



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. [See Table 1, page 95.](#)

Essential Understandings

- Real-world and mathematical situations can be represented using drawings and equations.
- An unknown can be in any position of a mathematical situation.

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 keywords are contrary to such thinking. It is important that students avoid using keywords to solve problems.

Academic Vocabulary/ Language

- add
- subtract
- adding to
- comparing
- unknown number
- equation
- symbol

Tier 2

- represent
- solve
- explain

Learning Targets

I can solve real world problems using addition and subtraction.
I can add or subtract any two numbers between 0 and 100 within a one- and two- step word problem.
I can explain my arithmetic using drawings and equations (with symbols for the "unknown").

Classroom Snapshot

Example

Some students are in the cafeteria. 24 more students came in.
 Now there are 60 students in the cafeteria.
 How many were in the cafeteria to start with?
 Use drawings and equations to show your thinking.

Question

Todd read 23 pages yesterday and 42 pages today. how many pages did he read in both days?

| One Step Word Problem One Operation | Two-Step Word Problem Two Operations, Same | Two-Step Word Problem Two Operations, Opposite |
|--|---|---|
| There are 15 stickers on the page. Cindy put some more stickers on the page. There are now 22 stickers on the page. How many stickers did Cindy put on the page? $15 + \square = 22$ $22 - 15 = \square$ | There are 9 blue marbles and 6 red marbles in the bag. Maria put in 8 more marbles. How many marbles are in the bag now? $9 + 6 + 8 = \square$ | There are 9 peas on the plate. Carlos ate 5 peas. Mother put 7 more peas on the plate. How many peas are on the plate now? $9 - 5 + 7 = \square$ |

Adapted from Darke County Schools and North Carolina Public Schools Wikispaces

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 95 in the [Ohio Department of Education Model Curriculum 2017](#) 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 within 100 as the answer. Students then share, discuss and compare their solution strategies after they solve the problems.

Ohio's New Learning Standards Mathematics Grade 2 Model Curriculum 2015

TABLE 1. COMMON ADDITION ADDITION AND SUBTRACTION SITUATIONS.

| | RESULT UNKNOWN | CHANGE UNKNOWN | START UNKNOWN |
|--|---|---|---|
| ADD TO | Two bunnies sat on the grass. Three more bunnies hopped there. How many bunnies are on the grass now? $2 + 3 = ?$ | Two bunnies were sitting on the grass. Some more bunnies hopped there. Then there were five bunnies. How many bunnies hopped over to the first two? $2 + ? = 5$ | Some bunnies were sitting on the grass. Three more bunnies hopped there. Then there were five bunnies. How many bunnies were on the grass before? $? + 3 = 5$ |
| TAKE FROM | Five apples were on the table. I ate two apples. How many apples are on the table now? $5 - 2 = ?$ | Five apples were on the table. I ate some apples. Then there were three apples. How many apples did I eat? $5 - ? = 3$ | Some apples were on the table. I ate two apples. Then there were three apples. How many apples were on the table before? $? - 2 = 3$ |
| | TOTAL UNKNOWN | ADDEND UNKNOWN | BOTH ADDENDS UNKNOWN ¹ |
| PULL TOGETHER/ TAKE APART² | Three red apples and two green apples are on the table. How many apples are on the table? $3 + 2 = ?$ | Five apples are on the table. Three are red and the rest are green. How many apples are green? $3 + ? = 5, 5 - 3 = ?$ | Grandma has five flowers. How many can she put in her red vase and how many in her blue vase? $5 = 0 + 5, 5 = 5 + 0$ $5 = 1 + 4, 5 = 4 + 1$ $5 = 2 + 3, 5 = 3 + 2$ |
| | DIFFERENCE UNKNOWN | BIGGER UNKNOWN | SMALLER UNKNOWN |
| COMPARE³ | ("How many more?" version): Lucy has two apples. Julie has five apples. How many more apples does Julie have than Lucy? ("How many fewer?" version): Lucy has two apples. Julie has five apples. How many fewer apples does Lucy have than Julie? $2 + ? = 5, 5 - 2 = ?$ | (Version with "more"): Julie has three more apples than Lucy. Lucy has two apples. How many apples does Julie have? (Version with "fewer"): Lucy has 3 fewer apples than Julie. Lucy has two apples. How many apples does Julie have? $2 + 3 = ?, 3 + 2 = ?$ | (Version with "more"): Julie has three more apples than Lucy. Julie has five apples. How many apples does Lucy have? (Version with "fewer"): Lucy has 3 fewer apples than Julie. Julie has five apples. How many apples does Lucy have? $5 - 3 = ?, ? + 3 = 5$ |

¹ These take apart situations can be used to show all the decompositions of a given number. The associated equations, which have the total on the left of the equal sign, help children understand that the = sign does not always mean "makes" or "results in" but always does mean "is the same number as."

² Either addend can be unknown, so there are three variations of these problem situations. *Both Addends Unknown* is a productive extension of this basic situation, especially for small numbers less than or equal to 10.

³ For the *Bigger Unknown* or *Smaller Unknown* situations, one version directs the correct operation (the version using more for the *Bigger Unknown* and using less for the *Smaller Unknown*). The other versions are more difficult.

Connections Across Standards

Students will apply place value strategies (2.NBT.4-6, 9).

Connect to measurement and data (2.MD.5-6, 8, 10).

1.NBT.4 (Prior 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.

3.NBT.2 (Future Grade Standard)

Fluently add and subtract within 1,000 using strategies and algorithms^G 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.OA.2

Fluently ^G add and subtract within 20 using mental strategies. By 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 Understanding

- Fluency means being efficient, accurate, and flexible with addition and subtraction strategies.

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.

Academic Vocabulary/ Language

- add
- subtract
- sum
- mental strategies

Tier 2

- fluently

Learning Targets

I can add and subtract numbers within 20 using an efficient strategy.

Classroom Snapshot

Example

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 $6 + 6 + 1 = 12 + 1 = 13$.

Question

What is $9 + 5 =$

“I started at 9 and counted 5 more. I landed on 14” OR

“I know that 9 and 1 is 10, so I broke 5 into 1 and 4. 9 plus 1 is 10. Then I have to add 4 more, which is 14.

What is $13 - 9 =$

“I know that 9 plus 4 equals 13. So, 13 minus 9 is 4.” OR

“Instead of 13 minus 9, I added 1 to each of the numbers to make the problem 14 minus 10. I know the answer is 4. So, 13 minus 9 is also 4.

Adapted from the Ohio Department of Education and North Carolina Public Schools Wikispaces

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.

Provide activities in which students apply the commutative and associative properties to their mental strategies for sums less or equal to 20 using the numbers 0 to 20.

Have students study how numbers are related to 5 and 10 so they can apply these relationships to their strategies for knowing $5 + 4$ or $8 + 3$. Students might picture $5 + 4$ on a ten-frame to mentally see 9 as the answer. For remembering $8 + 7$, students might think “since 8 is 2 away from 10, take 2 away from 7 to make $10 + 5 = 15$.”

Make posters for student-developed mental strategies for addition and subtraction within 20. Use names for the strategies that make sense to the students and include examples of the strategies.

Present a particular strategy along with the specific addition and subtraction facts relevant to the strategy. Have students use objects and drawings to explore how these facts are alike.

Ohio's New Learning Standards Mathematics Grade 2 Model Curriculum 2015 (Adjusted to reflect standards revisions.)

Connections Across Standards

Apply addition and subtraction to length (2.MD.5-6).

Apply addition and subtraction using money (2.MD.8).

Apply addition and subtraction to interpreting data. See Table 1, page 95. (2.MD.10).

Explain and apply addition and subtraction strategies, place value, and properties of operations (2.NBT.9).

