

Developing Algebraic Thinking Skills with the Number Balance Scale

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When working with algebraic equations, one often stumbles upon the students' erroneous understanding of the equal sign. Many students are under the impression that the = sign means "the answer is". They believe, then, that operations such as additions and subtractions should be written on the left-hand side of the sign and that the answer to these operations (the sum or difference) should appear on the right-hand side of the sign.

It is therefore important to break this misconception as soon as possible because when the students will come across equations containing variables or unknowns, the latter will not always be written on the right-hand side of the = sign.

The Number Balance Scale provides an effective, visual way for students to grasp the concept that when the unit balances (equality relation), the value of what is found on the left-hand side of the = sign is the same as the value of what is found on the right-hand side of the = sign. Students hang plastic weights from numbers on the left side and the right side of the balance's central pin. In the example pictured above, the equality relation 8 = 3 + 5 is represented. Students could also set up several other equations resulting in the same sum:

2+6=1+74+4=3+53+2+3=2+6

When the unit does not balance (inequality relation) (for ex., there is a weight hanging from an 8 and a 2 on the left-hand side, and a weight hanging from a 3 and a 4 on the right-hand side), students are challenged to find the unknown value, i.e. the missing number on the right which will balance the unit.

$$8 + 2 = 3 + 4 + ?$$
 or $8 + 2 = 3 + 4 + n$

Students will then discover that the value of ? or n is 3.

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