39		
X:93		

Paper Step: _____ [ ] SC-6 Ans: _____

6 Tier 2 • Detective

Constant-difference shift: 52 - 29 =

PLACE VALUE • [+1]

-10	TENS	ONES
Y:52		
X:29		

Paper Step: _____ [ ] SC-6 Ans: _____

7 Tier 2 • Detective

Constant-difference shift: 65 - 38 =

PLACE VALUE • [+1]

-10	TENS	ONES
Y:65		
X:38		

Paper Step: _____ [ ] SC-6 Ans: _____

8 Tier 2 • Detective

Constant-difference shift: 81 - 47 =

PLACE VALUE • [+1]

-10	TENS	ONES
Y:81		
X:47		

Paper Step: _____ [ ] SC-6 Ans: _____

9 Tier 2 • Detective

Subtract in two parts (Tens then Ones): 73 - 20 - 6 =

PLACE VALUE • [+1]

-10	TENS	ONES
Y:73		
X:20		

Paper Step: _____ [ ] SC-6 Ans: _____

10 Tier 2 • Detective

Subtract in two parts (Tens then Ones): 85 - 30 - 8 =

PLACE VALUE • [+1]

-10	TENS	ONES
Y:85		
X:30		

Paper Step: _____ [ ] SC-6 Ans: _____

Unit 08 Practice E — Two-Step Addition & Subtraction Chains on the Stack

Name: _____ Date: _____ Score: _____ / 10

TIER 3 • LEVEL 3: BOSS CHALLENGE • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE E (#1–#10) ON PAPER FIRST

EXAMPLE 1 **Evaluate 45 + 28 - 19 on the SC-6 stack.**

45 + 28 = 73 (in Y), then 73 - 19 = 54. Key: [45] [ENTER] [28] [+] [19] [-].

Verified Answer: 54

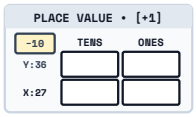
EXAMPLE 2 **Evaluate 90 - 34 - 26.**

90 - 34 = 56, then 56 - 26 = 30.

Verified Answer: 30

1 Tier 3 • Challenge

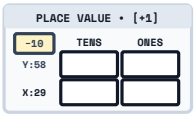
Two-step chain: 36 + 27 - 15 =



Paper Step: _____ [ ] SC-6 Ans: _____

2 Tier 3 • Challenge

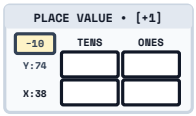
Two-step chain: 58 - 29 + 16 =



Paper Step: _____ [ ] SC-6 Ans: _____

3 Tier 3 • Challenge

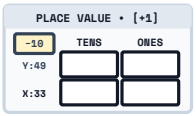
Two-step chain: 74 - 38 + 25 =



Paper Step: _____ [ ] SC-6 Ans: _____

4 Tier 3 • Challenge

Two-step chain: 49 + 33 - 27 =



Paper Step: _____ [ ] SC-6 Ans: _____

5 Tier 3 • Challenge

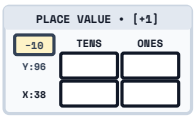
Two-step subtraction: 85 - 25 - 18 =



Paper Step: _____ [ ] SC-6 Ans: _____

6 Tier 3 • Challenge

Two-step subtraction: 96 - 38 - 22 =



Paper Step: _____ [ ] SC-6 Ans: _____

7 Tier 3 • Challenge

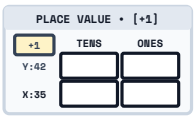
Two-step subtraction from 100: 100 - 45 - 28 =



Paper Step: _____ [ ] SC-6 Ans: _____

8 Tier 3 • Challenge

Two-branch comparison: (42 + 35) - (28 + 19) =



Paper Step: _____ [ ] SC-6 Ans: _____

9 Tier 3 • Challenge

Two-branch comparison: (64 + 18) - (90 - 35) =



Paper Step: _____ [ ] SC-6 Ans: _____

10 Tier 3 • Challenge

Bus stops: 52 riders start, 19 get on, 24 get off. Riders now?



Paper Step: _____ [ ] SC-6 Ans: _____

Unit 08 Practice F — Two-Digit Balance Puzzles, Reversals & Mastery Challenge

Name: _____ Date: _____ Score: _____ / 10

TIER 3 • LEVEL 3: BOSS CHALLENGE • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE F (#1–#10) ON PAPER FIRST

EXAMPLE 1 **Find the difference between 73 and its digit-reversal 37.**

73 - 37 = 36 (Notice: (7 - 3) × 9 = 4 × 9 = 36!).

Verified Answer: 36

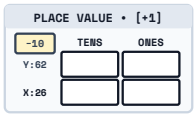
EXAMPLE 2 **Balance the equation: 46 + 27 = 90 - [?].**

Left side is 73. Subtract 90 - 73 = 17!

Verified Answer: 17

1 Tier 3 • Challenge

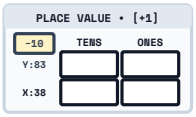
Digit-reversal difference: 62 - 26 =



Paper Step: _____ [ ] SC-6 Ans: _____

2 Tier 3 • Challenge

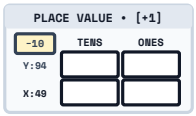
Digit-reversal difference: 83 - 38 =



Paper Step: _____ [ ] SC-6 Ans: _____

3 Tier 3 • Challenge

Digit-reversal difference: 94 - 49 =



Paper Step: _____ [ ] SC-6 Ans: _____

4 Tier 3 • Challenge

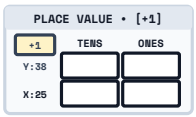
Digit-reversal sum: 47 + 74 =



Paper Step: _____ [ ] SC-6 Ans: _____

5 Tier 3 • Challenge

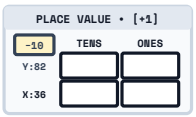
Balance the equation: 38 + 25 = 40 + [?]



Paper Step: _____ [ ] SC-6 Ans: _____

6 Tier 3 • Challenge

Balance the equation: 82 - 36 = 20 + [?]



Paper Step: _____ [ ] SC-6 Ans: _____

7 Tier 3 • Challenge

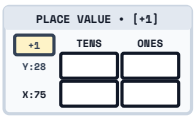
Balance the equation: 54 + 29 = 100 - [?]



Paper Step: _____ [ ] SC-6 Ans: _____

8 Tier 3 • Challenge

Mystery Number: Add 28 to me and you get 75. Who am I?



Paper Step: _____ [ ] SC-6 Ans: _____

9 Tier 3 • Challenge

Mystery Number: Subtract 39 from me and you get 46. Who am I?



Paper Step: _____ [ ] SC-6 Ans: _____

10 Tier 3 • Challenge

Two-Step Place Value Challenge: A bin holds 84 blocks. After 37 are used and 29 new blocks are added, how many are in the bin?



Paper Step: _____ [ ] SC-6 Ans: _____

Unit 08 Mastery Check: Two-Digit Operations (0–99)

Name: _____ Date: _____ Score: _____ / 100

100-POINT UNIT MASTERY ASSESSMENT — 10 UNSCAFFOLDED PROBLEMS (10 POINTS EACH)

Solve each problem on paper first in the dot-grid workspace. Write your final answer on the line, then verify your result on the SC-6 stack. Record your total score in Appendix B (Score Tracker) and verify complete worked keystrokes online at stackcalc.io/curriculum/answers.

1 Core Fluency • 10 pts

Add with a Gold [+1] Carry Token: 46 + 38 =

[ ] +10 pts [ ] SC-6 **Ans:** _____

2 Core Fluency • 10 pts

Add two-digit numbers on the tray: 57 + 29 =

[ ] +10 pts [ ] SC-6 **Ans:** _____

3 Core Fluency • 10 pts

Unbundle 1 Ten to 10 Ones to subtract: 64 - 28 =

[ ] +10 pts [ ] SC-6 **Ans:** _____

4 Core Fluency • 10 pts

Unbundle 1 Ten on the Place Value Tray: 81 - 45 =

[ ] +10 pts [ ] SC-6 **Ans:** _____

5 Core Fluency • 10 pts

Subtract across a zero in the Ones place: 90 - 37 =

[ ] +10 pts [ ] SC-6 **Ans:** _____

6 Core Fluency • 10 pts

Follow the 2-step stack chain: 52 + 29 - 34 =

[ ] +10 pts [ ] SC-6 **Ans:** _____

7 Application • 10 pts

A store has 74 balloons and sells 38 of them. How many balloons are left?

[ ] +10 pts [ ] SC-6 **Ans:** _____

8 Application • 10 pts

Leo has 48¢. How many more cents does he need to buy a toy that costs 85¢?

[ ] +10 pts [ ] SC-6 **Ans:** _____

9 Application • 10 pts

A school garden harvested 35 tomatoes Monday, 28 Tuesday, and gave 19 away. How many left?

[ ] +10 pts [ ] SC-6 **Ans:** _____

10 Error Analysis • 10 pts

Error Analysis: Mia solved 73 - 28 and got 55 because she did 8 - 3 = 5. Find the true answer!

[ ] +10 pts [ ] SC-6 **Ans:** _____

Unit 08 STEM: The Weather Station Thermometer Log

Name: _____ Date: _____ Score: _____ / 4

REAL-WORLD STEM APPLICATION & WORKSHOP: THE WEATHER STATION THERMOMETER LOG

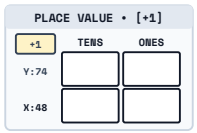
Junior meteorologists record daily high and low temperatures (in °F) and monthly rainfall totals at the school rooftop weather station.

Companion Book (Vol. I: From Blocks to the Stack (SC-6 Manual) — Ch. 3: Two-Digit Place-Value Subtraction & Unbundling) • Unbundling a Ten-Bar & Constant-Difference Shifts: When Row 1 needs more Ones to subtract Row 0, trade 1 Ten for 10 Ones on the tray—or shift both rows together so their gap never changes!

Block Studio: Place Value Studio (2-Row Tray, Digit Blocks & [+1] Tokens) • Stack Shortcut: [5] [2] [ENTER] [1] [9] [-] = 33

CASE INVESTIGATION 1 STEM Modeling

Monday's high was 74°F and the overnight low was 48°F. What was the temperature swing?



1. Draw or Count Blocks: _____

2. My Number Sentence: _____

3. My Answer: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)

CASE INVESTIGATION 2 STEM Modeling

Morning temperature was 56°F and rose 27°F by afternoon. What was the afternoon high?



1. Draw or Count Blocks: _____

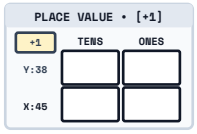
2. My Number Sentence: _____

3. My Answer: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)

CASE INVESTIGATION 3 Applied Calculation

Rainfall was 38 mm in April and 45 mm in May. How much short of 100 mm is the 2-month total?



1. Draw or Count Blocks: _____

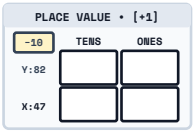
2. My Number Sentence: _____

3. My Answer: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)

CASE INVESTIGATION 4 Error Analysis Workshop

Error Analysis: A student computes $82°F - 47°F = 45°F$ by doing $7 - 2 = 5$. Correct the reading!



1. Draw or Count Blocks: _____

2. My Number Sentence: _____

3. My Answer: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)

Hands-On Math Explorers & Builders Note

Young builders, chefs, and nature explorers use physical blocks and paper math to solve real-world mysteries! Always build or write your paper setup first, write your number sentence, and check on your SC-6. Parents & teachers: full keys at stackcalc.io/curriculum/answers.

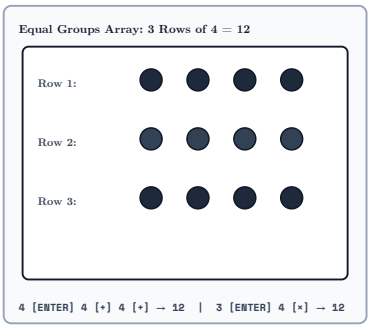
Equal Groups, Repeated Addition & Arrays

Mathematical Focus: Place Value Studio (2-Row Tray & Equal-Group Digit Blocks) • Standards: CCSS.MATH.2.OA.C.3, CCSS.MATH.2.OA.C.4

1. MATHEMATICAL CONCEPT & INSIDE-OUT APPROACH (Equal Groups Across the Place Value Tray: 4 + 4 + 4 = 12):

Equal groups on the tray show that multiplication is repeated addition of the same quantity.

Companion Book (Vol. I: From Blocks to the Stack (SC-6 Manual) — Ch. 4: Tile Arrays, Skip-Counting & Equal Groups) • Spinning Tile Grids 90° & Odd-Number Square Borders: Turn a 3 × 6 solar tile array a quarter-turn on your desk and it becomes 6 × 3 = 18—proving commutativity with your own hands!



2. KEY MATHEMATICAL PRINCIPLES: BUILDING THE FOUNDATIONS OF MULTIPLICATION ON THE TRAY

- Equal groups can be placed across consecutive sockets of the Place Value Tray (e.g. [4], [4], [4]).
- 3 groups of 4 is repeated addition: 4 + 4 + 4 = 12 (or 3 × 4 = 12).
- Repeated addition on the stack: type [4] [ENTER] [4] [+] [4] [+] = 12.
- Twin-Row Doubling: placing [7] in Row 1 (*Y*) and [7] in Row 0 (*X*) models [7] [ENTER] [+] = 14!

3. STEP-BY-STEP VERIFICATION WALKTHROUGH ON THE SC-6

Mathematical Setup: Place three [4] Digit Blocks across three sockets of the Place Value Tray to represent 3 equal groups of 4. Question: Add the equal groups left-to-right: 4 + 4 = 8, then 8 + 4 = 12. What is the total? (Prediction: 12)

Verification Keystrokes: 4 ENTER 4 + 4 +

Button Pressed	Screen (X)	How the 4-Level Stack Mirrors Your Mathematical Steps (T, Z, Y, X)
4	4	Group 1 ([4]) enters Register X
ENTER	4	4 lifts to Waiting Shelf Register Y
4	4	Group 2 ([4]) enters Register X
+	8	Group 1 + Group 2 = 8
4	4	Group 3 ([4]) enters Register X
+	12	8 + 4 = 12! Three equal groups of 4

STACK SHORTCUT & PAPER STRATEGY TIP (SC-6):

[4] [ENTER] [4] [+] [4] [+] = 12 (3 groups of 4) • Equal groups can be placed across consecutive sockets of the Place Value Tray (e.g. [4], [4], [4]).

