

Button, Button

Instructional Decisions (Statistics)

Objective

Students will be able to classify, estimate and count buttons in a set.
Students will be able to construct and analyze a line plot.

Overview of the Lesson

This lesson begins by the teacher reading to the students, The Button Box, by Margarete S. Reid. This book introduces students to counting and classifying sets of buttons. Using their own button boxes filled with different buttons, students count and classify the buttons and record their discoveries in their own book titled, My Button Box. Students are asked to guess the number of buttons a pair of students could hold. Each pair takes a handful of buttons and makes a total count. With that information students are asked to make an estimate of the totals from other pairs of students in the class. Students examine and discuss the differences in making guesses and making estimates based on definitive information. Students create and analyze a class line plot of the data they collected.

Materials

Teacher:

- The Button Box by Margarete S. Reid
- Box filled with a variety of buttons
- Eight clear jars marked with the following labels:
Guess 1-15, Guess 16 to 30, Guess 31 to 45;
Guess Greater than 45, Estimate 1-15, Estimate 16 to 30;
Estimate 31 to 45, Estimate Greater than 45

Each Student:

- Activity Sheet: Box
- Buttons (a variety of shapes, colors, and sizes)
- Crayons
- Construction paper (Approximately 15" by 20")
- My Button Box book made from Activity Sheet: My Button Box

Each Student Pair:

- Two sticky notes (Use two different colors.)
- Two one inch cubes

Procedure

On the previous day, students constructed a box. These directions are included on Activity Sheet: Boxes. You could put buttons in any container, however. Before the class, fill each box with a large handful of buttons and place them on students' desks.

Read The Button Box by Margarete S. Reid to the class. This book is rich in number sense activities. As you are reading, ask questions about the story and the types of sets that were made with the buttons. Focus questions around such concepts as more than, less than, equal to, greatest, and least.

Show the class a button box filled with a variety of buttons. Discuss the different sets that can be made.

Have students use their own button boxes filled with buttons, and a large sheet of construction paper to define their workspaces. Encourage students to explore the different attributes of the buttons and classify them into sets. As they make different sets with their buttons, tell the class to count the buttons in each set and to use words to describe each set. Students should be able to describe their sorting factors.

Ask students to identify the smallest set and the largest set. They may also arrange the sets in order from smallest to largest or largest to smallest in their workspaces.

Use Activity Sheet: My Button Box to make each child a small blank book. Using crayons, students draw and record in this book the different sets that they made. On each page students write the number of buttons in the set and the name of the set. Have the students celebrate their books by sharing them with other children.

Divide the class into pairs. Ask the class to guess the number of buttons that a pair of students could hold if they each took a handful. Stipulate that no buttons can be showing in their closed hands. Allow each pair time to discuss their "good guess" and then have them write their guess on a sticky note.

Display four jars with the following labels written clearly on the front of the jars: Guess 1 to 15, Guess 16 to 30, Guess 31 to 45, and Guess greater than 45. After the students have written their guesses on the sticky notes, have them put an inch cube in the jar with the appropriate interval for their guess.

After all pairs of students have placed a cube in the "Guess" jars, hold up the cubes from the jar marked Guess 1 to 15. Show each cube and have the students count them aloud. Place each cube back in the jar as it is counted. Using a sticky note, write the total and place it on the jar. Follow the same procedure for the remainder of the jars. Ask the class to name the jars that had the most cubes and the least cubes. Also ask if any jars had the same number of cubes.

In pairs, have each student take a handful of buttons and count to determine how many buttons they could hold together. Remind the students that no buttons can be showing when they take their handfuls. Show the students four new jars with the following labels: Estimate 1-15, Estimate 16-30, Estimate 31 to 45, and Estimate greater than 45. If possible, these jars may be stacked on top of the "Guess" jars. Ask the students to use the information they learned from actually taking a handful and counting the buttons to estimate what they think the other pairs in the room had in their two handfuls. Each pair of students will write their estimate on another sticky note of a different color, and place an inch cube in the jar with the appropriate interval.

After students have placed the cubes in the "Estimate" jars, follow the same procedure as with the "Guess" jars. Count the cubes in each jar and place a sticky note with that number on the jar.

Have the students compare their "guesses" with their "estimates." Discuss why they might be different. Focus the students' attention on the concept that when they guessed, they did not have as much information as they did when they estimated. After completing the investigation, they were able to have a better idea of the number of buttons in two handfuls and could make a better estimate.

Using sticky notes for "estimates", create a class line plot of the data collected by the pairs of students. Have the students analyze the data and predict the number of buttons a pair of students from another first grade class might be able to hold.

Mathematically Speaking. . .

One way young children use to make sense of their world is to count and name things in their environment. Counting and classifying are two basic skills necessary to any study of data analysis. Early learners need experiences in sorting members of a set according to one attribute or variable. As they improve their classification and counting skills, the introduction of the Venn diagram may be useful. The format of the Venn diagram gives students an alternative method for classifying objects whose attributes cause it to belong in more than one set.

