

Ratios & Proportional Reasoning: Unit Rates & Proportions

Tactile Concrete-Pictorial-Abstract (CPA) Station Guide • CCSS.MATH.7.RP.A.2

Student Name: _____

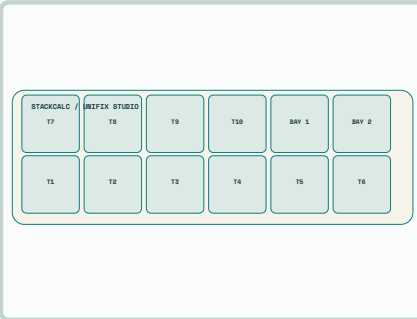
Date: _____

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: Unifix Tray

2. Desk Setup (Concrete -> Pictorial)**Physical Bench Setup:**

Snap cubes in repeated pairs: 3 red to 2 blue. Extend to 6:4, 9:6.

Sketch Model on Paper:

Draw a ratio table and coordinate graph showing straight line through origin (0,0).

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

MODE: **123** Base-10 Arithmetic

1. **180** X: 180 Total miles (180) in

2. **ENTER** Y: 180 | X: 180 Stack lift

3. **6** Y: 180 | X: 6 Gallons (6) into X

4. **÷** X: 30 Unit rate: 180 ÷ 6 =

EXPECTED LCD X: 30 mpg (k = 30)

1 A store sells 4 notebooks for \$16. Find cost per notebook.

Manipulative Model & Desk Sketch (Show your work):

Final Math Answer:

☐ Verified on SC-6**2 A runner completes 10 laps in 25 minutes. Find minutes per lap.**

Manipulative Model & Desk Sketch (Show your work):

Final Math Answer:

☐ Verified on SC-6**3 Solve proportion: $2 / 5 = x / 30$. Find x: $(2 \times 30) \div 5$.**

Manipulative Model & Desk Sketch (Show your work):

Final Math Answer:

☐ Verified on SC-6**4 Find constant of proportionality: $y = 56$ when $x = 7$.**

Manipulative Model & Desk Sketch (Show your work):

Final Math Answer:

☐ Verified on SC-6

Station Diagnostic & Solution Key: Chapter 4

Ratios & Proportional Reasoning: Unit Rates & Proportions • Manipulative Setup, Diagnostic Rubric & Verification Flow

MANIPULATIVE HARDWARE STATION INVENTORY & 3D PRINT PREPARATION

Station Kit: Interlocking Cubes & Ratio Rail

CAD / STL Source File:

Recommended Filaments:

CAD Blueprint: unifix_tray

Education/scad/unifix_cubes_parts.scad

Rainbow PLA Interlocking Cubes

Target Device: SC-6 / SC-32 Bridge

Standard: Gridfinity 42mm Pitch / 0.6mm Inset Markings

#	Math Problem Prompt	Expected Math Answer	Self-Check Keystrokes & RPN Stack
1	A store sells 4 notebooks for \$16. Find cost Standard: CCSS.MATH.7.RP.A.2	\$4.00/notebook	[1][6] [ENTER] [4] [÷]
2	A runner completes 10 laps in 25 minutes. Fi Standard: CCSS.MATH.7.RP.A.2	2.5 min/lap	[2][5] [ENTER] [1][0] [÷]
3	Solve proportion: 2 / 5 = x / 30. Find x: (2 Standard: CCSS.MATH.7.RP.A.2	x = 12	[2] [ENTER] [3][0] [*] [5] [÷]
4	Find constant of proportionality: y = 56 whe Standard: CCSS.MATH.7.RP.A.2	k = 8	[5][6] [ENTER] [7] [÷]

TEACHER DIAGNOSTIC GUIDE: COMMON MISCONCEPTIONS & REMEDIATION

Key Misconception to Target During Station Observation:

Watch for inverting the ratio (calculating x/y instead of y/x for unit price).

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.