Different Ways to Make a Number

The focus of the lesson is making numbers (1–10) using different combinations of beads. Students play How Many Ways?, a game in which they use both rows on the number rack to show quantities of beads.

Learn About Your Students

You might see or hear students:

- Counting beads by counting on from a number (e.g., 5... 6, 7, 8)
- Showing the same number of beads in different ways (e.g., 8 can be shown as 5 and 3, 7 and 1, 4 and 4, or 6 and 2)
- Changing from one quantity of beads to the next quantity without returning to the start position or counting one by one
- Instantly recognizing the number of beads based on the structure of the number rack.

You'll Need

- demonstration number rack (optional)
- student number racks
- scratch paper or student whiteboards with markers and erasers
- P3: Number Rack Combinations Chart (optional)
- Task Card 3: How Many Ways?

Learning Targets

Content

I can show the same number in different ways.

Practice

I can notice and describe patterns in related problems.

Teach

1 Explain to the students that they'll use their number racks to show different numbers. Remind them to slide their beads to the notched side for the starting position.

2 Ask students to show 8 using just one row.

Challenge students to show 8 with just one slide of the beads. Watch as they work and take note of a student who can demonstrate for the group in the next step.

3 Invite a volunteer to show 8 beads with just one slide. Then call on students to share how they know there are 8 beads shown.

If no one in your group showed 8 beads with one slide in step 2, model this yourself with input from the group. For example, you might ask, "Hmm… if I slid over all of the red beads, that would be how many?" (5) "Then, 5 red beads and 1 more white bead would be …?" (6) "I know! What if I use 5 red beads and 3 white beads?" (5… 6, 7, 8)

4 Ask students to return the beads to the start position and then show 8 using both rows. Have students share and compare their racks with a partner. Then invite at least two students to use both rows to make 8.
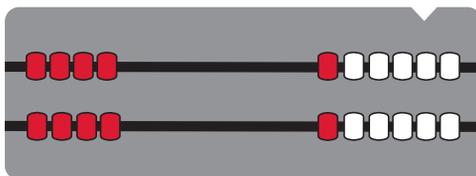
Four on top plus 4 on bottom is 8.   *Five on top plus 3 on bottom is also 8.*

5 Repeat step 3 and 4 with the following numbers, in this order: 5, 3, 10, 2, 7, 9.

- As students change from one number to the next, make note of those who can show new numbers by adding to or taking from the current amount, and those who return to the start position or count beads one by one. Encourage students to try to change from one number to the next without starting over, if possible.

- Solicit at least two different ways to show each number.

💡 Support

If students are counting beads one by one, ask them to show numbers between 0 and 5. Encourage them to use as few slides as possible. Return to one row of beads if needed.

💡 Support

If students need support showing a number with two rows, ask them to begin by showing a number with only the top row. From there, they can find a way to show the number using both rows.
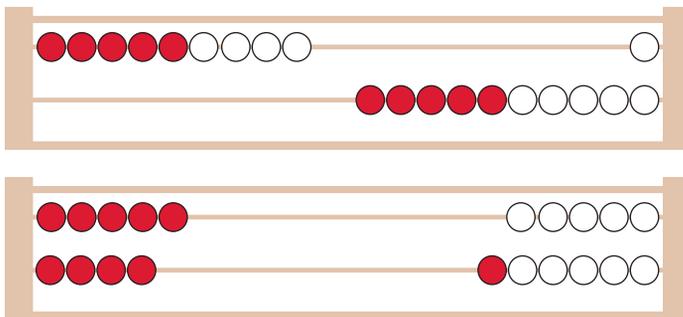
I can show 9 on one row. If I slide the 4 white beads back, I can replace them with 4 red beads on the bottom.

⚡ Challenge

If students are showing quantities to 10 efficiently and with ease, ask them to show numbers between 10 and 20.

6 Invite students to work alone or with a partner to find as many ways as they can to show 6 with two rows. Model how to create a table and fill in the first row. Students can record their own tables on scratch paper or student whiteboards to keep track of their work.

top	3	4	2
bottom	3	2	4
total	6	6	6

⚡ Challenge

Invite students to verbalize an equation to represent each combination of beads. Model how to record the equations.
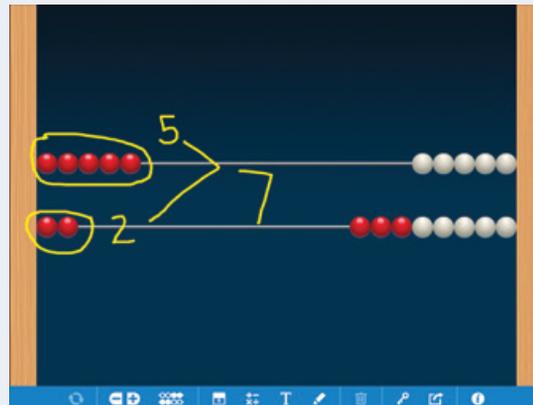

$$3 + 3 = 6$$
$$6 = 3 + 3$$
3 plus 3 equals 6

APP TIP

Students can use the Pen tool to show how they built each number. For more on the annotation tools in the Number Rack app, refer to page 152.

7   Pause at some point and invite students to suggest a structure for organizing the chart to make sure you are recording all of the possibilities. Begin the new chart and use it to record all combinations that make 6. Because students were asked to use both rows, you are unlikely to record 6 and 0 as combinations: but if students suggest that combination, include it in the chart.

top	1	2	3	4	5
bottom	5	4	3	2	1
total	6	6	6	6	6

8   When the chart is complete, ask students to talk first in pairs and then as a group about what they notice. Ask:

- Did you find any patterns in the chart? (There are matches, like 1 and 5 and 5 and 1; Every time you add a bead on top, you take 1 away from the bottom to keep the total 6.)

- Did we find all of the ways to make 6? How do you know?

- Can you predict the number of ways to make a sum for any number?

9   After students have explored making combinations for different numbers with the How Many Ways? Task Card, consider revisiting some of the questions from step 8 during another session or with specific students as appropriate.

Extend

Share Task Card 3: How Many Ways? and invite students to play with a partner.

Directions

1. Players choose a target number.
2. Player 1 builds the number on the number rack, using two rows, and shares with Player 2.
3. Player 2 builds the same number a different way and shares with Player 1.
4. Players go back and forth until they can't think of a different way to make the number.

Change It Up

- Work independently.
- Play with any number to 20.
- Play to make all combinations of 5 or 10. Show your work on a chart. Find an optional recording sheet in Lesson 3.

top	1	2	3	4	5	6	7	8
bottom	8	7	6	5	4	3	2	1
total	9	9	9	9	9	9	9	9

- Player 1 builds a number. Player 2 tries to make the number with a Doubles combination (e.g. 1 + 1, 2 + 2... 10 + 10).

Questions To Ask

- Did you find all the ways? How do you know?
- Can you predict the number of ways to make any number?
- If you are charting the ways to make your number, are you finding any patterns?