Academy of Dover Charter School

Math Unit: Third Grade-Understand Division

Curriculum Resource: Houghton Mifflin Harcourt Go Math! Common Core Edition (Chapter 6)

Unit Essential Question: How can you use division to find how many in each group or how many equal groups?

Overview: In this unit, students will develop an understanding of multiplication and division strategies for multiplication and division within 100.

Common Core Standards Addressed:

- CC.3.OA.3-Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.
- CC.3.OA.2-Interpret whole-number quotients of whole numbers, e.g., interpret 56 divided by 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are portioned into equal shares of 8 objects each.
- CC.3.OA.6-Understand division as an unknown-factor problem
- CC.3.OA.7-Fluently multiply and divide within 100, using strategies such as the relationship between division and multiplication or properties of operations.
- CC.3.OA.5-Apply properties of operations as strategies to multiply and divide (Commutative property of multiplication, Associative property of multiplication, Distributive property).
- CC.3.OA.4- Determine the unknown whole number in a multiplication or division equation relating three whole numbers. For example, determine the unknown number that makes the equation true in each of the equations $8 \times ? = 48$, $5 = \_ \div 3$, $6 \times 6 = ?$

*When beginning new unit, send parent letter home to introduce the new unit.

Introduction:

Use student book page 207-208 GO MATH student edition to introduce unit. Have students complete page 207 (1-7) independently. Direct students to "Math Detective with Carmen Sandiego". Discuss with students how to keep score when playing basketball. Ask students, "what do you need to know?" Allow students to share answers with a partner. Then ask students "how can you use repeated addition to solve this problem?" Allow students to share answers with a partner.

Upon completion of page 207, have students turn to page 208 in GO MATH student edition, which is the back of page 207. Allow students to complete the bubble map with a partner. Ask

partners to share their solutions with the class, including the reasoning behind each answer. Direct students to "Understand Vocabulary" on the lower half of the page. Introduce the new vocabulary words and give examples of each (dividend, related facts, divisor).

Lesson 1: Problem Solving-Model Division

Objective: Students will be able to solve division problems by using the strategy ACT IT OUT.

Essential Question: How can you use the strategy ACT IT OUT to solve problems with equal groups?

- Common Core Standards Addressed: CC.3.OA.3-Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.
  CC.3.OA.2-Interpret whole-number quotients of whole numbers, e.g., interpret 56 divided by 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are portioned into equal shares of 8 objects each.

- Materials Needed: pages 209-212 in GO Math student edition
  SmartBoard
  access to GO Math online tools
  counters
  Reteach 6.1 (worksheet)
  Enrich 6.1 (worksheet)
  Standards Practice 6.1 (worksheet/homework)
  paper cups (RTI Tier 2)
- Vocabulary: no new vocabulary

Lesson Overview:

- *Essential Question/Purpose*-Tell students that today they will be learning how to use the strategy ACT IT OUT to solve problems with equal groups. Show the essential question (posted in classroom) and tell students that by the end of the lesson, they should be able to answer the essential question.
- *Engage (Access Prior Knowledge)*-Begin by introducing the lesson. Discuss different types of manipulatives students have used in previous lessons. Remind students that counters are a type of manipulative. Ask students: "What other manipulatives have we used in other math lessons?" and "How can using manipulatives help you solve problems?" Allow students to share answers with partners. Then allow students to

share whole group. Guide students to conclusion that we can move the counters around to act out math problems.

- *Teach and Talk-*
  UNLOCK THE PROBLEM: Have students open their GO Math Student Edition to page 209. Project GO Math Student Edition (page 209) on SmartBoard. Read "Unlock the Problem" aloud for students. Ask students "When we are solving word problems, what are the steps that we take?" Students should respond by stating that we find the question, underline it, find the information provided, and circle the pieces of information. Instruct students to follow these steps in their book. Tell students that they will begin to solve the problem by using a graphic organizer. Direct students to the first box "What do I need to find?" and second box "What information do I need to use?" Remind students of the steps previously completed (underline question, circle information) and allow students to complete this part of the graphic organizer. Choose a student to come to board and complete the boxes. Direct students to "Solve the Problem: Describe how to act out the problem to solve." Guide students through completion, reminding students of "time order words" which are also discussed in our writing curriculum.
  TRY ANOTHER PROBLEM: Have students turn to page 210 and project on the board. Instruct students to complete this problem in partners, reminding students of the steps used to complete a word problem. Allow students to refer back to the example on page 209 as a model. When students complete, allow time to share their descriptions of how they acted out the problem. Ask "In this problem, did you find the number of equal groups or the number in each group? Explain". Allow for student responses, then ask "How did you know you needed to break apart 21 into smaller groups to solve the problem?" Allow for student responses. Follow with asking "If Hayden had 22 cookies, would the answer change? Explain."
- *Practice-*
  SHARE AND SHOW (guided practice)
  Project page 211 on board and instruct students to turn to this page. Have students complete #1 and then discuss with a partner. Check for understanding through observation. Read #2 aloud. Allow students to work in partners. Instruct students that they must be able to explain the steps and their answer to class. Allow for groups to share. Then have students complete #3 and #4. Discuss and check for understanding.
  ON YOUR OWN
  Allow students to complete page 212 individually. Work with any student(s) who may be struggling with the concept. Provide manipulatives (counters) if needed. Provide students who may have mastered the concept with additional problems (example: Gina bought 72 tomato plants for her garden. She would like to plant them in rows of 8. How many rows of tomato plants will Gina plant?)

- *Conclusion*-Provide index card to each student. Remind student of the essential question (posted in classroom). Instruct students to answer the essential question on the index card as an "exit ticket". Check student responses for understanding. Assign Standards Practice book page 105-106 for homework.
- *Response to Intervention:*
  Tier 1: Provide graphic organizer used during classwork. Provide students with the following problem: Pam bought 20 party favors. There are 5 favors in each pack. How many packs of party favors did Pam buy? Ask students "What are you asked to find?" and "What information will you use?" Discuss solving the problem and have students share strategies. Provide Reteach 6.1 for additional practice if needed.
  Tier 2: Provide students with the following problem: Henry bought 2 equal packages of balloons. He has 14 balloons. How many balloons were in each package? Ask students "What are you being asked to find?" and "What information will you use to solve the problem?" Have students use paper cups to represent packages. Ask students how many cups they will need. Have students put one counter in each cup until all 14 counters have been used. Ask students "How many counters are in each cup?" and "What do the counters in each cup represent?" Students should be able to identify how many balloons were in each package. Provide students with additional problems to solve using the cups and counters. Provide reteach 6.1 for additional practice if needed.
  Enrichment: Provide students with Enrich 6.1

Lesson 2: Size of Equal Groups

Objective: Students will be able to use models to explore the meaning of partitive (sharing) division.

Essential Question: How can you use "model a division problem" to find how many in each group?

- Common Core Standards Addressed: CC.3.OA.2-Interpret whole-number quotients of whole numbers, e.g., interpret 56 divided by 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are portioned into equal shares of 8 objects each.
  CC.3.OA.3-Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.
- Materials Needed: pages 213-216 in GO Math student edition
  SmartBoard
  access to GO Math online tools
  counters

math journals
Standards Practice 6.2 (worksheet/homework)
Reteach 6.2 (as needed)
Enrichment 6.2 (as needed)
paper plates (RTI-Tier 1)
masking tape (RTI-Tier 2)

- Vocabulary: divide

Lesson Overview:

- *Essential Question/Purpose*-Tell students that today they will be learning how they can model a division problem to find how many in each group. Show the essential question (posted in classroom) and tell students that by the end of the lesson, they should be able to answer the essential question.
- *Engage (Access Prior Knowledge)*-Begin by introducing the lesson. Ask students "Have you ever explored a cave?" If needed, share background information about caves with students (definition, causes, structures, etc).
- *Teach and Talk*-
  UNLOCK THE PROBLEM: Have students open their GO Math Student Edition to page 213. Project GO Math Student Edition (page 213) on SmartBoard. Read "Unlock the Problem" aloud for students. Ask students "When we are solving word problems, what are the steps that we take?" Students should respond by stating that we find the question, underline it, find the information provided, and circle the pieces of information. Instruct students to follow these steps in their book. Remind students that when we multiply, we put groups together. Tell students that when we divide, we separate things into equal groups. Have students add the word "divide" and its definition to their vocabulary in their math journals. Direct students to the ACTIVITY. Provide students with 12 counters. Have students place counters into 3 equal groups and model while instructing. Also demonstrate this strategy with drawing on SmartBoard. Ask students to answer the problem using these strategies. Also ask students "What do the 4 counters in each circle represent?" and "How can you check that 4 rocks in each box is correct?" Have students discuss their findings with their partner and then share out. Pose the problem "What if Hector had 18 rocks and he put an equal number in each of three boxes? How many rocks would be in each box?" Allow for time to solve and share whole group.
  TRY THIS: Have students turn to page 214 and project on the board. Instruct students to complete this problem in partners, reminding students of the steps used to complete a word problem. Allow students to refer back to the example on page 213 as a model. When students complete, allow time to share their descriptions of how they solved the problem. Ask students "What does the number in each square represent?" Ask "When

have you had to divide in real life?" "How is using counters to model division different from using counters to model multiplication?" "What if Madison wanted to put an equal number of her 15 rocks into each of 4 boxes?"

- *Practice-*
  SHARE AND SHOW (guided practice)
  Project page 215 on board and instruct students to turn to this page. Have students complete #1 and then discuss with a partner. Check for understanding through observation. Provide instruction to complete the table for #2, #3, and #4. Allow students to complete the table and review answers.
  ON YOUR OWN
  Instruct students to complete page 215-216 individually. Work with any student(s) who may be struggling with the concept. Provide counters in a small group and ask students to "divide" them into groups. Provide additional problems for practice. Provide students who may have mastered the concept with peer-tutoring opportunities for struggling students or additional math practice with division flash cards.
- *Conclusion*-Provide students with an index card. Show problem on board: Sam has collected 18 seashells for his collection. He is organizing them into 6 groups. How many seashells should he put in each group? Have students solve this problem on the index card. Use this as an informal assessment. Have students complete Standards Practice 6.2 as a homework assignment.
- *Response to Intervention-*
  Tier 1: Give each student in small group, 12 counters and 3 paper plates. Have studetns count out 3 equal groups from the 12 counters. Have students count out one counter for each plate and continue until all the counters have been placed on plates. Then have students count the number of counters on each plate to find how many are in each group. Repeat the activity having students make 2 equal groups from the 12 counters. Provide Reteach 6.2 for additional practice if needed.
  Tier 2: Use masking tape to make 3 large squares on the floor. Ask 6 students to form a group and tell them you want them to separate to make 3 equal groups. Have one student stand in each square. Ask students how they would continue to form these groups. Guide students if needed. Ask "how many students are in each group?" Repeat this activity by having the 6 students form 2 equal groups. Provide Reteach 6.2 for additional practice if needed.
  Enrich: Provide students with a "handful" of counters. Have each student count the number of counters they received. Have them decide if they can make 2 equal groups. Ask them to divide the counters. Have students repeat this activity with other "handfuls" of counters. Ask students to identify if they can make 2 equal groups using odd or even numbers of counters. Provide Enrich 6.2 for additional practice if needed.

Lesson 3: Number of Equal Groups

Objective: Students will be able to use models to explore the meaning of quotative (measurement) division.

Essential Question: How can you model a division problem to find how many equal groups?

- Common Core Standards Addressed: CC.3.OA.2-Interpret whole-number quotients of whole numbers, e.g., interpret 56 divided by 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are portioned into equal shares of 8 objects each.
  CC.3.OA.3-Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.
- Materials Needed: pages 217-220 in GO Math student edition
  SmartBoard
  access to GO Math online tools
  counters
  math journals
  Standards Practice 6.3 (worksheet/homework)
  Reteach 6.3 (if needed)
  Enrichment 6.3 (if needed)
  square tiles (RTI-Tier 1)
  counters (RTI-Tier 2)
- Vocabulary: no new vocabulary

Lesson Overview:

- *Essential Question/Purpose*-Tell students that today they will be learning how they can model a division problem to find how many equal groups. Show the essential question (posted in classroom) and tell students that by the end of the lesson, they should be able to answer the essential question.
- *Engage (Access Prior Knowledge)*-Begin by drawing 15 counters on the board. Ask students to think about a multiplication sentence that could be written using these 15 counters. Have students solve and share with partner. Then share answers whole group. Pose the problem "What division situation could the counters represent?" Have students discuss with partner and allow time for sharing whole group. Ask students "Why do you think the same model can be used for both multiplication and division?"
- *Teach and Talk*-

CONNECT-Tell students that this lesson connects to the previous lesson. Remind students that they have learned how to divide to find the number in each group. Tell students that today, we will be dividing to find the number of equal groups.
UNLOCK THE PROBLEM: Have students open their GO Math Student Edition to page 217. Project GO Math Student Edition (page 217) on SmartBoard. Read "Unlock the Problem" aloud for students. Ask students "When we are solving word problems, what are the steps that we take?" Students should respond by stating that we find the question, underline it, find the information provided, and circle the pieces of information. Instruct students to follow these steps in their book. Ask students how they can determine if they need to find how many equal groups or how many in each group? Have students look for clue words in the problem and circle them. Ensure that students understand that this time they are given the number in each group and they need to find the number of groups. Have students look at the 12 counters and circle a group of 3 counters. Show on board and check student work. Then have students continue circling groups of 3 until all counters are in groups. Show on board. Ask students how this is similar to other math lessons (making connections). Then ask students "will you need more boxes or fewer boxes if you increase the number of shells in each box?" Have students discuss this with partners and allow 1 person to share from each group.
TRY THIS: Have students turn to page 218 and project on the board. Instruct students to complete this problem in partners, reminding students of the steps used to complete a word problem. Allow students to refer back to the example on page 217 as a model. When students complete, allow time to share their descriptions of how they solved the problem. Ask students "What do the circles represent?" and "How can you check that your answer is correct?" Allow students to complete the H.O.T problem.

- *Practice-*
  SHARE AND SHOW (guided practice)
  Project page 219 on board and instruct students to turn to this page. Have students complete #1 and then discuss with a partner. Check for understanding through observation. Provide instruction to complete the table for #2, #3, and #4. Allow students to complete the table and review answers.
  ON YOUR OWN
  Allow students to complete page 219-220 individually. Work with any student(s) who may be struggling with the concept. Provide counters in a small group and ask students to "divide" them into groups. Provide additional problems for practice. Provide students who may have mastered the concept with peer-tutoring opportunities for struggling students or additional math practice with division flash cards.
- *Conclusion*-Ask students to think about the essential question. Have students answer the essential question and share with a partner. Allow each set of partners to share. Provide standards practice book 6.3 for homework.

- *Response to Intervention-*
  Tier 1: Give each student in small group 15 tiles. Have students make stacks of 3 tiles each. Ask students how many equal stacks of 3 tiles they can make. Then have students separate the tiles into stacks of 15 each, and find how many stacks they can make. Ask "how can you use your answer for the number of stacks of 3 tiles to predict how many stacks of 5 tiles there will be?" Have student complete activity and share. Provide Reteach 6.3 for additional practice if needed.
  Tier 2: Give each student in small group 8 counters. Have students use the 8 counters to make groups of 2. Ask students "how many counters are in this group?" Show the 4 groups of 2 counters each. Ask "how many groups did we make", "are the groups equal?", and "how can you tell?" Have students put the 8 counters into groups of 4. Discuss the results and ask students what they noticed. Provide Reteach 6.3 for additional practice if needed.
  Enrich: Tell students to write a word problem about finding how many in each group. For example: Bessie has 18 apples. She wants to put an equal number of apples in each of 3 bowls. How many apples does she put in each bowl? Tell students to write a word problem about finding the number of groups. For example: Jen has 20 pears. She wants to put 4 pears on each plate. How many plates will she need? Have students share and solve their problems. Students should explain whether they were finding how many groups or how many in each group. Provide Enrich 6.3 for additional practice if needed.

Lesson 4: Model with Bar Models

Objective: Students will be able to model division by using equal groups and bar models.

Essential Question: How can you use bar models to solve division problems?

- Common Core Standards Addressed: CC.3.OA.2-Interpret whole-number quotients of whole numbers, e.g., interpret 56 divided by 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are portioned into equal shares of 8 objects each.
  CC.3.OA.3-Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.
- Materials Needed: pages 221-224 in GO Math student edition
  SmartBoard
  access to GO Math online tools
  counters
  math journals

white board
Standards Practice 6.4(worksheet/homework)
Reteach 6.4 (if needed)
Enrichment 6.4 (if needed)
strips of paper, counters (RTI-Tier 1)
counters (RTI-Tier 2)

- Vocabulary: dividend, divisor, quotient

Lesson Overview:

- *Essential Question/Purpose*-Tell students that today they will be learning how they can use bar models to solve division problems. Show the essential question and tell students that by the end of the lesson, they will be able to answer this question.
- *Engage (Access Prior Knowledge)*-Begin by drawing 12 counters on the board. Ask students to describe the steps for dividing the counters into 4 equal groups. Ask students "why is it helpful to put 1 counter in each group at a time?" Have students share with a partner and then choose a few to share whole group.
- *Teach and Talk-*
  CONNECT-Tell students that this lesson connects to the previous lessons. Remind students that during previous lessons we have learned division strategies.
  UNLOCK THE PROBLEM: Have students open their GO Math Student Edition to page 221. Project GO Math Student Edition (page 221) on SmartBoard. Read "Unlock the Problem" aloud for students. Ask students "When we are solving word problems, what are the steps that we take?" Students should respond by stating that we find the question, underline it, find the information provided, and circle the pieces of information. Instruct students to follow these steps in their book.
  ACTIVITY 1: Read the directions for the activity. Be sure students place one counter at a time in each group. After students complete the page, ask: "How do you know your answer is correct?" Discuss how the parts of the bar model are related to the problem. To show that each dog represents one group, you can have students draw a line from each dog to one of the boxes on the bar model. Ask "Why are there 5 equal bars in the bar model?" Then ask students to compare and contrast the bar model with using counters.
  ACTIVITY 2: In this activity, students find the number of equal groups, or how many dogs are in each class. Have students show the division using the counters, then interpret the parts of the bar model. Have students discuss the following questions with a partner: Why did you circle groups of 5; What does the bar with the number 5 represent; What do the dashed lines represent; How is ACTIVITY 2 different from ACTIVITY 1?

Introduce new vocabulary and have students record in their math journals. Provide the example: 20 ÷ 5 = 4
dividend divisor quotient
and discuss each part of the equation (this information is also in their student books).

- *Practice-*
  SHARE AND SHOW (guided practice)
  Project page 222 on board and instruct students to turn to this page. Have students complete #1 and then discuss with a partner. Check for understanding through observation. Have students complete #2 and #3 on page 223 to check for understanding.
  ON YOUR OWN
  Allow students to complete page 223-224 individually. Work with any student(s) who may be struggling with the concept. Provide counters in a small group and ask students to "divide" them into groups. Use white board to model with the bar model. Provide additional problems for practice. Provide students who may have mastered the concept with peer-tutoring opportunities for struggling students or additional math practice with division flash cards.
- *Conclusion*-Ask students to think about the essential question. Have students answer the essential question and share with a partner. Allow each set of partners to share. Provide standards practice book 6.4 for homework.
- *Response to Intervention-*
  Tier 1: Read aloud the following situation: Luisa has 8 eggs. She needs to make 4 equal groups of eggs. Display a paper strip. Tell students to think that whole strip represents 8 eggs. Ask them how they would fold the paper to show 4 equal groups. Allow students to fold paper strips. Then have students share their paper folding and work with students to draw a bar model to match their paper strips with the folds. Now have students use counters to represent the eggs and divide 8 counters equally into the 4 sections of the paper strips. Have students tell how many eggs are in each group. Provide Reteach 6.4 for additional practice if needed.
  Tier 2: Have students draw 5 circles on a sheet of paper. Ask students "If we divide 15 counters into 5 equal groups, how many counters will be in each group?" Guide students to place one counter at a time in each circle. Ask "how many counters are in each group?" Write the division sentence on the board. Guide students to state that 15 is the total number of counters, 5 is the number of groups, and 3 is the number in each group. Then model how to draw a bar model to match the circles and division. Have students copy the bar model. Provide Reteach 6.4 for additional practice if needed.
  Enrich: Have students draw all the possible bar models with 12 as a dividend. Tell students they might change the number of equal groups as a strategy to help them find all the possible bar models. Remind students that each number of groups must provide for an equal number in each group. Have students work in pairs to share their bar

models. Have students choose one of their bar models and write a story problem to match it. Provide Enrich 6.4 for additional practice if needed.

Lesson 5: Algebra: Relate Subtraction and Division

Objective: Students will be able to use repeated subtraction and a number line to relate subtraction and division.

Essential Question: How is division related to subtraction?

- Common Core Standards Addressed: CC.3.OA.2-Interpret whole-number quotients of whole numbers, e.g., interpret 56 divided by 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are portioned into equal shares of 8 objects each.
  CC.3.OA.3-Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.
  CC.3.OA.7-Fluently multiply and divide within 100, using strategies such as the relationship between division and multiplication or properties of operations.
- Materials Needed: pages 225-228 in GO Math student edition
  SmartBoard
  access to GO Math online tools
  math journals
  white board
  Standards Practice 6.5(worksheet/homework)
  Reteach 6.5 (as needed)
  Enrich 6.5 (as needed)
  counters (RTI-Tier 1)
  counters, masking tape, index cards, marker (RTI-Tier 2)
  Real World video (Go Math curriculum-online) Ch. 6
- Vocabulary: no new vocabulary

Lesson Overview:

- *Essential Question/Purpose*-Tell students that today they will be learning how division is related to subtraction. Show the essential question and tell students that by the end of the lesson, they will be able to answer this question.

