

Sand Babies

Math Grows Up (Measurement)

Objective

Students will measure weight to the nearest pound and construct and interpret a bar graph. Students will measure length using non-standard units and determine area using square tiles.

Overview of the Lesson

Students have many motivating opportunities to explore and investigate measurement using standard and non-standard units. They round their birth weight to the nearest pound and construct a bar graph displaying the weights of the entire class. Students measure and place enough sand into a plastic bag to equal their birth weight. With construction paper, crayons and markers, they draw a head, arms, and legs and turn the bags of sand into sand babies. At centers, they investigate other types of measurement using non-standard plastic links to measure parts of their body and square tiles to measure the area of a footprint.

Materials

Teacher:

- Baby scale to measure pounds and ounces
- Sentence strip
- Scoop
- 5-10 index cards
- Sand
- Paper clips

Each Student:

- One gallon plastic bag
- Markers
- White construction paper
- Scissors
- Tape or glue
- Bulletin board paper (approximately 15 " by 18 ")
- Masking tape
- Multicultural crayons

Each Center:**Measuring Bodies**

- Bulletin board paper
- Paints
- Paintbrushes
- Lots of Links (plastic interlocking clips)
- Activity Sheet: Measuring Me

How Big is My Foot?

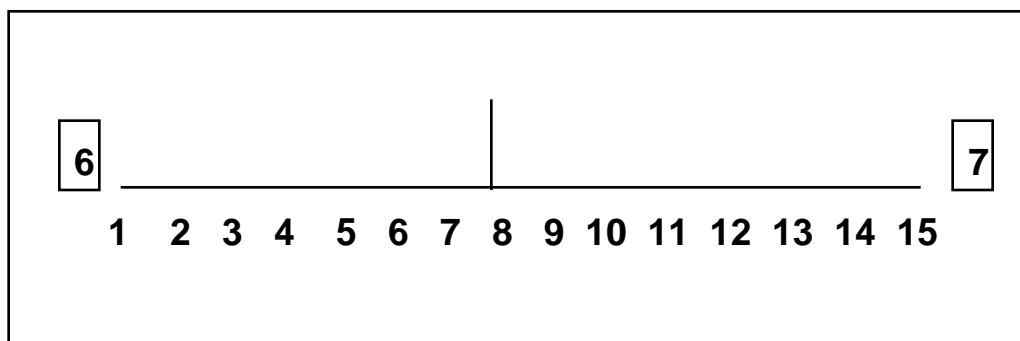
- Paper
- Marker
- Square tiles (different colors)

Procedure

Preparation: Several days before the lesson make a request that parents send their child's birth weight and length to school. As each student brings in the birth weight, write the weight on the back of a sticky note. Allow the students to draw pictures of their faces on the other sides of the sticky notes. Save these notes to use in the lesson.

Use a sentence strip to draw a scale depicting pounds and ounces. Label each ounce but leave enough room at each end of the scale to place an index card denoting pounds. Put a paper clip at each end so that cards representing pounds can be changed with each example. Examine the birth weight of the students and make cards to represent the pounds. The numbers will probably range from 5-10 but it would depend on premature births or very large babies. With a contrasting color

marker, make a dark line on the 8. For values 8 and above, students should round to the next pound. (See example below).



Place the illustration on the board. Call one student at a time up to the board. Give each student the birth weight sticky note that was made and announce the birth weight to the class. Ask the student to point to the place on the scale that represents his/her birth weight. Ask students to name which two whole pounds that the birth weight comes between, indicate the ounces, and determine which whole pound is closer to the actual weight.

Students use their sticky notes to create a bar graph drawn on the board denoting class birth weights. The sticky notes are placed one on top of the other to form the bars. After all of the students have placed the sticky notes onto the class graph, ask the students to determine the number of pounds that most of the children in the class weighed at birth. Have them further analyze the data by determining the least and greatest birth weights in the class.

