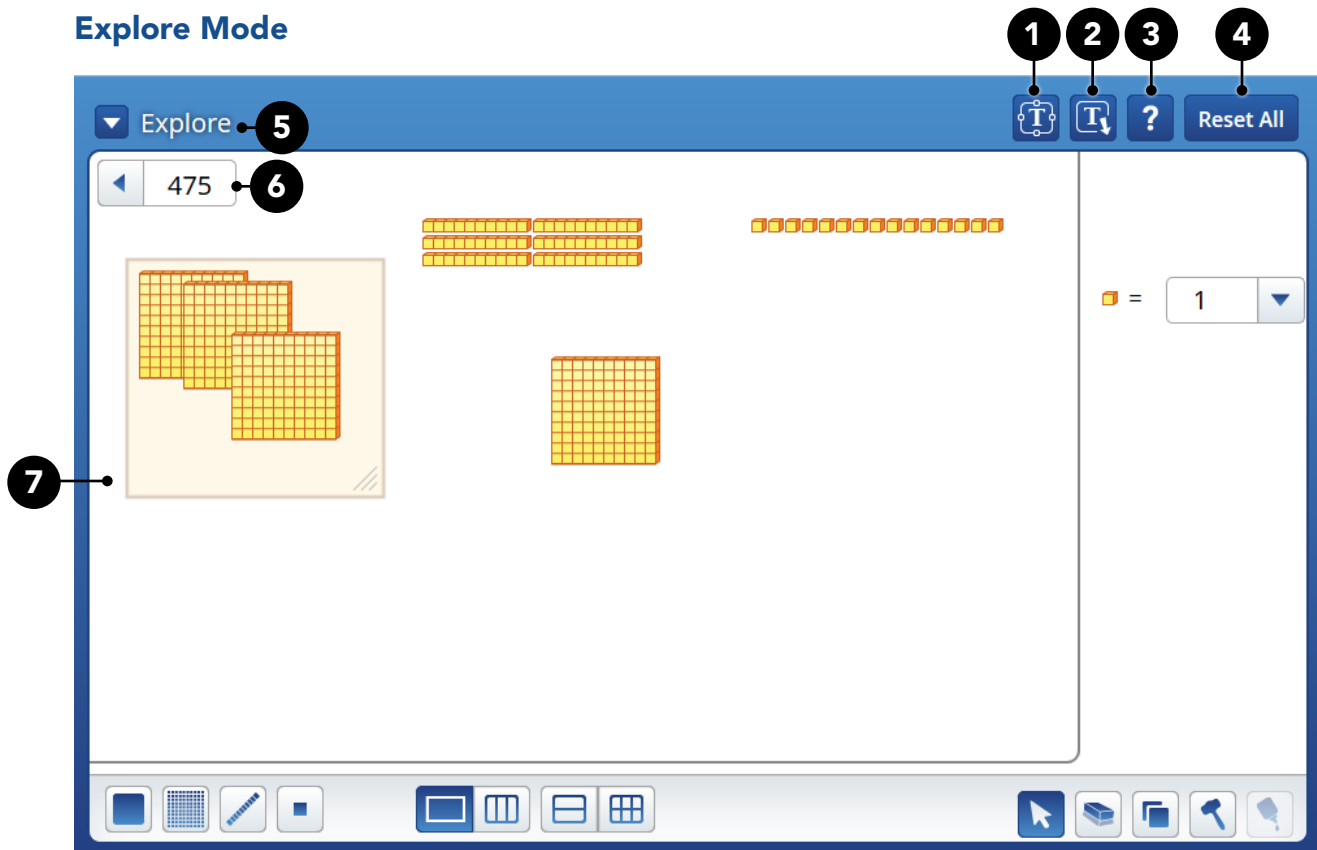


Place-Value Blocks

In this tool, you can model and solve base 10 whole number and decimal place-value expressions using place-value blocks.

