

Grade 3

MATH NATION

BY ACCELERATE LEARNING

Take & Teach



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THE LEADER in STEM EDUCATION

What's Inside This Sample Lesson?

- A fully guided lesson written to meet rigorous state and national standards
- **Teacher Edition** pages, **Student Workbook** pages, and other **helpful resources** to fully experience a Math Nation lesson
- Warm-ups, exploration tasks, instructional routines, and teacher prompts
- Support for English learners and students with disabilities
- Integrated reflection, synthesis, and cool-down opportunities

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Go Online!

Explore the digital resources for this lesson.



LESSON 17 MATCH AND DRAW ARRAYS

TEACHER-FACING LEARNING GOAL

- Relate arrays to drawings of equal groups and describe them in terms of multiplication.

ALIGNMENT

Addressing
3.OA.A.1

LESSON PREPARATION

Instructional Routines
Which One Doesn't Belong? (Warm-up)
Materials To Gather
Connecting Cubes or counters
Materials To Copy
Card Sort Arrays
Required Preparation
Activity 1:
<ul style="list-style-type: none"> • Create a set of cards from the blackline master for each group of 2 or 4 students.

LESSON TIMELINE

Warm-up	10 min
Activity 1	20 min
Activity 2	15 min
Lesson Synthesis	10 min
Cool Down	5 min

TEACHER REFLECTION QUESTION

What question do you wish you had asked today? When and why should you have asked it?



LESSON INFORMATION

Student-Facing Learning Goal

- Let's match arrays to equal groups and draw arrays.

Lesson Narrative

The purpose of this lesson is for students to relate arrays to drawings of equal groups and describe arrays in terms of multiplication.

Students first match arrays to drawings of equal groups. Then, they redraw drawings of equal groups as arrays. The work of this lesson connects to upcoming lessons when students represent arrays with expressions and equations. Make connecting cubes or counters available to students who need them.

Keep collecting ideas that arise about commutativity.



WARM-UP | WHICH ONE DOESN'T BELONG: ARRANGEMENTS

10 minutes

Instructional Routines

Which One Doesn't Belong?

The purpose of this warm-up is for students to compare four arrangements of dots to elicit the attributes, or structure, of an array. It gives students a reason to use language precisely (MP6). It gives the teacher an opportunity to hear how students use terminology and talk about characteristics of the items in comparison to one another. During the synthesis, ask students to explain the meaning of any terminology they use, such as rows, corners, groups, and array.

LAUNCH

- Groups of 2
- Display the image.
- "Pick one that doesn't belong. Be ready to share why it doesn't belong."
- 1 minute: quiet think time

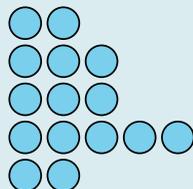
ACTIVITY

- "Discuss your thinking with your partner."
- 2-3 minutes: partner discussion
- Share and record responses.

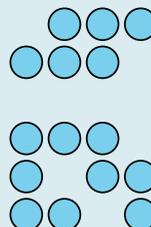
STUDENT-FACING TASK STATEMENT

Which one doesn't belong?

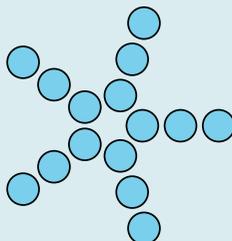
A.



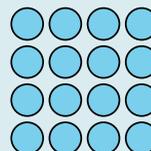
B.



C.



D.



POSSIBLE RESPONSES

- A is the only where the equal groups aren't in a straight line.
- B is the only where the equal groups and the dots in the equal groups aren't always right next to one another.
- C is the only one where the equal groups are not organized in rows.
- D is the only one that doesn't have 15 dots.

ACTIVITY SYNTHESIS

- “Why is B not an array?” (It has the same number of dots in each row, but not the same in each column. One of the columns only has 3 dots. The 3rd row is missing.)
- Consider asking:
 - “Let’s find at least one reason why each one doesn’t belong.”



EXPLORATION ACTIVITY | CARD SORT: ARRAYS 20 minutes

Instructional Routines	Materials To Gather	Required Preparation
Card Sort MLR1 Stronger and Clearer Each Time	Card Sort Arrays	Create a set of cards from the blackline master for each group of 2 or 4 students.

The purpose of this activity is for students to relate drawings of equal groups to arrays. Specifically, students look for arrays that have the same number of objects in each row or column as each drawing has in each group. In some arrays, the equal groups in the drawing are represented as rows, and in some, they are represented in columns. Students have the opportunity to explain the connections they see between the drawings and arrays, receive feedback from their peers, and revise their explanation for precision and clarity (MP3, MP6). This will be useful in future lessons when students record multiplication expressions and equations to represent arrays.

