MGSE2.OA.4 Video Transcript

00:01
[Opening Music]

00:11
This video will deconstruct the Georgia Standards of Excellence, 2.OA.4, which focuses on working with equal groups of objects to gain foundations for multiplication.

00:28
2.OA.4 states that students will use addition to find the total number of objects arranged in rectangular arrays, with up to five rows and up to five columns. Students will write an equation to express the total as a sum of equal addends. Students explore this concept with concrete objects, as well as pictorial representations on grid paper or other drawings.

00:53
First grade students begin to develop a foundation for 2.OA.4 by understanding the meaning of the equal sign, and that each side of an equation represents the same amount.

01:05
Kindergarten and first grade students also begin to develop number sense by subitizing, which is the ability to group objects and see patterns without having to count each object one by one. For example, a student might see the dots as three plus three plus one, or five plus two, which both equal seven.

01:24
Greg Tang's grapes of math is a great tool for encouraging students to see patterns and organize objects, without counting one by one. This riddle states, "Don't just group the ones you see, consider where a snail should be."

01:38
While on the next example, students are encouraged to “Find a square, before you count. Soon you'll see the right amount.”

01:47
With a strong foundation in early grades, third grade students begin to relate their understanding of arrays, equal groups, and other models to multiplication, which is a major focus in third grade.

1:59
To build conceptual understanding of equal groups and arrays, students should have plenty of opportunities to explore and create. For example, these counters can be divided into equal groups, which then can be arranged into rows and columns.

02:15
As students build rectangular arrays. They determined the quantity by using repeated addition, a building block for multiplication in third grade. Due to the commutative property of addition, students can either add the rows or the columns and still arrive at the same solution.

02:32
In the upcoming video you will see how students matched arrays with the corresponding repeated addition sentences.

02:38 (Video)

Teacher: So, with this array, we would have four… how many times? 1, 2, 3, 4, 5 times. Does this (pointing to array) show four, five times?
Student (picking up card with 4 + 4 + 4 + 4 + 4)
Teacher: Which one would that go to?
Student: This one?
Teacher: Ok. And this one… We have two, five times.
Teacher: So, what about these over here? Can any of these arrays have two different number sentences?
Student (picking up card with 4 + 4 and moving it to the array with 2 + 2 + 2 + 2): I found it. I actually found it.
Teacher: That's right. This one is 2 + 2 + 2 + 2 or 4 + 4.

03:27 (Video)
Student: This goes 2 + 2 + 2.
Teacher: What about this one?
Student: This one is 3 + 3.

03:36
As students create their own repeated addition equations, they begin to see connections on how the equations are related. The student first wrote four plus four equals eight, to show that there were two columns with four in each. He then wrote an equation to show that the same array could also be written as four rows of two. Check out his discovery, after he wrote the equations, side by side.

04:00 (Video)
Teacher: So, how many were in the first column?

Student: 4.
Teacher: 4. So, let's write that here. So, when we do that , we're adding our columns together.
Student: 4 + 4.
Teacher: So, how many total footballs?
Student: 8.
Teacher: When we go across, what do we call that?
Student: Umm…
Teacher: Remember (pointing to student's previous work)…
Student: Oh, this is… This is rows!
Teacher: 27. So, what numbers has he hopped on so far? He started on 7, then went to…
Students with teacher: 12, 17, 22, 27.
Teacher: A row!
Student: The row.
Teacher: Good. So, draw your lines for your rows.
Student (counting as he draws lines for his rows): 1, 2, 3, 4.
Teacher: That's right, we have four rows. Now, write a number sentence for our rows. So, here's a group of two… here's a group of two…
Student: 2 + 2 + 2 + 2
Teacher: Now, how much is that? Let's count by twos. Look… do you know how to count in a pattern? By twos?
Teacher: Two, four, six… eight.
Teacher (repeating the count): 2, 4, 6, 8.
Student: Oh…
Teacher: What do you notice?
Student: Eight?
Teacher: It's eight… This one was eight, too! We have the same amount.
Student (excitedly): This is 2 + 2 = 4.
Teacher: Good!
Student: And these two… this is one four!
Teacher: Yes!
Student: This is two (pointing to the two twos on the right)… This is four.
Teacher (pointing to the expression 4 + 4): Like that?
Student: Yes!
Teacher: Very good!

05:24
Now, let's take a look at some additional engaging classroom tasks and games. In array bingo, students create a four by four array with their cards. When a number is called, students find the array that has the same sum. While playing the game, students can be encouraged to use sentence frames to state the quantity in each row and column, which then leads to the final sum.