When making a good estimate, it is always helpful to have a benchmark. Showing students methods like using a benchmark or getting more information for making a good estimate is essential.

Extensions & Connections

Students could count the number of buttons on their clothes. They could make a class line plot displaying their data.

Students could collect a set of items from home and display the sets on a Venn diagram.

Have students use magazines and catalogs to find sets. The sets could be glued to a poster. Encourage students to label and count the members of the set.

Resources

The Button Box. Margarete S. Reid. Dutton Children's Books. (1990)
New York, New York.

Computer Software: *Data Insights*. Designed by Lois A. Edwards (Sunburst) and I.M. Keogh (Consultant).

Math in Motion: Origami in the Classroom. 2417 Vista Hogar. Newport Beach, California 92660. 714/721-0633 or 714/259-1999 Fax 259-7999.

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

- In the book, there is a distinction made between "larger" and "smaller" in two ways. How do you know that the student answering the question understood the distinction?
- Estimating, providing a benchmark experience, and then revising the estimate are key elements to developing estimation skills. Why are estimating skills an important part of number sense?

Standard 2: Teacher's Role in Discourse

- How did the teacher encourage students to use and apply mathematical language?
- What particular difficulties did you notice students were having from their discussions?
- When you ask students questions and only several respond, how do you ensure that other students understand the concepts presented?

Standard 3: Students' Role in Discourse

- How can you improve a student's ability to communicate mathematically?
- The teacher uses the same materials, buttons, in a variety of ways to make mathematical connections. State the various concepts/skills developed in the lesson. Include additional ideas for how to use buttons in a math lesson.

Standard 4: Tools for Enhancing Discourse

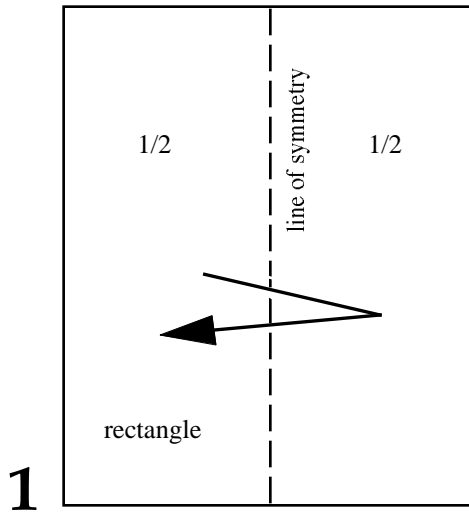
- Once the first estimates were placed in the jars, the students had a visual model which could then be counted. Discuss other visual models that the teacher used in the lesson, and how they might be extended.

Standard 6: Analysis of Teaching and Learning

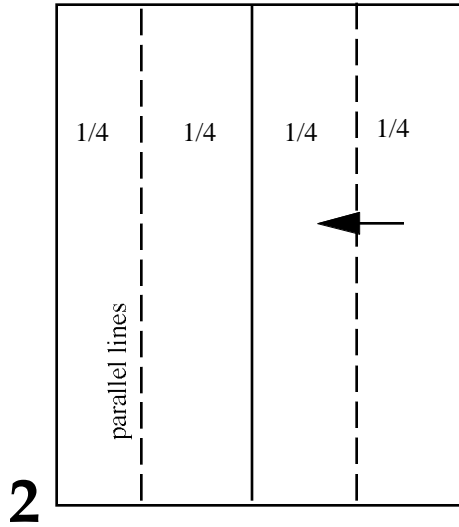
- The video teacher stated that breaking down directions for students is a combination of experience and knowledge of the students as learners. She related that when she first started teaching she gave all of the directions at one time. How do you give directions to your students?
- Each of us should constantly be analyzing the teaching, the tasks, the discourse and the classroom environment. Describe and comment on these elements in the Button, Button lesson.
- Create a few comments that could be reported to parents or administrators concerning the learning progress of students in this type of lesson.

Box

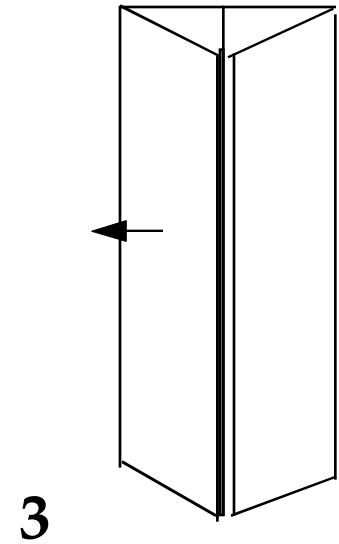
Fold in half lengthwise (Book fold). Unfold.



