Adding Equal Rows in Arrays

Teacher		**Class**	Grade 2
Subject	Math	**Topic**	Arrays
Date		**Room**	
Lesson length	60 minutes	**Country**	United States

Students learn to find an array total by adding equal rows. They build arrays and write the matching addition equation.

Curriculum links

- Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends. [1]

Learning objectives

- Students will find the total of arrays up to 5 by 5 by adding equal rows.
- Students will write the total as an equation with equal addends.

Success criteria

- I can count the rows and how many are in each row.
- I can add the equal rows to find the total.
- I can write the total like 4 + 4 + 4 = 12.

What students already know

Hold up 2 groups of 3 counters. Ask: How many in each group? Are they the same? What is 3 + 3? Listen for equal groups and 6.

Key words

array	things lined up in neat lines across and down [3]
row	a line that goes across, side to side [3]
column	a tall line that goes up and down [13]
equal	exactly the same amount or size
equation	a number sentence that shows a total, using + and =

Materials

- counters in two colors
- 5-by-5 grid mats
- paper, pencils and crayons
- Slides 1-11
- Worksheet Task C copies
- mini whiteboards and markers

Before the lesson

- Print Worksheet Task C, one copy per student, plus a few extra
- Load Slides 1-11 and test Video clip 5 (0:00-3:25) with sound
- Set out counters, grid mats, paper and pencils for pairs
- Make space to model an array where all students can see

Lesson outline

0–10 min **Starter** 10 min · Whole class

Hook students and review fast counting with equal rows.

YOU DO

1. Tip mixed counters on a tray and say the hook to spark ideas.
2. Show Slide 1 and read the title together.
3. Show Slide 5 and take a class vote on which array to build.
4. Build the voted array live, pointing to each row while the class adds.

STUDENTS DO

1. Vote for which array to build from Slide 5.
2. Count aloud row by row with the teacher.
3. Turn and tell a partner why neat lines are faster than mixed piles.

Say: My counters got all mixed up! How can we line them up so we can count them fast and not miss any? We will line them up in neat lines that are all the same. We count one line, then add that number again and again.

Worked example: Vote picks 3 rows of 2 crayons. Make Row 1 = 2, Row 2 = 2, Row 3 = 2. Point and add: 2, then 2 + 2 = 4, then 4 + 2 = 6. Write 2 + 2 + 2 = 6. Total is 6.

Ask: How should we line up mixed counters to count fast? (Line them up in neat equal rows.) · If we have 3 rows of 2, what do we add? (2 + 2 + 2 = 6.)

Check understanding: Thumbs up if you can say how many are in one row. If not, rebuild with 2 rows of 3 large counters and count again.

Support: Use only 2 large rows and count one row at a time with finger pointing. **Stretch:** Ask what the total would be if we added one more full row of 2.

Use: Slides 1, 5

10–22 min **Teaching** 12 min · Whole class

Model how to see rows and write row-by-row addition.

YOU DO

1. Show Slide 3 and have students sweep hands across for rows and down for columns.
2. Show Slide 4 and read the steps for adding an array.
3. Build 3 rows of 4 counters on the grid mat, with up to 5 rows and up to 5 columns [1].
4. Play Video clip 5 (0:00-3:25), then repeat its row check with the class model.

STUDENTS DO

1. Sweep hands across to show rows and down to show columns.
2. Watch the video and point to rows on the class array.
3. Say the equation with the teacher: 4 + 4 + 4 = 12.

Say: Rows go across, side to side [3]. Columns go up and down tall [13]. An array is made when items are in rows and columns, with every row the same length [3]. We count how many are in one row, then add that same number for each row.

Worked example: 3 rows of 4. One row has 4. Point to each row: 4, 8, 12. Write 4 + 4 + 4 = 12. The sum uses equal addends and the total is 12.

Ask: Which way do rows go, and how do we count them? (Rows go across, side to side [3]; count them top to bottom.) · There are 3 rows of 4. What equation shows the total? (4 + 4 + 4 = 12.)

Check understanding: All students write 4 + 4 + 4 = 12 on mini whiteboards and hold up. Reteach one row count if equations show 2 or 4 addends.

Support: Cover two rows, add the first two, then uncover the third and add on. **Stretch:** Ask students to say the running total after each row: 4, 8, 12.

Use: Slides 3-4, Video clip 5 (0:00–3:25)

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22–32 min **Guided practice** 10 min · Whole class

Practice finding totals together with real array pictures.

YOU DO

1. Show Slide 7 array cards one by one.
2. For each card, ask pairs to count rows and count one row.
3. Model pointing to each row while the class adds aloud.
4. Write each equal-addends equation where all can see it.

STUDENTS DO

1. Study each card and count rows and one full row with a partner.
2. Add row by row aloud and read the equation.
3. Check that every row is the same length and every column is the same length [3].

Say: Look at the picture. How many rows going across? How many in one row? Now we add that same number for each row. Point with me and say the adding sentence.

