

# Manipulatives: material and students

Business



7 Musts for Using Manipulatives By Marilyn Burns

1. I talk with students about why manipulatives help them learn math. These discussions are essential for first-time users and useful refreshers to refocus from time to time. I precede discussions by giving children time to explore a manipulative. Then we talk about what students noticed and I introduce the concepts they'll learn with the material.

2. From day one, I set ground rules for using materials. We talk about the similarities and differences between using manipulatives in class and playing with toys or games.

With toys or games, children can make up their own rules. With manipulatives, they are given specific problems and activities.

I do make clear, however, that they're free to make discoveries and explore new ideas. It's also important for students not to interfere with one another. I step in when I hear a howl of protest as a student who needs one more yellow tile takes it from another group's table. Sometimes I open up the discussion to the entire class. These impromptu reminders help keep students on track.

3. I set up a system for storing materials and familiarize students with it.

It's important for students to know where and how to store materials. A clear system makes the materials more accessible. Some teachers designate and label space on bookshelves. Others use zip-top plastic bags and portion materials into quantities useful for pairs or groups.

Still others place a supply of each material at students' tables so they're always within reach. 4. Time for free exploration is worth the investment. Whenever I introduce a new material, I allot at least one math period for this. Teacher demonstrations alone are like eating a papaya in front of the class and expecting children to know how it tastes.

Free exploration time also allows students to satisfy their curiosity so they don't become distracted from the assigned tasks. Expect children to see if tiles can fall like dominoes; build tall towers with rods; or construct rockets out of cubes. After children have explored a material, I ask what they've discovered and record their observations on a chart so their classmates can get insights from their ideas. Then I assign a specific task. 5.

For easy reference, I post class charts about manipulative materials.

Charts not only send students the message that I value manipulatives, but also help students learn materials' names and how to spell them. In September I post a chart that lists all the materials we'll use during the year. For some materials, I post separate charts to list their shapes and colors. And I leave posted charts of students' discoveries about materials. 6.

Manipulatives are a natural for writing assignments; having students write in math class has many benefits. Manipulatives provide concrete objects for children to describe. 7. I let parents get their hands on manipulatives, too.

It's important for parents to understand why their children are using materials.

Follow up by having children take home materials and activities to do with their families. (Hint: I wait until students have had some experience. )<sup>3</sup>

Marilyn Burns Answers Your Questions Marilyn Burns Answers Your Questions About Manipulatives Q. Manipulatives help my learners who struggle, but do my better Math students need them? A. Absolutely.

The challenge of teaching any subject is to find activities that are accessible to all learners and have the richness to challenge more interested or capable students.

Manipulatives are a wonderful resource for this. For example, I introduced fourth graders to Build the Yellow Hexagon. All students found different ways to build the hexagon and recorded their constructions with correct fractional notation. I asked the students who finished quickly: “ How much larger is the red trapezoid than the blue parallelogram? ” This challenged them to figure out how much more  $\frac{1}{2}$  is than  $\frac{1}{3}$ .

Q. How often should I use manipulatives in my teaching? A. Ideally, the materials are available for students to use at any time to help them think, reason, and solve problems.

When a manipulative material is key to a lesson, I initiate its use. Q. What about students who work well with manipulatives but have trouble with textbooks? A.

Showing the bridge from concrete experiences to symbolism is essential.

While it may be obvious to adults, it can be a stretch for students to see how a 3-by-4 rectangle built with tiles relates to the textbook explanation that  $3 \times 4$  means three groups of four. I help children make connections by <https://assignbuster.com/manipulatives-material-and-students/>

demonstrating how a rectangle can be separated into three rows with four tiles. Q. How many kinds of manipulatives do I need?

A. It makes sense to introduce one material and provide time for in-depth exploration.

But one advantage of using a variety is that children can think about ideas in different ways. For example, we wouldn't want children to think of fractions as related only to round pies. Q. Can't I make cheaper manipulatives? A. For years I've had children cut paper cookies to explore fractions, fold shapes for geometry, and use strips for measurement. Students also cut paper squares into the seven tangram puzzle pieces to see that the pieces make a square.

However, to create other shapes, compare areas and perimeters, or make observations over time, paper pieces aren't durable or exact. Manipulatives stand the test of time and are precise. They also allow students to discover the mathematical relationships inherent in them. 4 Q. Where do I fit manipulatives in when there's so much to do? A. I use manipulatives as a support for teaching the math topics that are in the curriculum.

I don't reserve materials for special days or assignments, but make them a regular and integral part of my general teaching. Q.

I worry that children will see the same materials year after year and lose interest. Do they? A. School-wide planning to discuss which manipulatives you'll use and how to use them can be valuable.

However, be careful not to designate certain materials or activities for only one grade. Most are appropriate for different levels, and repeat experiences

help students stretch their thinking. For example, asking primary children to find different ways to make trains of six interlocking cubes using just two colors helps them explore different addends of 6.

Older students can be challenged to figure out how many arrangements there are, not only for trains of 6, but also for trains of other lengths. Q. I don't have enough of any one kind of manipulative to use with my whole class.

What can I do? A. Some teachers I know organize learning centers and have small groups work at them. Others introduce a few activities to be done over several days, and students make choices based on which materials are available. Still others pool materials for a week with other teachers to create class sets.

In all cases, having students work cooperatively not only cuts down on the amount of material you need, but also encourages communication — which in turn promotes learning. Q.

How do I know when it's time for students to put away the materials? A. I let students be my guide. Observing them gives me valuable information.

Sometimes I've assigned students the problem of finding all of the rectangular arrays using 6, 12, and 24 tiles. While some need to build all of the rectangles with tiles and then record them, other students stop using the tiles and are comfortable drawing the rectangles.

Q.

I worry older students will complain that manipulatives are babyish. Any advice? A. I rarely get this reaction. Most are delighted to get their hands on concrete materials. If you anticipate naysayers, talk about how, for example, architects often build models of buildings and engineers construct prototypes.

Tell students that they'll use materials to model a problem or situation. Then be sure they first experience something that offers a challenge and that you provide free exploration time.