2nd Grade Math

Pacing Guide and Unpacked Standards

GROVEPORT MADISON SCHOOLS

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Groveport Madison Math Pacing Guide - Grade 2

2nd	Operations & Algebraic Thinking	Number & Operations in Base Ten	Measurement & Data	Geometry	Standards for Mathematical Practice
1st 9wks	2.OA.1 - Use addition & subtraction within 100 to one and two step word problems 2.OA.2 - Fluently add and subtract within 20 using mental strategies	2.NBT.5 - Fluently add & subtract within 100	2.MD.10 - Draw picture & bar graph to represent data set with up to 4 categories		MP.1 - Make sense of problems and persevere in solving them MP.2 - Reason abstractly and quantitatively MP.3 - Construct viable arguments and critique the reasoning of others MP.4 - Model with mathematics MP.5 - Use appropriate tools strategically MP.6 - Attend to precision MP.7 - Look for and make use of structure MP.8 - Look for and express regularity in repeated reasoning
2nd 9wks	2.OA.1 - Use addition & subtraction within 100 to one and two step word problems	2.NBT.1 - Understand value of digits within three digit numbers 2.NBT.2 - Skip count forward/backward within 1000 2.NBT.3 - Read/write numbers to 1000 2.NBT.4 - Compare two 3 digit numbers 2.NBT.5 - Fluently add & subtract within 100 2.NBT.6 - Add up to four two digit numbers using place value strategies 2.NBT.7 - Add & subtract within 1000 2.NBT.8 - Mentally add 10 or 100 to a given number 100-900 2.NBT.9 - Explain why addition/subtraction strategies work	2.MD.7 - Tell & write time from analog & digital clocks to nearest 5 minutes 2.MD.8 - Solve word problems involving dollar bills, quarters, dimes, nickels, pennies and symbols		

Groveport Madison Math Pacing Guide - Grade 2

2nd	Operations & Algebraic Thinking	Number & Operations in Base Ten	Measurement & Data	Geometry	Standards for Mathematical Practice
3rd 9wks			2.MD.1 - Measure the length of an object by selecting and using the appropriate tools 2.MD.2 - Measure length of object twice, using different units 2.MD.3 - Estimate lengths using inches, feet, centimeters and meters 2.MD.4 - Measure to determine difference in length between objects 2.MD.5 - Use addition & subtraction within 100 to solve word problems 2.MD.6 - Represent whole numbers as lengths on a number line 2.MD.9 - Generate measurement data by measuring, show in a line plot		MP.1 - Make sense of problems and persevere in solving them MP.2 - Reason abstractly and quantitatively MP.3 - Construct viable arguments and critique the reasoning of others MP.4 - Model with mathematics MP.5 - Use appropriate tools strategically MP.6 - Attend to precision MP.7 - Look for and make use of structure MP.8 - Look for and express regularity in repeated reasoning
4th 9wks	2.OA.3 - Determine a group of objects (up to 20) to be odd or even 2.OA.4 - Use addition to find total objects arranged in arrays up to 5 rows/columns			2.G.1 - Recognize and identify shapes based on number of sides and vertices 2.G.2 - Partition a rectangle into rows and columns of same-size squares to count & total 2.G.3 - Partition circles and rectangles into two, three and four equal shares using the words halves, thirds or fourths	

Ohio's Learning Standards-Clear Learning Targets

Math, Grade 2

2.OA.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.

Essential Question(s)

How do I know a problem is addition or subtraction?
How can I represent an addition or subtract problem using numbers?
How do the known numbers in a problem help me to solve the unknown number?

Common Misconceptions

Some students end their solution to a two-step problem after they complete the first step.

Students can misunderstand the use of the equal sign even if they have proficient computational skills. The equal sign means "is the same as" but most primary students think that the equal sign tells you that the "answer is coming up."

Students might rely on a key word or phrase in a problem to suggest an operation that will lead to an incorrect solution. For example, they might think that the word left always means that subtraction must be used to find a solution.
Students need to solve problems where key words are contrary to such thinking. It is important that students avoid using key words to solve problems.

Vocabulary

- Add
- Subtract
- adding to
- Taking from
- Putting together
- Taking apart
- Comparing
- Unknown number
- Equation
- Symbol
- Represent
- Solve
- Explain

Essential Skills

Determine operation needed to solve addition and subtraction problems in situations including add to, take from, put together, take apart, and compare.

Use drawings or equations to represent one- and two-step word problems.

Add and subtract within 100 to solve one-step word problems with unknowns in all positions.

Write an addition and subtraction equation with a symbol for the unknown.

Example	Question
Todd read 23 pages yesterday and 42 pages today. How many pages did he read in both days?	Write an equation for the above problem using "b" to represent the total number of books.

Ohio Department of Education Model Curriculum Instructional Strategies and Resources

Students now build on their work with one-step problems to solve two-step problems. Second graders need to model and solve problems for all the situations shown in Table 1 on page 88 in the Common Core State Standards and represent their solutions with equations. The problems should involve sums and differences less than or equal to 100 using the numbers 0 to 100. It is vital that students develop the habit of checking their answer to a problem to determine if it makes sense for the situation and the questions being asked. Ask students to write word problems for their classmates to solve. Start by giving students the answer to a problem. Then tell students whether it is an addition or subtraction problem situation. Also let them know that the sums and differences can be less than or equal to 100 using the numbers 0 to 100. For example, ask students to write an addition word problem for their classmates to solve which requires adding four two-digit numbers with 100 as the answer. Students then share, discuss and compare their solution strategies after they solve the problems.

http://education.ohio.gov/getattachment/Topics/Ohio-s-New-Learning-Standards/Mathematics/Grade_2_Math_Model_Curriculum_March2015.pdf.aspx

1.OA.1 (Prior Grade Standard)	3.OA.3 (Future Grade Standard)
Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart and comparing, with unknowns in all positions, e.g. by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.	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. Drawings need not show details, but should show the mathematics in the problem. (This applies wherever drawings are mentioned in the Standards.)

Ohio's Learning Standards-Clear Learning Targets
Math, Grade 2

2.OA.2

Fluently add and subtract within 20 using mental strategies. By the end of Grade 2, know from memory all sums of two one digit numbers. See standard 1.OA.6 for a list of mental strategies

Essential Question(s)

Why is it important to add and subtract facts in my head?

How can math facts help me solve problems?

Common Misconceptions

Students may overgeneralize the idea that answers to addition problems must be bigger. Adding 0 to any number results in a sum that is equal to that number. Provide word problems involving 0 and have students model them using drawings with an empty space for 0. Students are usually proficient when they focus on a strategy relevant to particular facts. When these facts are mixed with others, students may revert to counting as a strategy and ignore the efficient strategies they learned. Provide a list of facts from two or more strategies and ask students to name a strategy that would work for that fact. Students explain why they chose that strategy then show how to use it.

Vocabulary

- Add
- Subtract
- Sum
- Mental strategies
- Fluently

Essential Skills

Know mental strategies for addition and subtraction.

Know from memory all sums of two one-digit numbers.

Apply mental strategies to add and subtract fluently within 20

Fluently add and subtract within 20.

Example	Question
Without any external assistance and without mentally counting, they can recite the addition and subtraction facts within 20.	Recite addition and subtraction facts in the allotted time.

