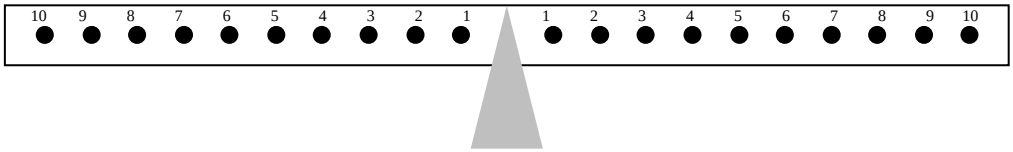
Algebra Balance Activity

An algebra balance has pegs that are numbered 1 to 10 from the middle outwards. The pegs are evenly spaced from each other.

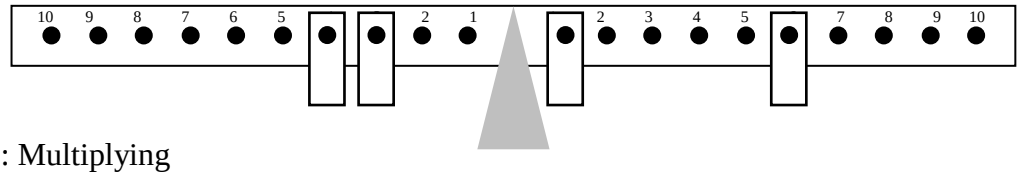


An equation consists of two expressions that are equal. We can show this on the balance by putting weights in the proper positions. If it balances than we have an equation. Consider the following examples

Example: Adding

$4 + 3 = 1 + 6$

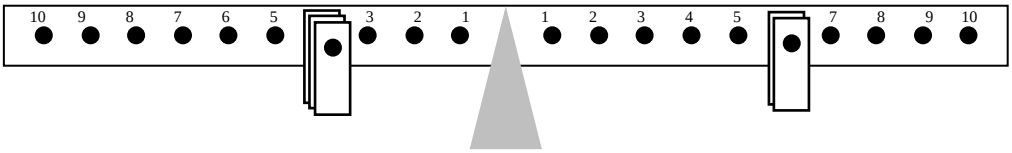
We can model this addition problem by putting one weight on the 4 and one weight on the 3 on the first side, then one weight on the 1 on the other side and one weight on the 6. Since $4 + 3 = 7$ and $1 + 6 = 7$, the two sides will balance. Verify that this will work on your Balance.



Example: Multiplying

$4(3) = 6(2)$

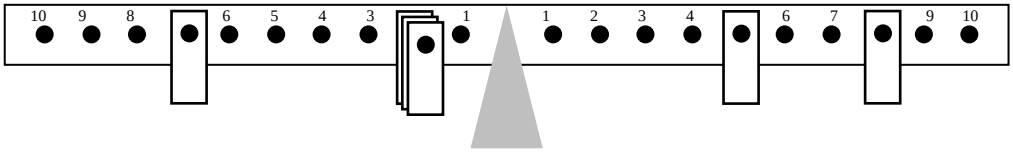
We can model multiplication by putting the number of weights on the other number. For example, on the left we can put 3 weights on the 4. This will balance with 2 weights on the 6. Verify that this will work on your Balance.



Example: Mixing addition and multiplication

$2(3) + 7 = 5 + 8$

We can model this on the balance by putting 3 weights on the number 2 and 1 weight on the number 7 on one side, and on the other side one weight on 5 and one weight on the 8. Verify that this will work on your Balance.



Will this balance? $2(3) + 7 = 5 + 8$?

Part 1 In your group, model each of the following on the Balance, and decide whether the equation is true. Write in words how many tiles you put on each number.

1. $9 + 3 = 4 + 7$

2. $2 + 3 + 5 = 1 + 4 + 3$

3. $3 + 6 + 10 = 4 + 9 + 5$

4. $2(3) = 6$

5. $8(2) = 3(5)$

6. $4(3) = 7 + 6$

7. $5(3) + 4 = 6(3) + 1$

8. $4(3) + 4 = 7(2) + 3$

Part 2 Find the number of weights needed to balance the equation by modeling the equation on the Balance.

Example: $3(\#) + 2 = 5 + 6$

Put one weight on the 2 on one side and on the other side put one weight on each of the 5 and the 6. Now one at a time put weights on the 3 until both sides balance. Whatever number of weights that are needed on the 3 is the solution.

1. $2(\#) + 1 = 9$

2. $2(\#) + 4 = 6$

3. $4 + 2(\#) = 6 + 4$

4. $4(\#) + 3 = 10 + 1$

5. $9(\#) + 4 = 10(\#) + 1$ The # must be the same on both sides of the equation

6. $7(\#) + 2 = 5(\#) + 6$

7. $8(\#) = 6(\#) + 7 + 1$

8. $5(\#) + 8 = 7(\#)$

Part 3 Are the following true or false? (Will they balance?) Describe how this can be shown on the Balance.

1. $5 + 3 = 3 + 5$

2. $7 + 6 = 6 + 7$

3. $4(3) = 3(4)$

4. $6(4) + 6 = 5(6)$

5. $2(3 + 1) = 2(3) + 1$

6. $4(2 + 4) = 4(2) + 4(4)$

7. $3(2) + 3(3) = 3(5)$

8. $4(2) + 3(4) = 4(5)$

Part 4 Find the # of weights needed to balance the equation by modeling the equation on the Balance. Remember, # is the same value everywhere it appears in an equation.

1. $3(\#) + 2 = 3(\#) + 5$

2. $4(\#) + 2 = 4(\#) + 2$

3. $3(\#) + 1(\#) + 4 = 4(\#) + 2$

4. $8(\#) = 5(\#) + 3(\#)$

Write up: