Mathematics | Grade 2

In Grade 2, instructional time should focus on four critical areas: (1) extending understanding of base-ten notation; (2) building fluency with addition and subtraction; (3) using standard units of measure; and (4) describing and analyzing shapes.

(1) Students extend their understanding of the base-ten system. This includes ideas of counting in fives, tens, and multiples of hundreds, tens, and ones, as well as number relationships involving these units, including comparing. Students understand multi-digit numbers (up to 1000) written in base-ten notation, recognizing that the digits in each place represent amounts of thousands, hundreds, tens, or ones (e.g., 853 is 8 hundreds + 5 tens + 3 ones).

(2) Students use their understanding of addition to develop fluency with addition and subtraction within 100. They solve problems within 1000 by applying their understanding of models for addition and subtraction, and they develop, discuss, and use efficient, accurate, and generalizable methods to compute sums and differences of whole numbers in base-ten notation, using their understanding of place value and the properties of operations. They select and accurately apply methods that are appropriate for the context and the numbers involved to mentally calculate sums and differences for numbers with only tens or only hundreds.

(3) Students recognize the need for standard units of measure (centimeter and inch) and they use rulers and other measurement tools with the understanding that linear measure involves an iteration of units. They recognize that the smaller the unit, the more iterations they need to cover a given length.

(4) Students describe and analyze shapes by examining their sides and angles. Students investigate, describe, and reason about decomposing and combining shapes to make other shapes. Through building, drawing, and analyzing two- and three-dimensional shapes, students develop a foundation for understanding area, volume, congruence, similarity, and symmetry in later grades.
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Grade 2 Overview

Operations and Algebraic Thinking
- Represent and solve problems involving addition and subtraction.
- Add and subtract within 20.
- Work with equal groups of objects to gain foundations for multiplication.

Number and Operations in Base Ten
- Understand place value.
- Use place value understanding and properties of operations to add and subtract.

Measurement and Data
- Measure and estimate lengths in standard units.
- Relate addition and subtraction to length.
- Work with time and money.
- Represent and interpret data.

Geometry
- Reason with shapes and their attributes.

Mathematical Practices
1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.
Represent and solve problems involving addition and subtraction. (2.OA.A)

1. Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.¹ (2.OA.A.1) (DOK 2)
   a. Example: Solution (DOK 1)
      A pencil costs 59 cents, and a sticker costs 20 cents less. How much do a pencil and a sticker cost together?

   b. Example: Solution (DOK 2)
      Louis wants to give $15 to help kids who need school supplies. He also wants to buy a pair of shoes for $39.

      a. How much money will he have to save for both?
      b. Louis gets $5 a week for his allowance. He plans to save his allowance every week. How many weeks does it take him to reach this goal?
      c. Louis remembers his sister's birthday is next month. He sets a goal of saving $16 for her gift. How many weeks does he have to save his allowance to reach this goal? How many weeks does he have to save his allowance for all three of his goals?

   c. Example: (Former NAEP question) (DOK 1)

   ![Scale Diagram]

   On the scale above, 2 cylinders balance 1 cube. Which of the scales below would balance?

   A. ![Diagram A]
   B. ![Diagram B]
   C. ![Diagram C]
   D. ![Diagram D]

   Answer: B

¹ See Glossary, Table 1.
d. Example: (Former NAEP question) (DOK 1)
The weights on the scale above are balanced. Each cube weighs 3 pounds. The cylinder weighs $N$ pounds. Which number sentence best describes this situation?

1. $6 + N = 12$
2. $6 + N = 4$
3. $2 + N = 12$
4. $2 + N = 4$
Answer: 1. $6 + N = 12$

e. Example: (Former NAEP question) (DOK 1)
Paco had 32 trading cards. He gave $N$ trading cards to his friend. Which expression tells how many trading cards Paco has now?
1. $32 + N$
2. $32 - N$
3. $N - 32$
4. $32 \div N$
Answer: 2. $32 - N$

f. Example: (Former NAEP question) (DOK 1)
The numbers in the pattern below are increasing by 12. Which of these numbers is part of the pattern?

14, 26, 38, ___, ___

1. 52
2. 58
3. 60
4. 62
Answer: 4. 62

g. Example: (Former NAEP question) (DOK 1)
What number should go in the blank above to make the number sentence true?

$58 = ____ + 36$
Answer: 22

Add and subtract within 20. (2.OA.B)
2. Fluently add and subtract within 20 using mental strategies. By end of Grade 2, know from memory all sums of two one-digit numbers. *(2.OA.B.2) (DOK 1)*

   a. Example: Solution (DOK 1)

   **Materials**
   - Whiteboard or chart paper and markers
   - Empty number line or magnetic cubes lined up on the whiteboard, alternating colors every 5 (see solution)
   - List of expressions ready to write up on the board:
     a. 4+10
     b. 4+12
     c. 4+22
     d. 8+20
     e. 8+29

   **Actions**
   - Write the expression on the board or chart paper. Start with 4+10.
   - Ask students to describe their strategy for solving the problem.
   - Choose one or more students to explain their strategy to the class. Represent each strategy on the board using the number line or magnetic cubes (see solution).
   - Once the student's strategy is understood by the class, continue with the next sum.

   b. Example: Solution (DOK 2)

---

2 See standard 1.OA.6 for a list of mental strategies.
Materials

• Number cards labeled 1-10 (attached as a PDF)

Actions

• Begin by playing the game as a whole class to demonstrate the rules and for students to illustrate the range of possible strategies.

• Have a student pick 5 number cards from the cards labeled 1 through 10. Then, have another student pick a “Target Number” between 10 through 20. Students must add and/or subtract 2 or more of the 5 number cards to arrive at the “target” number.

• As students present the different number combinations for the “target” number, write their expressions on the board and have them explain how they were able to mentally come up with the solution.

• As students explain their reasoning, name the strategies they used. For example, look for students making fives (e.g., 6 + 8 = 5 + 1 + 5 + 3 = 10 + 4 = 14) and tens (9 + 8 = 10 + 7), and using known facts (e.g., 8 + 8 is 16 so 8 + 7 is one less than 16) to encourage flexible thinking about the relationship among the facts.

• When students understand how the game works, they can play in pairs, checking each other's solutions.