- *Engage (Access Prior Knowledge)*-Use the Real World Video to introduce students to recycling. Ask: What does recycling mean? What are some things that can be recycled? What are some ways recycling helps the environment?
- *Teach and Talk-*
  UNLOCK THE PROBLEM: Have students open their GO Math Student Edition to page 225. Project GO Math Student Edition (page 225) on SmartBoard. Read "Unlock the Problem" aloud for students. Ask students "When we are solving word problems, what are the steps that we take?" Students should respond by stating that we find the question, underline it, find the information provided, and circle the pieces of information. Instruct students to follow these steps in their book.
  ONE WAY: This method uses repeated subtraction to divide. Remind students that we used repeated addition to add. Also remind students that division is the opposite of multiplication. So if we use repeated addition to multiply, we can use repeated subtraction to divide. Demonstrate on board. Have students assist with computation. Provide additional examples if necessary. Ask students to explain (to a partner) how to use subtraction to divide. Discuss why it is important to continue subtracting until you get 0.
  ANOTHER WAY: This way uses a number line to count back by 2's to divide. Remind students how we used a number line to multiply. Demonstrate on board. Have students discuss these questions with a partner: Why did you start at 12 and count backwards? What do the number of jumps represent?
- *Practice-*
  SHARE AND SHOW (guided practice)
  Have students complete #1 and then discuss with a partner. Check for understanding through observation. Have students complete #2 and #3 to check for understanding.
  ON YOUR OWN
  Instruct students to complete page 227-228 individually. Work with any student(s) who may be struggling with the concept. Give examples of repeated subtraction and provide number lines in necessary. Provide additional problems for practice. Provide students who may have mastered the concept with peer-tutoring opportunities for struggling students or additional math practice with division flash cards.
- *Conclusion*-Provide index card. Give students 2 division problems. Have them solve 1 using repeated subtraction and the second using a number line. Collect for an informal assessment. Provide standards practice book 6.5 for homework.
- *Response to Intervention-*
  Tier 1: Have students start with a pile of 15 counters. One at a time, have students remove 3 counters from the pile and write the subtraction equation that corresponds with their counters on white boards. Ex: The first students removes 3 counters from the pile and writes: 15-3=12. The second student removes 3 counters from the pile and write 12-3=9. Students continue to remove counters and write subtraction equations

until there are no more counters in the pile. Have students count the number of times they subtracted 3 and write the division equation. Discuss the relationship between subtraction and division. Provide Reteach 6.5 for additional practice if needed.
Tier 2: Use the masking tape and index cards to make a large, 0-12 number line on the floor. Ask a volunteer to stand on 8 and then jump back 2 spaces until he or she reaches 0. Have the student place a counter on the index card at each number he or she lands on. Ask students how many counters are on the number line and how many jumps were made. Write the division sentence on the board and discuss how each number in the equation was modeled by the activity. Provide Reteach 6.5 for additional practice if needed.
Enrich: Write the following riddle on the board: Subtract 3 from me 6 times and you will reach 0. What number am I? Have students solve the problem and then write the division equation it represents. Then have students write their own division riddles. Provide Enrich 6.5 for additional practice if needed.

Mid-Chapter Checkpoint
At this point in the unit, students will complete a "mid-chapter checkpoint" which is a formal assessment for Lessons 1-5 of this unit. (Student book pages 229-230) Use this assessment to determine if additional instruction is needed on division concepts previously taught.

Lesson 6: Model with Arrays
Objective: Students will be able to model division by using arrays.

Essential Question: How can you use arrays to solve division problems?

- Common Core Standards Addressed: CC.3.OA.2-Interpret whole-number quotients of whole numbers, e.g., interpret 56 divided by 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are portioned into equal shares of 8 objects each.
  CC.3.OA.3-Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.
- Materials Needed: pages 231-234 in GO Math student edition
  SmartBoard
  math journals
  white board
  square tiles
  Standards Practice 6.6(worksheet/homework)

Reteach 6.6 (if needed)
Enrich 6.6 (if needed)
square tiles (RTI-Tier 1)
square tiles (RTI-Tier 2)
1-centimeter grid paper (RTI-Enrich)

- Vocabulary: no new vocabulary

Lesson Overview:

- *Essential Question/Purpose*-Tell students that today they will be learning how they can use arrays to solve division problems.
- *Engage (Access Prior Knowledge)*-Have students use square tiles to review making arrays for multiplication. Remind students that an array is a set of objects arranged in rows and columns. There is the same number in each row. Ask students to think about an example of a time in the real world where arrays might be found (chairs, desks, parking lots, etc.) Have students model 4 x 5= using their tiles. Discuss how they found the product.
- *Teach and Talk-*
  INVESTIGATE: Have students open their GO Math Student Edition to page 231. Project GO Math Student Edition (page 231) on SmartBoard. Students will work with a partner. Provide each group of partners with 30 square tiles. Ask students to make an array to find how many rows of 5 are in 30. Have students to make a row of 5 tiles and continue to make as many rows of 5 tiles as they can. Ask students to share how many rows they made.
  DRAW CONCLUSIONS: Have students draw the array they made using the square times on page 232. Discuss how to write a division equation using the square tiles. Ask students why 30 is the dividend and what represents the quotient in this array.
  TRY THIS-Provide students with 24 tiles. Ask students to (individually) make an array with the same number of tiles in 4 rows. Direct students to place 1 tile in each of 4 rows and continue placing 1 tile in each row until all tiles have been used. Then have students draw the array they completed using tiles and write the division equation (student book page 232).
- *Practice-*
  SHARE AND SHOW (guided practice)
  Have students complete #1 and #5 and discuss with a partner. Review answers and strategies whole group to ensure understanding. Then have students continue to work individually to complete pages 233-234.
  Conclusion-Provide index card. Refer to the essential question. Ask students to demonstrate the answer to essential questions by drawing square tiles and using their drawing to answer a division equation. Provide standards practice book 6.6 for homework.

- *Response to Intervention-*
  Tier 1: Give students 10 tiles. Have students arrange the tiles in rows of 5 tiles each. Ask how many tiles are in each row and how many rows are there. Model how to write a division equation for the example. Ask students to think of another way to arrange the 10 tiles in the array and have them provide a division equation for that array. Ask students to share thoughts about the arrays (similarities/differences). Provide Reteach 6.6 for additional practice if needed.
  Tier 2: Model how to make an array with 3 rows of 6 tiles each. Ask students: How many tiles are in all; how many tiles are in each row; how many rows are there? Have students help to write a division equation for the array. Verbally connect each number in the division equation to the array. Give students 15 tiles and ask them to make an array with 3 tiles in each row. Ask students the same questions from the first example. Then have them use their answers to write a division equation. Provide Reteach 6.6 for additional practice if needed.
  Enrich: Write the following numbers on the board: 18, 20, 24, and 30. Have students choose one of the numbers. Tell students to draw as many arrays as possible to represent that number on the grid paper. Each array should have from 1-10 rows and columns. Then have students write a corresponding division equation for each array. Provide Enrich 6.6 for additional practice if needed.

Lesson 7: Algebra: Relate Multiplication and Division
Objective: Students will be able to use bar models and arrays to relate multiplication and division as inverse operations.

Essential Question: How can you use multiplication to divide?

- Common Core Standards Addressed: CC.3.OA.3-Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.
  CC.3.OA.2-Interpret whole-number quotients of whole numbers, e.g., interpret 56 divided by 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are portioned into equal shares of 8 objects each.
  CC.3.OA.6-Understand division as an unknown-factor problem
  CC.3.OA.7-Fluently multiply and divide within 100, using strategies such as the relationship between division and multiplication or properties of operations.
  CC.3.OA.4- Determine the unknown whole number in a multiplication or division equation relating three whole numbers. For example, determine the unknown number that makes the equation true in each of the equations $8 \times ? = 48$, $5 = \_ \div 3$, $6 \times 6 = ?$

- Materials Needed: pages 235-237 in GO Math student edition
  SmartBoard
  math journals
  white board
  Standards Practice 6.7(worksheet/homework)
  Reteach 6.7 (if needed)
  Enrich 6.7 (if needed)
  square tiles (RTI-Tier 1)
- Vocabulary: inverse operations

Lesson Overview:

- *Essential Question/Purpose*-Tell students that today they will be learning how division is related to subtraction. Show the essential question and tell students that by the end of the lesson, they will be able to answer this question.
- *Engage (Access Prior Knowledge)*-Review how to model a division problem using counters. Using a divisor of 2 or 5, make models using groups of 2 or 5 and some by using 2 or 5 equal groups. Ask students to think of a word problem (division and multiplication) that could represent the model.
- *Teach and Talk-*
  UNLOCK THE PROBLEM: Have students open their GO Math Student Edition to page 235. Project GO Math Student Edition (page 235) on SmartBoard. Read "Unlock the Problem" aloud for students. Ask students "When we are solving word problems, what are the steps that we take?" Students should respond by stating that we find the question, underline it, find the information provided, and circle the pieces of information. Instruct students to follow these steps in their book.
  ONE WAY: This method uses bar models to show how multiplication and division are related. Ask students what number should go in each bar. Then ask students to think about how they can check their answers. Have students share in partners and then share with whole group. Ask students how they know when to divide and when to multiply to solve a word problem. Discuss "key words or clue words" to help decide which operation to use. Discuss how multiplication and division are related. Introduce "inverse operations" and discuss that "inverse" means opposite. Have them enter definition into their math journals. Discuss how addition and subtraction are also inverse operations. Provide additional examples if needed.
  ANOTHER WAY: This way uses arrays to show the relationship between multiplication and division. Show page 236 on board. Ask students "how can the array show both a division problem and a multiplication problem?"
- *Practice-*
  SHARE AND SHOW (guided practice)

Have students complete #1 and then discuss with a partner. Check for understanding through observation. Have students complete #2-#6 to check for understanding.
ON YOUR OWN
Allow students to complete page 237-238 individually. Work with any student(s) who may be struggling with the concept. Provide additional problems for practice. Provide students who may have mastered the concept with peer-tutoring opportunities for struggling students or additional math practice with division flash cards.

- *Conclusion*-Ask students "how can you use multiplication to divide?" Use as an exit ticket. Provide standards practice book 6.7 for homework.
- *Response to Intervention*-
  Tier 1: Give each small group 12 tiles and have students make an array with 3 rows of 4 tiles each. Have students write the multiplication equation that shows 3 groups of 4. Ask students if they can use the same array to solve the division problem of 12 ÷ 4. Have students identify the rows of 4 and ask how many groups of 4 are in 12. Repeat the activity by having students make another array and then write a multiplication and division equation for it. Discuss how multiplication and division are related. Provide Reteach 6.7 for additional practice if needed.
  Tier 2: Help students understand the relationship between multiplication and division by having them act out situations about forming teams. Say "Suppose we need 3 teams of 2 people to play a game. How many players in all would be on the 3 teams?" Ask students to form teams to act out the situation. Guide students to understand that multiplication can be used to find how many players there are in all. Write 3 x 2 = 6 on a white board. Now say "Suppose we have 6 players and want to form 3 equal teams. How many players would be on each team?" Have 6 students act out the new situation. Write the division equation 6 ÷ 3 =2 on a white board. Discuss how the 2 situations are related. Provide Reteach 6.7 for additional practice if needed.
  Enrich: Have students write the following equations in their journals:
  1. 20 ___ 5 = 5 ___ 5
  2. 9 ___ 4 = 40 ___ 4
  3. 16 ___ 2 = 10 ___ 2
  4. 45 ___ 5 = 9 ___ 1

  Have students complete the missing blanks by using + , - , x , or ÷.
  Then ask students to write at least 2 more operation equations like the examples.
  Provide Enrich 6.7 for additional practice if needed.

Lesson 8: Write Related Facts
Objective: Students will be able to write related multiplication and division facts.

Essential Question: How can you write a set of related multiplication and division facts?

- Common Core Standards Addressed: CC.3.OA.3-Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.
  CC.3.OA.2-Interpret whole-number quotients of whole numbers, e.g., interpret 56 divided by 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are portioned into equal shares of 8 objects each.
  CC.3.OA.7-Fluently multiply and divide within 100, using strategies such as the relationship between division and multiplication or properties of operations.
- Materials Needed: pages 235-237 in GO Math student edition
  SmartBoard
  math journals
  white board
  square tiles
  Standards Practice 6.8 (worksheet/homework)
  Reteach 6.8 (if needed)
  Enrich 6.8 (if needed)
  square tiles (RTI-Tier 1)
  counters (RTI-Tier 2)
- Vocabulary: related facts

Lesson Overview:

- *Essential Question/Purpose*-Tell students that today they will be learning how to write a set of related multiplication and division facts. Show the essential question and tell students that by the end of the lesson, they will be able to answer this question.
- *Engage (Access Prior Knowledge)*-Have students work in pairs, giving each other a multiplication equation with an unknown number. For example, 4 x ? = 8. The partner will state the unknown number and then gives a related multiplication equation with an unknown number for the first player to solve. For example: 2 x 4 =? Have students reverse roles and repeat the activity.
- *Teach and Talk-*
  UNLOCK THE PROBLEM: Have students open their GO Math Student Edition to page 239. Project GO Math Student Edition (page 239) on SmartBoard. Read "Unlock the Problem" aloud for students. Discuss meaning of related facts (a set of related multiplication and division equations). Have students enter the new vocabulary and definition in their math journals.
  ACTIVITY: Provide students with square tiles. Direct students through the steps of the activity and complete the related facts. After students have completed the activity, ask

the following questions: 1. How does the array show both division and multiplication? 2. Why are there only 3 numbers used in a set of related facts? 3. Suppose an array showed 4 rows of 5 tiles. What numbers would you use to write the related facts? 4. What are the related facts for 4, 5, and 20? 5. How are the equations in a set of related facts alike? How are they different? Discuss answers whole group.
TRY THIS: Show students page 240 on board (and have them turn to this page in their books). Have students complete the array with 4 rows of 4 tiles. Ask students to complete the multiplication and division equations. Discuss why there are only 2 related facts for this array. Ask students to answer these questions with partners: 1. What are some other sets of numbers that will have only two equations in the set of related facts? 2. How do you know a set of numbers will have only 2 equations in the set of related facts? Allow time for partners to discuss, then share whole group.

- *Practice-*
  SHARE AND SHOW (guided practice)
  Have students complete #1 and then discuss with a partner. Check for understanding through observation. Have students complete #2-#5 to check for understanding.
  ON YOUR OWN
  Allow students to complete page 241-242 individually. Work with any student(s) who may be struggling with the concept. Provide additional problems for practice. Provide students who may have mastered the concept with peer-tutoring opportunities for struggling students or additional math practice with division flash cards.
- *Conclusion-*Ask students to write 2 sets of related facts and to prove how they are related. Remind students of essential question and discuss answers to the essential question. Provide standards practice book 6.8 for homework.
- *Response to Intervention-*
  <u>*Tier 1*</u>: Give each student square tiles. Have students make an array with 2 rows of 6 tiles each. Have students work together to write all the multiplication and division equations they can to represent that array. Ask students what numbers were used in all the equations. Tell students that 2, 6, and 12 can be used to write related facts. Ask the groups to find another set of numbers that can be used to write related facts. Provide Reteach 6.8 for additional practice if needed.
  <u>*Tier 2*</u>: Have students use counters to make 3 groups of 4 counters. Ask students "How can we find how many counters there are in all?" Encourage students to suggest using multiplication. Repeat for 4 groups of 3 counters. Write 4 x 3= 12 on white board. Next, have students use the counters to model 12 ÷ 4 =3 and 12 ÷ 3 =4. Write equations on the board. Ask students "what do you notice about the equations?" Tell students that four number equations make up the related facts for 3, 4, and 12. Discuss how the equations are related. Provide Reteach 6.8 for additional practice if needed.
  <u>*Enrich*</u>: Draw 2 arrays on the board (2 x 2 and 3 x 3). Point out that each array have the same number of rows and columns. Explain that 4 and 9 are called square numbers

because the tiles form a square shape. Have students continue the pattern and find the next two square numbers. They should draw the arrays for the numbers. Provide Enrich 6.8 for additional practice if needed.

Lesson 9: Division Rules for 1 and 0
Objective: Students will be able to divide using the rules for 1 and 0.

Essential Question: What are the rules for dividing with 1 and 0?

- Common Core Standards Addressed: CC.3.OA.3-Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.
  CC.3.OA.2-Interpret whole-number quotients of whole numbers, e.g., interpret 56 divided by 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are portioned into equal shares of 8 objects each.
  CC.3.OA.7-Fluently multiply and divide within 100, using strategies such as the relationship between division and multiplication or properties of operations.
  CC.3.OA.5-Apply properties of operations as strategies to multiply and divide (Commutative property of multiplication, Associative property of multiplication, Distributive property).

- Materials Needed: pages 243-246 in GO Math student edition
  SmartBoard
  math journals
  white board
  counters
  Standards Practice 6.9 (worksheet/homework)
  Reteach 6.9 (if needed)
  Enrich 6.9 (if needed)
  counters, paper plates (RTI-Tier 1)
  connecting cubes, transparent cups (RTI-Tier 2)
- Vocabulary: no new vocabulary

Lesson Overview:
- *Essential Question/Purpose*-Tell students that today they will be learning the rules for dividing with 1 and 0. Show the essential question and tell students that by the end of the lesson, they will be able to answer this question.

- *Engage (Access Prior Knowledge)*-Review using counters to model division problems. Solve division problems by finding the number in each group and some by finding the number of groups. Ask students "How do you know when to divide and when to multiply to solve a problem?"
- *Teach and Talk-*
  UNLOCK THE PROBLEM: Have students open their GO Math Student Edition to page 243. Project GO Math Student Edition (page 243) on SmartBoard. Read "Unlock the Problem" aloud for students. Discuss Rule A (Any number divided by 1 equals that number) and have students write this rule in their journals. Have students complete the quick picture to show the fish in the fishbowl. Provide additional examples of the rule if needed. Discuss Rule B (Any number (except 0) divided by itself equals 1) and have students write this rule in their journals. Have students complete the quick picture to show the fish in the fishbowl. Provide additional examples of the rule if needed. Have students turn to page 244. Read the problem aloud. Discuss Rule C (Zero divided by any number (except 0) equals 0) and have students write this rule in their journals. Have students complete the quick picture to show the fish in the fishbowl. Provide additional examples if needed. Discuss rule D (You cannot divide by 0) and have students write this rule in their journals.
- *Practice-*
  SHARE AND SHOW (guided practice)
  Have students complete #1. Check for understanding through observation. Discuss their answers. Have students complete #2-#5 to check for understanding.
  ON YOUR OWN
  Allow students to complete page 245-246 individually. Work with any student(s) who may be struggling with the concept. Provide additional problems for practice. Discuss "Connect to Reading" on page 246. Briefly remind students about comparing and contrasting.
- *Conclusion*-Provide students with 5 division equations using 1 and 0. Have them complete and turn in. Check for understanding through completion. Review essential question and discuss. Provide standards practice book 6.9 for additional practice as homework.
- *Response to Intervention-*
  Tier 1: Ask students to model $0 \div 3$ using counters and paper plates. Explain to students that the dividend, 0, represents the total number of counters and the divisor, 3, represents the total number of paper plates. The number of counters on each plate equals 0. So, $0 \div 3 = 0$. Ask students if they could model $3 \div 0$, where 3 is the number of counters and 0 is the total number of plates. Students should see that it is impossible to divide a number of counters equally among 0 paper plates. So, you cannot divide by 0. Provide Reteach 6.9 for additional practice if needed.

Tier 2: Give each student 2 connecting cubes and 1 cup. Ask "how many cubes can you put in the cup?" Discuss and guide students to write a division equation related to the model. Give each student another cup. Ask them to divide the cubes equally among the cups. Ask "How many cubes will be in each cup?" Guide students to write a division equation for this model. Remove the cubes and ask students how many cubes are in each cup now. Ask students to write a division equation for this model. Remove the cups and give each students 2 cubes. Ask the students "can you divide the cubes equally into 0 cups?" Explain that dividing by 0 is impossible. Provide Reteach 6.9 for additional practice if needed.

Enrich: Have students complete the equations below by filling each blank with +, -, x, or ÷.

5 ___ 3 ___ 4=11

3 ___ 4 ___ 5=7

0 ___ 8 ___ 6=6

9 ___ 1 ___ 3 =3

Then have students write their own mystery operation exercises. Tell students to begin with multiplication or division. This will allow them to follow the order of operations which they will learn in Chapter 7. Provide Enrich 6.9 for additional practice if needed.

Chapter 6 Review/Test

This can be found in the student GO Math book pages 247-250. This can be used either as review for the test or as a formal assessment. Review the chapter essential question, "How can you use division to find how many in each group or how many equal groups?" Ask students "How are multiplication and division related?" Then ask "What models can help you divide?" Also ask "How can subtraction help you divide?"

After completion, use the rubric on page 249-250 of the GO Math teacher edition to evaluate students' completion of the performance task.

Chapter 6 Assessment

There are 27 questions on the assessment. #1-13 are multiple choice questions. #13-25 require students to solve the problem and write the answer. #26 is a constructed response and #27 is an extended constructed response. Use rubric provided to score.

Chapter 6

School-Home Letter

Dear Family,

During the next few weeks, our math class will be learning about division. We will learn how division is related to subtraction, and how multiplication and division are inverse operations.

You can expect to see homework that provides practice with division.

Here is a sample of how your child will be taught to use repeated subtraction to solve division problems.

Vocabulary

dividend The number that is to be divided in a division problem

dividend, divisor, quotient The parts of a division problem. There are two ways to record division.

$$\underset{\text{dividend}}{10} \div \underset{\text{divisor}}{2} = \underset{\text{quotient}}{5}$$

$$\text{divisor} \rightarrow 2\overline{)10} \leftarrow \text{dividend}, \quad 5 \leftarrow \text{quotient}$$

MODEL Use Repeated Subtraction to Divide

This is how we will be using repeated subtraction to divide.

STEP 1

Start with the dividend and subtract the divisor until you reach 0.

$15 \div 5 = \_\_\_\_$

$$\begin{array}{r} 15 \\ -\ 5 \\ \hline 10 \end{array} \quad \begin{array}{r} 10 \\ -\ 5 \\ \hline 5 \end{array} \quad \begin{array}{r} 5 \\ -\ 5 \\ \hline 0 \end{array}$$

STEP 2

Count the number of times you subtract 5.

$$\begin{array}{rrr} 15 & 10 & 5 \\ -\ 5 & -\ 5 & -\ 5 \\ \hline 10 & 5 & 0 \end{array} \quad \text{(3 times)}$$

There are 3 groups of 5 in 15.

STEP 3

Record the quotient.

$15 \div 5 = 3$, or

$$5\overline{)15}^{\,3}$$

Fifteen divided by 5 equals 3.

Tips

Counting Back on a Number Line

Counting back on a number line is another way to find a quotient. On a 0–15 number line, for example, start at 15 and count back by 5s to 0. Then count the number of jumps on a number line (3 jumps) to find that $15 \div 5 = 3$.

Activity

Display a number of objects that are divisible by 5. Have your child use repeated subtraction to solve division problems. For example: "Here are 20 crayons. I want to subtract 5 crayons at a time until there are no crayons left. How many times can I subtract?" Check answers by arranging the objects.

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Chapter 6

Understand Division

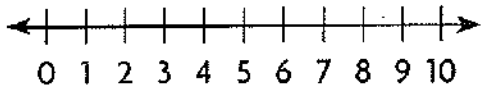
Show What You Know

Check your understanding of important skills.

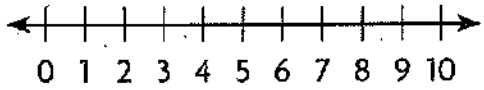
Name _____

Count Back to Subtract Use the number line. Write the difference.

