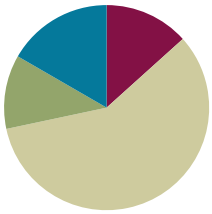
Lesson 5

Objective: Understand the meaning of the unknown as the number of groups in division.

Related Topics: More Lesson Plans for the Common Core Math

Suggested Lesson Structure

Fluency Practice	(8 minutes)
Application Problem	(7 minutes)
Concept Development	(35 minutes)
Student Debrief	(10 minutes)
Total Time	**(60 minutes)**



Fluency Practice (8 minutes)

- Group Counting **3.OA.1** (4 minutes)
- Divide Equal Groups **3.OA.2** (4 minutes)

Group Counting (4 minutes)

Note: Group counting reviews interpreting multiplication as repeated addition. Counting by twos and threes in this activity supports work with those factors in Topic B.

T: Let's count by twos. (Direct students to count forward and backward to 20, emphasizing the 8 to 10, 10 to 12, and 18 to 20 transitions.)

T: Let's count by threes. (Direct students to count forward and backward to 27, changing directions. Emphasize the 9 to 12 and 18 to 21 transitions.)

Record the count-by three up to 24 to use later in the lesson.

Divide Equal Groups (4 minutes)

Materials: (S) Personal white boards.

Note: Students directly relate repeated addition to division. They interpret the number of groups as the unknown in division. This activity anticipates the lesson objective.

T: (Project an array with 2 groups of 5 circled.) How many groups are circled?

S: 2.

T: How many are in each group?

S: 5.

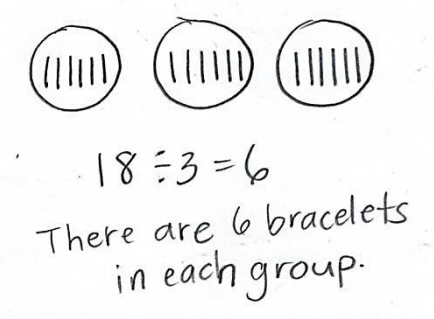
T: Say the total as a repeated addition sentence.
S: 5 + 5 = 10.
T: Write a division sentence for 10 divided into 2 equal groups.
S: (Write 10 ÷ 2 = 5.)

Continue with possible sequence 4 groups of 2, 3 groups of 4 and 2 groups of 6.

Application Problem (7 minutes)

Stacey has 18 bracelets. After she organizes the bracelets by color she has 3 equal groups. How many bracelets are in each group?

Note: This problem reviews the meaning of the unknown as the size of the group in division from Lesson 4. It also provides a comparison to Cynthia's party problem in Problem 1 of the concept development, where the unknown represents the number of groups in division.



Concept Development (35 minutes)

Materials: (S) Personal white boards, 18 counters for each student, student work from application problem

Problem 1: Division as fair-share, the unknown as the number of groups.

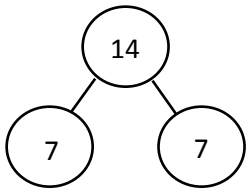
T: Next weekend my friend Cynthia is having a party. 18 people are coming. I told her I'd help her setup tables. We know that 6 people can sit at each table, but we're not sure how many tables we'll need. Turn and talk with your partner. What information do Cynthia and I already have?
S: They know the total number of people. It's 18. → Yeah, and they know how many people are sitting together, 6. That's the size of the group.
T: What information don't we know?
S: You don't know how many tables. → Tables are like groups. You don't know the number of groups.
T: Let's use counters to show the problem and check our thinking. Each of you has 18 counters, 1 for each person coming to the party. Put them into groups of 6.
MP.2
S: (Make groups of 6.)
T: Do you still agree we know the total and the size of each group?
S: Yes!
T: Looking at our models, what else do we now know?
S: We know there are 3 groups. → So that means Cynthia needs 3 tables to fit everyone.
T: (Write 18 ÷ 6 = 3 on the board.) How does this equation relate to the problem we just solved?
S: The equation shows that we divided. → We knew the total, 18 people. We divided them into groups with 6 people. Then we figured out that meant 3 groups of people. → We divided the total by the size of the group and found the number of groups.
T: Look back at your work from today's application problem. With your partner, compare the steps you

took to solve both the bracelet problem and the party problem. Notice the equations too.