Work with equal groups of objects to gain foundations for multiplication. (2.OA.C)

3. Determine whether a group of objects (up to 20) has an odd or even number of members, e.g., by pairing objects or counting them by 2s; write an equation to express an even number as a sum of two equal addends. (2.OA.C.3) (DOK 2)
   a. Example: Solution (DOK 3)
Lin wants to put some red and blue tiles on a wall for decoration. She is thinking about several different patterns of tiles she could create. She wants to choose a pattern that would let her use exactly as many red tiles as blue tiles.

a. Is it possible to create the pattern below using the same number of red tiles as blue tiles? Explain.

b. Is it possible to create the pattern below using the same number of red tiles as blue tiles? Explain.

c. Can you figure out how many tiles are in the pattern below without counting them one by one? Is it possible to create this pattern using the same number of red tiles as blue tiles? Explain.

d. Of the patterns above, which ones have an even number of tiles? Which ones have an odd number of tiles? If Lin wants to use an equal number of red tiles and blue tiles, should she use a pattern with an even number of tiles, or one with an odd number of tiles? Explain.

Example: Solution (DOK 1)
6 is even.

We can write $3+3=6$ to show this.

7 is odd.

We can write $3+3+1=7$ to show this.

Count out 20 buttons.
c. Example: (Former NAEP question) (DOK 3)
Sam did the following problems.

\[2 + 1 = 3\]
\[6 + 1 = 7\]

Sam concluded that when he adds one to any whole number, his answer will always be odd.
Is Same correct?
Explain your answer.
Answer: No: add a 1 to an odd whole number and it is even

d. Example: (Former NAEP question) (DOK 1)
Write each of the following numbers in the circle where it belongs.

\[\begin{array}{c}
30, 47, 124 \\
27, 53, 1 \\
6, 38, 42
\end{array}\]

Answer: Odd (47), Even (30, 124)

e. Example: (Former NAEP question) (DOK 3)
In each class listed below, the students are lining up with a partner to walk to lunch. Which class will have one child with no other child for a partner? Explain your choice.
Answer: Mr. West’s Class because there is an odd number of students and 25 cannot be divided by 2.

f. Example: (Former NAEP question) (DOK 1)
Which of these numbers is an odd number?
1. 6
2. 52
3. 111
4. 320
5. 536
Answer: 3. 111

4. Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends. (2.OA.C.4) (DOK 2)
a. Example: Solution (DOK 1)

Which of the following are equal to the number of dots in the picture below? (Choose all that apply.)

\[
\begin{array}{ccc}
\bullet & \bullet & \bullet \\
\bullet & \bullet & \bullet \\
\bullet & \bullet & \bullet \\
\bullet & \bullet & \bullet \\
\end{array}
\]

a. 3 + 3 + 3
b. 3 + 4
c. 4 + 4 + 4
d. 4 + 4 + 4 + 4
e. 3 + 3 + 3 + 3

b. Example: Solution (DOK 2)
Materials

- Copies of a rectangle with edges marked (one for each student/group, see attached blackline master)
- A straight edge tool

Actions

The teacher should guide students through these actions, as the text in this task is too complex for some second graders.

a. Draw a grid on the rectangle by connecting each mark to the one directly across from it on the opposite edge.

```
\begin{center}
\begin{tikzpicture}
  \draw[step=0.5cm,very thin,gray] (0,0) grid (2,1);
  \draw[thick] (0,0) -- (2,0) -- (2,1) -- (0,1) -- cycle;
\end{tikzpicture}
\end{center}
```

b. The grid separates the rectangle into many little squares. How many squares are there?

c. There are five little squares in each row. Count by fives to find how many squares there are in the entire rectangle.

d. What other methods can you think of to quickly count how many squares there are in the entire rectangle?

e. Write a number in each little square to count them and show that your answers are correct.

f. One number sentence which shows the total number of squares is \(3 + 3 + 3 + 3 + 3 = 15\). Write another number sentence which shows the total number of squares.
Understand place value. (2.NBT.A)

1. Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones; e.g., 706 equals 7 hundreds, 0 tens, and 6 ones. Understand the following as special cases:
   a. 100 can be thought of as a bundle of ten tens — called a "hundred."
   b. The numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds (and 0 tens and 0 ones). (2.NBT.A.1) (DOK 2)

   1. Example: Solution (DOK 1)
      a. How many ten-dollar bills equal a hundred-dollar bill?
      b. Jem had 20 ten-dollar bills. How many hundred-dollar bills can she trade them for?
      c. Dan had 6 hundred-dollar bills. How many ten-dollar bills can he trade them for?

   2. Example: Solution (DOK 1)
      a. What number is 1 more than 99?
      b. What number is 1 less than 600?
      c. What number is 10 more than 90?
      d. What number is 10 less than 300?
      e. What number is 100 more than 570?
      f. What number is 100 less than 149?

3. Example: Solution (DOK 3)
   Lamar and Siri had some base-ten blocks.

   Lamar said, "I can make 124 using 1 hundred, 2 tens, and 4 ones."

   Siri said, "I can make 124 using 124 ones."

   a. Can you find a way to make 124 using only tens and ones? Can you find a different way?

   b. Find as many ways as you can to make 124 using hundreds, tens, and ones. If you think you have found all the ways, explain how you know your list is complete.

4. Example: Solution (DOK 1)
a. What number represents the same amount as 2 tens + 7 ones?
b. What number represents the same amount as 4 tens + 0 ones?
c. What number represents the same amount as 5 tens + 12 ones?
d. What number represents the same amount as 3 hundreds + 18 tens + 5 ones?
e. What number represents the same amount as 7 hundreds + 19 tens?

5. Example: Solution (DOK 2)
Make true equations. Write one number in every space. Draw a picture if it helps.

a. 1 hundred + 4 tens = ______

4 tens + 1 hundred = ______
b. 14 tens = 10 tens + _____ tens

14 tens = _____ hundred + 4 tens

14 tens = _____ ones

c. 7 ones + 5 hundreds = ______
d. 8 hundreds = ______
e. 106 = 1 hundred + _____ tens + _____ ones

106 = _____ tens + _____ ones

106 = _____ ones

f. 90 + 300 + 4 = ______
6. Example: Solution (DOK 3)
Dona had cards with the numbers 0 to 9 written on them. She flipped over three of them. Her teacher said:

*If those three numbers are the digits in another number, what is the largest three-digit number you can make?*

\[
\begin{array}{|c|c|c|}
\hline
1 & 8 & 5 \\
\hline
\end{array}
\]

a. First Dona put the 8 in the hundreds place. Is this the right choice for the hundreds place? Explain why or why not.

b. Next, Dona said, “It doesn’t matter what number I choose for the other places, because I put the biggest number in the hundreds place, and hundreds are bigger than tens and ones.” Is she correct? Explain.