1. $8 - 5 =$ _____



2. $9 - 4 =$ _____



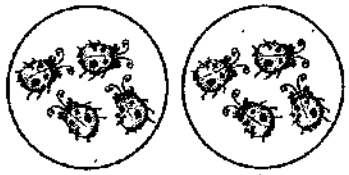
Count Equal Groups Complete.

3.

_____ groups

_____ in each group

4.



_____ groups

_____ in each group

Multiplication Facts Through 9 Find the product.

5. $8 \times 5 =$ _____

6. _____ $= 7 \times 7$

7. $3 \times 9 =$ _____

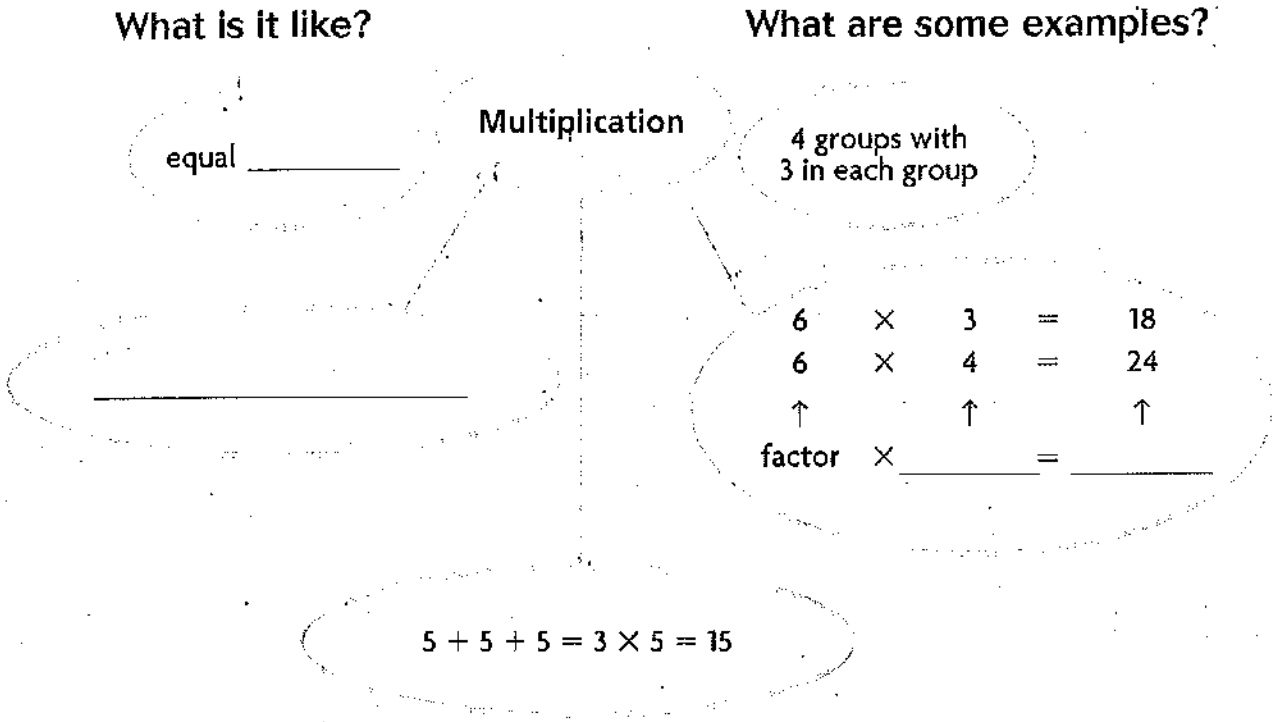
The table shows 3 different ways you can score points in basketball. Corina scored 12 points in a basketball game. Be a Math Detective to find the greatest number of field goals she could have scored. Then find the greatest number of 3-pointers she could have scored.

Scoring Points in Basketball	
free throw	1 point
field goal	2 points
3-pointer	3 points

Vocabulary Builder

Visualize It

Complete the bubble map by using the words with a ✓.



Understand Vocabulary

Draw a line to match each word or term with its definition.

Preview Words	Definitions
1. dividend	A set of related multiplication and division equations
2. related facts	The number that divides the dividend
3. divisor	The number that is to be divided in a division problem

Review Words

array
✓ equal groups
equation
✓ factor
Identity Property of Multiplication
✓ product
✓ repeated addition

Preview Words

divide
dividend
divisor
inverse operations
quotient
related facts

Online • eStudent Edition • Multimedia eGlossary

Name _____

Problem Solving • Model Division

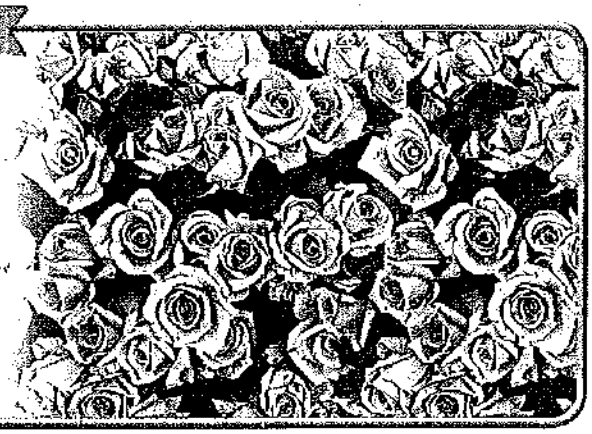
Essential Question How can you use the strategy *act it out* to solve problems with equal groups?

COMMON CORE STANDARD CC.3.OA.3
Represent and solve problems involving multiplication and division.

UNLOCK the Problem REAL WORLD

Stacy has 16 flowers. She puts an equal number of flowers in each of 4 vases. How many flowers does Stacy put in each vase?

Use the graphic organizer below to solve the problem.



Read the Problem

What do I need to find?

I need to find the number

of _____ Stacy puts in

each _____.

What information do I need to use?

Stacy has _____ flowers.
She puts an equal number of flowers in each of

_____ vases.

How will I use the information?

I will act out the problem

by making equal _____
with counters.

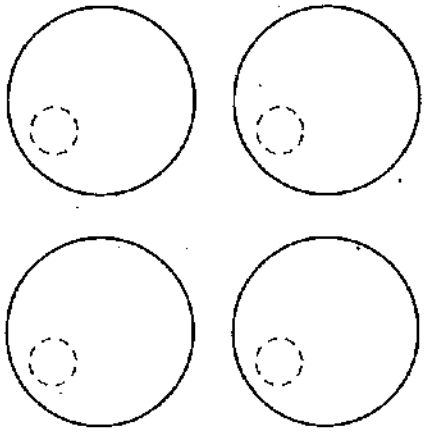
Solve the Problem

Describe how to act out the problem to solve.

First, count out _____ counters.

Next, make _____ equal groups. Place 1 counter at a time in each group until all 16 counters are used.

Last, draw the equal groups by completing the picture below.



So, Stacy puts _____ flowers in each vase.

Try Another Problem

Hayden is planning a party. He bakes 21 cookies. If he plans to give each person 3 cookies, how many people will be at his party?

Read the Problem	Solve the Problem
What do I need to find?	**Describe how to act out the problem to solve.**
What information do I need to use?	
How will I use the information?	

- How can you check your answer is reasonable? _____

_____

_____

MATHEMATICAL PRACTICES

Math Talk Explain how acting out a problem helps you solve it.

Name _____

Share and Show MATH BOARD

Tips

UNLOCK the Problem

- ✓ Circle the question.
- ✓ Underline important facts.
- ✓ Act out the problem with counters.

1. Sue is having a party. She has 16 cups. She puts them in 2 equal stacks. How many cups are in each stack?

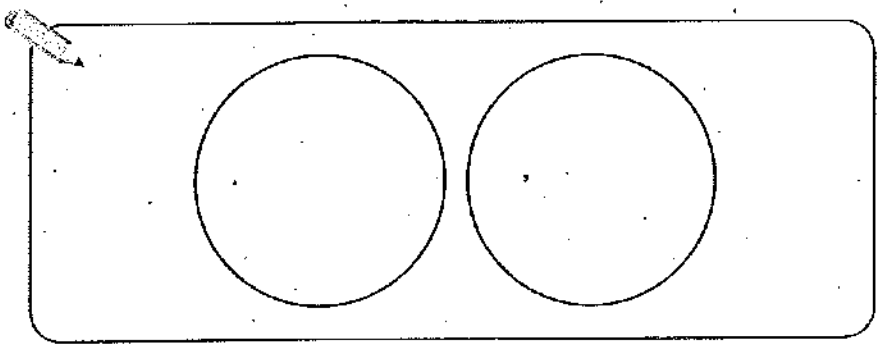
   First, decide how to act out the problem.

   You can use counters to represent the _____.

   You can draw _____ to represent the stacks.

   Then, draw to find the number of _____ in each stack.

SHOW YOUR WORK



There are _____ groups. There are _____ counters in each group.

So, there are _____ cups in each stack.

2. H.O.T. **What if** Sue has 24 cups and puts 4 cups in each stack? If she already made 4 stacks, how many more stacks can she make with the remaining cups?

_____

3. At Luke's school party, the children get into teams to play a game. If there are 35 children and they make teams of 5, how many teams are there?

_____

4. Anne put 20 cupcakes on 4 plates. If she put the same number of cupcakes on each one, how many cupcakes did she put on each plate?

_____

On Your Own

Use the table for 5–6.

5. Sadie's plates came in packages of 5. How many packages of plates did she buy?

_____

6. Write Math Sadie bought 4 packages of napkins and 3 packages of cups. Which item had more in each package? How many more? **Explain** how you found your answer.

_____

_____

_____

_____

_____

Sadie's Party Supplies

Item	Number
Plates	30
Napkins	28
Cups	24

Choose a STRATEGY

- Act It Out
- Draw a Diagram
- Find a Pattern
- Make a Table

SHOW YOUR WORK

7. Megan put 3 red balloons and 4 white balloons at each of 4 tables. How many balloons are at the tables altogether?

_____

8. H.O.T. There are 12 cookies on plates. List all the ways the cookies could be put equally on the plates.

_____

_____

_____

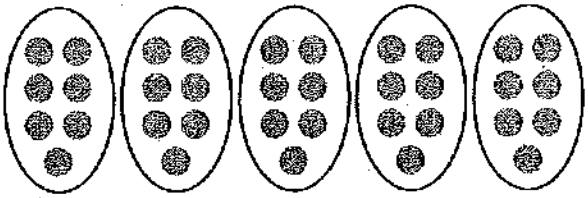
9. **Test Prep** Miguel bought 18 party favors. He gave 2 party favors to each of the children at his party. How many children were at Miguel's party?

Ⓐ 20 Ⓑ 16 Ⓒ 9 Ⓓ 8

Name _____

Problem Solving • Model Division

There are 35 people going to the amusement park. They will all travel in 5 vans with the same number of people in each van. How many people will travel in each van?

Read the Problem	Solve the Problem
What do I need to find? I need to find the number of people who will travel in each van. **What information do I need to use?** There are 35 people. 5 vans are taking all the people to the amusement park. **How will I use the information?** I can act out the problem by making equal groups with counters.	**Describe how to act out the problem to solve.** **Step 1** Start with 35 counters. **Step 2** Make 5 equal groups. Place 1 counter at a time in each group until all 35 counters are used. **Step 3** Count the number of counters in each group. 7  So, 7 people will travel in each van.

1. José packs 54 CDs into small boxes. Each box holds 9 CDs. How many boxes does José pack to hold all 54 CDs?

2. Mary volunteers at the library. She has 36 books to put on 4 empty shelves. If Mary puts an equal number of books on each shelf, how many books will be on each shelf?

Name _____

Modeling Problems

Model the problem to solve.

1. Gina needs to make 4 centerpieces with the same number of flowers in each centerpiece for the tables at her party. She bought 32 flowers to use. How many flowers will be in each centerpiece?

_____

2. Gina bought 18 balloons. If she makes 3 equal groups of balloons, how many balloons will be in each group?

_____

3. Gina bought 24 plates. If she stacks them in groups of 8, how many stacks of plates will she make?

_____

4. There will be a total of 20 people at the party. There are 4 tables. If Gina wants an equal number of people at each table, how many chairs should she set at each table?

_____

5. **Stretch Your Thinking** Find three more ways Gina could stack 24 plates into equal stacks, with at least 3 plates in a stack. Tell the number of stacks and how many would be in each stack.

_____

_____

TEST PREP

Lesson Check (CC.3.OA.3)

1. Maria buys 15 apples at the store and places them into bags. She puts 5 apples into each bag. How many bags does Maria use for all the apples?

Ⓐ 2 Ⓒ 4

Ⓑ 3 Ⓓ 10

2. Tom's neighbor is fixing a section of his walkway. He has 32 bricks that he is placing in 8 equal rows. How many bricks will Tom's neighbor place in each row?

Ⓐ 3 Ⓒ 5

Ⓑ 4 Ⓓ 6

Spiral Review (CC.3.OA.1, CC.3.OA.4, CC.3.OA.5, CC.3.MD.4)

3. Find the unknown factor. (Lesson 5.2)

$$7 \times \square = 56$$

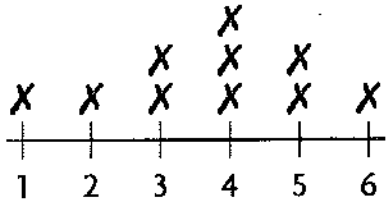
Ⓐ 6

Ⓑ 7

Ⓒ 8

Ⓓ 9

4. How many students practiced the piano more than 3 hours a week? (Lesson 2.7)

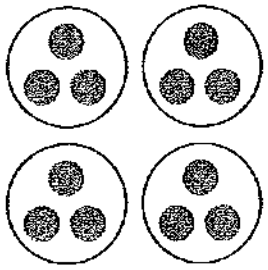


Piano Practice Hours

Ⓐ 2 Ⓒ 8

Ⓑ 6 Ⓓ 10

5. Count equal groups to find how many there are. (Lesson 3.1)



Ⓐ 3 Ⓒ 12

Ⓑ 4 Ⓓ 16

6. Which is another way to group the factors? (Lesson 4.6)

$(3 \times 2) \times 5$

Ⓐ $(3 + 2) + 5$

Ⓑ $(3 \times 2) + 5$

Ⓒ $3 \times (2 + 5)$

Ⓓ $3 \times (2 \times 5)$

Name _____

Problem Solving • Model Division

COMMON CORE STANDARD CC.3.OA.3

Represent and solve problems involving multiplication and division.

Solve each problem.

1. Six customers at a toy store bought 18 jump ropes. Each customer bought the same number of jump ropes. How many jump ropes did each customer buy?

   3 jump ropes

2. Hiro has 36 pictures of his summer trip. He wants to put them in an album. Each page of the album holds 4 pictures. How many pages will Hiro need for his pictures?

3. Katia has 42 crayons in a box. She buys a storage bin that has 6 sections. She puts the same number of crayons in each section. How many crayons does Katia put in each section of the storage bin?

4. Ms. Taylor's students give cards to each of the 3 class parent helpers. There are 24 cards. How many cards will each helper get if the students give an equal number of cards to each helper?

5. Jamie divides 20 baseball stickers equally among 5 of his friends. How many stickers does each friend get?

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Name _____

Size of Equal Groups

Essential Question How can you model a division problem to find how many in each group?

COMMON CORE STANDARD **CC.3.OA.2**
Represent and solve problems involving multiplication and division.

UNLOCK the Problem REAL WORLD

Hector has 12 rocks from Onondaga Cave State Park. He puts an equal number of his rocks in each of 3 boxes. How many rocks are in each box?

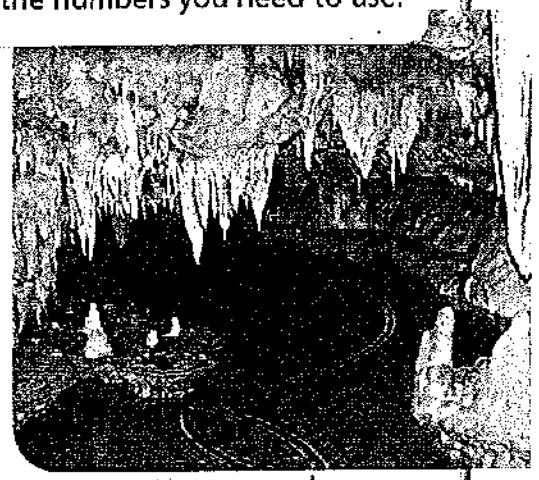
- What do you need to find?

_____

- Circle the numbers you need to use.

When you multiply, you put equal groups together. When you **divide**, you separate into equal groups.

You can divide to find the number in each group.



▲ **Onondaga Cave is located in Leasburg, Missouri. Over the years, water has formed flowstones and other colorful deposits.**

Activity Use counters to model the problem.

Materials ■ counters ■ MathBoard

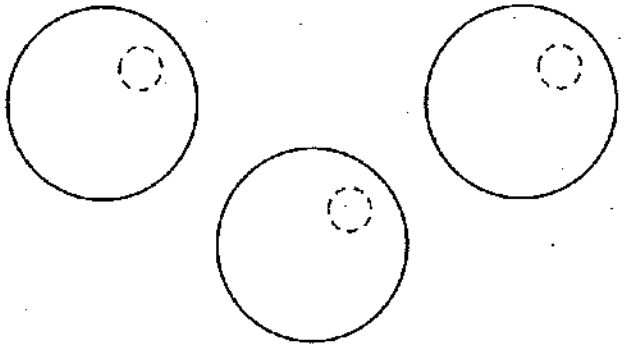
STEP 1

Use 12 counters.

_____

STEP 2

Draw 3 circles on your MathBoard. Place 1 counter at a time in each circle until all 12 counters are used. Draw the rest of the counters to show your work.



There are _____ counters in each group.

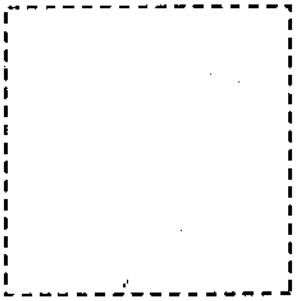
So, there are _____ rocks in each box.

Try This!

Madison has 15 rocks. She puts an equal number of rocks in each of 5 boxes. How many rocks are in each box?

STEP 1

Draw 5 squares to show 5 boxes.



STEP 2

Draw 1 counter in each square to show the rocks. Continue drawing 1 counter at a time in each box until all 15 counters are drawn.

There are _____ counters in each group.

So, there are _____ rocks in each box.

MATHEMATICAL PRACTICES

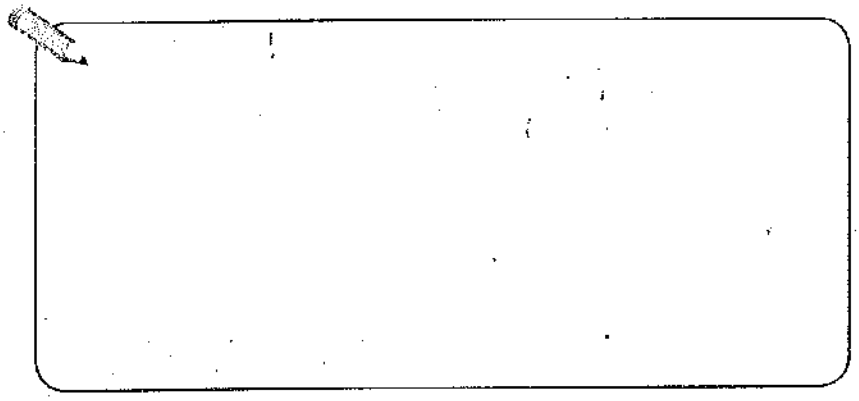
Math Talk Describe another way to arrange 15 counters to make equal groups.

1. How many counters did you draw? _____
2. How many equal groups did you make? _____
3. How many counters are in each group? _____

Name _____

Share and Show MATH BOARD

1. Jon has 8 counters. He makes 4 equal groups. Draw a picture to show the number of counters in each group.



MATHEMATICAL PRACTICES

Math Talk Explain how you made the groups equal.

Use counters or draw a quick picture on your MathBoard. Make equal groups. Complete the table.

	Counters	Number of Equal Groups	Number in Each Group
✓ 2.	10	2	
✓ 3.	24	6	
4.	12	4	

On Your Own

Use counters or draw a quick picture on your MathBoard. Make equal groups. Complete the table.

	Counters	Number of Equal Groups	Number in Each Group
5.	14	7	
6.	21	3	
7.	20	5	
8.	12	6	
9.	36	9	

Problem Solving REAL WORLD

Use the table for 10–11.

Photos	
Name	**Number of Photos**
Madison	28
Joe	25
Ella	15

SHOW YOUR WORK

10. Madison puts all of her photos in a photo album. She puts an equal number of photos on each of 4 pages in her album. How many photos are on each page?

_____

11. H.O.T. Joe and Ella combine their photos. Then they put an equal number on each page of an 8-page photo album. How many photos are on each page?

_____

12. Write Math Rebekah's family found 30 sand dollars. **Explain** how to share the sand dollars equally among the 6 people in her family.

_____

_____

_____

_____

_____

13. Test Prep Zana has 9 rocks from a trip. She puts an equal number of rocks in each of 3 bags. How many rocks are in each bag?

Ⓐ 27 Ⓒ 6

Ⓑ 12 Ⓓ 3

Name _____

Size of Equal Groups

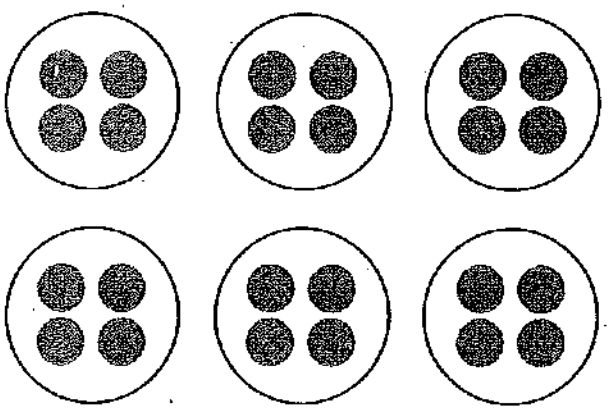
When you **divide**, you separate into equal groups.

Use counters or draw a quick picture. Make equal groups. Complete the table.

Counters	Number of Equal Groups	Number in Each Group
24	6	

The number in each group is unknown, so divide.

Place 1 counter at a time in each group until all 24 counters are used.



There are 4 counters in each of 6 groups.

Use counters or draw a quick picture. Make equal groups. Complete the table.

	Counters	Number of Equal Groups	Number in Each Group
1.	12	2	
2.	10	5	
3.	16	4	
4.	24	3	
5.	15	5	

Name _____

Matching Models

Draw a line to match each word problem with the model you can use to solve it. Then write the answer.

