

## Early Algebra Interview Project

Two suggested interviews follow the Benchmarks for Concepts of Equality. The first, Children's Understanding of Equality, is recommended for lower primary grades (K-2), and the second, Children's Relational Thinking, is recommended for upper primary grades (3-5). You are encouraged to develop your own interview assessment tool with at least 6 true-false problems and at least 8 open sentences (5 points each).

1. Take one of these interviews yourself, and rate your own level (1, 2, 3, or 4), along with your rationale for this rating. Use both the benchmark descriptions below and specific data from the interview in your rationale. [15 points]
2. Then interview a child, record only their first name and grade level, and assess their level on this benchmark (1, 2, 3, or 4), along with your rationale, using both the benchmark descriptions below and specific data from the interview. You may wish to provide some sort of manipulative for the child to use to directly model these problems, such as Unifix or multilink cubes, base 10 blocks, color tiles, pennies, paper clips, or any other countable item.

Also feel free to interact with the child as you pursue their personal growth in understanding of the meaning of the equal sign. I.e., your aim is to *assess*, but you can use this as a teaching opportunity, as well 😊 [15 points]

### Benchmarks for Conceptions of Equality

*(Thinking Mathematically, pp. 19-20)*

1. Children are specific about what they think the equal sign means. For example, typical misconceptions for the open sentence  $8 + 4 = \underline{\quad} + 5$  include:
  - The answer comes next (the answer is 12).
  - Use all of the numbers (the answer is 17).
  - Extend the problem (the answers are 12 and 17).
2. Children accept as true some number sentences that are not of the form  $a + b = c$ .  
Examples:  $8 = 5 + 3$        $8 = 8$        $3 + 5 = 8 + 0$        $3 + 5 = 3 + 5$   
 $9 + 2 = 2 + 9$
3. Children recognize that the equal sign represents a relation between two equal numbers, often by carrying out the calculations on each side of the equal sign and comparing those results.
4. Children are able to compare the mathematical expressions without actually carrying out the calculations.

## Sample Interview on Children's Understanding of Equality

Name: \_\_\_\_\_

Grade Level: \_\_\_\_\_

- True or False.
- (1)  $7 + 4 = 11$
  - (2)  $11 = 4 + 7$
  - (3)  $11 = 11$
  - (4)  $4 + 7 = 7 + 4$
  - (5)  $7 + 4 = 11 + 0$
  - (6)  $4 + 7 = 0 + 11$
  - (7)  $8 + 9 = 17 + 4$

Fill in the blank to make the open sentence true. (8)  $4 + 7 = \square$

(9)  $\square = 4 + 7$

(10)  $11 = \square$

(11)  $4 + 7 = \square + 3$

(12)  $9 + 5 = \square + 6$

(13)  $17 = 9 + \square$

(14)  $25 + 18 = 23 + \square$

(15)  $7 + 11 = \square + 10$

## Sample Interview on Children's Relational Thinking

Name: \_\_\_\_\_

Grade Level: \_\_\_\_\_

Fill in the blank to make the open sentence true. (1)  $9 + 5 = \square + 4$

Fill in the blank to make the open sentence true. (2)  $15 + 5 = \underline{\quad} + 14$

True or False. (3)  $17 + 19 = 17 + 19$  \_\_\_\_\_

(4)  $12 + 20 = 13 + 19$  \_\_\_\_\_

(5)  $15 + 18 = 16 + 17$  \_\_\_\_\_

(6)  $20 + 30 = 21 + 29$  \_\_\_\_\_

(7)  $33 + 12 = 32 + 13$  \_\_\_\_\_

(8)  $41 + 19 = 42 + 18$  \_\_\_\_\_

Fill in the blank to make the open sentence true.

(9)  $15 + 18 = 15 + \underline{\quad}$

(10)  $15 + 18 = 16 + \square$

(11)  $23 + 18 = 22 + \underline{\quad}$

(12)  $44 + 27 = \square + 43$

Extras: (13)  $52 + 47 = 50 + \underline{\quad}$

(14)  $49 + 34 = \underline{\quad} + 46$

(15)  $\underline{\quad} + 13 = 15 + 49$

\*(16)  $3 \times 8 = 6 \times \underline{\quad}$