Choose one student to come to the front of the classroom. Have the student place a one gallon plastic bag on the scale. Help the student to fill the bag with sand until it equals the student's birth weight. Seal the plastic bag. Have the student pass the bag around to other students so they may "feel" the weight of that child at birth. Wrap masking tape around the bag of sand to form the body of a baby. It should resemble a five pound bag of flour or sugar. Wrap the body in bulletin board paper. You may want to use pink for girls and blue for boys.

Students use white construction paper and multicultural crayons to draw a head, arms, and legs for the sand baby. They then tape or glue the body parts to the main body.

Students can then move to math centers to continue their explorations with measurement. To conserve time, it would be easier to work with about six students at a time in measuring the sand for the babies. Other students could work at the math centers or draw the body parts for the sand babies.

Centers:

Measuring Bodies

Students lay on large sheets of bulletin board paper while other students trace the outline of their bodies. They then paint their shapes to resemble their appearance. When working with primary students, it may be helpful to elicit some students in the intermediate grades to help. Tell the students to measure the length of their bodies, arms, and legs using Lots of Links and use Activity Sheet: Measuring Me to record the personal data. Encourage students to make an estimate before they do the actual measurement. Students will record their heights on a class chart so that they may compare his/her height to that of other students.

How Big Is My Foot?

Students are asked to bring in the largest footprint of a person in their house. They will determine the area of the footprint by covering it with square tiles. To aid the young students in counting the tiles, tell them to change colors each time that they count ten tiles. Each student will then make prints of his/her own feet and compare the area of their foot with the large footprints brought in from home.

Mathematically Speaking...

In the early primary grades, students need to have many experiences to investigate measurement with both standard and non-standard units. Teaching children to measure to the nearest centimeter, inch, or pound also helps to reinforce their number sense. For example, when students are rounding 7 pounds 4 ounces to the nearest pound, they first need to know where this number would be on a number line depicting pounds and ounces. They need to determine the two whole numbers between which the number would lie. If it is exactly in the middle, it would be rounded to the higher number.

When teaching students to make bar graphs, emphasize that both axes need to be properly labeled. The bar graph should also have a title. Young learners may need help in developing an appropriate scale for their bar graphs. In this lesson as in most beginning graphing lessons, the scale was one. With the appropriate data, scaling by 2, 5, and 10 can reinforce counting and number sense skills.

Extensions & Connections

Students may graph the data that they collected when measuring the area of the footprint. Students may make a line plot displaying the heights of the students in the class.

Resources

Multicultural crayons (found in local department stores).

Number Sense and Operations: Addenda Series, Grades K-6. (1993) National Council of Teachers of Mathematics. Reston, Virginia. ISBN 0-87353-319-4; #448E1B.

Ideas for Online Discussion

(Some ideas may apply to more than one standard of the NCTM Professional Standards for Teaching Mathematics.)

Standard 1: Worthwhile Mathematical Tasks

- How does this task promote student curiosity and increase their understanding in the area of measurement?
- How are the learning styles of students utilized in this lesson?

Standard 2: Teacher's Role in Discourse

- What methods are used by the teacher to set up opportunities for students to discuss the mathematics of this lesson?

Standard 3: Students' Role in Discourse

- In the lesson, the teacher asked who was taller. What evidence did the student present? What methods do you use to have students justify their reasoning?

Standard 4: Tools for Enhancing Discourse

- The early experience of creating a line plot for birth weight and bar graph for birth weight and height are experiences in gathering and interpreting data. Share some of the experiences you use in your classroom for graphing data about your students.

Standard 5: Learning Environment

- As a first grade teacher, this person seems to put a high premium on the learning environment created in the classroom. Give evidence to support the efforts made to show that students are encouraged to take risks, and display mathematical competence. How does she use physical space? How is collaboration used?

Standard 6: Analysis of Teaching and Learning

- What are some of the formative assessments the teacher can use to determine which students will need additional experiences in measurement?
- The students have recorded data about height on a chart. How can the teacher use this data at a later time to re-visit the skills used in this lesson?

MEASURING ME

NAME _____

DATE _____

My body is _____ lots of links long.

My arm is _____ lots of links long.

My leg is _____ lots of links long.

I am taller than _____ .

I am shorter than _____ .