05:50 (Video)
Student (spinning the spinner): 12.
Teacher: 12…
Student: I mean 15…
Teacher: 15… Can you find an array that shows fifteen?
Student: Found it!
Teacher: What does it look like? Describe what your array looks like.
Student 2: Three rows of five.
Teacher: Three rows of five!

Teacher: You almost have four in a row. What else do you need?
Student: 12.
Teacher: You need 12?
Student 2: I need five… for two (different cards).
Teacher: What do you need?
Student 3: I need eight and five.
Teacher: What about in this row? You're very close…
Student (counting by fives): 25.

06:35
In Spin an Array, students use spinners to determine the number of rows and columns their array will have.

06:42
After building their array, they write repeated addition equations and cover the sum on the game board.

06:48
With the building arrays task, students are given a quantity that they can build with different rectangular arrays. Students discover that quantities can be represented in different ways, and

that not all quantities can be divided into the same number of equal groups. How many different ways can you build an array with 18 tiles?

07:07 (Video)
Teacher: How did you build your array?
Student 1: I, I kept. I started with four rows… and then I realized that doesn't… that can't use all eighteen. Then, I took away one and got three and I realized it used all 18, so....
Teacher: So, what's your repeated addition?
Student 2: 6 + 6 + 6
Teacher (to student nearby): Is your array the same or different?
Student 2: Different.
Teacher: How many rows do you have?
Student 2: Umm…. Umm… Six.
Teacher: How many in each row?
Student 2: Three.
Teacher (after students move arrays closer together): Do your arrays look alike?
Both Students: Yeah.
Teacher: You both end up with 18, but you (Student 1) have 6 + 6 + 6, and you (Student 2) have 3 + 3 + 3 + 3 + 3 + 3. Do you think there's another way to make 18? See if you can build an array a different way.

Student 2: I can do 9… because 9 + 9 also equals 18.

08:19
In the array scavenger hunt activity, students search the school to find arrays. They recorded their findings using flipgrid.

08:27 (Video)
Student 1: Four rows of three. 3 + 3 + 3 + 3.
Student 2: I see an array on the ceiling… Three groups of six… 6 + 6 + 6.

08:48
In addition to finding arrays in the real world, students should be encouraged to apply their understanding and create arrays through real world tasks. In this task, students design rectangular boxes for different quantities of chocolates. The first order was a box of 12 chocolates. But the second order was doubled, for a box of 24.

11:08 (Video)
Student 1: I have three rows of eight.

Teacher: Three rows… with eight in each row. And yours looks a little different. How did you design your box?
Student 2: I designed mine with four rows of six.
Teacher: And what about you? Did yours make a rectangular array?
Student 3: No. I needed four more pieces.
Teacher: Four more pieces. Do you think you could fix it and turn it into an array?
Student 3: Yes.
Student 1 (to Student 3): I can see what you can do. You can put those three on the top.
Teacher: Will that work?
Student 3: Yeah, that works. That'll work.
Teacher: So, what does your array look like now?
Student 3: Umm…
Teacher: How many rows do you have?
Student 3 (counting): Eight rows of three.
Teacher: Eight rows of three… And she had three rows of eight. Do they look alike?
Student 3: Not really.
Student 1: Kinda…
Teacher: They kinda do?
Student: Me and his does, but mine is just sideways of his. It's turned like that.
Teacher: That's right.

10:06
In this next task, students were asked to design an organized garden. The garden had four different kinds of vegetables. Each vegetable had five seeds.

10:15
Teacher: How many vegetables did the family plant?
Student: They planted 20 vegetables.
Teacher: And how do you know?
Student: By counting by fives… 5, 10, 15, 20.
Teacher: So, what does your drawing show?
Student: Five carrots, five cucumbers, five peas, and five corns.
Teacher: Are they all equal groups?
Student: Yes.
Teacher: They are

10:42

Student: It all equals 20. Now, how I knew it was 20 is cause 5 + 5 = 10. Then you go to the other side and 5 + 5 = 10. 10 + 10 = 20 cause you have 2 tens equal to the two (pointing to the 2 in the tens place) and zero ones so that would make… umm… zero.

11:02

The story, My Full Moon is Square, provides a great connection to literature. The frog likes to read stories by the light of the moon, and the fireflies like to listen. But one night, clouds covered the moon. Four fireflies sprung into action to provide extra light, and made a formation with two rows of two. More fireflies continued to join until the array was too bright. To help with the blinding glare, the fireflies flew higher in the sky to make a square moon.

11:35

A second grader's facility with the arrays is a means to develop a strong conceptual foundation for multiplication in third grade. Students gradually transition from additive to multiplicative thinking. For additional support and resources, please visit Unit 6 in the GA frameworks. In Unit 6, you will discover even more engaging tasks that promote student discourse and discovery.

12:00

[Closing Music]