


# BUILD IT!

# FESTIVAL

Mathematics Activities  
for Grades K-6

TEACHER'S  
  
GEMS  
GUIDE

Lawrence Hall of Science • University of California at Berkeley

## PAPER MATERIALS

**Newspaper:** One of the activities, Dowel Designs, uses newspaper as its main material. This enables students to help contribute to the Festival and encourages creative reuse of materials.

**Card Stock:** As noted above, many of the activities have activity cards that go with them. These cards need to be made one time and for greater durability we recommend card stock. We also recommend that you use **white** card stock so that the colors of the pattern blocks will stand out.

**Colored Paper for Duplication:** The Tangrams activity uses square sheets of paper or regular 8 ½" x 11" sheets to duplicate a master. We recommend using a variety of colors for this activity, so that at the stations, each student will have a square sheet of paper or master sheet in a color different than the others at her table. When students use the seven tangram shapes they will have distinct sets.

## SIGNS

There is a sign to accompany each activity to guide students into their investigations at each station. Depending upon how you present the Festival, you may choose not to make them. Each activity has a suggested introduction that can include the explanation of what is on the sign. However, many teachers have found it helpful to have the signs to remind students of their task and to pose additional questions. When more than one activity is being presented at a time, the signs are very helpful. For many activities, we have provided alternate signs for younger students. In general, the signs have a minimum of words—though beware students are often too busy building to read them!

### How to Make Signs

Duplicate the master signs following each activity you have selected and laminate them onto file folders for greater durability. You will want one sign for each station for each activity.

*At some schools, teachers pooled their pattern block supplies and shared them for the Festival so that they had ample blocks for all the activities.*

pattern block task cards that use the blocks efficiently. However, for some activities, such as Tessellations, more blocks may be needed, if the entire class does the activity at the same time. If this much expense exceeds your abilities, you can still use the learning station activities in this book which require pattern blocks by ordering only one or two sets and using either the Single Station Format or the Diverse Station Format. **We know some teachers, who, if they had to choose only one math manipulative for their classrooms, would choose pattern blocks!**

## POLYHEDRA

The materials needed for the Polyhedra activity are expensive, *but* this activity is so popular with everyone that we could not bear to leave it out! Working with polyhedra invites students to learn about three-dimensional geometry by creating shapes with flat, snap-together plastic triangles, squares, and pentagons. Students have fun creating their own imaginative shapes and then focus on the geometry involved. If you do not already have or have access to polyhedra, you will need to spend approximately \$90 for the polyhedra at one learning station. **To help alleviate the cost of this material, some schools have designated a portion of the school's materials budget to acquire a school set. The polyhedra can then be shared by classrooms or used for a math lab.**

## ACTIVITY CARDS

Many of the activities have student activity cards to accompany them. These are on Duplicating Masters within each of the activities and are meant to be duplicated on card stock for durability. In many cases, these cards are labeled "A," "B," and "C" to designate order of difficulty with "A" being the easiest and "C" being the most challenging. The guide is spiral bound for your copying convenience.

# *Materials You Need*

Please see the "Sources for Materials" section on page 213 for specific ordering information from a variety of sources.

## **PATTERN BLOCKS**

We thought long and hard about what manipulatives to use at this Festival. For many reasons, we decided to use pattern blocks as a main manipulative. One of the most important reasons being their appeal to students. Many teachers report that in their classrooms, students often choose these brightly-colored geometric shapes during free choice work periods. At this Festival, pattern blocks are used in four of the eight regular activities as well as for the preliminary and introductory activities.

Students use the pattern blocks to gain insights into many aspects of geometry as well as pattern and number. The pattern blocks also lend themselves to artist creations tying mathematics with visual arts. But this just scratches the surface of the power of pattern blocks as a mathematical teaching tool. To name a few, they can be used to teach number concepts such as addition, multiplication, and fractions; as a non-standard tool for measurement; as a tool for expressing functions and algebraic expressions; and as a concrete material to explore discrete mathematics.

Pattern blocks are available in wood or plastic. We highly recommend the wooden blocks because they can also be used to create three-dimensional structures. Another variety of pattern blocks is a set of elaborate plastic rainbow pattern blocks featuring the six shapes in six different vibrant colors. Because these are thicker, they, like wooden blocks, can be used to build three-dimensionally. There is also a giant-sized set of carpet tile pattern blocks available which is ideal for modeling and for young students to use to build.

To present the pattern block activities to a class of 32 students, we recommend that you have at least six sets of 250 pattern blocks or four sets of 432 pattern blocks. If you need to acquire these, it will cost you over \$100. We have tried to create