7. Example: Solution (DOK 3)
Some students are working with base-ten blocks.

a. Nina has 3\(\big|\) hundreds, 8\(\big|\) tens, and 23\(\big|\) ones. How many ones would this be?

b. Lamar wants to make the number 261\(\big|\). He has plenty of hundreds blocks and ones blocks to work with, but only 4 tens blocks. His friend Jose said,

*You can still make 261\(\big|\) with the blocks you have.*

Explain how he can.

c. Find at least three different ways to make 124\(\big|\) using hundreds, tens and ones.

8. Example: Solution (DOK 2)
Pla was having a party. She put 10 stickers in each party bag.

a. On the first day she made 10 bags. How many stickers were in her 10 bags all together?

b. On the second day she made 3 more bags with ten stickers in each one. How many stickers total were in her 10 bags plus 3 more bags?

c. On the third day she made 7 more bags with ten stickers in each one. How many stickers total are in her 20 bags of ten?

d. On the fourth day, she made another 10 bags with ten stickers in each one. How many stickers are in her 30 bags of ten?

e. After one week, she had made a total of 50 bags with ten stickers in each one. How many stickers total are in her 50 bags of ten?

9. Example: Solution (DOK 2)
Pencils are packed 10 in a box. A classroom carton has 10 boxes.

a. Jem has 1 carton and 4 boxes. How many pencils does Jem have all together?

b. Lee needs to pack 370 pencils.

   i. How many boxes does Lee need?

   ii. If Lee puts the boxes in cartons, how many cartons can he completely fill?

c. Ms. Kato needs 10 pencils for each of her 26 students.

   i. If she can only buy boxes, how many boxes does she need?

   ii. She finds out that it is cheaper to buy pencils in cartons. How many cartons should she buy? How many additional boxes will she need?
10. Example: Solution (DOK 3)
The post office packages stamps like this:

- 10 stamps in each strip.
- 10 strips of 10 in each sheet.

a. Yesterday Mike saw 4 full sheets, 7 strips, and 2 extra stamps in the drawer. He counted all the stamps and found out that there were 472 stamps in all. He said,

> The number 472 matches the 4 sheets, 7 strips, and 2 stamps. Cool!

Why did Mike's number match up with the numbers of sheets, strips, and extra stamps? Draw a picture to help explain your answer.

b. Today Mike found 3 extra stamps, 1 sheet, and 5 strips. He said,

> Because of how things matched up yesterday, I guess there are 315 stamps total.

i. Find the total number of stamps.

ii. Explain why Mike's guess is incorrect. What could he have done to guess correctly?
11. Example: Solution (DOK 2)  
   a. 127 is a number.  
      - Write it as a sum of 100's, 10's, and 1's.  
      - Write its name in words.  
      - Draw a picture to represent the number.  
      - Locate it on the number line.  
   b. 500+60+8 is a number.  
      - Write it as a three-digit number.  
      - Write its name in words.  
      - Draw a picture to represent the number.  
      - Locate it on the number line.  
   c. Six hundred and nine is a number.  
      - Write it as a three-digit number.  
      - Write it as a sum of 100's, 10's, and 1's.  
      - Draw a picture to represent the number.  
      - Locate it on the number line.  
   d. The picture represents a number. The big square represents 100, the rectangle represents 10, and the small square represents 1.  
      - Write it as a three-digit number.  
      - Write it as a sum of 100's, 10's, and 1's.  
      - Write its name in words.  
      - Locate it on the number line.  
   e. A number is shown on the number line.  
      - Write it as a three-digit number.  
      - Write it as a sum of 100's, 10's, and 1's.  
      - Write its name in words.  
      - Locate it on the number line.  
      - Draw a picture to represent the number.

2. Count within 1000; skip-count by 5s, 10s, and 100s. (2.NBT.A.2) (DOK 1)  
   a. Example: Solution (DOK 2)
Louis wants to give $15 to help kids who need school supplies. He also wants to buy a pair of shoes for $39.

a. How much money will he have to save for both?

b. Louis gets $5 a week for his allowance. He plans to save his allowance every week. How many weeks does it take him to reach this goal?

c. Louis remembers his sister’s birthday is next month. He sets a goal of saving $16 for her gift. How many weeks does he have to save his allowance to reach this goal? How many weeks does he have to save his allowance for all three of his goals?

b. Example: (Former NAEP question) (DOK 1)

3. Read and write numbers to 1000 using base-ten numerals, number names, and expanded form. (2.NBT.A.3) (DOK 1,2)
   a. Example: Solution (DOK 2)
a. 127 is a number.
   - Write it as a sum of 100's, 10's, and 1's.
   - Write its name in words.
   - Draw a picture to represent the number.
   - Locate it on the number line.

b. 500 + 60 + 8 is a number.
   - Write it as a three-digit number.
   - Write its name in words.
   - Draw a picture to represent the number.
   - Locate it on the number line.

c. Six hundred and nine is a number.
   - Write it as a three-digit number.
   - Write it as a sum of 100's, 10's, and 1's.
   - Draw a picture to represent the number.
   - Locate it on the number line.

d. The picture represents a number. The big square represents 100, the rectangle represents 10, and the small square represents 1.

   ![Diagram](image)

   - Write it as a three-digit number.
   - Write it as a sum of 100's, 10's, and 1's.
   - Write its name in words.
   - Locate it on the number line.

e. A number is shown on the number line.

   ![Number Line](image)

   - Write it as a three-digit number.
   - Write it as a sum of 100's, 10's, and 1's.
   - Write its name in words.
   - Draw a picture to represent the number.

4. Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using >, =, and
< symbols to record the results of comparisons. (2.NBT.A.4) (DOK 2)

a. Example: Solution (DOK 1)

1. Arrange the following numbers from least to greatest:

   476  647  74  674  467

   _____ _____ _____ _____ _____

2. Arrange the following numbers from greatest to least:

   326  362  63  623  632

   _____ _____ _____ _____ _____

b. Example: Solution (DOK 1)

   Are these comparisons true or false?

   a. 2| hundreds + 3| ones > 5| tens + 9| ones
   b. 9| tens + 2| hundreds + 4| ones < 924
   c. 456| < 5| hundreds
   d. 4| hundreds + 9| ones + 3| ones < 491
   e. 3| hundreds + 4| tens < 7| tens + 9| ones + 2| hundred
   f. 7| ones + 3| hundreds > 370
   g. 2| hundreds + 7| tens = 3| hundreds - 2| tens

c. Example: Solution (DOK 2)
a. Plot the following numbers on the number line.

```
456 983 938 425 220 202 799
```

b. Choose eight pairs of numbers from those you plotted on the number line. Compare them.

i. _____ > | _____
ii. _____ > | _____
iii. _____ > | _____
iv. _____ > | _____
v. _____ < | _____
vi. _____ < | _____
vii. _____ < | _____
viii. _____ < | _____

c. Is the number \( a \) greater or less than the number \( b \)?

How do you know?

d. Example: Solution (DOK 1)
   a. Use all the digits 5, 7, and 2 to create different 3-digit numbers.

   b. What is the greatest number you can make using all of the digits?

   _________

   c. What is the smallest number you can make using all of the digits?

   _________

e. Example: Solution (DOK 1)
Use <, =, or > to complete the following number sentences.

a. 657| _____ 457 + 100 + 100|
b. 926| _____ 726 + 100 + 10|
c. 511 + 10 + 10 + 10| _____ 531 − 10 − 10|
d. 923 + 10| _____ 953 − 10 − 10|
e. 100 + 100 + 300 + 10| _____ 510|
f. 347 + 30| _____ 397 − 10 − 10|
g. 126 − 10 − 10 − 10 − 10| _____ 96 − 10|

f. Example: Solution (DOK 3)
   Compare each pair of numbers. Write your comparison using <, =, or > and in words. Explain your answer with a picture.

   a. 99 and 100
   b. 154 and 231
   c. 453 and 428
   d. 351 and 354
Use place value understanding and properties of operations to add and subtract. (2.NBT.B)

5. Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction. (2.NBT.B.5) (DOK 1,2)
   a. Example: Solution (DOK 2)
      Jamir has collected some pennies in a jar. Recently, he added coins other than pennies to his jar. Jamir reached his hand into the jar and pulled out this combination:

      ![Image of coins]

      a. Jamir wants to count the total value of these coins. What coin do you suggest he start with? Why would Jamir want to start counting with this coin?

      b. What is the total value of these coins? Write a number sentence that represents the total value of the coins.

      c. Jamir reached into the jar again and was surprised to pull out a different combination of coins with the same total value as before. Draw a collection of coins that Jamir could have pulled from the jar. Write a number sentence that represents the total value of the coins.

   b. Example: Solution (DOK 3)
      Materials
      - Popsicle sticks and rubber bands or base-10 blocks
      - Paper and pencil for each student
      Actions
      The teacher should pose the following question to students:

      *Louis wants to give $15 to help kids who need school supplies. He also wants to buy a pair of shoes for $39. If Louis gets $1 every day for his allowance, how many days will it take him to save enough money for both? Explain how you know.*

   c. Example: Solution (DOK 2)
Louis wants to give $15 to help kids who need school supplies. He also wants to buy a pair of shoes for $39.

a. How much money will he have to save for both?

b. Louis gets $5 a week for his allowance. He plans to save his allowance every week. How many weeks does it take him to reach this goal?

c. Louis remembers his sister’s birthday is next month. He sets a goal of saving $16 for her gift. How many weeks does he have to save his allowance to reach this goal? How many weeks does he have to save his allowance for all three of his goals?

d. Example: (Former NAEP question) (DOK 2)
While Adisha’s parents were looking for a car, Adisha counted the number of cards and trucks in the lot of the sales office.
She counted:
25 new cars
16 used cars
59 trucks

How many more trucks than cars are there on the lot?

Write directions for how to use the calculator to solve this problem.

Answer: There are 18 more trucks than cars on the lot. You would take 59 - 16 – 25.

e. Example: (Former NAEP question) (DOK 2)
Tanika wrote 100 in four different ways.
85 + 15
141 – 41
70 + 30
102 – 2

Write 100 in four other ways. Do not use the numbers Tanika used.

1. ____________
2. ____________
3. ____________
4. ____________

Answer: 
1. 25 + 75
2. 125 - 25
3. 97 + 3
4. 104 - 4
6. Add up to four two-digit numbers using strategies based on place value and properties of operations. (2.NBT.B.6) (DOK 2)
   a. Example: Solution (DOK 2)
      The picture shows islands connected by bridges. To cross a bridge, you must pay a toll in coins. If you start on the island marked in blue with 100 coins, how can you make it to the island marked in red?

      ![Diagram of islands and bridges]

      Answer: 253

   b. Example: (Former NAEP question) (DOK 1)
      Add:
      
      38
      74
      66
      +75
      
      Answer: 253

7. Add and subtract within 1000, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method. Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds. (2.NBT.B.7) (DOK 2)
   a. Example: Solution (DOK 3)
      Materials

      * Paper * Pencil * Hundreds board * Base-ten blocks

      Actions

      Pose this problem to the children: We are in school 180 days. Today is the 124th day of school. How many more days until we are out of school for summer vacation? Explain how you know.
b. Example: **Solution** (DOK 2)

**Materials**

For each student:

- A large index card
- A pencil

**Action**

Part 1

The teacher will put up the following addition problem:

\[
\begin{array}{c}
24 \\
+32 \\
\end{array}
\]

This problem should be within easy grasp of all students because the focus of this lesson isn’t the solution that 24 + 32 = 56 but rather making explicit to students all the ways they can go about solving such a problem.

First the teacher and the class should do the problem in the traditional way, moving from right to left. Young learners love to have the “answer” to things and students won’t be able to focus on the next part of the problem until they know the teacher knows that they know the answer!

The teacher should then have students brainstorm a different way they could solve the problem. Students should talk with a talking partner first so everyone has “talk time” and goes to their seat with an idea.
Students should then go to their seats with an index card and a pencil. Once there, students will write or draw an alternative way to solve the problem. Some examples of this are using the left to right method, drawing a picture, using base ten blocks, turning it into a story problem or another creative way that maybe only the student knows about.