Fluently add and subtract within 100 (2.NBT.5).

1.OA.6 (Prior Grade Standard)

Add and subtract within 20, demonstrating fluency^G 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 $6 + 6 + 1 = 12 + 1 = 13$.

3.NBT.2 (Future Grade Standard)

Fluently add and subtract within 1,000 using strategies and algorithms^G 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.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 Understandings

- Whole numbers are odd or even.
- When pairing an even numbered group of objects, no members are left over.
- When pairing an odd numbered group of objects, one member is left over. An even number may be decomposed into two equal addends, e.g., $10 = 5 + 5$; $8 = 4 + 4$.

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. An example of this is a child may say that 358 is odd because you can pair 3 and 5 and 8 is leftover.

Academic Vocabulary/ Language

- odd
- even
- equation
- sum
- addend

Tier 2

- determine
- object
- paring
- express

Learning Targets

- I can work with equal groups and arrays to more easily find the total of the objects.
- I can identify whether a group of objects (up to 20) has an even or odd number.
- I can explain to another person what even means using objects and an equation.

Classroom Snapshot

Examples

The student can identify an even number of objects.

The student can identify an odd number of objects.

Questions

Is 8 an even number? Justify your thinking.

Possible responses:

Student A
I grabbed 8 counters. I paired counters up into groups of 2. Since I didn't have any counters left over, I know that 8 is an even number.

Student B
I grabbed 8 counters. I put them into 2 equal groups. There were 4 counters in each group, so 8 is an even number.

Student C
I drew 8 boxes in a rectangle that had two columns. Since every box on the left matches a box on the right, I know that 8 is even.



Student D
I know 4 plus 4 equals 8. So, 8 is an even number.

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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).

Ohio's New Learning Standards Mathematics Grade 2 Model Curriculum 2015

Connections Across Standards

- Skip count by tens, fives, and hundreds (2.NBT.2).
- Partition rectangles into rows and columns (2.G.2).
- Skip count with pennies, nickels, and dimes (2.MD.8).
- Tell time to the nearest five minutes (2.MD.7).

1.OA.5 (Prior Grade Standard)

Relate counting to addition and subtraction (e.g., by counting on 2 to add 2).

3.NBT.2 (Future Grade Standard)

Fluently add and subtract within 1,000 using strategies and algorithms^G 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

| | | |
|---|--|--|
| <div style="border: 1px solid black; border-radius: 15px; padding: 10px; display: inline-block; margin-bottom: 10px;"> 2.OA.4 </div> <p>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.</p> | <p>Common Misconceptions Students may confuse the terms row and column and interchange them when writing a repeated addition sentence. The focus should be on the repeated addition of the representation.</p> | <p>Academic Vocabulary/ Language</p> <ul style="list-style-type: none"> ▪ total ▪ addition ▪ rectangular arrays ▪ equation ▪ sum ▪ addend <p style="text-align: center;">Tier 2</p> <ul style="list-style-type: none"> ▪ rows ▪ columns ▪ express |
| <p style="text-align: center;">Essential Understandings</p> <ul style="list-style-type: none"> ● Each row in an array has an equal number of objects. ● Each column in an array has an equal number of objects. ● Adding rows or columns of an array will result in the same solution. ● The number of objects in an array is the same when the array is turned (rotated). | | |
| <p>Learning Targets</p> | <p>I can work with equal groups and arrays to more easily find the total of the objects. I can find the number of objects in an array by using repeated addition. I can write an equation to find the number of objects in an array.</p> | |

Classroom Snapshot

Examples

Use addition to find the number of objects.



The student can write the equation

$4 + 4 + 4 = B$ to find the total in this array.



Questions

What numbers can you add to find the total number of dots?



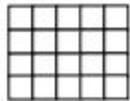
Write an equation to find the number of dots in the array.



Adapted from Darke County Schools

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: $20 = 4 + 4 + 4 + 4 + 4$

Ohio's New Learning Standards Mathematics Grade 2 Model Curriculum 2015

Connections Across Standards

Skip count by tens, fives, and hundreds (2.NBT.2).

Partition rectangles into rows and columns (2.G.2).

Skip count with pennies, nickels, and dimes (2.MD.8).

Tell time to the nearest five minutes (2.MD.7).

1.NBT.4 (Prior 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.

3.OA.7 (Future Grade Standard)

Fluently ^G multiply and divide within 100, using strategies such as the relationship between multiplication and division, e.g., knowing that $8 \times 5 = 40$, one knows $40 \div 5 = 8$, 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.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.

Understanding 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).

Essential Understandings

- A group of ten tens is now referred to as a “hundred.”
- A three-digit number is made up of hundreds, tens, and ones.
- A numeral can stand for a different amount depending on its place or position in a number.
- The digits to the left hold a larger value than the digit(s) to the right.

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.

Academic Vocabulary/ Language

- digit
- hundreds
- tens
- ones
- bundle

Tier 2

- represent

Learning Targets

- I can explain how the value of the digits in a three digit number changes with their placement.
- I can explain how ten tens can be put together to form a hundred.
- I can explain how all the hundreds are related to one another because they have no ones or tens.

Classroom Snapshot

Examples

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 increase by one.

Questions

What is the value of the digit 7 in 738?

Carl thinks that when you add ten to 394 it should be 3104 or 3(10)4. Explain why this is not correct.

Use base ten blocks to show the number 212 in two different ways.

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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.

Ohio's New Learning Standards Mathematics Grade 2 Model Curriculum 2015

Connections Across Standards

When adding and subtracting students should use place value understanding of hundreds, tens, and ones (2.NBT.6-9).

Tell time to nearest five minutes (2.MD.7).

Using pennies, nickels, and dimes to further place value understanding (2.MD.8).

Use repeated addition of 5 (2.OA.4).

Represent and interpret data (2.MD.10).

1.NBT.2 (Prior 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).

3.NBT.2 (Future Grade Standard)

Fluently add and subtract within 1,000 using strategies and algorithms^G 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 1,000 by ones, tens, and hundreds starting at any number; skip-count by 5s starting at any multiple of 5.

Common Misconceptions

Students may struggle to skip count when starting at a different number. For example, when they try to count by 10's starting at 23 or by counting by 5's beginning at 65.

This is a great skill to practice when you have extra minutes throughout the day. Using a 100's chart as well as a 300's chart helps students recognize patterns when counting

**Academic Vocabulary/
Language**

- ones
- tens
- hundreds
- multiple

Tier 2

- count
- skip-count

Essential Understanding

- Skip counting is a repeating pattern.

Learning Targets

- I can count forward or backward by ones, tens, and hundreds within 1,000.
- I can skip count by 10's and 100's starting at any number.
- I can skip count by 5's up to 1000 and starting at any multiple of 5.

Classroom Snapshot

Example

The student can skip count by 5's starting with the number 245.

Students will begin to see a pattern of numbers ending with the digits of 0 and 5.

Question

Counting by 10's, name the next three numbers:
682, _____, _____, _____

Destiny was skip counting by 100's using base ten blocks.
What were her next three numbers?
356, _____, _____, _____

Adapted from Darke County Schools and North Carolina Public Schools Wikispaces

Ohio Department of Education Model Curriculum Instructional Strategies and Resources

Provide games and other situations that allow students to practice counting and skip-counting, both forward and backward. 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.

Ohio's New Learning Standards Mathematics Grade 2 Model Curriculum 2015 (Adjusted to reflect standards revisions.)

Connections Across Standards

When adding and subtracting students should use place value understanding of hundreds, tens, and ones (2.NBT.6-9).

Tell time to nearest five minutes (2.MD.7).

Using pennies, nickels, and dimes to further place value understanding (2.MD.8).

Use repeated addition of 5 (2.OA.4).

Represent and interpret data (2.MD.10).

