
Math in Desert Design

Activity Summary

Students will combine art and math in an activity which uses numbers and graph paper to make basket designs. They will also look at the basketry of the Tohono O'odham and discuss how and why baskets are made.

Bringing it Together

This activity introduces another form of expression of desert people, in particular the basketry of the Tohono O'odham. While the making of baskets is a form of artistic expression, it is also utilitarian -- baskets had many

traditional uses such as to carry goods, store materials, and assist in the harvest. As well, O'odham baskets were made from natural materials of the desert. The fibers of the yucca plant (*Yucca elata*), beargrass (*Nolina microcarpa*), devil's claw (*Martynia parviflora*), and willow (*Salix nigra*) were stripped, soaked, and woven to make the baskets. Some baskets are woven tight enough to hold liquids!

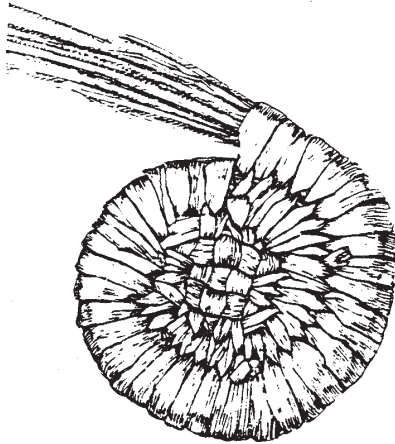
Art is generally considered fun and math can often be thought of as difficult or scary for students. This activity combines the two subjects using math in a fun

way to create art. It is an opportunity to combine several disciplines in a way that becomes relevant to the students as they create their own designs similar to those used in the basketry of the Tohono O'odham.

Activity Procedure

1) Have students open their Student Journals to "Math in Desert Design." Review the geometric shapes explaining that when figures such as squares, rectangles, parallel lines, and triangles are used in art, it is called "geometric design." Call on students to draw on the board some of the patterns and shapes they see.

2) Discuss the making and uses of baskets by the Tohono O'odham. [If you have any O'odham students in the class they may have family members who are or were basket makers. Encourage these students to share with the class what they know of the art.] Emphasize the use of native plant materials to make baskets and review some common plant names. Explain that baskets were first made for utilitarian purposes but that many baskets are now made as a form of artistic expression.



Objectives:

Students will:

- study basket designs of the Tohono O'odham.
- practice using multiplication skills.
- create geometric designs by coloring mathematically selected squares on graph paper.

Materials

- Student Journals
- 150 & 600 Chart Paper (templates provided in Journals and with Teacher's Guide)

Taking it Home and Other Extensions

Invite a basket maker to the class to demonstrate their craft. Invite O'odham students in your classroom or school to bring in baskets from home to share with the class. Invite someone to class to explain how to weave baskets and collect materials to make your own baskets. Study and compare baskets made by other cultures.

3) Tell students that this is an opportunity to express themselves artistically (yea!). It is also an opportunity to study their multiplication tables (what?!). Have them consider the designs they particularly liked on the baskets; how would they replicate it or create it? Note that some of the patterns are intricate, repeating themselves in precise ways. This activity will look at these basket weaving patterns in a mathematical way.

