

Classroom Setup and Efficiency

Why Use the Balls and Trays?

Using visuals to explain what is happening and to improve understanding is a common occurrence. An example of this is drawing a sketch to help someone understand what we are talking about. Sometimes the visual explanation requires animation or as with our example drawn several sequential illustrations. The balls and trays allow the learner to easily construct multiple visuals of a mathematical concept. They also provide the learner with a tactile input that will enhance their conceptual understanding. The balls and trays are manipulatives that provide these important features in a very systematic way. They also give the learner a sense of self-construction in finding the solution to a problem and a mental image of why the procedure works. When working with fractions, the important concept of the unit and a unit within a unit is always visible. Any age learner can easily manipulate the balls.

Child Safety

Since one-inch balls and trays are not recommended for children under five years of age as they are a choking hazard, we offer balls and trays in a two-inch size,



Ball Packaging and Storage

Ease in distribution and collection of balls can be accomplished by using zip lock bags. It is recommended that 20 balls of the same color ball be placed in a quart size zip lock bag. The bags are then easily stored in a plastic storage box or cardboard box (Figure 1).



Figure 1

Distribution, Collection, and Set-up of Materials

On days that the balls and trays are used, the students can pick up their materials as they enter the classroom. The students can also put them back as they leave. This way distribution and collection has minimal effect on teaching time. When working with whole numbers and fractions students will need two bags of balls each containing different colored balls (Figure 2). When working with integers students will need two bags of balls of the same color (Figure 3).



Figure 2



Figure 3

Working with Integers

If you are going to work with integers, it is helpful to mark the trays where the zero line will be. There are two easy ways to mark this line. The one shown is to take a bottle of white out and quickly make a white line on the tray (Figure 4). This will not interfere with the trays being used for any other activity. The second method is to use knitting yarn and make a drawstring loop that can be put on the tray when working with integers. The white out method takes about 30 seconds a tray and only needs to be done once.

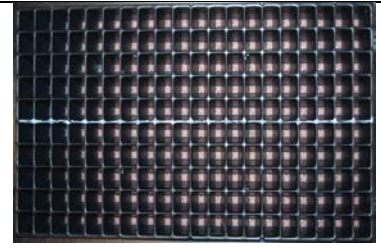


Figure 4

Working in Groups

When following along with the movies and using the balls and trays or other manipulatives it is recommended that the learners work in groups of two to four. As most teachers have learned with experience, students helping students helps both the student needing the help and the student giving the help.

Additional Comments

Knowing how to manipulate numbers using addition, subtraction, multiplication, division, etc. does not mean a person understands the concepts behind the manipulation. Many students have been taught that when doing math the only thing that matters is getting the right answer. This philosophy is the reason many learners do not like math. They lack conceptual understanding and are often frustrated when working application problems. Just like a good carpenter, lawyer, or surgeon knows what each tool at their disposal is for and how it works, a good mathematician knows the tools associated with numbers and how they work.