

Algebra Tile Workshop

Mission: Two expressions can look different but always give the same answer. Build groups of algebra tiles, copy them, and sort like tiles to prove expressions are equivalent.

Big question: How can tiles show that two expressions are equivalent?

★ Warm-up: Number talk

Compute two ways. Are they equal?

$3 \times (10 + 2)$ vs $3 \times 10 + 3 \times 2$ ✓ **Both 36.**

4 groups of $(5 + 1)$ ✓ **$24 = 20 + 4$.**

Key vocabulary

Equivalent expressions	Expressions that are equal for every value of the variable.
Distributive property	$a(b + c) = ab + ac$.
Like terms	Terms with the same variable part, like $2x$ and $5x$.
Simplify	Rewrite with fewer terms.

1 Box 1

Make 3 groups

In the simulator: Make 3 groups of $(x + 2)$, then sort like tiles.

What is $3(x + 2)$ after sorting?

☐ $3x + 6$ ☐ $3x + 2$ ☐ $x + 6$ ☐ $5x$

✓ **$3x + 6$**

2 Box 2

$2(2x + 3)$

In the simulator: Build 2 groups of $(2x + 3)$ and sort.

Write $2(2x + 3)$ without parentheses.

Look for: $4x$; $+ 6$; at least 1 words

3 Box 3

Messy pile

In the simulator: Load the messy pile and sort like tiles.

What does $2x + 3 + x + 1 + 2x$ simplify to?

☐ $5x + 4$ ☐ $9x$ ☐ $4x + 5$ ☐ $5x + 1$

✓ **$5x + 4$**

4 Box 4

Prove it with a number

Test $3(x + 2)$ and $3x + 6$ with $x = 4$. What do you get?

☐ Both equal 18 ☐ 18 and 14 ☐ 12 and 18

✓ **Both equal 18**

5 Box 5

Error detective

What did Tia forget?

☐ To multiply the 3 by 4 as well ($4x + 12$) ☐ Nothing ☐ To add 4

✓ **To multiply the 3 by 4 as well ($4x + 12$)**

6 Box 6

Legend: factor it Legend only

Which expression is equivalent to $6x + 9$?

☐ $3(2x + 3)$ ☐ $6(x + 9)$ ☐ $3(2x + 9)$ ☐ $9(6x)$

✓ **$3(2x + 3)$**

7 Box 7

Explain with tiles

Explain how the tiles show $3(x + 2) = 3x + 6$.

Look for: Uses groups; Counts x tiles; Counts unit tiles



Exit ticket: answer the big question in your own words

How can tiles show that two expressions are equivalent?

Look for: The distributive property says $3(x + 2) = 3x + 6$: three groups of $(x + 2)$ have 3 x-tiles and 6 unit tiles. Combining like terms (x-tiles with x-tiles, units with units) simplifies expressions without changing their value.



Completion codes

Students see a code like **ABC-I3** when they finish. The first part must match below. The letter is the level (E = Explorer, I = Investigator, L = Legend), and the number at the end is how many stars they earned.

Level	Code starts with
 Explorer	1HI-E
 Investigator	1P7-I
 Legend	110-L



Watch for these misconceptions

- "3x means $3 + x$." It means 3 times x.

- "Do the operation you see." Use the inverse operation to undo it.
- "Only change one side of the equation." Whatever you do to one side, do to the other.