Explore Mode

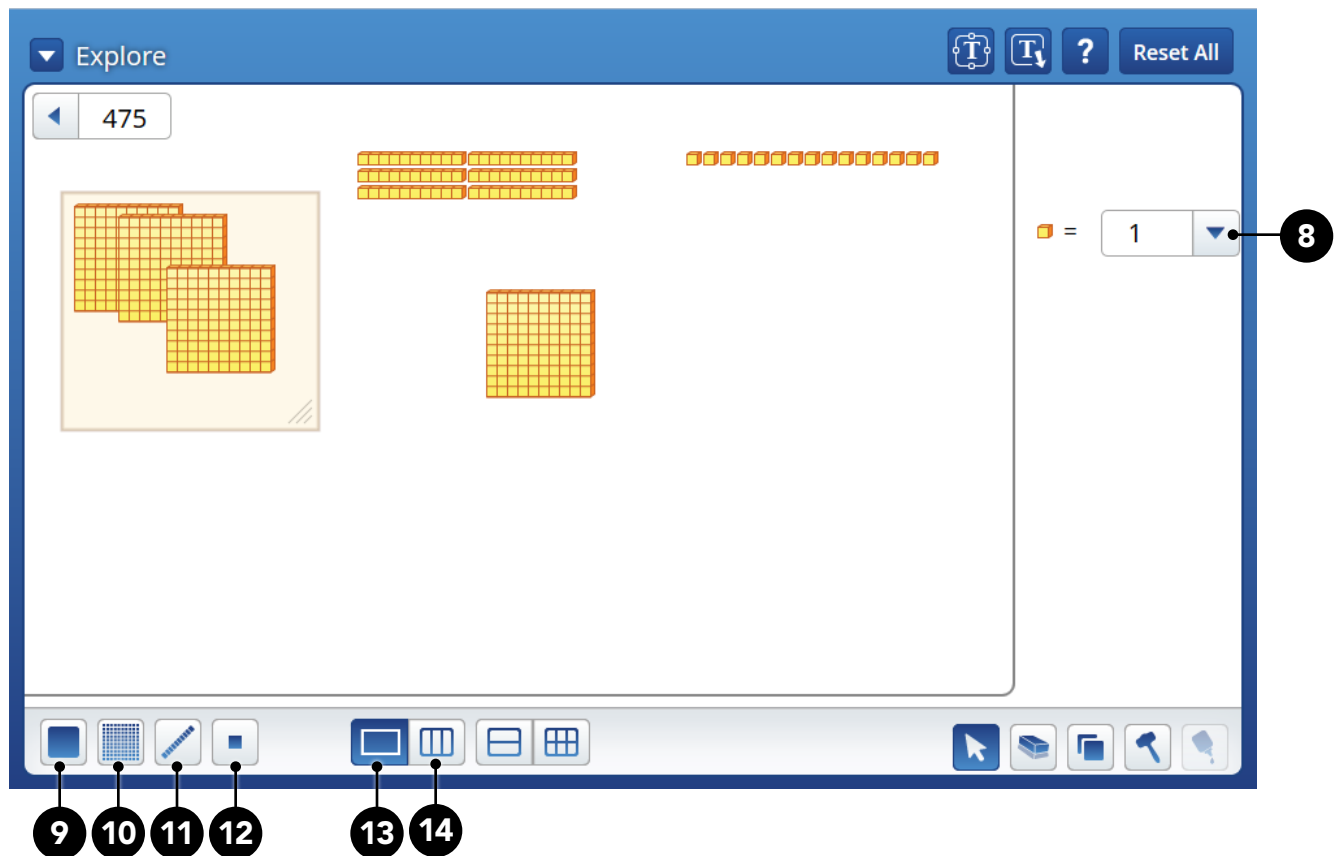


1. **Textbox** Add comments to the activity area.
2. **Textbox with Arrow** Add comments to the activity area, using the arrow to focus attention on a particular area.
3. **Help** Launch a help file PDF for the tool.
4. **Reset All** Reset all current work in the activity area for the tool back to the default settings.
5. **Mode Drop-down** Shows all the available modes of the Place-Value Blocks tool. Selecting a mode will open the tool to that mode, and save any current work in the mode you were previously working in. There are five modes in the Place-Value Blocks tool: Explore, Addition, Subtraction, Multiplication, and Division.
6. **Expression display** Shows the collective value of the place-value blocks
7. **Activity Area** The area of the tool where place-value blocks can be added and manipulated. In this mode you can add up to 50 100-blocks, 100 10-blocks, and 200 1-blocks.