1.NBT.5 (Prior Grade Standard)

Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used.

1.NBT.6

Subtract multiples of 10 in the range 10-90 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.

3.NBT.2 (Future Grade Standard)

Fluently add and subtract within 1,000 using strategies and algorithms^G 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 1,000 using base-ten numerals, number names, expanded form ^G, and equivalent representations, e.g., 716 is $700 + 10 + 6$, or $6 + 700 + 10$, or 6 ones and 71 tens, etc.

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.

Academic Vocabulary/ Language

- base-ten numerals
- number names
- expanded form
- equivalent representations
- ones
- tens
- hundred

Tier 2

- explain

Essential Understandings

- Words can be used to represent numbers.
- When there are no ones and/or tens, the digit zero must be used in that ones and/or tens place to preserve the value of the number.
- Three-digit numbers can be composed and decomposed using multiple representations.
- Numbers written in expanded form can be expressed as an equation.
- Numbers have equivalent representations.

Learning Targets

I can read and write any number from 1 to 1000 using base-ten numerals, number names, or expanded form.

Classroom Snapshot

Example

The student knows that 301 is the same as “Three hundred one” and “ $300 + 1$ ”.

Base ten numerals: (123)

Number names: (one hundred twenty-three)

Expanded form: ($100 + 20 + 3$)

Question

Write the expanded form of 542.

Write numbers in the blanks to make the equations true.

Draw pictures as needed.

$$283 = \underline{\quad} \text{ hundreds} + \underline{\quad} \text{ tens} + \underline{\quad} \text{ ones}$$

$$283 = \underline{\quad} \text{ tens} + \underline{\quad} \text{ ones}$$

$$9 \text{ tens} + 12 \text{ ones} = \underline{\hspace{2cm}}$$

Adapted from Darke County Schools and North Carolina Public Schools Wikispaces

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, finding equivalent representations.

Ohio’s New Learning Standards Mathematics Grade 2 Model Curriculum 2015 (Adjusted to reflect standards revisions.)

Connections Across Standards

When adding and subtracting students should use place value understanding of hundreds, tens, and ones (2.NBT.6-9).

Tell time to nearest five minutes (2.MD.7).

Using pennies, nickels, and dimes to further place value understanding (2.MD.8).

Use repeated addition of 5 (2.OA.4).

Represent and interpret data (2.MD.10).

1.NBT.2 (Prior 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

3.NBT.2 (Future Grade Standard)

Fluently add and subtract within 1,000 using strategies and algorithms^G based on place value, properties of operations, and/or the relationship between addition and subtraction.

| | |
|---|--|
| 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). | |
|---|--|



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.

Essential Understandings

- Numbers have equivalent representations.
- Numbers can be compared.
- Symbols $>$, $=$, and $<$ can be used to record the comparison between numbers.
- When comparing numbers, start with the greatest place value.

Common Misconceptions

The use of the learning aids (such as alligator mouth) must be accompanied by the connection to the symbols: $<$ (less than), $>$ (greater than), and $=$ (equal to). More importantly, students need to begin to develop the understanding between comparing numbers and place value. In Grade 2, it means that this number has more hundreds, or the same number of hundreds, but with more tens, making it greater. Finally, students need to begin to understand that both inequality symbols ($<$, $>$) can create true statements about any two numbers where one is greater/smaller than the other, ($15 < 28$ and $28 > 15$).

Academic Vocabulary/ Language

- hundreds
- tens
- ones
- less than $<$
- greater than $>$
- equal $=$

Tier 2

- compare
- record

Learning Targets

I can explain how the value of the digits in a three digit number changes with their placement.
I can correctly compare 3-digit numbers using $>$, $=$, and $<$ by observing the value of their digits.

Classroom Snapshot

Example

I know 901 is larger than 309 because the 9 in the hundreds column is more than the 9 in the ones column.

$$\text{So, } 901 > 309$$

452 has 4 hundreds 5 tens and 2 ones. 455 has 4 hundreds 5 tens and 5 ones. They have the same number of hundreds and the same number of tens, but 455 has 5 ones and 452 only has 2 ones. 453 is less than 455.

$$452 < 455$$

Question

Which of the following is true?

$$123 > 321$$

$$123 = 321$$

$$123 < 321$$

Use $>$ or $<$ to make the statements true.

Draw pictures as needed.

$$700 + 5 + 60 \underline{\hspace{1cm}} 60 + 3 + 700$$

$$32 \text{ tens } \underline{\hspace{1cm}} 254$$

Adapted from Darke County Schools

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.

Ohio's New Learning Standards Mathematics Grade 2 Model Curriculum 2015

Connections Across Standards

When adding and subtracting students should use place value understanding of hundreds, tens, and ones (2.NBT.6-9).

Tell time to nearest five minutes (2.MD.7).

Using pennies, nickels, and dimes to further place value understanding (2.MD.8).

Use repeated addition of 5 (2.OA.4).

Represent and interpret data (2.MD.10).

1.NBT.3 (Prior 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 $<$.

3.NBT.1 (Future Grade Standard)

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/or 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.

Academic Vocabulary/ Language

- addition
- subtraction
- efficiency
- accurately
- relationship
- place value
- operations

Tier 2

- explain
- solve

Essential Understandings

- When adding and subtracting numbers, the place and value of the digits is important for determining either the sum or the difference.
- The digit in the ones place will remain the same when finding 10 more or 10 less.
- There is a relationship between addition and subtraction.
- When adding or subtracting, sometimes it is necessary to compose or decompose tens or hundreds.
- Fluency is being efficient, accurate, and flexible with addition and subtraction strategies

Learning Targets

I can add and subtract within 100 efficiently and accurately using a variety of strategies.

Example

The student can explain strategies to add $34 + 40$ and is efficient in reciting the answer.

ex: $30 + 40$ is 70 and then add 4 to get 74 OR
 $35 + 40$ is 75 then subtract 1 to get 74

$$67 + 25 = \underline{\quad}$$

Place Value Strategy:

I broke both 67 and 25 into tens and ones. 6 tens plus 2 tens equals 8 tens. Then I added the ones. 7 ones plus 5 ones equal 12 ones. I then combined my tens and ones. 8 tens plus 12 ones equals 92.

Decomposing into Tens:

I decided to start with 67 and break 25 apart. I knew I needed 3 more to get to 70, so I broke off a 3 from the 25. I then added my 20 from the 22 left and got to 90. I had 2 left. 90 plus 2 is 92. So, $67 + 25 = 92$

Commutative Property:

I broke 67 and 25 into tens and ones so I had to add $60+7+20+5$. I added 60 and 20 first to get 80. Then I added 7 to get 87. Then I added 5 more. My answer is 92.

Classroom Snapshot

Question

How many tens and how many ones are in the answer when you add 28 and 33?

One of your classmates solved the problem $56 - 34 = \underline{\quad}$ by writing “I know that I need to add 2 to the number 4 to get 6. I also know that I need to add 20 to 30 to get 50. So, the the answer is 22.” Is their strategy correct? Explain why or why not.

Adapted from Darke County Schools and North Carolina Public Schools Wikispaces

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.

Ohio’s New Learning Standards Mathematics Grade 2 Model Curriculum 2015

Connections Across Standards

Solve one- and two-step word problems within 100 (2.OA.1).

Fluently add and subtract within 20 (2.OA.2).

Understand that the three digits of a three-digit number represents hundreds, tens, and ones (2.NBT.1).

Solve problems involving length (2.MD.5).

Solve problems with money (2.MD.8).

Solve problems involving data (2.MD.10).

1.OA.6 (Prior Grade Standard)

Add and subtract within 20, demonstrating fluency^G 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 $6 + 6 + 1 = 12 + 1 = 13$.

