

# SUBTRACT, STEP 1

## Lesson Plan: Number Concept, Subtract, Step 1

### Activity Screen Shot



### Theme Host: Chuck



### Animal Friend: Mountain Goat



### OVERVIEW

The student is introduced to the notion of subtraction (“take away”) by being asked to move objects from one pile to another.

### PRINCIPAL LEARNING GOAL(S)

- Reinforce the concept of number as a count of objects in a set
- Reinforce connections between: a set of objects; recorded count (e.g., coloured counter cells); a numeral
- Initiate the concept of subtraction as “taking away” objects from a given set of objects
- Introduce the numeral 0 as the count of objects in an empty set

### PREREQUISITE KNOWLEDGE AND SKILLS

- Practiced the act of counting physical objects
- Used slashes (/) and ELM’s counters to represent a count
- Associated numerals 1 to 9 with a corresponding count of objects
- Already seen/understood subtraction as taking objects away from a given pile, moving them into a new pile

### RESOURCES NEEDED

- Blackboard and chalk or Lego pieces

### POTENTIAL DIFFICULTIES

- Missing or weak pre-requisite knowledge – review strategies such as using the counter to help in counting.

### WARM UP ~ 3-5 MINUTES

Select a student and ask her to say a number between 1 & 9 (e.g., 6). Draw a set of objects (e.g., circles) on the board, either more or less than 6. Ask the class if you got the number right. When the class says no, ask how to fix it so that there are 6. Get students to verbalize how many must be added/taken away. When taking away objects, don’t erase them, just X over them. Alternatively, do this activity with physical objects, e.g., Lego pieces, and create a new pile for any that are taken away.

### MAIN ACTIVITY ~ 20 MINUTES

Initially the student sees two frames (“barn” and “pasture”) with a random number (between 1-9) of goats in the barn. The student counts the animals, and then is asked to move a number of them into the pasture. The teacher assists when necessary.

### 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) *There are three counters on the screen. What does each count? How do you know that?*  
The barn counter counts goats in the barn, the pasture counter counts goats in the pasture and the total counter counts all goats on the screen. The students might say that the barn counter counts goats in the barn because the number of coloured cells always matches the number of goats in the barn. Ask what happens when you send a goat to the pasture, in an attempt to have them notice that the number of coloured cells in the barn counter then goes down by one. Push for similar reasoning concerning the pasture counter. A critical observation that students should be making is that the third counter never changes because the total number of goats does not change.
- 2) *What does it mean to “take away” some objects?*  
This step introduces the idea of “take away”, or splitting a given set of objects into two piles rather than just one big pile. It is important that the students tell you that the total number of goats on the screen doesn’t change, just the location. The hope is that students can conceptualize subtraction and addition as opposite operations. One can start with two sets (barn and pasture) and combine them into one big set (addition), or start with one big set and remove a specific subset (subtraction). In equations this corresponds to: given  $a$  and  $b$ , we combine them to obtain  $a + b = c$ ; versus given  $c$ , we subtract  $a$  to obtain  $c - a = b$ .
- 3) *If I had no goats, what number would I use?*  
Another new idea is the use of the symbol “0” to represent an empty set, one with none of the objects that we are counting inside it. When we start the step, the pasture has no goats, which are the objects that we are counting.

