

Numbers at School

OVERVIEW

In this lesson, children increase their awareness of the many ways that numbers are used in their world. They search for numbers in their school, draw pictures of things that have numbers, and discuss how those numbers help people. The children also talk to adults in their building, such as cafeteria helpers, the nurse, the custodian, and the office manager, about how these adults use numbers. The children then make a mural of what they discovered.

MATERIALS

- butcher paper to display the children's work
- optional: clipboards, 1 per student

TIME

- one class period

Teaching Directions

1. Explain to the students that they will go on a walk to find out how numbers help people at school. Ask them to think about where they might find numbers, and why those numbers might be there.
2. Hand out pencils and blank paper (and clipboards if you have them).
3. Take the students on a walk around the school building. As they walk, have them stop periodically to observe objects that have numbers, draw these items, and the numbers, and then discuss how the numbers are used.
4. Return to the classroom. Bring the students together to share the numbers they discovered, and the purposes those numbers serve. On the butcher paper, write their observations. Note when the numbers were used to
 - measure
 - identify (for example, a telephone number or door number)
 - tell how many (for example, tell how many children ate lunch)
 - indicate order (for example, fifth grade)
5. Have the students cut out their drawings of objects that illustrate the sentences you wrote and glue them onto the class mural.
6. Display the mural in a public place so visitors can see what the students are learning, and so the school helpers are reminded that their work uses mathematics in ways that are important to the students.

Teaching Notes

This investigation invites children to become acquainted with the adults in their school lives in a new and different way. They talk to the nurse, not as a sick child talking to a medical practitioner, but as a coinvestigator into how mathematics is used in the world. Whenever I do this with children I see the world around me with new eyes, as do the enthusiastic students and the other adults at school. I often hear the adults comment, "I never knew I used so much math at work!"

In this activity children learn that numbers are used for different purposes. Numbers represent quantities, they identify (as in a phone number or address), they are used to measure, and also to tell relative position. Children need to see the many ways that numbers function in the world around them.

This activity has an end product, a chart that will be displayed in the hallway. School hallways are an important place to communicate to parents and visitors. When I display children's work in hallways, I include an explanation that describes the important mathematics that the children were doing. In this way parents, administrators, and other visitors learn the value of how we're teaching mathematics to children.

The Lesson

"We're going to take a walk around the school today," I told the children. "As we walk, we're going to look for numbers and think about how those numbers help people."

"I know a lot about numbers," said Rafael. "I know one hundred plus one hundred is two hundred. I never have to count, I just think in my brain and it's there."

"You all know a lot about numbers," I agreed. "And they're important, so we study them at school. But why are numbers important at school and in our homes?"

"I've got numbers at my house," said Ricardo. "We've got a clock so my mom can be on time."

"My mom uses numbers to cook. You have to use them to make soup," Pradnya told the group.

"Does your mom use a measuring cup?" I asked. Pradnya nodded.

"It measures," offered Rafael. "You can put flour or sugar in it so you know how much."

"I wonder what numbers we have in our school," I said, to introduce the investigation. "How does Ms. Martínez, the principal, use numbers? And I wonder how the nurse uses numbers. We're going to take a walk around the school to look for numbers. When you see a number, think about why that number is there. And then I want you to sketch the thing that has the numbers and think about how those numbers help people."

We lined up, the students clutching blank paper on clipboards, and pencils. As we walked out the door they immediately noticed the door number. They eagerly copied it down, and I reminded them that I wanted them to draw the whole door as well as its number. As we walked down the hall, they stopped by the fire extinguisher.

"I see numbers," Ana said.

"No there's not, that's letters," said Ricardo.

We looked closely and saw that Ana was right; there were dates recording when the fire extinguisher was tested.

The children saw numbers all along the walls in classroom displays. Two children copied a chart of

counting by tens, and another looked at a recipe for "Good-Smelling Play-Doh." "It's got numbers to tell how much," observed Saskia. She carefully copied some of the recipe.

I moved the children on to the nurse's office. "Do you have any numbers in here?" Marco asked. Ms. Gonzales smiled and showed the students the electronic thermometer. She took Marco's temperature and the children counted as the thermometer registered higher and higher numbers until it stopped at 99.

