

Who Measures What in Our Neighborhood?

K-1 Classroom

Phase 1



How long is the carpet?



How deep is the puddle?

Teachers planned for the project by brainstorming major concepts and big ideas that they felt were essential for students to understand. These big ideas included:

1. Most people measure in their daily lives.
2. There are many different types of measuring tools.
3. Many things in our surroundings need to be measured.
4. Measurement is essential to finding answers in many fields of study.
5. There are standard and non-standard units of measurement.

Teachers made a topic web of possible avenues of exploration that included activities, field trip sites, experts, resources, required curricular objectives and basic skills. Teachers used their topic web as a resource for the project investigation. They provided the materials and resources for students to find answers in their areas of interest.

In the classroom, the project began when children remembered the fall project entitled, *Keeping our Environment Healthy*. The children recalled that they took measurements when they collected data. They remembered weighing the litter from the playground and the nearby pond. They also remembered weighing the garbage generated at lunch at the beginning of the project and compared it to the weight of the garbage from their lunches at the end of the project.

The teacher recorded their recollections of their experiences with measurement on 'post-it' notes and began the Student Measurement Topic Web 1. In small groups, students revisited their ideas and explained them further to categorize them. The teacher helped students categorize their ideas by asking them to listen for similarities. The discussion of how their ideas were similar to others' enabled the teacher to note and document students' current understandings and misunderstandings.

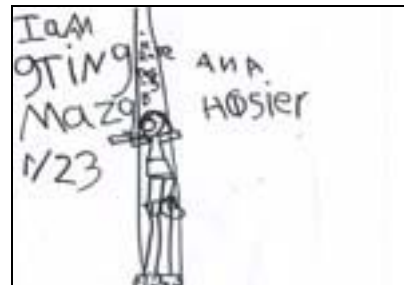


The teacher is telling children to categorize by similarities.

To encourage students to think further about their previous experiences with measurement, teachers shared personal stories. The head teacher described a special wall in her kitchen that recorded heights of all the family members. Several children told of their experiences with measuring. Children wrote and drew about their personal experiences.



"My grandma measures me to make my clothes."



"I am getting measured."

Their pictures were photocopied and revisited so that students could form groups with peers who had similar experiences. The following conversation occurred during the sorting process of their memory drawings.

- NO: I drew my dad measuring a piece of wood so he could build my clubhouse.
WJ: I think mine should go with NO's because my dad is measuring to build a deck.
BK: My dad had to measure pieces of wood for building a climber in our back yard. My picture should go with NO's too.
JK: My picture shows when I was a baby I got measured and weighed. My picture could go with NO's.
BK: No. Yours isn't about measuring how long something is.
JK: Yes. See here is the ruler to see how long the baby is.
BK: But you also said weight.
DM: That's the same – measuring for a clubhouse and weighing a baby. I have a baby brother and he gets weighed.
AB: Yeah.
NO: Weighing babies and measuring wood is not the same. They should not go together in my category.
JK: I think it should go together.



Students discuss how to categorize their memory drawings.



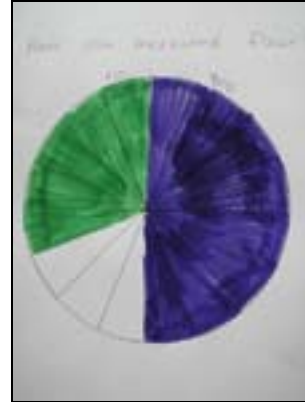
Graphic representation of their categories of their memories about measurement.