Ohio Department of Education Model Curriculum Instructional Strategies and Resources

Students now build on their work with one-step problems to solve two-step problems. Second graders need to model and solve problems for all the situations shown in Table 1 on page 88 in the Common Core State Standards and represent their solutions with equations. The problems should involve sums and differences less than or equal to 100 using the numbers 0 to 100. It is vital that students develop the habit of checking their answer to a problem to determine if it makes sense for the situation and the questions being asked. Ask students to write word problems for their classmates to solve. Start by giving students the answer to a problem. Then tell students whether it is an addition or subtraction problem situation. Also let them know that the sums and differences can be less than or equal to 100 using the numbers 0 to 100. For example, ask students to write an addition word problem for their classmates to solve which requires adding four two-digit numbers with 100 as the answer. Students then share, discuss and compare their solution strategies after they solve the problems.

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1.OA.6 (Prior Grade Standard)	3.OA.7 (Future Grade Standard)
Add and subtract within 20, demonstrating fluency with various strategies for addition and subtraction within 10. Strategies may include counting on; making ten, e.g., 8 + 6 = 8 + 2 + 4 = 10 + 4 = 14; decomposing a number leading to a ten, e.g., 13 – 4 = 13 – 3 – 1 = 10 – 1 = 9; using the relationship between addition and subtraction, e.g., knowing that 8 + 4 = 12, one knows 12 – 8 = 4; and creating equivalent but easier or known sums, e.g., adding 6 + 7 by creating the known equivalent 6 + 6 + 1 = 12 + 1 = 13.	**Multiply and divide within 100.** Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division, e.g., knowing that 8 × 5 = 40, one knows 40 ÷ 5 = 8 or properties of operations. Limit to division without remainders. By the end of Grade 3, know from memory all products of two one-digit numbers.

Ohio's Learning Standards-Clear Learning Targets

Math, Grade 2

2.OA.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.

Essential Question(s)
Why is a group of objects odd or even?
How can I represent an equal group of objects using numbers and symbols?

Common Misconceptions

Knowing that even numbers end in 0, 2,4, 6,8 or odd numbers end in 1,3,5,7, and 9 does not ensure that students understand the meaning of evenness.

Students will look at the number of digits to determine if the number is odd or even instead of the quantity itself.

Example: 53 is an even number because it has 2 digits. This is a misconception.

Students will determine whether a number is odd or even by the first digit in the number instead of the digit in the ones place.

Vocabulary

- Odd
- Even
- Equation
- Sum
- Addend
- Determine
- Object
- Pairing
- Express

Essential Skills	Determine whether a group of objects is odd or even, using a variety of strategies. Generalize the fact that all even numbers can be formed from the addition of 2 equal addends. Count a group of objects up to 20 by 2s. Write an equation to express a given even number as a sum of two equal addends.

Examples	Questions
The student can identify an even number of objects. The student can identify an odd number of objects.	Give at least two different explanations on how to explain why a number of objects is even or odd. Write an equation that would show why the number 12 is even.

Ohio Department of Education Model Curriculum Instructional Strategies and Resources

Students need to understand that a collection of objects can be one thing (a group) and that a group contains a given number of objects. Investigate separating no more than 20 objects into two equal groups. Find the numbers (the total number of objects in collections up to 20 members) that will have some objects and no objects remaining after separating the collections into two equal groups. Odd numbers will have some objects remaining while even numbers will not. For an even number of objects in a collection, show the total as the sum of equal addends (repeated addition).

http://education.ohio.gov/getattachment/Topics/Ohio-s-New-Learning-Standards/Mathematics/Grade_2_Math_Model_Curriculum_March2015.pdf.aspx

1.OA.5 (Prior Grade Standard)	3.OA.9 (Future Grade Standard)
Relate counting to addition and subtraction (e.g., by counting on 2 to add 2).	**Solve problems involving the four operations, and identify and explain patterns in arithmetic.** Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. *For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends.*

Ohio's Learning Standards-Clear Learning Targets
Math, Grade 2

2.OA.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.

Essential Question(s)

Why do arrays of objects help me find the total number?
How can I represent an array of objects using numbers and symbols?

Common Misconceptions

Students may confuse the terms row and columns and interchange them when writing a repeated addition sentence. The focus should be on the repeated addition of the representation.

Vocabulary

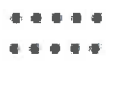
- Rectangular arrays
- Equation
- Sum
- Addend
- Rows
- Columns
- Express

Essential Skills

Write an equation with repeated equal addends from an array.

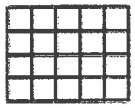
Generalize the fact that arrays can be written as repeated addition problems.

Solve repeated addition problems to find the number of objects using rectangular arrays.

Example	Question
Use addition to find the number of objects.	What numbers can you add to find the total number of dots?
The student can write the equation 4 + 4 + 4 = B to total this array	Write an equation to find the number of dots in the array. 

Ohio Department of Education Model Curriculum Instructional Strategies and Resources

A rectangular array is an arrangement of objects in horizontal rows and vertical columns. Arrays can be made out of any number of objects that can be put into rows and columns. All rows contain the same number of items and all columns contain an equal number of items. Have students use objects to build all the arrays possible with no more than 25 objects. Their arrays should have up to 5 rows and up to 5 columns. Ask students to draw the arrays on grid paper and write two different equations under the arrays: one showing the total as a sum by rows and the other showing the total as a sum by columns. Both equations will show the total as a sum of equal addends.



The equation by rows: 20 = 5 + 5 + 5 +5

The equation by columns: 20 = 4 + 4 + 4 + 4 + 4

http://education.ohio.gov/getattachment/Topics/Ohio-s-New-Learning-Standards/Mathematics/Grade_2_Math_Model_Curriculum_March2015.pdf.aspx

1.OA.7 (Prior Grade Standard)	3.OA.1 (Future Grade Standard)
Understand the meaning of the equal sign, and determine if equations involving addition and subtraction are true or false. *For example, which of the following equations are true and which are false? 6 = 6, 7 = 8 – 1, 5 + 2 = 2 + 5, 4 + 1 = 5 + 2.*	Interpret products of whole numbers, e.g., interpret 5 × 7 as the total number of objects in 5 groups of 7 objects each. (Note: These standards are written with the convention that *a* x *b* means *a* groups of *b* objects each; however, because of the commutative property, students may also interpret 5 x 7 as the total number of objects in 7 groups of 5 objects each).

Ohio's Learning Standards-Clear Learning Targets
Math, Grade 2

2.NBT.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

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).

Essential Question(s)
What does a digit's position in a number tell about its value?

Common Misconceptions

Some students may not move beyond thinking of the number 358 as 300 ones plus 50 ones plus 8 ones to the concept of 8 singles, 5 bundles of 10 singles or tens, and 3 bundles of 10 tens or hundreds. Use base-ten blocks to model the collecting of 10 ones (singles) to make a ten (a rod) or 10 tens to make a hundred (a flat). It is important that students connect a group of 10 ones with the word ten and a group of 10 tens with the word hundred.

Vocabulary

- digit
- hundreds
- tens
- ones
- represent

Essential Skills

Explain the value of each digit in a 3-digit number.

Identify a bundle of 10 tens as a "hundred."

Represent a three-digit number with hundreds, tens, and ones.

Example	Question
Explain why the value of the digit 3 in 351 is worth more than the 5. The student can explain the value of each digit in the number 351. The student can explain how once you reach a maximum of ten tens, the hundreds increases by one.	Carl thinks that when you add ten to 394 it should be 3104 or 3(10)4. Explain why this is not correct. What is the value of the digit 7 in 738?