WARM-UP CHECK A: SOLVE ON PAPER FIRST, THEN VERIFY ON YOUR CALCULATOR!

Core Investigation: Place four [5] Digit Blocks on your Place Value Tray (4 groups of 5). What is 5 + 5 + 5 + 5?

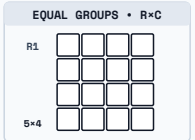
1. First Quantity / Inner Step: _____

2. Second Quantity / Operation: _____

3. My Paper Prediction: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)

Mathematical Scratchpad:



Extension: Even Numbers & Twin-Row Doubling on the Tray

Deepening Concepts • Standards: CCSS.MATH.2.OA.C.3

1. EXTENSION CONCEPT & SETUP (Even Numbers & Twin-Row Doubling on the Tray):

Every even number splits into two equal Digit Blocks on Row 1 and Row 0 of the Place Value Tray.

Extension Setup: Place a [7] Digit Block in Row 1 (Waiting Shelf Y) and a matching [7] Digit Block in Row 0 (Workbench X) of the Place Value Tray. • Question: Because Row 1 and Row 0 hold equal [7] blocks, their sum 7 + 7 is an even double. What is 7 + 7? (Prediction: 14)

2. EXTENSION STACK SEQUENCE (SC-6): [7] [ENTER] [+]

Button Pressed	Screen (X)	Extension Stack Dynamics (T, Z, Y, X)
[7]	7	7 enters Register X
[ENTER]	7	7 duplicated into Waiting Shelf Y (Row 1)
[+]	14	7 + 7 = 14! Double 7 is an even number

3. PARENT & TEACHER COACHING: TARGET MISCONCEPTIONS & STACK REMEDIATIONS

Misconception 1 — Confusing Group Size with Number of Groups: 3 groups of 4 is mistaken for 3 + 4 = 7.

Mathematical & Stack Remediation: Place three [4] Digit Blocks side-by-side on the Place Value Tray so all three groups of 4 are visible.

Misconception 2 — Pressing [ENTER] Multiple Times During Chained Sums: Typing [ENTER] after [+].

Mathematical & Stack Remediation: [ENTER] is only needed once to lift the first quantity into Y; subsequent [+] operations combine directly.

4. STACK SHORTCUT & PARTNER EXPLAIN-WHY CHALLENGE (SC-6)

Calculator Shortcut: [4] [ENTER] [4] [+] [4] [+] = 12 (3 groups of 4)

Explain-Why Reflection: How does your paper diagram or stack trace prove why Misconception 1 is wrong?

WARM-UP CHECK B (EXTENSION): SOLVE ON PAPER FIRST, THEN VERIFY ON YOUR CALCULATOR!

Extension Challenge: Place [9] in Row 1 and [9] in Row 0 of your Place Value Tray ([9] [ENTER] [+]). What even number is formed?

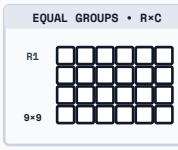
1. First Quantity / Inner Step: _____

2. Second Quantity / Operation: _____

3. My Paper Prediction: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)

Mathematical Scratchpad:



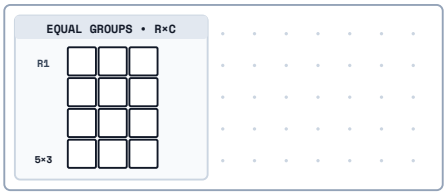
Unit 09 Lab: Equal Groups, Repeated Addition & Arrays

Name: _____ Date: _____ Score: _____ / 4

DIRECTIONS: (1) Build with your Place Value blocks & draw in Box 1. (2) Write the two quantities & math in Box 2.
(3) Write your Prediction BEFORE pressing keys, then check with your partner or teacher on the SC-6!

Investigation 1: Place three [5] blocks on the tray (3 groups of 5): 5 + 5 + 5 =

1. Draw Your Blocks on the Tray:



2. Number Bond & Two Quantities:

First Quantity (Top Row):

Second Quantity (Bottom Row):

Combine (+, −, or ×):

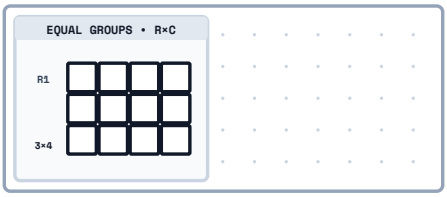
3. My Prediction:

Final Verified Answer:

[ ] Verified on SC-6 Stack

Investigation 2: Place four [3] blocks on the tray (4 groups of 3): 3 + 3 + 3 + 3 =

1. Draw Your Blocks on the Tray:



2. Number Bond & Two Quantities:

First Quantity (Top Row):

Second Quantity (Bottom Row):

Combine (+, −, or ×):

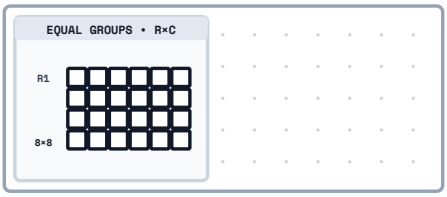
3. My Prediction:

Final Verified Answer:

[ ] Verified on SC-6 Stack

Investigation 3: Double [8] on the tray using the instant shortcut: 8 [ENTER] + =

1. Draw Your Blocks on the Tray:



2. Number Bond & Two Quantities:

First Quantity (Top Row):

Second Quantity (Bottom Row):

Combine (+, −, or ×):

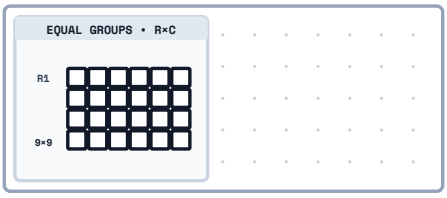
3. My Prediction:

Final Verified Answer:

[ ] Verified on SC-6 Stack

Investigation 4: Place [9] in Row 1 and [9] in Row 0 of the tray: 9 + 9 =

1. Draw Your Blocks on the Tray:



2. Number Bond & Two Quantities:

First Quantity (Top Row):

Second Quantity (Bottom Row):

Combine (+, −, or ×):

3. My Prediction:

Final Verified Answer:

[ ] Verified on SC-6 Stack

MY LAB REFLECTION: Draw or tell how your paper sketch matched the numbers on your SC-6 screen!

Unit 09 Practice A — Equal Groups & Repeated Addition on the Stack

Name: _____ Date: _____ Score: _____ / 10

TIER 1 • LEVEL 1: BUILDER FOUNDATION • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE A (#1–#10) ON PAPER FIRST

EXAMPLE 1 **3 equal groups of 5 blocks: 5 + 5 + 5.**

5 + 5 = 10, then 10 + 5 = 15 (3 × 5 = 15). Key: [5] [ENTER] [5] [+] [5] [+].

Verified Answer: 15

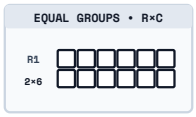
EXAMPLE 2 **4 equal groups of 4 blocks: 4 + 4 + 4 + 4.**

4 × 4 = 16. Key: [4] [ENTER] [4] [×].

Verified Answer: 16

1 Tier 1 • Builder

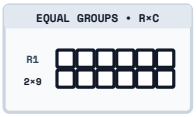
2 equal groups of 6: 6 + 6 =



Paper Step: _____ [ ] SC-6 Ans: _____

2 Tier 1 • Builder

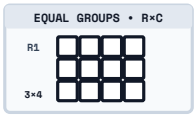
2 equal groups of 9: 9 + 9 =



Paper Step: _____ [ ] SC-6 Ans: _____

3 Tier 1 • Builder

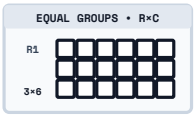
3 equal groups of 4: 4 + 4 + 4 =



Paper Step: _____ [ ] SC-6 Ans: _____

4 Tier 1 • Builder

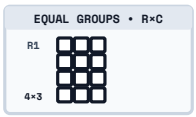
3 equal groups of 6: 6 + 6 + 6 =



Paper Step: _____ [ ] SC-6 Ans: _____

5 Tier 1 • Builder

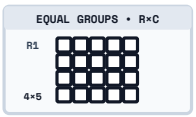
4 equal groups of 3: 3 + 3 + 3 + 3 =



Paper Step: _____ [ ] SC-6 Ans: _____

6 Tier 1 • Builder

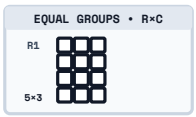
4 equal groups of 5: 5 + 5 + 5 + 5 =



Paper Step: _____ [ ] SC-6 Ans: _____

7 Tier 1 • Builder

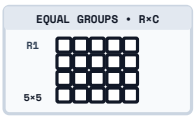
5 equal groups of 3: 3 + 3 + 3 + 3 + 3 =



Paper Step: _____ [ ] SC-6 Ans: _____

8 Tier 1 • Builder

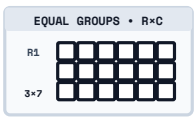
5 equal groups of 5: 5 × 5 =



Paper Step: _____ [ ] SC-6 Ans: _____

9 Tier 1 • Builder

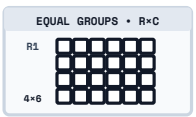
3 equal groups of 7: 7 + 7 + 7 =



Paper Step: _____ [ ] SC-6 Ans: _____

10 Tier 1 • Builder

4 equal groups of 6: 6 + 6 + 6 + 6 =



Paper Step: _____ [ ] SC-6 Ans: _____

Unit 09 Practice B — Rectangular Arrays (Rows × Columns) & Turn-Around Facts

Name: _____ Date: _____ Score: _____ / 10

TIER 1 • LEVEL 1: BUILDER FOUNDATION • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE B (#1–#10) ON PAPER FIRST

EXAMPLE 1 An array has 3 rows of 5 tiles. Rotate it to 5 rows of 3 tiles.

Both 3 × 5 and 5 × 3 equal 15 tiles!

Verified Answer: 15

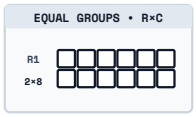
EXAMPLE 2 An array has 20 tiles in 4 equal rows. How many tiles per row?

20 ÷ 4 = 5 tiles per row. Key: [20] [ENTER] [4] [÷].

Verified Answer: 5

1 Tier 1 • Builder

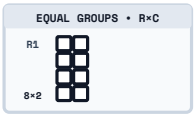
Array of 2 rows of 8 tiles: 2 × 8 =



Paper Step: _____ [ ] SC-6 Ans: _____

2 Tier 1 • Builder

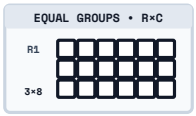
Array of 8 rows of 2 tiles: 8 × 2 =



Paper Step: _____ [ ] SC-6 Ans: _____

3 Tier 1 • Builder

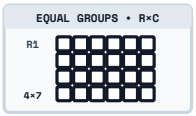
Array of 3 rows of 8 tiles: 3 × 8 =



Paper Step: _____ [ ] SC-6 Ans: _____

4 Tier 1 • Builder

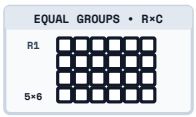
Array of 4 rows of 7 tiles: 4 × 7 =



Paper Step: _____ [ ] SC-6 Ans: _____

5 Tier 1 • Builder

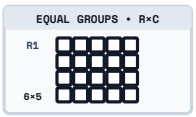
Array of 5 rows of 6 tiles: 5 × 6 =



Paper Step: _____ [ ] SC-6 Ans: _____

6 Tier 1 • Builder

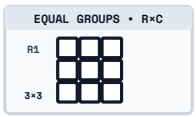
Array of 6 rows of 5 tiles: 6 × 5 =



Paper Step: _____ [ ] SC-6 Ans: _____

7 Tier 1 • Builder

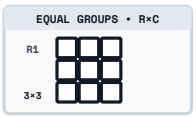
Find tiles per row: 12 tiles in 3 equal rows:



Paper Step: _____ [ ] SC-6 Ans: _____

8 Tier 1 • Builder

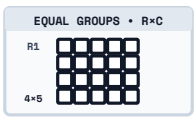
Find tiles per row: 18 tiles in 3 equal rows:



Paper Step: _____ [ ] SC-6 Ans: _____

9 Tier 1 • Builder

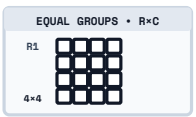
Find tiles per row: 20 tiles in 5 equal rows:



Paper Step: _____ [ ] SC-6 Ans: _____

10 Tier 1 • Builder

Find tiles per row: 24 tiles in 4 equal rows:



Paper Step: _____ [ ] SC-6 Ans: _____

Unit 09 Practice C — Real-World Array Stories & Equal-Group Word Problems

Name: _____ Date: _____ Score: _____ / 10

TIER 2 • LEVEL 2: STORY & DETECTIVE LAB • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE C (#1–#10) ON PAPER FIRST

EXAMPLE 1 A muffin tin has 3 rows with 4 cups in each row. How many cups in all?

3 × 4 = 12 muffin cups. Key: [3] [ENTER] [4] [×].

Verified Answer: 12 cups

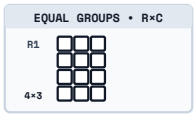
EXAMPLE 2 Spot the Mistake: For 5 rows of 4 chairs, Sam added 5 + 4 = 9.

5 rows of 4 means 4 + 4 + 4 + 4 + 4 = 5 × 4 = 20 chairs!

Verified Answer: 20 chairs

1 Tier 2 • Detective

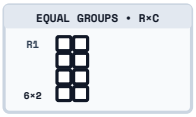
A window has 4 rows of 3 glass panes. How many glass panes are in the window?



