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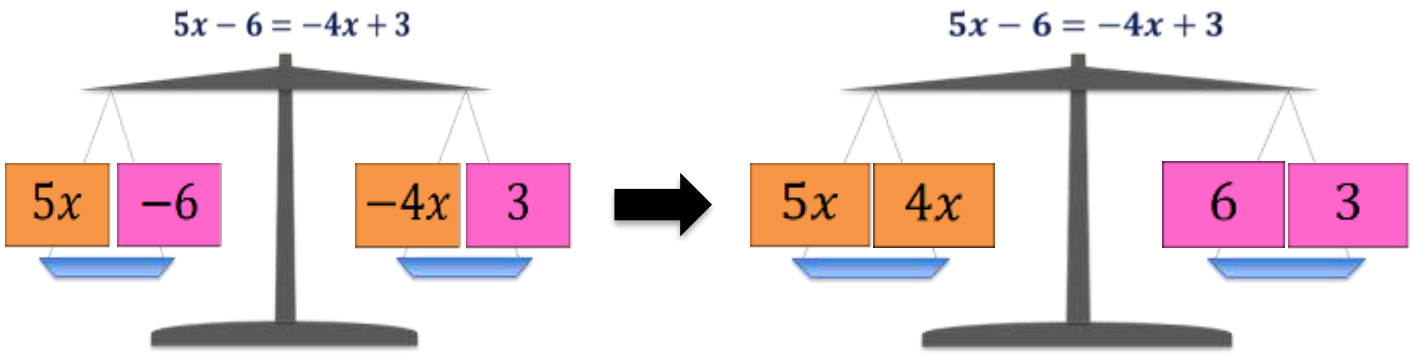
If the Balance is Right!: Solve Equations with Variables on Both Sides **Math 8**

How do we keep a balance scale balanced?

1. Print or write out cards for each term in the equations (some terms will may be repeated, and these can be reused)
2. Write the term (with a variable) on an **ORANGE** post-it or card.
3. Write the constant on a **PINK** post-it or card.
4. Flip over the cards and write the opposite form of that term
   For example: If the term is 3x the opposite is -3x
   If the term is (-5) then it's opposite is 5
5. Lay a copy of the **Balance Scale Template** in front of you
6. Model the equation, talk through it with your partner
7. Show the steps of how to solve it on the worksheet
8. Solve for x, plug it back in to check your work

Example:



Solve:

$$5x + 4x = 6 + 3$$
$$9x = 9$$
$$\frac{9x}{9} = \frac{9}{9}$$
$$x = 1$$

Check:

$5x - 6 = -4x + 3, \quad x = 1$

$$5(1) - 6 = -4(1) + 3$$
$$5 - 6 = -4 + 3$$
$$-1 = -1$$

Therefore, the solution of the equation $5x - 6 = -4x + 3$ is **1.**

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If the Balance is Right!: Solve Equations with Variables on Both Sides **Math 8**

Equations: Make cards and model these equations on your balance scale. Use the space below to write the steps and solve. Don't forget to check!