3.NBT.2 (Future Grade Standard)

Fluently add and subtract within 1,000 using strategies and algorithms^G 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
 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.

**Academic Vocabulary/
 Language**

- add
- subtract
- two-digit number
- place value
- operations

Essential Understandings

- When adding and subtracting numbers, the place and value of the digits is important for determining either the sum or the difference.
- The digit in the ones place will remain the same when finding 10 more or 10 less.
- The digits in the tens place and the ones place will remain the same when finding 100 more or 100 less.

Tier 2

- solve

Learning Targets

I can add up to four two-digit numbers using a variety of strategies.

Classroom Snapshot

Example

The student can explain how to pair compatible numbers when adding $32 + 7 + 8 + 23$.

The student can explain how to break apart numbers by place values to add $43 + 34 + 57$.

Question

What numbers could you pair together to help solve the addition problem of $32 + 7 + 8 + 23$.

How would you solve $43 + 34 + 57 = \underline{\quad}$

Adapted from Darke County Schools and North Carolina Public Schools Wikispaces

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.

Ohio's New Learning Standards Mathematics Grade 2 Model Curriculum 2015 (Adjusted to reflect standards revisions.)

Connections Across Standards

Solve one- and two-step word problems within 100 (2.OA.1).

Fluently add and subtract within 20 (2.OA.2).

Understand that the three digits of a three-digit number represents hundreds, tens, and ones (2.NBT.1).

Solve problems involving length (2.MD.5).

Solve problems with money (2.MD.8).

Solve problems involving data (2.MD.10).

1.NBT.4 (Prior 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

3.NBT.2 (Future Grade Standard)

Fluently add and subtract within 1,000 using strategies and algorithms^G based on place value, properties of operations, and/or the relationship between addition and subtraction.

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.



Ohio's Learning Standards-Clear Learning Targets

Math Grade 2

2.NBT.7

Add and subtract within 1,000, 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 Understandings

- The digit in the ones place will remain the same when finding 10 more or 10 less.
- The digits in the tens place and the ones place will remain the same when finding 100 more or 100 less.
- There is a relationship between addition and subtraction.
- When 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.
- When adding or subtracting, sometimes it is necessary to compose or decompose tens or hundreds.
- When adding and subtracting numbers, the place and value of the digits is important for determining either the sum or the difference.

Common Misconceptions

When adding three-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 the ones place and record these sums.

When subtracting three-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.

Academic Vocabulary/ Language

- add
- subtract
- place value
- ones
- tens
- hundreds
- properties of operations
- compose
- decompose
- concrete model

Tier 2

- strategy
- relate
- drawing
- written method

Learning Targets

I can add and subtract numbers from 0 to 1000 using different strategies based on place value and regrouping.
I can record the strategy that I used to add or subtract with a picture, numbers or an equation.

Classroom Snapshot

Example

The student can write an explanation on how to subtract 237 from 825.

Students extend their understanding of adding two-digit numbers

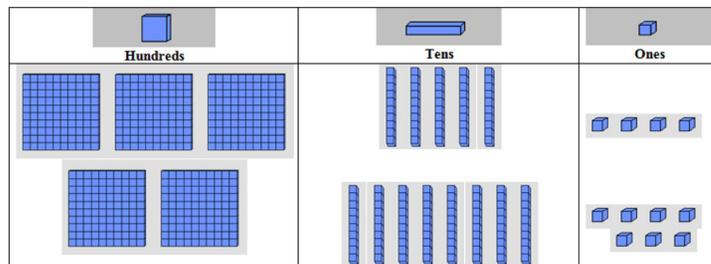
Question

Bob tried to solve the following problem:

$$\begin{array}{r} 845 \\ - 237 \\ \hline 612 \end{array}$$

Explain to Bob what he did wrong and what the correct answer is.

Solve $354 + 287 = \underline{\quad}$ using base ten blocks.



Adapted from Darke County Schools and North Carolina Public Schools Wikispaces

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.

Ohio's New Learning Standards Mathematics Grade 2 Model Curriculum 2015 (Adjusted to reflect standards revisions.)

Connections Across Standards

Solve one- and two-step word problems within 100 (2.OA.1).

Fluently add and subtract within 20 (2.OA.2).

Understand that the three digits of a three-digit number represents hundreds, tens, and ones (2.NBT.1).

Solve problems involving length (2.MD.5).

Solve problems with money (2.MD.8).

Solve problems involving data (2.MD.10).

1.NBT.4 (Prior 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.

3.NBT.2 (Future Grade Standard)

Fluently add and subtract within 1,000 using strategies and algorithms^G 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.

Common Misconceptions

Students may think that the 4 in 46 represents 4, not 40 if base ten language is not used. The strategy for mentally adding and subtracting 10 or 100 is an invented strategy that does not happen naturally. It will need to be modeled for students in order for them to gain a better understanding of the values of the numerical places.

**Academic Vocabulary/
Language**

- add
- subtract
- tens
- hundred
- place value
- operations

Tier 2

- mentally add/subtract

Essential Understandings

- When adding and subtracting numbers, the place and value of the digits is important for determining either the sum or the difference.
- The digit in the ones place will remain the same when finding 10 more or 10 less.
- The digits in the tens place and the ones place will remain the same when finding 100 more or 100 less.
- There is a relationship between addition and subtraction.
- When 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.

Learning Targets

I can mentally add or subtract 10 or 100 from any number from 100 to 900.

| Example | Classroom Snapshot | Question |
|--|--|--|
| <p>The student can mentally add 10 to a random number from 0 to 900.</p> <p>Students should begin to recognize the patterns in numbers that only the number in the tens place or the hundreds place changes when they add 10 or 100.</p> | | <p>Name the number that is 100 less than 240.</p> <p>What is 10 more than 518?</p> |
| <p>Adapted from Darke County Schools and North Carolina Public Schools Wikispaces</p> | | |
| <p>Ohio Department of Education Model Curriculum Instructional Strategies and Resources</p> | | |
| <p>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.</p> | | |
| <p>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.</p> | | |
| <p>Ohio's New Learning Standards Mathematics Grade 2 Model Curriculum 2015</p> | | |
| <p>Connections Across Standards</p> | | |
| <p>Solve one- and two-step word problems within 100 (2.OA.1).</p> | | |
| <p>Fluently add and subtract within 20 (2.OA.2).</p> | | |
| <p>Understand that the three digits of a three-digit number represents hundreds, tens, and ones (2.NBT.1).</p> | | |
| <p>Solve problems involving length (2.MD.5).</p> | | |
| <p>Solve problems with money (2.MD.8).</p> | | |
| <p>Solve problems involving data (2.MD.10).</p> | | |
| <p>1.NBT.4 (Prior 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</p> | <p>3.NBT.2 (Future Grade Standard) Fluently add and subtract within 1,000 using strategies and algorithms^G based on place value, properties of operations, and/or the relationship between addition and subtraction.</p> | |

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.



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 Understandings

- When adding and subtracting numbers, the place and value of the digits is important for determining either the sum or the difference.
- The digit in the ones place will remain the same when finding 10 more or 10 less.
- The digits in the tens place and the ones place will remain the same when finding 100 more or 100 less.
- There is a relationship between addition and subtraction.
- When adding or subtracting, sometimes it is necessary to compose or decompose tens or hundreds.

Common Misconceptions

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

When adding two or three-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 the hundreds place and record these sums.

When subtracting two-digit or three-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.

Academic Vocabulary/ Language

- addition
- subtraction
- place value
- properties
- operations

Tier 2

- explain

Learning Targets

I can use my understanding of place value to explain the properties of addition and subtraction.
I can explain why various addition or subtraction strategies work using numbers, drawings, or objects.

Classroom Snapshot

Example

The student can use base ten blocks to explain $125 + 378$.

