

Expressions, Equations & Volume: Postorder Traversal & Cubic Units

Tactile Concrete-Pictorial-Abstract (CPA) Station Guide • CCSS.MATH.5.OA.A.1

Student Name: _____

Date: _____

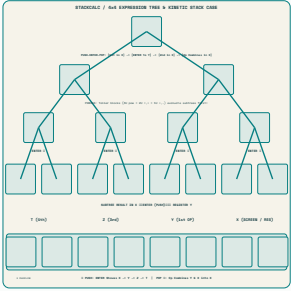
Model: SC-6

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



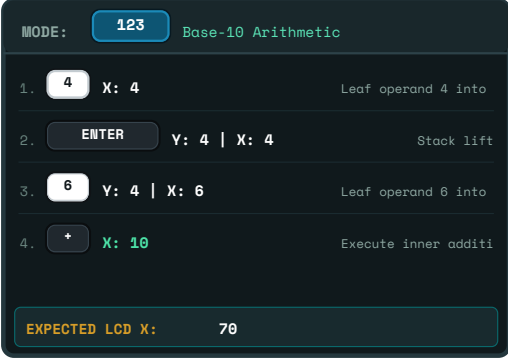
Kit: Tree Board

2. Desk Setup (Concrete -> Pictorial)

Physical Bench Setup:
Assemble cubic volume model: base 4x5 cubes, height 3 layers. Total 60 cubes.

Sketch Model on Paper:
Draw an expression tree with root operator [x] and leaf operands.

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



1 Evaluate $(15 - 5) \times 8$ on the stack.

Manipulative Model & Desk Sketch (Show your work):

Final Math Answer:

☐ Verified on SC-6

2 Evaluate $25 + (6 \times 4)$ on the stack.

Manipulative Model & Desk Sketch (Show your work):

Final Math Answer:

☐ Verified on SC-6

3 Find volume of prism: length 6, width 4, height 5.

Manipulative Model & Desk Sketch (Show your work):

Final Math Answer:

☐ Verified on SC-6

4 Find volume of cube with edge length 5 cm.

Manipulative Model & Desk Sketch (Show your work):

Final Math Answer:

☐ Verified on SC-6

Station Diagnostic & Solution Key: Unit 1

Expressions, Equations & Volume: Postorder Traversal & Cubic Units • Manipulative Setup, Diagnostic Rubric & Verification Flow

MANIPULATIVE HARDWARE STATION INVENTORY & 3D PRINT PREPARATION

Station Kit: 4x4 Expression Tree Case & Cubic Blocks

CAD / STL Source File:

Recommended Filaments:

CAD Blueprint: tree_board

Education/build/scad/tree_board.scad

Oceanic Teal Expression Tree Tray with White Tokens (PLA)

Target Device: SC-6 Elementary

Standard: Gridfinity 42mm Pitch / 0.6mm Inset Markings

#	Math Problem Prompt	Expected Math Answer	Self-Check Keystrokes & RPN Stack
1	Evaluate $(15 - 5) \times 8$ on the stack. Standard: CCSS.MATH.5.OA.A.1	80	[1][5] [ENTER] [5] [-] [8] [×]
2	Evaluate $25 + (6 \times 4)$ on the stack. Standard: CCSS.MATH.5.OA.A.1	49	[6] [ENTER] [4] [×] [2][5] [+]
3	Find volume of prism: length 6, width 4, hei Standard: CCSS.MATH.5.OA.A.1	120 cubic units	[6] [ENTER] [4] [×] [5] [×]
4	Find volume of cube with edge length 5 cm. Standard: CCSS.MATH.5.OA.A.1	125 cm³	[5] [ENTER] [5] [×] [5] [×]

TEACHER DIAGNOSTIC GUIDE: COMMON MISCONCEPTIONS & REMEDIATION

Key Misconception to Target During Station Observation:

No parentheses required in RPN: inner operations evaluate first automatically.

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.