

The Checker Board of Multiplication

Prerequisite:

An introduction to the large bead frame and some ability to read large numbers. This is preparation for geometric multiplication.

Points of Consciousness:

Mark your place with your finger

Materials:

- The checkerboard – a board divided into 36 squares (4 rows) representing category colors, green, blue, and red. Printed numbers corresponding to the categories 1 to 100 million are printed along the bottom edge of the board; values from 1 to 1000 are printed along the right side starting with units at the bottom.
- White multiplicand cards and gray multiplier cards
- Colored bead box
- Pencil and paper

Presentation 1: Introduction to Patterns and Placing Units

1. Display the checkerboard and discuss what strikes the child.
2. Place a unit bead in various places and determine its place value.
3. Explain:

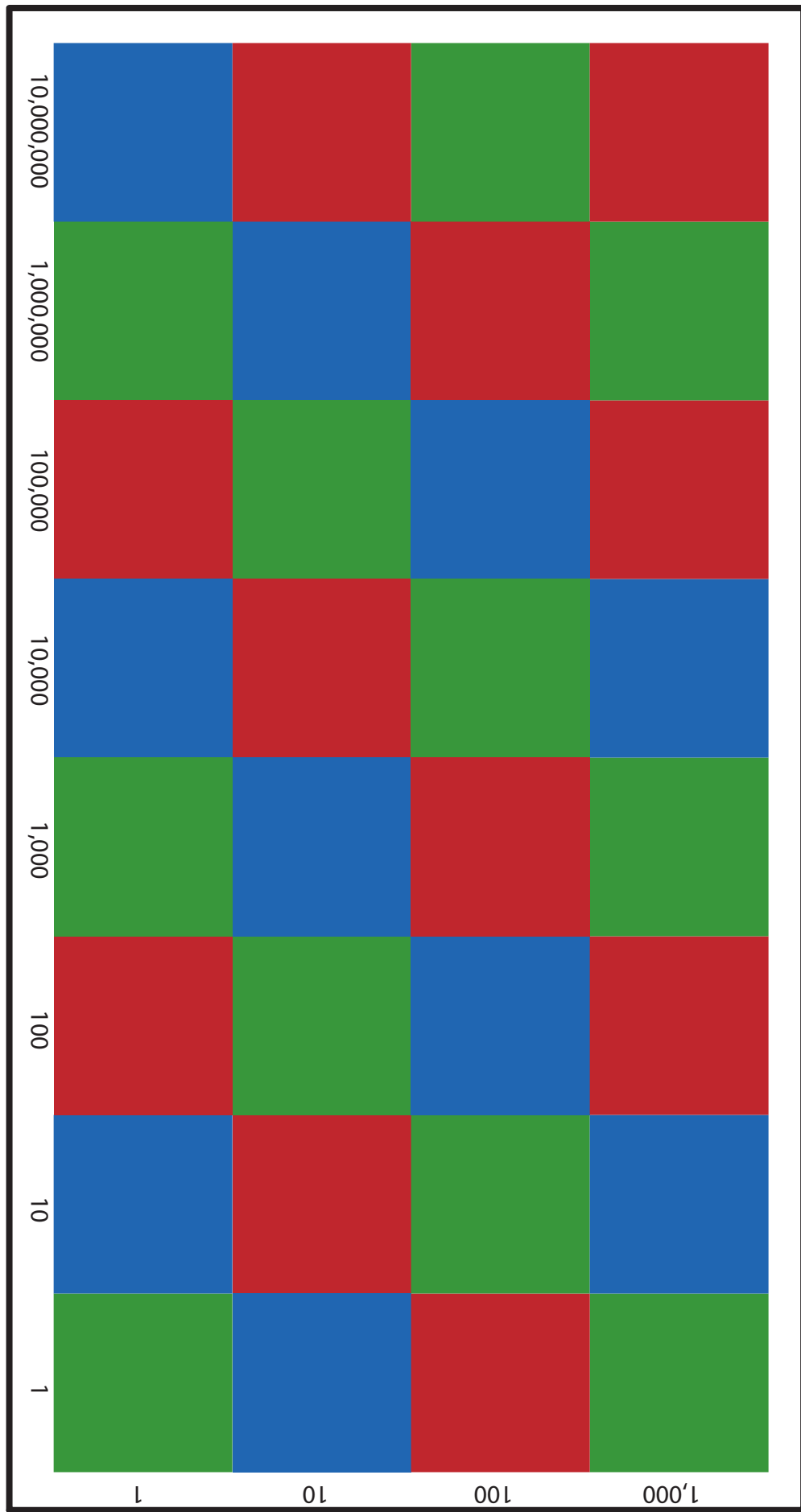
If I put 2 beads in the unit place it is 2.

