

Core Content

Cluster Title: Use place value understanding and properties of operations to perform multi-digit arithmetic.

Standard 6: Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

MASTERY Patterns of Reasoning:

Conceptual:

Students will understand that the remainder is separate from the quotient.

Students will understand the relationship between multiplication and division.

Students will understand how place value affects division.

Students will understand properties of operations.

Students will understand that division is either finding the number of items in a group when the number of groups is known (quotative or measurement model) or how many groups there are when the number in each group is known (partitive or sharing model). Note: It is not necessary for students to know the names of the models.

Example:

Quotative Model: Juanita has twelve apples. She wants to put 3 apples in a bag. How many bags will she need? $12 \text{ apples} \div 3 \text{ apples per bag} = 4 \text{ bags}$

Partitive Model: Juanita has 12 apples. She wants to put them in 3 bags. How many apples will go in each bag? $12 \text{ apples} \div 3 \text{ bags} = 4 \text{ apples per bag}$

Procedural:

Students can use multiplication and division facts fluently.

Students can decompose (break apart) numbers to divide.

Students can use repeated subtraction and sharing as division strategies.

Students can solve equations involving division.

Students can divide up to four-digit dividends and one-digit divisors.

Students can use multiple strategies to divide these numbers. Multiple algorithms are encouraged at this step.

Representational:

Students can model division with rectangular arrays, area models and manipulatives (e.g., place value blocks, mats, money, etc.).

Supports for Teachers

Critical Background Knowledge	
<p>Conceptual:</p> <ul style="list-style-type: none"> Students will understand meaning of multiplication and division. Students will understand the relationship between multiplication and division (e.g., inverse operations). Students will understand place value. Students will understand the properties of operations. Students will know how to use basic multiplication and division facts fluently. Students will know and be fluent in basic subtraction facts. <p>Procedural:</p> <ul style="list-style-type: none"> Students can fluently multiply and divide within 100. <p>Representational:</p> <ul style="list-style-type: none"> Students can model simple division with arrays. 	
Academic Vocabulary and Notation	
divisor, dividend, quotient, remainder, array, area model, inverse operations, properties of operations, product, factor	
Instructional Strategies Used	Resources Used
<p>Model division by sharing money equally (partitive). For example, four students have earned a total of \$56 in good behavior bucks. The teacher awards the group of students the money in five \$10 bills and six \$1 bills. The division problem is:</p> $4 \overline{) \$ 56}$ <p>Place the five \$10 bills on the table and divide them evenly into 4 piles, resulting in one \$10 in each pile with one \$10 bill left over. The teacher is left with one \$10 bill and six \$1 bills for a total of \$16. The \$10 can be exchanged at the “bank” for ten \$1 bills. The teacher now has sixteen \$1 bills that can be divided evenly between the 4 students, with \$4 for each. Each student receives a total of \$14.</p>	<p>Place value manipulatives (e.g. money, base ten blocks, discs, etc.) and graph paper</p> <p>http://nrich.maths.org/6402</p> <p>http://www.kidsnumbers.com/long-division.php</p> <p>Use Unit 4 at: http://eduplace.com/math/mthexp/g4/mathbkg/ http://nrich.maths.org/6402</p>

Model division by subtracting groups of the divisor from the dividend (measurement or quotitive).

$$\begin{array}{r}
 6 \overline{) 158} \\
 \underline{- 60} \\
 98 \\
 \underline{- 60} \\
 38 \\
 \underline{- 36} \\
 2
 \end{array}$$

↑
↑
 Remainder Quotient

10

10

+ 6

26

How many groups of 6 are in 158? (At least 10)
 Use 10 as the first partial quotient. $10 \times 6 = 60$
 Subtract $158 - 60 = 98$

How many groups of 6 are in 98? (At least 10)
 Use 10 as the second partial quotient. $10 \times 6 = 60$
 Subtract $98 - 60 = 38$

How many groups of 6 are in 38? (At least 6)
 Use 6 as the third partial quotient. $6 \times 6 = 36$
 Subtract $38 - 36 = 2$

Add the partial quotients and record any remainders.

Assessment Tasks Used

Skill-Based Task:

$487 \div 6 =$
 $2,426 \div 2 =$
 $342 \div 3 =$

Problem Task:

Each year our school has a field day where students rotate between 7 different activities. If the physical education teacher divides the 434 students evenly between the activities, how many students will there be at each activity? Will there be any students left out? Justify your answer.