Worked example: Egg Carton holds 2 neat rows with 5 in each row. One row = 5. Add: 5 + 5 = 10. Total is 10 eggs. Baking Tray holds 3 neat rows with 4 in each row. Add: 4 + 4 + 4 = 12. Total is 12.

Ask: The egg carton shows 2 rows of 5. What is the equation? (5 + 5 = 10.) · Why can we add 4 + 4 + 4 for the baking tray? (Because each row has the same number, 4.)

Check understanding: Cold-call pairs to read each equation and point to the rows. If mixed up, go back to counting one full row first.

Support: Give the frame: There are __ rows of __. I added __ + __ = __. **Stretch:** Ask which card has the largest total and how they knew without counting one by one.

Use: Slide 7

32–50 min **Main activity** 18 min · Pairs

Let pairs build arrays and record equal-addends equations.

YOU DO

1. Show Slide 9 and explain the pair task: build, add, write, draw.
2. Hand out grid mats, counters, paper and Worksheet Task C.
3. Circulate, ask pairs to point to rows as they add, and check equations.
4. Pick two arrays to share, including one with 3 rows and one up to 5 by 5 [1].

STUDENTS DO

1. Build a rectangular array on the mat with up to 5 rows and up to 5 columns [1].
2. Point to each row, add the equal rows, and write the equation on paper.
3. Complete Worksheet Task C by reading each array and adding the equal rows.

Say: With your partner, build a neat array with up to 5 rows and up to 5 columns. Keep rows going across and columns going up and down. Count one row, add row by row, and write it like 4 + 4 + 4 = 12.

Worked example: Pair builds 3 rows with 4 in each row. Touch Row 1: 4. Touch Row 2: 4 + 4 = 8. Touch Row 3: 8 + 4 = 12. Write 4 + 4 + 4 = 12 and draw the dots to match.

Ask: How many rows did you make and how many in each row? (For example, 3 rows with 4 in each row.) · What equation matches your array? (For example, 4 + 4 + 4 = 12.)

Check understanding: Collect whiteboards or papers and match drawing to equation. If mismatched, have pair rebuild and recount one row.

Support: Start with only 2 rows and use two colors of counters so each row is easy to see and add. **Stretch:** Build a 5-row array and predict the total before placing the last row, then check by adding.

Use: Slide 9, Worksheet Task C

50–60 min **Plenary** 10 min · Whole class

Review learning and check each student can show an array total.

YOU DO

1. Show Slide 10 and have class read the fact together.
2. Show Slide 2 and add the biggest 5 by 5 array together [1].
3. Show Slide 11 and set the 4-row exit draw and write task.
4. Collect exit tickets and name who met the success lines.

STUDENTS DO

1. Read the fact and add 5 + 5 + 5 + 5 + 5 = 25 together.
2. Draw a 4-row array with up to 5 in each row and write its equation.
3. Finish the sentences: One thing I learned today... One question I still have...

Say: An array is neat rows with the same number. That is why you can add rows to get the total fast. Now show me on your own. Draw a 4-row array and write its adding equation.

Ask: Why can we add rows to find the total fast? (Because every row has the same number.) · For 5 rows with 5 in each row, what is the equation? (5 + 5 + 5 + 5 + 5 = 25. [1])

Check understanding: Read exit tickets for correct 4-row drawing and equal-addends equation. Pull a small group to rebuild 2 rows if needed tomorrow.

Support: Let students draw on grid paper and trace one row first before adding. **Stretch:** Ask students to make a different 4-row array with a different total and compare equations.

Use: Slides 2, 10-11

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Common mistakes

Mistake	How to spot it	How to fix it
Calling uneven groups an array and adding different numbers.	Equation has unequal addends like 4 + 3 + 5, or drawing has ragged rows.	Check every row is the same length [3]. If not, it is not an array — fix the rows, then add again.
Mixing rows and columns when counting.	Student counts up and down for rows or writes 3 addends for 4 rows.	Trace across for rows, side to side [3], and down for columns [13]. Count rows top to bottom.
Writing the wrong number of addends, like three 4s for 2 rows of 4.	Drawing shows 2 rows but equation shows 4 + 4 + 4.	Point to each row and say one 4 per row. Cross out the extra 4 and re-add 4 + 4 = 8.

Support

- Start with only 2 rows and use two colors of counters so each row is easy to see and add.
- Use sentence frames and grid mats, and have the LSE point to each row while the student adds.

Stretch

- Build a 5-row array and predict the total before placing the last row, then check by adding.
- Make a second array with the same total but a different number of rows and compare equations.

For the LSE or teaching assistant

Stay with the focus pairs during main activity. Help them line up counters, point row by row, and say the equation aloud before writing.

Check for understanding

Question	Answer
Draw 3 rows of 4 dots. Write the equation and total.	4 + 4 + 4 = 12; total 12.
An array has 2 rows of 5. Write the equation and total.	5 + 5 = 10; total 10.
How do you know a picture is an array you can add by rows?	It has equal rows and columns with every row the same length [3].

Homework

Draw one small array at home with up to 5 rows and write its equal-addends equation.

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