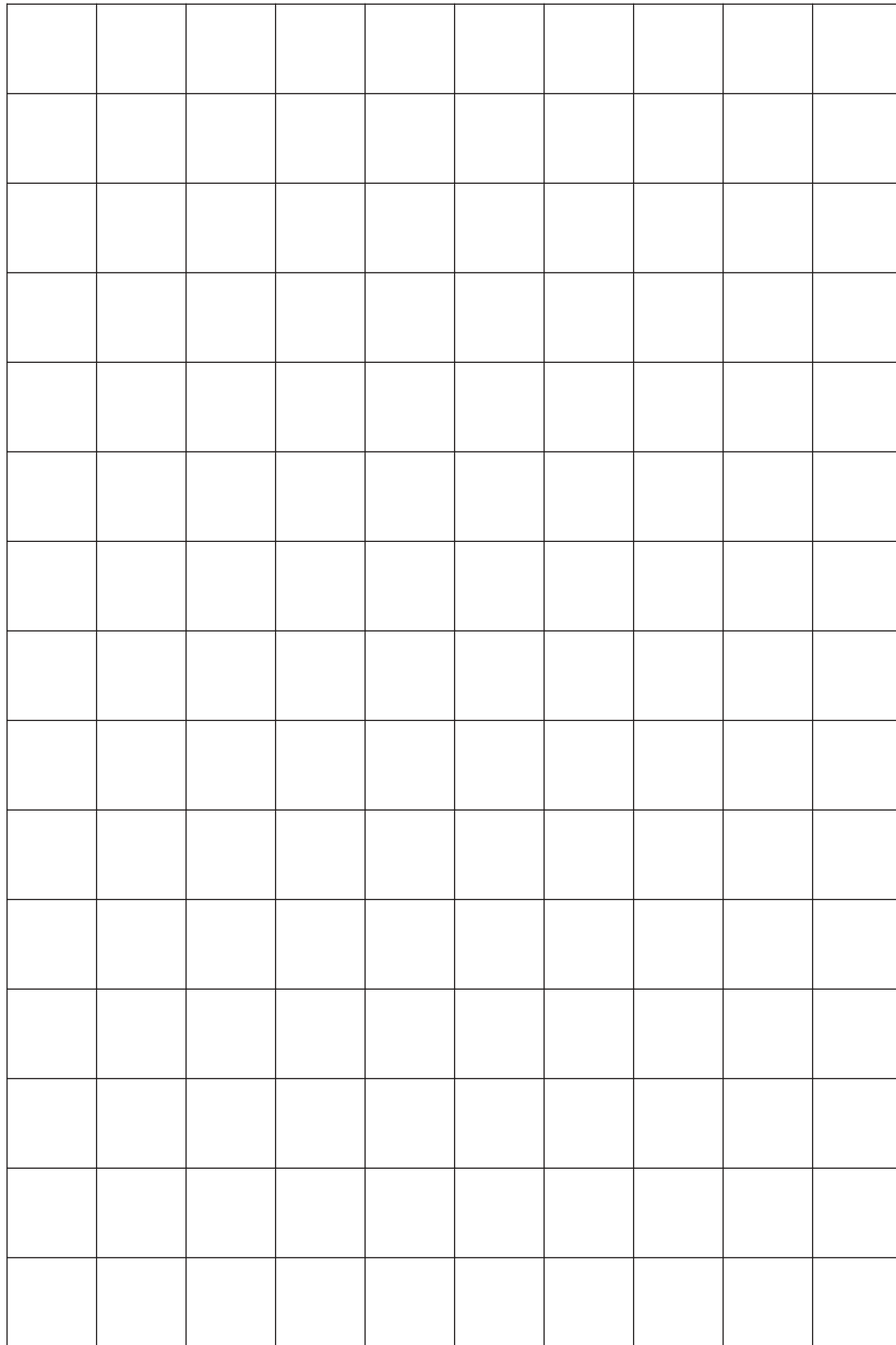
4) Prepare your graph paper. This activity uses what is referred to as "One Hundred-fifty Chart Paper." For classrooms with more advanced math skills "Six Hundred Chart Paper" has been provided (only in the teacher's guide.) Students are also provided with One Hundred-fifty Chart paper in their Journals. Teacher's sample pages (150 & 600 chart paper) have been included in this packet to assist you in understanding and conducting the activity. To make One Hundred-fifty Chart paper, students should number the squares of their graph paper as follows: On the first row, number each square, beginning with zero and ending with nine. The second row begins with ten and ends with nineteen. The next row is numbered twenty to twenty-nine and so forth until the numbering pattern ends with one hundred forty-nine on the bottom right-hand corner. (You may choose to make one set of One Hundred-fifty Chart paper and duplicate it for the rest of the students if you desire although the numbering process is educational in itself.)

5) Students will next have to refer to their multiplication tables. Each student should write out the multiples of selected numbers (between 2 and 9) up to 149. Next, have students create geometric designs on their graph paper by coloring in the squares which correspond to answers of the multiplication tables. For example, some students will color in blocks which are multiples of three. Other students may color in squares which are multiples of four, etc. Each set of answers creates a different design on the graph paper. Students may also use different combinations of multiple sets. For example, they may color multiples of three one color and multiples of seven another color. Experiment with different combinations to create a variety of designs.

6) You may also give students extra One Hundred-fifty Chart paper and allow them to create other designs by coloring in selected squares (which don't necessarily correspond to multiplication tables). Students can see how designs with seemingly rounded edges can be made using only squares. Challenge students to create such desert designs as a bird, coyote, or saguaro cactus.

7) Decorate the classroom walls with your creations. Have students give names to their geometric patterns.

150 Chart Paper



600 Chart Paper