(continued on the next page)

Place-Value Blocks

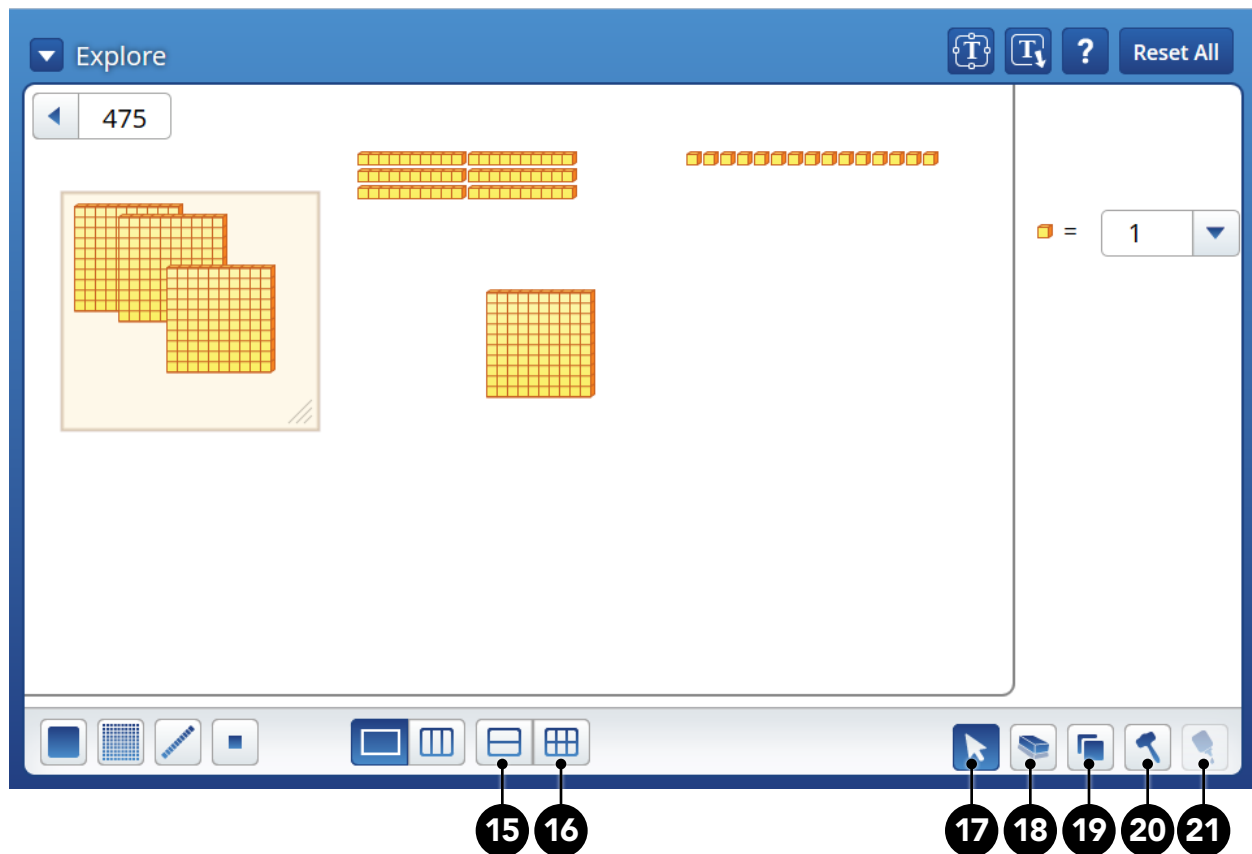
Explore Mode *continued*



- 8. Place Value Mat** You can use mats to visually group sets of place-value blocks together. You can only add blocks to mat by dragging them, and blocks do not move with the mat once placed. Mats can only be placed in the Single workspace.
- 9. Place Value Mat** You can use mats to visually group sets of place-value blocks together. You can only add blocks to mat by dragging them, and blocks do not move with the mat once placed. Mats can only be placed in the Single workspace.
- 10. 100-Block** When selected, each press in the activity area will add a 100-Block. The value of the 100-Block is affected by the Unit-Block value.
- 11. 10-Block** When selected, each press in the activity area will add a 10-Block. The value of the 10-Block is affected by the Unit-Block value.
- 12. 1-Block** When selected, each press in the activity area will add a 1-Block. The value of the 1-Block is affected by the Unit-Block value.
- 13. Single Place-Value Workspace** Splits the workspace into three columns, one for each block type. You can only add or remove blocks of one type to its particular column in this workspace.
- 14. Double Workspace** The activity area is split into two bins, where you can add 100-blocks, 10-blocks, and 1-blocks to each bin and manipulate them. You can move blocks freely between the bins.

Place-Value Blocks

Explore Mode *continued*



- 15. Double Place-Value Workspace** Splits the workspace into three columns for each of the two bins, one for each block type. You can only add or remove blocks of one type to its particular column in this workspace.
- 16. Pointer** Use the pointer to select and move blocks within the activity area. When the pointer is selected, you can create a selection rectangle to select more than one block to manipulate. When selected, a block will have a blue outline around it.
- 17. Eraser** Using the eraser, you can select any blocks(s) to remove them from the activity area.
- 18. Clone** Using the clone button, you can press on any selected block(s) to create duplicates of the selected block(s). You can use the clone feature until the block limit is achieved in the activity area.
- 19. Hammer** Using the hammer button, you can break 100- and 10- blocks. If there are blocks that can be broken in the activity area, the hammer button is disabled.
- 20. Glue** If you select exactly ten 1-blocks or 10-blocks in the activity area, the glue button becomes active. Selecting the glue button will merge the blocks into a larger block.
- 21. Unit-Block drop-down** Using the drop-down, you can select the value of the 1-block as 1, 0.1, or 0.01. The value of the 100-blocks and 10-blocks will update accordingly as you change the value of the 1-block.