Ohio Department of Education Model Curriculum Instructional Strategies and Resources

The understanding that 100 is 10 tens or 100 ones is critical to the understanding of place value. Using proportional models like base-ten blocks and bundles of tens along with numerals on place-value mats provides connections between physical and symbolic representations of a number. These models can be used to compare two numbers and identify the value of their digits.

Model three-digit numbers using base-ten blocks in multiple ways. For example, 236 can be 236 ones, or 23 tens and 6 ones, or 2 hundreds, 3 tens and 6 ones, or 20 tens and 36 ones. Use activities and games that have students match different representations of the same number.

Provide games and other situations that allow students to practice skip-counting. Students can use nickels, dimes and dollar bills to skip count by 5, 10 and 100. Pictures of the coins and bills can be attached to models familiar to students: a nickel on a five-frame with 5 dots or pennies and a dime on a ten-frame with 10 dots or pennies

1.NBT.2 (Prior Grade Standard)	3.NBT.2 (Future Grade Standard)
Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:10 can be thought of as a bundle of ten ones - called a "ten;" the numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones; and the numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).	Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction

Ohio's Learning Standards-Clear Learning Targets
Math, Grade 2

2.NBT.2	Count forward and backward within 1000 by ones, tens, and hundreds starting at any number; skip-count by 5s starting at any multiple of 5.	**Common Misconceptions**	**Vocabulary**
Essential Question(s) How does place value help me skip-count?		Some students may not move beyond thinking of the number 358 as 300 ones plus 50 ones plus 8 ones to the concept of 8 singles, 5 bundles of 10 singles or tens, and 3 bundles of 10 tens or hundreds. Use base-ten blocks to model the collecting of 10 ones (singles) to make a ten (a rod) or 10 tens to make a hundred (a flat). It is important that students connect a group of 10 ones with the word ten and a group of 10 tens with the word hundred.	▪ skip-count

Essential Skills	Count within 1000. Skip-count by 5s to 1000. Skip-count by 10s to 1000. Skip-count by 100s to 1000.

Example	Question
The student can skip count by 5's starting with 245.	Counting by 10's, name the next three numbers. 680, ___, ___. ___.

Ohio Department of Education Model Curriculum Instructional Strategies and Resources

Provide games and other situations that allow students to practice skip-counting. Students can use nickels, dimes and dollar bills to skip count by 5, 10 and 100. Pictures of the coins and bills can be attached to models familiar to students: a nickel on a five-frame with 5 dots or pennies and a dime on a ten-frame with 10 dots or pennies.

http://education.ohio.gov/getattachment/Topics/Ohio-s-New-Learning-Standards/Mathematics/Grade_2_Math_Model_Curriculum_March2015.pdf.aspx

1.NBT.1 (Prior Grade Standard)	3.NBT.2 (Future Grade Standard)
Count to 120, starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral	Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.

Ohio's Learning Standards-Clear Learning Targets
Math, Grade 2

2.NBT.3	Read and write numbers to 1000 using base-ten numerals, number names, expanded form, and equivalent representations, e.g., 716 is 700 + 10 + 6, or 6 + 700 + 10, or 6 ones and 71 tens, etc.	**Common Misconceptions**	**Vocabulary**
Essential Question(s) How else can I represent a number using place value? How can place value help me solve problems?		Some students may not move beyond thinking of the number 358 as 300 ones plus 50 ones plus 8 ones to the concept of 8 singles, 5 bundles of 10 singles or tens, and 3 bundles of 10 tens or hundreds. Use base-ten blocks to model the collecting of 10 ones (singles) to make a ten (a rod) or 10 tens to make a hundred (a flat). It is important that students connect a group of 10 ones with the word ten and a group of 10 tens with the word hundred.	▪ base ten numerals ▪ number names ▪ expanded form ▪ Explain

Essential Skills	Recognize that the digits in each place represent amounts of thousands, hundreds, tens, or ones. Read and write numbers to 1000 using base ten numerals, number names, and expanded form. Decompose numbers less than or equal to 10 into pairs in more than one way. Record decomposition of a number within 10 by a drawing or written equation.

Example	Question
The student knows that 301 is the same as 'Three hundred one" and "300 + 1". An example of expanded form is 643 = 600 + 40 + 3	Write the expanded form of 542.

Ohio Department of Education Model Curriculum Instructional Strategies and Resources

The understanding that 100 is 10 tens or 100 ones is critical to the understanding of place value. Using proportional models like base-ten blocks and bundles of tens along with numerals on place-value mats provides connections between physical and symbolic representations of a number. These models can be used to compare two numbers and identify the value of their digits. Model three-digit numbers using base-ten blocks in multiple ways. For example, 236 can be 236 ones, or 23 tens and 6 ones, or 2 hundreds, 3 tens and 6 ones, or 20 tens and 36 ones. Use activities and games that have students match different representations of the same number.

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1.NBT.3 (Prior Grade Standard)	3.NBT.2 (Future Grade Standard)
Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols >, =, and <.	Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.

Ohio's Learning Standards-Clear Learning Targets
Math, Grade 2

2.NBT.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.

Common Misconceptions

Students may mistakenly use bigger than or smaller than rather the greater than or less than.

Vocabulary

- Hundreds
- Tens
- Ones
- Compare
- Record

Essential Question(s)

Why is a number greater than, less than, or equal to another number?
How does the place value in numbers help me compare?

Essential Skills

Know the value of each digit represented in a three-digit number.

Know what >, <, and = symbols each represent.

Compare two three-digit numbers based on place value of each digit

Use >, =, and < symbols to record the results of comparisons.

Example	Question
I know 901 is larger than 309 because the 9 in the hundreds column is much more than 9 in the ones column.	Which of the following is true? 123 > 321

Ohio Department of Education Model Curriculum Instructional Strategies and Resources

On a number line, have students use a clothespin or marker to identify the number that is ten more than a given number or five more than a given number. Have students create and compare all the three-digit numbers that can be made using numbers from 0 to 9. For instance, using the numbers 1, 3, and 9, students will write the numbers 139, 193, 319, 391, 913 and 931. When students compare the numerals in the hundreds place, they should conclude that the two numbers with 9 hundreds would be greater than the numbers showing 1 hundred or 3 hundreds. When two numbers have the same digit in the hundreds place, students need to compare their digits in the tens place to determine which number is larger.

http://education.ohio.gov/getattachment/Topics/Ohio-s-New-Learning-Standards/Mathematics/Grade_2_Math_Model_Curriculum_March2015.pdf.aspx

1.NBT.3 (Prior Grade Standard)	3.NBT.1 (Future Grade Standard)
Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols >, =, and <.	Use place value understanding to round whole numbers to the nearest 10 or 100.

Ohio's Learning Standards-Clear Learning Targets
Math, Grade 2

2.NBT.5	Fluently add and subtract within 100 using strategies based on place value, properties of operations, and the relationship between addition and subtraction.	**Common Misconceptions** When adding two-digit numbers, some students might start with the digits in the ones place and record the entire sum. Then they add the digits in the tens place and record this sum. When subtracting two-digit numbers, students might start with the digits in the ones place and subtract the smaller digit from the larger digit. Then they move to the tens and the hundreds places and subtract the smaller digits from the larger digits.	**Vocabulary** ▪ Place value ▪ Operations ▪ Explain ▪ Solve

Essential Question(s)

Why is place value important when I add and subtract?
Which strategy will help me solve this problem the best?