S: For the bracelets I drew circles to show 3 groups first. Then I shared the bracelets between the groups. → In the party problem we put the people in groups of 6 first. Then we found how many groups. → The 6 and 3 switched places. → That's because in the bracelet problem we had to find the size of the groups, and in the party problem we had to find the number of groups.

T: I'm hearing you notice that the unknown was different in each problem. We divide when we want to find the size of the groups *or* the number of groups.

Repeat the process using 14 ÷ 7 = ____, without a story context. Focus on 7 being the size of the groups. Match the equation to a number bond.



Sample number bond

Problem 2: Relate finding the number of groups to counting by the divisor.

T: Cynthia plans to buy 15 burgers. 3 burgers come in each pack. How many packs should she buy? Whisper to your partner what the numbers 15 and 3 represent in this problem.

S: 15 is the total number of burgers. 3 is the number of burgers in a pack.

T: Is the unknown the number of groups or the size of the group?

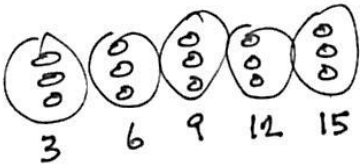
S: The number of groups.

T: On your board write the division sentence you would use to find how many packs to buy.

S: (Write 15 ÷ 3 = ____.)

T: Let's draw to find out how many packs Cynthia needs.

S: (Students draw.)



T: How many packs did Cynthia need?

S: 5 packs.

T: 15 ÷ 3 is?

S: 5.

T: Let's write the total number of burgers under each pack. How many total burgers does she have in one pack?

S: 3 burgers.

T: In two packs?

S: 6 burgers (repeat the process up to 15).

T: Let's read our numbers.

S: 3, 6, 9, 12, 15.

T: Why did we stop at 15?

S: Because Cynthia only needs 15 burgers.

NOTES ON MULTIPLE MEANS FOR ENGAGEMENT:

Students might need help remembering to relate the number of groups to the more familiar parts shown by the number bond. Have them work in partners to draw, or scaffold the process for the whole group by walking them through it.

T: What connection can you make between this problem and our fluency (indicate the count by three series from earlier)?

S: It's like counting by three.

T: Yes. Each time we add a group, we add a three.

T: Count by threes with me and track the number of threes on your fingers.

S: 3, 6, 9, 12, 15. (Start with a closed fist and stick out one finger each time you say a three.)

T: How many threes did we count?

S: 5.

T: Skip-counting also shows us that Cynthia needs 5 packs.

Repeat the process with 21 ÷ 3 = ___ and 14 ÷ 2 = ___, not in a story context.

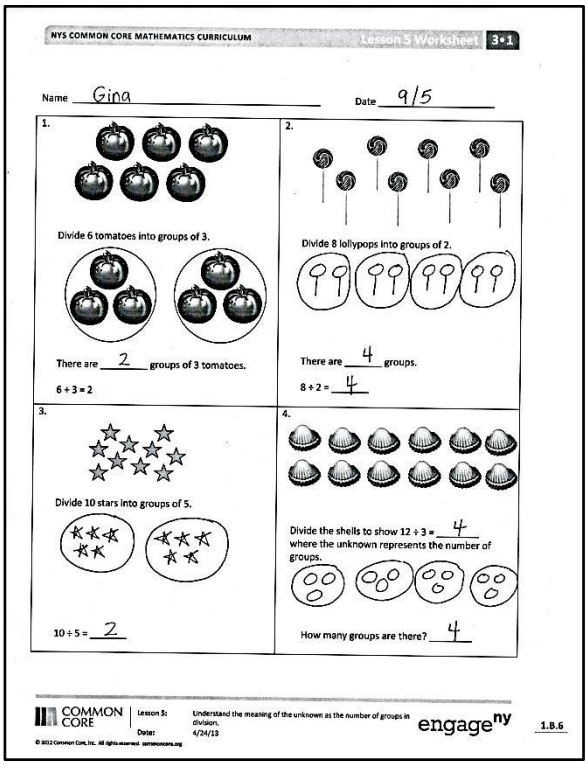
T: A count-by can be a quick way to solve division problems when we need to find the number of equal groups. Especially if we have a big total like 21!

NOTES ON MULTIPLE MEANS FOR ACTION AND EXPRESSION:

It may be tempting to skip the visual in this segment of the lesson. For many students who are visual learners it's an easy way to talk about what may be a common confusion: There are not 6 burgers in the second pack, rather there are 6 burgers in 2 packs. Even for advanced students, the visual helps make clear why the count-by works and also makes the connection to addition very evident.

