

Mrs. Sigler's First-Grade Class: Experiences with Triangles

Mrs. Sigler's first-grade students are learning about geometric figures. The students have been given a set of polygons to sort into two groups: triangles and other shapes. Within the set there are many different sizes of kinds of triangles, including scalene, equilateral, isosceles, and right triangles. The triangles are cut out of colored paper and are red, green, or blue. Other shapes are also in the set – squares, rectangles, hexagons, and parallelograms. Students are working in groups of four. Mrs. Sigler notices that one group of students has separated the equilateral triangles from all of the other triangles and grouped them alone. They have placed most of the other triangles in the “other” category.

1. **Mrs. S:** I see you've separated the shapes. What is this group of shapes called? [Points to the set of equilateral triangles.]
2. **All:** Triangles!
3. **Mrs. S:** I'd like each of you to explain your thinking to me. I'd like each of you to explain to me why all of the shapes in this group are triangles [points to the equilateral triangles] and all of *these* are *not* triangles [points to some triangles in the “other” group].
4. **Ollie:** This [points to one equilateral triangle] just looks like a triangle.
5. **Mrs. S:** Can you say more? What do you mean?
6. **Ollie:** It's short and fat and just looks right.
7. **Yoon So:** Yeah. This one [points to a scalene triangle] is too skinny and pointy. It isn't a triangle.
8. **Mrs. S:** What do you think, Paul? Do you agree or disagree?
9. **Paul:** Well, these are maybe triangles [indicates the group of equilateral triangles] because you know they just look like triangles.
10. **Mrs. S:** Hmm. I'm not sure I'm understanding. Can you tell me more about what you mean? You say they just look like triangles. What does a triangle look like?
11. **Paul:** Umm . . . [Paul looks around the room and then points to a poster of geometric shapes. The shapes on the poster are all regular polygons and the triangle on it is equilateral.] Like that one. See, triangles just look like this [cups hand into the shape of an equilateral triangle]. They're flat on the bottom.
12. **Mrs. S:** Ollie, can you say again what Paul said?
13. **Ollie:** These are a triangle [cups his hand].
14. **Mrs. S:** What else did he say?
15. **Ollie:** They have to sit on their bottoms – there aren't pointy parts on the bottom.
16. **Mrs. S:** OK. Look at this. [She takes one of the large equilateral triangles from the triangle pile and turns it so a vertex is pointing downward.] Is this a triangle?
17. **Paul:** [Turns the triangle so it is sitting on a side.] Now it is.
18. **Mrs. S:** Sim, you have been very quiet. What do you think? Is this a triangle? [Turns the equilateral triangle around so the point is again facing down.]
19. **Sim:** I don't think so.
20. **Mrs. S:** So you think this is *not* a triangle? Is that right?
21. **Sim:** It's not a triangle.
22. **Mrs. S:** Can you say more? Why do you think it's not a triangle?
23. **Sim:** I don't know. [Long pause.] Maybe it is. Because I can turn it and it looks like a triangle.

Is the teacher moving the students' mathematical understanding forward?

Why is she asking them each to speak in turn?

Is this productive talk?