1. Sean has 15 baseball cards. He puts them into equal groups. How many baseball cards does Sean put in each group?

_____

2. Lucy has a box of 24 cookies. She divides them equally among some friends. How many cookies does each friend receive?

_____

3. Eddie has 56 coins in his collection. He separates the coins into equal groups. How many coins are in each group?

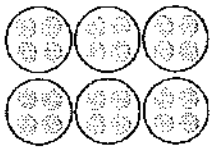
_____

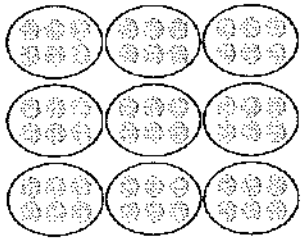
4. Michael bought 54 juice boxes for a picnic. He plans to put an equal number at each of the picnic tables. How many juice boxes will Michael put at each table?

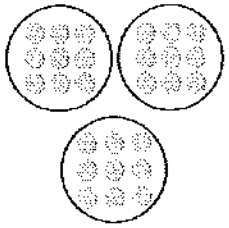
_____

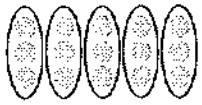
5. Leona has 27 feathers to put on some masks. She uses the same number of feathers on each mask. How many feathers does she use on each mask?

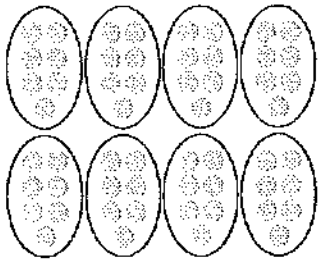
_____

A 

B 

C 

D 

E 

Name _____

Size of Equal Groups

COMMON CORE STANDARD CC.3.OA.2
Represent and solve problems involving multiplication and division.

Use counters or draw a quick picture. Make equal groups. Complete the table.

	Counters	Number of Equal Groups	Number in Each Group
1.	15	3	5
2.	21	7	
3.	28	7	
4.	32	4	
5.	9	3	
6.	18	3	
7.	20	5	
8.	16	8	
9.	35	5	
10.	24	3	

Problem Solving REAL WORLD

11. Alicia has 12 eggs that she will use to make 4 different cookie recipes. If each recipe calls for the same number of eggs, how many eggs will she use in each recipe?

_____

12. Brett picked 27 flowers from the garden. He plans to give an equal number of flowers to each of 3 people. How many flowers will each person get?

_____

TEST PREP

Lesson Check (CC.3.OA.2)

1. Ryan has 21 pencils. He wants to put the same number of pencils in each of 3 pencil holders. How many pencils will he put in each pencil holder?

   Ⓐ 6
   Ⓑ 7
   Ⓒ 8
   Ⓓ 9

2. Corrine is setting out 24 plates on 6 tables for a dinner. She sets the same number of plates on each table. How many plates does Corrine set on each table?

   Ⓐ 3
   Ⓑ 4
   Ⓒ 5
   Ⓓ 6

Spiral Review (CC.3.OA.1, CC.3.OA.4, CC.3.OA.5, CC.3.OA.9)

3. Each table has 4 legs. How many legs do 4 tables have? (Lesson 3.1)

   Ⓐ 1
   Ⓑ 8
   Ⓒ 16
   Ⓓ 20

4. Tina has 3 stacks of 5 CDs on each of 3 shelves. How many CDs does she have in all? (Lesson 4.6)

   Ⓐ 14
   Ⓑ 30
   Ⓒ 35
   Ⓓ 45

5. What is the unknown factor? (Lesson 5.2)

   $7 \times \square = 35$

   Ⓐ 4
   Ⓑ 5
   Ⓒ 6
   Ⓓ 7

6. Which of the following describes a pattern in the table? (Lesson 5.1)

Number of packs	1	2	3	4	5
Number of yo-yos	3	6	9	12	7

   Ⓐ Add 2.
   Ⓑ Multiply by 2.
   Ⓒ Multiply by 3.
   Ⓓ Add 12.

Name _____

Number of Equal Groups

Essential Question How can you model a division problem to find how many equal groups?

COMMON CORE STANDARD **CC.3.OA.2**
Represent and solve problems involving multiplication and division.

CONNECT You have learned how to divide to find the number in each group. Now you will learn how to divide to find the number of equal groups.

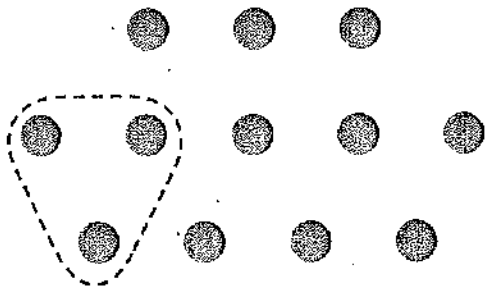
UNLOCK the Problem REAL WORLD

William has 12 shells and some boxes. He wants to put his shells in groups of 3. How many boxes does he need for his shells?

- Underline what you need to find.
- How many shells does William want in each group? _____

Make equal groups.

- Look at the 12 counters.
- Circle a group of 3 counters.
- Continue circling groups of 3 until all 12 counters are in groups.

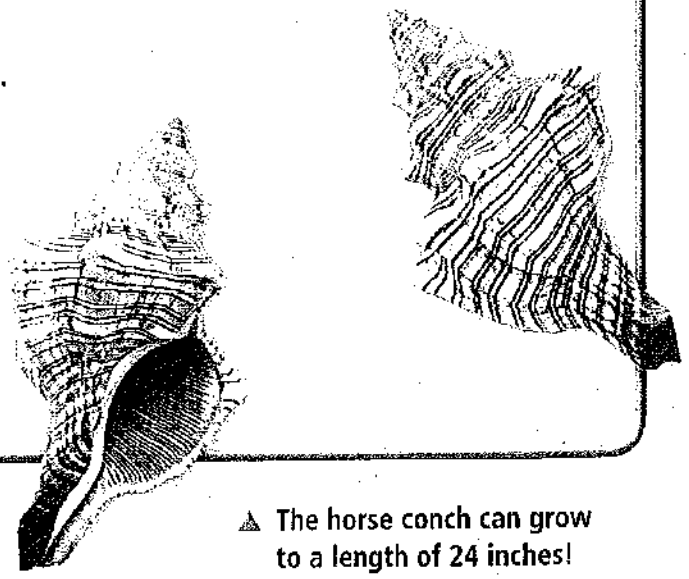


There are _____ groups of counters.

So, William needs _____ boxes for his shells.

MATHEMATICAL PRACTICES

Math Talk Explain how the drawing would change if William wanted to put his shells in groups of 4.



The horse conch can grow to a length of 24 inches!

Try This!

Sarah has 15 shells. She wants to put each group of 5 shells in a box. How many boxes does she need for her shells?

STEP 1

Draw 15 counters.

STEP 2

Make a group of 5 counters by drawing a circle around them. Continue circling groups of 5 until all 15 counters are in groups.

There are _____ groups of 5 counters.

So, Sarah needs _____ boxes for her shells.

H.O.T. **What if** Sarah puts her 15 shells in groups of 3?

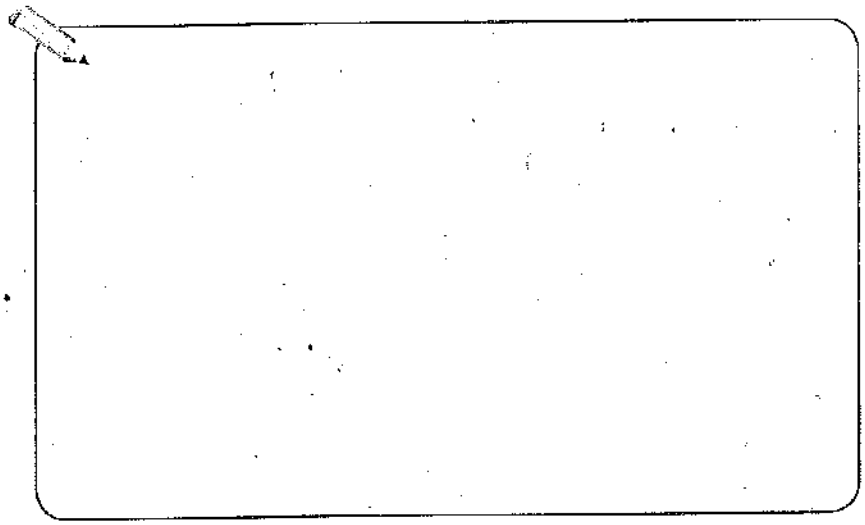
How many boxes does she need? _____

Draw a quick picture to show your work.

Name _____

Share and Show MATH BOARD

1. Emily has 12 counters. She puts them in groups of 2. Draw a picture to show the number of groups.



MATHEMATICAL PRACTICES

Math Talk Explain how you find the number of equal groups when you divide.

Draw counters on your MathBoard. Then circle equal groups. Complete the table.

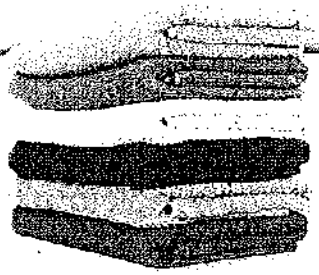
	Counters	Number of Equal Groups	Number in Each Group
✓2.	20		4
✓3.	24		3
4.	18		2

On Your Own

Draw counters on your MathBoard. Then circle equal groups. Complete the table.

	Counters	Number of Equal Groups	Number in Each Group
5.	16		8
6.	25		5
7.	27		9
8.	32		4

UNLOCK the Problem REAL WORLD



9. A store has 24 beach towels in stacks of 6 towels each. How many stacks of beach towels are at the store?

a. What do you need to find? _____

_____

b. How will you use what you know about making equal groups to solve the problem? _____

_____

c. Draw equal groups to find how many stacks of beach towels there are at the store.

d. Complete the sentences.

The store has _____ beach towels.

There are _____ towels in each stack.

So, there are _____ stacks of beach towels at the store.

10. Some friends share 35 beach toys equally. If each friend gets 5 beach toys, how many friends are there?

_____

11. Test Prep Dan's train is 27 inches long. If each train car is 3 inches long, how many train cars are there?

Ⓐ 9 Ⓒ 7

Ⓑ 8 Ⓓ 6

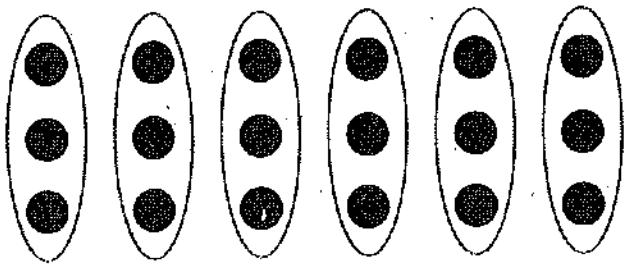
Name _____

Number of Equal Groups

Complete the table. Use counters to help find the number of equal groups.

Counters	Number of Equal Groups	Number in Each Group
18		3

The number of equal groups is unknown, so divide.
Circle groups of 3 counters until all 18 counters are in a group.



There are 6 groups of 3 counters each.

Draw counters. Then circle equal groups. Complete the table.

	Counters	Number of Equal Groups	Number in Each Group
1.	24		4
2.	20		5
3.	21		7
4.	36		4

Name _____

Eggs in One Basket

For each of the following recipes, tell how many batches can be made using 24 eggs. Draw a quick picture with counters to solve each problem.

1. A custard recipe calls for 8 eggs.

2. An omelet recipe calls for 3 eggs.

3. A muffin recipe calls for 2 eggs.

4. A French toast recipe calls for 12 eggs.

5. **Stretch Your Thinking** If one batch of cookies calls for 5 eggs, how many batches can you make with 24 eggs? Will there be any eggs left over? **Explain.**

Name _____

Number of Equal Groups

COMMON CORE STANDARD CC.3.OA.2
Represent and solve problems involving multiplication and division.

Draw counters on your MathBoard. Then circle equal groups. Complete the table.

	Counters	Number of Equal Groups	Number in Each Group
1.	24	3	8
2.	35		7
3.	30		5
4.	16		4
5.	12		6
6.	36		9
7.	18		3
8.	15		5
9.	28		4
10.	27		3

Problem Solving REAL WORLD

11. In his bookstore, Toby places 21 books on shelves, with 7 books on each shelf. How many shelves does Toby need?

_____

12. Mr. Holden has 32 quarters in stacks of 4 on his desk. How many stacks of quarters are on his desk?

_____

TEST PREP

Lesson Check (CC.3.OA.2)

1. Ramon works at a clothing store. He puts 24 pairs of jeans into stacks of 8. How many stacks does Ramon make?

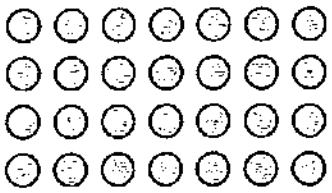
   Ⓐ 5
   Ⓑ 4
   Ⓒ 3
   Ⓓ 2

2. There are 36 people waiting in line for a hay ride. Only 6 people can ride on each wagon. If each wagon is full, how many wagons are needed for all 36 people?

   Ⓐ 5
   Ⓑ 6
   Ⓒ 7
   Ⓓ 8

Spiral Review (CC.3.OA.3, CC.3.OA.8, CC.3.OA.9, CC.NBT.3)

3. Which multiplication sentence does the array show? (Lesson 3.5)



   Ⓐ $4 \times 5 = 20$
   Ⓑ $4 \times 6 = 24$
   Ⓒ $4 \times 7 = 28$
   Ⓓ $4 \times 8 = 32$

4. Austin buys 4 boxes of nails for his project. There are 30 nails in each box. How many nails does Austin buy in all? (Lesson 5.4)

   Ⓐ 12
   Ⓑ 34
   Ⓒ 70
   Ⓓ 120

5. Which describes the number sentence? (Lesson 1.1)

$$8 + 0 = 8$$

   Ⓐ odd + odd = odd
   Ⓑ Identity Property of Addition
   Ⓒ even + even = even
   Ⓓ Commutative Property of Addition

6. Each month for 6 months, Kelsey completes 5 paintings. How many more paintings does she need to complete before she has completed 38 paintings? (Lesson 4.10)

   Ⓐ 2
   Ⓑ 6
   Ⓒ 8
   Ⓓ 9

Name _____

Model with Bar Models

Essential Question How can you use bar models to solve division problems?

COMMON CORE STANDARD CC.3.OA.2
Represent and solve problems involving multiplication and division.

UNLOCK the Problem REAL WORLD

A dog trainer has 20 dog treats for 5 dogs in his class. If each dog gets the same number of treats, how many treats will each dog get?

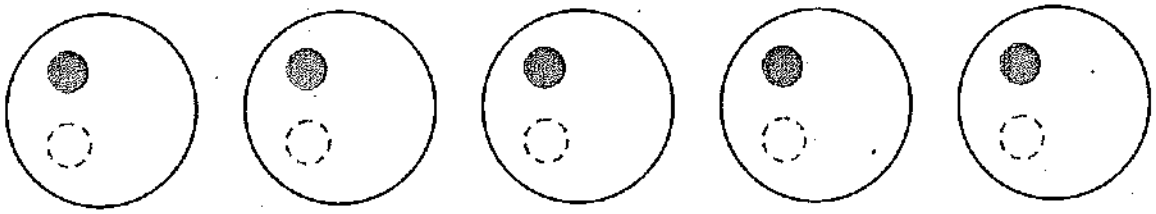
- What do you need to find?

_____

Activity 1 Use counters to find how many in each group.

Materials ■ counters ■ MathBoard

- Use 20 counters.
- Draw 5 circles on your MathBoard.
- Place 1 counter at a time in each circle until all 20 counters are used.
- Draw the rest of the counters to show your work.



There are ____ counters in each of the 5 groups.

A bar model can show how the parts of a problem are related.

- Complete the bar model to show 20 dog treats divided into 5 equal groups.

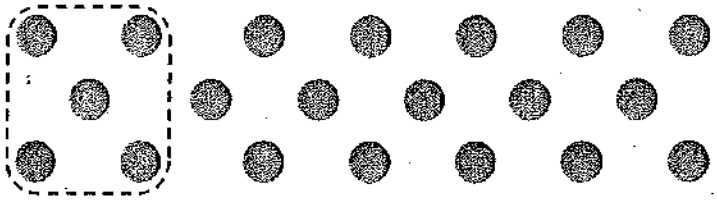
20 dog treats

So, each dog will get ____ treats.

Activity 2 Draw to find how many equal groups.

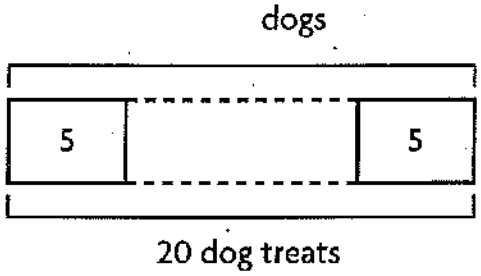
A dog trainer has 20 dog treats. If he gives 5 treats to each dog in his class, how many dogs are in the class?

- Look at the 20 counters.
- Circle a group of 5 counters.
- Continue circling groups of 5 until all 20 counters are in groups.



There are _____ groups of 5 counters.

- Complete the bar model to show 20 treats divided into groups of 5 treats.



So, there are _____ dogs in the class.

Here are two ways to record division.

Write: $20 \div 5 = 4$

dividend **divisor** **quotient**

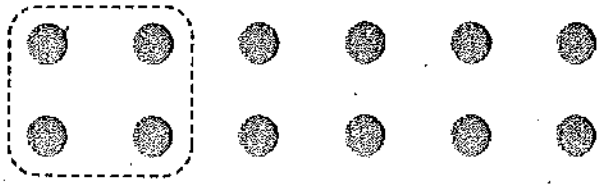
$$5\overline{)20}$$ ← divisor; 20 ← dividend; 4 ← quotient

Read: Twenty divided by five equals four.

Math Talk MATHEMATICAL PRACTICES Describe how you solved the problem. Use the terms *dividend*, *divisor*, and *quotient* in your explanation.

Share and Show MATH BOARD

1. Complete the picture to find $12 \div 4$. _____

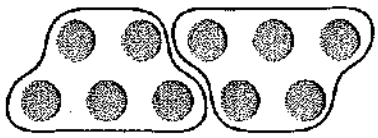


Math Talk MATHEMATICAL PRACTICES Explain how you know how many groups to make.

Name _____

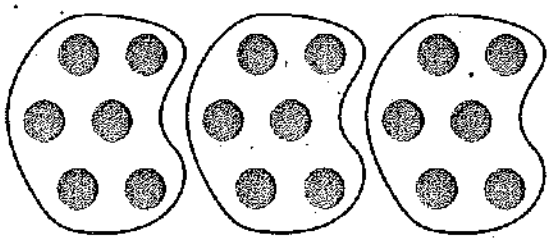
Write a division equation for the picture.

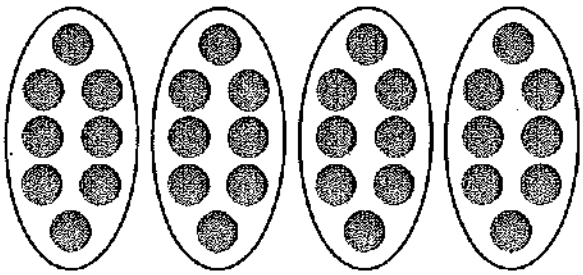
2. 

3. 

On Your Own

Write a division equation for the picture.

4. 

5. 

Practice: Copy and Solve Make equal groups to find the quotient. Draw a quick picture to show your work.

6. $20 \div 2$

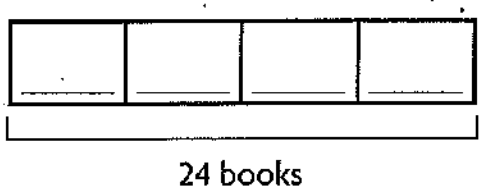
7. $27 \div 9$

8. $20 \div 5$

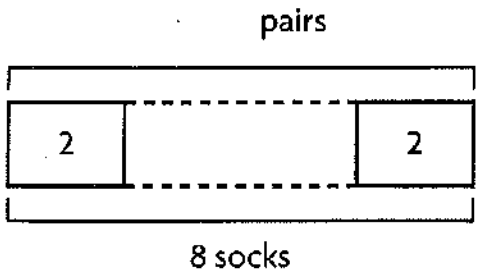
9. $18 \div 3$

Complete the bar model to solve. Then write a division equation for the bar model.

10. There are 24 books in 4 equal stacks. How many books are in each stack?



11. There are 8 matching socks. How many pairs of socks can you make?



Problem Solving REAL WORLD

Use the table for 12–13.

Dog Treats

Type	Number in Box
Chew Sticks	14
Chewies	25
Dog Bites	30
Puppy Chips	45

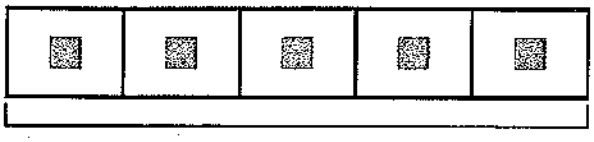
12. Kevin bought a box of Puppy Chips for his dog. If he gives his dog 5 treats each day, for how many days will one box of treats last?

SHOW YOUR WORK

13. H.O.T. Pat bought one box of Chew Sticks to share equally between his 2 dogs. Mia bought one box of Chewies to share equally among her 5 dogs. How many more treats will each of Pat's dogs get than each of Mia's dogs? **Explain.**

14. Write Math **Pose a Problem** Write and solve a problem for $42 \div 7$ in which the quotient is the number of groups.

15. **Test Prep** Ed buys 5 bags of treats. He buys 15 treats in all. How many treats are in each bag?



15 treats

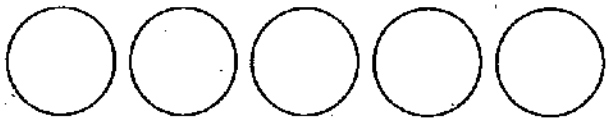
Ⓐ 2 Ⓑ 3 Ⓒ 4 Ⓓ 5

Name _____

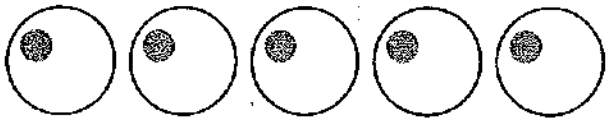
Model with Bar Models

Use counters to find 15 ÷ 5.

Step 1 Use 15 counters. Draw 5 circles to show the number of equal groups.



Step 2 Place 1 counter at a time in each circle.



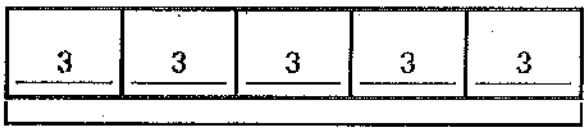
Step 3 Continue until you have placed all 15 counters.

Step 4 Count the number of counters in each circle.

There are 3 counters in each of the 5 groups.