Students were curious about the experiences of their peers. Many students developed questionnaires to poll their classmates:

- KC: Have you been measured for making clothes?
- WJ: Have you measured a deck?
- BK: Have you measured pieces of wood?
- CW: Have you ever measured from your chair to your daddy's chair?
- VM: Have you been weighed at the doctor's?
- AB: Have you been measured for new shoes?
- PJ: Have you been measured on a scale?
- BH: Have you been measured for how tall you are at home?
- JK: Have you been measured when you were a baby?
- AH: Have you been measured against a wall at home?
- LS: Has your mom measured you to see how tall you are?
- AC: Have you been measured for making a costume?
- ST: Have you been measured for how tall you are at the doctor?
- NB: Has your height been measured at the doctor?
- HB: Have you measured flour?
- TB: Have you got yourself measured with a stick?



Questionnaire asking classmates, "Have you measured flour?"



Pie graph showing the number of students who had and had not measured flour.

During large group discussion, several students mentioned problems they had while measuring something. The teacher asked students with similar problems to get together in small groups to discuss the difficulties they had measuring.



Students discuss what is difficult about measuring solids.



Students discuss what is difficult about measuring the length of things.

The comments from the group discussing solids included:

- WJ: It's hard measuring the depth of wood.
- LS: It's hard measuring what is solid.
- VM: It's hard measuring salt because it is so, so, so, so little.

One group discussed measuring the length, width and height of things.

- AC: Sometimes you need a big measuring ruler that's really tall.
- BH: You have to read hard numbers.
- BK: The tape measure isn't always long enough.

Another group discussed difficulties they had weighing things.

- KW: We couldn't weigh all the garbage.
ST: I didn't know what to measure with.
JN: How do we measure something light like a pencil?
JC: Some things fall out of the weighing cups because they are too big or too round.
NO: How do you weigh something really heavy like a bowling ball?

Another group discussed difficulties they had had in measuring liquids. These discussions helped students develop a fuller understanding of their experiences.

They drew pictures and made models of measuring devices with clay, Legos, rods, blocks and boxes and junk. During this phase as they recalled and explained, examined, defended and debated their experiences, questions arose. Teachers talked with individuals to clarify their questions and helped them to articulate what they wanted to know.

One student asked, "How do you measure the computer?" The teacher responded by asking for clarification, "What is it that you want to know about the computer? Do you want to know how tall the computer is? Or how heavy the computer is? Or how the computer can help you measure?" The student replied, "I want to know how tall is the computer?"

Another student asked, "How do you make measuring tape?" The teacher responded by asking him if he wanted to see how one worked or how to make one?" The student answered, "How do you make a measuring tape work?"

VM inquired, "How do you measure cars?" The teacher asked, "Do you want to know how long and how tall and how wide a car is to see if it will fit in a garage or what kind of measuring does a car tell the driver?" VM said he wanted to know what kind of measuring does a car tell a driver. For MW's question, "How far does the USA go," the teacher asked, "Do you want to know the longitude and latitude on a map or the area covered by the US?" MW said he wanted to know about longitude and latitude.

Teachers used the students' questions and their categories to form smaller study groups. Teachers grouped some individual questions under broader researchable questions.

Questions

What tools are used for measuring?

How do measuring tools work?

- WJ: How do you make a measuring tape work?
JN: How do scales work?

What things get measured?

- LS: How do they measure a TV? Do they put it on a scale?

JC: How tall are you?
HB: How do you measure wood? I think they tape measure.
TBP: How do people measure the parts in a computer?
BH: How do you measure cars to make a car?
KC: How do you measure wire?
MW: How far does the USA go? (longitude and latitude)
NB: How do you measure how long a planet is? On a globe?
PJ: How tall are computers?

How do you measure with measuring tools?

AC: Why sometimes it is hard to measure with a ruler?
SD: How many people can fit across the USA?

Why do we measure?

KW: Why do we have to measure?

Who measures what in our neighborhood?

CS: What does the Fire Institute measure? My guess is they measure hoses.
BK: What do people use for measuring water?
JK: Is the preschool still measuring wood?
VM: What kind of measuring does a car tell the driver?

The teachers guided the individual and small groups of students in researching their own questions. The entire class focused on the main question, “Who measures what in the neighborhood?”