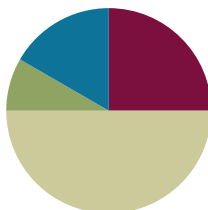


## Lesson 3

**Objective:** Interpret the meaning of factors – the size of the group or the number of groups.

### Suggested Lesson Structure

■ Fluency Practice	(15 minutes)
■ Application Problem	(5 minutes)
■ Concept Development	(30 minutes)
■ Student Debrief	(10 minutes)
<b>Total Time</b>	<b>(60 minutes)</b>



### Fluency Practice (15 minutes)

- Add Equal Groups **3.OA.1** (9 minutes)
- Group Counting **3.OA.1** (3 minutes)
- Add to Multiply **3.OA.1** (3 minutes)

### Sprint: Add Equal Groups (9 minutes)

Materials: (S) Add Equal Groups Sprint

Note: This sprint reviews the Lesson 1 Objective. See *Directions for Administration of Sprints* in Lesson 2.

### Group Counting (3 minutes)

Note: Basic skip-counting skills from Grade 2 shift focus in this Grade 3 activity. Group-counting reviews interpreting multiplication as repeated addition. Counting by twos and threes in this activity anticipates work with those factors in Topic B.

- T: Let's count by twos. (Direct students to count forward and backward to 20, periodically changing directions.)
- T: Let's count by threes. (Direct students to count forward and backward to 21, periodically changing directions. Emphasize the 9 to 12 and 18 to 21 transitions.)

### Add to Multiply (3 minutes)

Materials: (S) Personal white boards

Note: This activity reviews Lesson 2. Students directly relate repeated addition to multiplication. They interpret products using the array.

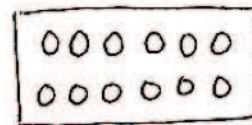
- T: (Project a picture array with 3 groups of 5 circled.) How many groups are circled?  
 S: 3.  
 T: How many are in each group?  
 S: 5.  
 T: Write it as an addition sentence.  
 S: (Write  $5 + 5 + 5 = 15$ .)  
 T: Write a multiplication sentence representing 3 fives equals 15.  
 S:  $3 \times 5 = 15$ .

Continue with possible sequence: 3 groups of 10, 3 groups of 4, and 7 groups of 2.

### Application Problem (5 minutes)

Robbie sees that a carton of eggs shows an array with 2 rows of 6 eggs. What is the total number of eggs in the carton? Use the RDW process to show your solution.

Note: This problem reviews writing multiplication sentences from arrays learned in Lesson 2. The egg carton provides a natural array for students to see 2 rows of 6.



$2 \times 6 = 12$

There are 12 eggs in Robbie's carton.

### Concept Development (30 minutes)

Materials: (S) Personal white boards

#### Problem 1: Equal groups activity.

The following activity should take about 5 minutes.

- T: Here are the rules for our opening activity.
1. **Divide** yourselves into 4 equal groups.
  2. Each group will stand in a corner of the room.
  3. Divide silently. You can use body movements to gesture, but no words.
- T: Show thumbs up when your group is ready. Be sure to look around the room to double check that all 4 groups are equal before showing you're ready.



#### NOTES ON EQUAL GROUPS ACTIVITY:

Adjust the directions for the equal groups activity depending on the total number of students in your class.

- If the total number is not a multiple of four, that adds complexity. Either some students will not be in a group or you can use an adult, teddy bear, etc. to stand in.
- If there are 16–19 students, you will have 4 groups of four. This is not advisable. Use stand-ins to compensate.

- S: (Students move around the room silently until there are 4 equal groups, 1 in each corner.)
- T: At the signal tell how many equal groups we’ve made. (Signal.)
- S: 4 equal groups.
- T: (Write  $4 \times \underline{\quad} =$  total number of students in the class.)  
At the signal tell the size of each group. (Signal.)
- S: (Students respond depending on class numbers.)
- T: (Complete the equation on the board.) These numbers—the number of groups and the number in each group—are called **factors**.

**Problem 2: Interpret the meaning of factors in number bonds.**

Students transition back to their seats with personal boards.

- T: Use the multiplication sentence on the board to draw an array. Make sure that your board is vertical.
- S: (Draw a  $4 \times \underline{\quad}$  array.)
- T: Let’s draw a number bond for our multiplication sentence. Draw a circle with our class total.
- S: (Students draw.)
- T: Draw parts coming from the total. Make 1 part to represent each row in our array.
- S: (Draw 4 circles coming from the total.)
- T: Show the size of 1 row with your fingers.
- S: (Show fingers.)
- T: Write the factor representing the size of the group inside the circle that represents each group.
- T: Look back at the multiplication sentence. How is the factor 4 represented in the number bond?
- S: It’s in the number of parts. → Groups are like parts. → In the number bond the ‘part’ circles actually represent equal groups, so there are 4. The number inside is the size of the group.
- T: Here is an analysis of our number sentence.

$$\begin{array}{ccccccc}
 4 & & \times & 6 & = & 24 & \\
 \downarrow & & & \downarrow & & \downarrow & \\
 \text{number} & & & \text{size} & & \text{total} & \\
 \text{of} & & & \text{of} & & & \\
 \text{groups} & & & \text{groups} & & & 
 \end{array}$$

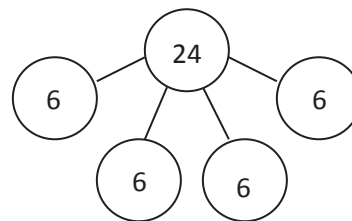


**NOTES ON NUMBER BONDS:**

The number bond is a pictorial representation of part–part–whole relationships and shows that within a part–whole relationship, smaller numbers (the parts) make up larger numbers (the whole). The number bond may be presented as shown below.

(Excerpted from “How to Implement A Story of Units.”)

Sample number bond for a class of 24:



**NOTES ON MULTIPLE MEANS OF ACTION AND EXPRESSION:**

The number bond is another way for students to explore the relationship between factors in multiplication. Have them compare it with its uses in addition to distinguish the importance of equal groups in multiplication.

Continue with the following possible suggestions:

- 2 groups of 8
- 3 rows of 5
- A number bond showing 6 groups of 3
- The equation  $5 \times 4 = 20$

### Problem Set (10 minutes)

Students should do their personal best to complete the Problem Set within the allotted 10 minutes. For some classes, it may be appropriate to modify the assignment by specifying which problems they work on first. Some problems do not specify a method for solving. Students solve these problems using the RDW approach used for Application Problems.

### Student Debrief (10 minutes)

**Lesson Objective:** Interpret the meaning of factors—the size of the group or the number of groups.

The Student Debrief is intended to invite reflection and active processing of the total lesson experience. Invite students to review their solutions for the Problem Set. They should check work by comparing answers with a partner before going over answers as a class. Look for misconceptions or misunderstandings that can be addressed in the Debrief. Guide students in a conversation to debrief the Problem Set and process the lesson. You may choose to use any combination of the ideas below to lead the discussion.


- Why do you think I started the lesson by asking you to **divide** yourselves into equal groups in the corners of the room?
- Identify the **factors** and their meanings from each image on the Problem Set from 1 to 5.
- In Problem 6, discuss the two ways to draw the array and number bond with factors 2 and 3.
- Module 1 introduces many new vocabulary words: row, array, number of groups, size of groups, and factor. You may want to have students make a vocabulary page in their math journals.

NYS COMMON CORE MATHEMATICS CURRICULUM Lesson 3 Worksheet 3•1

Name Gina Date 9/3

Solve numbers 1-4 using the pictures provided for each problem.

1. There are 5 flowers in each bunch. How many flowers are in 4 bunches?




a) Number of groups: 4 Size of each group: 5

b)  $4 \times 5 = \underline{20}$

c) There are 20 flowers altogether.

---

2. There are 3 candies in each box. How many candies are in 6 boxes?




a) Number of groups: 6 Size of each group: 3

b)  $6 \times 3 = \underline{18}$

c) There are 18 candies altogether.

---

3. There are 4 oranges in each row. How many oranges are there in 3 rows?



a) Number of rows: 3 Size of each row: 4


b)  $3 \times 4 = \underline{12}$

c) There are 12 oranges altogether.

COMMON CORE Lesson 3: Understand the Meaning of Factors: The Size of the Group or the Number of Groups 3•1A-3.1A.9  
Date: 4/2/13  
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NYS COMMON CORE MATHEMATICS CURRICULUM Lesson 3 Worksheet 3•1

4. There are 2 loaves of bread in each row. How many loaves of bread are there in 5 rows?




a. Number of rows: 5 Size of each row: 2

b.  $5 \times 2 = \underline{10}$


c. There are 10 loaves of bread altogether.

5. a. Write a multiplication sentence for the array shown below.

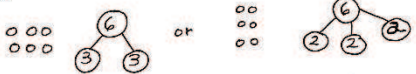


$4 \times 3 = 12$

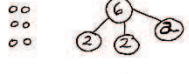
b. Draw a number bond for the array where each part represents the amount in one row.



6. Draw an array using factors 2 and 3. Then show a number bond where each part represents the amount in one row.



or



COMMON CORE Lesson 3: Interpret the meaning of factors: the size of the group or the number of groups.  
Date: 4/24/13  
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- Relate factors to their meaning: the size of the group or the number of groups. Have students share the definition in pairs. Then ask students to write the word and a definition or example next to it in their journals.

### Exit Ticket (3 minutes)

After the Student Debrief, instruct students to complete the Exit Ticket. A review of their work will help you assess the students' understanding of the concepts that were presented in the lesson today and plan more effectively for future lessons. You may read the questions aloud to the students.

**A**

# Correct \_\_\_\_\_

Solve.

1	$2 + 2 =$		23	$7 + 7 =$	
2	2 twos =		24	2 sevens =	
3	$5 + 5 =$		25	$9 + 9 =$	
4	2 fives =		26	2 nines =	
5	$2 + 2 + 2 =$		27	$8 + 8 =$	
6	3 twos =		28	2 eights =	
7	$2 + 2 + 2 + 2 =$		29	$3 + 3 + 3 =$	
8	4 twos =		30	3 threes =	
9	$5 + 5 + 5 =$		31	$4 + 4 + 4 =$	
10	3 fives =		32	3 fours =	
11	$5 + 5 + 5 + 5 =$		33	$3 + 3 + 3 + 3 =$	
12	4 fives =		34	4 threes =	
13	2 fours =		35	4 fives =	
14	$4 + 4 =$		36	$4 + 4 + 4 + 4 + 4 =$	
15	2 threes =		37	3 sixes =	
16	$3 + 3 =$		38	$6 + 6 + 6 =$	
17	2 sixes =		39	3 eights =	
18	$6 + 6 =$		40	$8 + 8 + 8 =$	
19	5 twos =		41	3 sevens =	
20	$2 + 2 + 2 + 2 + 2 =$		42	$7 + 7 + 7 =$	
21	5 fives =		43	3 nines =	
22	$5 + 5 + 5 + 5 + 5 =$		44	$9 + 9 + 9 =$	

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**B** Improvement \_\_\_\_\_ # Correct \_\_\_\_\_

Solve.

1	$5 + 5 =$	23	$8 + 8 =$
2	2 fives =	24	2 eights =
3	$2 + 2 =$	25	$7 + 7 =$
4	2 twos =	26	2 sevens =
5	$5 + 5 + 5 =$	27	$9 + 9 =$
6	3 fives =	28	2 nines =
7	$5 + 5 + 5 + 5 =$	29	$3 + 3 + 3 + 3 =$
8	4 fives =	30	4 threes =
9	$2 + 2 + 2 =$	31	$4 + 4 + 4 =$
10	3 twos =	32	3 fours =
11	$2 + 2 + 2 + 2 =$	33	$3 + 3 + 3 =$
12	4 twos =	34	3 threes =
13	2 threes =	35	4 fives =
14	$3 + 3 =$	36	$4 + 4 + 4 + 4 + 4 =$
15	2 sixes =	37	3 sevens =
16	$6 + 6 =$	38	$7 + 7 + 7 =$
17	2 fours =	39	3 nines =
18	$4 + 4 =$	40	$9 + 9 + 9 =$
19	5 fives =	41	3 sixes =
20	$5 + 5 + 5 + 5 + 5 =$	42	$6 + 6 + 6 =$
21	5 twos =	43	3 eights =
22	$2 + 2 + 2 + 2 + 2 =$	44	$8 + 8 + 8 =$

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Name \_\_\_\_\_

Date \_\_\_\_\_

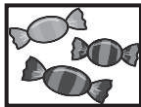
Solve numbers 1–4 using the pictures provided for each problem.

1. There are 5 flowers in each bunch. How many flowers are in 4 bunches?



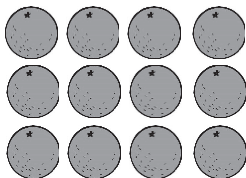
- a. Number of groups: \_\_\_\_\_ Size of each group: \_\_\_\_\_
- b.  $4 \times 5 =$  \_\_\_\_\_
- c. There are \_\_\_\_\_ flowers altogether.

2. There are \_\_\_\_\_ candies in each box. How many candies are in 6 boxes?



- a. Number of groups: \_\_\_\_\_ Size of each group: \_\_\_\_\_
- b.  $6 \times$  \_\_\_\_\_  $=$  \_\_\_\_\_
- c. There are \_\_\_\_\_ candies altogether.

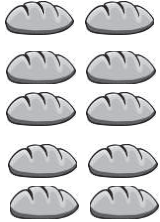
3. There are 4 oranges in each row. How many oranges are there in \_\_\_\_\_ rows?



- a. Number of rows: \_\_\_\_\_ Size of each row: \_\_\_\_\_
- b. \_\_\_\_\_  $\times 4 =$  \_\_\_\_\_
- c. There are \_\_\_\_\_ oranges altogether.



4. There are \_\_\_\_\_ loaves of bread in each row. How many loaves of bread are there in 5 rows?



a. Number of rows: \_\_\_\_\_ Size of each row: \_\_\_\_\_

b. \_\_\_\_\_ × \_\_\_\_\_ = \_\_\_\_\_

c. There are \_\_\_\_\_ loaves of bread altogether.

5. a. Write a multiplication sentence for the array shown below.

X X X  
 X X X  
 X X X  
 X X X

b. Draw a number bond for the array where each part represents the amount in one row.

6. Draw an array using factors 2 and 3. Then show a number bond where each part represents the amount in one row.

Name \_\_\_\_\_

Date \_\_\_\_\_

Draw an array that shows 5 rows of 3 squares. Then show a number bond where each part represents the amount in one row.

Name \_\_\_\_\_

Date \_\_\_\_\_

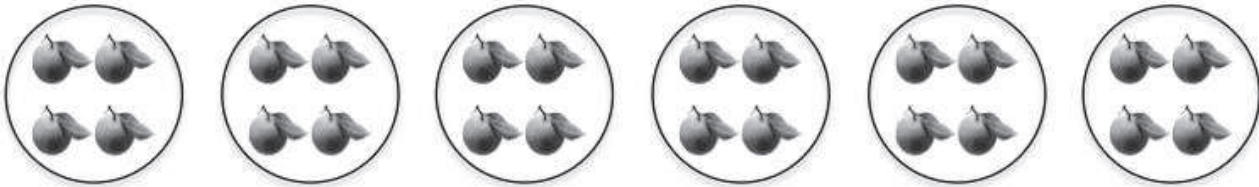
Solve problems 1–4 using the pictures for each problem.



1. There are 5 pineapples in each group. How many pineapples are there in 5 groups?

- a. Number of groups: \_\_\_\_\_ Size of each group: \_\_\_\_\_
- b.  $5 \times 5 =$  \_\_\_\_\_
- c. There are \_\_\_\_\_ pineapples altogether.

2. There are \_\_\_\_\_ oranges in each basket. How many oranges are there in 6 baskets?



- a. Number of groups: \_\_\_\_\_ Size of each group: \_\_\_\_\_
- b.  $6 \times$  \_\_\_\_\_  $=$  \_\_\_\_\_
- c. There are \_\_\_\_\_ oranges altogether.

3. There are 4 bananas in each row. How many bananas in \_\_\_\_\_ rows?



a. Number of rows: \_\_\_\_\_ Size of each row: \_\_\_\_\_

b. \_\_\_\_\_  $\times$  4 = \_\_\_\_\_

c. There are \_\_\_\_\_ bananas altogether.

4. There are \_\_\_\_\_ peppers in each row. How many peppers are there in 6 rows?



a. Number of rows: \_\_\_\_\_ Size of each row: \_\_\_\_\_

b. \_\_\_\_\_  $\times$  \_\_\_\_\_ = \_\_\_\_\_

c. There are \_\_\_\_\_ peppers altogether.

5. Draw an array using factors 4 and 2. Then show a number bond where each part represents the amount in one row.