Essential Skills	Know strategies for adding and subtracting based on properties of operations. Know strategies for adding and subtracting based on the relationship between addition and subtraction. Choose a strategy (place value, properties of operations, and /or the relationship between addition and subtraction) to fluently add and subtract within 100.

Example	Question
The student can explain strategies to add 34 + 40 and is efficient in reciting the answer. (i.e. 30 + 40 is 70 and then add 4 to get 74 OR 35 + 40 is 75 then subtract 1 to get 74)	How many tens and how many ones are in the answer when you add 28 and 33?

Ohio Department of Education Model Curriculum Instructional Strategies and Resources

Provide many activities that will help students develop a strong understanding of number relationships, addition and subtraction so they can develop, share and use efficient strategies for mental computation. An efficient strategy is one that can be done mentally and quickly. Students gain computational fluency, using efficient and accurate methods for computing, as they come to understand the role and meaning of arithmetic operations in number systems. Efficient mental processes become automatic with use. Students need to build on their flexible strategies for adding within 100 in Grade 1 to fluently add and subtract within 100, add up to four two-digit numbers, and find sums and differences less than or equal to 1000 using numbers 0 to 1000.

http://education.ohio.gov/getattachment/Topics/Ohio-s-New-Learning-Standards/Mathematics/Grade_2_Math_Model_Curriculum_March2015.pdf.aspx

1.NBT.4 (Prior Grade Standard)	3.NBT.2 (Future Grade Standard)
Add within 100, including adding a two-digit number and a one-digit number and adding a two-digit number and a multiple of 10, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; record the strategy with a written numerical method (drawings and, when appropriate, equations) and explain the reasoning used. Understand that when adding two-digit numbers, tens are added to tens; ones are added to ones; and sometimes it is necessary to compose a ten.	Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.

Ohio's Learning Standards-Clear Learning Targets
Math, Grade 2

2.NBT.6	Add up to four two-digit numbers using strategies based on place value and properties of operations.	**Common Misconceptions** Students may think that the 4 in 46 represents 4, not 40. When adding two-digit numbers, some students might start with the digits in the ones place and record the entire sum. Then they add the digits in the tens place and record this sum.	**Vocabulary** ▪ place value ▪ operations
Essential Question(s) Why is place value important when I add and subtract? Which strategy will help me solve this problem the best?			
Essential Skills	Know strategies for adding two- digit numbers based on place value and properties of operations. Use strategies to add up to four two-digit numbers.		

Example	Question
The student can explain how to pair compatible numbers when adding 32+ 7 + 8 + 23.	What numbers could you pair together to help solve the addition problem of 32 + 7 + 8 + 23.

Ohio Department of Education Model Curriculum Instructional Strategies and Resources

Initially, students apply base-ten concepts and use direct modeling with physical objects or drawings to find different ways to solve problems. They move to inventing strategies that do not involve physical materials or counting by ones to solve problems. Student-invented strategies likely will be based on place-value concepts, the commutative and associative properties, and the relationship between addition and subtraction. These strategies should be done mentally or with a written record for support.

It is vital that student-invented strategies be shared, explored, recorded and tried by others. Recording the expressions and equations in the strategies horizontally encourages students to think about the numbers and the quantities they represent instead of the digits. Not every student will invent strategies, but all students can and will try strategies they have seen that make sense to them. Different students will prefer different strategies.

http://education.ohio.gov/getattachment/Topics/Ohio-s-New-Learning-Standards/Mathematics/Grade_2_Math_Model_Curriculum_March2015.pdf.aspx

1.NBT.4 (Prior Grade Standard)	3.NBT.2 (Future Grade Standard)
Add within 100, including adding a two-digit number and a one-digit number and adding a two-digit number and a multiple of 10, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; record the strategy with a written numerical method (drawings and, when appropriate, equations) and explain the reasoning used. Understand that when adding two-digit numbers, tens are added to tens; ones are added to ones; and sometimes it is necessary to compose a ten.	Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.

Ohio's Learning Standards-Clear Learning Targets
Math, Grade 2

2.NBT.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; record the strategy with a written numerical method (drawings and, when appropriate, equations) and explain the reasoning used. Understand that in adding or subtracting three-digit numbers, hundreds are added or subtracted from hundreds, tens are added or subtracted from tens, ones are added or subtracted from ones; and sometimes it is necessary to compose or decompose tens or hundreds.

Essential Question(s)

Why do I need to understand place value to add and subtract 3-digit numbers?

How can I show this addition or subtraction problem?

Which strategy will help me solve this problem the best?

Common Misconceptions

Students may think that the 4 in 46 represents 4, not 40.

When adding two-digit numbers, some students might start with the digits in the ones place and record the entire sum. Then they add the digits in the tens place and record this sum.

When subtracting two-digit numbers, students might start with the digits in the ones place and subtract the smaller digit from the larger digit. Then they move to the tens and the hundreds places and subtract the smaller digits from the larger digits.

Vocabulary

- Place value
- Operations
- Compose
- Decompose
- Concrete model
- Strategy
- Relate
- Drawing
- Written method

Essential Skills

Decompose any number within 1000 into hundreds, tens, and ones.

Choose an appropriate strategy for solving an addition or subtraction problem within 1000.

Use composition and decomposition of hundreds and tens when necessary to add and subtract within 1000.

Example	Question
Break apart one or both numbers to make them easier to add. 692 + 346 =	509 hot dogs were sold at a baseball game. 464 hot dogs were sold at another baseball game. How many hot dogs were sold at the two baseball games?

Ohio Department of Education Model Curriculum Instructional Strategies and Resources

It is vital that student-invented strategies be shared, explored, recorded and tried by others. Recording the expressions and equations in the strategies horizontally encourages students to think about the numbers and the quantities they represent instead of the digits. Not every student will invent strategies, but all students can and will try strategies they have seen that make sense to them. Different students will prefer different strategies. Students will decompose and compose tens and hundreds when they develop their own strategies for solving problems where regrouping is necessary. They might use the make-ten strategy (37 + 8 = 40 + 5 = 45, add 3 to 37 then 5) or (62 - 9 = 60 – 7 = 53, take off 2 to get 60, then 7 more) because no ones are exchanged for a ten or a ten for ones. Have students analyze problems before they solve them. Present a variety of subtraction problems within 1000. Ask students to identify the problems requiring them to decompose the tens or hundreds to find a solution and explain their reasoning.

http://education.ohio.gov/getattachment/Topics/Ohio-s-New-Learning-Standards/Mathematics/Grade_2_Math_Model_Curriculum_March2015.pdf.aspx

1.NBT.4 (Prior Grade Standard)	3.NBT.2 (Future Grade Standard)
Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, 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 and explain the reasoning used. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten.	Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.

Ohio's Learning Standards-Clear Learning Targets
Math, Grade 2

2.NBT.8	Mentally add 10 or 100 to a given number 100-900, and mentally subtract 10 or 100 from a given number 100-900

Essential Question(s)

Why can I add or subtract 10 to a number easily?
Why can I add or subtract 100 to a number easily?
How will being able to add and subtract 10 or 100 for any number help me solve real-world problems?

Common Misconceptions

Students may not correctly identify the place value of tens and hundreds.

Students may not see the pattern without a number grid or concrete manipulatives.

Vocabulary

- Place value
- Operations
- Mentally add/subtract

Essential Skills

Know place value within 1000.

Apply knowledge of place value to mentally add or subtract 10 or 100 to/from a given number 100-900.

