

# Multiplication & Division: Arrays & Groups

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

Student Name: \_\_\_\_\_

Date: \_\_\_\_\_

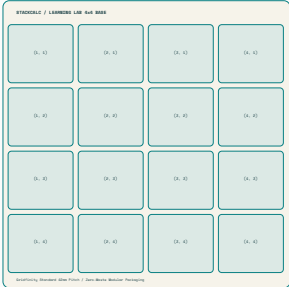
Model: SC-6

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**



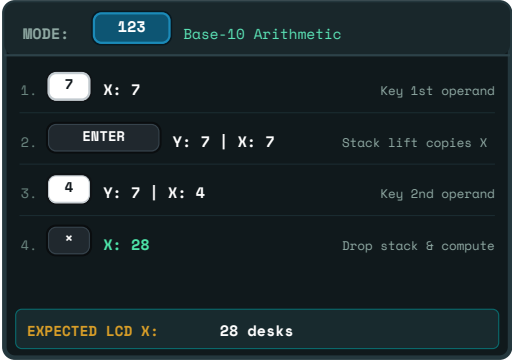
Kit: Gridfinity Baseplate

**2. Desk Setup (Concrete -> Pictorial)**

**Physical Bench Setup:**  
Snap cubes into 4 rows of 6 columns on the Gridfinity dock.

**Sketch Model on Paper:**  
Sketch a rectangular area array labeled 4 and 6.

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



**1** 6 rows of 8 chairs. Total chairs?

Manipulative Model & Desk Sketch (Show your work):

Final Math Answer:

☐ Verified on SC-6

**2** 9 bags with 5 apples each. Total apples?

Manipulative Model & Desk Sketch (Show your work):

Final Math Answer:

☐ Verified on SC-6

**3** 36 stickers shared equally by 4 students.

Manipulative Model & Desk Sketch (Show your work):

Final Math Answer:

☐ Verified on SC-6

**4** 42 markers divided into boxes of 6.

Manipulative Model & Desk Sketch (Show your work):

Final Math Answer:

☐ Verified on SC-6

# Station Diagnostic & Solution Key: Chapter 3

Multiplication & Division: Arrays & Groups • Manipulative Setup, Diagnostic Rubric & Verification Flow

MANIPULATIVE HARDWARE STATION INVENTORY & 3D PRINT PREPARATION

Station Kit: Interlocking Cubes & Gridfinity Baseplate

CAD / STL Source File:

Recommended Filaments:

CAD Blueprint: gridfinity\_baseplate

Education/scad/lib/gridfinity.scad

Charcoal 4x4 Grid Base & Teal Cubes (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 | 6 rows of 8 chairs. Total chairs?<br><small>Standard: CCSS.MATH.3.OA.A.3</small>         | 48                   | [6] [ENTER] [8] [×]               |
| 2 | 9 bags with 5 apples each. Total apples?<br><small>Standard: CCSS.MATH.3.OA.A.3</small>  | 45                   | [9] [ENTER] [5] [×]               |
| 3 | 36 stickers shared equally by 4 students.<br><small>Standard: CCSS.MATH.3.OA.A.3</small> | 9 stickers each      | [3][6] [ENTER] [4] [÷]            |
| 4 | 42 markers divided into boxes of 6.<br><small>Standard: CCSS.MATH.3.OA.A.3</small>       | 7 boxes              | [4][2] [ENTER] [6] [÷]            |

TEACHER DIAGNOSTIC GUIDE: COMMON MISCONCEPTIONS & REMEDIATION

Key Misconception to Target During Station Observation:

Division is the inverse: total in Y, group size in X, [÷] yields row count.

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.