Students will understand that they may need to compose or decompose 10s or 100s.

Question

Use pictures of base ten blocks to explain how to subtract 17 from 23.

Sarah wanted to solve the equation $32 + 49 = \underline{\quad}$. First she added 30 to 40, getting 70. What does she need to do next?

Adapted from Darke County Schools and CPalms website

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.

Ohio's New Learning Standards Mathematics Grade 2 Model Curriculum 2015

Connections Across Standards

Solve one- and two-step word problems within 100 (2.OA.1).

Fluently add and subtract within 20 (2.OA.2).

Understand that the three digits of a three-digit number represents hundreds, tens, and ones (2.NBT.1).

Solve problems involving length (2.MD.5).

Solve problems with money (2.MD.8).

Solve problems involving data (2.MD.10).

1.NBT.4 (Prior 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

3.NBT.2 (Future Grade Standard)

Fluently add and subtract within 1,000 using strategies and algorithms^G based on place value, properties of operations, and/or the relationship between addition and subtraction.

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.



Ohio's New Learning Standards-Clear Learning Targets

Math Grade 2

| | | | |
|---|---|---|---|
| 2.MD.1 | <p>Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes</p> | <p style="text-align: center;">Common Misconceptions</p> <p>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.</p> <p>Some students might think that they can only measure lengths with a ruler starting at the left edge.</p> <p>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.</p> | <p style="text-align: center;">Academic Vocabulary/ Language</p> <ul style="list-style-type: none"> ▪ measure ▪ length ▪ ruler ▪ yardstick ▪ meter stick ▪ measuring tape <p style="text-align: center; margin-top: 20px;">Tier 2</p> <ul style="list-style-type: none"> ▪ appropriate tools |
| <p style="text-align: center;">Essential Understandings</p> <ul style="list-style-type: none"> ● Length is measured by using an appropriate tool. ● Length is found by counting intervals rather than counting the marks on a measurement tool. ● The length of an object remains constant regardless of where it is placed on a measurement tool. ● Starting points on a measurement tool may vary. ● Units must be of equal size. ● Measurements can be nonstandard or standard units. ● All measurements include a margin of error. ● Numerals on a measuring tool indicate the number of length units. | | | |
| Learning Targets | <p>I can measure the length of an object.</p> <p>I can measure the length of an object by selecting the right tool.</p> | | |

| Example | Classroom Snapshot | Question |
|--|---|--|
| <p>The student can measure an object using standard units to a specific level of accuracy.</p> <p>Students should connect their understanding of non-standard units to measuring with specific units.</p> | | <p>Measure the length of a pencil to the nearest inch.</p> <p>Would it be more appropriate to use a ruler or a yardstick to measure the length of a book? Explain why.</p> |
| <p>Adapted from Darke County Schools and North Carolina Public Schools Wikispaces</p> | | |
| <p>Ohio Department of Education Model Curriculum Instructional Strategies and Resources</p> | | |
| <p>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.</p> | | |
| <p>Ohio's New Learning Standards Mathematics Grade 2 Model Curriculum 2015</p> | | |
| <p>Connections Across Standards</p> | | |
| <p>Using addition and subtraction within 100 to solve one- and two-step word problems (2. OA.1). Fluently add and subtract within 100 (2. NBT.5).</p> | | |
| <p>1.MD.1 (Prior Grade Standards) Order three objects by length; compare the lengths of two objects indirectly by using a third object.</p> <p>1.MD.2 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. <i>Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps.</i></p> | <p>3.MD.2 (Future Grade Standard) 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"; see Table 2, page 96.</p> | |



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.

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.

Academic Vocabulary/ Language

- measure
- measurement
- size
- length
- unit

Essential Understandings

- There is a relationship between the size of the unit and the number of units required to cover the length.
- Length is measured by using an appropriate tool.
- Length is found by counting intervals rather than counting the marks on a measurement tool.
- The length of an object remains constant regardless of where it is placed on a measurement tool.
- Starting points on a measurement tool may vary.
- Numerals on a measuring tool indicate the number of length units.

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.

Tier 2

- describe
- relate
- object

Learning Targets

I can measure the length of an object.
I can measure an object using two different units and explain the how the two measures are the same or different.

| Example | Classroom Snapshot | Question |
|--|--|--|
| <p>The student can measure a table width in feet and inches and correctly explains why it takes more inches than feet to describe the measurement.</p> <p>The smaller the unit, the more units it will take to measure the item.</p> | | <p>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.</p> <p>Measure the height of the table with a yardstick. How tall is the table in feet? How tall is the table in inches? Explain how both the measurements can be used to describe the height of the table.</p> |
| <p>Adapted from Darke County Schools and North Carolina Public Schools Wikispaces</p> | | |
| <p>Ohio Department of Education Model Curriculum Instructional Strategies and Resources</p> <p>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.</p> <p>Ohio's New Learning Standards Mathematics Grade 2 Model Curriculum 2015</p> | | |
| <p>Connections Across Standards</p> <p>Using addition and subtraction within 100 to solve one- and two-step word problems (2. OA.1). Fluently add and subtract within 100 (2. NBT.5).</p> | | |
| <p>1.MD.1 (Prior Grade Standards)</p> <p>Order three objects by length; compare the lengths of two objects indirectly by using a third object.</p> <p>1.MD.2</p> <p>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. <i>Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps.</i></p> | <p>3.MD.2 (Future Grade Standard)</p> <p>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"; see Table 2, page 96.</p> | |



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

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.

Academic Vocabulary/ Language

- estimate
- length
- unit
- inch
- feet
- centimeter
- meter

Essential Understandings

- Length is measured by using an appropriate tool.
- There is a relationship between the size of the unit and the number of units required to cover the length.
- Lengths can be estimated.

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.

Tier 2

- compare
- record

Learning Targets

I can estimate the length of an object in inches, feet, centimeters, and meters.

Classroom Snapshot

Example

The student can estimate the height of a student in feet.

Students can check their estimate by measuring the item using a standard unit of measure.

Question

Estimate the height of the doorway in meters.

How many inches do you think this pencil is if you measured it with a ruler?

Adapted from Darke County Schools and North Carolina Public Schools Wikispaces

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.

Ohio's New Learning Standards Mathematics Grade 2 Model Curriculum 2015

Connections Across Standards

Using addition and subtraction within 100 to solve one- and two-step word problems (2. OA.1).

Fluently add and subtract within 100 (2. NBT.5).

1.MD.1 (Prior Grade Standards)

Order three objects by length; compare the lengths of two objects indirectly by using a third object.

1.MD.2

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. *Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps.*

3.MD.2 (Future Grade Standard)

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"; see Table 2, page 96.



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

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.

Academic Vocabulary/ Language

- measure
- length
- standard unit
- difference

Essential Understandings

- Length is measured by using an appropriate tool.
- Numerals on a measuring tool indicate the number of length units.
- Lengths can be compared.

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.

Tier 2

- determine
- expressing
- object

Learning Targets

I can measure lengths in standard units.
I can compare the standard measurement of two objects and explain their difference.

| Example | Classroom Snapshot | Question |
|--|---------------------------|---|
| <p>The student can measure and explain how much longer the book is than the pencil in inches.</p> <p>Student will need to be able to identify the appropriate tool used to measure the item(s).</p> <p>Adapted from Darke County Schools and North Carolina Public Schools Wikispaces</p> | | <p>Measure the two lines in inches and determine how much longer one is than the other.</p> <p>Choose two pieces of string to measure. How many inches do you think each string is? Next, measure the exact length. Compare the lengths of the strings.</p> |
| <p>Ohio Department of Education Model Curriculum Instructional Strategies and Resources</p> <p>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.</p> <p>Ohio's New Learning Standards Mathematics Grade 2 Model Curriculum 2015</p> | | |
| <p>Connections Across Standards</p> <p>Using addition and subtraction within 100 to solve one- and two-step word problems (2. OA.1). Fluently add and subtract within 100 (2. NBT.5).</p> | | |
| <p>1.MD.1 (Prior Grade Standards) Order three objects by length; compare the lengths of two objects indirectly by using a third object.</p> <p>1.MD.2 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. <i>Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps.</i></p> | | <p>3.MD.2 (Future Grade Standard) 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"; see Table 2, page 96.</p> |



Ohio's Learning Standards-Clear Learning Targets

Math Grade 2

2.MD.5

Use addition and subtraction within 100 to solve word problems involving lengths 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. (This applies wherever drawings are mentioned in the Standards.)