(continued on the next page)

Place-Value Blocks

Addition Mode

The screenshot shows the 'Addition Mode' interface. The top section is for the first addend, with a bin display showing 246 (labeled 22) and a workspace with place-value blocks (labeled 23). The bottom section is for the second addend, with a bin display showing 234 (labeled 24) and a workspace with place-value blocks (labeled 25). On the right side, there is a 'Show Expression' checkbox (labeled 26) which is checked, and an 'Expression Display' showing the addition 246 + 234 (labeled 27). Below the expression display is a 'Model Sum' button (labeled 28). At the top right, there are icons for text, a question mark, and a 'Reset All' button. At the bottom, there are icons for different block types and a navigation bar.

- 22. First Addend Bin Display** Shows the total value of all the blocks in the first addend bin.
- 23. First Addend Bin** You can add blocks to the bin to model the first addend in your expression. You can only add nine blocks of each type to the bin.
- 24. Second Addend Bin Display** Shows the total value of all the blocks in the second addend bin.
- 25. Second Addend Bin** You can add blocks to the bin to model the second addend in your expression. You can only add nine blocks of each type to the bin.
- 26. Show Expression Checkbox** When selected, an expression of the two addends appears below the checkbox.
- 27. Expression Display** Show an expression of the two addends. To see the value of each addend in the display, each Bin Display must be showing the value in their respective bin. The sum of the addends will appear when the expression is simplified.
- 28. Model Sum Button** Once you have modeled a whole number in each of the addend bins, the Model Sum Button becomes active. When you select the Model Sum Button, the two addends are combined into one bin.

(continued on the next page)

Place-Value Blocks

Subtraction Mode Part 1

The screenshot shows a digital interface for subtraction using place-value blocks. The main area is a large bin labeled 'Subtraction' with a '459' display and a '29' label. The bin contains several yellow blocks: four hundred blocks (large squares), five ten blocks (horizontal bars), and nine one blocks (small squares). To the right of the bin is a control panel with a 'Show Expression' checkbox (checked), an 'Expression Display' showing '459' with a subtraction line, and a 'Model Difference' button. A 'Reset All' button is in the top right corner. A toolbar at the bottom contains icons for adding blocks, a calculator, and other tools. Callout numbers 29, 30, 31, 32, and 33 point to specific elements: 29 points to the '459' display, 30 points to the bin, 31 points to the 'Show Expression' checkbox, 32 points to the 'Expression Display', and 33 points to the 'Model Difference' button.