This activity uses MLR1 Stronger and Clearer Each Time. Advances: reading, writing.

Support for Students with Disabilities

Engagement: Develop Effort and Persistence. Chunk this task into more manageable parts. Give students a subset of the cards to start with and introduce the remaining cards once students have completed their initial set of matches.

Supports accessibility for: Attention, Organization

LAUNCH

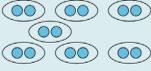
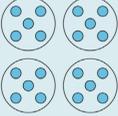
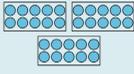
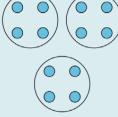
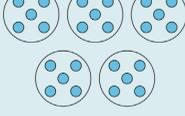
- Groups of 2 or 4
- Distribute one set of pre-cut cards to each group of students.

ACTIVITY

- “This set of cards includes drawings of equal groups and arrays. Match each drawing to an array. Work with your partner to justify your choices.”
 - 8 minutes: partner work time
 - “Independently choose a match you and your partner made. Write down how you know that the drawing matches the array.”
 - 2 minutes: independent work time
- MLR1 Stronger and Clearer Each Time**
- “Share your response to why your cards match with your partner. Take turns being the speaker and the listener. If you are the speaker, share your ideas and writing so far. If you are the listener, ask questions and give feedback to help your partner improve their work.”
 - 3–5 minutes: structured partner discussion
 - Repeat with 2–3 different partners.
 - “Revise your initial draft based on the feedback you got from your partners.”
 - 2–3 minutes: independent work time

STUDENT-FACING TASK STATEMENT

1. Match the drawing of equal groups and arrays that are alike. Be prepared to explain your reasoning.

<p>A</p> 	<p>B</p> 	<p>C</p> 
<p>D</p> 	<p>E</p> 	<p>F</p> 
<p>G</p> 	<p>H</p> 	<p>I</p> 
<p>J</p> 	<p>K</p> 	<p>L</p> 

2. Choose a match you and your partner made. Write down how you know the drawing matches that array.

POSSIBLE RESPONSES

- A and J
 - B and K
 - C and G
 - D and H
 - E and F
 - I and L
- Sample response: I and L match because the array has 2 dots in each column and the drawing has 2 dots in each group. Also, the drawing has 6 groups and the array has 6 columns. They both have 12 dots.

ACTIVITY SYNTHESIS

- Have 2-3 students share the matches they made and describe how they know those cards go together.
- “Did your group agree on the matches? What did you look for to decide two cards were matches?” (Yes, we looked for equal groups that had the same number of dots in a group as one of the rows in the array.)
- Listen for language students use to describe their matches and the structure of the arrays. As needed, ask:
 - “What do you mean by _____?”
 - “What else could we call _____?”
 - “How could you use ‘equal groups’ to explain your match?”
- Highlight the use of terms like *row*, *column*, and *equal groups*.



EXPLORATION ACTIVITY | DRAW ARRAYS 15 minutes

Materials To Gather
Connecting cubes or counters

The purpose of this activity is for students to draw arrays from a given arrangements of dots. Students draw an array from dots in equal groups to reinforce the definition of an array and then draw as many arrays as they can from 16 randomly placed dots. Having cubes or counters for students to physically rearrange would be helpful in this activity.

Support for English Language Learners
MLR8 Discussion Supports. To support partner discussion, display the following sentence frames: “This array matches the diagram because . . .”, and “This array shows multiplication because . . .”
Advances: Conversing, Representing

LAUNCH

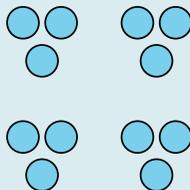
- Groups of 2
- Give students access to connecting cubes or counters.

ACTIVITY

- “Work independently to draw a way that the first group of dots in problem 1 could be arranged into an array.”
- 2 minutes: independent work time
- “Discuss how you arranged your dots and how the array is related to multiplication with your partner.”
- 1 minute: partner discussion
- “How did you rearrange the dots to make an array?” (Since there were 3 in each group, I put 3 dots in each row. I saw 2 groups of 6, so I made 2 rows of 6.)
- Consider asking:
 - “Did anyone create a different array?”
- “Now you are going to make as many arrays as you can from 16 dots.”
- 2–3 minutes: independent work time
- “Share how you rearranged the dots into arrays with your partner. See if together you can come up with any other arrays.”
- 3–5 minutes: partner work time

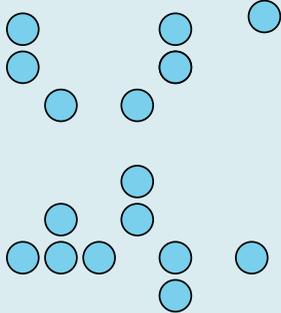
STUDENT-FACING TASK STATEMENT

1. A. Draw 1 way the dots can be rearranged into an array.



B. Explain or show how the array is related to multiplication.

2. A. Draw ways that the dots can be rearranged into an array. Draw as many as you can.



B. Explain or show how the array is related to multiplication.

POSSIBLE RESPONSES

1. Sample responses:
 A. 4 by 3 array, 3 by 4 array, 6 by 2 array, 2 by 6 array
 B. The array shows multiplication because each row has 3 dots, which is an equal group.

2. Sample responses:
 A. 2 by 8 array, 8 by 2 array, 4 by 4 array
 B. The array shows multiplication because each column has 2 dots, which is an equal group.

ACTIVITY SYNTHESIS

- “What kinds of equal groups did you make from 16 dots? How can you see the equal groups in the arrays you made?” (I can make 2 groups of 8. I drew it as 2 rows of 8 dots.)



LESSON SYNTHESIS 10 minutes

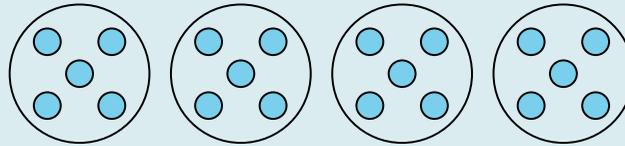
“Today we made drawings that showed how groups of dots could be rearranged into arrays.”

“What do you need to think about when you draw an array?” (Make sure the rows and columns all have the same number of dots. Make the number of groups the number of columns or row in the array and then draw how many are in each group in each column or row. All the dots have to be used.)



COOL DOWN | DRAW AND DESCRIBE 5 minutes

STUDENT-FACING TASK STATEMENT



1. Redraw the equal groups as an array.
2. Describe how the diagram and the array are related.

POSSIBLE RESPONSES

1. Sample response: Students create a 4×5 , 5×4 , 2×10 , or 10×2 array.
2. Sample response: There are 5 dots in each group and there are 4 groups in each row. There are 4 groups and there are 4 rows. They both have 20 dots.

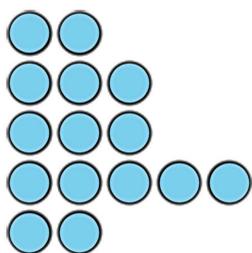
Unit 1, Lesson 17: Match and Draw Arrays



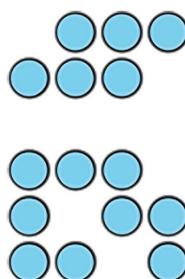
Which One Doesn't Belong: Arrangements

Which one doesn't belong?

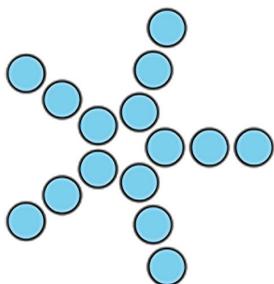
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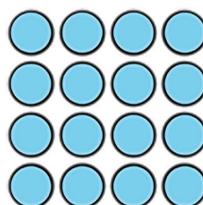
B.



C.



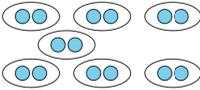
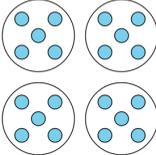
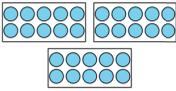
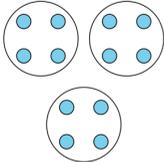
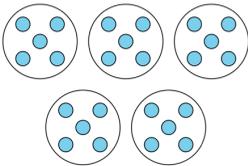
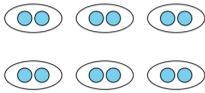
D.





Card Sort: Arrays

1. Match the drawings of equal groups and arrays that are alike. Be prepared to explain your reasoning.

<p>A</p> 	<p>B</p> 	<p>C</p> 
<p>D</p> 	<p>E</p> 	<p>F</p> 
<p>G</p> 	<p>H</p> 	<p>I</p> 
<p>J</p> 	<p>K</p> 	<p>L</p> 

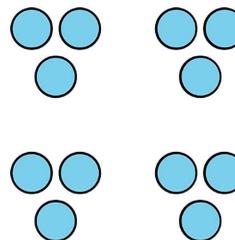
- 2. Choose a match you and your partner made. Write down how you know the drawing matches the array.



Draw Arrays

1.

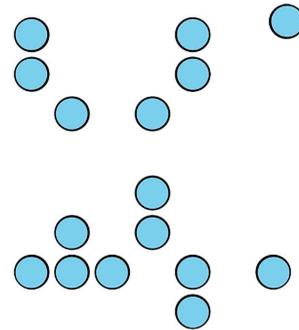
- A. Draw 1 way the dots could be rearranged into an array.



- B. Explain or show how the array is related to multiplication.

2.

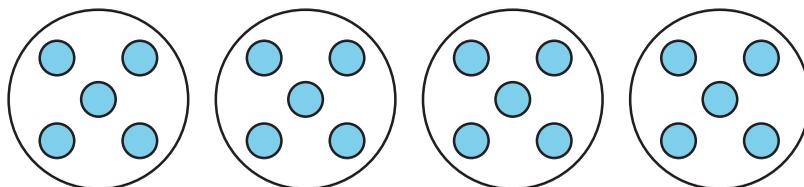
- A. Draw ways that the dots could be arranged into arrays. Draw as many ways as you can.



- B. Explain or show how each array is related to multiplication.

Lesson 17: Match and Draw Arrays

Cool Down: Draw and Describe



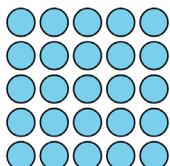
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2. Describe how the diagram and the array are related.

Card Sort Arrays

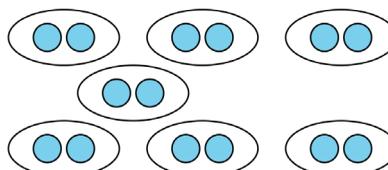
Card Sort: Arrays

A



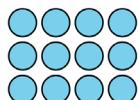
Card Sort: Arrays

B



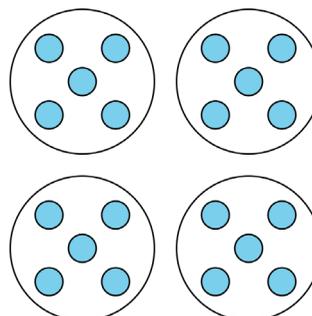
Card Sort: Arrays

C



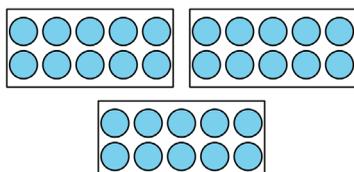
Card Sort: Arrays

D



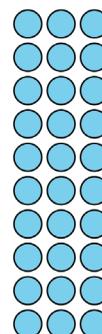
Card Sort: Arrays

E



Card Sort: Arrays

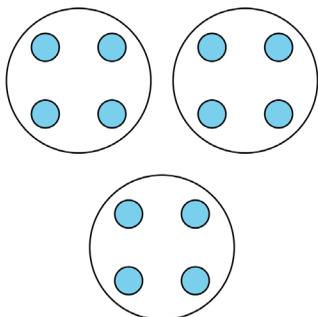
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Card Sort Arrays

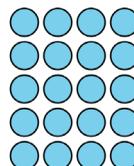
Card Sort: Arrays

G



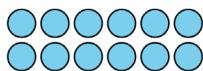
Card Sort: Arrays

H



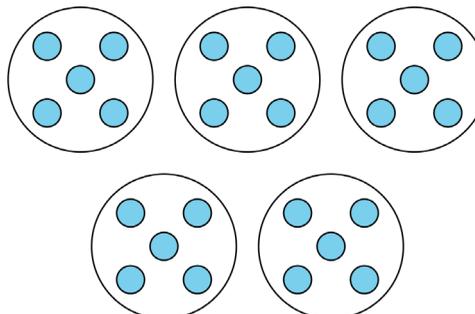
Card Sort: Arrays

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Card Sort: Arrays

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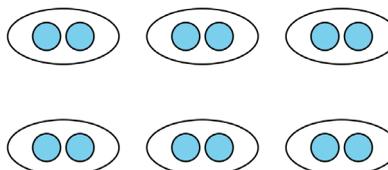
Card Sort: Arrays

K



Card Sort: Arrays

L





**Ready to see the
full program?**

Scan here!



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