Essential Understandings

- Addition and subtraction strategies can be used to solve real-world measurement problems.
- A symbol can be used to represent an unknown number.

Common Misconceptions

A misconception that many students have is that it is valid to assume that a key word or phrase in a problem suggests the same operation will be used every time. For example, they might assume that the word left always means that subtraction must be used to find a solution. Providing problems in which key words like this are used to represent different operations is essential.

Requiring students to include the unit of measure in their answer will help them when they do work with measurement and conversions in the upper grades. For example, if they solve a problem where they add 6 feet and 3 feet, their answer should be 9 feet rather than just 9.

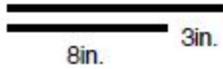
Academic Vocabulary/ Language

- addition
- subtraction
- units
- length
- equations
- symbols
- unknown number

Tier 2

- solve
- drawing
- represent
- word problems

| | |
|-------------------------|--|
| Learning Targets | <p>I can solve world problems involving the addition and subtraction of lengths.</p> <p>I can add or subtract measurements within 100 units in word problems using numbers, drawings, and equations.</p> |
|-------------------------|--|

| Example | Classroom Snapshot | Question |
|--|---------------------------|---|
| <p>The student can write an equation that would represent adding three lengths to get a total.</p> <p>Students can use a drawing to solve measurement word problems.</p> | | <p>If the short line is 8 inches and the difference is 3 inches, what is the measure of the longer line?</p>  <p>In P.E. class Kate jumped 14 inches. Mary jumped 23 inches. How much farther did Mary jump than Kate?</p> |

Adapted from Darke County Schools and North Carolina Public School Wikispaces

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.

Ohio’s New Learning Standards Mathematics Grade 2 Model Curriculum 2015

Connections Across Standards

Measure to determine how much longer one object is than another (2. MD.4).
 Generate measurement data by measuring lengths of several objects to the nearest whole unit and/or by making repeated measurements of the same objects (2. MD. 9).
 Using addition and subtraction within 100 to solve one- and two-step word problems (2. OA.1).
 Fluently add and subtract within 100 (2. NBT.5).

1.MD.1 (Prior Grade Standards)

Order three objects by length; compare the lengths of two objects indirectly by using a third object.

1.MD.2

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. *Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps.*

3.MD.2 (Future Grade Standard)

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"; see Table 2, page 96.



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^G 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.

Essential Understandings

- There is a relationship between number lines and measurement tools.
- A number line diagram is similar to a ruler in that whole numbers are 1 unit apart.
- Each number on a number line denotes the distance from the labeled point from 0, not the number itself.

Common Misconceptions

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

When creating a number line diagram, students may not space the lines equally along the line and not understand the need for standard units.

Students should also be shown that a number line doesn't have to begin with zero. A number line can begin with any number as long as the numbers continue in order and are equally spaced. Open numbers lines are a useful tool for adding and subtracting within 100.

Academic Vocabulary/ Language

- whole number
- length
- number line
- equal
- sum
- difference

Tier 2

- represent
- diagram
- corresponding
- word problems

| | |
|-------------------------|--|
| Learning Targets | <p>I can solve problems of addition and subtraction of whole numbers on a number line diagram.</p> <p>I can relate measurement to the number line.</p> |
|-------------------------|--|

| Example | Classroom Snapshot | Question |
|---|---------------------------|---|
| <p>The student can relate measurement to a number line and demonstrate how to add and subtract on the number line.</p> <p>Students can use addition and subtraction strategies to solve problems on a number line.</p> | | <p>Draw a number line and then show how one could subtract 12 from 20 using the number line to get the correct answer.</p> <p>There were 27 students on the bus. 19 students got off the bus. How many students are on the bus?</p> |
| <p>Adapted from Darke County Schools and North Carolina Public Schools Wikispaces</p> | | |
| <p>Ohio Department of Education Model Curriculum Instructional Strategies and Resources</p> | | |
| <p>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.</p> | | |
| <p>Ohio’s New Learning Standards Mathematics Grade 2 Model Curriculum 2015</p> | | |
| <p>Connections Across Standards</p> <p>Measure to determine how much longer one object is than another (2. MD.4).</p> <p>Generate measurement data by measuring lengths of several objects to the nearest whole unit and/or by making repeated measurements of the same objects (2. MD. 9).</p> | | |

Using addition and subtraction within 100 to solve one- and two-step word problems (2. OA.1).

Fluently add and subtract within 100 (2. NBT.5).

1.MD.2 (Prior 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. Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps.

3.MD.4 (Future Grade Standard)

Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by creating a line plot^G, 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

| | | | |
|--|---|---|---|
| <div style="border: 1px solid black; border-radius: 15px; padding: 10px; display: inline-block;"> <h3 style="margin: 0;">2.MD.7</h3> </div> | <p>Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.</p> | <p style="text-align: center;">Common Misconceptions</p> <p>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.</p> | <p style="text-align: center;">Academic Vocabulary/ Language</p> <ul style="list-style-type: none"> ▪ analog ▪ digital ▪ clock ▪ time ▪ minutes ▪ hours ▪ a.m. ▪ p.m. <p style="text-align: center;">Tier 2</p> <ul style="list-style-type: none"> ▪ nearest |
| <p style="text-align: center;">Essential Understandings</p> <ul style="list-style-type: none"> ● Time can be measured to the nearest 5 minutes. ● Time can be measured using an analog clock or digital clock. ● Time can be recorded using hours and to the nearest 5 minutes, e.g., Twenty-five minutes after eleven is represented as 11:25. ● A day is measured as an interval of 24 hours. ● A day is divided equally into a.m. time and p.m. time. | | | |
| <p>Learning Targets</p> | <p>I can tell time to the nearest five minutes on an analog and digital clock. I can write time to the nearest five minutes on an analog and digital clock.</p> | | |

Example

The student can read the correct time to the nearest 5 minutes when shown a clock.

Students can make connections to skip counting by 5's.

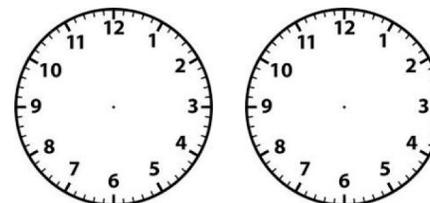
Classroom Snapshot

Question

What time does this clock show?



On the clocks below draw the hands on the clock for 2:05 and 2:40.



Adapted from Darke County Schools and North Carolina Public Schools

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.

Ohio's New Learning Standards Mathematics Grade 2 Model Curriculum 2015 (Adjusted to reflect standards revisions.)

Connections Across Standards

Use place value (2.NBT.2, 4-8).

Partition circles (2.G.3).

Solve problems involving addition and subtraction (2.OA.1).

1.MD.3a (Prior Grade Standard)

a. Tell and write time in hours and half-hours using analog and digital clocks.

3.MD.1a (Future Grade Standard)

a. Tell and write time to the nearest minute. Measure time intervals in minutes (within 90 minutes). Solve real-world problems involving addition and subtraction of time intervals (elapsed time) in minutes, e.g., by representing the problem on a number line diagram or clock.