- 29. First Number Bin Display** Shows the total value of all the blocks in the first addend bin.
- 30. First Number Bin** You can add blocks to the bin to model the first number in your expression. You can only add nine blocks of each type to the bin.
- 31. Show Expression Checkbox** When selected, an expression of the two numbers to be subtracted appears below the checkbox.
- 32. Expression Display** Show an expression of the difference of the two numbers. To see the value of each number, each bin display must show the value of the blocks in their respective bin.
- 33. Model Difference Button** Once you have modeled a whole number in the first number bin, the Model Difference Button becomes active.

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Place-Value Blocks

Subtraction Mode Part 2

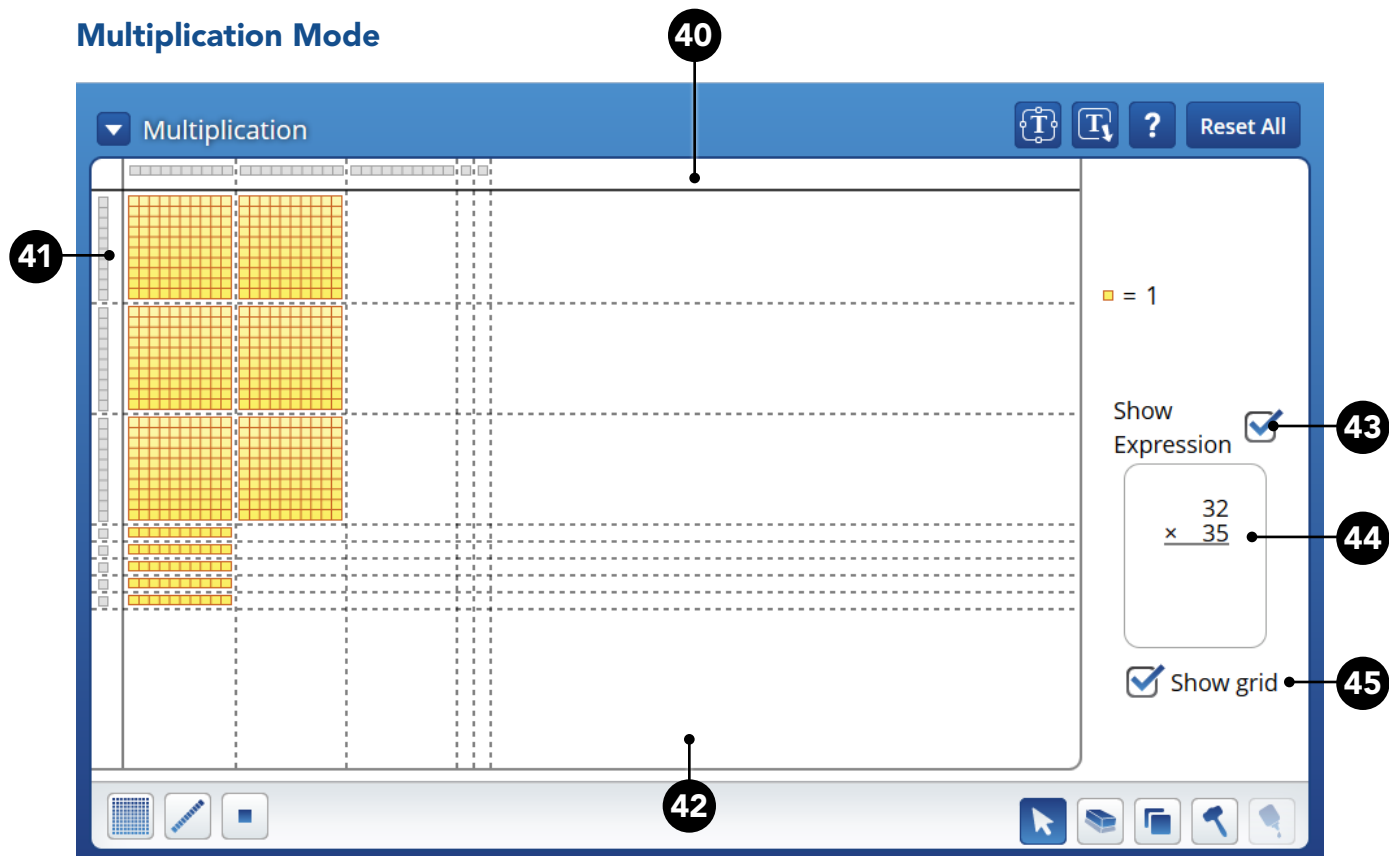
The screenshot shows a software interface for subtraction using place-value blocks. At the top, a blue header bar contains a dropdown menu set to 'Subtraction', a 'Reset All' button, and icons for text, a question mark, and a calculator. Below the header, there are two main sections. The top section, labeled '34' in a black circle, is the 'Difference Bin Display' and shows the number '359' in a bin. To its right, a black circle '35' points to the 'Difference Bin' which contains yellow blocks representing the value 359. The bottom section, labeled '36' in a black circle, is the 'Second Number Bin Display' and shows the number '100' in a bin. To its right, a black circle '37' points to the 'Second Number Bin' which is currently empty. On the right side of the interface, there is a 'Show Expression' checkbox labeled '38' which is checked. Below it, a display area labeled '39' shows the subtraction expression:
$$\begin{array}{r} 459 \\ - 100 \\ \hline 359 \end{array}$$
 At the bottom of the interface, there is a toolbar with icons for adding blocks, a calculator, and other tools.

