SUBTRACT, STEP 2

Lesson Plan: Number Concept, Subtract, Step 2

Activity Screen Shot

Theme Host: Chuck

Animal Friend: American Bison/Buffalo

OVERVIEW

Students now "count" the animals in the initially empty pasture and record the count as 0. In addition, the software introduces symbolic representation for the process in the form of an equation that is automatically updated as the student moves animals.

PRINCIPAL LEARNING GOAL(S)

- Reinforce the concept of the numeral 0 as the count of the number of objects in an empty set
- Associate the operation of subtraction with the idea of moving objects from one set ("take away" objects from this set) to another set
- Show that an equation is a symbolic/mathematical description of the relationship between the numbers of objects in each of two sets and the total number of objects in both sets combined
- Show that the equation changes as objects are moved between sets but the total number of objects does not change

PREREQUISITE KNOWLEDGE AND SKILLS

- Already seen/understood subtraction as taking objects away from a given pile, moving them into a new pile

POTENTIAL DIFFICULTIES

- Some students may do the step correctly but not notice the dynamic equation that is being presented, so it is important to focus student attention on the equation, its meaning, and why some values change and others don't

WARM UP ~ 3-5 MINUTES

You can display a certain number of fingers on your right hand (e.g., 5) and say "how many fingers am I showing?". After the class agrees on an answer ask them to suggest how many fingers you should close (e.g., 3). As you close fingers on the right hand simultaneously open corresponding fingers on your left hand. Wave your right hand and ask “now how many do I have open in this hand” and “how many do I have open counting both hands”.

CONSOLIDATION ~15 MINUTES

To help students consolidate their new knowledge and make connections to prior learning, allow time for subsequent discussion. The questions below raise important issues:

1) *What did the initial equation tell you? How do you know this?*
   You are looking for the students to say that all the buffaloes are in the barn and that there are no buffaloes in the pasture, so the barn count and total count are the same. When they say this press them to try to obtain a statement about the 0 numeral being connected to the fact that there are no buffaloes in the pasture.

2) *What happened to the equation when you moved the first buffalo from the barn to the pasture?*
   You are looking for the students to say that when a buffalo moves from the barn to the pasture, the counter for the barn loses one coloured cell and the counter for the pasture gains one. Also, the numeral in the number box under the barn changes, going down one numeral, while the numeral in the number box under the pasture also changes, going up by one numeral. Also, the numbers in the equation change to match the numbers in the counters. If no student mentions this, and you have a projector, then display the step, move a buffalo, and then ask again what they just saw happen.

3) *What does each number in the equation represent?*
   Note that for some examples, where # of buffaloes in the barn = # in the pasture, the situation can be ambiguous. Try to avoid having such an example projected when asking this question. The answer that you are looking for is that each number in the equation corresponds to one of the number boxes, either that under the barn, under the pasture, or under the total counter, and try to have the students identify which is which and explain how they know this.

4) *Did you notice that some numbers in the equation change as you moved the buffaloes, but one number didn't change? Why did that number not change?*
   The key idea that you are attempting to make clear is that when we move buffaloes from barn to pasture, we are not changing the total number of buffaloes, so the total counter and numeral in the number box under the total counter cannot change. Further, the box in the equation that represents the total number of buffaloes never changes.