You can use a bar model to show how the parts of a problem are related.

- There are 15 counters.
- There are 5 equal groups.
- There are 3 counters in each group.



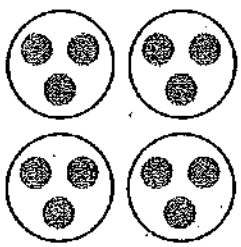
15 counters

Write a division equation for the model.

$15 \div 5 = 3$

Write a division equation for the picture.

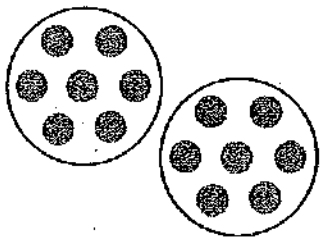
1.



_____

_____

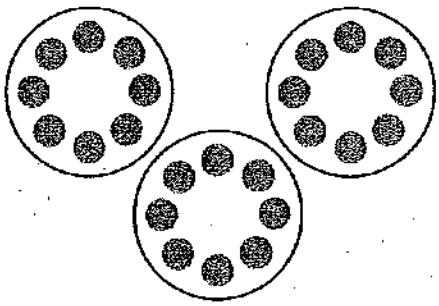
2.



_____

_____

3.



_____

_____

Name _____

Speedy Math

Solve each problem. For each exercise, the quotient has a matching letter. Place the letter above the exercise number to find the answer to the question.

1. $20 \div 5 =$ _____

2. $42 \div 7 =$ _____

3. $25 \div 5 =$ _____

4. $45 \div 9 =$ _____

5. $36 \div 4 =$ _____

6. $12 \div 6 =$ _____

7. $48 \div 8 =$ _____

What is the fastest animal on land?

KEY	A	B	C	E	H	I	R	T
	2	3	4	5	6	7	8	9

_____	_____	_____	_____	_____	_____	_____
1.	2.	3.	4.	5.	6.	7.

8. **Stretch Your Thinking** Make up your own division exercises and puzzle to answer the question "What animal really likes carrots?" The answer is a "rabbit."

_____

_____

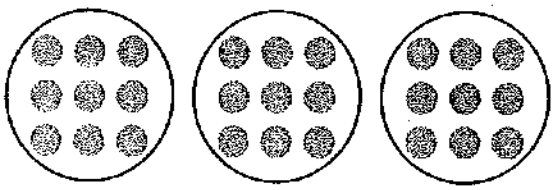
_____

Name _____

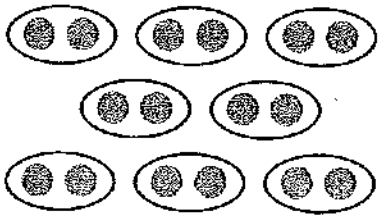
Model with Bar Models

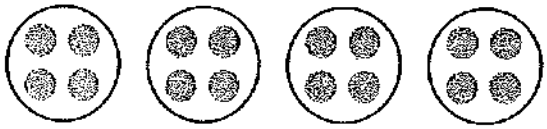
COMMON CORE STANDARD CC.3.OA.2
Represent and solve problems involving multiplication and division.

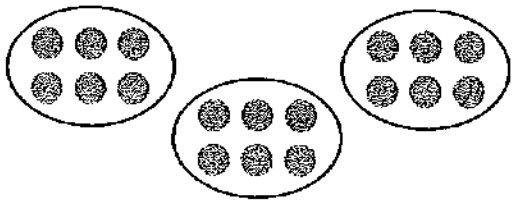
Write a division equation for the picture.

1. 

$27 \div 3 = 9$ or $27 \div 9 = 3$

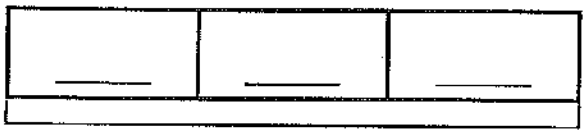
2. 

3. 

4. 

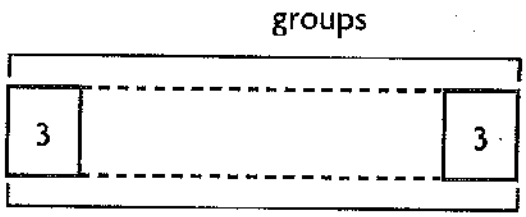
Complete the bar model to solve. Then write a division equation for the bar model.

5. There are 15 postcards in 3 equal stacks. How many postcards are in each stack?



15 postcards

6. There are 21 key rings. How many groups of 3 key rings can you make?



21 key rings

Problem Solving REAL WORLD

7. Jalyn collected 24 stones. She put them in 4 equal piles. How many stones are in each pile?

8. Tanner has 30 stickers. He puts 6 stickers on each page. On how many pages does he put stickers?

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TEST PREP

Lesson Check (CC.3.OA.2)

1. Jack and his little sister are stacking 24 blocks. They put the blocks in 3 equal stacks. How many blocks are in each stack?

   Ⓐ 4
   Ⓑ 6
   Ⓒ 7
   Ⓓ 8

2. Melissa made 45 greeting cards. She put them in 5 equal piles. How many cards did she put in each pile?

   Ⓐ 9
   Ⓑ 8
   Ⓒ 7
   Ⓓ 6

Spiral Review (CC.3.OA.5, CC.3.OA.7, CC.3.MD.4)

3. Angie puts 1 stamp on each envelope. She puts stamps on 7 envelopes. How many stamps does Angie use? (Lesson 3.7)

   Ⓐ 0
   Ⓑ 1
   Ⓒ 7
   Ⓓ 8

4. A carnival ride has 8 cars. Each car holds 4 people. How many people are on the ride if all the cars are full? (Lesson 4.8)

   Ⓐ 34
   Ⓑ 32
   Ⓒ 28
   Ⓓ 24

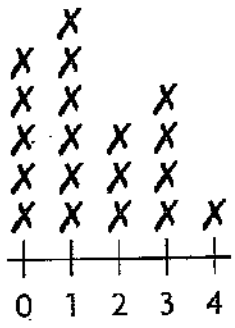
Use the line plot for 5–6.

5. How many families have 1 computer at home? (Lesson 2.7)

   Ⓐ 4
   Ⓑ 5
   Ⓒ 6
   Ⓓ 7

6. How many families have more than 1 computer at home? (Lesson 2.7)

   Ⓐ 4
   Ⓑ 5
   Ⓒ 7
   Ⓓ 8



Number of Computers at Home

Name _____

Relate Subtraction and Division

Essential Question How is division related to subtraction?

COMMON CORE STANDARD **CC.3.OA.3**
Represent and solve problems involving multiplication and division.

UNLOCK the Problem REAL WORLD

Serena and Mandy brought a total of 12 newspapers to school for the recycling program. Each girl brought in one newspaper each day. For how many days did the girls bring in newspapers?

- How many newspapers were brought in altogether?

_____

- How many newspapers did the two girls bring in altogether each day?

_____

One Way Use repeated subtraction.

- Start with 12.
- Subtract 2 until you reach 0.
- Count the number of times you subtract 2.

12	10	8	6	4	2
− 2	− 2	− 2	− 2	− 2	− 2
10	8				

Number of times you subtract 2: 1 2 3 4 5 6

Since you subtract 2 six times, there are _____ groups of 2 in 12.

So, Serena and Mandy brought in newspapers for _____ days.

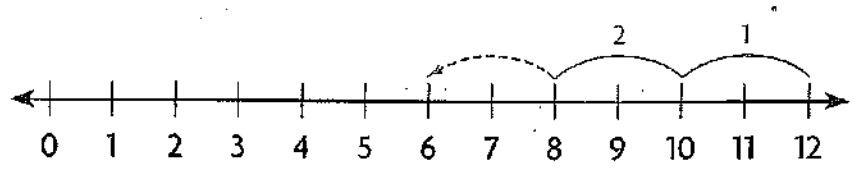
Write: $12 \div 2 = 6$ or $2\overline{)12}^{\,6}$

Read: Twelve divided by two equals six.

ERROR Alert
Be sure to keep subtracting 2 until you are unable to subtract 2 anymore.

Another Way Count back on a number line.

- Start at 12.
- Count back by 2s as many times as you can. Draw the rest of the jumps on the number line.
- Count the number of times you jumped back 2.



You jumped back by 2 six times.

There are _____ jumps of 2 in 12.

$12 \div 2 =$ _____

MATHEMATICAL PRACTICES

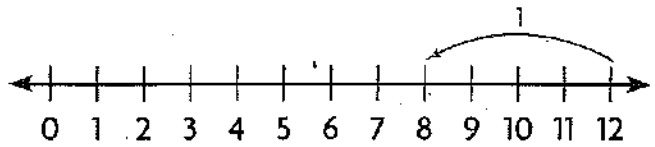
Math Talk Explain in your own words how you found the answer.

- What do your jumps of 2 represent? _____

_____

Share and Show MATH BOARD

1. Draw the rest of the jumps on the number line to complete the division equation. $12 \div 4 =$ _____



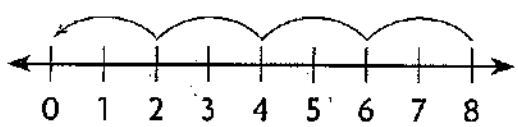
MATHEMATICAL PRACTICES

Math Talk Explain how counting back on a number line is like using repeated subtraction.

Write a division equation.

2. $\begin{array}{r} 10 \\ -\ 5 \\ \hline 5 \end{array}$ $\begin{array}{r} 5 \\ -\ 5 \\ \hline 0 \end{array}$

_____

3. 

_____

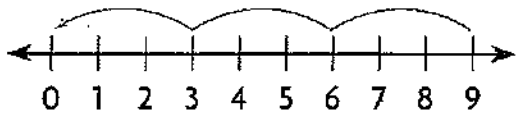
Name _____

On Your Own

Write a division equation.

4. $28 - 7 = 21$, $21 - 7 = 14$, $14 - 7 = 7$, $7 - 7 = 0$

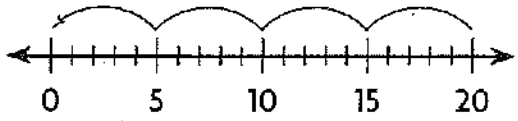
_____

5. 

_____

6. $24 - 8 = 16$, $16 - 8 = 8$, $8 - 8 = 0$

_____

7. 

_____

8. H.O.T. Write a word problem that can be solved by using one of the division equations above.

_____

_____

Use repeated subtraction or a number line to solve.

9. $18 \div 6 =$ _____

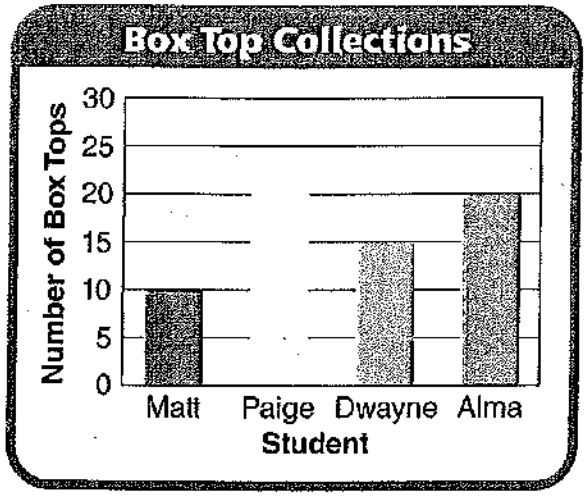
10. $14 \div 7 =$ _____

11. $9\overline{)27}$

12. $3\overline{)24}$

Problem Solving REAL WORLD

Use the graph for 13–15.



13. Matt puts his box tops in 2 equal piles. How many box tops are in each pile?

14. H.O.T. Paige brought an equal number of box tops to school each day for 5 days. Alma also brought an equal number of box tops each day for 5 days. How many box tops did the two students bring in altogether each day? **Explain.**

SHOW YOUR WORK

15. Write Math **What's the Question?** Dwayne puts all his box tops into bins. He puts an equal number in each bin. The answer is 5. What's the question?

16. **Test Prep** Maya collected 7 box tops each day. She collected 21 box tops in all. For how many days did Maya collect box tops?

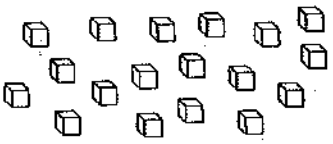
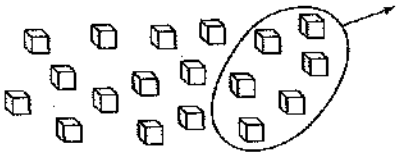
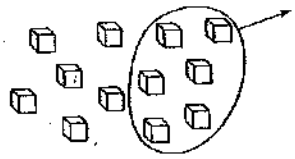
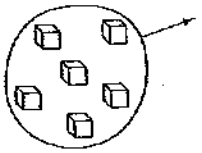
Ⓐ 2 days Ⓒ 4 days

Ⓑ 3 days Ⓓ 6 days

Name _____

Algebra • Relate Subtraction and Division

Find 18 ÷ 6.

	Use base-ten blocks.	Use repeated subtraction.
Step 1 Start with the number you are dividing, 18.		
Step 2 Subtract the number you are dividing by, 6.		18 − 6 12
Step 3 There are more than 6 left. Subtract 6 again.		18 → 12 − 6 → − 6 12 → 6
Step 4 There are 6 left. Subtract 6 again.		18 → 12 → 6 − 6 → − 6 → − 6 12 → 6 → 0

Step 5 Count the number of times you subtract 6.

You subtract 6 three times, so there are 3 groups of 6 in 18.

Write: 18 ÷ 6 = 3

Write a division equation.

1. 27 → 18 → 9
   − 9 → − 9 → − 9
   18 → 9 → 0

   _____

2. 16 → 12 → 8 → 4
   − 4 → − 4 → − 4 → − 4
   12 → 8 → 4 → 0

   _____

Name _____

Fish Tank Math

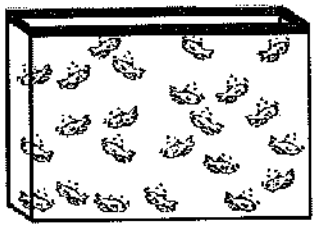
Jed works in a pet store that sells fish. He needs to move fish from the old tanks and put them in the new tanks. He can move the fish in small groups only.

Use repeated subtraction to solve each problem. Circle groups of fish each time you subtract. Then write how many equal groups Jed can make and how many fish are left over.

1. 19 ÷ 6

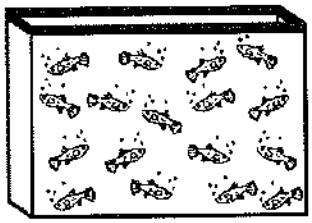
____ groups and ____ left over

2. 23 ÷ 5



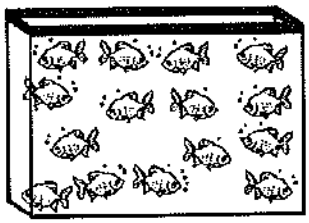
____ groups and ____ left over

3. 17 ÷ 3



____ groups and ____ left over

4. 15 ÷ 4



____ groups and ____ left over

5. **Stretch Your Thinking** Choose one of the problems. Change the number of fish in each group so there will not be any fish left over. **Explain** why you chose that tank.

_____

_____

_____

_____

Name _____

Relate Subtraction and Division

COMMON CORE STANDARD CC.3.OA.3
Represent and solve problems involving multiplication and division.

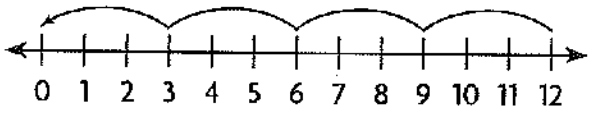
Write a division equation.

1.

$$\begin{array}{r} 16 \\ -\ 4 \\ \hline 12 \end{array} \quad \begin{array}{r} 12 \\ -\ 4 \\ \hline 8 \end{array} \quad \begin{array}{r} 8 \\ -\ 4 \\ \hline 4 \end{array} \quad \begin{array}{r} 4 \\ -\ 4 \\ \hline 0 \end{array}$$

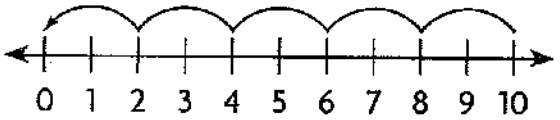
$16 \div 4 = 4$

2.



_____

3.



_____

4.

$$\begin{array}{r} 20 \\ -\ 5 \\ \hline 15 \end{array} \quad \begin{array}{r} 15 \\ -\ 5 \\ \hline 10 \end{array} \quad \begin{array}{r} 10 \\ -\ 5 \\ \hline 5 \end{array} \quad \begin{array}{r} 5 \\ -\ 5 \\ \hline 0 \end{array}$$

_____

Use repeated subtraction or a number line to solve.

5. $28 \div 7 =$ _____

6. $18 \div 6 =$ _____

7. $8\overline{)40}$

8. $9\overline{)36}$

Problem Solving REAL WORLD

9. Mrs. Costa has 18 pencils. She gives 9 pencils to each of her children for school. How many children does Mrs. Costa have?

_____

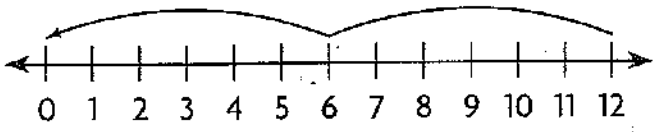
10. Boël decides to plant rose bushes in her garden. She has 24 bushes. She places 6 bushes in each row. How many rows of rose bushes does she plant in her garden?

_____

TEST PREP

Lesson Check (CC.3.OA.3)

1. Which division equation is shown?



Ⓐ $3 \times 4 = 12$ Ⓒ $12 \div 3 = 4$

Ⓑ $12 \div 6 = 2$ Ⓓ $12 \div 4 = 3$

2. Isabella has 35 cups of dog food. She feeds her dogs 5 cups of food each day. For how many days will the dog food last?

Ⓐ 6 days Ⓒ 8 days

Ⓑ 7 days Ⓓ 9 days

Spiral Review (CC.3.OA.3, CC.3.OA.8, CC.3.MD.3)

3. Ellen buys 4 bags of oranges. There are 6 oranges in each bag. How many oranges does Ellen buy? (Lesson 4.3)

Ⓐ 10 Ⓒ 24

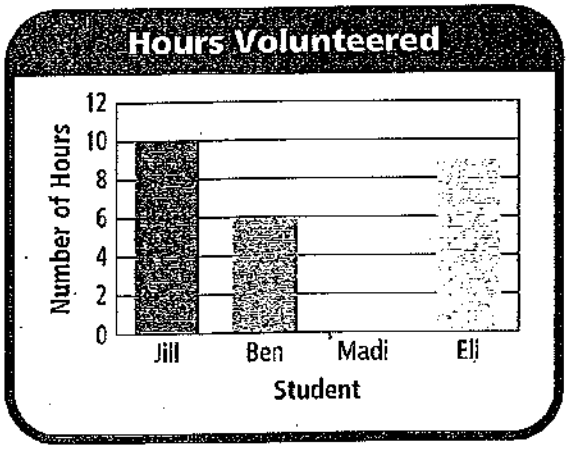
Ⓑ 12 Ⓓ 30

4. Each month for 7 months, Samuel mows 3 lawns. How many more lawns does he need to mow before he has mowed 29 lawns? (Lesson 4.10)

Ⓐ 1 Ⓒ 7

Ⓑ 3 Ⓓ 8

Use the graph for 5–6.



5. How many hours did Eli volunteer? (Lesson 2.4)

Ⓐ 4 hours Ⓒ 9 hours

Ⓑ 8 hours Ⓓ 10 hours

6. Madi volunteered 2 hours less than Jill. At what number should the bar for Madi end? (Lesson 2.5)

Ⓐ 3 Ⓒ 8

Ⓑ 6 Ⓓ 12

Name _____

Mid-Chapter Checkpoint

Vocabulary

Choose the best term from the box to complete the sentence.

Vocabulary
divide
divisor

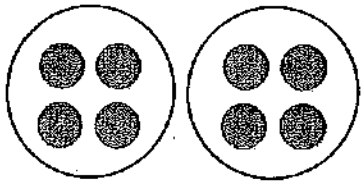
1. You _____ when you separate into equal groups. (p. 213)

Concepts and Skills

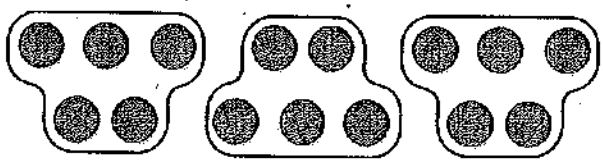
Use counters or draw a quick picture on your MathBoard. Make or circle equal groups. Complete the table. (CC.3.OA.2)

	Counters	Number of Equal Groups	Number in Each Group
2.	6	2	
3.	30		5
4.	28	7	

Write a division equation for the picture. (CC.3.OA.2)

5. 

_____

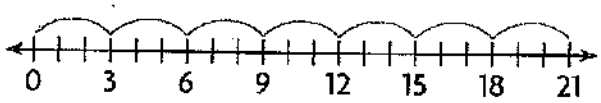
6. 

_____

Write a division equation. (CC.3.OA.3)

7. $36 - 9 = 27$, $27 - 9 = 18$, $18 - 9 = 9$, $9 - 9 = 0$

_____

8. 

_____

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Fill in the bubble for the correct answer choice.

TEST PREP

9. Adam plants 14 seeds in some flowerpots. If he puts 2 seeds in each pot, how many flowerpots does he use? (CC.3.OA.2)

Ⓐ 7 Ⓒ 12

Ⓑ 8 Ⓓ 16

10. Desiree has 20 stickers. She gives the same number of stickers to each of 5 friends. Which equation can be used to find the number of stickers each friend receives? (CC.3.OA.3)

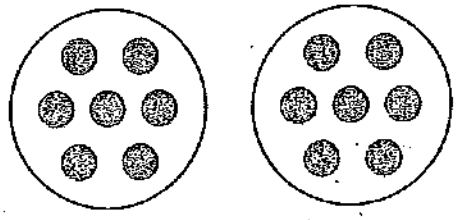
Ⓐ $20 + 5 = \square$

Ⓑ $20 - 5 = \square$

Ⓒ $20 \times 5 = \square$

Ⓓ $20 \div 5 = \square$

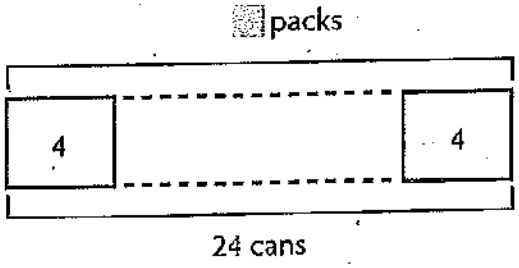
11. Jayden modeled a division equation with some counters. Which division equation matches the model? (CC.3.OA.2)



Ⓐ $12 \div 2 = 6$ Ⓒ $16 \div 2 = 8$

Ⓑ $14 \div 2 = 7$ Ⓓ $18 \div 2 = 9$

12. Lillian bought 24 cans of cat food. There were 4 cans in each pack. How many packs of cat food did Lillian buy? (CC.3.OA.2)



Ⓐ 5 Ⓑ 6 Ⓒ 7 Ⓓ 8

Name _____

Model with Arrays

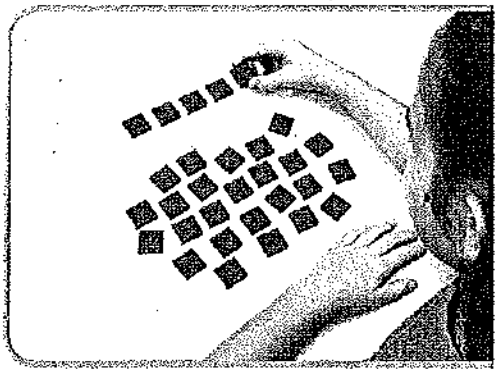
Essential Question How can you use arrays to solve division problems?

