

Speaker:

Name: Yasmine Abtahi
Institution: University of Ottawa
Email: yabtahi@uottawa.ca
Position: PhD Student

Title: Which rod? Unit & the Addition of Fractions

Intended Audience: Elementary

Type of Presentation

Preferred: Short Presentation (less than 20 minutes)

Description:

Fractions the over arching topic:

“Among all the topics in K-12 curriculum, rational numbers arguably hold the distinction of being the most protracted in terms of development, the most difficult to teach, the most mathematically complex, the most cognitively challenging, and the most essential to success in higher mathematics and science” (Lamon, 2007).

Topic 1 : The concept of “Unit”

One of the difficulties children experience while trying to make sense of fractions is the complex processes associated with unitizing, that is, identifying the unit of a given fraction (Lamon, 2002; Steffe, 2003). For example consider the following question: which is bigger, $\frac{1}{2}$ or $\frac{1}{4}$. Well, the answer depends on the unit. Generally children assume that unit for each fraction is one. But that may not always be the case.

Units become problematic when students confront a problem where the unit is not one object (Steffe, 2003) or where sizes of the comparative units are not the same (Cramer & Henry, 2002).

One way of focusing students' attention on the concept of unit is to provide them with partitioning activities in which the unit is made to vary (Lamon, 1996).

For example, you can have students partition one sandwich between two people (unit = 1 sandwich), and then have them partition two sandwiches between two people (unit = 2 sandwiches). In both cases students are asked to share one-half of the total amount but because the unit differs (one sandwich versus two sandwiches) the amount shared will also differ (half of 1 sandwich versus 2 halves of 2 sandwiches).

Topic 2 : The concept of “Addition of Fractions”

Conceptual understanding of the notion of “unit” leads to better understanding of the addition of fractions. Students' questions, such as “why don't we just add the tops (numerators) and then add the bottoms (denominators),” show the lack of conceptual understanding of the “unit”. To properly solve an addition of fractions problem, students need to find a common denominator that is a common unit that fits in the denominators of both fractions. The attached two mathematical activities are designed for students to see why it is necessary to have a common unit when adding two pieces of different sizes (e.g. two Cuisenaire rods or two pieces of fraction circles).

1- Activity 1:

The objective of this activity is to re-emphasize the importance of a common unit. The goal is for students to see that they cannot add pieces of different sizes—in this case different Cuisenaire rods—without taking their size into account.

2- Activity 2:

The objective of this activity is for to get students to solve an addition of fractions problem using the fraction circles. For example solving for $\frac{1}{2} + \frac{1}{3}$. To accomplish the task students need to find a $\frac{1}{2}$ piece (pink) and a piece of $\frac{1}{3}$ (orange).