

## Problem of the Month Measuring Up



### Level A

A small group of six soldiers came into a small town. They were very hungry, but none of the townspeople offered them food. One of the soldiers announced that they would make *Stone Soup*. “How do you make Stone Soup a towns’ person asked?” Well the soldier replied, “You need a big pot, water and a large stone.” The townspeople, very curious to see how Stone Soup was made, gathered together the materials. The soldiers started to cook the soup over a fire they made. Once the soup began to boil, a soldier said, “sure this will be a tasty stone soup, but a delicious stone soup would have additional ingredients.” The townspeople, now even more curious, asked what extra ingredients might be added. “Well for each person you would need 2 baby carrots, 3 green onions and five chunks of meat.”

What ingredients are needed to make a delicious stone soup for the six soldiers?

What ingredients are needed to make a delicious stone soup for ten people?

What ingredients are needed to make a delicious stone soup for 25 people?

Explain how you determined you answers.

## Level B

The townspeople brought more and more ingredients and put them in the soup. They began to lose track of how many people they could serve. One young girl who was careful to count the green onions announced that there were 69 green onions in the soup.

How many chunks of meat would need to be in the soup to make the recipe taste right?

How many people can be served soup with all these ingredients? Show how you figured it out.

One man said, “If we have 69 green onions, then I know we need 45 carrots.” Is the man right, explain your answer.

## Level C

You have designed a picture that is shaped as a square. The dimensions of your picture are 6 inches by 6 inches. You want to make it into a poster with dimensions 13 inches by 13 inches. The duplication machine has three settings, one that reduces the linear measure by a factor of 75%, one that enlarges linear measure by a factor of 140% and one that just makes identical copies or applies the factor of 100%. How many multiple enlargements or reductions will you need to make in order to create a poster that has its sides 13 inches long (accurate within five-hundredths)? Explain what setting was used and how that changed the measurements of the copy for each step in the process.

## Level D

Two measuring sticks are the exact same length. The scale units on the two sticks are different. Each stick is marked with equally spaced units. The first stick starts at 0 and has 462 marks. The second stick starts at 0 and has 385 marks. Suppose the sticks were lined up so the two zero marks were matched. The 462 mark and the 385 mark would also be matched exactly. As you scan the measuring sticks, starting at zero, what is the very next set of marks on the two sticks that match exactly? What other marks match? Explain how you know.

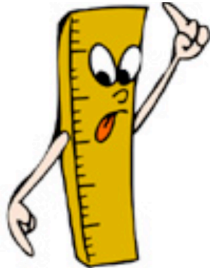
## Level E

Arturo, Brennan, and Cameron each have broken measuring sticks. Each stick is marked with equally spaced units, but the units are not necessarily the same size from one stick to another. The first number appearing on Arturo's stick is 13. Brennan's stick starts with 32 and on Cameron's stick the number is 27.

They all held their sticks up next to the same chair and looked at the top number. Arturo's stick read 93, Brennan's stick read 92 and Cameron stick read 147.

Brennan measured Cameron's height using his stick in the same manner as he had the chair. It read 155. What reading would Arturo's measuring stick give for Cameron's height?

Determine a method for converting between the three different measuring sticks. If you measured something using Cameron's stick, what reading would you have on Arturo's and Brennan's sticks, and vice versa. Explain your solutions.



## Problem of the Month Measuring Up



### Primary Version Level A

**Materials:** Sets of plastic food or color blocks.

**Discussion on the rug:** (Teacher asks the class.) "Who knows the story of Stone Soup?" (Teacher invites a student to tell about the story or she reads the story to the class). The teacher says to the host, "Suppose we wanted to feed two people stone soup. Let's start thinking how many vegetables we will need. " (The teacher invites students to share their ideas.) "How many carrots would we need?" the teacher asks the class. (Students share their answers and explain how they know.) The teacher says, "How many green onions and chunks of meat would we need?" (Students share their ideas. They may act it out to show the ingredient amounts. The teacher repeats the discussion for three people).

**In small groups:** (Students have counters available.)

Teacher says, "If you want to make stone soup for 10 people, how many carrots, green onions and chunks of meat do you need?" (Students work together to find a solution. After the students are done, the teacher asks students to share their answers and method.)

**At the end of the investigation:** (Students either discuss or dictate a response to this summary question.) "Explain and show how you know how many, each of the vegetable, you need for 10 people."