Paper Step: _____ [ ] SC-6 Ans: _____

2 Tier 2 • Detective

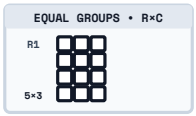
6 bicycles are parked outside. Each bicycle has 2 wheels. How many wheels in all?



Paper Step: _____ [ ] SC-6 Ans: _____

3 Tier 2 • Detective

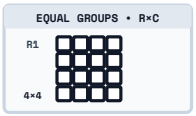
5 tricycles are on the playground. Each tricycle has 3 wheels. How many wheels in all?



Paper Step: _____ [ ] SC-6 Ans: _____

4 Tier 2 • Detective

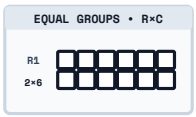
4 cars are waiting at a light. Each car has 4 tires. How many tires in all?



Paper Step: _____ [ ] SC-6 Ans: _____

5 Tier 2 • Detective

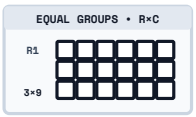
An egg carton holds 2 rows of 6 eggs. How many eggs are in 2 full cartons?



Paper Step: _____ [ ] SC-6 Ans: _____

6 Tier 2 • Detective

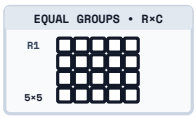
A bookshelf has 3 shelves with 9 books on each shelf. How many books in all?



Paper Step: _____ [ ] SC-6 Ans: _____

7 Tier 2 • Detective

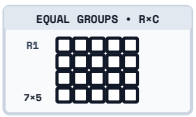
Maya plants 5 rows of 5 strawberry plants in her garden. How many plants in all?



Paper Step: _____ [ ] SC-6 Ans: _____

8 Tier 2 • Detective

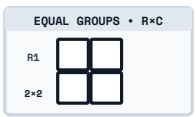
7 hands are raised in class. Each hand has 5 fingers. How many fingers in all?



Paper Step: _____ [ ] SC-6 Ans: _____

9 Tier 2 • Detective

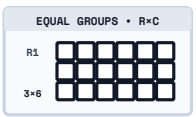
Share 16 stickers equally between 2 friends. How many stickers does each friend get?



Paper Step: _____ [ ] SC-6 Ans: _____

10 Tier 2 • Detective

Spot the Mistake: Leo says 3 groups of 6 equals 3 + 6 = 9. Find the true total of 3 × 6!



Paper Step: _____ [ ] SC-6 Ans: _____

Unit 09 Practice D — Even & Odd Numbers, Twin-Row Halving & Doubling

Name: _____ Date: _____ Score: _____ / 10

TIER 2 • LEVEL 2: STORY & DETECTIVE LAB • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE D (#1–#10) ON PAPER FIRST

EXAMPLE 1 **Test 18 for Even or Odd by dividing into 2 equal rows: 18 ÷ 2.**

18 ÷ 2 = 9 R 0 → 2 equal rows of 9 (Even!).

Verified Answer: 9 (Even)

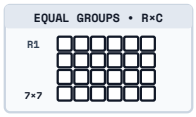
EXAMPLE 2 **Test 15 for Even or Odd using [15] [ENTER] [2] [INT÷].**

15 ÷ 2 = 7 R 1 (1 leftover block → Odd!).

Verified Answer: 7 R 1 (Odd)

1 Tier 2 • Detective

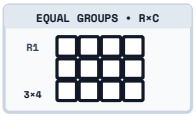
Twin-Row Tray Double: Place 7 on both rows of your tray and double 7:



Paper Step: _____ [ ] SC-6 Ans: _____

2 Tier 2 • Detective

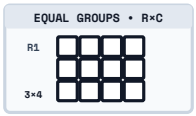
Twin-Row Tray Double: Place 11 on both rows of your tray and double 11:



Paper Step: _____ [ ] SC-6 Ans: _____

3 Tier 2 • Detective

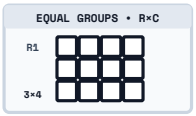
Twin-Row Tray Double: Place 14 on both rows of your tray and double 14:



Paper Step: _____ [ ] SC-6 Ans: _____

4 Tier 2 • Detective

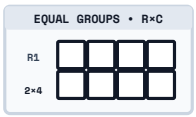
Twin-Row Tray Double: Place 16 on both rows of your tray and double 16:



Paper Step: _____ [ ] SC-6 Ans: _____

5 Tier 2 • Detective

Split into 2 equal rows: 14 ÷ 2 =



Paper Step: _____ [ ] SC-6 Ans: _____

6 Tier 2 • Detective

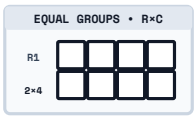
Split into 2 equal rows: 20 ÷ 2 =



Paper Step: _____ [ ] SC-6 Ans: _____

7 Tier 2 • Detective

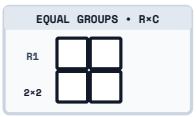
Split into 2 equal rows: 24 ÷ 2 =



Paper Step: _____ [ ] SC-6 Ans: _____

8 Tier 2 • Detective

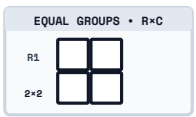
Odd Check (Quotient & Remainder): 13 ÷ 2 =



Paper Step: _____ [ ] SC-6 Ans: _____

9 Tier 2 • Detective

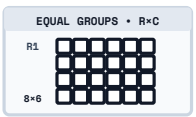
Odd Check (Quotient & Remainder): 17 ÷ 2 =



Paper Step: _____ [ ] SC-6 Ans: _____

10 Tier 2 • Detective

Even + Even is always Even: Evaluate 8 + 6 =



Paper Step: _____ [ ] SC-6 Ans: _____

Unit 09 Practice E — Skip-Counting by 2*s*, 5*s*, and 10*s* & Combining Arrays

Name: _____ Date: _____ Score: _____ / 10

TIER 3 • LEVEL 3: BOSS CHALLENGE • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE E (#1–#10) ON PAPER FIRST

EXAMPLE 1 **Combine a 2×5 array and a 3×5 array: (2 × 5) + (3 × 5).**

10 + 15 = 25 (which equals 5 × 5!). Key: [2] [ENTER] [5] [×] [3] [ENTER] [5] [×] [+].

Verified Answer: 25

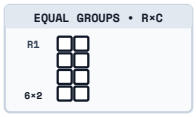
EXAMPLE 2 **3 rows of 4 plus 5 extra blocks: (3 × 4) + 5.**

12 + 5 = 17 blocks.

Verified Answer: 17

1 Tier 3 • Challenge

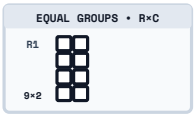
Skip-count 6 jumps of 2: 6 × 2 =



Paper Step: _____ [ ] SC-6 Ans: _____

2 Tier 3 • Challenge

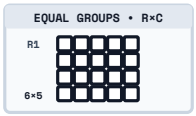
Skip-count 9 jumps of 2: 9 × 2 =



Paper Step: _____ [ ] SC-6 Ans: _____

3 Tier 3 • Challenge

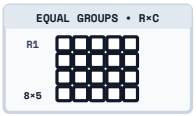
Skip-count 6 jumps of 5: 6 × 5 =



Paper Step: _____ [ ] SC-6 Ans: _____

4 Tier 3 • Challenge

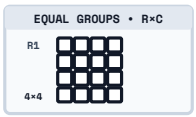
Skip-count 8 jumps of 5: 8 × 5 =



Paper Step: _____ [ ] SC-6 Ans: _____

5 Tier 3 • Challenge

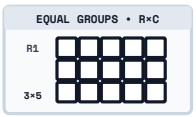
Skip-count 7 jumps of 10: 7 × 10 =



Paper Step: _____ [ ] SC-6 Ans: _____

6 Tier 3 • Challenge

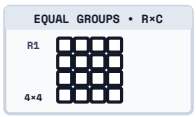
Array plus loose blocks: (3 × 5) + 4 =



Paper Step: _____ [ ] SC-6 Ans: _____

7 Tier 3 • Challenge

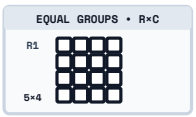
Array plus loose blocks: (4 × 4) + 6 =



Paper Step: _____ [ ] SC-6 Ans: _____

8 Tier 3 • Challenge

Array minus removed blocks: (5 × 4) - 3 =



Paper Step: _____ [ ] SC-6 Ans: _____

9 Tier 3 • Challenge

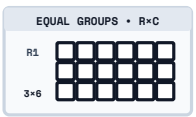
Combine two arrays: (2 × 4) + (3 × 4) =



Paper Step: _____ [ ] SC-6 Ans: _____

10 Tier 3 • Challenge

Combine two arrays: (3 × 6) + (2 × 6) =



Paper Step: _____ [ ] SC-6 Ans: _____

Unit 09 Practice F — Square Numbers, Array Decomposition & Mastery Review

Name: _____ Date: _____ Score: _____ / 10

TIER 3 • LEVEL 3: BOSS CHALLENGE • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE F (#1–#10) ON PAPER FIRST

EXAMPLE 1 How many new tiles are added when a 3×3 square grows to a 4×4 square?

$4^2 - 3^2 = 16 - 9 = 7$ tiles. Key: [4] [x^2] [3] [x^2] [-].

Verified Answer: 7 tiles

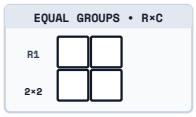
EXAMPLE 2 Double a double to multiply by 4: Find 4×7.

Double 7 is 14; double 14 is 28! Key: [7] [ENTER] [+] [ENTER] [+].

Verified Answer: 28

1 Tier 3 • Challenge

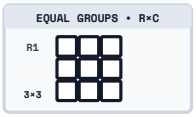
Square array 2×2:



Paper Step: _____ [ ] SC-6 Ans: _____

2 Tier 3 • Challenge

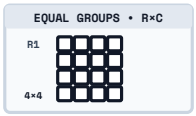
Square array 3×3:



Paper Step: _____ [ ] SC-6 Ans: _____

3 Tier 3 • Challenge

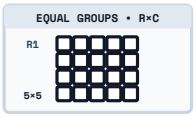
Square array 4×4:



Paper Step: _____ [ ] SC-6 Ans: _____

4 Tier 3 • Challenge

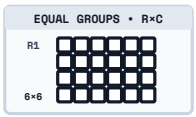
Square array 5×5:



Paper Step: _____ [ ] SC-6 Ans: _____

5 Tier 3 • Challenge

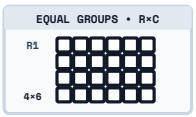
Square array 6×6:



Paper Step: _____ [ ] SC-6 Ans: _____

6 Tier 3 • Challenge

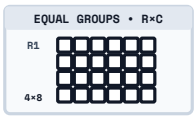
Double-double (×4): Double 6 once, then double it again: $4 \times 6 =$



Paper Step: _____ [ ] SC-6 Ans: _____

7 Tier 3 • Challenge

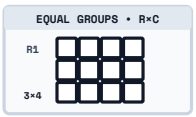
Double-double (×4): Double 8 once, then double it again: $4 \times 8 =$



Paper Step: _____ [ ] SC-6 Ans: _____

8 Tier 3 • Challenge

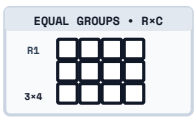
Difference of squares: $5^2 - 4^2 =$



Paper Step: _____ [ ] SC-6 Ans: _____

9 Tier 3 • Challenge

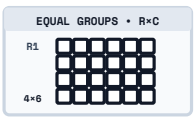
Difference of squares: $6^2 - 5^2 =$



Paper Step: _____ [ ] SC-6 Ans: _____

10 Tier 3 • Challenge

Composite Array Challenge: Combine a 4×6 block array and a 3×5 block array on your studio grid. Total blocks?



Paper Step: _____ [ ] SC-6 Ans: _____

Unit 09 Mastery Check: Equal Groups, Repeated Addition & Arrays

Name: _____ Date: _____ Score: _____ / 100

100-POINT UNIT MASTERY ASSESSMENT — 10 UNSCAFFOLDED PROBLEMS (10 POINTS EACH)

Solve each problem on paper first in the dot-grid workspace. Write your final answer on the line, then verify your result on the SC-6 stack. Record your total score in Appendix B (Score Tracker) and verify complete worked keystrokes online at stackcalc.io/curriculum/answers.

1 Core Fluency • 10 pts

Evaluate 3 equal groups of 5: 5 + 5 + 5 =

[ ] +10 pts [ ] SC-6 **Ans:** _____

2 Core Fluency • 10 pts

Evaluate 4 rows of 4 tiles: 4 × 4 =

[ ] +10 pts [ ] SC-6 **Ans:** _____

3 Core Fluency • 10 pts

Evaluate 5 rows of 6 tiles: 5 × 6 =

[ ] +10 pts [ ] SC-6 **Ans:** _____

4 Core Fluency • 10 pts

Double 13 on the stack: 13 + 13 =

[ ] +10 pts [ ] SC-6 **Ans:** _____

5 Core Fluency • 10 pts

Split 18 into 2 equal rows: 18 ÷ 2 =

[ ] +10 pts [ ] SC-6 **Ans:** _____

6 Core Fluency • 10 pts

Array plus loose blocks: (3 × 4) + 7 =

[ ] +10 pts [ ] SC-6 **Ans:** _____

7 Application • 10 pts

A baking sheet has 4 rows of 5 cookies. How many cookies are on the sheet?

[ ] +10 pts [ ] SC-6 **Ans:** _____

8 Application • 10 pts

6 boxes each hold 3 tennis balls. How many tennis balls are there in all?

[ ] +10 pts [ ] SC-6 **Ans:** _____

9 Application • 10 pts

Divide 19 blocks into 2 equal rows. How many in each row and how many left over?

[ ] +10 pts [ ] SC-6 **Ans:** _____

10 Error Analysis • 10 pts

Error Analysis: Why is 17 an odd number when you build a 2-row array?

