Teaching Elementary schoolers is teaching myself!

Solving mathematic questions is fun, and the excitement I acquire after cracking a problem is unmeasurable. The magnitude of joy was huge since I self-taught myself to solve challenging questions that I couldn't have solved before in my life; I had inspiration to pick more questions and pick more of them until I was exhausted. But when it comes to encouraging another person to solve them, it is a totally different task: inspiring one to have a similar thought process with me is already hard, and the problem solving skills are mostly different for everybody. Having a couple of elementary school students as my buddy is even more challenging: I must put myself into their perspective and preclude any advanced knowledge in my tutorage. This made me practice putting myself into another's position, especially those who are just developing their basis on a certain subject. Solving a problem through the lens of an elementary school student's viewpoint, but I could do so by relying on visuals and pictures. Giving more opportunity to present their solutions helped me as well.

In the beginning of my tutorage to a couple of students devoted to olympiad math, I was and am glad to teach them, but the issue was that problems they solve require different and complex problem solving techniques, which isn't easy for elementary school students. When I first began my tutoring for both elementary school students, my buddies managed to solve a good amount of problems due to triviality of problems that appear in the first few pages of a problem set. But after three or more sessions, the problems became more difficult both for the buddy to understand and me to explain. Even the step-by-step solution didn't convince the students, so it took a long time for me to explain every detail of my solution tiny by tiny. Explaining in the way I saw was simply unnecessarily advanced and rigorous to the students. Another teaching style was needed.

After a few classes, I began using pictures such as a red box instead of x, y, and z. It seemed to me that using variables was a little unfamiliar concept to the students, so I used actual pictures that represent each variable. For instance, if a problem asks the number of keys that Adrian has, I would draw the pictures of keys owned by Adrian, and I would label and color the picture uniquely. If there are multiple conditions about the variables, I would draw different images representing the variables and show how they relate to each other. This was obviously something that I needed back in elementary school, so the pictures would help significantly, I thought.

Discarding variables was a success. Although my usages of variables and the pictures ultimately were identical, There were fewer times for me to ask how one can solve an equation when I used pictures than when I used variables. Buddies often say "I don't know", especially when I have to introduce a set of equations to solve the questions. Since they aren't familiar with using variables, they didn't understand how multiplication and addition worked in an equation involving a variable or variables. So, instead of writing a variable and its coefficient, I would draw the given variable until I have the same number of pictures equivalent to the coefficient. If I had to draw Adrian with marbles three times more than Bethany, then I would draw three marbles for Adrian and one for Bethany. Since it would over-generalize the condition, I would draw multiple diagrams for different numbers of marbles, which often led to buddies coming up with fascinating solutions.

The fact that using pictures is effective was quite interesting to me, since there was no ultimate difference between problem solving through variables and pictures. It is just that it is more visualized. As a person who is willing to continue tutoring experience, this was a golden nugget since I didn't think about using pictures for variables that can be named like α and β. Visuals really help one visualize the picture and imagine them more than variables, and this is indeed what I must continue using for further lessons.

Outside mathematics, the students are cooperative, so they don't give me any concerns till now. I know that a lot of advanced olympiad problem solvers start their study in their youth, and I want my buddies to succeed in that early competition. I hope that they could solve problems in a more effective way, and I hope that my tutoring gives some insight to them.