The students then gathered around a tall plastic device for measuring height. "It's got a lot of numbers!" Lina exclaimed. Some children sketched it while others noticed the numbers on a chart for testing eyesight. Amanda, Gabriela, and Rafael gathered around the microwave to sketch it while explaining to each other what the numbers did. (See Figure 1-1.)

"I had no idea that we have so many numbers in here!" Ms. Gonzales exclaimed. "I'm glad you came."

We stopped in the cafeteria, where the kitchen helpers were cleaning up after lunch. "What numbers do you have?" asked Ana.

"Oh, we have to count just about everything in the kitchen, and we write the numbers on report forms," said Mrs. Miranda. "We count the trays before lunch and after lunch so we can find out how many children ate today. We count the cartons of milk before breakfast and after breakfast for the same reason. One other important thing we do every Friday is count the forks and the spoons. Then we compare the numbers with last Friday to see how many got



FIGURE 1-1 Gabriela's drawing showed the numbers on the microwave and included her explanation, "El horno es para calentar la comida" (The microwave oven is for heating food).



FIGURE 1-2 Amanda found a number 2 on a carton of milk.

lost. That's very important." The children nodded seriously and some began to sketch. (See Figure 1-2.)

"Look at the dishwasher," said Mrs. Miranda. "It says 'one hundred fifty' on it. Why do you think that number is there?"

"It tells how many trays are in it?" asked Ana.

"Actually, it tells how hot the dishes are as they're being washed," answered Mrs. Miranda. "It has to get to one hundred and fifty degrees during the wash cycle and one hundred and seventy degrees during the rinse. That's how the germs are killed so you don't get sick."

"The lunch lady asks us our number when we come to eat," Verena reminded Mrs. Miranda.

"That's right," Mrs. Miranda answered. Verena was referring to the number assigned to children who qualify for free or reduced-cost lunch; the cashier circles the number when a child goes through the check-out line. Nearly all the students at my school qualify for the lunch program, so Mrs. Miranda's list has about three hundred numbers on it. (See Figure 1-3.)

"Let's go look at my list of numbers," suggested Mrs. Miranda. The children followed her from the kitchen to the cashier's station. "Why do you think we ask you your number instead of your name?" she asked.

"'Cause it's fast?" asked Marisa tentatively. "Right," said Mrs. Miranda. "And after lunch we count the numbers. Look how we circle the groups of ten. Then we count ten, twenty, thirty, forty, fifty, and so on until we find out how many children ate today. That number has to match the number of trays."

The children noticed the numbers that showed the price of the lunches. Mrs. Miranda then showed them the long cash-register tape that showed all the lunches that were bought that day.

"That's a lot of numbers," Andrés said with a sigh.