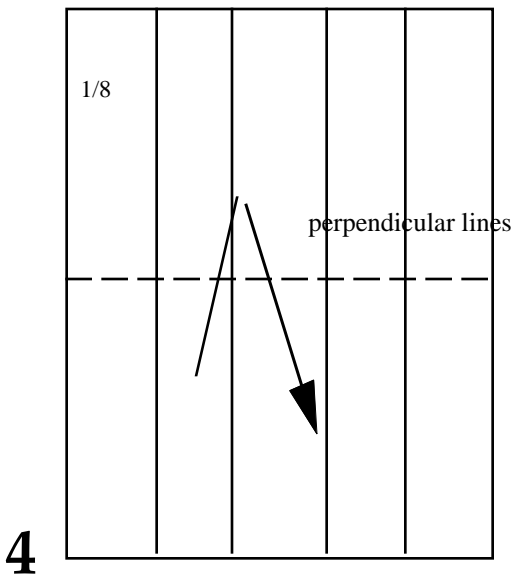
Bring longer edges to meet at the center crease (cupboard door fold).



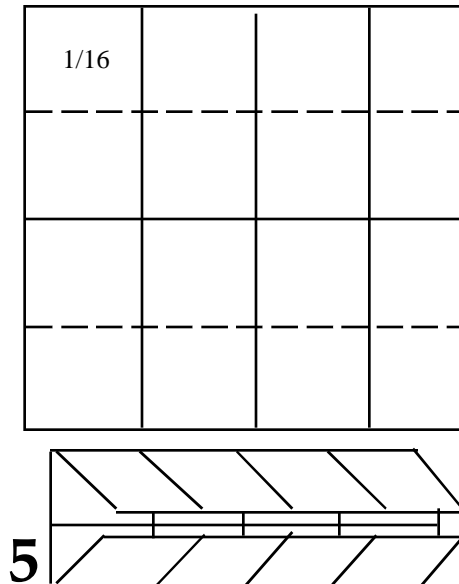
Unfold.



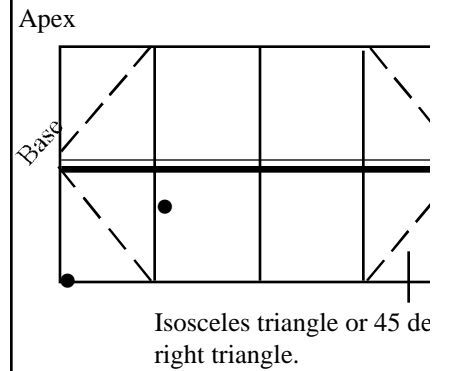
Book fold crosswise. Unfold.



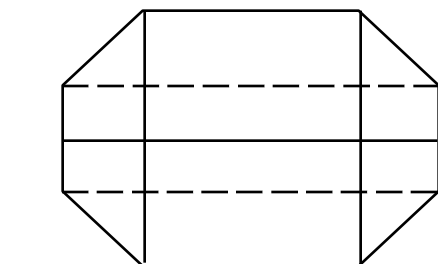
Bring shorter edges to meet at the crosswise crease. This time leave the folds in.



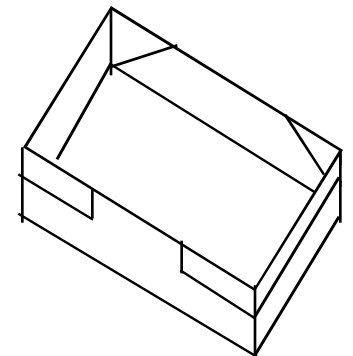
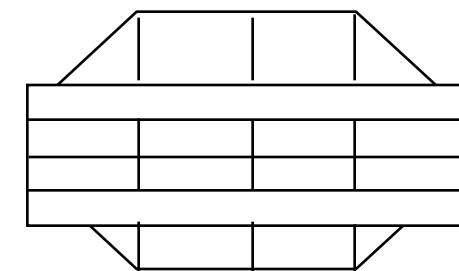
At each corner, bring the folded edge along the nearest crease. Note that the edges do NOT reach the crosswise crease.



Fold the cut edges of the paper outward, one up and one down, as far as you can over the corner flaps to hold them in place.



Place a thumb under each of the "hems" just made and pull them up and apart. The ends of the model will fold upward to become the ends of a box. Pinch the corners of the box to make them square.



Voila! A finished box!
Make another for a lid.

**MY
BUTTON
BOX**

BY _____

-----cut-----cut-----cut-----

**MY
BUTTON
BOX**

BY _____

This is a set of _____

_____ .

There are _____ buttons in this set.

-----cut-----cut-----cut-----

This is a set of _____

_____ .

There are _____ buttons in this set.

This is a set of _____

_____ .

There are _____ buttons in this set.

- - - - -cut - - - - -cut - - - - -cut - - - - -

This is a set of _____

_____ .

There are _____ buttons in this set.