Example	Question
The student can mentally add 10 to a random number from 0 to 900.	Name the number that is 100 less than 240.

Ohio Department of Education Model Curriculum Instructional Strategies and Resources

It is vital that student-invented strategies be shared, explored, recorded and tried by others. Recording the expressions and equations in the strategies horizontally encourages students to think about the numbers and the quantities they represent instead of the digits. Not every student will invent strategies, but all students can and will try strategies they have seen that make sense to them. Different students will prefer different strategies. Students will decompose and compose tens and hundreds when they develop their own strategies for solving problems where regrouping is necessary. They might use the make-ten strategy (37 + 8 = 40 + 5 = 45, add 3 to 37 then 5) or (62 - 9 = 60 – 7 = 53, take off 2 to get 60, then 7 more) because no ones are exchanged for a ten or a ten for ones.

Have students analyze problems before they solve them. Present a variety of subtraction problems within 1000. Ask students to identify the problems requiring them to decompose the tens or hundreds to find a solution and explain their reasoning.

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1.NBT.6 (Prior Grade Standard)	3.NBT.3 (Future Grade Standard)
Subtract multiples of 10 in the range10-90 from multiples of 10 in the range 10-90 (positive or zero differences), 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 and explain the reasoning used.	Multiply one-digit whole numbers by multiples of 10 in the range 10–90, e.g., 9 × 80, 5 × 60 using strategies based on place value and properties of operations.

Ohio's Learning Standards-Clear Learning Targets
Math, Grade 2

2.NBT.9

Explain why addition and subtraction strategies work, using place value and the properties of operations. Explanations may be supported by drawings or objects.

Essential Question(s)

Which strategy will help me solve this problem the best?
Why did my strategy work to solve a problem?
What could be another strategy I could have used to solve a problem?

Common Misconceptions

Students may be able to do the operation, but not be able to articulate the reasoning.

Vocabulary

- Place value
- Properties
- Operations
- Explain

Essential Skills

Know addition and subtraction strategies using place value and properties of operations related to addition and subtraction.

Explain why addition and subtraction strategies based on place value and properties of operations work.

Example	Question
The student can use base ten blocks to explain 125 + 378.	Use base ten blocks and explain how to subtract 17 from 23.

Ohio Department of Education Model Curriculum Instructional Strategies and Resources

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Have students analyze problems before they solve them. Present a variety of subtraction problems within 1000. Ask students to identify the problems requiring them to decompose the tens or hundreds to find a solution and explain their reasoning.

1.NBT.4 (Prior Grade Standard)	3.NBT.2 (Future Grade Standard)
Add within 100, including adding a two-digit number and a one-digit number and adding a two-digit number and a multiple of 10, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; record the strategy with a written numerical method (drawings and, when appropriate, equations) and explain the reasoning used. Understand that when adding two-digit numbers, tens are added to tens; ones are added to ones; and sometimes it is necessary to compose a ten.	Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.

Ohio's New Learning Standards-Clear Learning Targets
Math, Grade 2

2.MD.1

Measure the length of an object by selecting and using appropriate tools such as rulers, yardstick, meter stick, and measuring tapes.

Essential Question(s)

Why do we use tools to measure?
Why did I choose the tool I did to measure an object?
How would changing the tool I use to measure change the measurement?

Common Misconceptions

When some students see standard rulers with numbers on the markings, they believe that the numbers are counting the marks instead of the units or spaces between the marks.

Some students might think that they can only measure lengths with a ruler starting at the left edge. Provide situations where the ruler does not start at zero. For example, a ruler is broken and the first inch number that can be seen is 2. If a pencil is measured and it is 9 inches on this ruler, the students must subtract 2 inches from the 9 inches to adjust for where the measurement started.

Vocabulary

- Measure
- Length
- Ruler
- Yardstick
- Meter stick
- Measuring tape
- Appropriate
- Tools

Essential Skills

Identify tools that can be used to measure length.

Determine which tool is most appropriate to use to measure the length of an object.

Measure the length of objects using appropriate tools.

Example	Question
The student can measure an object using standard units to a specific level of accuracy.	Measure the length of the pencil to the nearest 1/4 inch.

Ohio Department of Education Model Curriculum Instructional Strategies and Resources

Second graders are transitioning from measuring lengths with informal or nonstandard units to measuring with these standard units: inches, feet, centimeters, and meters. The measure of length is a count of how many units are needed to match the length of the object or distance being measured. Students have to understand what a length unit is and how it is used to find a measurement. They need many experiences measuring lengths with appropriate tools so they can become very familiar with the standard units and estimate lengths. Use language that reflects the approximate nature of measurement, such as the length of the room is about 26 feet.

http://education.ohio.gov/getattachment/Topics/Ohio-s-New-Learning-Standards/Mathematics/Grade_2_Math_Model_Curriculum_March2015.pdf.aspx

1.MD.1-2 (Prior Grade Standard)	3.MD.2 (Future Grade Standard)
Order three objects by length; compare the lengths of two objects indirectly by using a third object. Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps.	Measure and estimate liquid volumes and masses of objects using standard units of grams, kilograms, and liters. Add, subtract, multiply, or divide whole numbers to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem. Excludes multiplicative comparison problems involving notions of "times as much."

Ohio's Learning Standards-Clear Learning Targets
Math, Grade 2

2.MD.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.

Essential Question(s)

How does measuring the same object with a different unit change the measurement?
Why does one unit make more sense to use than another?

Common Misconceptions

When some students see standard rulers with numbers on the markings, they believe that the numbers are counting the marks instead of the units or spaces between the marks.

Some students might think that they can only measure lengths with a ruler starting at the left edge. Provide situations where the ruler does not start at zero. For example, a ruler is broken and the first inch number that can be seen is 2. If a pencil is measured and it is 9 inches on this ruler, the students must subtract 2 inches from the 9 inches to adjust for where the

Vocabulary

- Measure
- Length
- Unit
- Describe
- Relate
- Object

Essential Skills

Know how to measure the length of objects with different units.

Compare measurements of an object taken with two different units.

Describe why the measurements of an object taken with two different units are different.

Explain the length of an object in relation to the size of the units used to measure it.

Example	Question
The student can measure a table width in feet and inches and correctly explain why it takes more inches than feet to describe the measurement.	Sue says that when she changes her measurement from feet to inches it will be a larger number. Explain why you think she is right or wrong.

Ohio Department of Education Model Curriculum Instructional Strategies and Resources

Have students measure the same length with different-sized units then discuss what they noticed. Ask questions to guide the discussion so students will see the relationship between the size of the units and measurement, i.e. the measurement made with the smaller unit is more than the measurement made with the larger unit and vice versa.

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1.MD.1-2 (Prior Grade Standard)	3.MD.2 (Future Grade Standard)
Order three objects by length; compare the lengths of two objects indirectly by using a third object. Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps.	Measure and estimate liquid volumes and masses of objects using standard units of grams, kilograms, and liters. Add, subtract, multiply, or divide whole numbers to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem. Excludes multiplicative comparison problems involving notions of "times as much."

Ohio's Learning Standards-Clear Learning Targets
Math, Grade 2

2.MD.3

Estimate lengths using units of inches, feet, centimeters, and meters.

Common Misconceptions

Students must understand the difference between US Customary and Metric measurements. They must understand the relationship between inches/feet and also centimeters/meters.

Vocabulary

- Estimate
- Length
- Unit
- Inch
- Feet
- Centimeter
- Meter

Essential Question(s)

How does measuring the same object with a different unit change the measurement?
Why does one unit make more sense to use than another?