[ ] +10 pts [ ] SC-6 **Ans:** _____

Unit 09 STEM: The Community Garden Veggie Patch

Name: _____ Date: _____ Score: _____ / 4

REAL-WORLD STEM APPLICATION & WORKSHOP: THE COMMUNITY GARDEN VEGGIE PATCH

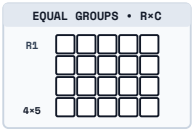
Second-grade botanists lay out rectangular raised beds in the school garden, spacing vegetable seedlings in equal rows and columns.

Companion Book (Vol. I: From Blocks to the Stack (SC-6 Manual) — Ch. 4: Tile Arrays, Skip-Counting & Equal Groups) • Spinning Tile Grids 90° & Odd-Number Square Borders: Turn a 3 × 6 solar tile array a quarter-turn on your desk and it becomes 6 × 3 = 18—proving commutativity with your own hands!

Mathematical Focus: Place Value Studio (2-Row Tray & Equal-Group Digit Blocks) • Stack Shortcut: [4] [ENTER] [4] [+] [4] [+] = 12 (3 groups of 4)

CASE INVESTIGATION 1 STEM Modeling

Bed A has 4 rows of 5 carrot plants. How many carrot plants are in Bed A?



1. My Paper Setup: _____

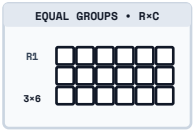
2. My Number Sentence: _____

3. My Answer: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)

CASE INVESTIGATION 2 STEM Modeling

Bed B has 3 rows of 6 tomato plants. How many tomato plants are in Bed B?



1. My Paper Setup: _____

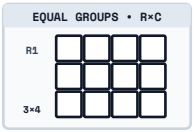
2. My Number Sentence: _____

3. My Answer: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)

CASE INVESTIGATION 3 Applied Calculation

Combine Bed A and Bed B. How many vegetable plants are in both beds?



1. My Paper Setup: _____

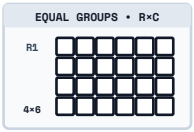
2. My Number Sentence: _____

3. My Answer: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)

CASE INVESTIGATION 4 Error Analysis Workshop

Error Analysis: A student plants 4 rows of 6 sunflowers and writes 4 + 6 = 10. Find the true count!



1. My Paper Setup: _____

2. My Number Sentence: _____

3. My Answer: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)

Hands-On Math Explorers & Builders Note

Young builders, chefs, and nature explorers use physical blocks and paper math to solve real-world mysteries! Always build or write your paper setup first, write your number sentence, and check on your SC-6. Parents & teachers: full keys at stackcalc.io/curriculum/answers.

UNIT 10 CORE CONCEPT LAB (PAGE 1 OF 11) • GRADE 2 (SC-6)

Measurement, Length & Coin Money Pipelines

Mathematical Focus: Place Value Studio (2-Row Tray, Digit Blocks & [+1] Carry Tokens) • Standards: CCSS.MATH.2.MD.A.1, CCSS.MATH.2.MD.B.5

1. MATHEMATICAL CONCEPT & INSIDE-OUT APPROACH (Combining Lengths on the Place Value Tray: 14 cm + 19 cm):

Physical lengths add end-to-end; the Place Value Tray and 4-level stack mirror measurement concatenation.

Companion Book (Vol. I: From Blocks to the Stack (SC-6 Manual) — Ch. 6: Measurement, Time & Ch. 9: Real-World Maker Labs) • The 84 mm Master Datum Ruler & Making Change: Every StackCalc studio is built on the 84 mm master datum ($2^2 \times 3 \times 7$), letting rulers, blocks, and coin values lock together with zero gaps!

Ruler Length & Coin Addition Pipeline

Rod 1 (14 cm) + Rod 2 (19 cm) = 33 cm

Key: 14 [ENTER] 19 [+] → 33 cm

Coins: Quarter (25¢) + Dime (10¢) + Nickel (5¢)

25 [ENTER] 10 [+] 5 [+] → 40¢

100 [ENTER] 41 [-] → 59¢ change from $1.00!

2. KEY MATHEMATICAL PRINCIPLES: MEASURING LENGTHS AND COUNTING MONEY ON THE TRAY

- Length is additive: placing 14 cm in Row 1 (Y) and 19 cm in Row 0 (X) gives a total length of 14 + 19 = 33 cm.
- Coins map to Tens and Ones on the Place Value Tray: Penny = [1], Nickel = [5], Dime = [1][0], Quarter = [2][5].
- Chained addition counts mixed coins on the stack: [25] [ENTER] [10] [+] [5] [+] [1] [+] = 41¢.
- $1.00 equals [1][0][0] cents; finding change from $1.00 is subtraction: 100 [ENTER] 41 [-] = 59¢!

3. STEP-BY-STEP VERIFICATION WALKTHROUGH ON THE SC-6

Mathematical Setup: Place [1][4] (14 cm) in Row 1 (Waiting Shelf Y) and [1][9] (19 cm) in Row 0 (Workbench X) of the Place Value Tray. Question: Add Ones (4 + 9 = 13 → [3] in Ones, Gold [+1] Carry Token on Tens) and Tens (1 + 1 + 1 = [3]). Total length? (Prediction: 33 cm)

Verification Keystrokes: `1` `4` `ENTER` `1` `9` `+`

Button Pressed	Screen (X)	How the 4-Level Stack Mirrors Your Mathematical Steps (T, Z, Y, X)
`1` `4`	14	First length (14 cm) enters Register X
`ENTER`	14	14 lifts to Waiting Shelf Register Y (Row 1)
`1` `9`	19	Second length (19 cm) enters Register X (Row 0)
`+`	33	14 + 19 = 33 cm! Total combined length

3. PAPER STEPS & SC-6 STACK LEARNING GUIDE & SELF-CHECK

- Mathematical Rule: Length is additive: placing 14 cm in Row 1 (Y) and 19 cm in Row 0 (X) gives a total length of 14 + 19 = 33 cm.
- Stack Shortcut & Pattern: [25] [ENTER] [10] [+] [5] [+] = 40¢ (Quarter + Dime + Nickel) — $1.00 equals [1][0][0] cents; finding change from $1.00 is subtraction: 100 [ENTER] 41 [-] = 59¢!
- 2-Second Paper-to-Screen Audit: Confirm your paper setup and inner values match Register Y (Waiting Shelf) and Register X (Workbench) before pressing the operator key.

WARM-UP CHECK A: SOLVE ON PAPER FIRST, THEN VERIFY ON YOUR CALCULATOR!

Core Investigation: A ribbon is 28 cm long in Row 1. You cut off 12 cm in Row 0. How much ribbon remains?

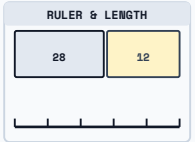
1. First Quantity / Inner Step: _____

2. Second Quantity / Operation: _____

3. My Paper Prediction: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)

Mathematical Scratchpad:



Extension: Counting Mixed Coins & Making Change from 100¢ on the Tray

Deepening Concepts • Standards: CCSS.MATH.2.MD.C.8

1. EXTENSION CONCEPT & SETUP (Counting Mixed Coins & Making Change from 100¢ on the Tray):

Automatic stack lift holds $1.00 (100¢) in upper registers while you accumulate your coin purchase in Register X.

Extension Setup: Place [1][0][0] (100¢) in Row 1 (Waiting Shelf Y) of the Place Value Tray. Build 25¢ + 10¢ + 5¢ = [4][0] in Row 0 (Workbench X). • Question: Total coins = 25 + 10 + 5 = 40¢. Subtract Row 0 from Row 1: 100 − 40 = 60¢ change! (Prediction: 60¢)

2. EXTENSION STACK SEQUENCE (SC-6): `1` `0` `0` `ENTER` `2` `5` `ENTER` `1` `0` `+` `5` `+` `-`

Button Pressed	Screen (X)	Extension Stack Dynamics (T, Z, Y, X)
`1` `0` `0`	100	100 cents ($1.00) enters Register X
`ENTER`	100	100 lifts to Register Y
`2` `5`	25	Quarter (25¢) enters Register X
`ENTER`	25	25 lifts; 100 lifts to Register Z
`1` `0`	10	Dime (10¢) enters Register X
`+`	35	25 + 10 = 35¢; 100 waits in Register Y
`5`	5	Nickel (5¢) enters Register X
`+`	40	35 + 5 = 40¢; 100 in Register Y
`-`	60	100 − 40 = 60¢ change!

3. PARENT & TEACHER COACHING: TARGET MISCONCEPTIONS & STACK REMEDIATIONS

Misconception 1 — Adding Numbers with Mismatched Units: Adding 12 inches and 5 cm directly as 17.

Mathematical & Stack Remediation: Emphasize that measurement units must match before placing Digit Blocks on the Place Value Tray.

Misconception 2 — Counting Coin Pieces Instead of Cent Values: Counting 1 quarter as [1] instead of [2][5].

Mathematical & Stack Remediation: Always build a quarter's true cent value ([2] in Tens, [5] in Ones = 25¢) on the Place Value Tray.

4. STACK SHORTCUT & PARTNER EXPLAIN-WHY CHALLENGE (SC-6)

Calculator Shortcut: [25] [ENTER] [10] [+] [5] [+] = 40¢ (Quarter + Dime + Nickel)

WARM-UP CHECK B (EXTENSION): SOLVE ON PAPER FIRST, THEN VERIFY ON YOUR CALCULATOR!

Extension Challenge: You buy a pencil for 35¢ and an eraser for 25¢. How much change do you receive from $1.00?

1. First Quantity / Inner Step: _____

2. Second Quantity / Operation: _____

3. My Paper Prediction: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)

Mathematical Scratchpad:



Unit 10 Lab: Measurement, Length & Coin Money Pipelines

Name: _____ Date: _____ Score: _____ / 4

DIRECTIONS: (1) Sketch your place-value / bar model in Box 1. (2) Show your step-by-step paper math in Box 2.
(3) Write your Prediction BEFORE pressing keys, then verify your answer on the SC-6!

Investigation 1: A board is 42 inches long. You cut 15 inches off. How much remains?

1. Place-Value / Bar Model Sketch:



2. Step-by-Step Paper Work:

Step 1 (First Group / Product):

Step 2 (Combine / Divide):

Equation & Solution:

3. My Prediction:

Final Verified Answer:

[ ] Verified on SC-6 Stack

Investigation 2: Find the total value in cents of 2 quarters and 3 dimes:

1. Place-Value / Bar Model Sketch:



2. Step-by-Step Paper Work:

Step 1 (First Group / Product):

Step 2 (Combine / Divide):

Equation & Solution:

3. My Prediction:

Final Verified Answer:

[ ] Verified on SC-6 Stack

Investigation 3: You spend 72¢ at the store. What is your change from $1.00?

1. Place-Value / Bar Model Sketch:



2. Step-by-Step Paper Work:

Step 1 (First Group / Product):

Step 2 (Combine / Divide):

Equation & Solution:

3. My Prediction:

Final Verified Answer:

[ ] Verified on SC-6 Stack

Investigation 4: Combine lengths: side A is 18 cm and side B is 24 cm. Find the total length:

1. Place-Value / Bar Model Sketch:



2. Step-by-Step Paper Work:

Step 1 (First Group / Product):

Step 2 (Combine / Divide):

Equation & Solution:

3. My Prediction:

Final Verified Answer:

[ ] Verified on SC-6 Stack

MY LAB REFLECTION: Draw or tell how your paper sketch matched the numbers on your SC-6 screen!

Unit 10 Practice A — Adding & Subtracting Lengths (cm, in, ft, m)

Name: _____ Date: _____ Score: _____ / 10

TIER 1 • LEVEL 1: BUILDER FOUNDATION • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE A (#1–#10) ON PAPER FIRST

EXAMPLE 1 **Combine a 14 cm rod and a 19 cm rod: 14 + 19.**

14 + 19 = 33 cm. Key: [14] [ENTER] [19] [+].

Verified Answer: 33 cm

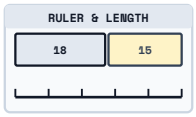
EXAMPLE 2 **Cut 18 cm from a 50 cm ribbon: 50 - 18.**

50 - 18 = 32 cm remaining. Key: [50] [ENTER] [18] [-].

Verified Answer: 32 cm

1 Tier 1 • Builder

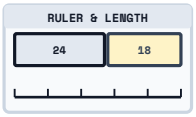
Combine two rods: 18 cm + 15 cm =



Paper Step: _____ [ ] SC-6 Ans: _____

2 Tier 1 • Builder

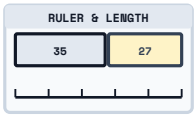
Combine two boards: 24 in + 18 in =



Paper Step: _____ [ ] SC-6 Ans: _____

3 Tier 1 • Builder

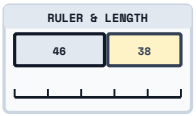
Combine two ropes: 35 ft + 27 ft =



Paper Step: _____ [ ] SC-6 Ans: _____

4 Tier 1 • Builder

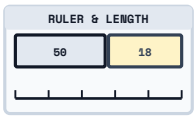
Combine two tracks: 46 cm + 38 cm =



Paper Step: _____ [ ] SC-6 Ans: _____

5 Tier 1 • Builder

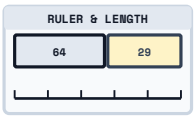
Cut a ribbon: 50 cm - 18 cm =



Paper Step: _____ [ ] SC-6 Ans: _____

6 Tier 1 • Builder

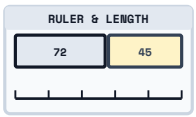
Cut a board: 64 in - 29 in =



Paper Step: _____ [ ] SC-6 Ans: _____

7 Tier 1 • Builder

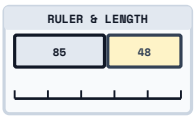
Compare heights: How much taller is a 72 in door than a 45 in table?