If I put 2 beads in the ten place it is 20.

If I put 2 beads in the hundreds place it is 200.

If I put 2 beads in the millions place it is 2,000,000.

4. Repeat the above with other bead bars and in different rows to confirm the child's grasp of the concept.
5. Demonstrate placing and reading 2 bars; continue placing more bars in different rows, sliding, and reading.
6. Discuss the simple, thousands, and millions family.
7. Children can take turns placing and reading numbers, or if they like, they can compose numbers and record them.



Presentation 2: Long Multiplication

1. Propose the problem $5267 \times 23 =$.
2. Lay the white multiplicand digit cards along the bottom of the checkerboard, and the gray multiplier cards up the right side.
3. Turn over the 2 multiplier card; begin multiplying with units times units (7×3) and continue to thousands placing the bead amounts in the corresponding squares.
4. Continue with the tens by turning over both gray cards and placing quantities in the second row above the first quantities starting with the units.
5. Combine beads for each category by sliding down diagonally to the left.
6. Add and exchange in each category to get the answer i.e. 121, 141.

Presentation 3: Multiplication Using Facts

1. Multiply each category in the head and place the beads after exchanging in the head.
2. Slide, exchange, and record the product

Presentation 4: Long Multiplication with Partial Products

1. Write the problem vertically and then horizontally on paper:

$$\begin{array}{r} 4375 \times 25 = \\ 4375 \\ \times 25 \end{array}$$

2. Have the child do the first row on the checker board.
3. Exchange and record the partial product. Explain that this is not the answer because we haven't multiplied 4375 by 20 yet.

$$\begin{array}{r} 4375 \\ \times 25 \\ 21,875 \end{array}$$

4. Have the child do the second row on the checker board.
5. Don't slide yet. Exchange and record the partial product.
6. Slide and exchange. Add the partial products on the board, then add up the problem on paper and compare the two.

$$\begin{array}{r} 4375 \\ \times 25 \\ 21,875 \\ + 87,500 \\ 109,375 \end{array}$$

7. Explain the placing of the numbers.

Extensions:

Give problems with zero.

Carry over mentally

Multiplication with numbers that gives a square like 111×111

Age:

Early 6 to 8.

Purpose:

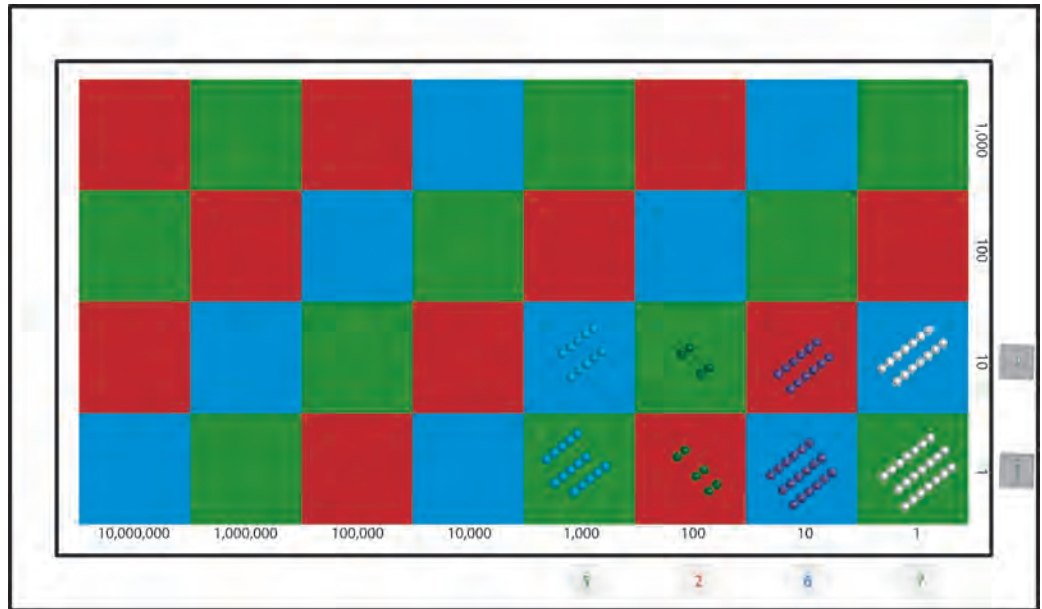
To teach long multiplication and category multiplication

Note:

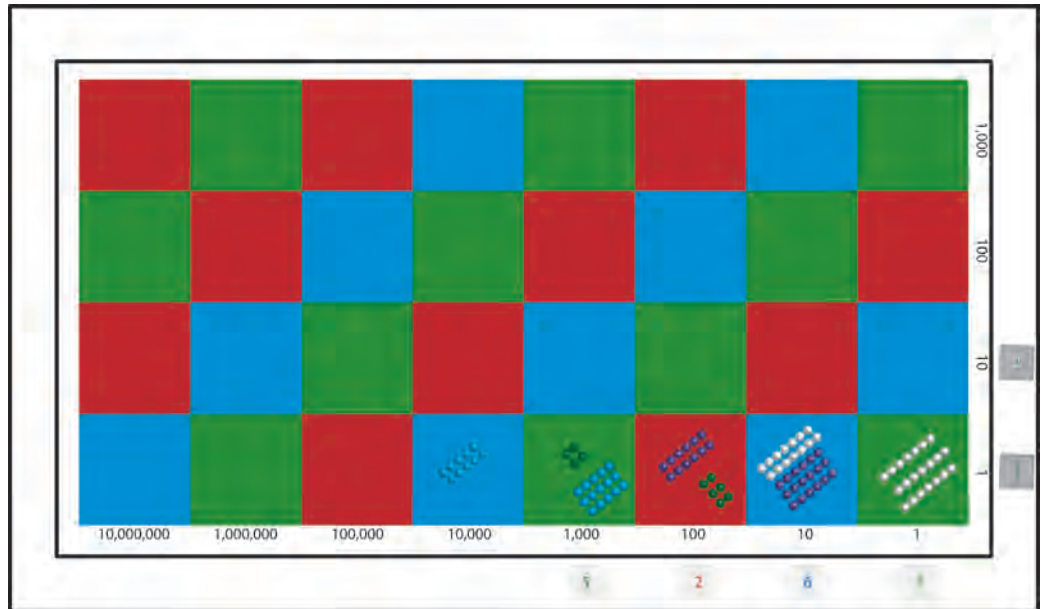
If the children came up with an answer that is wrong, they can get frustrated when asked to start again from the top. We can just point out the trouble spot.

Presentation 2

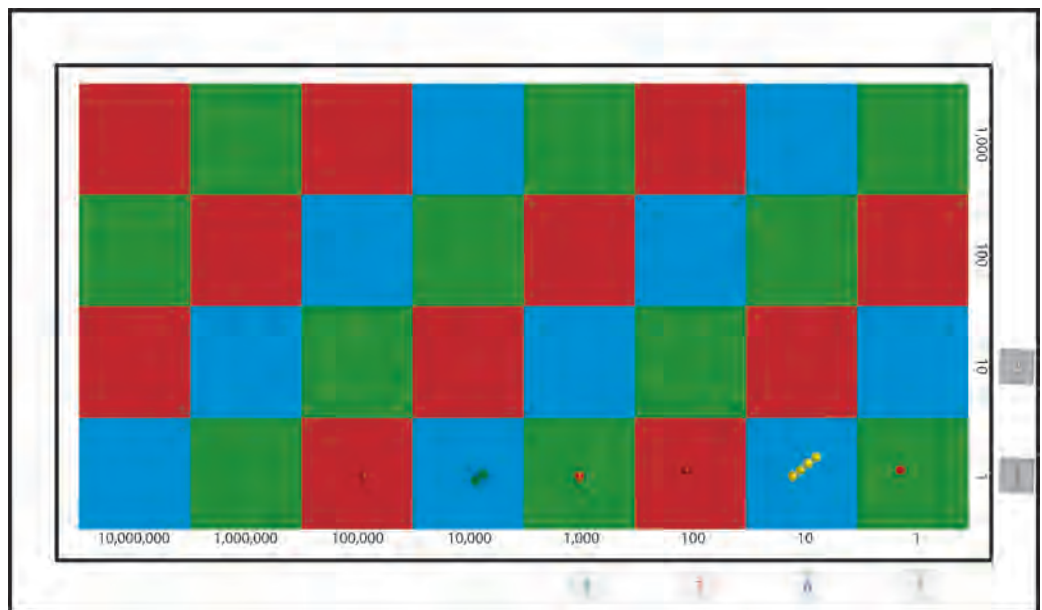
1



2



3



Geometrical Form of Multiplication

Materials:

- Graph paper
- A regular pencil and 3 colored pencils (red, green, blue)
- Ruler

Prerequisite:

- Checkerboard up to multiplication with facts.
- Knows a fair amount of their multiplication facts.