COMMON CORE STANDARD **CC.3.OA.3**
Represent and solve problems involving multiplication and division.

Investigate

Materials ▫ square tiles

You can use arrays to model division and find equal groups.

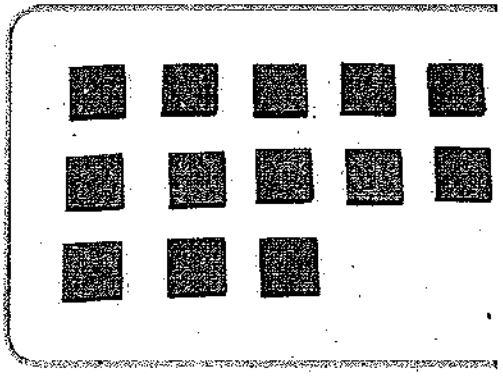


A. Count out 30 tiles. Make an array to find how many rows of 5 are in 30.

B. Make a row of 5 tiles.

C. Continue to make as many rows of 5 tiles as you can.

How many rows of 5 did you make? _____



Draw Conclusions

1. Explain how you used the tiles to find the number of rows of 5 in 30.

_____

_____

2. What multiplication equation could you write for the array? Explain.

_____

_____

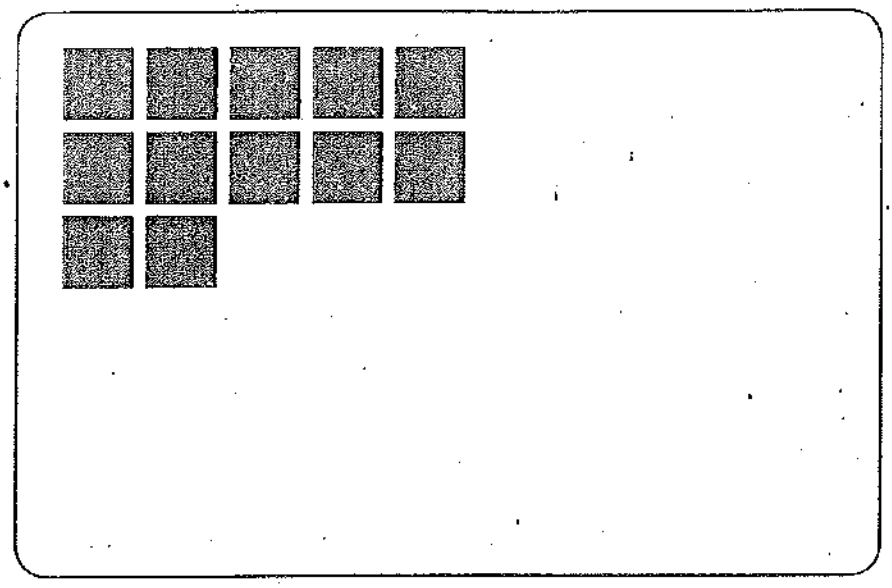
3. H.O.T. Apply Tell how to use an array to find how many rows of 6 are in 30.

_____

_____

Make Connections

You can write a division equation to show how many rows of 5 are in 30. Show the array you made in Investigate by completing the drawing below.



Math Idea

You can divide to find the number of equal rows or to find the number in each row.

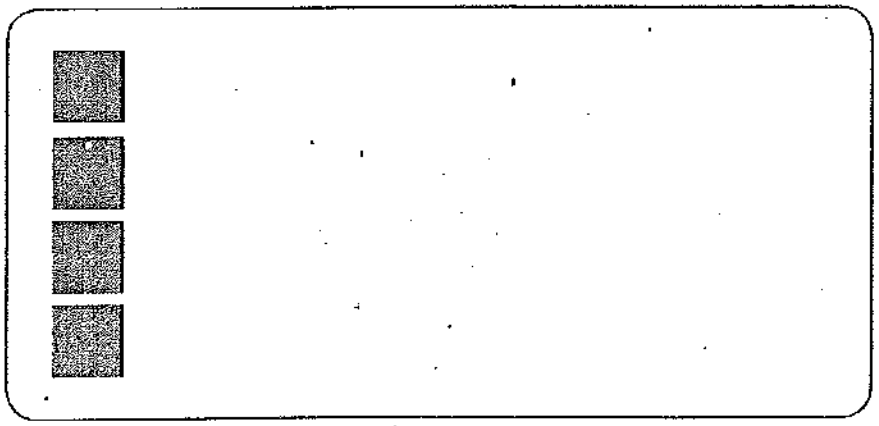
$30 \div 5 =$

There are _____ rows of 5 tiles in 30.

So, $30 \div 5 =$ _____.

Try This!

Count out 24 tiles. Make an array with the same number of tiles in 4 rows. Place 1 tile in each of the 4 rows. Then continue placing 1 tile in each row until you use all the tiles. Draw your array below.



MATHEMATICAL PRACTICES

Math Talk Explain how making an array helps you divide.

- How many tiles are in each row? _____
- What division equation can you write for your array? _____

Name _____

Share and Show MATH BOARD

Use square tiles to make an array. Solve.

1. How many rows of 3 are in 18?

_____

2. How many rows of 6 are in 12?

_____

3. How many rows of 7 are in 21?

_____

4. How many rows of 8 are in 32?

_____

Make an array. Then write a division equation.

5. 25 tiles in 5 rows

_____

6. 14 tiles in 2 rows

_____

7. 28 tiles in 4 rows

_____

8. 27 tiles in 9 rows

_____

9. How many rows of 3 are in 15?

_____

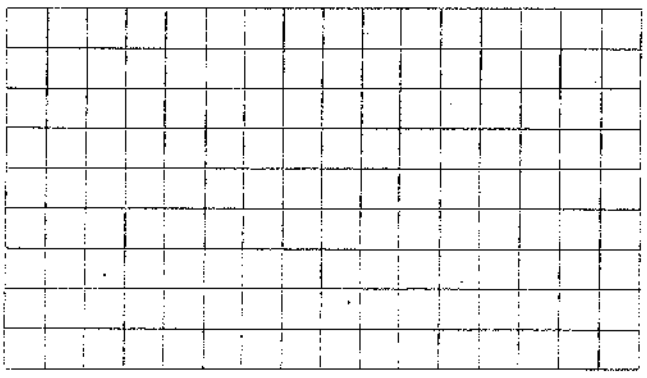
10. How many rows of 8 are in 24?

_____

MATHEMATICAL PRACTICES

Math Talk Explain when you count the number of rows to find the answer and when you count the number of tiles in each row to find the answer.

11. **Write Math** Show two ways you could make an array with tiles for $18 \div 6$. Shade squares on the grid to record the arrays.



UNLOCK the Problem REAL WORLD

TEST PREP

12. Thomas has 28 tomato seedlings to plant in his garden. He wants to plant 4 seedlings in each row. How many rows of tomato seedlings will Thomas plant?

Ⓐ 5 Ⓑ 6 Ⓒ 7 Ⓓ 8

a. What do you need to find? _____

_____

b. What operation could you use to solve the problem? _____

_____

c. Draw an array to find the number of rows of tomato seedlings.

d. What is another way you could have solved the problem?

_____

_____

e. Complete the sentences.

Thomas has _____ tomato seedlings.

He wants to plant _____

seedlings in each _____.

So, Thomas will plant _____ rows of tomato seedlings.

f. Fill in the bubble for the correct answer choice above.

13. Faith plants 36 flowers in 6 equal rows. How many flowers are in each row?

Ⓐ 42 Ⓑ 30 Ⓒ 7 Ⓓ 6

14. There were 20 plants sold at a store on Saturday. Customers bought 5 plants each. How many customers bought the plants?

Ⓐ 3 Ⓑ 4 Ⓒ 5 Ⓓ 6

FOR MORE PRACTICE:
Standards Practice Book, pp. P115–P116

Name _____

Model with Arrays

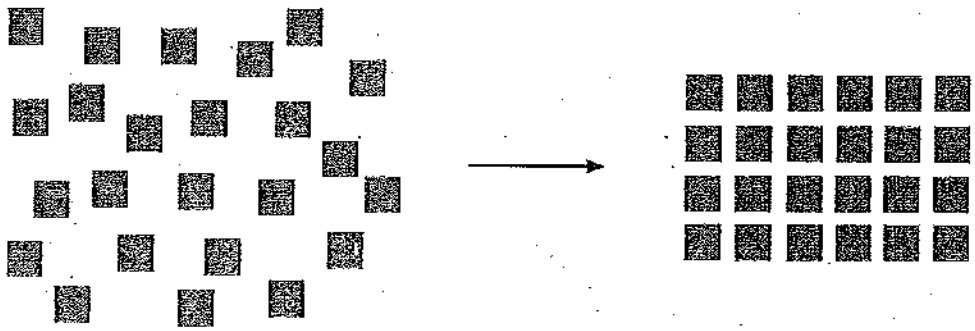
You can use arrays to model division.

How many rows of 6 tiles each can you make with 24 tiles?

Use square tiles to make an array. Solve.

Step 1 Use 24 tiles.

Step 2 Make as many rows of 6 as you can.



You can make 4 rows of 6.

So, there are 4 rows of 6 tiles in 24.

Use square tiles to make an array. Solve.

1. How many rows of 7 are in 28?

_____

2. How many rows of 5 are in 15?

_____

Make an array. Then write a division equation.

3. 18 tiles in 3 rows

_____

4. 20 tiles in 4 rows

_____

5. 14 tiles in 2 rows

_____

6. 36 tiles in 4 rows

_____

Name _____

Array Puzzles

Use the clues to help solve the puzzle. You can use tiles or draw the array on a separate sheet of paper.

1. I am an array made with 24 tiles. I have 8 tiles in each row. How many rows do I have?

_____

2. I am an array with 4 equal rows. I have 16 tiles in all. How many tiles are in each of my rows?

_____

3. I am a square-shaped array. I have 7 rows. How many tiles do I have in all? (Hint: A square has 4 sides of equal length.)

_____

4. I am an array made with 24 tiles. My number of rows is 2 more than the number of tiles in each of my rows. How many rows do I have?

_____

5. I am an array with 7 tiles in each row. My number of rows is 4 less than the number of tiles in each of my rows. How many tiles am I made with in all?

_____

6. I am an array made with 40 tiles. I have an odd number of rows and an even number of tiles in each of my rows. The number of my rows plus the number of tiles in each of my rows equals 13. How many rows do I have?

_____

7. Write Math → Write your own array puzzle. Include the answer.

_____

_____

_____

Name _____

Model with Arrays

COMMON CORE STANDARD CC.3.OA.3
Represent and solve problems involving multiplication and division.

Use square tiles to make an array. Solve.

1. How many rows of 4 are in 12?

   3 rows

2. How many rows of 3 are in 21?

   _____

3. How many rows of 6 are in 30?

   _____

4. How many rows of 9 are in 18?

   _____

Make an array. Then write a division equation.

5. 20 tiles in 5 rows

   _____

6. 28 tiles in 7 rows

   _____

7. 18 tiles in 9 rows

   _____

8. 36 tiles in 6 rows

   _____

Problem Solving REAL WORLD

9. A dressmaker has 24 buttons. He needs 3 buttons to make one dress. How many dresses can he make with 24 buttons?

   _____

10. Liana buys 36 party favors for her 9 guests. She gives an equal number of favors to each guest. How many party favors does each guest get?

    _____

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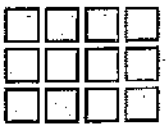
TEST PREP

Lesson Check (CC.3.OA.3)

1. Mr. Canton places 24 desks in 6 equal rows. How many desks are in each row?

   Ⓐ 2
   Ⓑ 3
   Ⓒ 4
   Ⓓ 5

2. Which division equation is shown by the array?



   Ⓐ $12 \div 6 = 2$
   Ⓑ $12 \div 3 = 4$
   Ⓒ $12 \div 2 = 6$
   Ⓓ $12 \div 1 = 12$

Spiral Review (CC.3.OA.1, CC.OA.4, CC.3.OA.5, CC.3.OA.7)

3. Amy has 2 rows of 4 sports trophies on each of her 3 shelves. How many sports trophies does Amy have in all? (Lesson 4.6)

   Ⓐ 8
   Ⓑ 9
   Ⓒ 12
   Ⓓ 24

4. What is the unknown factor? (Lesson 5.2)

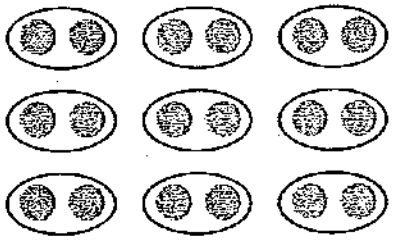
   $9 \times p = 45$

   Ⓐ 4
   Ⓑ 5
   Ⓒ 6
   Ⓓ 7

5. Sam has 7 stacks with 4 quarters each. How many quarters does Sam have? (Lesson 4.5)

   Ⓐ 11
   Ⓑ 12
   Ⓒ 24
   Ⓓ 28

6. How can you skip count to find how many counters in all? (Lesson 3.1)



   Ⓐ 3 groups of 2
   Ⓑ 3 groups of 3
   Ⓒ 9 groups of 2
   Ⓓ 18 groups of 2

Name _____

Relate Multiplication and Division

Essential Question How can you use multiplication to divide?

COMMON CORE STANDARD **CC.3.OA.6**
Understand properties of multiplication and the relationship between multiplication and division.

UNLOCK the Problem REAL WORLD

Pam went to the fair. She went on the same ride 6 times and used the same number of tickets each time. She used 18 tickets. How many tickets did she use each time she went on the ride?

- What do you need to find?

_____

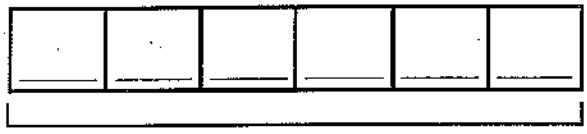
_____

- Circle the numbers you need to use.

One Way Use bar models.

You can use bar models to understand how multiplication and division are related.

Complete the bar model to show 18 tickets divided into 6 equal groups.

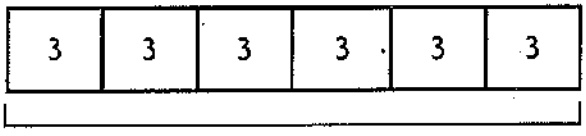


18 tickets

Write: 18 ÷ 6 = _____

What if the problem said Pam went on the ride 6 times and used 3 tickets each time? How many tickets did Pam use in all?

Complete the bar model to show 6 groups of 3 tickets.



tickets

Write: 6 × 3 = _____

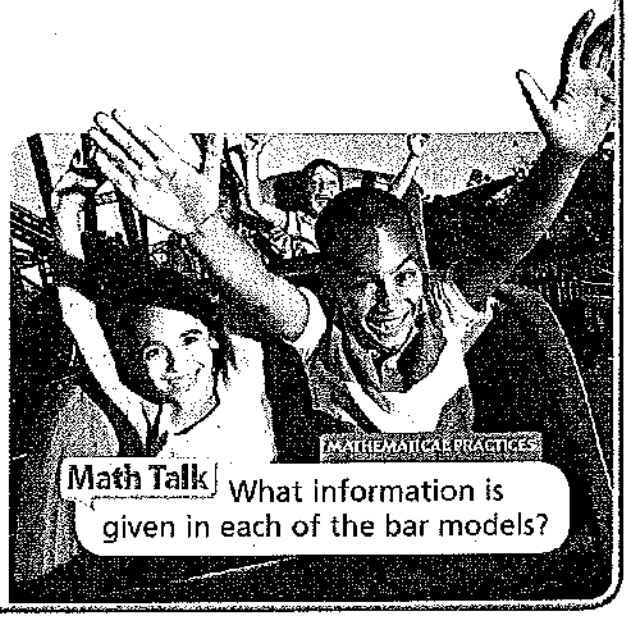
So, Pam used _____ tickets each time she went on the ride.

Multiplication and division are opposite operations, or **inverse operations**.

You can think about multiplication to solve a division problem.

To solve 18 ÷ 6 = ▢, think 6 × ▢ = 18.

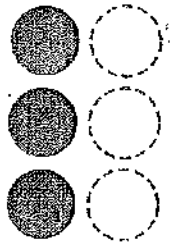
Since 6 × 3 = 18, then 18 ÷ 6 = 3.



Another Way Use an array.

You can use an array to see how multiplication and division are related.

Show an array with 18 counters in 3 equal rows by completing the drawing.



There are _____ counters in each row.

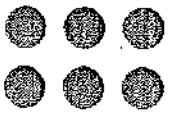
Write: 18 ÷ 3 = _____

The same array can be used to find the total number if you know there are 3 rows with 6 counters in each row.

Write: 3 × 6 = _____

Share and Show MATH BOARD

1. Use the array to complete the equation.



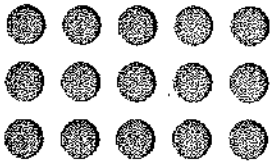
Think: There are 3 counters in each row.

6 ÷ 2 = _____

MATHEMATICAL PRACTICES

Math Talk Describe another way to find the quotient for 6 ÷ 2.

Complete.

2. 

3 rows of _____ = 15

3 × _____ = 15

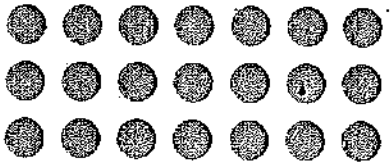
15 ÷ 3 = _____

3. 

2 rows of _____ = 12

2 × _____ = 12

12 ÷ 2 = _____

✓4. 

3 rows of _____ = 21

3 × _____ = 21

21 ÷ 3 = _____

Complete the equations.

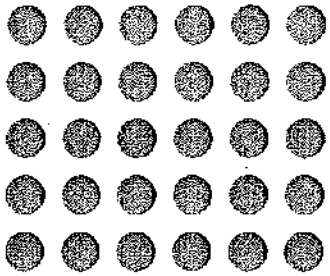
5. 5 × _____ = 40 40 ÷ 5 = _____

✓6. 6 × _____ = 18 18 ÷ 6 = _____

Name _____

On Your Own

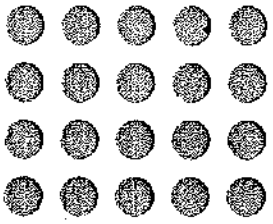
Complete.

7. 

5 rows of _____ = 30

5 × _____ = 30

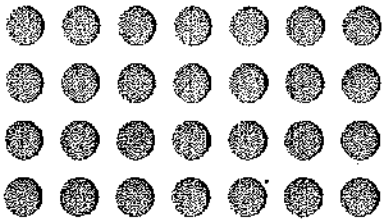
30 ÷ 5 = _____

8. 

4 rows of _____ = 20

4 × _____ = 20

20 ÷ 4 = _____

9. 

4 rows of _____ = 28

4 × _____ = 28

28 ÷ 4 = _____

Complete the equations.

10. 7 × _____ = 21 21 ÷ 7 = _____

11. 8 × _____ = 16 16 ÷ 8 = _____

12. 4 × _____ = 32 32 ÷ 4 = _____

13. 6 × _____ = 24 24 ÷ 6 = _____

14. 9 × _____ = 18 18 ÷ 9 = _____

15. 5 × _____ = 25 25 ÷ 5 = _____

H.O.T. Algebra Complete.

16. 3 × 3 = 27 ÷ _____

17. 16 ÷ 2 = _____ × 2

18. 9 = _____ ÷ 4

19. 5 = _____ ÷ 7

20. 42 ÷ 7 = _____ × 2

21. 30 ÷ _____ = 2 × 3

Problem Solving REAL WORLD

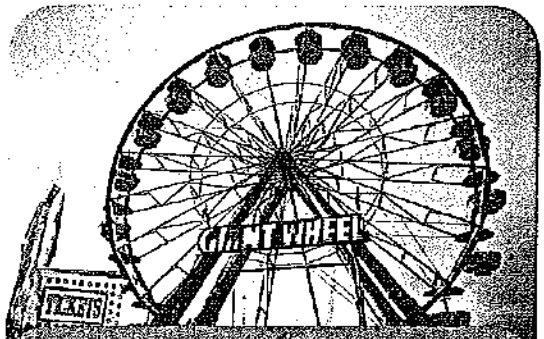
Use the table for 22–23.

22. Mr. Jerome paid $24 for some students to get into the fair. How many students did Mr. Jerome pay for?

_____

23. H.O.T. Garrett is 8 years old. He and his family are going to the county fair. What is the price of admission for Garrett, his 2 parents, and baby sister?

_____

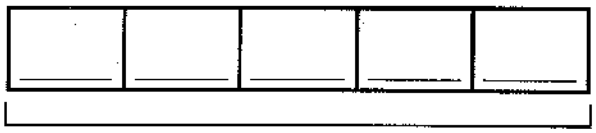


Cochise County Fair

Price of Admission	
Adults	$6
Students	$3
Children 5 and under free	

24. There are 20 seats on the Wildcat ride. The number of seats in each car is the same. If there are 5 cars on the ride, how many seats are there in each car? Complete the bar model to show the problem. Then answer the question.

SHOW YOUR WORK



20 seats

_____

25. Write Math Pose a Problem How many days are there in 2 weeks? Write and solve a related word problem to represent the inverse operation.

_____

_____

26. Test Prep There are 35 prizes in 5 equal rows. How many prizes are in each row?

Ⓐ 6 Ⓑ 7 Ⓒ 8 Ⓓ 9

Name _____

Algebra • Relate Multiplication and Division

You can use an array to complete 21 ÷ 3 = _____.

Use 21 counters.
Make 3 equal rows.

There are 7 counters in each row.

3 rows of 7 = 21

So, 21 ÷ 3 = 7

The 21 tells the total number of counters in the array.
The 3 stands for the number of equal rows.
The 7 stands for the number of counters in each row.