Essential Skills

Know how to measure the length of objects with different units.

Compare measurements of an object taken with two different units.

Describe why the measurements of an object taken with two different units are different.

Explain the length of an object in relation to the size of the units used to measure it.

Example	Question
The student can estimate the height of a student in feet.	Estimate the height of the doorway in meters.

Ohio Department of Education Model Curriculum Instructional Strategies and Resources

Insist that students always estimate lengths before they measure. Estimation helps them focus on the attribute to be measured, the length units, and the process. After they find measurements, have students discuss the estimates, their procedures for finding the measurements and the differences between their estimates and the measurements.

http://education.ohio.gov/getattachment/Topics/Ohio-s-New-Learning-Standards/Mathematics/Grade_2_Math_Model_Curriculum_March2015.pdf.aspx

1.MD.1-2 (Prior Grade Standard)	3.MD.2 (Future Grade Standard)
Order three objects by length; compare the lengths of two objects indirectly by using a third object. Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps.	Measure and estimate liquid volumes and masses of objects using standard units of grams, kilograms, and liters. Add, subtract, multiply, or divide whole numbers to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem. Excludes multiplicative comparison problems involving notions of "times as much."

Ohio's Learning Standards-Clear Learning Targets
Math, Grade 2

2.MD.4	Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.	**Common Misconceptions** Students must use the same standard length to measure.	**Vocabulary** ▪ Measure ▪ Length ▪ Standard unit ▪ Difference ▪ Determine ▪ Expressing

Essential Question(s)

Why is it important to use the same unit when measuring to compare two objects?

Essential Skills	Name standard length units. Compare lengths of two objects. Determine how much longer one object is than another in standard length units.

Example	Question
The student can measure and explain how much longer the book is than the pencil in inches.	Measure the two lines in inches and determine how much longer one is than the other.

Ohio Department of Education Model Curriculum Instructional Strategies and Resources

Insist that students always estimate lengths before they measure. Estimation helps them focus on the attribute to be measured, the length units, and the process. After they find measurements, have students discuss the estimates, their procedures for finding the measurements and the differences between their estimates and the measurements.

http://education.ohio.gov/getattachment/Topics/Ohio-s-New-Learning-Standards/Mathematics/Grade_2_Math_Model_Curriculum_March2015.pdf.aspx

1.MD.1-2 (Prior Grade Standard)	3.MD.2 (Future Grade Standard)
Order three objects by length; compare the lengths of two objects indirectly by using a third object. Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps.	Measure and estimate liquid volumes and masses of objects using standard units of grams, kilograms, and liters. Add, subtract, multiply, or divide whole numbers to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem. Excludes multiplicative comparison problems involving notions of "times as much."

Ohio's Learning Standards-Clear Learning Targets
Math, Grade 2

2.MD.5

Use addition and subtraction within 100 to sole word problems involving length that are given in the same whole number units, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem. Drawings need not show details but should show the mathematics in the problem.

Essential Question(s)

What strategy will help me solve this problem the best?
How can knowing some of the lengths in the problem help me find the unknown length?
How can I represent this problem?
Why do I need to units in the problem to be the same?

Common Misconceptions

Students may depend on key words to solve the problem. Using keywords often encourages students to strip numbers from the problem and use them to perform a computation outside of the problem context.

Vocabulary

- Units
- Length
- Equations
- Symbols
- Unknown number
- Solve
- Drawing
- Represent

Essential Skills

Add and subtract lengths within 100.

Recognize the size of inches, feet, centimeters, and meters.

Solve word problems involving lengths that are given in the same units.

Solve word problems involving length that have equations with a symbol for the unknown number.

Example	Question
http://darke.k12.oh.us/~carl_jones/FOV2-00108031/S01B8C18D.14/Learning%20Targets%202%20tabloid.pdf	If the short line is 8 inches and the difference is 3 inches, what i measure of the longer line?

Ohio Department of Education Model Curriculum Instructional Strategies and Resources

Provide one- and two-step word problems that include different lengths measurement made with the same unit (inches, feet, centimeters, and meters). Students add and subtract within 100 to solve problems for these situations: adding to, taking from, putting together, taking apart, and comparing, and with unknowns in all positions. Students use drawings and write equations with a symbol for the unknown to solve the problems. Have students represent their addition and subtraction within 100 on a number line. They can use notebook or grid paper to make their own number lines. First they mark and label a line on paper with whole-number units that are equally spaced and relevant to the addition or subtraction problem. Then they show the addition or subtraction using curved lines segments above the number line and between the numbers marked on the number line. For 49 + 5, they start at 49 on the line and draw a curve to 50, then continue drawing curves to 54. Drawing the curves or making the "hops" between the numbers will help students focus on a space as the length of a unit and the sum or difference as a length.

http://education.ohio.gov/getattachment/Topics/Ohio-s-New-Learning-Standards/Mathematics/Grade_2_Math_Model_Curriculum_March2015.pdf.aspx

1.MD.1-2 (Prior Grade Standard)	3.MD.2 (Future Grade Standard)
Order three objects by length; compare the lengths of two objects indirectly by using a third object. Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps.	Measure and estimate liquid volumes and masses of objects using standard units of grams, kilograms, and liters. Add, subtract, multiply, or divide whole numbers to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem. Excludes multiplicative comparison problems involving notions of "times as much."

Ohio's Learning Standards-Clear Learning Targets
Math, Grade 2

2.MD.6

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

Common Misconceptions

Students may count the lines on a number line instead of counting the spaces to measure an object.

Vocabulary

- Whole number
- Length
- Number line
- Sum
- Difference
- Represent
- Diagram
- Corresponding

Essential Question(s)

How does a number line help me show a number?
How can I describe numbers on a number line using length?
Why does using a number line to add and subtract help me understand the sum or difference?

Essential Skills

Represent whole numbers from 0 on a number line with equally spaced points.

Explain length as the distance between zero and another mark on the number line diagram.

Use a number line to represent the solution of whole-number sums and differences related to length within 100.

Example	Question
The student can relate measurement to a number line and demonstrate how to add and subtract on the number line.	Draw a number line and then show how one could subtract 12 from 20 using the number line to get the correct answer.

Ohio Department of Education Model Curriculum Instructional Strategies and Resources

Provide one- and two-step word problems that include different lengths measurement made with the same unit (inches, feet, centimeters, and meters). Students add and subtract within 100 to solve problems for these situations: adding to, taking from, putting together, taking apart, and comparing, and with unknowns in all positions. Students use drawings and write equations with a symbol for the unknown to solve the problems. Have students represent their addition and subtraction within 100 on a number line. They can use notebook or grid paper to make their own number lines. First they mark and label a line on paper with whole-number units that are equally spaced and relevant to the addition or subtraction problem. Then they show the addition or subtraction using curved lines segments above the number line and between the numbers marked on the number line. For 49 + 5, they start at 49 on the line and draw a curve to 50, then continue drawing curves to 54. Drawing the curves or making the "hops" between the numbers will help students focus on a space as the length of a unit and the sum or difference as a length.

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1.MD.4 (Prior Grade Standard)	3.MD.4 (Future Grade Standard)
Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.	Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by creating a line plot, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters.

Ohio's Learning Standards-Clear Learning Targets
Math, Grade 2

2.MD.7	Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.

Essential Question(s)

How do the hands on a clock help me tell time?
How can I show a time on a clock?

