7.3 Linear Systems and Elimination

TEKS A.8.B

MATERIALS • algebra tiles

QUESTION How can you solve a linear system using algebra tiles?

You can use the following algebra tiles to model equations.

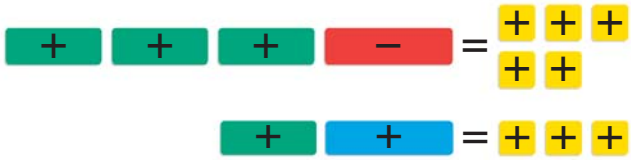
1-tiles **x-tiles** **y-tiles**

EXPLORE Solve a linear system using algebra tiles.

Solve the linear system: $3x - y = 5$ Equation 1
$x + y = 3$ Equation 2

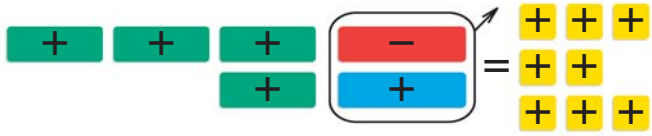
STEP 1 Model equations

Model each equation using algebra tiles. Arrange the algebra tiles so that one equation is directly below the other equation.



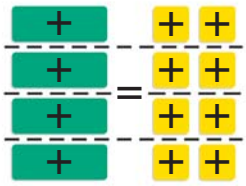
STEP 2 Add equations

Combine the two equations to form one equation. Notice that the new equation has one positive y-tile and one negative y-tile. The y-tiles can be removed because the pair of y-tiles has a value of 0.



STEP 3 Solve for x

Divide the remaining tiles into four equal groups. Each x-tile is equal to two 1-tiles. So, $x = 2$.



STEP 4 Solve for y

To find the value of y, use the model for Equation 2. Because $x = 2$, you can replace the x-tile with two 1-tiles. Solve the new equation for y. So $y = 1$, and the solution of the system is (2, 1).

DRAW CONCLUSIONS Use your observations to complete these exercises

Use algebra tiles to model and solve the linear system.

1. $x + 3y = 8$
   $4x - 3y = 2$
2. $2x + y = 5$
   $-2x + 3y = 7$
3. $5x - 2y = -2$
   $x + 2y = 14$
4. $x + 2y = 3$
   $-x + 3y = 2$

5. **REASONING** Is it possible to solve the linear system $3x - 2y = 6$ and $2x + y = 11$ using the steps shown above? *Explain* your reasoning.