Utah's Largest Math Event 2009-2010

Mirror Images

Kinder/1st/2nd Grade

Standard 3: Students will understand basic geometry and measurement concepts as well as collect and organize data. **K** Objective 1: Identify, sort, and classify objects according to common attributes. **1st** Objective 1: Identify, describe, and create simple geometric figures. **2nd** Objective 1: Describe, classify, and create geometric figures.
Intended Learning Outcomes: 1. Develop a positive learning attitude toward mathematics. 2. Become effective problem solvers by selecting appropriate methods, employing a variety of strategies, and exploring alternative approaches to solve problems. 3. Reason logically, using inductive and deductive strategies and justify conclusions. 4. Communicate mathematical ideas and arguments coherently to peers, teachers, and others using the precise language and notation of mathematics. 5. Connect mathematical ideas within mathematics to other disciplines and to everyday experiences. 6. Represent mathematical ideas in a variety of ways.

Background Information

Geometry not only provides a means for describing, analyzing, and understanding structures in the world around us but also introduces an experience of mathematics that complements and supports the study of other aspects of mathematics such as number and measurement. Geometry offers powerful tools for representing and solving problems in all areas of mathematics (Navigating through Geometry, NCTM, 2002).

Learning with understanding is essential to mathematical literacy. Mathematical literacy is having procedural and computational skills as well as conceptual understanding. Mathematical proficiency has five interwoven and interdependent strands: understanding, computing, applying, reasoning, and engaging (National Research Council, 2002). This activity is intended to promote mathematical literacy geometric proficiency within your students.

Materials

Pattern blocks (two hexagons, a trapezoid, two triangles, a square, a blue rhombus, and a tan rhombus for every student)
Pattern block stickers or die-cuts (optional)
Mirror for every student
Blank paper

Invitation to Learn

Find a variety of pictures that have symmetry and cut them in half. Hold onto one piece of each puzzle and place the remaining pieces on the board. Show the students one of the pieces and have them find the other half. Continue until all puzzle pieces are matched.

For examples of pictures that have symmetry, go to http://www.preschoolcoloringbook.com. Look under the following categories:

Shapes:	Pentagon, Hexagon
Fish & Ocean Life:	Lobster
Birthday:	Birthday Cake
Butterfly & Moths:	#11
Alphabet:	Block Letter: H

Instructional Procedures

Activity 1

Give each student a mirror, two yellow hexagons, and two green triangles. Using one triangle and one hexagon, put the blocks together so that the green triangle makes a hat on the hexagon (figure 1.1).

Have the students recreate the image. Next, have students place a mirror along the bottom edge of the hexagon and look in the mirror to see its image (figure 1.2). Ask,

- What do you see in the mirror?
- How is the image in the mirror the same as the design you built?
- How is the image in the mirror different from the design you built?

Say, "Use the other hexagon and triangle to build what you saw in the mirror. Use the mirror to check what you built. Is it the same?"

Repeat the above activity placing the mirror to the right of the design (figure 1.3). Ask the same questions. Place the mirror on a slant (figure 1.4), but have students build what they think they will see in the mirror before checking it with a mirror. Repeat the questions.

figure 1.1

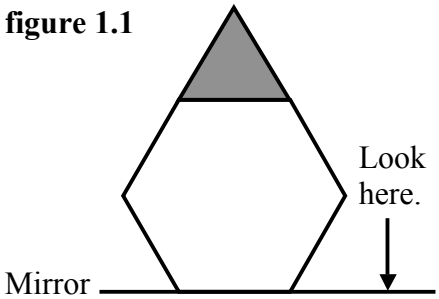


figure 1.2

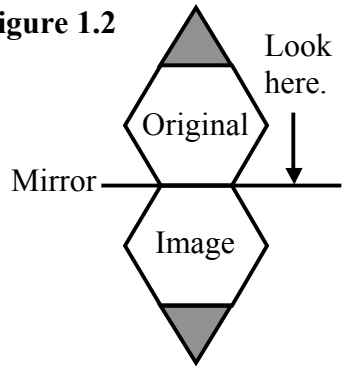


figure 1.3

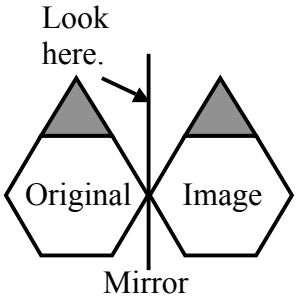
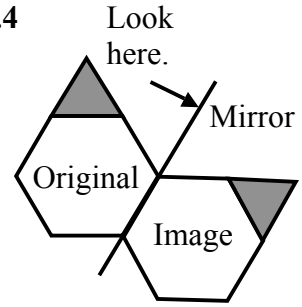


figure 1.4



Activity 2 (Qualifying Problem for ULME)

Activity 1 is a foundational activity for completing this activity.

Build a design using one yellow hexagon and one blue rhombus (figure 2.1). Repeat the previous day's activities by placing the mirror below, to the right, and at a slant.

Now, have the students create their own design using any three pattern blocks they choose. This time each student must record their original design on paper using crayons, die-cuts or stickers. Then they must predict what the image will look like when the mirror is placed below and to the right of their design. Next, they

must record their predictions before they check it in the mirror and make any necessary revisions to their predictions.

Students must explain their thinking process by:

1. Producing a visual representation of the patterns.
2. Writing a description of the reasoning and justification of the process and solution.

figure 2.1