- 34. Difference Bin Display** Shows the value of the difference between the first number and the second number. After the Model Difference Button is selected, the initial value of the Difference Bin is the same as the first number.
- 35. Difference Bin** Shows the blocks remaining from the first number.
- 36. Second Number Bin Display** Shows the total value of all the blocks in the second addend bin.
- 37. Second Number Bin** You can add blocks to the bin to model the second number in your expression. You can only move blocks from the Difference Bin to the model the second number.
- 38. Show Expression Checkbox** When selected, an expression of the two numbers appears below the checkbox.
- 39. Expression Display** Show an expression of the two numbers. To see the value of each number in the display, each Bin Display must be showing the value in their respective bin. The difference of the two numbers will appear when the expression is simplified.

(continued on the next page)

Place-Value Blocks

Multiplication Mode

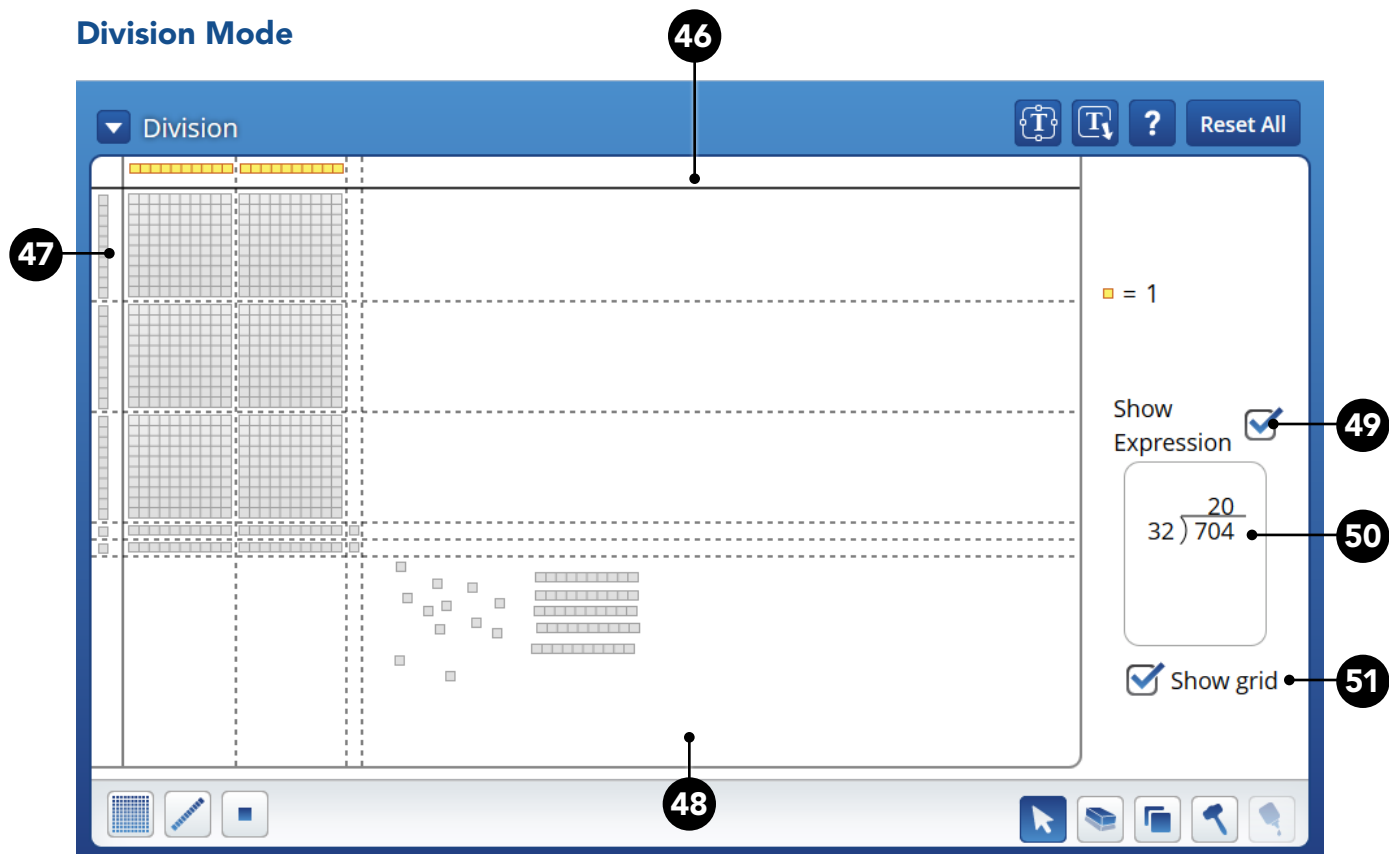


- 40. First Factor Area** Add blocks to model your first factor to be multiplied. You can only add 10-blocks, and 1-blocks to factor area.
- 41. Second Factor Area** Add blocks to model your second factor to be multiplied. You can only add 10-blocks, and 1-blocks to factor area.
- 42. Product Area** Add blocks to model the product of the two factors. You can add 100-, 10-, and 1-blocks to the product area.
- 43. Show Expression Checkbox** When selected, an expression of the two factors to be multiplied appears below the checkbox.