1. $4x - 6 = 2x + 8$

2. $3x - 7 = 2x + 2$

3. $7x + 2 = 3x + 94$

4. $5x + 5 = 14 + 2x$

5. $7x - 4 = 2x + 16$

6. $3x - 1 = 2x$

7. $2x - 5 = -3x$

8. $x+2 = -14 -3x$

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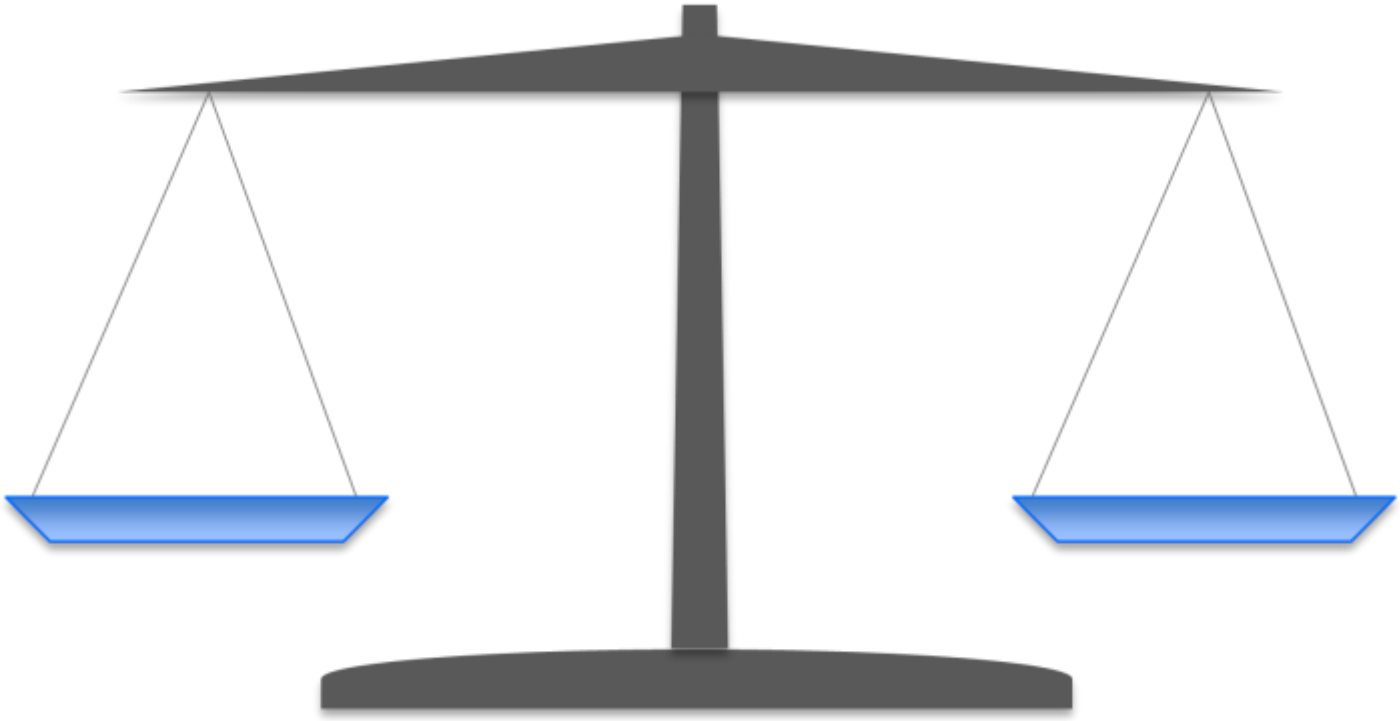
If the Balance is Right!: Solve Equations with Variables on Both Sides **Math 8**

Balance Scale Template

Place your post-its or cards, and move variables to one side, constants to the other. Don't forget - to move from one pan to another, the term changes its sign, so flip it over to the opposite sign.

Note to the designer, make a template similar to the one below. Provide space on both sides for cards to be placed.