Paper Step: _____ [ ] SC-6 Ans: _____

8 Tier 1 • Builder

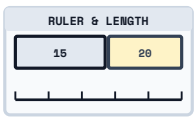
Compare lengths: How much longer is an 85 cm desk than a 48 cm chair?



Paper Step: _____ [ ] SC-6 Ans: _____

9 Tier 1 • Builder

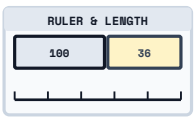
Three-piece train track: 15 cm + 20 cm + 25 cm =



Paper Step: _____ [ ] SC-6 Ans: _____

10 Tier 1 • Builder

Trimmed string: Start with 100 cm, cut off 36 cm:



Paper Step: _____ [ ] SC-6 Ans: _____

Unit 10 Practice B — Counting Coins (Quarters, Dimes, Nickels & Pennies)

Name: _____ Date: _____ Score: _____ / 10

TIER 1 • LEVEL 1: BUILDER FOUNDATION • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE B (#1–#10) ON PAPER FIRST

EXAMPLE 1 **Find the value of 1 Quarter, 2 Dimes, and 1 Nickel.**

25 + 20 = 45, then 45 + 5 = 50¢. Key: [25] [ENTER] [20] [+] [5] [+].

Verified Answer: 50¢

EXAMPLE 2 **Find the change from $1.00 after spending 65¢.**

100 - 65 = 35¢. Key: [100] [ENTER] [65] [-].

Verified Answer: 35¢

1 Tier 1 • Builder

Find the value in cents: 2 Quarters =

RULER & LENGTH: 2 | ?

Paper Step: _____ [ ] SC-6 Ans: _____

2 Tier 1 • Builder

Find the value in cents: 3 Quarters =

RULER & LENGTH: 3 | ?

Paper Step: _____ [ ] SC-6 Ans: _____

3 Tier 1 • Builder

How many cents are in 4 Quarters (1 Dollar)?

RULER & LENGTH: 4 | 1

Paper Step: _____ [ ] SC-6 Ans: _____

4 Tier 1 • Builder

Find the value in cents: 1 Quarter and 2 Dimes =

RULER & LENGTH: 1 | 2

Paper Step: _____ [ ] SC-6 Ans: _____

5 Tier 1 • Builder

Find the value in cents: 2 Quarters, 1 Dime, and 1 Nickel =

RULER & LENGTH: 2 | 1

Paper Step: _____ [ ] SC-6 Ans: _____

6 Tier 1 • Builder

Find the value in cents: 3 Dimes, 3 Nickels, and 4 Pennies =

RULER & LENGTH: 3 | 3

Paper Step: _____ [ ] SC-6 Ans: _____

7 Tier 1 • Builder

Find the value in cents: 2 Quarters, 3 Dimes, and 2 Pennies =

RULER & LENGTH: 2 | 3

Paper Step: _____ [ ] SC-6 Ans: _____

8 Tier 1 • Builder

Change from $1.00 after spending 40¢:

RULER & LENGTH: 1 | 0

Paper Step: _____ [ ] SC-6 Ans: _____

9 Tier 1 • Builder

Change from $1.00 after spending 65¢:

RULER & LENGTH: 1 | 0

Paper Step: _____ [ ] SC-6 Ans: _____

10 Tier 1 • Builder

Change from $1.00 after spending 78¢:

RULER & LENGTH: 1 | 0

Paper Step: _____ [ ] SC-6 Ans: _____

Unit 10 Practice C — Real-World Measurement & Coin Shopping Word Problems

Name: _____ Date: _____ Score: _____ / 10

TIER 2 • LEVEL 2: STORY & DETECTIVE LAB • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE C (#1–#10) ON PAPER FIRST

EXAMPLE 1 Maya buys an apple for 35¢ and a sticker for 25¢. Change from $1.00?

Cost: 35 + 25 = 60¢. Change: 100 - 60 = 40¢.

Verified Answer: 40¢

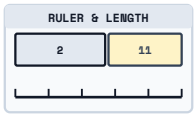
EXAMPLE 2 Spot the Mistake: A pencil starts at the 3 cm mark and ends at 12 cm. Sam said 12 cm.

Subtract the starting mark from the ending mark: 12 - 3 = 9 cm!

Verified Answer: 9 cm

1 Tier 2 • Detective

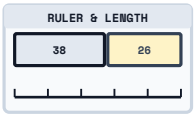
A crayon is placed from the 2 cm mark to the 11 cm mark on a ruler. How long is the crayon?



Paper Step: _____ | | SC-6 Ans: _____

2 Tier 2 • Detective

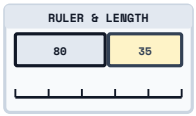
A toy car rolls 38 cm, stops, and rolls 26 cm farther. How far did it roll in all?



Paper Step: _____ | | SC-6 Ans: _____

3 Tier 2 • Detective

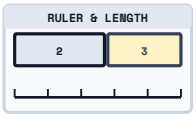
A wooden board is 80 inches long. A carpenter saws off 35 inches. How long is the rest?



Paper Step: _____ | | SC-6 Ans: _____

4 Tier 2 • Detective

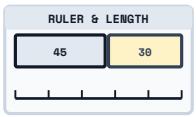
Noah has 2 quarters and 3 dimes. If he buys a 75¢ notebook, how many cents are left?



Paper Step: _____ | | SC-6 Ans: _____

5 Tier 2 • Detective

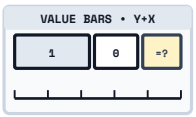
Sofia buys a 45¢ ruler and a 30¢ eraser. How much did she spend altogether?



Paper Step: _____ | | SC-6 Ans: _____

6 Tier 2 • Detective

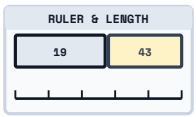
Liam pays $1.00 for a 68¢ juice box. How many cents of change does he get back?



Paper Step: _____ | | SC-6 Ans: _____

7 Tier 2 • Detective

A plant was 19 cm tall in May and grew to 43 cm in June. How many cm did it grow?



Paper Step: _____ | | SC-6 Ans: _____

8 Tier 2 • Detective

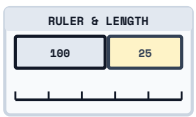
Priya has 4 dimes, 3 nickels, and 7 pennies. How many cents does she have in all?



Paper Step: _____ | | SC-6 Ans: _____

9 Tier 2 • Detective

A 100 cm ribbon has two 25 cm pieces cut from it. How much ribbon remains?



Paper Step: _____ | | SC-6 Ans: _____

10 Tier 2 • Detective

Spot the Mistake: Eli counted 3 nickels and 2 dimes as 5 × 10 = 50¢. Find the true value!



Paper Step: _____ | | SC-6 Ans: _____

Unit 10 Practice D — Perimeter of Rectangles, Triangles & Polygons

Name: _____ Date: _____ Score: _____ / 10

TIER 2 • LEVEL 2: STORY & DETECTIVE LAB • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE D (#1–#10) ON PAPER FIRST

EXAMPLE 1 Find the perimeter of a rectangle with length 12 cm and width 8 cm.

$P = 12 + 8 + 12 + 8 = 2 \times (12 + 8) = 40$ cm. Key: [12] [ENTER] [8] [+] [2] [×].

Verified Answer: 40 cm

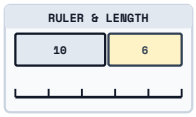
EXAMPLE 2 Find the perimeter of an equilateral triangle with side 15 cm.

$P = 15 + 15 + 15 = 3 \times 15 = 45$ cm.

Verified Answer: 45 cm

1 Tier 2 • Detective

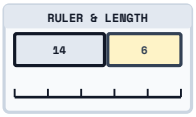
Find the perimeter of a rectangle with length 10 cm and width 6 cm:



Paper Step: _____ [ ] SC-6 Ans: _____

2 Tier 2 • Detective

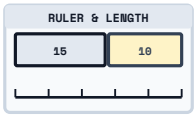
Find the perimeter of a rectangle with length 14 cm and width 6 cm:



Paper Step: _____ [ ] SC-6 Ans: _____

3 Tier 2 • Detective

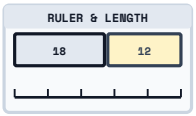
Find the perimeter of a rectangle with length 15 in and width 10 in:



Paper Step: _____ [ ] SC-6 Ans: _____

4 Tier 2 • Detective

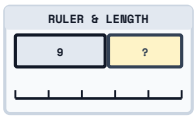
Find the perimeter of a rectangle with length 18 cm and width 12 cm:



Paper Step: _____ [ ] SC-6 Ans: _____

5 Tier 2 • Detective

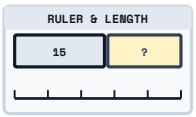
Find the perimeter of a square with side 9 cm:



Paper Step: _____ [ ] SC-6 Ans: _____

6 Tier 2 • Detective

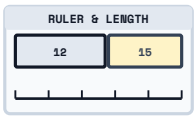
Find the perimeter of a square with side 15 cm:



Paper Step: _____ [ ] SC-6 Ans: _____

7 Tier 2 • Detective

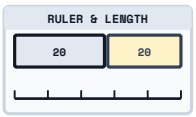
Perimeter of a triangle with sides 12 cm, 15 cm, and 18 cm:



Paper Step: _____ [ ] SC-6 Ans: _____

8 Tier 2 • Detective

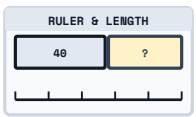
Perimeter of a triangle with sides 20 in, 20 in, and 14 in:



Paper Step: _____ [ ] SC-6 Ans: _____

9 Tier 2 • Detective

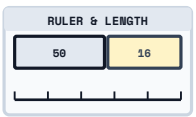
A square frame has perimeter 40 cm. How long is each side?



Paper Step: _____ [ ] SC-6 Ans: _____

10 Tier 2 • Detective

A triangle has perimeter 50 cm. Two sides are 16 cm and 19 cm. Find the 3rd side:



Paper Step: _____ [ ] SC-6 Ans: _____

Unit 10 Practice E — Multi-Item Shopping Pipelines & Unit Conversions

Name: _____ Date: _____ Score: _____ / 10

TIER 3 • LEVEL 3: BOSS CHALLENGE • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE E (#1–#10) ON PAPER FIRST

EXAMPLE 1 **Buy a 38¢ pen and a 27¢ pad with $1.00. Find change on the stack.**

100 [ENTER] 38 [ENTER] 27 [+] [-] → 100 - 65 = 35¢!

Verified Answer: 35¢

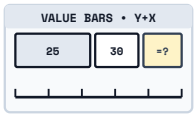
EXAMPLE 2 **Convert 2 feet and 6 inches into total inches.**

2 × 12 = 24 in, plus 6 in = 30 inches.

Verified Answer: 30 in

1 Tier 3 • Challenge

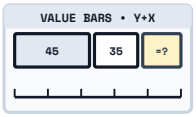
You buy items for 25¢ and 30¢ and pay with $1.00. How much change do you get?



Paper Step: _____ [ ] SC-6 Ans: _____

2 Tier 3 • Challenge

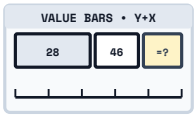
You buy items for 45¢ and 35¢ and pay with $1.00. How much change do you get?



Paper Step: _____ [ ] SC-6 Ans: _____

3 Tier 3 • Challenge

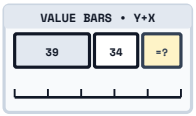
You buy items for 28¢ and 46¢ and pay with $1.00. How much change do you get?



Paper Step: _____ [ ] SC-6 Ans: _____

4 Tier 3 • Challenge

You buy items for 39¢ and 34¢ and pay with $1.00. How much change do you get?



Paper Step: _____ [ ] SC-6 Ans: _____

5 Tier 3 • Challenge

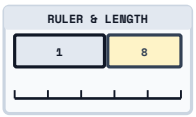
Feet to inches: How many inches are in 3 feet?



Paper Step: _____ [ ] SC-6 Ans: _____

6 Tier 3 • Challenge

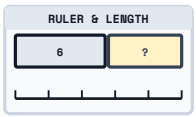
Feet and inches: How many total inches are in 1 foot and 8 inches?



Paper Step: _____ [ ] SC-6 Ans: _____

7 Tier 3 • Challenge

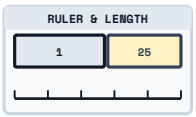
Yards to feet: How many feet are in 6 yards?



Paper Step: _____ [ ] SC-6 Ans: _____

8 Tier 3 • Challenge

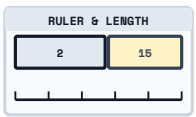
Hours to minutes: How many total minutes are in 1 hour and 25 minutes?



Paper Step: _____ [ ] SC-6 Ans: _____

9 Tier 3 • Challenge

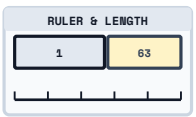
Elapsed time: Practice starts at 2:15 and ends at 2:50. How many minutes long is it?



Paper Step: _____ [ ] SC-6 Ans: _____

10 Tier 3 • Challenge

Coins to 1 Dollar: You have 63¢. How many more cents do you need to make $1.00?



Paper Step: _____ [ ] SC-6 Ans: _____

Unit 10 Practice F — Coin Puzzles, Broken-Ruler Challenges & K–2 Capstone Review

Name: _____ Date: _____ Score: _____ / 10

TIER 3 • LEVEL 3: BOSS CHALLENGE • STUDY THESE 2 WORKED EXAMPLES BEFORE SOLVING PRACTICE F (#1–#10) ON PAPER FIRST

EXAMPLE 1 I have 4 coins worth 55¢ (1 Quarter and 3 identical coins). What are the 3 coins?

55 - 25 = 30¢; 30 ÷ 3 = 10¢ → 3 Dimes!

Verified Answer: 10¢ (Dimes)

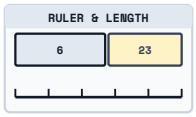
EXAMPLE 2 A rectangle has perimeter 36 cm and length 11 cm. Find its width.

Half-perimeter = 36 ÷ 2 = 18 cm; width = 18 - 11 = 7 cm.