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.


NYS COMMON CORE MATHEMATICS CURRICULUM Lesson 5 Worksheet 3•1

Name Gina Date 9/5

1. Divide 6 tomatoes into groups of 3.
There are 2 groups of 3 tomatoes.
6 ÷ 3 = 2

2. Divide 8 lollypops into groups of 2.
There are 4 groups.
8 ÷ 2 = 4

3. Divide 10 stars into groups of 5.
10 ÷ 5 = 2

4. Divide the shells to show 12 ÷ 3 = 4 where the unknown represents the number of groups.
How many groups are there? 4

COMMON CORE Lesson 5: Understand the meaning of the unknown as the number of groups in division. Date: 4/24/13 engage^ny 1.B.6

Student Debrief (10 minutes)

Lesson Objective: Understand the meaning of the unknown as the number of groups in division.

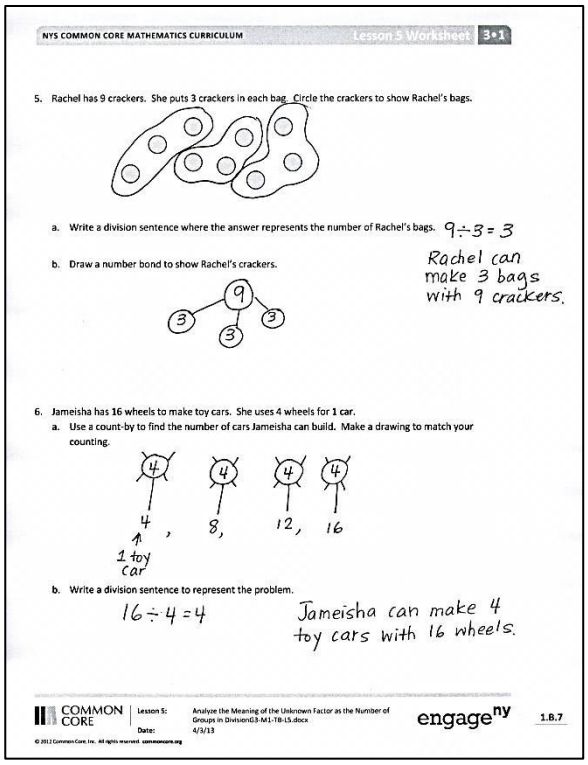
The Student Debrief is intended to invite reflection and active processing of the total lesson experience.

Invite students to review their solutions for the Activity 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.

Review the relationship of multiplication to division. Guide students to observe that division is used to find either factor—the unknown can be the size of groups (learned yesterday) or the number of groups (learned today)

- Practice using the count-by strategy to solve Problem Set problem 5.
- How is a number bond diagram different than a drawing representing a count-by?



NYS COMMON CORE MATHEMATICS CURRICULUM Lesson 5 Worksheet 3•1

5. Rachel has 9 crackers. She puts 3 crackers in each bag. Circle the crackers to show Rachel's bags.

a. Write a division sentence where the answer represents the number of Rachel's bags. 9 ÷ 3 = 3

b. Draw a number bond to show Rachel's crackers.

Rachel can make 3 bags with 9 crackers.

6. Jameisha has 16 wheels to make toy cars. She uses 4 wheels for 1 car.

a. Use a count-by to find the number of cars Jameisha can build. Make a drawing to match your counting.

4, 8, 12, 16

1 toy car

b. Write a division sentence to represent the problem.

16 ÷ 4 = 4

Jameisha can make 4 toy cars with 16 wheels.

COMMON CORE | Lesson 5: Date: | Analyze the Meaning of the Unknown Factor as the Number of Groups in Division G3-M1-TB-L5.docx 4/3/13 | engage^ny | 1.B.7

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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.

Name _____ Date _____

1.

Divide 6 tomatoes into groups of 3.

There are _____ groups of 3 tomatoes.

6 ÷ 3 = 2

2.

Divide 8 lollypops into groups of 2.

There are _____ groups.