Once students have been given about 5 minutes to write or draw, the teacher should bring the class back together. The teacher can use a random calling method such as sticks with students’ names or can take raised hands. Random calling will ensure that many students get a chance to talk. The teacher will compile a list on the board of all the ways students have come up with.

Students may also come up with other ways not listed here, and the teacher should validate all reasonable responses. The teacher may need to provide a few higher level ideas, such as left to write addition or using number charts.

Once students have brainstormed ideas the teacher should give them another chance to talk. The teacher can use the give one/get one procedure. Students stand up and find a friend to talk to. They give the friend one addition strategy and then get one additional strategy.

If the teacher needs to do this task over two days they can break here and do Part 2 on another day.

Part 2

After the class has talked about all the ways they could solve the two digit addition problem the teacher should put the following three digit addition problem on the board:

\[
\begin{array}{c}
224 \\
+132
\end{array}
\]

The students should look over the brainstormed list of solution ways and see if each solution would also apply to solving three digit addition problems. (They all should work for both two and three digit addition problems.) The class can then talk about how their skills for two digit problem solving transfer to three digit problem solving.

c. Example: (Former NAEP question) (DOK 3)
A dartboard has three separate areas.

Darts that land in the inner circle earn 100 points each.
Darts that land in the middle ring earn 10 points each.
Darts that land in the outer ring earn 1 point each.

Jill threw 9 darts. Each X marks a spot where one of Jill’s darts landed. What was Jill’s score?

Jill’s Turn

Answer: ______________ points

Kevin threw 7 darts, and they landed as shown. He has 2 more darts to throw. Ruth threw 7 darts, and they landed as shown. She has 2 more darts to throw.
3. 

The person who has the highest score after throwing 9 darts wins the game.

Can Jill win the game?  
Can Kevin win the game?  
Can Ruth win the game?

- Yes  
- No

Answer: 315 for Jill, Jill could win the game, Kevin could win the game, Ruth could not win the game. The highest number of points Kevin can get is 324. The highest amount Ruth can get is 306.

d. Example: (Former NAEP question) (DOK 1)

301
-75

1.  226  
2.  235  
3.  236  
4.  374

Answer: 226

e. Example: (Former NAEP question) (DOK 1)

On Saturday 789 people went to the zoo. On Sunday 983 people went to the zoo. How many more people went to the zoo on Sunday than on Saturday?

1.  194  
2.  204  
3.  206  
4.  1,722

Answer: 1. 194

f. Example: (Former NAEP question) (DOK 1)
The figure above represents 237. Which number is more than 237?

A. 244  
B. 249  
C. 251  
D. 377

Answer: C. 251
8. Mentally add 10 or 100 to a given number 100–900, and mentally subtract 10 or 100 from a given number 100–900. \(\text{(2.NBT.B.8)}\) \(\text{(DOK 2)}\)

a. Example: Solution \(\text{(DOK 3)}\)

**Materials**

- Chart paper
- Marker

**Actions**

The teacher will begin by asking a student volunteer to show 3 using base-ten blocks. The teacher will then record 3 on the chart. The teacher will then ask how students can show the number that is 10 more and invite another student volunteer to build 10 more with cubes. Student may add 10 individual units or a ten stick. The goal is for students to move from counting ten units to counting one unit of 10, and to connect the concrete representations of the numbers with abstract oral counting. The teacher will then record 13 on the chart and continue this process, asking students “What's 10 more than \(\ldots\)?” and have student volunteers show 10 more with the base-ten blocks. At some point, a student will likely use a ten stick instead of ten ones; when this happens, the teacher can help the students see this is a more efficient strategy. If no students add a ten stick, the teacher can help them make this transition.

The goal of writing the numbers on the chart paper as shown below is to record the numbers in a way that makes the "add ten" pattern visible for students. By recording 10 numbers in a row, students may see patterns in tens as they look across, and also hundreds as they look vertically.
Throughout the process, the teacher should pose questions to elicit student thinking and understanding of the concept of 10, 100, and patterns within the structure of our base ten number system. Questions may include:

- What do you notice?
- Why do you think that is?
- What number will be next? How do you know?
- What’s happening to the digit in the tens place? Why?
- What’s happening to the digit in the ones place? Why?
- Why do the numbers build like that?
- What’s the relationship between _ and _?
- What patterns do you notice looking horizontally?
- What patterns do you notice looking vertically?
- What number will be below _? How do you know?
- What number will be at the end of the fourth row? How do you know?

Closing: Ask students, “How might this task help you solve 38+10? 124+10?” Support students in making connections to choral counting activity and mentally adding or subtracting 10 (or 100) from any given number 100-900.

9. Explain why addition and subtraction strategies work, using place value and the properties of operations.3
(2.NBT.B.9) (DOK 3)
   a. Example: Solution (DOK 3)

---

3 Explanations may be supported by drawings or objects.
Peyton said, "I can solve 47 + 65" and he showed this strategy.

\[ 47 + 65 = 100 + 12 = 112 \]

Presley said, “That doesn’t make sense. Explain why that works.”

a. Draw a diagram to show Peyton’s thinking.
b. Explain Peyton’s strategy and why it works.
Measure and estimate lengths in standard units. (2.MD.A)

1. Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes. *(2.MD.A.1) [DOK 1]*
   a. Example: Solution (DOK 3)

   **Materials**
   
   * ruler, meter sticks, yard sticks, measuring tape*
   
   * paper*
   
   * crayons*

   **Actions**

   **Part 1**

   a. Explain that students will be working in pairs to determine the length of each partner's foot. Ask what tools would be appropriate for determining length. Chart student thinking about appropriate tools, and today's goal of using standard measurement tools such as rulers, yard sticks, meter sticks, or measuring tape.

   b. Ask student pairs to consider the unit(s) that would give the most precise measure of the length of a student's foot. If students struggle with this idea, the teacher might model using his/her foot as an example considering yards, meters, feet, inches and centimeters.

   c. Ask student pairs to identify the unit they will work with and predict the length of each partner's foot and record their estimations. Estimates should be recorded in units.
Part 2

a. Have one student from each pair stand on a blank sheet of paper and have his/her partner make a mark at the student’s heel and another at the toe.

b. Then, together, have the pair measure the distance between the two marks to determine the length of the first student’s foot and record the length. Students may have to find the closest unit.

c. Have students then find the difference between the estimation and actual length.

d. Repeat with the second student, using a different color to make the marks. The second student should stand at the same endpoint as the first student so that students can visually compare the two representations and compare the number of the distance in units in part three.

