Modifying Children's Mathematical Tasks for Use in IBL Content Courses for Prospective Elementary Teachers

Dana Olanoff
Widener University
dolanoff@widener.edu

Amy Hillen
Kennesaw State University
ahillen@kennesaw.edu

Eva Thanheiser
Portland State University
evat@pdx.edu

Rachael Welder
CUNY – Hunter College
rachael@rachaelwelder.com

Ziv Feldman
Boston University
zfeld@bu.edu

Jennifer Tobias
Illinois State University
jtobias@ilstu.edu

Website: www.mathtaskmasters.com
Contact: masters@mathtaskmasters.com

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Children's Task: Comparing Fractions

Which Is Greater? (page 1 of 2)

Solve the problems below and explain or show how you determined the answer.

1. Which is greater? $\frac{7}{10}$ or $\frac{3}{5}$

2. Which is greater? $\frac{7}{8}$ or $\frac{9}{10}$

3. Which is greater? $\frac{4}{3}$ or $\frac{3}{4}$

4. Which is greater? $\frac{3}{8}$ or $\frac{1}{3}$

Taken from p. 21 of Russell, S. J., et al. (2008). *Investigations in number, data, and space student activity book, Grade 5* (2nd ed.). Glenview, IL: Scott Foresman.

- What mathematical ideas does the task have the potential to elicit for children? For prospective elementary teachers?
- What would you need to consider and/or plan for in order to modify and implement the task with prospective elementary teachers?
- In what ways would you modify the task for this new audience, and why?

Modified Task for Prospective Teachers: Comparing Fractions

For each set of fractions below, circle the fraction that is greater (or if the fractions are equivalent, write "=" in between them), and provide a "sense-making" explanation for how you know. You may use pictures if that is helpful to you, but your explanation cannot rely solely on a picture.

Notes:
Calculators may not be used. Feel free to work on these problems in any order that makes sense to you.
If you find yourself struggling with any of the problems, skip them and revisit them later.

1)	$\frac{1}{2}$	$\frac{17}{31}$	6)	$\frac{13}{15}$	$\frac{17}{19}$	11)	$\frac{2}{7}$	$\frac{3}{8}$
2)	$\frac{2}{17}$	$\frac{2}{19}$	7)	$\frac{15}{17}$	$\frac{19}{18}$	12)	$\frac{25}{12}$	$\frac{31}{15}$
3)	$\frac{4}{7}$	$\frac{9}{14}$	8)	$\frac{7}{10}$	$\frac{8}{9}$	13)	$\frac{11}{20}$	$\frac{19}{36}$
4)	$\frac{3}{7}$	$\frac{6}{11}$	9)	$\frac{1}{4}$	$\frac{25}{99}$	14)	$\frac{2}{9}$	$\frac{3}{8}$
5)	$\frac{8}{9}$	$\frac{12}{13}$	10)	$\frac{24}{7}$	$\frac{34}{15}$	15)	$\frac{18}{25}$	$\frac{16}{27}$

Reasoning and sense-making strategies for comparing fractions

Strategy name		Abbre-viation	Generalized description of strategy	Example (greater fraction is underlined)
Same Size Pieces		SSP	When comparing fractions whose parts are of equal size, the fraction with the greater number of parts is greater.	8/14 vs. 9/14
Same Number of Pieces		SNP	When comparing fractions with the same number of parts, the fraction with the greater sized parts is greater.	2/17 vs. 2/19
Comparing to a Benchmark Value	*when benchmark is **between** the given fractions*	BVB	If one of the fractions being compared is greater than a benchmark value and the other fraction being compared is smaller than the same benchmark value, the fraction that is greater than the benchmark is greater.	15/17 vs. 19/18 (benchmark value: 1)
	*when benchmark is **equivalent** to one of the fractions being compared*	BVE	If the fraction that is given as the benchmark value is larger than the other fraction, then the former is greater. If the fraction that is given as the benchmark value is less than the other fraction, then the latter is greater.	½ vs. 17/31 (benchmark value: ½)
	*when benchmark is more than or less than both of the fractions, the **distance** the fractions are from the benchmark must be compared*	BVD	If the fractions being compared are both greater than a benchmark value, then the distance each fraction is from the benchmark needs to be compared (using some other strategy – typically, SSP or SNP). The fraction that is further past the benchmark (i.e., the fraction that is a larger amount more than the benchmark) is the greater fraction.	11/20 vs. 19/36 (benchmark value: ½)
			If the fractions being compared are both less than a benchmark value, then the distance each fraction is from the benchmark needs to be compared (using some other strategy – typically, SSP or SNP). The fraction that is closest to the benchmark (i.e., the fraction that is "missing the smaller amount") is the greater fraction.	8/9 vs. 12/13 (benchmark value: 1)
Greater Number of Larger Pieces		GLP	When comparing a greater number of greater-size pieces to a smaller number of smaller-size pieces, the fraction that has the greater number of greater-size pieces is greater. It is important to note that this strategy cannot be applied when comparing a smaller amount of greater pieces to a greater amount of smaller pieces – there is no way to know which fraction is greater without using some other strategy.	18/25 vs. 16/27