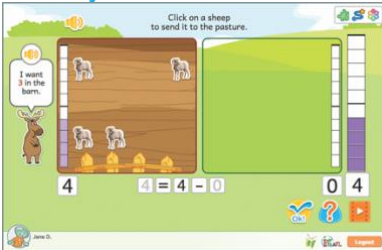


SUBTRACT, STEP 5

Lesson Plan: Number Concept, Subtract, Step 5

Activity Screen Shot



Theme Host: Chuck



Animal Friend: Desert Bighorn Sheep



OVERVIEW

Unlike the first three activities, here students are asked to “take away” animals until the number of animals remaining reaches a specified number. This operation is equivalent to solving the equation: # in barn = # total - ?. Equations $0 = \# - \#$ and $\# = \# - 0$ are also explored.

PRINCIPAL LEARNING GOAL(S)

- Reinforce the concept of subtraction as describing a process of "taking objects away from a set"
- Learn to use the equation $\#1 = \#2 - ?$ in problem solution

PREREQUISITE KNOWLEDGE AND SKILLS

- Completed previous activities in Subtract

RESOURCES NEEDED

- Lego pieces

POTENTIAL DIFFICULTIES

- Many students may mechanically move sheep from the barn to the pasture relying on the computer for the correct answer without actually doing any computation. Emphasize the need to compute an answer before moving sheep
- Some students may have difficulty correcting the equation so discuss the equation seen at the beginning of Phase 2, in particular asking which counter each number in the equation corresponds to and how they know this

WARM UP ~ 3-5 MINUTES

Introduce this activity by having students observe you building a tower, 5 to 7 Lego blocks tall, starting with a pile of 9 Lego blocks. Then say "I will change the height of this tower, what height do you want me to make it?" After a suggested new height has been accepted, discuss with students whether blocks need to be added or subtracted from the current tower, and how many blocks need to be changed. Repeat this a few times. (This warm up activity both reinforces the previous activity and previews the current activity.)

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 is the meaning of 0 in the context of a set and in the context of an equation?*
Students will think of 0 as representing "nothing", which is a problem because "nothing" can literally mean "no things", which corresponds to the notion of 0 as a count of objects in the empty set, but "nothing" can also mean "of little or no value", which does not correspond to the notion of 0. Steer the discussion towards making this distinction in the mathematical use of the word "nothing" for 0. Note that in equations that the students have seen, 0 can represent adding or removing no objects, but also can represent the result of removing all objects (leaving 0).
- 2) *What strategies did you use to solve puzzle pieces in this step?*
Look for a student who says that she/he computed the number of sheep to move before starting to move any sheep. This idea of computing the answer before acting, and then perhaps using other indicators to verify an answer, should be encouraged.
- 3) *What is the difference between Step 3 and 5?*
Students are unlikely to be able to recall Step 3 in sufficient detail to express the difference between that activity and Step 5 that they just completed. Tell students that although these two activities seem similar, someone told you that they are really different. Using a projector, show the class how you would work through one puzzle piece of Step 3, asking for help from the students at every stage so that it is they that actually solve the problems. Emphasize computation first, clicking only afterwards. Then repeat using Step 5. Hopefully some student will tell you that the difference between the two activities is whether Chuck tells you the eventual value of animals in the barn or of animals in the pasture. If not, try to lead some students to this without actually telling them.
- 4) *The equation in Step 5 involved subtraction. Could we have done this activity using addition? How?*
Engage the students in describing the different ways that they did this activity. Encourage them to debate amongst themselves which method they prefer and why. Note that the usual way to determine how many need to be moved to the pasture is to subtract the desired number in the barn from the current number in the barn. Alternatively one can "count down", starting with the current number of sheep in the barn, and stopping when the requested number is reached, and then counting how many fingers were used to count down, but this is still subtraction. However, "counting up" can also be used. Start with the number of sheep that are desired for the barn, count until ending with the number of sheep currently in the barn, and then count how many fingers were used to count up. This "counting up" is an alternative form of addition. Exposure to different ways of solving problems helps students to develop a deeper understanding.