You can use a related multiplication fact to check your answer.

21 ÷ 3 = 7 3 × 7 = 21

So, 3 rows of 7 represents 21 ÷ 3 = 7 or 3 × 7 = 21.

Complete.

1.

6 rows of _____ = 24

6 × _____ = 24

24 ÷ 6 = _____

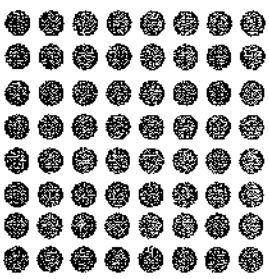
2.

3 rows of _____ = 27

3 × _____ = 27

27 ÷ 3 = _____

3.



8 rows of _____ = 64

8 × _____ = 64

64 ÷ 8 = _____

Complete the equations.

4. 6 × _____ = 42 42 ÷ _____ = 6

5. 9 × _____ = 54 54 ÷ _____ = 9

Name _____

Multiplication and Division Match

Solve. Then draw a line to match each multiplication equation to a related division equation.

1.	$2 \times 8 =$ _____ •	**A**	$12 \div 2 = 6$
2.	$5 \times 8 =$ _____ •	**B**	$42 \div 7 = 6$
3.	$3 \times 9 =$ _____ •	**C**	$18 \div 3 = 6$
4.	$6 \times 7 =$ _____ •	**D**	$40 \div 8 = 5$
5.	$2 \times 6 =$ _____ •	**E**	$24 \div 6 = 4$
6.	$5 \times 7 =$ _____ •	**F**	$27 \div 9 = 3$
7.	$6 \times 4 =$ _____ •	**G**	$24 \div 3 = 8$
8.	$8 \times 8 =$ _____ •	**H**	$36 \div 9 = 4$
9.	$3 \times 6 =$ _____ •	**I**	$16 \div 2 = 8$
10.	$9 \times 4 =$ _____ •	**J**	$18 \div 2 = 9$
11.	$9 \times 2 =$ _____ •	**K**	$64 \div 8 = 8$
12.	$8 \times 3 =$ _____ •	**L**	$35 \div 5 = 7$

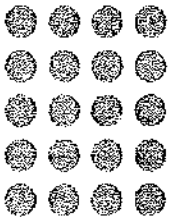
Name _____

Relate Multiplication and Division

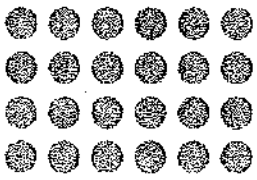
ALGEBRA
Lesson 6.7

COMMON CORE STANDARD CC.3.OA.6
Understand properties of multiplication and the relationship between multiplication and division.

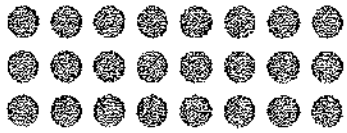
Complete the equations.

1. 

5 rows of 4 = 20
5 × 4 = 20
20 ÷ 5 = 4

2. 

4 rows of _____ = 24
4 × _____ = 24
24 ÷ 4 = _____

3. 

3 rows of _____ = 24
3 × _____ = 24
24 ÷ 3 = _____

Complete the equations.

4. 4 × _____ = 28 28 ÷ 4 = _____

5. 6 × _____ = 36 36 ÷ 6 = _____

6. 7 × _____ = 35 35 ÷ 7 = _____

7. 7 × _____ = 21 21 ÷ 7 = _____

8. 9 × _____ = 27 27 ÷ 9 = _____

9. 2 × _____ = 16 16 ÷ 2 = _____

10. 4 × _____ = 36 36 ÷ 4 = _____

11. 8 × _____ = 40 40 ÷ 8 = _____

Problem Solving REAL WORLD

12. Mr. Martin buys 36 muffins for a class breakfast. He places them on plates for his students. If he places 9 muffins on each plate, how many plates does Mr. Martin use?

_____

13. Ralph read 18 books during his summer vacation. He read the same number of books each month for 3 months. How many books did he read each month?

_____

TEST PREP

Lesson Check (CC.3.OA.6)

1. Which number will complete the equations?

$6 \times \square = 24$

$24 \div 6 = \square$

Ⓐ 3 Ⓒ 5

Ⓑ 4 Ⓓ 6

2. Alice has 14 seashells. She divides them equally between her 2 sisters. How many seashells does each sister get?

Ⓐ 7 Ⓒ 12

Ⓑ 8 Ⓓ 16

Spiral Review (CC.3.OA.1, CC.3.OA.9, CC.3.MD.3)

3. Sam and Jesse can each wash 5 cars in an hour. They both work for 7 hours over 2 days. How many cars did Sam and Jesse wash? (Lesson 4.6)

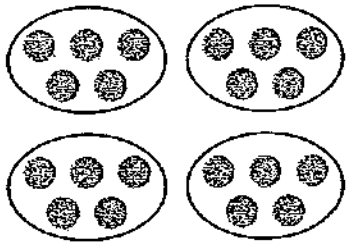
Ⓐ 70

Ⓑ 35

Ⓒ 24

Ⓓ 14

4. Keisha skip counted to find how many counters in all. How many equal groups are there? (Lesson 3.1)



_____ groups of 5

Ⓐ 3 Ⓒ 5

Ⓑ 4 Ⓓ 20

5. The key for a picture graph showing the number of books students read is: Each ▯ = 2 books. How many books did Nancy read if she has ▯ ▯ ▯ by her name? (Lesson 2.2)

Ⓐ 2

Ⓑ 4

Ⓒ 5

Ⓓ 6

6. Jan surveyed her friends to find their favorite season. She recorded 𝍸 III for summer. How many people chose summer as their favorite season? (Lesson 2.1)

Ⓐ 5

Ⓑ 8

Ⓒ 9

Ⓓ 13

Name _____

Write Related Facts

Essential Question How can you write a set of related multiplication and division facts?

COMMON CORE STANDARD CC.3.OA.7
Multiply and divide within 100.

UNLOCK the Problem

Related facts are a set of related multiplication and division equations. What related facts can you write for 2, 4, and 8?

- What model can you use to show how multiplication and division are related?

_____

Activity

Materials ■ square tiles

STEP 1

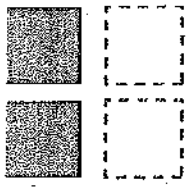
Use 8 tiles to make an array with 2 equal rows.

Draw the rest of the tiles.

How many tiles are in each row? _____

Write a division equation for the array using the total number of tiles as the dividend and the number of rows as the divisor.

_____ ÷ _____ = _____



Write a multiplication equation for the array.

_____ × _____ = _____

STEP 2

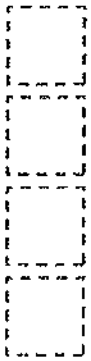
Now, use 8 tiles to make an array with 4 equal rows.

Draw the rest of the tiles.

How many tiles are in each row? _____

Write a division equation for the array using the total number of tiles as the dividend and the number of rows as the divisor.

_____ ÷ _____ = _____



Write a multiplication equation for the array.

_____ × _____ = _____

So, 8 ÷ 2 = _____, 2 × 4 = _____, 8 ÷ 4 = _____,

and 4 × 2 = _____ are related facts.

Try This! **Draw an array with 4 rows of 4 tiles.**

Your array shows the related facts for 4, 4, and 16.

$4 \times 4 =$ _____ $16 \div 4 =$ _____

Since both factors are the same, there are only two equations in this set of related facts.

- Write another set of related facts that has only two equations.

_____

Remember

$4 \times 4 = 16$

↑ factor ↑ factor ↑ product

Share and Show

1. Complete the related facts for this array.

$2 \times 8 = 16$ $16 \div 2 = 8$

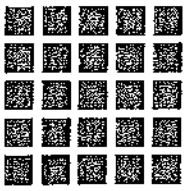
_____ _____

MATHEMATICAL PRACTICES

Math Talk Look at the multiplication and division equations in a set of related facts. What do you notice about the products and dividends? Explain.

Write the related facts for the array.

2.



_____

_____

_____

_____

3.

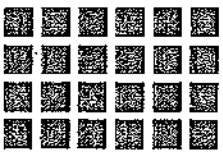
_____

_____

_____

_____

4.



_____

_____

_____

_____

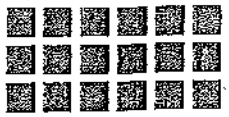
5. Why do the related facts for the array in Exercise 2 have only two equations?

_____

Name _____

On Your Own

Write the related facts for the array.

6. 

_____

_____

_____

_____

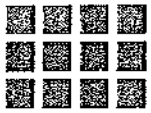
7. 

_____

_____

_____

_____

8. 

_____

_____

_____

_____

Write the related facts for the set of numbers.

9. 2, 5, 10

_____

_____

_____

_____

10. 3, 8, 24

_____

_____

_____

_____

11. 6, 6, 36

_____

_____

_____

_____

Complete the related facts.

12. $4 \times 7 =$ _____

$7 \times$ _____ $= 28$

$28 \div$ _____ $= 4$

$28 \div 4 =$ _____

13. $5 \times$ _____ $= 30$

$6 \times$ _____ $= 30$

$30 \div 6 =$ _____

$30 \div 5 =$ _____

14. _____ $\times 9 = 27$

_____ $\times 3 = 27$

_____ $\div 9 = 3$

$27 \div$ _____ $= 9$

15. _____ $\times 5 = 20$

_____ $\times 4 = 20$

$20 \div$ _____ $= 5$

_____ $\div 5 = 4$

16. $2 \times$ _____ $= 12$

$6 \times 2 =$ _____

_____ $\div 2 = 6$

$12 \div$ _____ $= 2$

17. $5 \times 8 =$ _____

_____ $\times 5 = 40$

$40 \div 5 =$ _____

_____ $\div 8 = 5$

Problem Solving REAL WORLD

Use the table for 18–19.

Clay Supplies

Item	Number in Package
Clay	12 sections
Clay tool set	11 tools
Glitter dough	36 sections

18. Mr. Lee divides 1 package of clay and 1 package of glitter dough equally among 4 students. How many more glitter dough sections than clay sections does each student get?

SHOW YOUR WORK

19. **Write Math** **What's the Error?** Ty has a package of glitter dough. He says he can give 9 friends 5 equal sections. Describe his error.

20. **HOT** **Pose a Problem** Write a word problem that can be solved by using $35 \div 5$. Solve your problem.

21. **Test Prep** Which equation is NOT included in the same set of related facts as $9 \times 4 = 36$?

Ⓐ $4 \times 9 = 36$

Ⓑ $36 \div 6 = 6$

Ⓒ $36 \div 4 = 9$

Ⓓ $36 \div 9 = 4$

FOR MORE PRACTICE:
Standards Practice Book, pp. P119–P120

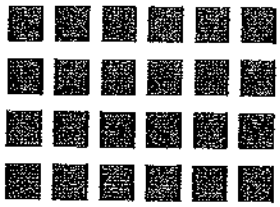
Name _____

Algebra • Write Related Facts

Related facts are a set of related multiplication and division equations.

Write the related facts for the array.

There are 4 equal rows of tiles.
There are 6 tiles in each row.
There are 24 tiles.
Write 2 multiplication equations and 2 division equations for the array.



factor × factor = product

$4 \times 6 = 24$

$6 \times 4 = 24$

dividend ÷ divisor = quotient

$24 \div 4 = 6$

$24 \div 6 = 4$

The equations show how the numbers 4, 6, and 24 are related.

So, the related facts are $4 \times 6 = 24$, $6 \times 4 = 24$, $24 \div 4 = 6$, and $24 \div 6 = 4$.

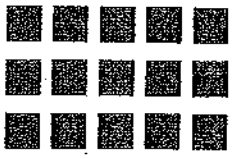
Write the related facts for the array.

1.

_____ _____

_____ _____

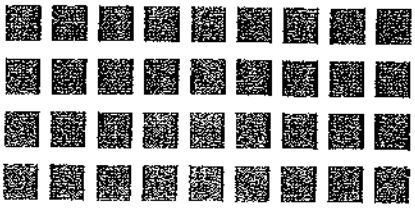
2.



_____ _____

_____ _____

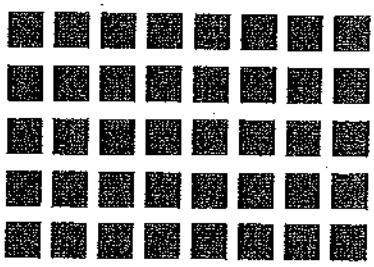
3.



_____ _____

_____ _____

4.



_____ _____

_____ _____

Name _____

Related Fact Riddles

Related facts use three numbers. Solve each riddle to find the three numbers. Then, write the set of related facts for the numbers.

Remember the following vocabulary terms: ***dividend ÷ divisor = quotient.***

1. Seven is the quotient. The dividend is a multiple of 3 that is less than 30.

_____

_____

2. The quotient is 7 less than the divisor. The dividend is 18.

_____

_____

3. This set of related facts contains two numbers less than 10. One of these numbers is the product of 3 and 3. When you multiply the two numbers, the product is a multiple of 5. Write the related facts.

_____

_____

4. The quotient and the divisor are the same number. The sum is 8. Write the related facts.

_____

_____

5. Write Math ➔ How many equations did you write for Exercise 4? How do you know your answer is correct?

_____

_____

6. **Stretch Your Thinking** Write a riddle for three numbers in a set of related facts. Then write the related facts for the numbers.

_____

_____

_____

Name _____

Write Related Facts

COMMON CORE STANDARD CC.3.OA.7
Multiply and divide within 100.

Write the related facts for the array.

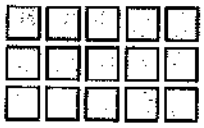
1. 

$2 \times 6 = 12$

$6 \times 2 = 12$

$12 \div 2 = 6$

$12 \div 6 = 2$

2. 

3. 

Write the related facts for the set of numbers.

4. 3, 7, 21

5. 2, 9, 18

6. 4, 8, 32

Complete the related facts.

7. $4 \times 9 =$ ____

$9 \times$ ____ $= 36$

$36 \div$ ____ $= 4$

____ $\div 4 = 9$

8. ____ $\times 7 = 35$

____ $\times 5 = 35$

____ $\div 7 = 5$

$35 \div 5 =$ ____

9. $6 \times$ ____ $= 18$

$3 \times 6 =$ ____

$18 \div$ ____ $= 3$

____ $\div 3 = 6$

Problem Solving REAL WORLD

10. CDs are on sale for $5 each. Jennifer has $45 and wants to buy as many as she can. How many CDs can Jennifer buy?

_____

11. Mr. Moore has 21 feet of wallpaper. He cuts it into sections that are each 3 feet long. How many sections does Mr. Moore have?

_____

TEST PREP

Lesson Check (CC.3.OA.7)

1. Which number completes the set of related facts?

$5 \times \quad = 40$ $\quad 40 \div \quad = 5$

$\times 5 = 40$ $\quad 40 \div 5 =$

Ⓐ 6
Ⓑ 7
Ⓒ 8
Ⓓ 9

2. Which equation is not in the same set of related facts as $4 \times 7 = 28$?

Ⓐ $7 \times 4 = 28$
Ⓑ $4 + 7 = 11$
Ⓒ $28 \div 4 = 7$
Ⓓ $28 \div 7 = 4$

Spiral Review (CC.3.OA.1, CC.3.OA.5, CC.3.OA.7, CC.3.NBT.3)

3. Beth runs 20 miles each week for 8 weeks. How many miles does Beth run in 8 weeks? (Lesson 5.5)

Ⓐ 16 miles
Ⓑ 28 miles
Ⓒ 100 miles
Ⓓ 160 miles

4. Find the product. (Lesson 3.7)

5×0

Ⓐ 0
Ⓑ 1
Ⓒ 5
Ⓓ 10

5. Uri's bookcase has 5 shelves. There are 9 books on each shelf. How many books in all are in Uri's bookcase? (Lesson 4.9)

Ⓐ 14
Ⓑ 36
Ⓒ 45
Ⓓ 54

6. There are 6 batteries in one package. How many batteries will 6 packages have? (Lesson 3.1)

Ⓐ 12
Ⓑ 18
Ⓒ 24
Ⓓ 36

Name _____

Division Rules for 1 and 0

Essential Question What are the rules for dividing with 1 and 0?

COMMON CORE STANDARD **CC.3.OA.5**
Understand properties of multiplication and the relationship between multiplication and division.

UNLOCK the Problem REAL WORLD

What rules for division can help you divide with 1 and 0?

If there is only 1 fishbowl, then all the fish must go in that fishbowl.

$4 \div 1 = 4$

↑ number of fish ↑ number of bowls ↑ number in each bowl

Try This! There are 3 fish and 1 fishbowl. Draw a quick picture to show the fish in the fishbowl.

Write the equation your picture shows.

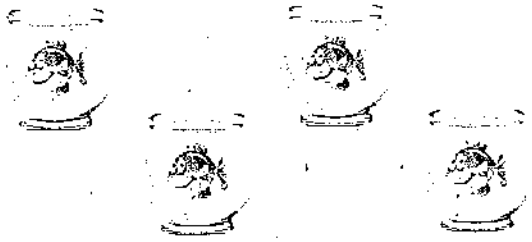
_____ ÷ _____ = _____

Rule A: Any number divided by 1 equals that number.

MATHEMATICAL PRACTICES

Math Talk Explain how Rule A is related to the Identity Property of Multiplication.

If there is the same number of fish and fishbowls, then 1 fish goes in each fishbowl.



$4 \div 4 = 1$

↑ number of fish ↑ number of bowls ↑ number in each bowl

Try This! There are 3 fish and 3 fishbowls. Draw a quick picture to show the fish divided equally among the fishbowls.

Write the equation your picture shows.

_____ ÷ _____ = _____

Rule B: Any number (except 0) divided by itself equals 1.

If there are 0 fish and 4 fishbowls, there will not be any fish in the fishbowls.

$0 \div 4 = 0$

↑ number of fish; ↑ number of bowls; ↑ number in each bowl

Try This! There are 0 fish and 3 fishbowls. Draw a quick picture to show the fishbowls.

Write the equation your picture shows.

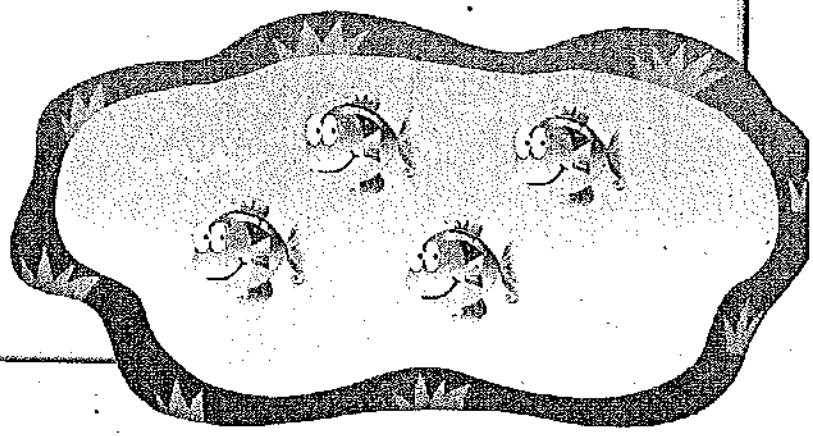
_____ ÷ _____ = _____

Rule C: Zero divided by any number (except 0) equals 0.

If there are 0 fishbowls, then you cannot separate the fish equally into fishbowls. Dividing by 0 is not possible.

~~$4 \div 0 = \square$~~

Rule D: You cannot divide by 0.



Share and Show MATH BOARD

1. Use the picture to find $2 \div 2$. _____

MATHEMATICAL PRACTICES

Math Talk Explain what happens when you divide a number (except 0) by itself.

Find the quotient.

2. $7 \div 1 =$ _____

3. $8 \div 8 =$ _____

4. $0 \div 5 =$ _____

5. $6 \div 6 =$ _____

Name _____

On Your Own

Find the quotient.

6. $0 \div 8 =$ ____ 7. $5 \div 5 =$ ____ 8. $2 \div 1 =$ ____ 9. $0 \div 7 =$ ____

10. $5\overline{)0}$ 11. $1\overline{)9}$ 12. $7\overline{)7}$ 13. $10\overline{)10}$

Practice: Copy and Solve Find the quotient.

14. $6 \div 1$ 15. $25 \div 5$ 16. $0 \div 6$ 17. $18 \div 3$

18. $14 \div 2$ 19. $9 \div 9$ 20. $28 \div 4$ 21. $8 \div 1$

22. $3\overline{)27}$ 23. $5\overline{)10}$ 24. $3\overline{)0}$ 25. $1\overline{)0}$

Problem Solving REAL WORLD

SHOW YOUR WORK

26. Claire has 7 parakeets. She puts 4 in a cage. She divides the other parakeets equally among 3 friends to hold. How many parakeets does each friend get to hold?

_____

27. Lena has some parrots. She gives each parrot 1 grape. If Lena gives out 5 grapes, how many parrots does she have?

_____

28. H.O.T. Write Math → Suppose a pet store has 21 birds that are in 21 cages. Use what you know about division rules to find the number of birds in each cage. Explain your answer.

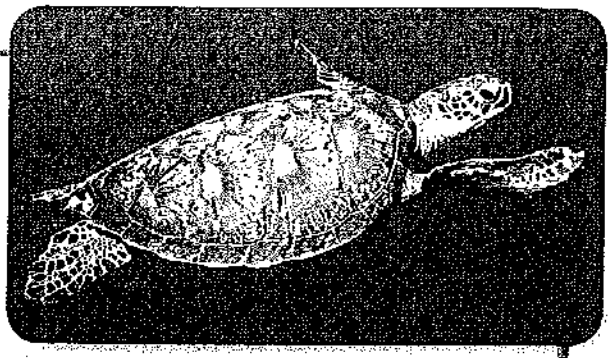
_____

_____

29. Test Prep Joe has 4 horses. He puts each horse in its own stall. How many stalls does Joe use?

Ⓐ 0 Ⓑ 1 Ⓒ 2 Ⓓ 4

Connect to Reading



Compare and Contrast

You have learned the rules for division with 1. Compare and contrast them to help you learn how to use the rules to solve problems.

Compare the rules. Think about how they are *alike*.
Contrast the rules. Think about how they are *different*.

Read: Rule A: Any number divided by 1 equals that number.

Rule B: Any number (except 0) divided by itself equals 1.

Compare: How are the rules alike?

- Both are division rules for 1.

Contrast: How are the rules different?

- Rule A is about dividing a number by 1. The quotient is that number.
- Rule B is about dividing a number (except 0) by itself. The quotient is always 1.

Read the problem. Write an equation. Solve.
Circle *Rule A* or *Rule B* to tell which rule you used.