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 Understandings

- A nickel is worth 5 cents (5¢).
- A quarter is worth 25 cents (25¢).
- An amount of dollars is represented with the dollar symbol (\$).
- A collection of pennies, nickels, dimes, and quarters can be counted.
- The size of a coin does not determine its value.
- The dollar symbol and cent symbol are not used simultaneously, i.e., do not use decimal notation. Note: Decimal notation, e.g., \$1.33, will be used in 4th grade to represent values beyond 100 cents.

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.

Academic Vocabulary/ Language

- dollar
- quarter
- dime
- nickel
- penny
- symbols: \$,¢
- value

Tier 2

- identify
- collection
- solve
- appropriately

| | |
|------------------------|---|
| Learning Target | <p>I can name and tell the value of nickels and quarters.</p> <p>I can find the value of a group of coins.</p> <p>I can solve addition and subtraction word problems involving money.</p> |
|------------------------|---|

| Example | Classroom Snapshot | Question |
|---|---------------------------|--|
| <p>The student can correctly identify money, know the difference between dollars and cents, and can solve problems with money.</p> <p>The student can solve word problems, adding and subtracting dollars with dollars, and cents with cents.</p> | | <p>If you have 2 dimes and 3 pennies, how many cents do you have?</p> <p>How many different ways can you make 37¢ using pennies, nickels, dimes, and quarters?</p> |
| <p>Adapted from Darke County Schools and North Carolina Public Schools Wikispaces</p> | | |

Ohio Department of Education Model Curriculum Instructional Strategies and Resources

The topic of money begins in Kindergarten with the use of pennies for counting. Money concepts build on that work in First grade with knowing the name and value of pennies and dimes. 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.

Career Connection

Students will use play money to solve real-work, word problems. Arrange a field trip to your local bank or credit union where students can interview professionals who count money and interact with math in their work (e.g., bank teller, loan officer, investment banker).

Ohio’s New Learning Standards Mathematics Grade 2 Model Curriculum 2015 (Adjusted to reflect standards revisions.)

Connections Across Standards

Use place value (2.NBT.2, 4-8).

Partition circles (2.G.3).

Solve problems involving addition and subtraction (2.OA.1).

1.MD.3b (Prior Grade Standard)

b. Identify pennies and dimes by name and value.

3.MD.1b (Future Grade Standard)

b. Solve word problems by adding and subtracting within 1,000, dollars with dollars and cents with cents (not using dollars and cents simultaneously) using the \$ and ¢ symbol appropriately (not including decimal notation).



Ohio's Learning Standards-Clear Learning Targets

Math Grade 2

| | | | |
|---|---|---|---|
| <div style="border: 1px solid black; border-radius: 15px; padding: 10px; display: inline-block;"> <h3 style="margin: 0;">2.MD.9</h3> </div> | <p>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 creating a line plot ^G, where the horizontal scale is marked off in whole number units.</p> | <p style="text-align: center;">Common Misconceptions</p> <p>Students may count the lines on a number line instead of counting the spaces to measure an object.</p> <p>When creating a number line diagram, students may not space the lines equally along the line and not understand the need for standard units.</p> <p>Students may try to put non numerical data (like “Favorite Pets” or “Pizza Toppings” into a line plot.</p> | <p style="text-align: center;">Academic Vocabulary Language</p> <ul style="list-style-type: none"> ▪ data ▪ measurement ▪ length ▪ whole number unit ▪ line plot ▪ horizontal scale <p style="text-align: center;">Tier 2</p> <ul style="list-style-type: none"> ▪ generate ▪ object ▪ nearest ▪ repeated ▪ marked off |
| <p style="text-align: center;">Essential Understandings</p> <ul style="list-style-type: none"> • Length measurement data can be generated and used to create a line plot in whole number units. • Categorical data results from sorting objects into as many as four categories. | <p>Learning Targets</p> <p>I can measure several objects to the nearest whole unit. I can collect measurement data and make a line plot.</p> | | |

Classroom Snapshot

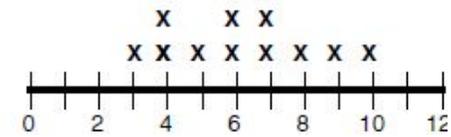
Example

The student can create a line plot given some measurement data.

Students will be able to answer questions about data in the line plot.

Question

Write down all the data represented by the line plot shown.



Sarah measured several ribbons to the nearest inch. She wrote down the lengths in a table. Make a line plot to represent the data.

| | | | | |
|---|--------|----------|----------|----------|
| 4 | | X | | |
| 3 | | X | | X |
| 2 | X | X | | X |
| 1 | X | X | X | X |
| | 1 inch | 2 inches | 3 inches | 4 inches |

Adapted from Darke County Schools North Carolina Public Schools Wikispaces

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.

Career Connection

Students will use play money to solve real-work, word problems. Arrange a field trip to your local bank or credit union where students can interview professionals who count money and interact with math in their work (e.g., bank teller, loan officer, investment banker).

Ohio's New Learning Standards Mathematics Grade 2 Model Curriculum 2015 (Adjusted to reflect standards revisions.)

Connections Across Standards

Represent and solve problems involving addition and subtraction (2.OA.1).

Add and subtract within 20 fluently (2.OA.2).

Relate addition and subtraction to length (2.MD.6).

1.MD.4 (Prior 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.

3.MD.4 (Future Grade Standard)

Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by creating a line plot^G, 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.
See Table 1, page 95.

Essential Understandings

- Categorical data results from sorting objects into as many as four categories.
- Data can be organized and represented in a picture graph or bar graph.
- Given a graph, the data can be used to solve addition, subtraction, and comparison problems.

Common Misconceptions

Students initially put data into one list instead of into categories.

Students will need help understanding how to organize the data.

Students will see that data needs to be represented however, they may not understand that different representations of data can tell a different story about the data. When interpreting data, students tend to focus on individual pieces instead of the whole data set.

Academic Vocabulary/ Language

- categories
- single-unit scales
- picture graph
- data set
- put-together
- take-apart
- compare

Tier 2

- draw
- organize
- interpret
- represent

Learning Targets

- I can organize, display the data, and interpret data.
- I can create a picture graph and a bar graph.
- I can solve problems from the information on picture graphs or bar graphs.

Classroom Snapshot

Example

Students will organize data with up to 4 categories.

Students will solve simple math problems and comparisons using a graph.

Question

How many more apples were sold in February than January?



How many people liked strawberry and chocolate ice cream?

| Flavor | Number of People |
|------------|------------------|
| Vanilla | 10 |
| Strawberry | 5 |
| Cherry | 3 |
| Chocolate | 6 |

Adapted from Darke County Schools and North Carolina Public Schools Wikispaces

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, page 95 of the Ohio State Learning Standards for Mathematics. Students will need to organize, represent, and interpret data with up to four categories.

Career Connection

Students will use play money to solve real-work, word problems. Arrange a field trip to your local bank or credit union where students can interview professionals who count money and interact with math in their work (e.g., bank teller, loan officer, investment banker).