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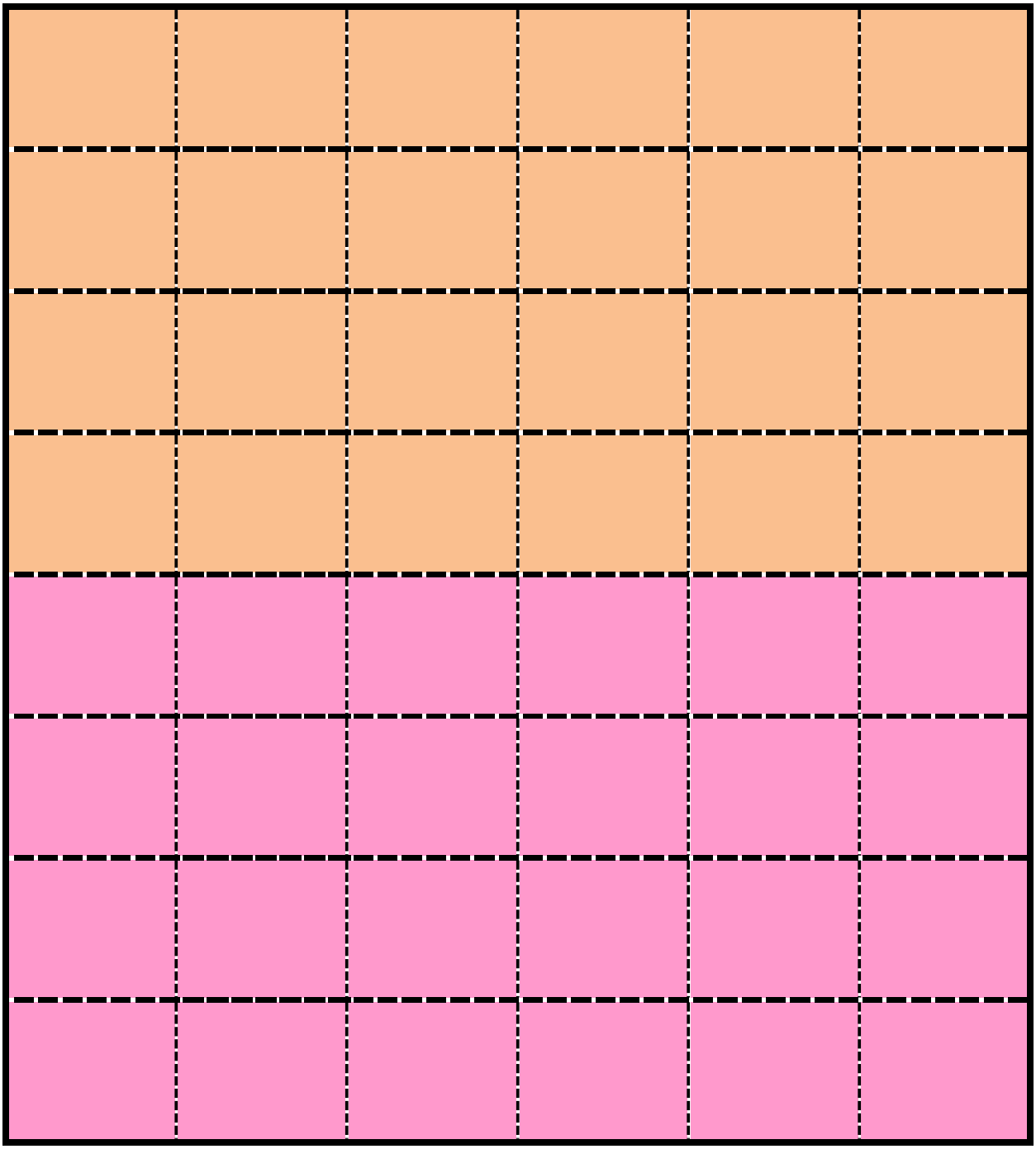
If the Balance is Right!: Solve Equations with Variables on Both Sides **Math 8**

Post-Its/Cards Template

Create cards to print out if possible

Cut out your cards. Then write the opposite value on the other side.



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If the Balance is Right!: Solve Equations with Variables on Both Sides **Math 8**

Reflecting on Solving Equations with Variables on Both Sides

1.) How did you decide which side to move your post-its (variable terms)?
2.) What did you learn about moving variable terms?
3.) Did you ever end up with a negative variable term? Why or why not?
4.) Solve the following equation 2 ways. First, move variables to the left, then solve it by moving the variables to the right side. What do you notice?

$9x - 10 = 3x + 14$	$9x - 10 = 3x + 14$
Move the variables to the left side of the equal sign and solve. Show your steps.	Move the variables to the right side of the equal sign and solve. Show your steps.

a) What do you notice?

b) Which way was easier for you? Why?