

**About Classroom Routines**

## How Many Pockets?

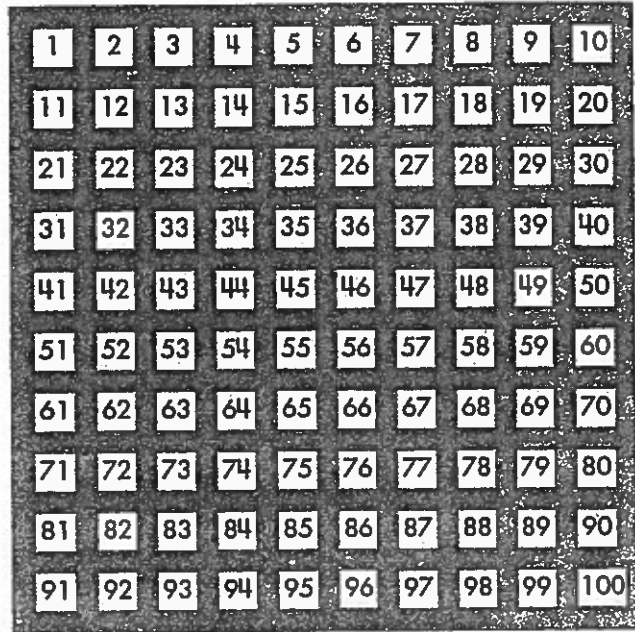
How Many Pockets? is one of the classroom routines presented in the grade 2 *Investigations* curriculum. In this routine, students collect, represent, and interpret numerical data about the number of pockets everyone in the class is wearing on a particular day. This often becomes known as Pocket Day. In addition to providing opportunities for comparison of data, Pocket Day provides a meaningful context in which students work purposefully with counting and grouping. Pocket Day experiences contribute to the development of students' number sense—the ability to use numbers flexibly and to see relationships among numbers.

If you are doing the full-year grade 2 curriculum, collect pocket data at regular intervals throughout the year. Many teachers collect pocket data every tenth day of school.

The basic activity is described below, followed by suggested variations. Variations are introduced within the context of the *Investigations* units. If you are not doing the full-year curriculum, begin with the basic activity and add variations when students become familiar with this routine.

### Materials

- Interlocking cubes
- Large jar
- Large rubber band or tape
- Hundred Number Wall Chart and Number Cards (1–100)
- Pocket Data Chart (teacher-made)
- Class list of names
- Chart paper



Hundred Number Wall Chart

How many pockets are we wearing today?		
	Pockets	People
Pocket Day 1		

Pocket Data Chart

### Basic Activity

**Step 1.** Students estimate how many pockets the class is wearing today. Students share their estimates and their reasoning. Record the estimates on chart paper. As the Pocket Days continue through the year, students may base their estimates on the data recorded on past Pocket Days.

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**Step 2. Students count their pockets.** Each student takes one interlocking cube for each pocket he or she is wearing.

**Step 3. Students put the cubes representing their pockets in a large jar.** Vary the way in which you do this. For example, rather than passing the jar around the group, call on students with specific numbers of pockets to put their cubes in the jar (for example, students with 3 pockets). Use numeric criteria to determine who puts their cubes in the jar (for example, students with more than 5 but fewer than 8 pockets).

**Step 4. With students, agree on a way to count the cubes.** Count the cubes to find the total number of pockets. Ask students for ideas about how to double-check the count. By re-counting in another way, students see that a group of objects can be counted in more than one way; for example, by 1's, 2's, 5's, and 10's. With many experiences, they begin to realize that some ways of counting are more efficient than others and that a group of items can be counted in ways other than by 1, without changing the total.

Primary students are usually most secure in counting by 1's, and that is often their method of choice. Experiences with counting and grouping in other ways help them begin to see that number is conserved or remains the same regardless of its arrangement—15 cubes is 15 whether counted by 1's, 2's, or 5's. Students also become more flexible in their ability to use grouping, which is especially important in our number system, in which grouping by 10 is key.

**Step 5. Record the total for the day on a Pocket Data Chart.** Maintaining a chart of the pocket data as they are accumulated provides natural opportunities for students to see that data can change over time and to compare quantities.

How many pockets are we wearing today?		
	Pockets	People
Pocket Day 1	41	29

### Variations

**Comparing Data** Students revisit the data from the previous Pocket Day and the corresponding cube level marked on the now-empty jar.

**On the last Pocket Day, we counted [give number] pockets. Do you think we will be wearing more, fewer, or about the same number of pockets today? Why?**

After students explain their reasoning, continue with the basic activity. When the cubes have been collected, invite students to compare the level of cubes now with the previous level and to revise their estimates based on this visual information.

