The Sharing Beans with Friends activity helps young students think about numbers and contributes to their development of number sense.

**Activity objectives**
- Before reading the story, students will communicate what they already know about the number 13.
- While reading the story, students will decompose the number 13 by dividing one group of thirteen beans into smaller fair-share groups.
- After dividing the beans among various numbers of story characters, students will predict what will happen next in the story (possibly making mathematical conjectures).
- Students will represent their mathematical findings with concrete objects, drawings, verbal explanations, and written number sentences.

**Materials**
- 3 × 5-inch index cards—six for each pair of students
- Sets of thirteen large dried beans (lima or fava), or other small objects for counting (such as Unifix® cubes)—one set for each pair of students
- Sandwich bags or cups for organizing the sets of beans or other counting objects
- Recording sheet—one for each student

**Sequence of steps**
1. Prereading: Ask students what they know about the number 13. Encourage them to respond to one another’s ideas and record their ideas on chart paper. If a document projector is available, use it to introduce and share the book *Bean Thirteen* (McElligott 2007). Examine the cover and facing pages. Add more ideas to the chart paper as the illustrations stimulate students’ thoughts. Count the beans on the title page together.
2. After distributing materials, allow time for exploration. (Relatively unstructured exploration time proactively helps avoids issues of inattention that may result from moving too quickly into the more structured activity.)

Students should work in pairs, at tables if possible. Let them know how long they will have to explore (e.g., five minutes) and communicate expectations, such as keeping all materials visible on the table and in their shared work space, and taking turns handling the beans. Encourage students to make observations, ask questions, and discuss their observations.

3. After students have explored the materials, read the first six pages of the story, to Flora’s division of the beans into two piles of six (with one leftover) and Ralph’s insistence that he will not eat bean thirteen. (“I’m not eating it,” said Ralph, “and you can’t make me.”)

4. Have students set out the cards for Ralph and Flora on the table in front of them. Ask them to separate the thirteen beans into two batches with an equal number of beans in each. Is it possible? Encourage them to talk about the results, first in pairs and then during whole-class discussion. Record the corresponding number sentences (e.g., $6 + 6 + 1 = 13$) on chart paper, and have them use their recording sheets.

5. Read three more pages, up to Flora and Ralph’s division of the beans into three mounds. Ask students to regroup the thirteen beans into one pile and include April’s card on the table in front of them with Ralph’s and Flora’s. Ask them to share the beans equally among Ralph, Flora, and April. Students may distribute the beans as though they are dealing cards, or they may try to make small groups of beans and then check the number in each group. If students are reluctant to discuss the processes they used to group the beans and their mathematical observations, stimulate the conversation and probe their thinking with questions such as the following:

- What did you do to divide the beans?
- Are there still thirteen beans altogether?
- What number sentence would show the way the beans are grouped now? (One possibility is $4 + 4 + 4 + 1 = 13$.)
- Did you get the same result as Ralph and Flora did? (Show the illustration.)
6. Continue by reading through “I do,” said Ralph. “Bean thirteen is trouble.” Have students regroup the thirteen beans and repeat the process of adding a card (for Joe), dividing the beans, discussing results, and writing a number sentence.

7. Ask students what they think will happen next. At this point in the story, students may predict that Ralph and Flora will invite another friend. Press for their thoughts on what will happen when the beans are divided among the friends. (Responses will vary. Students may conjecture that they will always have one “leftover” bean.) Regroup the beans into one pile and repeat the process of adding a card (for Meg) and making equal shares. Students may have difficulty with dividing the beans into five groups because the number of leftovers will be greater than the number of beans each character receives. (Each friend has an equal share of two, and three beans are leftover.) Have students discuss their findings. They may be surprised at the “different” results. After the discussion, record the number sentence.

8. Continue reading through Flora’s phone call to Rocco (“Don't panic,” said Flora. “I’m calling Rocco. He eats everything.”). Have students put the beans back together into one pile, add Rocco’s card to the others, and again divide the beans among the friends. Share results, and write the corresponding number sentence.

9. Continue reading to where the characters put beans on their own plates. Discuss how the characters actually shared the beans.

- Why do the insects (and one worm) have different amounts (numbers) of beans?
- How was their way of sharing the beans different from what we call equal shares?
- Who ate bean 13?

10. Finish reading the story.

Close the activity by going back to the chart paper with students’ ideas about the number 13. Encourage students to discuss patterns they see in their number sentences and extend the pattern beyond what the book presents. For example, share among seven friends, eight friends, and so on. How many friends would have to be at the dinner for everyone to have the same number of beans with no leftovers? Add the new number sentences to the chart.

## Sharing Beans with Friends

**Activity based on Bean Thirteen by Matthew McElligott**

**Directions:** As you follow along with the story, record the number of beans each friend will have for dinner and write a number sentence to represent the groupings of beans.

<table>
<thead>
<tr>
<th>Number of friends</th>
<th>Drawing of Friends’ Equal Shares</th>
<th>Extra bean(s)</th>
<th>Number sentence</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>RALPH</td>
<td>FLORA</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>RALPH</td>
<td>FLORA</td>
<td>APRIL</td>
</tr>
<tr>
<td>4</td>
<td>RALPH</td>
<td>FLORA</td>
<td>APRIL</td>
</tr>
<tr>
<td>5</td>
<td>RALPH</td>
<td>FLORA</td>
<td>APRIL</td>
</tr>
<tr>
<td>6</td>
<td>RALPH</td>
<td>FLORA</td>
<td>APRIL</td>
</tr>
</tbody>
</table>

Recording sheet by Clare V. Bell, illustrated by Matthew McElligott.