30. Jamal bought 7 goldfish at the pet store. He put them in 1 fishbowl. How many goldfish did he put in the fishbowl?

_____

Rule A Rule B

31. Ava has 6 turtles. She divides them equally among 6 aquariums. How many turtles does she put in each aquarium?

_____

Rule A Rule B

FOR MORE PRACTICE:
Standards Practice Book, pp. P121–P122

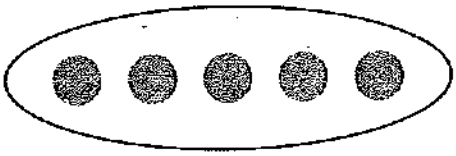
Name _____

Algebra • Division Rules for 1 and 0

Division rules can help you understand how to divide with 1 and 0.

Rule A: Any number divided by 1 equals that number.

$5 \div 1 = 5$ or $1\overline{)5}$ $\quad 5$



One group of 5

Rule B: Any number (except 0) divided by itself equals 1.

$5 \div 5 = 1$ or $5\overline{)5}$ $\quad 1$

Five groups of 1

Rule C: Zero divided by any number (except 0) equals 0.

$0 \div 5 = 0$ or $5\overline{)0}$ $\quad 0$

Five groups of 0

Rule D: You cannot divide by 0.

Find the quotient.

1. $4 \div 1 =$ ____ **2.** $2 \div 2 =$ ____ **3.** $8 \div 1 =$ ____ **4.** $7 \div 7 =$ ____

5. $0 \div 8 =$ ____ **6.** $0 \div 9 =$ ____ **7.** $4 \div 4 =$ ____ **8.** $6 \div 1 =$ ____

9. $6 \div 6 =$ ____ **10.** $0 \div 4 =$ ____ **11.** $0 \div 2 =$ ____ **12.** $3 \div 1 =$ ____

Name _____

A Planet of 1 and 0

Fill in the correct quotient to complete the fact. Then, fill in the other blank with the word that makes the most sense from the box below. Each word may be used only once. Some words will not be used.

planets	kite	letter
toes		
rock	cities	

1. On the Earth's surface, there are _____ basic types of _____.
   (3 ÷ 1)

2. The number _____ looks like the _____ O.
   (0 ÷ 4)

3. There are usually _____ fingers and _____ on each hand and foot.
   (5 ÷ 1)

4. In our solar system, _____ of the _____, Mercury and Venus, have no moons.
   (2 ÷ 1)

5. **Stretch Your Thinking** If Exercise 2 had read 4 ÷ 0, could it be solved? **Explain.**

_____

_____

6. **Write Math** Write a fill-in story like the exercises above, using a rule for 1 or 0. Use one of the words left in the box.

_____

_____

_____

Name _____

Division Rules for 1 and 0

ALGEBRA
Lesson 6.9

COMMON CORE STANDARD CC.3.OA.5
Understand properties of multiplication and the relationship between multiplication and division.

Find the quotient.

1. $3 \div 1 =$ 3 **2.** $8 \div 8 =$ _____ **3.** _____ $= 0 \div 6$ **4.** $2 \div 2 =$ _____

5. _____ $= 9 \div 1$ **6.** $0 \div 2 =$ _____ **7.** $0 \div 3 =$ _____ **8.** _____ $= 0 \div 4$

9. $7\overline{)7}$ **10.** $1\overline{)6}$ **11.** $9\overline{)0}$ **12.** $1\overline{)5}$

13. $1\overline{)0}$ **14.** $4\overline{)4}$ **15.** $1\overline{)10}$ **16.** $2\overline{)2}$

Problem Solving REAL WORLD

17. There are no horses in the stables. There are 3 stables in all. How many horses are in each stable?

_____

18. Jon has 6 kites. He and his friends will each fly 1 kite. How many people in all will fly a kite?

_____

TEST PREP

Lesson Check (CC.3.OA.5)

1. Candace has 6 pairs of jeans. She places each pair on its own hanger. How many hangers does Candace use?

Ⓐ 0 Ⓒ 6

Ⓑ 1 Ⓓ 12

2. There are 0 birds and 4 bird cages. Which division equation describes how many birds are in each cage?

Ⓐ $0 \div 4 = 0$ Ⓒ $4 \div 1 = 4$

Ⓑ $4 \div 4 = 1$ Ⓓ $0 \times 4 = 0$

Spiral Review (CC.3.OA.5, CC.3.OA.9, CC.3.MD.3)

3. There are 7 plates on the table. There are 0 sandwiches on each plate. How many sandwiches are on the plates in all? (Lesson 3.7)

7×0

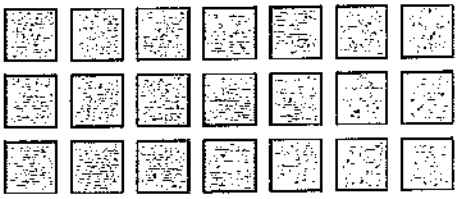
Ⓐ 0

Ⓑ 1

Ⓒ 7

Ⓓ 70

4. Which shows a way to break apart the array to find the product? (Lesson 4.4)



Ⓐ $(3 \times 5) + (3 \times 2)$

Ⓑ $(2 \times 8) + (1 \times 8)$

Ⓒ $(4 \times 7) + (1 \times 7)$

Ⓓ $(3 \times 6) + (3 \times 3)$

5. Which of the following describes a pattern in the table? (Lesson 5.1)

Vans	1	2	3	4	5
Students	6	12	18	24	30

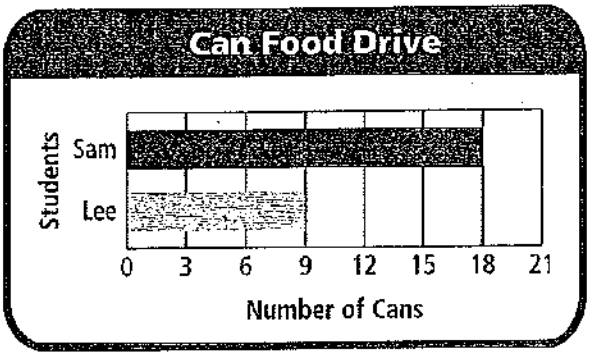
Ⓐ Add 5.

Ⓑ Multiply by 2.

Ⓒ Subtract 1.

Ⓓ Multiply by 6.

6. Use the graph.



How many more cans did Sam bring in than Lee? (Lesson 2.5)

Ⓐ 4 Ⓒ 7

Ⓑ 5 Ⓓ 9

Name _____

Chapter 6 Review/Test

Vocabulary

Choose the best term from the box to complete the sentence.

Vocabulary
dividend
inverse operations
related facts

1. Multiplication and division are opposite operations, or _____. (p. 235)

2. _____ are a set of related multiplication and division equations. (p. 239)

Concepts and Skills

Make an array. Then write a division equation. (CC.3.OA.3)

3. 32 tiles in 4 rows

_____

4. 28 tiles in 7 rows

_____

Complete the equations. (CC.3.OA.6)

5. $3 \times \_\_\_\_ = 24$ $\quad 24 \div 3 = \_\_\_\_$

6. $5 \times \_\_\_\_ = 15$ $\quad 15 \div 5 = \_\_\_\_$

7. $7 \times \_\_\_\_ = 49$ $\quad 49 \div 7 = \_\_\_\_$

8. $9 \times \_\_\_\_ = 18$ $\quad 18 \div 9 = \_\_\_\_$

Complete the related facts. (CC.3.OA.7)

9. $4 \times 8 = \_\_\_\_$

$8 \times \_\_\_\_ = 32$

$32 \div \_\_\_\_ = 8$

$32 \div 8 = \_\_\_\_$

10. $3 \times \_\_\_\_ = 9$

$\_\_\_\_ \div 3 = 3$

11. $6 \times \_\_\_\_ = 42$

$7 \times 6 = \_\_\_\_$

$\_\_\_\_ \div 6 = 7$

$42 \div \_\_\_\_ = 6$

Assessment Options Online Chapter Test

Fill in the bubble for the correct answer choice.

TEST PREP

12. Caroline has 27 books. She put an equal number of her books on each of 3 shelves. How many books are on each shelf? (CC.3.OA.2)

Ⓐ 7

Ⓑ 8

Ⓒ 9

Ⓓ 10

13. Leo has 24 cookies. He wants to put groups of 6 cookies on a plate. How many plates does he need? (CC.3.OA.2)

Ⓐ 4

Ⓑ 5

Ⓒ 18

Ⓓ 30

14. A pet shop has 18 hamsters. They sold 10 and put the remaining hamsters into 8 cages. How many hamsters are in each cage? (CC.3.OA.5)

Ⓐ 8

Ⓑ 4

Ⓒ 2

Ⓓ 1

15. Aidan bought 14 goldfish and 2 fishbowls. He put an equal number of fish in each fishbowl. Which equation can be used to find how many goldfish are in each fishbowl? (CC.3.OA.3)

Ⓐ $14 - 2 = \square$

Ⓑ $2 + \square = 14$

Ⓒ $14 \div 2 = \square$

Ⓓ $2 \times 14 = \square$

Name _____

TEST PREP

Fill in the bubble for the correct answer choice.

16. Which division equation belongs to this set of related facts? (CC.3.OA.7)

$4 \times 6 = 24$ $6 \times 4 = 24$

Ⓐ $20 \div 4 = 5$

Ⓑ $24 \div 6 = 4$

Ⓒ $18 \div 6 = 3$

Ⓓ $24 \div 3 = 8$

17. Jasmine made some cards for her family. She used 16 stickers and put 4 of them on each card. How many cards did Jasmine make? (CC.3.OA.2)

Ⓐ 2

Ⓑ 3

Ⓒ 4

Ⓓ 5

18. Which of the following multiplication equations can be used to find $42 \div 7$? (CC.3.OA.6)

Ⓐ $6 \times 6 = 36$

Ⓑ $5 \times 8 = 40$

Ⓒ $8 \times 6 = 48$

Ⓓ $7 \times 6 = 42$

19. Jill has 6 puppies. The puppies play in 1 crate. How many puppies are in the crate? (CC.3.OA.5)

Ⓐ 0

Ⓑ 1

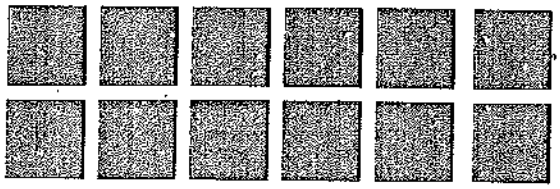
Ⓒ 6

Ⓓ 7

Constructed Response

20. Brendan bought 30 baseball cards. They came in packs of 10. How many packs of baseball cards did Brendan buy? Explain how you found the answer. (CC.3.OA.3)

21. Sue drew this array. Write the related facts represented by the array. (CC.3.OA.7)



Performance Task (CC.3.OA.2, CC.3.OA.3)

22. There are 20 students in Mr. Hamilton's class. He wants to put the students in equal groups.

A List as many ways as you can to arrange the students in equal groups.

B Tell how you know you found all the ways.

Name _____

COMMON CORE STANDARDS CC.3.OA.2, CC.3.OA.3, CC.3.OA.5, CC.3.OA.6, CC.3.OA.7

Chapter 6 Extra Practice

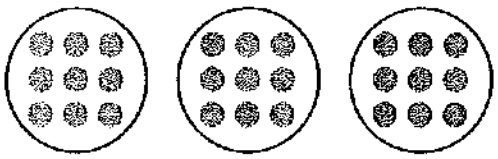
Lessons 6.1 - 6.3

Make equal groups. Complete the table.

	Counters	Number of Equal Groups	Number in Each Group
1.	18	9	
2.	24		8
3.	12	6	
4.	35	7	
5.	32		4
6.	25		5

Lesson 6.4

Write a division equation for the picture.

1. 

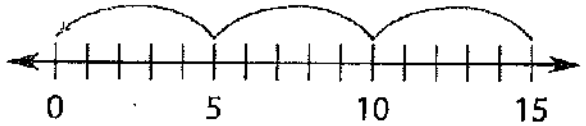
2. 

_____ _____

_____ _____

Lesson 6.5

Write a division equation.

1. 

2. $\begin{array}{r} 24 \\ -\ 6 \\ \hline 18 \end{array}$ $\begin{array}{r} 18 \\ -\ 6 \\ \hline 12 \end{array}$ $\begin{array}{r} 12 \\ -\ 6 \\ \hline 6 \end{array}$ $\begin{array}{r} 6 \\ -\ 6 \\ \hline 0 \end{array}$

_____ _____

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Lesson 6.6

Make an array. Then write a division equation.

1. 12 tiles in 4 rows

2. 18 tiles in 3 rows

3. 35 tiles in 5 rows

4. 28 tiles in 7 rows

Lesson 6.7

Complete the equations.

1. $8 \times \_\_\_ = 40$ $40 \div 8 = \_\_\_$

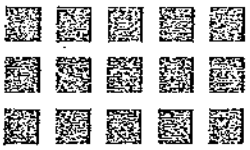
2. $6 \times \_\_\_ = 36$ $36 \div 6 = \_\_\_$

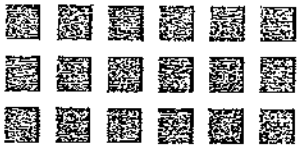
3. $3 \times \_\_\_ = 21$ $21 \div 3 = \_\_\_$

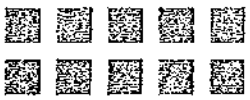
4. $2 \times \_\_\_ = 18$ $18 \div 2 = \_\_\_$

Lesson 6.8 (pp. 239–243)

Write the related facts for the array.

1. 

2. 

3. 

Lesson 6.9

Find the quotient.

1. $7 \div 1$ ___

2. $4 \div 4$ ___

3. $9 \div 1$ ___

4. $0 \div 1$ ___

5. Anton has 8 flower pots. He plants 1 seed in each pot. How many seeds does Anton use?

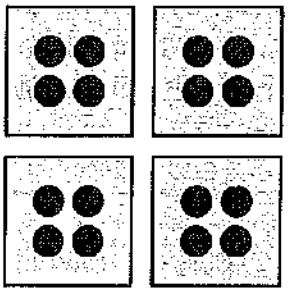
Choose the correct answer.

1. The baseball coach ordered 40 gloves for 5 teams. If each team gets the same number of gloves, how many will each team get?

40 gloves

A 7
B 8
C 9
D 10

2. Mr. Jackson has 16 flashcards. He gives an equal number of flashcards to 4 groups.



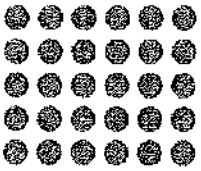
How many flashcards does Mr. Jackson give to each group?

A 4
B 8
C 12
D 16

3. Otis paid $7 for some markers for school. Each marker cost $1. How many markers did Otis buy?

A 0
B 1
C 6
D 7

4. Anna planted 30 pumpkin seeds equally in 5 rows.

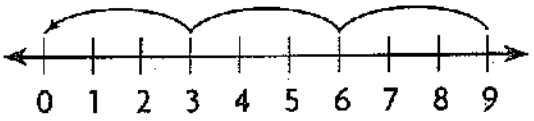


How many pumpkin seeds did Anna plant in each row?

A 4
B 5
C 6
D 8

GO ON

5. Marco's mother bought 9 toy cars. She asked Marco to share the cars equally among his friends. Marco used a number line to help him.



Which division equation is represented by the number line?

A $9 \div 3 = 3$

B $3 \div 3 = 1$

C $9 \div 9 = 1$

D $6 \div 3 = 2$

6. Heather places 32 stamps into groups of 8. How many groups of stamps are there?

A 3

B 4

C 6

D 7

7. Fritz wrote a set of related facts for the array below. Which equation is **not** included in the set of related facts for this array?

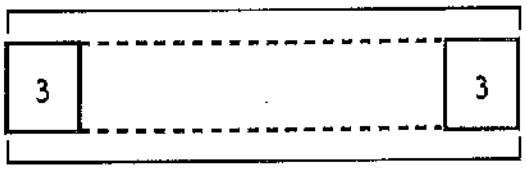
A $6 \times 3 = 18$

B $6 \div 2 = 3$

C $3 \times 2 = 6$

D $2 \times 3 = 6$

8. Rico went for a 12-mile bike ride. He stopped every 3 miles to take pictures. How many times did Rico stop during his bike ride?



12 miles

A 3

B 4

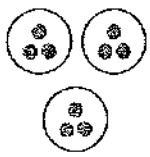
C 9

D 15

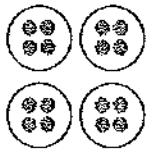
GO ON

9. Jason has 12 books. He wants to place his books in 4 equal stacks. Which model shows how many books Jason should put in each stack?

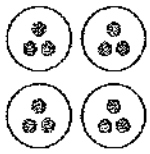
A



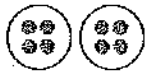
C



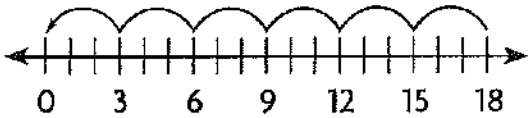
B



D



10. Tara made $18 selling cookies. She wants to know how many cookies she sold. Tara used a number line to help her.



Which division equation is represented by the number line?

A $18 \div 2 = 9$

B $18 \div 9 = 2$

C $18 \div 3 = 6$

D $18 \div 18 = 1$

11. Linda picked 48 flowers. She placed them equally into 8 vases. How many flowers are in each vase?

A 4

B 5

C 6

D 7

12. John made 8 cat treats. He divided the cat treats equally among 8 cats. How many cat treats did John give to each cat?

A 0

B 1

C 4

D 8

13. Yolanda knitted 15 scarves in 3 different colors. If she made the same number of scarves of each color, how many scarves of each color did she make?

$3 \times \square = 15$ $\quad$ $15 \div 3 = \square$

A 4

B 5

C 9

D 12

GO ON

Write the correct answer.

14. Mrs. Rinks buys 24 beads. Each bag holds 8 beads. How many bags of beads does Mrs. Rinks buy?

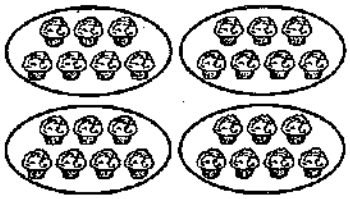
_____

15. Peter writes a set of related facts. One of the facts he writes is $18 \div 6 = 3$. Write an equation that is included in the same set of related facts.

_____

_____

16. Sandy divided a batch of muffins into 4 bags to sell at the bake sale.



Write the division equation represented by the picture.

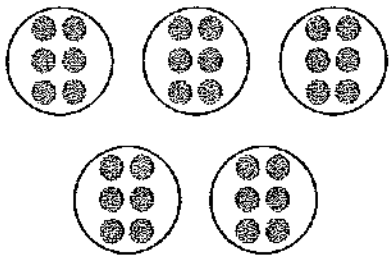
_____

17. There are 0 toys and 6 toy chests. How many toys are in each toy chest?

_____

GO ON

18. During a field trip, 30 students in Mrs. Beckman's class were placed into groups of 6 students each for a tour of the museum. How many groups were there?



_____

19. Lola bought a bag of 15 apples for her friends. She used repeated subtraction to help her divide the apples equally among her friends.

$$\begin{array}{r} 15 \\ -\ 5 \\ \hline 10 \end{array} \quad \begin{array}{r} 10 \\ -\ 5 \\ \hline 5 \end{array} \quad \begin{array}{r} 5 \\ -\ 5 \\ \hline 0 \end{array}$$

Write a division equation that matches the repeated subtraction.

_____

20. Carlos uses the numbers 3, 7, and 21 to write a set of related facts. Write an equation that is part of the set of related facts that Carlos writes.

_____

_____

21. Mr. Kane wants to divide craft sticks into groups of 6 for an art project. How many groups of 6 can be made with 24 craft sticks?

_____

GO ON

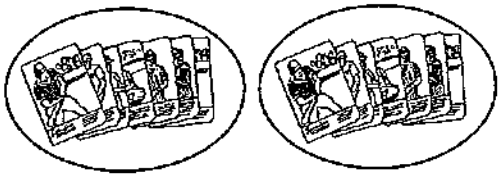
22. Miller has 20 blocks. He makes 5 equal groups. How many blocks does Miller put in each group?

_____

23. Tinley buys 56 hamburger buns for the team party. The hamburger buns come in packages of 8. Write a related multiplication fact for this problem.

_____

24. Rex and Theodore shared a package of 14 baseball cards equally.



How many baseball cards will each boy get?

_____

25. There are 18 students in the science club. Mrs. Rios separates the students into two equal groups. How many students are in each group?

18 students

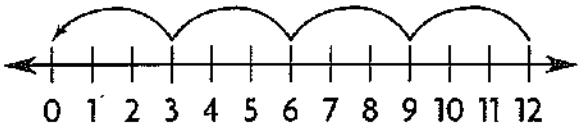
_____

GO ON

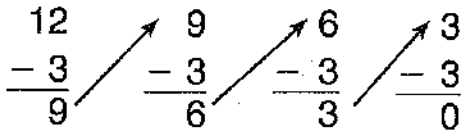
Constructed Response

26. Laila and Sophia use different ways to solve the division equation $12 \div 3 = \square$. Compare and contrast the two ways. Then solve.

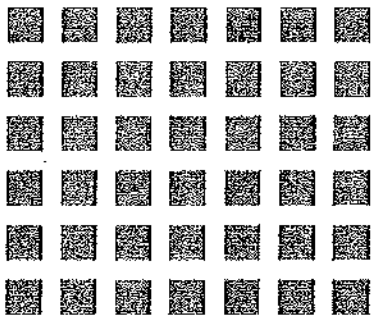
Laila's Way



Sophia's Way



Extended Constructed Response



27. Gretchen used 42 tiles to make an array.

A Gretchen wrote a set of related facts for the array. Write the set of related facts. Explain why the equations you write are related.

B Gretchen makes another array and writes only two equations to show the related facts. Explain why she might have done this. Write a set of related facts that Gretchen could have written for her array.

Constructed Response

The Constructed Response item is scored using the 3-point scoring rubric in the *Assessment Guide.* A student can receive partial credit for answers that are partially correct or partially completed.

Performance Indicators

For Problem 26, a student with a Level 2 paper:

_____ identifies that both methods show the relationship between subtraction and division.

_____ explains that Laila's way uses jumps on a number line while Sophia's way uses repeated subtraction.

_____ completes the division equation correctly.

Extended Constructed Response

The Extended Constructed Response item is scored using the 4-point scoring rubric in the *Assessment Guide.* A student can receive partial credit for answers that are partially correct or partially completed.

Performance Indicators

For Problem 27, a student with a Level 3 paper:

_____ identifies the four equations in the set of related facts.

_____ explains that related facts use inverse operations.

_____ explains that related facts use the same numbers.

_____ describes an array that has the same number of rows and columns.

_____ tells why only two equations are needed for the array.

_____ writes a possible set of related facts.