Common Misconceptions

Some students might confuse the hour and minutes hands. For the time of 3:45, they say the time is 9:15. Also, some students name the numeral closest to the hands, regardless of whether this is appropriate. For instance, for the time of 3:45 they say the time is 3:09 or 9:03. Assess students' understanding of the roles of the minute and hour hands and the relationship between them. Provide opportunities for students to experience and measure times to the nearest five minutes and the nearest hour. Have them focus on the movement and features of the hands.

Vocabulary

- Analog
- Digital
- Nearest

Essential Skills

Tell time using analog clocks and digital clocks to the nearest 5 minutes.

Write time using analog clocks and digital clocks.

Identify the hour and minute hand on an analog clock.

Identify and label when a.m. and p.m. occur.

Determine what time is represented by the combination of the number on the clock face and the position of the hands.

Example	Question
The student can read the correct time to the nearest 5 min when shown a clock.	What time does this clock show?

Ohio Department of Education Model Curriculum Instructional Strategies and Resources

Second graders expand their work with telling time from analog and digital clocks to the nearest hour or half-hour in

Grade 1 to telling time to the nearest five minutes using a.m. and p.m.

http://education.ohio.gov/getattachment/Topics/Ohio-s-New-Learning-Standards/Mathematics/Grade_2_Math_Model_Curriculum_March2015.pdf.aspx

1.MD.3 (Prior Grade Standard)	3.MD.1 (Future Grade Standard)
Tell and write time in hours and half-hours using analog and digital clocks.	Work with time and money. **a.** Tell and write time in hours and half-hours using analog and digital clocks.

Ohio's Learning Standards-Clear Learning Targets
Math, Grade 2

2. MD.8

Solve problems with money.
a. Identify nickels and quarters by name and value.
b. Find the value of a collection of quarters, dimes, nickels, and pennies.
c. Solve word problems by adding and subtracting within 100, dollars with dollars and cents with cents (not using dollars and cents simultaneously) using the $ and ¢ symbols appropriately (not including decimal notation).

Essential Question(s)
What strategy will help me solve this problem the best?
Why is it important to count, add, and subtract money?

Common Misconceptions

Students might overgeneralize the value of coins when they count them. They might count them as individual objects. Also some students think that the value of a coin is directly related to its size, so the bigger the coin, the more it is worth. Place pictures of a nickel on the top of five-frames that are filled with pictures of pennies. In like manner, attach pictures of dimes and pennies to ten-frames and pictures of quarters to 5 x 5 grids filled with pennies. Have students use these materials to determine the value of a set of coins in cents

Vocabulary

- Dollar
- Quarter
- Dime
- Nickel
- Penny
- Symbols: $, ¢
- Solve

Essential Skills

Identify and recognize the value of dollar bills, quarters, dimes, nickels, and pennies.

Identify the $ and ¢ symbols.

Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies using $ and ¢ symbols appropriately.

Example	Question
The student can correctly identify money, knows the difference between $ and ¢, and can solve problems with money.	If you have 20 dimes and 3 pennies, how many cents do you have?

Ohio Department of Education Model Curriculum Instructional Strategies and Resources

The topic of money begins at Grade 2 and builds on the work in other clusters in this and previous grades. Help students learn money concepts and solidify their understanding of other topics by providing activities where students make connections between them. For instance, link the value of a dollar bill as 100 cents to the concept of 100 and counting within 1000. Use play money - nickels, dimes, and dollar bills to skip count by 5s, 10s, and 100s. Reinforce place value concepts with the values of dollar bills, dimes, and pennies. Students use the context of money to find sums and differences less than or equal to 100 using the numbers 0 to 100.

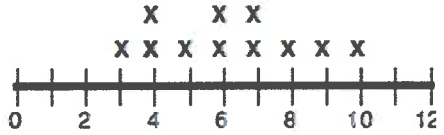
They add and subtract to solve one- and two-step word problems involving money situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions. Students use drawings and equations with a symbol for the unknown number to represent the problem. The dollar sign, $, is used for labeling whole-dollar amounts without decimals, such as $29. Students need to learn the relationships between the values of a penny, nickel, dime, quarter and dollar bill.

http://education.ohio.gov/getattachment/Topics/Ohio-s-New-Learning-Standards/Mathematics/Grade_2_Math_Model_Curriculum_March2015.pdf.aspx

(Prior Grade Standard)	3.MD.2 (Future Grade Standard)
1.MD.3 Work with time and money.	Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l).6 Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem.

Ohio's Learning Standards-Clear Learning Targets
Math, Grade 2

2.MD.9	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 y creating a line plot where the horizontal scale is marked off in whole-number units.	**Common Misconceptions** Students often do not see the connection between a line plot and a number line. A line plot can be thought of as plotting data on a number line.	**Vocabulary** ▪ Measurement ▪ Nearest unit ▪ Line plot ▪ Data
Essential Question(s) How can I best show set of data? What does the data tell me? Why does showing the data this way help me tell about it?			
Essential Skills	Measure lengths of objects by repeating measurements. Represent measurement data on a line plot. Create a line plot with a horizontal scale marked in whole numbers using measurements.		

Example	Question
The student can create a line plot given some measurement data	Write down ALL the data represented by the line plot shown. 

Ohio Department of Education Model Curriculum Instructional Strategies and Resources

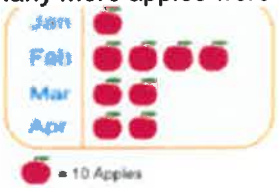
Line plots are useful tools for collecting data because they show the number of things along a numeric scale. They are made by simply drawing a number line then placing an X above the corresponding value on the line that represents each piece of data. Line plots are essentially bar graphs with a potential bar for each value on the number line. Pose a question related to the lengths of several objects. Measure the objects to the nearest whole inch, foot, centimeter or meter. Create a line plot with whole-number units (0, 1, 2 ...) on the number line to represent the measurements.

http://education.ohio.gov/getattachment/Topics/Ohio-s-New-Learning-Standards/Mathematics/Grade_2_Math_Model_Curriculum_March2015.pdf.aspx

1.MD.2 (Prior Grade Standard)	3.MD.4 (Future Grade Standard)
Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps.	Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters.

Ohio's Learning Standards-Clear Learning Targets
Math, Grade 2

2.MD.10	Organize, represent, and interpret data with up to four categories; complete picture graphs when single-unit scales are provided; complete bar graphs when single-unit scales are provided; solve simple put-together, take-apart, and compare problems in a graph.	**Common Misconceptions** Students confuse equal values in an object graph that appear unequal. For example, when making an object graph using shoes for boys and girls, five adjacent boy shoes would likely appear longer than five adjacent girl shoes. To standardize the objects, place the objects on the same-sized construction paper, then make the object graph.	**Vocabulary** ▪ Picture graph ▪ Bar graph ▪ Data set ▪ Put-together ▪ Take-apart ▪ Compare ▪ Draw ▪ Represent ▪ Presented
Essential Question(s) How can I best show a set of data? What does the data tell me? Why does showing the data this way help me tell about it?			
Essential Skills	Recognize and identify picture graphs and bar graphs. Identify and label the components of a picture graph and bar graph. Make comparisons between categories in the graph using more than, less than, etc. Solve problems relating to data in graphs by using addition and subtraction. Draw a single-unit scale picture graph to represent a given set of data with up to four categories. Draw a single-unit scale bar graph to represent a given set of data with up to four categories.		