- 44. Expression Display** Show an expression of the product of the two numbers. To see the value of the product of the two factors, you must fill the area outlined by the two factors at the top and left.
- 45. Show Grid Button** Shows a grid overlay in the Product Area. The grid lines are created by aligning the blocks from the factor areas at the top and left. Only a block of the correct type will fit in the areas between each set of grid lines.

(continued on the next page)

Place-Value Blocks

Division Mode



- 46. Quotient Area** Add blocks to model your the quotient. You can only add 10-blocks, and 1-blocks to factor area. You can only model the quotient once there are blocks in the dividend and divisor areas.
- 47. Divisor Area** Add blocks to model your divisor. You can only add 10-blocks, and 1-blocks to factor area.
- 48. Dividend Area** Add blocks to model the dividend. You can add 100-, 10-, and 1-blocks to the dividend area. You must model the dividend first.
- 49. Show Expression Checkbox** When selected, an expression of the two numbers to be multiplied appears below the checkbox.
- 50. Expression Display** Shows the dividend, divisor, and quotient in long division form. As each of the dividend, divisor, and quotient areas is filled with blocks, the expression display updates the value of each number.
- 51. Show Grid Button** Shows a grid overlay in the Dividend Area. The grid lines are generated by aligning the blocks from the divisor and quotient areas. Only a block of the correct type will fit between each set of grid lines.