Verified Answer: 7 cm

1 Tier 3 • Challenge

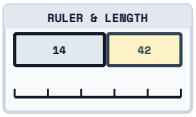
Broken Ruler: An object spans from the 6 cm mark to the 23 cm mark. Length?



Paper Step: _____ [ ] SC-6 Ans: _____

2 Tier 3 • Challenge

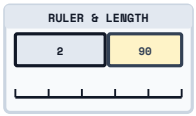
Broken Ruler: A ribbon spans from the 14 in mark to the 42 in mark. Length?



Paper Step: _____ [ ] SC-6 Ans: _____

3 Tier 3 • Challenge

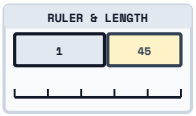
Coin Puzzle: 2 Quarters + [?] Dimes = 90¢. How many Dimes?



Paper Step: _____ [ ] SC-6 Ans: _____

4 Tier 3 • Challenge

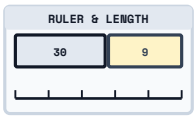
Coin Puzzle: 1 Quarter + [?] Nickels = 45¢. How many Nickels?



Paper Step: _____ [ ] SC-6 Ans: _____

5 Tier 3 • Challenge

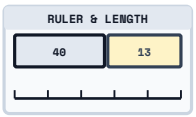
Missing Width: A rectangle has perimeter 30 cm and length 9 cm. Find its width:



Paper Step: _____ [ ] SC-6 Ans: _____

6 Tier 3 • Challenge

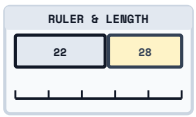
Missing Width: A rectangle has perimeter 40 cm and length 13 cm. Find its width:



Paper Step: _____ [ ] SC-6 Ans: _____

7 Tier 3 • Challenge

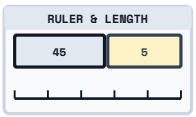
Three-piece wood cut: Cut 22 cm and 28 cm from a 90 cm board. What length remains?



Paper Step: _____ [ ] SC-6 Ans: _____

8 Tier 3 • Challenge

Equal ribbon pieces: Cut a 45 cm ribbon into 5 equal pieces. Length of each piece?



Paper Step: _____ [ ] SC-6 Ans: _____

9 Tier 3 • Challenge

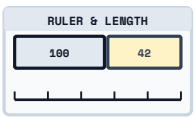
Piggy Bank Total: Find the total value in cents of 3 Quarters, 2 Dimes, and 4 Pennies:



Paper Step: _____ [ ] SC-6 Ans: _____

10 Tier 3 • Challenge

Two-Item Change Challenge: Start with 100¢ on your Place Value Tray and buy items for 42¢ and 18¢. How many cents remain?



Paper Step: _____ [ ] SC-6 Ans: _____

Unit 10 Mastery Check: Measurement, Length & Money

Name: _____ Date: _____ Score: _____ / 100

100-POINT UNIT MASTERY ASSESSMENT — 10 UNSCAFFOLDED PROBLEMS (10 POINTS EACH)

Solve each problem on paper first in the dot-grid workspace. Write your final answer on the line, then verify your result on the SC-6 stack. Record your total score in Appendix B (Score Tracker) and verify complete worked keystrokes online at stackcalc.io/curriculum/answers.

1 Core Fluency • 10 pts

Combine the two rod lengths: 26 cm + 38 cm =

[ ] +10 pts [ ] SC-6 **Ans:** _____

2 Core Fluency • 10 pts

Find the remaining board length: 75 in - 29 in =

[ ] +10 pts [ ] SC-6 **Ans:** _____

3 Core Fluency • 10 pts

Find the total value in cents of 2 Quarters, 2 Dimes, and 1 Nickel:

[ ] +10 pts [ ] SC-6 **Ans:** _____

4 Core Fluency • 10 pts

Find the change from $1.00 after spending 57¢:

[ ] +10 pts [ ] SC-6 **Ans:** _____

5 Core Fluency • 10 pts

Find the perimeter of a rectangle 11 cm long by 7 cm wide:

[ ] +10 pts [ ] SC-6 **Ans:** _____

6 Core Fluency • 10 pts

Compute the two-item change from 100¢: 100 - (36 + 24) =

[ ] +10 pts [ ] SC-6 **Ans:** _____

7 Application • 10 pts

A key starts at the 4 cm mark on a ruler and ends at the 11 cm mark. How long is the key?

[ ] +10 pts [ ] SC-6 **Ans:** _____

8 Application • 10 pts

Maya buys a 45¢ sticker and a 28¢ pencil. How much change does she get from $1.00?

[ ] +10 pts [ ] SC-6 **Ans:** _____

9 Application • 10 pts

A square garden has sides that are each 12 feet long. What is the perimeter of the garden?

[ ] +10 pts [ ] SC-6 **Ans:** _____

10 Error Analysis • 10 pts

Error Analysis: Leo found the perimeter of a 10 cm by 5 cm rectangle by adding 10 + 5 = 15. Fix it!

[ ] +10 pts [ ] SC-6 **Ans:** _____

Unit 10 STEM: The Toy Maker's Measuring & Coin Shop

Name: _____ Date: _____ Score: _____ / 4

REAL-WORLD STEM APPLICATION & WORKSHOP: THE TOY MAKER'S MEASURING & COIN SHOP

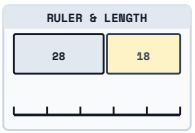
Young craftspeople cut balsa wood strips to build model gliders and sell their finished models at the school STEM fair.

Companion Book (Vol. I: From Blocks to the Stack (SC-6 Manual) — Ch. 6: Measurement, Time & Ch. 9: Real-World Maker Labs) • The 84 mm Master Datum Ruler & Making Change: Every StackCalc studio is built on the 84 mm master datum ($2^2 \times 3 \times 7$), letting rulers, blocks, and coin values lock together with zero gaps!

Mathematical Focus: Place Value Studio (2-Row Tray, Digit Blocks & [+1] Carry Tokens) • Stack Shortcut: [25] [ENTER] [10] [+] [5] [+] = 40¢ (Quarter + Dime + Nickel)

CASE INVESTIGATION 1 STEM Modeling

A glider needs a 28 cm main wing and an 18 cm tail wing. Total wood strip length needed?



1. My Paper Setup: _____

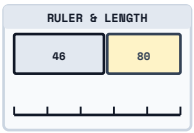
2. My Number Sentence: _____

3. My Answer: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)

CASE INVESTIGATION 2 STEM Modeling

You cut the 46 cm needed from an 80 cm balsa strip. How many cm of wood are left over?



1. My Paper Setup: _____

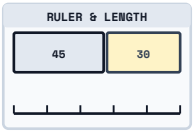
2. My Number Sentence: _____

3. My Answer: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)

CASE INVESTIGATION 3 Applied Calculation

A customer buys a glider for 45¢ and a launcher for 30¢ with $1.00. Find their change:



1. My Paper Setup: _____

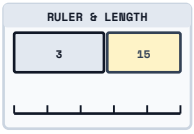
2. My Number Sentence: _____

3. My Answer: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)

CASE INVESTIGATION 4 Error Analysis Workshop

Error Analysis: A student measures a wing from the 3 cm mark to 15 cm and says 15 cm. Correct it!



1. My Paper Setup: _____

2. My Number Sentence: _____

3. My Answer: _____

[ ] Verified on SC-6 Stack (Online Key: stackcalc.io/curriculum/answers)

Hands-On Math Explorers & Builders Note

Young builders, chefs, and nature explorers use physical blocks and paper math to solve real-world mysteries! Always build or write your paper setup first, write your number sentence, and check on your SC-6. Parents & teachers: full keys at stackcalc.io/curriculum/answers.

Certificate of Early Elementary Stack Mastery

Awarded for completing all 10 units of the Early Elementary Math Lab (840 Problems).

CERTIFICATE OF EARLY ELEMENTARY STACK MASTERY

This certifies that: _____

has completed all 10 Hands-On Math Lab units, leveled practice worksheets (Practice A through F), 100-Point Unit Mastery Checks, and STEM Applied Cases—solving on paper first with physical manipulative models and verifying step-by-step on the 4-level StackCalc SC-6 calculator.

[ ] Early Elementary Explorer (Units 01–10 • Grades K–2 • SC-6)

Portfolio Summary: 10 Lab Units • 840 Verified Problems • 100-Pt Mastery Avg: _____ %

[ ] CRA Manipulative Mastery [ ] Paper-First Predictions [ ] 4-Level Stack Verification

Teacher / Parent Signature: _____ **Date:** _____

ESSENTIAL SC-6 KEYCAP SEQUENCES TO REMEMBER

Doubling Any Number in Register X (e.g., 2 × 7 = 14)

7 ENTER +

Place Value Studio: Duplicates [7] from Row 0 (X) to Row 1 (Y) and combines twin rows.

Two-Digit Addition Across a Ten (28 + 15 = 43)

2 8 ENTER 1 5 +

Place Value Studio: Trades 10 Ones for a Gold [+1] Carry Token in the Tens socket.

Parenthesis-Free Multi-Step: (8 + 5) − 6 = 7

8 ENTER 5 + 6 -

Place Value Studio: Computes 8 + 5 = 13 in Row 0 first, then subtracts 6.

Making a Ten with 3 Addends (8 + 2 + 5 = 15)

8 ENTER 2 + 5 +

Place Value Studio: Completes a full Ten-Frame (8 + 2 = 10), then adds 5 Ones.

Chained Multiplication: 3 × 4 × 2 = 24

3 ENTER 4 × 2 ×

Place Value Studio: Scales a 3 × 4 block array (12) by 2 to build 24.

CONGRATULATIONS! YOUR NEXT STEP IN THE STACKCALC LIBRARY (GRADES 3–5):

• Next Curriculum Workbook: Book 2B — Upper Elementary Math Lab (Fractions, Decimals, Area & Prime Towers • Grades 3–5).

• Add to Your Lab Desk: 84.0 mm Fraction Studio, Prime Factor Studio, Volume I: From Blocks to the Stack & Book 5 at https://stackcalc.io!

Early Elementary Math Lab Score Tracker & Standards Log

Record your scores for the Lab Investigation, Practice Worksheets A–F, Mastery Checks, and STEM Cases.

Unit & Mathematical Topic	Standards	Lab (/4)	Prac A–F	Quiz (/100)	STEM (/4)
Unit 01: Step Counting & Number Sequences Pre-K – Kindergarten • pp. 5–15	CCSS.MATH.K.CC.A.1 CCSS.MATH.K.CC.B.4	____ / 4	__/__/__	____ / 100	____ / 4
Unit 02: Number Bonds to 5 & 10 Kindergarten – Grade 1 • pp. 16–26	CCSS.MATH.K.OA.A.3 CCSS.MATH.1.OA.B.3	____ / 4	__/__/__	____ / 100	____ / 4
Unit 03: Ten-Frames & Regrouping Foundations Grade 1 • pp. 27–37	CCSS.MATH.1.OA.C.6 CCSS.MATH.1.NBT.B.2	____ / 4	__/__/__	____ / 100	____ / 4
Unit 04: Addition Facts within 20 & The Waiting Shelf Grade 1 – 2 • pp. 38–48	CCSS.MATH.1.OA.C.6 CCSS.MATH.2.OA.B.2	____ / 4	__/__/__	____ / 100	____ / 4
Unit 05: Place Value Studio: Tens & Ones Grade 1 – 2 • pp. 49–59	CCSS.MATH.1.NBT.B.2 CCSS.MATH.2.NBT.A.1	____ / 4	__/__/__	____ / 100	____ / 4
Unit 06: Subtraction & Tray Comparison Grade 1 – 2 • pp. 60–70	CCSS.MATH.1.OA.B.4 CCSS.MATH.2.OA.B.2	____ / 4	__/__/__	____ / 100	____ / 4
Unit 07: Make-10 Regrouping & [+1] Tokens Grade 1 – 2 • pp. 71–81	CCSS.MATH.1.NBT.C.4 CCSS.MATH.2.NBT.B.5	____ / 4	__/__/__	____ / 100	____ / 4
Unit 08: Two-Digit Operations (0–99) Grade 2 • pp. 82–92	CCSS.MATH.2.NBT.B.5 CCSS.MATH.2.NBT.B.7	____ / 4	__/__/__	____ / 100	____ / 4
Unit 09: Equal Groups, Repeated Addition & Arrays Grade 2 • pp. 93–103	CCSS.MATH.2.OA.C.3 CCSS.MATH.2.OA.C.4	____ / 4	__/__/__	____ / 100	____ / 4
Unit 10: Measurement, Length & Money Grade 2 • pp. 104–114	CCSS.MATH.2.MD.A.1 CCSS.MATH.2.MD.B.5	____ / 4	__/__/__	____ / 100	____ / 4

ONLINE ANSWER KEY & COMPLETE STEP-BY-STEP KEYSTROKE PORTAL

In accordance with modern evidence-based mathematics instruction, complete worked answers are hosted online rather than printed in the student lab book to encourage authentic problem-solving and paper-first predictions.

• Online Portal: https://stackcalc.io/curriculum/answers#early-elementary

1. PAPER PREDICTION

Solve by hand & write your prediction before touching keys.

2. STACK VERIFICATION

Enter your steps on the SC-6 to check for agreement.

3. ERROR ANALYSIS

If X differs, inspect where your paper step or key diverged.

Cumulative Exam 1: Units 01–05 Benchmark

Name: _____ Date: _____ Score: _____ / 100

100-POINT CUMULATIVE EXAM 1 — UNITS 01–05 BENCHMARK (10 PROBLEMS • 10 PTS EACH)

Covers Step Counting, Number Bonds to 10, Make-10 Regrouping, Twin-Row Doubling, and Tens & Ones on the Place Value Studio Tray. Solve on paper first, verify on the SC-6 stack, and check worked keystrokes at stackcalc.io/curriculum/answers.

1 Core Fluency • 10 pts

Step Count by 1*s*: Start at 6 on your Ten-Frame and add 1 block three times. Where do you land?