Example	Question
http://darke.k12.oh.us/~carl_jones/FOV2-00108031/S01B8C18D.14/Learning%20Targets%202%20tabloid.pdf	How many more apples were sold in February than January? 

Ohio Department of Education Model Curriculum Instructional Strategies and Resources

At first students should create real object and picture graphs so each row or bar consists of countable parts. These graphs show items in a category and do not have a numerical scale. For example, a real object graph could show the students' shoes (one shoe per student) lined end to end in horizontal or vertical rows by their color. Students would simply count to find how many shoes are in each row or bar. The graphs should be limited to 2 to 4 rows or bars. Students would then move to making horizontal or vertical bar graphs with two to four categories and a single-unit scale. Use the information in the graphs to pose and solve simple put together, take-apart, and compare problems illustrated in Table 1(above) of the Common Core State Standards.

http://education.ohio.gov/getattachment/Topics/Ohio-s-New-Learning-Standards/Mathematics/Grade_2_Math_Model_Curriculum_March2015.pdf.aspx

1.MD.4 (Prior Grade Standard)	3.MD.4 (Future Grade Standard)
Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.	Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by creating a line plot, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters.

Ohio's Learning Standards-Clear Learning Targets
Math, Grade 2

2.G.1

Recognize and identify triangles, quadrilaterals, pentagons, and hexagons based on the number of sides or vertices. Recognize and identify cubes, rectangular prisms, cones, and cylinders

Essential Question(s)

How do I know this shape is its name?
Why should we identify shapes using angles and faces?

Common Misconceptions

Some students may think that a shape is changed by its orientation. They may see a rectangle with the longer side as the base, but claim that the same rectangle with the shorter side as the base is a different shape. This is why is it so important to have young students handle shapes and physically feel that the shape does not change regardless of the orientation, as illustrated below.

Vocabulary

- Attribute
- Angle
- Face
- Triangle
- Quadrilateral
- Pentagon
- Hexagon
- Cube
- Recognize
- Draw
- Identify

Essential Skills

Identify the attributes of triangles, quadrilaterals, pentagons, hexagons, and cubes (e.g., faces, angles, sides, vertices, etc.)

Identify triangles, quadrilaterals, pentagons, hexagons, and cubes based on the given attributes.

Describe and analyze shapes by examining their sides and angles, not by measuring.

Compare shapes by their attributes (e.g., faces, angles).

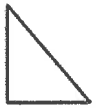
Draw shapes with specified attributes.

Example	Question
The student can identify a pentagon.	What is the name of this figure?

Ohio Department of Education Model Curriculum Instructional Strategies and Resources

Example:
Teacher: Draw a closed shape that has five sides. What is the name of the shape?
Student: I drew a shape with 5 sides. It is called a pentagon.

Example:
Teacher: I have 3 sides and 3 angles. What am I?
Student: A triangle. See, 3 sides, 3 angles.



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Example:
Teacher: Draw a closed shape that has five sides. What is the name of the shape?
Student: I drew a shape with 5 sides. It is called a pentagon.

Example:
Teacher: I have 3 sides and 3 angles. What am I?
Student: A triangle. See, 3 sides, 3 angles.

1.G.1 (Prior Grade Standard)	3.G.1 (Future Grade Standard)
Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size); build and draw shapes to possess defining attributes.	Draw and describe triangles, quadrilaterals (rhombuses, rectangles, and squares), and polygons (up to 8 sides) based on the number of sides and the presence or absence of square corners (right angles).

Ohio's Learning Standards-Clear Learning Targets
Math, Grade 2

2.G.2	Partition a rectangle into rows and columns of same-size squares and count to find the total number of them.	Common Misconceptions Students may believe that a region model represents one out of two, three or four fractional parts without regard to the fact that the parts have to be equal shares.	**Vocabulary** • Partition • Rectangle • Column • Row
Essential Question(s) What does the number of squares in this rectangle tell me?			
Essential Skills	Define partition. Identify a row. Identify a column. Count to find the total number of same-size squares. Determine how to partition a rectangle into same-size squares.		

Example	Question
The student can divide a rectangle into 12 equal squares and count them.	Continue dividing the rectangle and then count all the squares.

Ohio Department of Education Model Curriculum Instructional Strategies and Resources

Modeling multiplication with partitioned rectangles promotes students' understanding of multiplication. Tell students that they will be drawing a square on grid paper. The length of each side is equal to 2 units. Ask them to guess how many 1 unit by 1 unit squares will be inside this 2 unit by 2 unit square. Students now draw this square and count the 1 by 1 unit squares inside it. They compare this number to their guess. Next, students draw a 2 unit by 3 unit rectangle and count how many 1 unit by 1 unit squares are inside. Now they choose the two dimensions for a rectangle, predict the number of 1 unit by 1 unit squares inside, draw the rectangle, count the number of 1 unit by 1 unit squares inside and compare this number to their guess. Students repeat this process for different-size rectangles. Finally, ask them to what they observed as they worked on the task. It is vital that students understand different representations of fair shares. Provide a collection of different-size circles and rectangles cut from paper. Ask students to fold some shapes into halves, some into thirds, and some into fourths. They compare the locations of the folds in their shapes as a class and discuss the different representations for the fractional parts. To fold rectangles into thirds, ask students if they have ever seen how letters are folded to be placed in envelopes. Have them fold the paper very carefully to make sure the three parts are the same size. Ask them to discuss why the same process does not work to fold a circle into thirds.

http://education.ohio.gov/getattachment/Topics/Ohio-s-New-Learning Standards/Mathematics/Grade_2_Math_Model_Curriculum_March2015.pdf.aspx

1.G.3 (Prior Grade Standard)	3.G.2 (Future Grade Standard)
Partition circles and rectangles into two and four equal shares, describe the shares using the words *halves, fourths,* and *quarters,* and use the phrases *half of, fourth of,* and *quarter of.* Describe the whole as two of or four of the shares in real-world contexts. Understand for these examples that decomposing into more equal shares creates smaller shares.	Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. *For example, partition a shape into 4 parts with equal area, and describe the area of each part as 1/4 of the area of the shape.*

Ohio's Learning Standards-Clear Learning Targets
Math, Grade 2

2.G.3

Partition circles and rectangles into two, three, or four equal shares; describe the shares using the words *halves, thirds, or fourths* and *quarters,* and use the phrases *half of, third of, or fourth of* and *quarter of.* Describe the whole as two halves, three thirds, or four fourths in real-world contexts. Recognize that equal shares of identical wholes need not have the same shape.

Essential Question(s)

How can I describe the equal shares of this shape?
What happens to the equal shares as more equal shares are made within a shape?
How can I show equal shares of the same whole in a different way?

Common Misconceptions

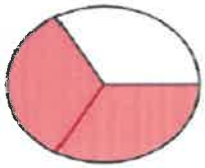
Students also may believe that a region model represents one out of two, three or four fractional parts without regard to the fact that the parts have to be equal shares, e.g., a circle divided by two equally spaced horizontal lines represents three thirds.

Vocabulary

- Partition
- Circle
- Halves
- Thirds
- Half of
- A third of
- Equal shares
- Whole
- Describe
- Recognize
- Identical

Essential Skills

Identify two, three, and four equal shares of a whole.
Describe equal shares using vocabulary: halves, thirds, fourths, half of, third of, etc.
Describe the whole as two halves, three thirds, or four fourths.
Justify why equal shares of identical wholes need not have the same shape.

Example	Question
The student can name each section of this circle. 	If the large rectangle is one whole, what is the name for the shaded section?

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