Part 3

a. Working in pairs, have students compare the distances between the lengths of each student’s foot.

Class Discussion

Engaging in a class discussion will support students in thinking about the mathematical ideas embedded within the task.

- What tool did you use and why?
- How was that tool helpful?
- If you were going to measure _____ (a desk, a whiteboard, an eraser), would you use the same tool? Why?
- How long was your foot? What was your estimate? What was the difference?
- What unit did you use to measure? How did you decide to use _____? Why is the unit important?
- How long was your partner’s foot? What was his/her estimate? What was the difference?
• What was the difference between the length of your foot and the length of your partner’s foot? How did you find the difference?

• What did you notice about finding the difference? Is there more than one way to find the difference? (This might be an opportunity to discuss finding the difference by measuring how much longer one length is than the other or by using an operation such as addition to add up from the smallest length to the larger length or by subtracting the smaller length from the larger length.)

2. Measure the length of an object twice, using length units of different lengths for the two measurements; describe how the two measurements relate to the size of the unit chosen. (2.MD.A.2) (DOK 2,3)

3. Estimate lengths using units of inches, feet, centimeters, and meters. (2.MD.A.3) (DOK 2)
   a. Example: Solution (DOK 3)

   Materials

   • ruler, meter sticks, yard sticks, measuring tape
   • paper
   • crayons

   Actions

   Part 1

   a. Explain that students will be working in pairs to determine the length of each partner’s foot. Ask what tools would be appropriate for determining length. Chart student thinking about appropriate tools, and today’s goal of using standard measurement tools such as rulers, yard sticks, meter sticks, or measuring tape.

   b. Ask student pairs to consider the unit(s) that would give the most precise measure of the length of a student’s foot. If students struggle with this idea, the teacher might model using his/her foot as an example considering yards, meters, feet, inches and centimeters.

   c. Ask student pairs to identify the unit they will work with and predict the length of each partner’s foot and record their estimations. Estimates should be recorded in units.

   Part 2

   a. Have one student from each pair stand on a blank sheet of paper and have his/her partner make a mark at the student’s heel and another at the toe.
b. Then, together, have the pair measure the distance between the two marks to determine the length of the first student's foot and record the length. Students may have to find the closest unit.

c. Have students then find the difference between the estimation and actual length.

d. Repeat with the second student, using a different color to make the marks. The second student should stand at the same endpoint as the first student so that students can visually compare the two representations and compare the number of the distance in units in part three.

Part 3

a. Working in pairs, have students compare the distances between the lengths of each student's foot.

Class Discussion

Engaging in a class discussion will support students in thinking about the mathematical ideas embedded within the task.

• What tool did you use and why?

• How was that tool helpful?

• If you were going to measure ____ (a desk, a whiteboard, an eraser), would you use the same tool? Why?

• How long was your foot? What was your estimate? What was the difference?
• What unit did you use to measure? How did you decide to use _____? Why is the unit important?

• How long was your partner's foot? What was his/her estimate? What was the difference?

• What was the difference between the length of your foot and the length of your partner's foot? How did you find the difference?

• What did you notice about finding the difference? Is there more than one way to find the difference? (This might be an opportunity to discuss finding the difference by measuring how much longer one length is than the other or by using an operation such as addition to add up from the smallest length to the larger length or by subtracting the smaller length from the larger length.)

4. Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit. (2.MD.A.4) (DOK 1,2)

a. Example: Solution (DOK 3)

   Materials
   • ruler, meter sticks, yard sticks, measuring tape
   • paper
   • crayons

   Actions
   Part 1

   a. Explain that students will be working in pairs to determine the length of each partner's foot. Ask what tools would be appropriate for determining length. Chart student thinking about appropriate tools, and today's goal of using standard measurement tools such as rulers, yard sticks, meter sticks, or measuring tape.

   b. Ask student pairs to consider the unit(s) that would give the most precise measure of the length of a student's foot. If students struggle with this idea, the teacher might model using his/her foot as an example considering yards, meters, feet, inches and centimeters.

   c. Ask student pairs to identify the unit they will work with and predict the length of each partner's foot and record their estimations. Estimates should be recorded in units.

   Part 2

   a. Have one student from each pair stand on a blank sheet of paper and have his/her partner make a mark at the student's heel and another at the toe.
b. Then, together, have the pair measure the distance between the two marks to determine the length of the first student’s foot and record the length. Students may have to find the closest unit.

c. Have students then find the difference between the estimation and actual length.

d. Repeat with the second student, using a different color to make the marks. The second student should stand at the same endpoint as the first student so that students can visually compare the two representations and compare the number of the distance in units in part three.

Part 3

a. Working in pairs, have students compare the distances between the lengths of each student’s foot.

**Class Discussion**

Engaging in a class discussion will support students in thinking about the mathematical ideas embedded within the task.

- What tool did you use and why?
- How was that tool helpful?
- If you were going to measure _____ (a desk, a whiteboard, an eraser), would you use the same tool? Why?
- How long was your foot? What was your estimate? What was the difference?
Relate addition and subtraction to length. (2.MD.B)

b. Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units, e.g., by using drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem. (2.MD.B.5) (DOK 2)

1. Example: Solution (DOK 2)
   
   Presley jumped 36 cm on her first jump in the high jump competition. On her second jump, she jumped 45 cm.

   a. How many total cm did Presley jump?

   b. How many fewer cm did Presley jump on her first jump than her second jump?

   c. Logan also jumped twice. The total of Logan's two jumps was 95 cm. How many more total cm did Logan jump than Presley?

c. Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points corresponding to the numbers 0, 1, 2, ..., and represent whole-number sums and differences within 100 on a number line diagram. (2.MD.B.6) (DOK 1,2)

1. Example: Solution (DOK 2)
One day, Frog and Toad were sitting together on a lily pad. Some lily pads were in a line across the pond.

In the morning, Frog hopped three lily pads away. In the afternoon, he hopped two more away. In the evening, he hopped another two more.

Toad hopped four lily pads away in the morning. He rested in the afternoon and continued three further in the evening. Frog said,

>Toad, we ended up at the same place!