Note:

This is the checker board recreated on graph paper

Presentation:

1. Explain that you'll do multiplication by drawing and give the equation $3,432 \times 43 =$
2. Write the equation on the top of the graph paper.
3. Start at the lower right corner of the graph paper; mark it with a point.
4. Move 2 spaces to the left (representing the unit digit of the multiplicand).
5. Continue 3 spaces to the left from that point (representing the 10s) and so on for the other digits of the multiplicand (i.e. 4 then 3).
6. Explain that you'll take the number 43 times; starting at the original point, mark 3 spaces up for the unit; 4 more for the tens.
7. Close off the space by connecting the outermost points (making a rectangle).
8. Mark off the different categories with horizontal and vertical lines.
9. Color in the categories with corresponding colors; Write the multiplication in each space with it's answer.
10. List the answers on paper and add for the final product.

$$\begin{array}{r}
 6 \\
 90 \\
 1200 \\
 9000 \\
 80 \\
 1200 \\
 16,000 \\
 \underline{120,000} \\
 147,576
 \end{array}$$

Purpose:

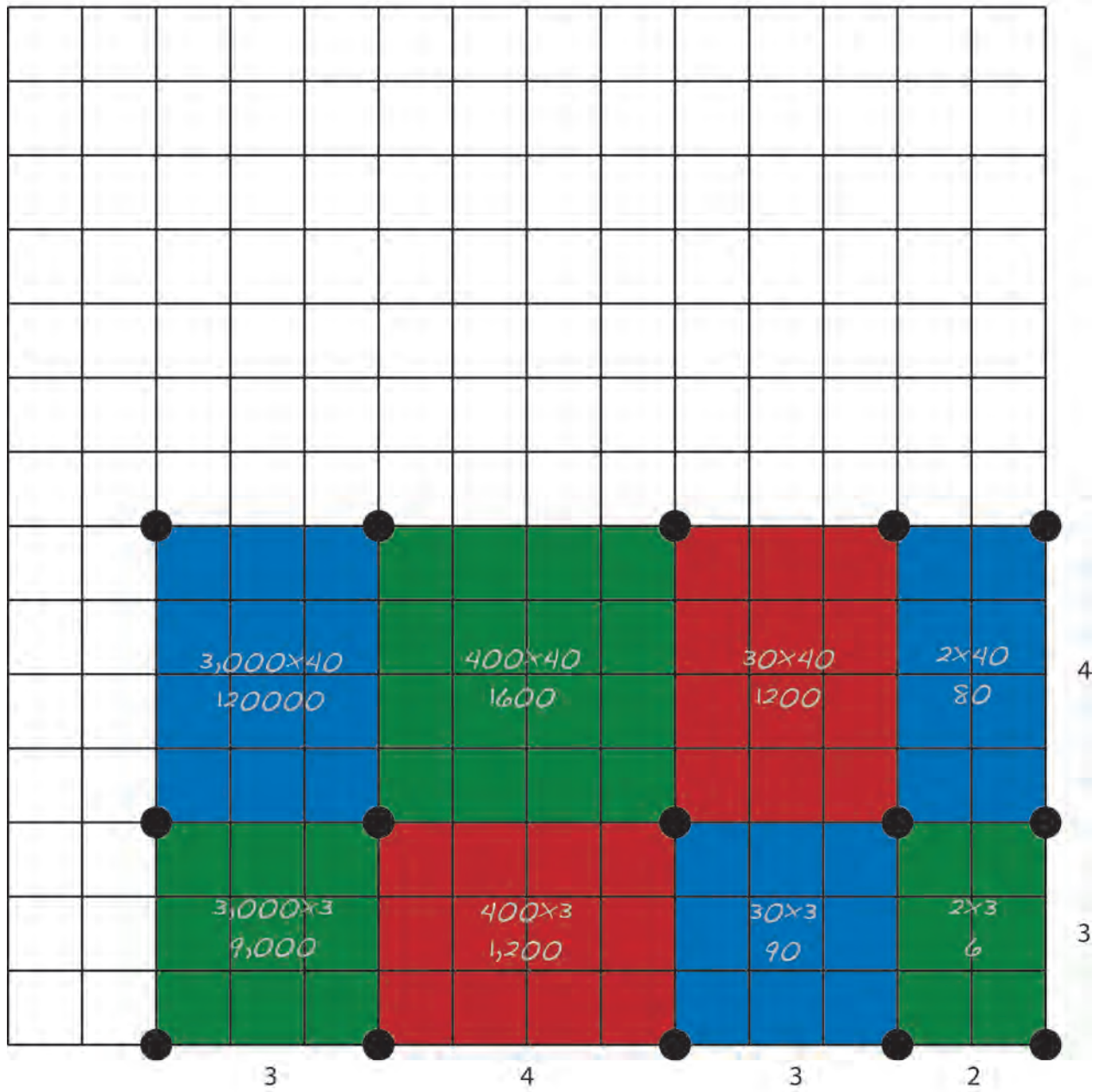
Preparation for squaring

An analysis of multiplication relative to geometric shape.

Age:

7 or 8

$$3,432 \times 43 =$$



$$\text{answer} = 147,576$$