Discuss the revised estimates and then complete the activity. After you add the day's total to the Pocket Data Chart, ask students to compare and interpret the data. To facilitate discussion, build a train of interlocking cubes for today's and the previous Pocket Day's number. As students compare the trains, elicit what the cube trains represent and why they have different numbers of cubes.

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**Using the Hundred Number Wall Chart** Do the basic activity, but this time students choose only one way to count the cubes. Then introduce the Hundred Number Wall Chart as a tool that can be used for counting cubes. This is easiest when done with students sitting on the floor in a circle.

To check our pocket count, we'll put our cubes in the pockets on the chart. A pocket can have just one cube, so we'll put one cube in number 1's pocket, the next cube in number 2's pocket, and keep going in the same way. How many cubes can we put in the first row?

Students will probably see that 10 cubes will fill the first row of the chart.

One group of 10 cubes fits in this row. What if we complete the second row? How many rows of the chart do you think we will fill with the cubes we counted today?

Encourage students to share their thinking. Then have them count with you and help to place the cubes one by one in the pockets on the chart. When finished, examine the chart together, pointing out the total number of cubes in it and the number of complete rows. For each row, snap together the cubes to make a train of 10. As you do so, use the rows to encourage students to consider combining groups of 10. Record the day's total on the Pocket Data Chart.

**Note:** If cubes do not fit in the pockets of the chart, place the chart on the floor and place the cubes on top of the numbers.

**Finding the Most Common Number of Pockets** Each student connects the cubes representing his or her pockets into a train. Before finding the total number of pockets, sort the cube trains with students to find out what is the most common number of pockets. Pose and investigate additional questions, such as:

- How many people are wearing the greatest number of pockets?
- Is there a number of pockets no one is wearing?

- Who has the fewest pockets?

The cubes are then counted to determine the total number of pockets.

**Taking a Closer Look at Pocket Data** Each student builds a cube train representing his or her pockets. Beginning with those who have zero pockets, call on students to bring their cube trains to the front of the room. Record the information in a chart such as the one shown here. You might make a permanent chart with blanks for placing number cards.

<u>0</u> people have 0 pockets.	<u>0</u> pockets
<u>4</u> people have 1 pocket.	<u>4</u> pockets
<u>2</u> people have 2 pockets.	<u>4</u> pockets
<u>2</u> people have 3 pockets.	<u>6</u> pockets

Pose questions about the data, such as, "Two people each have 2 pockets. How many pockets is that?" Then record the number of pockets.

To work with combining groups, you might keep a running total of pockets as data are recorded in the chart until you have found the cumulative total.

We counted 12 (for example) pockets, and then we counted 6 pockets. How many pockets have we counted so far? Be ready to tell us how you thought about it.

As students give their solutions, encourage them to share their mental strategies. Alternatively, after all data have been collected, students could work on the problem of finding the total number of pockets.

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**Graphing Pocket Data** Complete the activity using the Variation, Finding the Most Common Number of Pockets. Leave students' cube trains intact. Each student then creates a representation of the day's pocket data. Provide a variety of materials, including stick-on notes, stickers or paper squares, markers and crayons, drawing paper, and graph paper for students to use.

These cube trains represent how many pockets people are wearing today. Suppose you want to show our pocket data to your family, friends, or students in another classroom or even at a different school. How could you show our pocket data on paper so that someone else could see what we found out about our pockets today?

By creating their own representations, students become more familiar with the data and may begin to develop theories as they consider how to communicate what they know about the data to an audience. Students' representations may not be precise; what's important is that the representations enable them to describe and interpret their data.

### Comparing Pocket Data with Another Class

Arrange to compare pocket data with a fourth or fifth grade class. Present the following question to the students:

**Do you think fifth grade students wear more, fewer, or about the same number of pockets as second grade students? Why?**

Discuss students' thinking. Then investigate this question by comparing your data with data from another classroom. One way to do this is to invite the other class to participate in your Pocket Day. Do the activity first with the second graders, recording how many people have each number of pockets on the Pocket Data Chart and finding the total number of pockets. Repeat with the other students, recording their data on chart paper. Then compare the two sets of data.

**How does the number of pockets in the fifth grade compare to the number of pockets in second grade? Why?**

Discuss students' ideas.

**Calculate the Total Number of Pockets** Divide students into groups of four or five. Each group determines the total number of pockets being worn by the group. Data from each small group are shared and recorded on the board. Using this information, students work in pairs to determine the total number of pockets worn by the class. As a group, they share strategies used for determining the total number of pockets.

In another variation, students share individual pocket data with the group. Each student records this information using a class list of names to keep track. They then determine the total number of pockets worn by the students in the class. Observe how students calculate the total number of pockets. What materials do they use? Do they group familiar numbers together, such as combinations of 10, doubles, or multiples of 5?