TABLE 1. COMMON ADDITION AND SUBTRACTION SITUATIONS.

| | RESULT UNKNOWN | CHANGE UNKNOWN | START UNKNOWN |
|---|---|---|---|
| ADD TO | Two bunnies sat on the grass. Three more bunnies hopped there. How many bunnies are on the grass now? $2 + 3 = ?$ | Two bunnies were sitting on the grass. Some more bunnies hopped there. Then there were five bunnies. How many bunnies hopped over to the first two? $2 + ? = 5$ | Some bunnies were sitting on the grass. Three more bunnies hopped there. Then there were five bunnies. How many bunnies were on the grass before? $? + 3 = 5$ |
| TAKE FROM | Five apples were on the table. I ate two apples. How many apples are on the table now? $5 - 2 = ?$ | Five apples were on the table. I ate some apples. Then there were three apples. How many apples did I eat? $5 - ? = 3$ | Some apples were on the table. I ate two apples. Then there were three apples. How many apples were on the table before? $? - 2 = 3$ |
| | TOTAL UNKNOWN | ADDEND UNKNOWN | BOTH ADDENDS UNKNOWN ¹ |
| PULL TOGETHER/TAKE APART² | Three red apples and two green apples are on the table. How many apples are on the table? $3 + 2 = ?$ | Five apples are on the table. Three are red and the rest are green. How many apples are green? $3 + ? = 5, 5 - 3 = ?$ | Grandma has five flowers. How many can she put in her red vase and how many in her blue vase? $5 = 0 + 5, 5 = 5 + 0$ $5 = 1 + 4, 5 = 4 + 1$ $5 = 2 + 3, 5 = 3 + 2$ |
| | DIFFERENCE UNKNOWN | BIGGER UNKNOWN | SMALLER UNKNOWN |
| COMPARE³ | ("How many more?" version): Lucy has two apples. Julie has five apples. How many more apples does Julie have than Lucy? ("How many fewer?" version): Lucy has two apples. Julie has five apples. How many fewer apples does Lucy have than Julie? $2 + ? = 5, 5 - 2 = ?$ | (Version with "more"): Julie has three more apples than Lucy. Lucy has two apples. How many apples does Julie have? (Version with "fewer"): Lucy has 3 fewer apples than Julie. Lucy has two apples. How many apples does Julie have? $2 + 3 = ?, 3 + 2 = ?$ | (Version with "more"): Julie has three more apples than Lucy. Julie has five apples. How many apples does Lucy have? (Version with "fewer"): Lucy has 3 fewer apples than Julie. Julie has five apples. How many apples does Lucy have? $5 - 3 = ?, ? + 3 = 5$ |

¹ These take apart situations can be used to show all the decompositions of a given number. The associated equations, which have the total on the left of the equal sign, help children understand that the = sign does not always mean "makes" or "results in" but always does mean "is the same number as."

² Either addend can be unknown, so there are three variations of these problem situations. *Both Addends Unknown* is a productive extension of this basic situation, especially for small numbers less than or equal to 10.

³ For the *Bigger Unknown* or *Smaller Unknown* situations, one version directs the correct operation (the version using more for the *Bigger Unknown* and using less for the *Smaller Unknown*). The other versions are more difficult.



Ohio's New Learning Standards Mathematics Grade 2 Model Curriculum 2015 (Adjusted to reflect standards revisions.)

Connections Across Standards

Represent and solve problems involving addition and subtraction (2.OA.1).

Add and subtract within 20 fluently (2.OA.2).

Relate addition and subtraction to length (2.MD.6).

1.MD.4 (Prior 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.

3.MD.4 (Future Grade Standard)

Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by creating a line plot^G, 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.

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 it is so important to have young students handle shapes and physically feel that the shape does not change regardless of the orientation, as illustrated below.



Academic Vocabulary/ Language

- attribute
- angle
- face
- side
- vertices
- triangle
- quadrilateral
- pentagon
- hexagon
- cube
- rectangular prism
- cones
- cylinder

Tier 2

- recognize
- draw
- identify

Essential Understandings

- Two-dimensional shapes (that are closed and have straight sides meeting at corners/vertices) can be classified by the number of sides and/or vertices.
- Three-dimensional shapes (cubes, rectangular prisms, cones, and cylinders) can be recognized and identified.

Learning Targets

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

Classroom Snapshot

Example

The student can identify a pentagon.

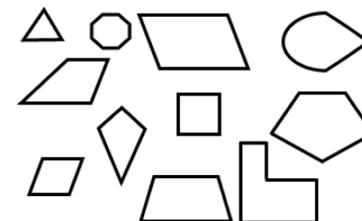
The student can draw a shape with three angles.

Question

What is the name of this figure?



Circle all of the quadrilaterals among these shapes.



Adapted from Darke County Schools and North Carolina Public Schools Wikispaces

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.



Ohio's New Learning Standards Mathematics Grade 2 Model Curriculum 2015 (Adjusted to reflect standards revisions.)

Connections Across Standards

Work with equal groups of objects (2.OA.4).

Measure and estimate lengths in standard units (2.MD.1-4).

1.G.1 (Prior 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 that possess defining attributes.

3.G.1 (Future Grade Standard)

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, e.g., a rectangle divided by four equally spaced horizontal lines represents four fourths.

**Academic Vocabulary/
 Language**

- partition
- rectangle

Tier 2

- column
- row

Essential Understanding

- Rectangles can be partitioned into rows and columns.



Learning Targets

I can apply my knowledge of arrays to partition shapes into columns and rows.
 I can cut a rectangle into equal squares and count them.

Classroom Snapshot

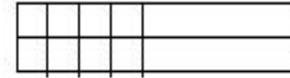
Example

The student can divide a rectangle into 12 equal squares and count them.

Students may notice a pattern of repeated addition while finding the total number of equal squares in a rectangle.

Question

Continue dividing the rectangle and then count all the squares.



How could you cut a square pan of brownies into equal pieces so that you would have 8 total brownies?

Adapted from Darke County Schools and Howard County Public Schools

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.

Ohio's New Learning Standards Mathematics Grade 2 Model Curriculum 2015

Connections Across Standards

Work with equal groups of objects (2.OA.4).

Measure and estimate lengths in standard units (2.MD.1-4).

1.G.3 (Prior 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

3.G.2 (Future Grade Standard)

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*

in real-world contexts. Understand for these examples that decomposing into more equal shares creates smaller shares.

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 Understandings

- When decomposing circles and rectangles into halves, thirds, or fourths, equal shares of identical wholes need not have the same shape.

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, e.g., a circle divided by two equally spaced horizontal lines represents three thirds.



Academic Vocabulary/ Language

- partition
- circle
- halves
- thirds
- half of
- a third of
- equal shares
- whole

Tier 2

- describe
- recognize
- identical

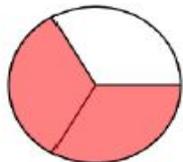
Learning Targets

- I can divide circle and rectangles into two, three, or four equal parts.
- I can describe the equal shares with the terms *halves*, *thirds*, *fourths*, and *quarters*.
- I can describe the whole as two halves, three thirds, or four fourths in a real world situation.

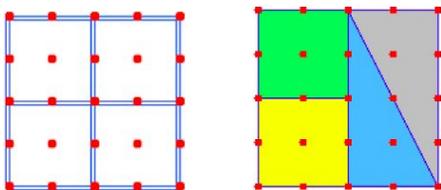
Classroom Snapshot

Examples

The student can name each section of this circle.

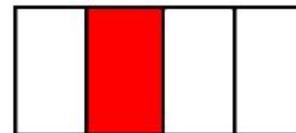


Students will realize that equal shares of two identical shapes may not have the same shape.



Questions

If the large rectangle is one whole, what is the name for the shaded section?



Partition each rectangle into fourths in a different way. Explain how you know that each part is a fourth.



Adapted from Darke County Schools and North Carolina Public Schools Wikispace

Ohio Department of Education Model Curriculum Instructional Strategies and Resources

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.

Ohio's New Learning Standards Mathematics Grade 2 Model Curriculum 2015

Connections Across Standards

Work with equal groups of objects (2.OA.4).

Measure and estimate lengths in standard units (2.MD.1-4).

1.G.3 (Prior 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. Understand for these examples that decomposing into more equal shares creates smaller shares.

3.G.2 (Future Grade Standard)

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.*