

algebraforall

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Sample Activity Orange

Balancing Act

Adding the same amount to both sides to balance equations

AIM

Students will see that if they add the same amount to each side of an addition equation, the equation remains balanced.

MATERIALS

- 1 set of balance scales
- Connecting cubes
- 2 signs: equals symbol (=), and "not equals" symbol (\neq)
- Magnetic counters (or standard counters and Blu-Tack)
- 1 copy of the blackline master (opposite) for each student

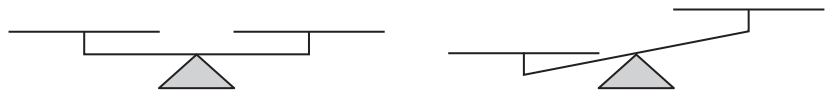
REFLECTION

Say, *Describe an equation.* (It has an equals symbol and equivalent collections on each side.) *If we add an amount to one side of an equation, what must we do to the other side to keep it balanced?* (Add the same amount.) Call on volunteers to discuss their ideas.

1 Place 5 red cubes and 3 blue cubes on the left side of the scales, and 4 red cubes and 4 blue cubes on the right. Point to the left and ask, *How many red and blue cubes are on this side? How many red and blue cubes are on the other side?* Stick the "equals" sign on the front of the scales and ask, *How do we write this?* Elicit several responses then write $5 + 3 = 4 + 4$ on the board.

2 Add 2 green cubes to the left side and ask, *Are the scales still balanced?* (No.) Stick the "not equals" sign on the front of the scales. Ask, *How do we write this?* Write $5 + 3 + 2 \neq 4 + 4$ on the board, then ask, *How can we balance the scales?* (Add 2 green cubes to the right side.) *How do we write this?* Record $5 + 3 + 2 = 4 + 4 + 2$. Repeat, adding 3 then 5 green cubes to each side.

3 Draw the following diagrams on the board.



Discuss how the 1st diagram represents an equation, because it is balanced. Refer to the 2nd diagram and ask, *Does this also represent an equation? Why not? Which side has more?* Ask a student to use magnetic counters to model $2 + 8 = 5 + 5$ on the 1st diagram. Add 3 counters to the left side and ask, *Are the scales still balanced? Which diagram should we use?* Move the counters to the 2nd diagram and ask, *How do we write this?* Write $2 + 8 + 3 \neq 5 + 5$ on the board. Ask, *How can we balance the scales?* (Add 3 counters to the right.) *How do you know? Which diagram should we use?* Move the counters to the 1st diagram and ask, *How do we write this?* Write $2 + 8 + 3 = 5 + 5 + 3$ on the board.

4 Ask the students to individually complete Question 1 on the blackline master. Allow time for them to share their answers, then complete Question 2 with the class.

Balancing Act

Name _____

1. Write the missing number to make each scale balance.

<p>a.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> $5 + 3 + 2$ </div> <div style="text-align: center;"> $6 + 2$ </div> </div>	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> $5 + 3 + 2$ </div> <div style="text-align: center;"> $6 + 2 + \square$ </div> </div>
<p>b.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> $6 + 11 + 7$ </div> <div style="text-align: center;"> $20 - 3$ </div> </div>	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> $6 + 11 + 7$ </div> <div style="text-align: center;"> $20 - 3 + \square$ </div> </div>
<p>c.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> $5 + 2$ </div> <div style="text-align: center;"> $13 - 6 + 10$ </div> </div>	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> $5 + 2 + \square$ </div> <div style="text-align: center;"> $13 - 6 + 10$ </div> </div>

2. Draw the missing jump and write the missing number to make the 2 sums equal.

<p>a.</p> <p>$2 + 6 + \underline{\quad}$</p> <div style="text-align: center;"> </div> <p>$5 + 3 + 7$</p>	<p>b.</p> <p>$4 + 8 + \underline{\quad}$</p> <div style="text-align: center;"> </div> <p>$3 + 9 + 4$</p>
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