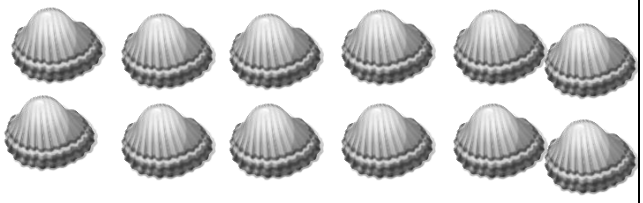
8 ÷ 2 = _____

3.

Divide 10 stars into groups of 5.

10 ÷ 5 = _____

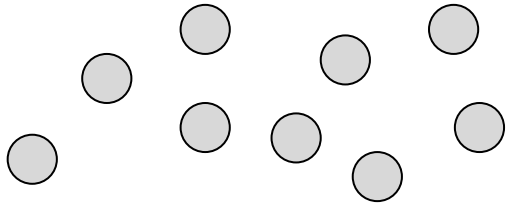
4.



Divide the shells to show 12 ÷ 3 = _____ where the unknown represents the number of groups.

How many groups are there? _____

5. Rachel has 9 crackers. She puts 3 crackers in each bag. Circle the crackers to show Rachel's bags.



a. Write a division sentence where the answer represents the number of Rachel's bags.

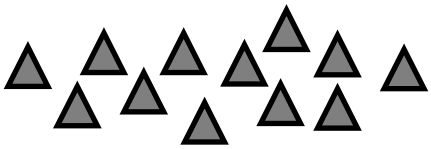
b. Draw a number bond to show Rachel's crackers.

6. Jameisha has 16 wheels to make toy cars. She uses 4 wheels for 1 car.
   a. Use a count-by to find the number of cars Jameisha can build. Make a drawing to match your counting.

b. Write a division sentence to represent the problem.

Name _____ Date _____

1. Divide 12 triangles into groups of 6.

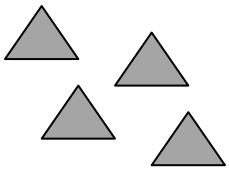


12 ÷ 6 = _____

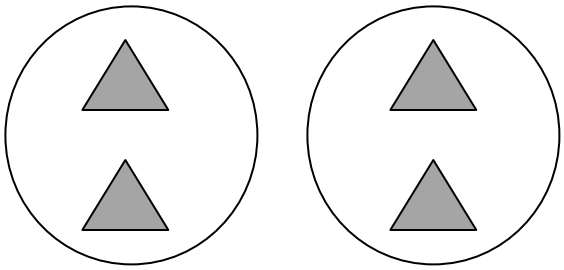
2. Spencer buys 20 strawberries to make smoothies. Each smoothie needs 5 strawberries. Use a count-by to find the number of smoothies Spencer can make. Make a drawing to match your counting.

Name _____ Date _____

1.



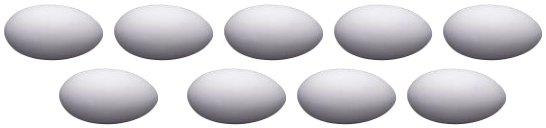
Divide 4 triangles into groups of 2.



There are _____ groups of 2 triangles.

4 ÷ 2 = 2

2.



Divide 9 eggs into groups of 3.

There are _____ groups.

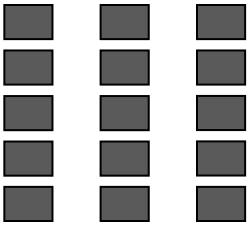
9 ÷ 3 = _____

3.

Divide 12 buckets of paint into groups of 3.

12 ÷ 3 = _____

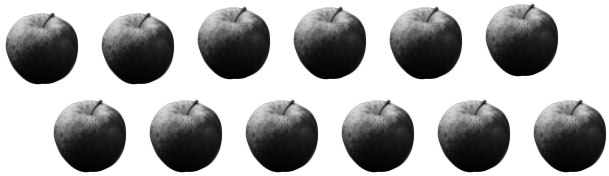
4.



Group the squares to show 15 ÷ 5 = _____ where the unknown represents the number of groups.

How many groups are there? _____

5. Daniel has 12 apples. He puts 6 apples in each bag. Circle the apples to find the number of bags Daniel makes.



a. Write a division sentence where the answer represents the number of Daniel's bags.

b. Draw a number bond to show Daniel's apples.

6. Jacob is drawing cats. He draws 4 legs on each cat, and a total of 24 legs.
   a. Use a count-by to find the number of cats Jacob draws. Make a drawing to match your counting.

b. Write a division sentence to represent the problem.