[ ] +10 pts [ ] SC-6 Ans: _____

2 Core Fluency • 10 pts

Number Bond to 10: A full Ten-Frame holds 10 blocks. If 4 blocks are blue, how many are yellow?

[ ] +10 pts [ ] SC-6 Ans: _____

3 Core Fluency • 10 pts

Make-10 Bridge: Place 8 blocks in Frame 1 and 5 in Frame 2. Trade blocks to fill 10 and find 8 + 5:

[ ] +10 pts [ ] SC-6 Ans: _____

4 Core Fluency • 10 pts

Nine-Plus Bridge: Use a Make-10 trade on your Place Value Tray to solve 9 + 7 = ?

[ ] +10 pts [ ] SC-6 Ans: _____

5 Core Fluency • 10 pts

Twin-Row Doubling: Place 8 blocks on Row Y and 8 blocks on Row X of your tray. What is the double of 8?

[ ] +10 pts [ ] SC-6 Ans: _____

6 Core Fluency • 10 pts

Near-Double Plus One: Use your double of 7 plus 1 more block to find 7 + 8 = ?

[ ] +10 pts [ ] SC-6 Ans: _____

7 Application • 10 pts

Place Value Tens & Ones: Build 3 Tens and 6 Ones on the Place Value Tray. What 2-digit number is formed?

[ ] +10 pts [ ] SC-6 Ans: _____

8 Application • 10 pts

Three-Addend Make-10: Snap together the 10-pair first to solve 7 + 3 + 8 = ?

[ ] +10 pts [ ] SC-6 Ans: _____

9 Application • 10 pts

Story Application: Mia stacks 6 red blocks and 6 gold blocks, then adds 4 more. How many blocks in all?

[ ] +10 pts [ ] SC-6 Ans: _____

10 Error Analysis • 10 pts

Error Spotter: Leo typed 40 + 5 and got 405 instead of placing [4] in Tens and [5] in Ones. What is 40 + 5?

[ ] +10 pts [ ] SC-6 Ans: _____

Cumulative Exam 2: Units 06–10 Benchmark

Name: _____ Date: _____ Score: _____ / 100

100-POINT CUMULATIVE EXAM 2 — UNITS 06–10 BENCHMARK (10 PROBLEMS • 10 PTS EACH)

Covers Fact-Family Subtraction, Gold [+1] Carry Tokens, Two-Digit Regrouping, Equal-Groups Block Arrays, and Measurement/Money. Solve on paper first, verify on the SC-6 stack, and check worked keystrokes at stackcalc.io/curriculum/answers.

1 Core Fluency • 10 pts

Fact Family Take-Away: Unbundle 1 Ten on the Place Value Tray to solve 14 − 6 = ?

[ ] +10 pts [ ] SC-6 Ans: _____

2 Core Fluency • 10 pts

Gold [+1] Carry Token: Add 27 + 16 on the Place Value Tray by trading 10 Ones for a [+1] Ten token:

[ ] +10 pts [ ] SC-6 Ans: _____

3 Core Fluency • 10 pts

Two-Digit Regrouping Sum: Combine 38 + 25 using your Place Value Digit Blocks and [+1] Carry Token:

[ ] +10 pts [ ] SC-6 Ans: _____

4 Core Fluency • 10 pts

Two-Digit Unbundling Subtraction: Trade 1 Ten for 10 Ones on the tray to solve 52 − 18 = ?

[ ] +10 pts [ ] SC-6 Ans: _____

5 Core Fluency • 10 pts

Two-Step Tray Chain: Compute (24 + 19) − 13 on the 4-level stack without parentheses:

[ ] +10 pts [ ] SC-6 Ans: _____

6 Core Fluency • 10 pts

Equal Groups Array: Build 4 rows of 5 blocks on your desk grid: 4 × 5 = ?

[ ] +10 pts [ ] SC-6 Ans: _____

7 Application • 10 pts

Skip-Count Array: Build 3 rows of 6 blocks and verify on the SC-6 stack: 3 × 6 = ?

[ ] +10 pts [ ] SC-6 Ans: _____

8 Application • 10 pts

Coin Bank Total: Find the total value in cents of 2 quarters, 3 dimes, and 1 nickel:

[ ] +10 pts [ ] SC-6 Ans: _____

9 Application • 10 pts

Length Comparison: A blue block tower is 45 cm tall and a red tower is 28 cm tall. How much taller is the blue tower?

[ ] +10 pts [ ] SC-6 Ans: _____

10 Error Analysis • 10 pts

Error Spotter: Sam added 29 + 14 and forgot the Gold [+1] Carry Token, getting 33. What is the true sum 29 + 14?

[ ] +10 pts [ ] SC-6 Ans: _____

APPENDIX C (EXAM 3 OF 4) • FULL-CURRICULUM MULTI-STEP SYNTHESIS (UNITS 01–10 • SC-6)

Cumulative Exam 3: Multi-Step Synthesis

Name: _____ Date: _____ Score: _____ / 100

100-POINT CUMULATIVE EXAM 3 — FULL-CURRICULUM SYNTHESIS (10 PROBLEMS • 10 PTS EACH)

Synthesizes Make-10 Regrouping, Place Value Studio Carry/Unbundling, Block Arrays, and Multi-Step Story Problems across Units 01–10. Solve on paper first, verify on the SC-6 stack, and check worked keystrokes at stackcalc.io/curriculum/answers.

1 Core Fluency • 10 pts

Make-10 & Subtract: Add 8 + 7 on your Ten-Frame, then take away 5 blocks: (8 + 7) − 5 = ?

[ ] +10 pts [ ] SC-6 Ans: _____

2 Core Fluency • 10 pts

Double & Add Ten: Double 9 on your Twin-Row Tray, then add 1 Ten on the Place Value Tray:

[ ] +10 pts [ ] SC-6 Ans: _____

3 Core Fluency • 10 pts

Place Value Expansion: Combine 50 + 20 + 8 on the Whole Number Tray:

[ ] +10 pts [ ] SC-6 Ans: _____

4 Core Fluency • 10 pts

Regrouping & Unbundling Chain: Solve (36 + 17) − 24 step-by-step on paper and verify on the SC-6:

[ ] +10 pts [ ] SC-6 Ans: _____

5 Core Fluency • 10 pts

Array Plus Extra Blocks: Build 5 rows of 4 blocks, then add 6 more blocks. How many blocks in all?

[ ] +10 pts [ ] SC-6 Ans: _____

6 Core Fluency • 10 pts

Two Arrays Combined: Combine a 3 × 4 block array and a 2 × 5 block array. How many blocks in all?

[ ] +10 pts [ ] SC-6 Ans: _____

7 Application • 10 pts

Making Change from $1.00: You buy a 45¢ pencil and a 25¢ eraser. How much change do you receive from $1.00?

[ ] +10 pts [ ] SC-6 Ans: _____

8 Application • 10 pts

Three-Number Regrouping Sum: Add 18 + 22 + 35 on your Place Value Tray:

[ ] +10 pts [ ] SC-6 Ans: _____

9 Application • 10 pts

Garden Perimeter Walk: A rectangular garden bed is 12 feet long and 8 feet wide. What is its perimeter in feet?

[ ] +10 pts [ ] SC-6 Ans: _____

10 Error Analysis • 10 pts

Error Spotter: Ava solved 60 − 27 without unbundling a Ten and wrote 47. What is the true difference 60 − 27?

[ ] +10 pts [ ] SC-6 Ans: _____

Cumulative Exam 4: Final Capstone Mastery

Name: _____ Date: _____ Score: _____ / 100

100-POINT CUMULATIVE EXAM 4 — FINAL CAPSTONE & 3D BLOCK STUDIO EXAM (10 PTS EACH)

Final K–2 mastery exam integrating Place Value Studio Trays, Gold [+1] Carry Tokens, Block Arrays, and SC-6 Stack Verification. Solve on paper first, verify on the SC-6 stack, and check worked keystrokes at stackcalc.io/curriculum/answers.

1 Core Fluency • 10 pts

Place Value Tray Challenge: Build 4 Tens and 8 Ones, then add 3 Tens and 7 Ones on the Place Value Tray:

[ ] +10 pts [ ] SC-6 **Ans:** _____

2 Core Fluency • 10 pts

Zero-Placeholder Vault: Unbundle 1 Ten on the Place Value Tray to solve 80 − 36 = ?

[ ] +10 pts [ ] SC-6 **Ans:** _____

3 Core Fluency • 10 pts

Double-Double Chain: Double 6, then double that result again on the stack:

[ ] +10 pts [ ] SC-6 **Ans:** _____

4 Core Fluency • 10 pts

Block Tower Difference: Tower A has 6 rows of 5 blocks and Tower B has 18 blocks. How many more blocks are in Tower A?

[ ] +10 pts [ ] SC-6 **Ans:** _____

5 Core Fluency • 10 pts

Classroom Supply Kit: 4 tables each have 6 markers, plus 8 spare markers in the caddy. How many markers in all?

[ ] +10 pts [ ] SC-6 **Ans:** _____

6 Core Fluency • 10 pts

Two-Step Bookstore Purchase: You have 90¢. You spend 35¢ and then earn 20¢ back. How many cents do you have now?

[ ] +10 pts [ ] SC-6 **Ans:** _____

7 Application • 10 pts

Three-Stack Addition: Combine 26 + 34 + 19 using Gold [+1] Carry Tokens on the Place Value Tray:

[ ] +10 pts [ ] SC-6 **Ans:** _____

8 Application • 10 pts

Symmetric Array Difference: Subtract a 3 × 3 square array from a 5 × 5 square array:

[ ] +10 pts [ ] SC-6 **Ans:** _____

9 Application • 10 pts

Maker Lab Ribbon Cut: Start with 72 inches of ribbon and cut off two 18-inch pieces. How much ribbon remains?

[ ] +10 pts [ ] SC-6 **Ans:** _____

10 Error Analysis • 10 pts

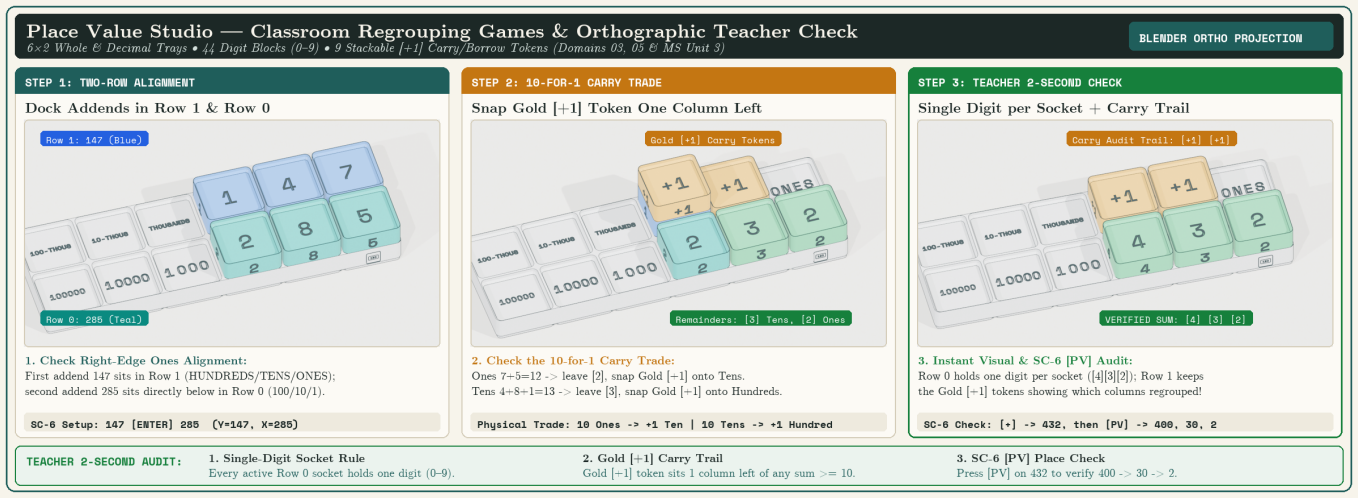
Capstone Error Analysis: Noah evaluated (15 + 9) − 8 and got 24 because he forgot to subtract 8. Find (15 + 9) − 8:

[ ] +10 pts [ ] SC-6 **Ans:** _____

APPENDIX D (PART 1 OF 4) • OFFICIAL 3D BLOCK KIT 1 — PLACE VALUE STUDIO

Place Value Studio: 3D Blocks & Desk Games

Hands-on activities and 2-second visual checks for the 6×2 Whole/Decimal Trays, Digit Blocks (0–9), and Gold [+1] Carry Tokens.



HANDS-ON 3D BLOCK STUDIO ACTIVITIES & STACK VERIFICATION

Activity 1: 'Race to 1,000 Carry Relay' (2-Row Tray & Gold [+1] Carry Tokens)

Start at 000 on the 6×2 Whole Number Tray. Place a 3-digit addend in Row 0 (Line X) and add it to the waiting quantity in Row 1 (Line Y). Whenever a column sum reaches 10 or more, leave the ones digit in Row 0 and snap a Gold [+1] Carry Token one column to the left, then verify on the stack!

Stack Check (147 + 285 = 432): `1` `4` `7` `ENTER` `2` `8` `5` `+`

Activity 2: 'The Decimal Point Shifter (×10 & ÷10 Slide)' (Whole & Decimal Trays)

Dock the Whole Number Tray (100,000 to 1) and Decimal Tray (0.1 to 0.000001) side-by-side at the raised decimal point (•). Build 4.75 and multiply by 10 by physically sliding every digit block one column left across the stationary decimal point—seeing why digits shift columns!

Stack Check (4.75 × 10 = 47.5): `4` `•` `7` `5` `ENTER` `1` `0` `×`

Activity 3: 'The Borrowing Bank Vault (Zero-Placeholder Unbundling)'

Set 502 in Row 1 (Line Y) and 168 in Row 0 (Line X). Because Ones (2 − 8) and Tens (0 − 6) cannot subtract directly, unbundle 1 Hundred ([5] → [4]), trade across the zero Tens ([0] → [9]), and snap the Gold [+1] token onto Ones (12 − 8 = 4) to reveal 334.

