

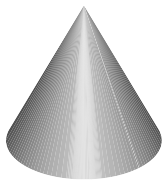
Observations of geometric solids

Paul

GRADE 4, APRIL

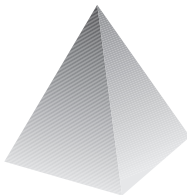
As an introduction to a geometry unit, I asked the question, “What is geometry?” About half the class conveyed something that related to shapes, but nothing (or very little) beyond that. With this information in mind, I was very curious about their intuitive responses to shapes. What geometric thinking do they bring with them from “everyday” life, I wondered.

I presented my fourth graders with a bag of geometric solids and asked the students to describe the different shapes to me. I wanted to see if they would describe them by using their experience with everyday objects, by using the geometric names such as *cone* or *prism*, or by referring to concepts such as *faces*, *edges*, and *corners*. At different points in the conversations, I gave them the geometric name for each solid. Following are some of the descriptions I heard.



cone

- “A triangle with a flat bottom.”
- “A round triangle.”
- “A large circle with smaller and smaller circles on top until it reaches a point.”
- “Big to small circles.”
- “Like a loudspeaker.”
- “A cylinder, triangle, and circle in one.”



square pyramid

- “A 3-D triangle.”
- “A cone, but square.”
- “The top of a house.”
- “Squares piled on top of each other, getting smaller and smaller.”
- “A beam of light.”
- “Flat sides, flat bottom, making a point.”
- “A cone is a pyramid’s cousin.”

470

475

480

485

490

495

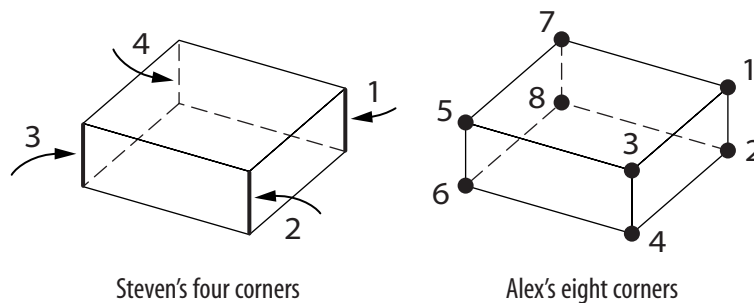
them to build their understanding? I wasn't sure, but I did decide to follow my instincts instead of the guide. I decided we would look at a variety of blocks, some from a set of wooden solid blocks and some from the set of pattern blocks (which are "flatter" and thus seem more two-dimensional), to talk about their similarities and differences.

I put some of each kind of block into the center of our circle and asked the children to tell me what was the same about the blocks. They came up with a list that I thought was quite predictable: They're all blocks, they're all made out of wood; they have shapes; you can build with them. Then Nikki said, "The pattern blocks are sort of shaped in different shapes than the geometric blocks." She proceeded to point to the blocks that she saw as different.

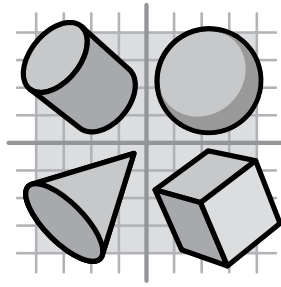
Trevor interrupted when Nikki said there was no geometric block that was the same as the square orange pattern block. He pointed to a rectangular solid that looked somewhat like the orange pattern block but was larger. As they discussed the differences, they pointed out that the pattern block looked "flatter" and the other was "sort of bigger, and stuff."

I then set out the two blocks that Nikki and Trevor had been discussing and asked the children to describe them. Both were rectangular solids; one was thinner than the other. I asked the students to tell me how they were the same or not the same.

Alex started the conversation by saying the blocks were the same because they had flat sides. A good start. Steven brought up that they both had four corners. I asked him to show us what he meant, and he pointed to the four shorter edges of the pattern block as he counted "1, 2, 3, 4" (see figure at left). Alex disagreed and said there were eight corners, pointing to each vertex as he counted (see figure at right).



All of a sudden, children were perking up and joining in. I felt I needed to make a decision about today's topic. Here was some real



C H A P T E R

8

Highlights of related research

by Danielle Harrington and Marion Reynolds

SECTION 1 Reasoning about shapes

SECTION 2 Talking about shapes

SECTION 3 Visualizing shape

SECTION 4 The complexities of understanding angle

SECTION 5 Sorting out relationships between 2-D and 3-D

SECTION 6 Building and using definitions

Children amass a large body of informal knowledge about shapes even before entering school as they interact with and explore their surroundings. They write and draw on rectangular pieces of paper, play with spherical balls, run their fingers over the pentagonal bolts on fire hydrants, and perhaps even notice how the angles made by the blades of a pair of scissors change size when they use them. Children may also wonder at the geometric beauty in natural forms such as butterflies, flowers, and snowflakes.