Show each of their journeys on a number line, starting at 0. Use different colors for the morning, afternoon, and evening hops. Write a number sentence that reflects that they ended up at the same place.

Work with time and money. (2.MD.C)

d. Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m. (2.MD.C.7) (DOK 1)
1. Example: Solution (DOK 2)
IA.1. Describe the relationship among standard units of time: minutes, hours, days, weeks, months and years. (2.MD.C.1A.1) (DOK 2, 3)
e. Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using $ and ¢ symbols appropriately. Example: If you have 2 dimes and 3 pennies, how many cents do you have? (2.MD.C.8) (DOK 2)
   1. Example: Solution (DOK 2)
      Jamir has collected some pennies in a jar. Recently, he added coins other than pennies to his jar. Jamir reached his hand into the jar and pulled out this combination:

      ![Image of coins]

      a. Jamir wants to count the total value of these coins. What coin do you suggest he start with? Why would Jamir want to start counting with this coin?

      b. What is the total value of these coins? Write a number sentence that represents the total value of the coins.

      c. Jamir reached into the jar again and was surprised to pull out a different combination of coins with the same total value as before. Draw a collection of coins that Jamir could have pulled from the jar. Write a number sentence that represents the total value of the coins.
2. Example: **Solution** (DOK 3)

Arianna has been saving her chore money all summer. Her mother has allowed her to spend the money on school supplies of Arianna's choosing. Here are some of her favorite items and the price for each:

<table>
<thead>
<tr>
<th>Lunchbox</th>
<th>Art Supplies</th>
<th>Pencil Box</th>
<th>Mechanical Pencil</th>
</tr>
</thead>
<tbody>
<tr>
<td>$2 and 50¢</td>
<td>75¢</td>
<td>$1 and 25¢</td>
<td>45¢</td>
</tr>
</tbody>
</table>

Arianna has four dollars and twenty-five cents to spend.

a. Select two items she might choose to purchase. What is the total cost of these two items?

b. Select three items she might choose to purchase. What is the total cost of these three items? How much money will Arianna have left over if she buys these three items?

c. How many pencil boxes can Arianna buy without going over the $4 and 25¢ she has saved?

Explain your thinking for part (c) in words.
3. Example: Solution (DOK 3)

Materials

- Coins and dollar bills
- Problem with table of costs displayed

<table>
<thead>
<tr>
<th>Stuffed Animals at the Pet Shop</th>
<th>Cost for each animal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dog</td>
<td>2 pennies, 3 nickels, and 1 quarter</td>
</tr>
<tr>
<td>Snake</td>
<td>6 pennies, 2 nickels, and 2 dimes</td>
</tr>
<tr>
<td>Bird</td>
<td>5 nickels, 3 dimes, and 1 quarter</td>
</tr>
<tr>
<td>Cat</td>
<td>5 pennies, 5 nickels, 5 dimes, and 1 quarter</td>
</tr>
<tr>
<td>Rabbit</td>
<td>7 pennies, 3 nickels, 2 dimes, and 3 quarters</td>
</tr>
<tr>
<td>Frog</td>
<td>5 pennies, 5 dimes, 5 quarters</td>
</tr>
<tr>
<td>Monkey</td>
<td>3 pennies, 3 nickels, 3 quarters</td>
</tr>
</tbody>
</table>

a. How much money would you spend if you purchased one of each animal at the pet shop?

b. If you have $3 to spend at the pet shop, what animals would you buy?

c. What two animals could you buy if you have $2 to spend? How much change will you get back?

d. How much money would you spend if you purchased the dog, snake, and the bird?

e. Make up a problem for your partner to solve.
4. Example: Solution (DOK 3)
Susan wanted to make a birthday card for her best friend but needed some art supplies.

a. She emptied her piggy bank and found 1 quarter, 5 dimes, 3 nickels, and 8 pennies.

![Image of coins]

How much money did Susan find in her piggy bank? Show or explain how you know.

b. Susan went to the store with her mother and saw a pack of stickers for 35¢ and a glitter pen for 60¢. Does Susan have enough money to buy both items to make her birthday card? Show or explain how you know.

c. While Susan was at the store, she saw a ring that she would like to have herself. The ring costs 45¢. Can she still buy one or both of the other items?

5. Example: Solution (DOK 3)

Materials

- Popsicle sticks and rubber bands or base-10 blocks
- Paper and pencil for each student

Actions

The teacher should pose the following question to students:

*Louis wants to give $15 to help kids who need school supplies. He also wants to buy a pair of shoes for $39. If Louis gets $1 every day for his allowance, how many days will it take him to save enough money for both? Explain how you know.*
6. Example: Solution (DOK 3)
   Amy went to the arcade. At the arcade, people can buy tokens to use for the games.

   a. Amy paid $5 to get some tokens. Show two different ways she could have paid using some bills and some coins.

   b. Amy finished playing games. She has 4 tokens left over. Can she use these at the grocery store to buy some food? Why or why not?

   c. The arcade trades tokens for 15 cents. How much money could Amy trade for her 4 tokens? Can she use these at the grocery store to buy some food? Why or why not?

7. Example: Solution (DOK 2)
   Materials
   - *Alexander, Who Used to be Rich Last Sunday* by Judith Viorst

     ![Alexander, Who Used to be Rich Last Sunday](image)

   - Plastic coins
   - Labels for items Alexander spent his money on (attached)
   - Paper coins (attached)
   - Scissors, glue, and construction paper

   Actions
   - The teacher reads *Alexander, Who Used to be Rich Last Sunday* to the class, stopping each time he spends a portion of his money to record on a chart the item(s) and how much he spent.

   - The students identify a combination of coins that could be used for the purchase. The teacher can also model with plastic coins one way to show the amount he spent, with the class following along. If there is more than one set of coins that will work, different students can suggest them to the class.
• By the end of the story, the amount of money the teacher and each of the students used should add up to one dollar.

• After the story has been read, the students are given the labels and paper coins to cut out and match together to create posters. It must be made explicit here that the students can only use the coins they have, so there is only one correct solution. What will help them to find the correct solution is to try and show how Alexander spent his money on each item by using the smallest number of coins possible.

