

Multi-Step Word Problems & Bar Models

Tactile Concrete-Pictorial-Abstract (CPA) Station Guide • CCSS.MATH.3.OA.D.8

Student Name: _____

Date: _____

Model: SC-6

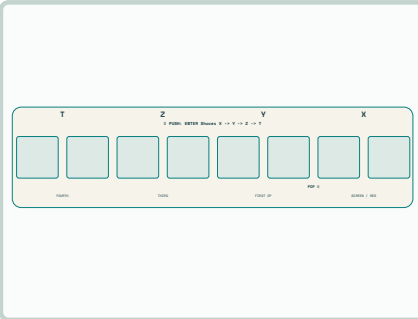
Check Score: ___ / 4

STUDENT SELF-CHECK RULE (NO CHEATING):

Build with blocks and solve on paper first! Use your SC-6 calculator ONLY to verify answers on the 4-line LCD screen.

STATION LAB TUTORIAL: BENCH SCHEMATIC & CPA PROGRESSION

1. 2D Bench Blueprint



Kit: Stack Board

2. Desk Setup (Concrete -> Pictorial)

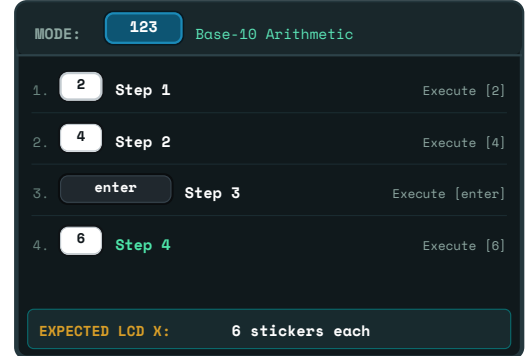
Physical Bench Setup:

Build tape models with cube blocks: 24 total, subtract 6, split into 3.

Sketch Model on Paper:

Draw Singapore bar model: total bar with bracket and partition.

3. Step-by-Step LCD Stack Trace (SC-6)



1 Sarah has \$50, buys 2 shirts at \$15 each. Change?

Manipulative Model & Desk Sketch (Show your work):

Final Math Answer:

☐ Verified on SC-6

2 A baker bakes 40 loaves, sells 16, packs remainder in 4 bins.

Manipulative Model & Desk Sketch (Show your work):

Final Math Answer:

☐ Verified on SC-6

3 5 boxes with 8 pencils each, plus 12 extra loose pencils.

Manipulative Model & Desk Sketch (Show your work):

Final Math Answer:

☐ Verified on SC-6

4 Three friends each buy a \$4 snack, and split a \$9 pizza. Total cost?

Manipulative Model & Desk Sketch (Show your work):

Final Math Answer:

☐ Verified on SC-6

Station Diagnostic & Solution Key: Chapter 5

Multi-Step Word Problems & Bar Models • Manipulative Setup, Diagnostic Rubric & Verification Flow

MANIPULATIVE HARDWARE STATION INVENTORY & 3D PRINT PREPARATION

Station Kit: Interlocking Cubes & 4-Line Hardware LCD Stack

CAD Blueprint: `stack_board`

Target Device: SC-6 Elementary

CAD / STL Source File:

Education/build/scad/stack_board.scad

Standard: Gridfinity 42mm Pitch / 0.6mm Inset Markings

Recommended Filaments:

Oceanic Teal 4-Register Rail & White Tiles (PLA)

#	Math Problem Prompt	Expected Math Answer	Self-Check Keystrokes & RPN Stack
1	Sarah has \$50, buys 2 shirts at \$15 each. Ch Standard: CCSS.MATH.3.OA.D.8	\$20	[1][5] [ENTER] [2] [*] [5][0] [ENTER]
2	A baker bakes 40 loaves, sells 16, packs rem Standard: CCSS.MATH.3.OA.D.8	6 loaves per bin	[4][0] [ENTER] [1][6] [-] [4] [÷]
3	5 boxes with 8 pencils each, plus 12 extra 1 Standard: CCSS.MATH.3.OA.D.8	52 pencils	[5] [ENTER] [8] [*] [1][2] [+]
4	Three friends each buy a \$4 snack, and split Standard: CCSS.MATH.3.OA.D.8	\$21	[3] [ENTER] [4] [*] [9] [+]

TEACHER DIAGNOSTIC GUIDE: COMMON MISCONCEPTIONS & REMEDIATION

Key Misconception to Target During Station Observation:

Traditional calculators require $(24 - 6) / 3$; RPN evaluates naturally in sequence.

How the Manipulatives & Calculator Foster Self-Correction:

Students solve with pencil and physical blocks first. When they self-check on the SC-6, any discrepancy between their written answer and the calculator's 4-line LCD immediately prompts them to re-inspect their physical bench model or regrouping, turning errors into productive struggle without teacher intervention.

Station Facilitation & Pacing Tip:

Keep 3D printed trays docked on standard Gridfinity baseplates to prevent loose parts on student desks. Encourage students to articulate their CPA steps: name the block representation (Concrete), point to their drawn tape/bond model (Pictorial), and verify register values (Abstract).

CLASSROOM SCORING & STATION MASTERY RUBRIC

Exemplary (18–20 pts):

Complete, accurate manipulative sketches; exact math answers; independently verified self-check on LCD stack.

Proficient (14–17 pts):

Correct math answers; minor sketch omissions; verified on calculator with minimal teacher prompting.

Developing (10–13 pts):

Understands problem concept but made computational slips; successfully self-corrected using calculator LCD.

Intervention (<10 pts):

Relied on calculator before solving on paper, or struggled with underlying physical manipulative models.