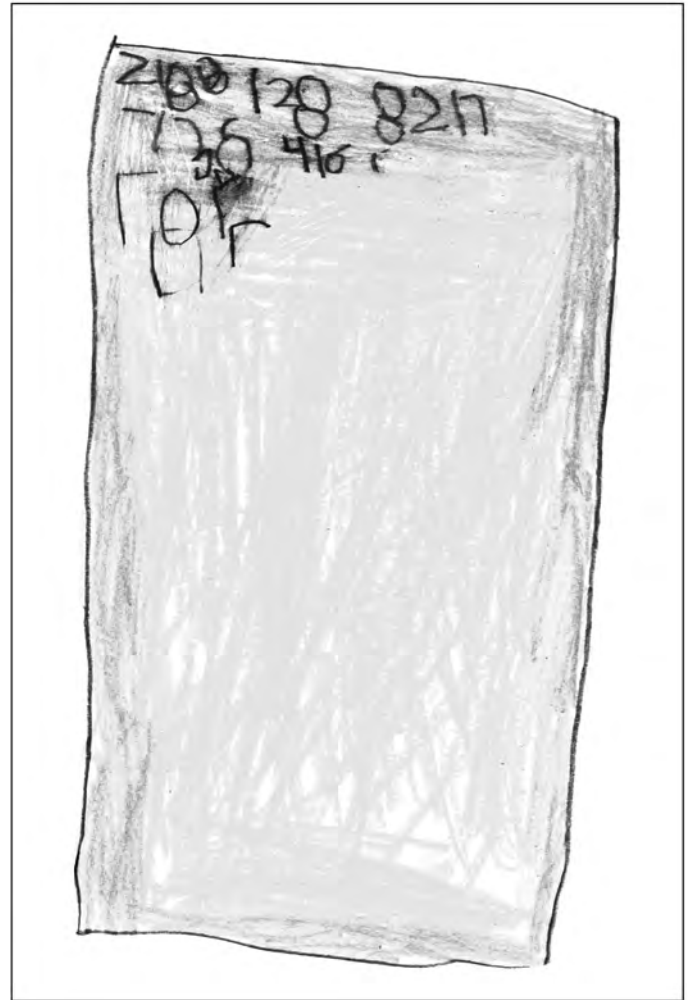


FIGURE 1-3 Andrés copied the list of numbers that are assigned to students in the free-lunch program.

"You think *that's* hard," said Mrs. Miranda, smiling. "The next thing Ms. Hanson and I do is count all the money. The money has to match this number at the bottom."

Ms. Hanson joined us then. "How many of you ate pizza pockets today?" she asked.

Eleven children raised their hands.

"And how many of you ate tacos?"

The others' hands went up.

"This morning," Ms. Hanson explained, "I used your lunch counts to figure out how many we'd need for the whole school, and I had to count how many pizza pockets to make, and how many tacos."

When we returned to our classroom after the twenty-minute walk, the children gathered on the rug, clutching their drawings.

"What did you discover?" I asked them. "As you tell us how people at our school use numbers, I'll write down what you say. Later we'll put the chart in the hall to share our discoveries with everyone else."

“There’s a whole lot of numbers out there,” said Marisa.

“You’re absolutely right,” I agreed. “We sure do use numbers a lot. That’s why we learn about numbers at school.”

“There’s numbers on all the doors,” said Pradnya.

I recorded her observation and then inquired, “Why are they there?”

“So your mom knows which is your room,” answered Robert.

“Yeah,” agreed Omar. “She might go to Mr. Garcia’s room instead.”

“Some other numbers tell us which one,” I explained, “like the door number, so your mom knows which room, or a phone number that tells the phone company which phone.” (See Figure 1–4.)

“The calendar number says the day,” said Ana.

“That’s true,” I answered as I wrote her words on the chart.

“The nurse uses that tall thing to tell you how big you are,” contributed Graciela.

“What’s that called?” I wondered aloud. No one responded. “I think it has a special name. Maybe you can ask her next time you see her. But it does help her measure us. What other things does the nurse measure?”

“How much we weigh,” said Marisa.

“And our temperature,” Ana added.

“Do they use numbers to measure things in the cafeteria?” I inquired.

The children chattered excitedly about all the measuring they had seen in the lunchroom.

We continued discussing while I wrote their observations on the chart.

“My goodness, we certainly found a lot of numbers,” I said, and we reread the chart together:

Numbers in Our School

The doors have numbers.

The calendar number says the day.

The nurse measures how tall we are and how much we weigh.

Marco’s temperature is 99 degrees.

We tell Mrs. Miranda our lunch numbers.

The lunch ladies count the trays and the milk cartons.

The dishwasher has 150 on it.

We saw the lunch price.

They count the tacos.

Then I moved on to how we’d illustrate the chart. “You made some wonderful drawings of all the things that we found that have numbers,” I said. “Would you mind contributing some of your illustrations to our chart?”

Children volunteered to add their pictures to illustrate various observations and went to get scissors and glue sticks. Soon the chart was ready.

Then we reread our words and admired our illustrations. Before I taped the chart to the hallway wall, I said, “It will be nice for Mrs. Miranda and Ms. Gonzales to see all that we learned from them. And maybe the other children at school will start noticing numbers, too.” It was clear that the students had a new awareness of the importance of numbers in the world around them.



FIGURE 1–4 Sunil recorded the numbers and other symbols on each button of the telephone.

Linking Assessment and Instruction

You may wish to make the following observations:

- Did the children notice only a few numbers or many numbers in their world? How many different things did they record?
- Did they enjoy seeing their world through the eyes of young mathematicians? Did they talk about the purposes the numbers served? Did they make connections to their own lives?
- Did the children’s pictures include not just the number, but also the item associated with that number? Could you identify what the item was simply by looking at the picture? These drawings frequently show that the child both observed and was able to record the proportions of the object’s shape.