Represent and interpret data. (2.MD.D)

f. Generate measurement data by measuring lengths of several objects to the nearest whole unit, or by making repeated measurements of the same object. Show the measurements by making a line plot, where the horizontal scale is marked off in whole-number units. (2.MD.D.9) (DOK 2)

1. Example: Solution (DOK 2)
   Hand span is a measure of distance from the tip of the thumb to the tip of the little finger with the hand fully extended.
   • Each student places his or her dominant hand on the edge of a piece of paper with the hand fully extended.
   • The student should make a mark at the tip of the thumb and the tip of the little finger. The distance between marks is the length of the hand span.
   • The student should measure his or her hand span with a centimeter ruler and round the measurement to the nearest whole centimeter.
   • Each student should record his or her measurement on a piece of paper.

   The teacher can ask each student for his or her measurement and record the data using a line plot with a horizontal scale marked off in whole centimeters. Alternatively, the teacher can set up the line plot and ask each student to come record his or her own hand span, showing the students how by recording the teacher's hand span.

   Students should comment about patterns they observe on the line plot and write or discuss the answers to these two questions:

   a. What are the largest and smallest spans? What is the difference between the largest and smallest spans?
b. Use words to describe the shape of the data set. Does it appear taller in the center like a mountain? Are there peaks in more than one place? Is the shape of the data flat like a table top? Are there gaps? Are some hand spans much bigger or smaller than the others?

2. Example: Solution (DOK 2)
   a. Pick two points on the outside borders of the United States map (excluding Hawaii and Alaska) so that the line between them stays within the borders. Draw the line. How far apart are the points? Measure the length of the line to find out. Do this 10 times and make a line-plot of your data.
   
   b. Starting anywhere on the map of the United States and drawing in a straight line until hitting a border, what is the longest line you can draw? It might help to ask your classmates what lengths they found as well.
3. Example:  Solution  (DOK 2)

   a. Students in pairs grow bean plants from seed. In a small glass jar, put a roll of paper towel inside, cut to the height of the jar. Place a bean seed between the paper towel and the glass. Pour around 1 centimeter of water into the bottom of the jar. Place the jar on a window ledge where it will receive light, but preferably not direct sunlight.

   b. When the bean seeds start to grow, have the students measure their bean plant every couple of days or so. Students record each measurement with the date in their science books.

   c. Record the student pairs’ data on a line plot every few days, depending on how fast the plants grow. Prepare a blank line plot for each ‘measurement day’, and invite each student pair to record the height of their plant on the line plot.

   d. Each time the line plot is finished, discuss the patterns evident in the line plot, and compare with earlier line plots.
IA.2 Use interviews, surveys, and observations to collect data that answer questions about students' interests and/or their environment. (2.MD.D.1A.2) (DOK 2,3)
g. Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph. (2.MD.D.10) (DOK 2)

1. Example: Solution (DOK 2)
   **Materials**
   - Pocket chart
   - Sentence strip
   - Square pieces of paper for each student
   - Popsicle sticks

   **Setup**
   Write a question that has three choices as an answer on a sentence strip. For example,

   “Which flavor of ice cream do you like best?”

   Put the three categories on the bottom of the pocket chart. For example,

   **Chocolate Vanilla Strawberry**

   Write interpretation questions on the popsicle sticks. For example,

   - “How many students answered this question?”
   - “Which has the most?”
   - “Which has the fewest?”
   - “Are any the same?”
   - “How many are in each category?”

---

4 See Glossary, Table 1.
Reason with shapes and their attributes. (2.G.A)

1. Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces. Identify triangles, quadrilaterals, pentagons, hexagons, and cubes. (2.G.A.1) (DOK 1,2)
   
   a. Example: Solution (DOK 2)
      
      • Color the inside of all the triangles blue.
      
      • Color the inside of all the quadrilaterals red.
      
      • Color the inside of all the pentagons orange.
      
      • Color the inside of all the hexagons green.
      
      • Circle all the shapes that have sides that are equal.

\(^5\) Sizes are compared directly or visually, not compared by measuring.
b. Example: (Former NAEP question) (DOK 1)  
What shapes make up the faces of a square pyramid?
1. Triangles only
2. Pentagon and triangles
3. Square and rectangles
4. Square and triangles

Answer: 4. Square and triangles
c. Example: (Former NAEP question) (DOK 1)
What is the shape of the shaded figure inside the star?

![Star with shaded figure]

1. Hexagon
2. Pentagon
3. Quadrilateral
4. Triangle

Answer: 2. Pentagon
d. Example: (Former NAEP question) (DOK 1)
In the figure below, outline a four-sided shape that is not a rectangle (or a square).

![Figure with four-sided shapes]

Answer:
e. Example: (Former NAEP question) (DOK 1)
How many sides does a pentagon have?
1. Three
2. Four
3. Five
4. Six
5. Seven

Answer: 3. Five
2. Partition a rectangle into rows and columns of same-size squares and count to find the total number of them. (2.G.A.2) (DOK 2)
   a. Example: Solution (DOK 2)

   Materials
   - Copies of a rectangle with edges marked (one for each student/group, see attached blackline master)
   - A straight edge tool

   Actions
   The teacher should guide students through these actions, as the text in this task is too complex for some second graders.

   a. Draw a grid on the rectangle by connecting each mark to the one directly across from it on the opposite edge.

   ![Rectangle divided into squares]

   b. The grid separates the rectangle into many little squares. How many squares are there?
   c. There are five little squares in each row. Count by fives to find how many squares there are in the entire rectangle.
   d. What other methods can you think of to quickly count how many squares there are in the entire rectangle?
   e. Write a number in each little square to count them and show that your answers are correct.
   f. One number sentence which shows the total number of squares is $3 + 3 + 3 + 3 = 15$. Write another number sentence which shows the total number of squares.

3. Partition circles and rectangles into two, three, or four equal shares, describe the shares using the words half, thirds, half of, a third of, etc., and describe the whole as two halves, three thirds, four fourths. Recognize that equal shares of identical wholes need not have the same shape. (2.G.A.3) (DOK 2,3)
   a. Example: Solution (DOK 3)
a. Which pictures show one half of the shape shaded? Explain.

i.

![Circle with one half shaded]

ii.

![Pie chart with one third shaded]

iii.

![Triangle with one fourth shaded]

iv.

![Rectangle with one fourth shaded]

b. Is more or less than one half of the shape shaded in (ii)? Explain.

c. Is more or less than one half of the shape shaded in (iv)? Explain.