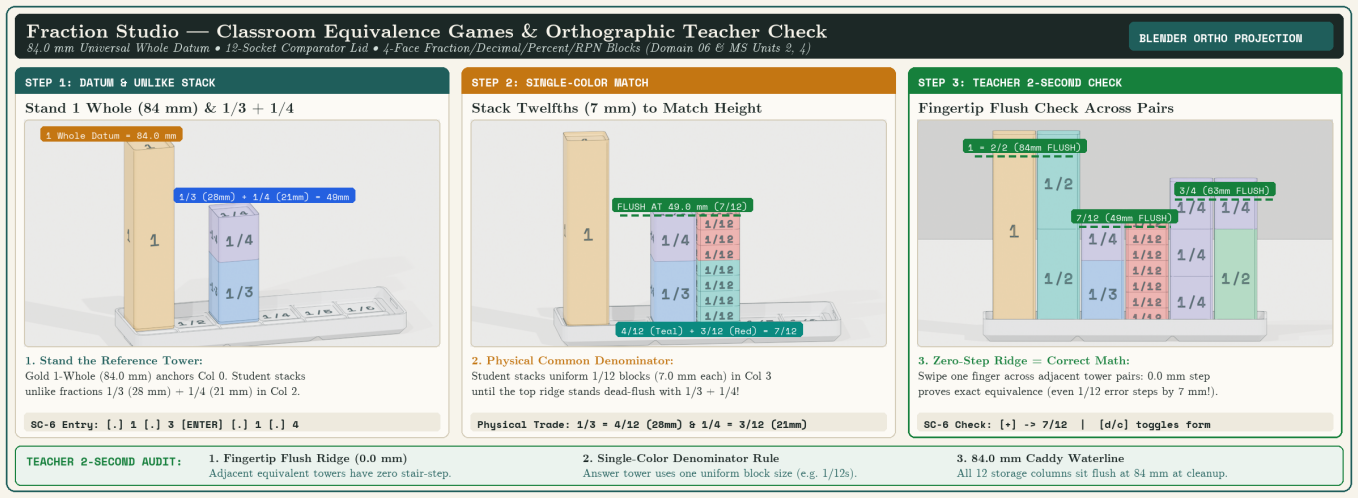
Stack Check (502 − 168 = 334): `5` `0` `2` `ENTER` `1` `6` `8` `-`

WHY PHYSICAL 3D PLACE VALUE BLOCKS BEAT FLAT PAPER (2-SECOND VISUAL CHECK)

- Check 1 — Single-Digit Socket Rule: Each machined socket on the Place Value Tray holds one digit block (0–9). Whenever a column reaches 10, the physical tray forces a 10-for-1 trade into the next column left.
- Check 2 — Tactile Gold [+1] Carry Trail: Every Gold [+1] token sits visibly one column to the left of the column that crossed 10—eliminating forgotten carries.
- Check 3 — Direct 1-to-1 Stack Mapping: Row 1 of the physical tray maps directly to Register Y (Waiting Shelf) and Row 0 maps directly to Register X (Workbench).

Fraction Studio: 84 mm Towers & Flush Checks

Proportional 84.0 mm fraction towers (1 Whole down to 1/12) and the 12-Socket Comparator Lid.



HANDS-ON 3D BLOCK STUDIO ACTIVITIES & STACK VERIFICATION

Activity 1: 'The 84.0 mm Flush Tower Challenge (Make 1 Whole)'

Stand the Gold 1-Whole block (84.0 mm) in Column 0 of the 12-Socket Comparator Lid. Build an equal 84.0 mm tower in Column 1 using four blocks from different denominator families: 1/2 (42 mm) + 1/4 (21 mm) + 1/6 (14 mm) + 1/12 (7 mm) = 84.0 mm. Swipe a finger across the top ridge to feel 0.0 mm step!

Stack Check (1/2 + 1/4 + 1/6 + 1/12 = 1): [.] [1] [.] [2] [ENTER] [.] [1] [.] [4] [+] [.] [1] [.] [6] [+] [.] [1] [.] [1] [2] [+]

Activity 2: 'Two-Dot Common Denominator Duel (1/3 + 1/4 = 7/12)'

Stack 1/3 (28.0 mm) + 1/4 (21.0 mm) = 49.0 mm in Column 2. Next, find a single-color block family (twelfths, 7.0 mm each) and stack seven 1/12 blocks (49.0 mm) in Column 3 so both towers stand 100% flush!

Stack Check (1/3 + 1/4 = 7/12): [.] [1] [.] [3] [ENTER] [.] [1] [.] [4] [+]

Activity 3: 'Split & Rebuild Fraction Division (1/2 ÷ 3/4 = 2/3)'

Stand the 1/2 block (42.0 mm) in Column 1. Since it represents 3 fourths of the mystery tower, split 42.0 mm into 3 equal 1/6 blocks (÷ 3 → 14.0 mm is 1 fourth), then stack 4 of those 1/6 blocks in Column 3 (× 4 → 56.0 mm = two 1/3 blocks = 2/3)!

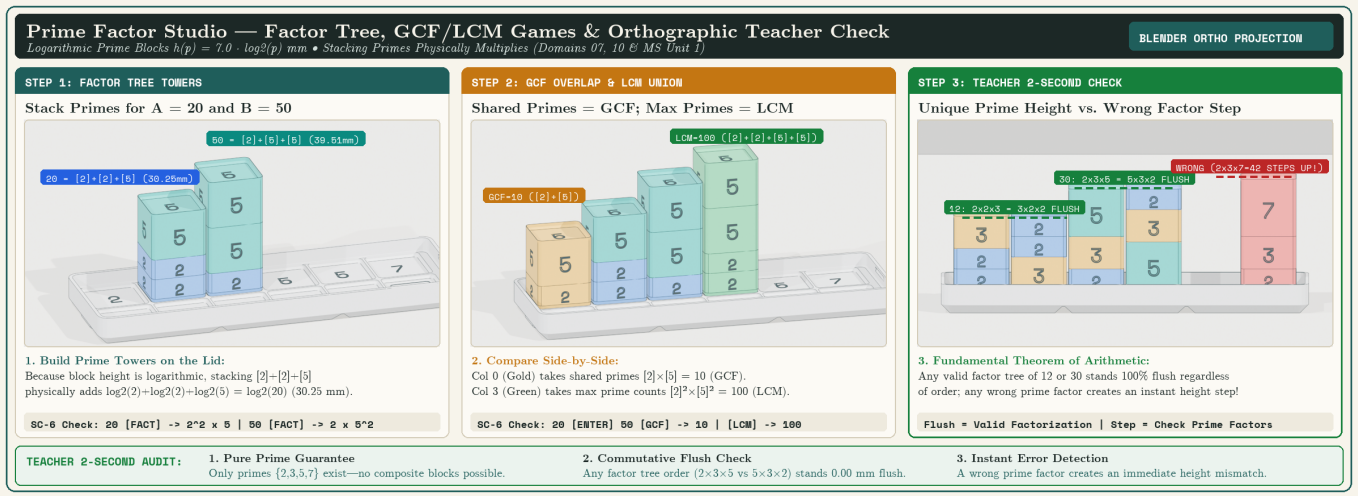
Stack Check (1/2 ÷ 3/4 = 2/3): [.] [1] [.] [2] [ENTER] [.] [3] [.] [4] [÷]

WHY 84.0 MM 3D FRACTION TOWERS BEAT FLAT DRAWINGS (2-SECOND FLUSH AUDIT)

- Check 1 — The 0.0 mm Fingertip Flush Test: Because $84 = 2^2 \times 3 \times 7$, halves, thirds, fourths, sixths, sevenths, and twelfths all have exact integer millimeter heights! Even a 1/12 error creates a bold 7.0 mm physical step.
- Check 2 — Single-Color Answer Tower Rule: Adding unlike fractions requires trading into one uniform block color (common denominator) that stands dead-flush with the mixed tower.
- Check 3 — Four-Face Rotational Engraving: Rotate any Fraction Studio block 90° in your hand to read its Fraction (1/4), Decimal (0.25), Percent (25%), and Two-Dot Key (.1.4).

Prime Factor Studio: Logarithmic Prime Blocks

Logarithmic prime factor blocks ($h(p) = 7.0 \cdot \log_2(p)$ mm for primes 2, 3, 5, 7) where multiplication becomes physical height addition.



HANDS-ON 3D BLOCK STUDIO ACTIVITIES & STACK VERIFICATION

Activity 1: 'The Commutative Skyscraper Race ($2 \times 3 \times 5 = 30$)'

Factor 30 two different ways: Tower A uses $6 \times 5 \rightarrow [2] + [3] + [5]$ in Column 2, while Tower B uses $10 \times 3 \rightarrow [5] + [2] + [3]$ in Column 3. Because each block's height is proportional to $\log_2(p)$, both towers stand 100% flush at 34.35 mm!

Stack Check ($2 \times 3 \times 5 = 30$): 2 ENTER 3 × 5 ×

Activity 2: 'Fundamental Theorem of Arithmetic Challenge ($12 = 2 \times 2 \times 3$)'

Stack the prime tower for 12 ([2] + [2] + [3] = 25.10 mm) in Column 1, then try to match its exact height in Column 2 using different primes (e.g., [5] + [2] = 10 = 23.25 mm or [2] + [7] = 14 = 26.65 mm). No other prime combination ever stands flush!

Stack Check ($2 \times 2 \times 3 = 12$): 2 ENTER 2 × 3 ×

Activity 3: 'Side-by-Side GCF Overlap & LCM Union Duel (20 & 50)'

Build Tower $A = 20$ ([2]+[2]+[5]) and Tower $B = 50$ ([2]+[5]+[5]). Copy the shared prime blocks ([2]+[5] = 10) to build GCF(20, 50) = 10 on the left, and stack the tallest count of each prime ([2]+[2]+[5]+[5] = 100) to build LCM(20, 50) = 100 on the right!

Stack Check (GCF = 10, LCM = 100 → 10 × 100 = 1000): 2 ENTER 5 × 2 ENTER 2 × 5 × 5 × ×

HOW LOGARITHMIC 3D PRIME BLOCKS MAKE FACTORING & LOGARITHMS VISIBLE

- Check 1 — Pure Prime Guarantee: Because the Prime Factor Studio contains only prime blocks ($\{2, 3, 5, 7\}$), you can never stop a factor tree early at a composite number like 4, 6, 8, or 9.
- Check 2 — Physical Logarithm Law: Stacking blocks adds their heights $h(a) + h(b) = 7.0 \cdot \log_2(a) + 7.0 \cdot \log_2(b) = 7.0 \cdot \log_2(a \cdot b)$, turning abstract logarithms into a 3D tower!
- Check 3 — GCF + LCM Height Symmetry: On the comparator lid, $h(\text{GCF}) + h(\text{LCM}) = h(A) + h(B)$, proving visually why GCF(A, B) × LCM(A, B) = $A \times B$.

Official StackCalc Block Studios, Calculators & Library Guide

Order official 3D Manipulative Block Studios, distraction-free calculators, and companion books at https://stackcalc.io.

1. THE OFFICIAL STACKCALC HANDS-ON HARDWARE & 3D BLOCK STUDIO ECOSYSTEM (STACKCALC.IO)

STUDIO 1	**Place Value Studio**	Core Kit • K–6
6×2 Whole & Decimal Trays, 40 Digit Blocks (0–9), Gold [+1] Carry Tokens & Base-10 Set		
STUDIO 2	**Fraction Studio**	Grades 2–8
78 Proportional Fraction Towers (84.0 mm Whole down to 1/12) & 12-Socket Comparator Lid		
STUDIO 3	**Prime Factor Studio**	Grades 3–10
Logarithmic Prime Blocks ($h(p) = 7.0 \cdot \log2(p)$ mm for 2, 3, 5, 7) & Comparator Lid		
SC-6	**Elementary RPN Calculator**	Core Calc • K–8
4-Register Visible Stack (T, Z, Y, X), Two-Dot Fractions (.a.b), [PV], [FACT], [GCF] + Web Sim		
SC-32	**Scientific STEM Calculator**	Grades 8–12 & AP
32-Key Scientific RPN: [POLY], [$\rightarrow\theta,r$], [SIN/COS/TAN], [LN/LOG], [BASE] + iOS/watchOS App		

2. COMPANION TRADE BOOKS & WORKBOOKS IN THE STACKCALC LIBRARY (STACKCALC.IO)

Volume I & II • Illustrated Trade Books:	Vol. I: From Blocks to the Stack (Grades K–6) • Vol. II: Thinking in the Stack (Grades 7–12 & AP)
Book 1 • Teaching with the Stack:	Master K–12 Teacher & Homeschool Guide, Word-for-Word Scripts & Misconception Matrix (46 pp.)
Book 2A & 2B • Elementary Math Labs:	Book 2A: Early Elementary (K–2) • Book 2B: Upper Elementary (3–5) (10 Units + 4 Exams • 840 Probs)
Book 3 • Middle School Math Lab:	Grades 6–8 Two-Method Block & SC-6 Workbook (10 Units, 45 Sections & 10 Quizzes • 1,000 Problems)
Book 4 & 5 • High School & Speed Labs:	Book 4: High School & STEM Lab (SC-32) • Book 5: Stack Speed & Fluency (180 Timed Tests)

3. ONLINE ANSWER KEY, FREE SIMULATOR & HARDWARE ORDERING PORTAL

- Online Worked Solutions & Keystrokes (840 Verified Problems): https://stackcalc.io/curriculum/answers#early-elementary
- Order Physical 3D Block Studios & Distraction-Free SC-6 Calculators: https://stackcalc.io
- Free Web Simulator & iOS/watchOS App: Practice on the interactive SC-6 / SC-32 simulator or download StackCalc 32 on the App Store!