



Course Outcome Summary

Course Information: **Math 2**

Description: This course is about second grade students understanding mathematical concepts, problem solving and learning computation.

Instruction Level: Grade 2

Course Standards:

- Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones (706 equals 7 hundreds, 0 tens, and 6 ones).
- Count within 1000; skip-count by 5s, 10s, and 100s.
- Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.
- Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using $>$, $=$, and $<$ symbols to record the results of comparisons.
- Fluently add and subtract within 100 using strategies based on place value, properties of operations and/or the relationship between addition and subtraction.
- Add up to four 2-digit numbers using strategies based upon place value and properties of operations.
- Add and subtract within 1000 using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method. Understand that in adding or subtracting three digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds.
- Mentally add 10 or 100 to a given number 100-900 and mentally subtract 10 or 100 from a given number 100-900.
- Explain why addition and subtraction strategies work, using place value and the properties of operation.
- Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tape.
- 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.
- Estimate lengths using units of inches, feet, centimeters, and meters.
- Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.
- Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units (by using drawings of rulers) and equations with a symbol for the unknown number to represent the problem.

- Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points corresponding to the numbers 0, 1, 2, and represent whole-number sums and differences within 100 on a number line diagram.
- Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.
- Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using \$ and cent symbols appropriately. Example: If you have two dimes and three pennies how many cents do you have?
- Generate measurement data by measuring lengths of several objects to the nearest whole unit or by making repeated measurements of the same object. Show the measurements by making a line plot, where the horizontal scale is marked off in whole-number units.
- Draw a picture graph and a bar graph (with single unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph.
- Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces. (Sizes are compared directly or visually, not compared by measuring) Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.
- Partition a rectangle into rows and columns of same-size squares and count to find the total number of them.
- Partition circles and rectangles into two, three, or four equal shares, describe the shares using the words halves, thirds, half of, a third of, etc. and describe the whole as two halves, three thirds, four fourths. Recognize that equal shares of identical wholes need not have the same shape.
- Use addition and subtraction within 100 to solve one and two- step word problems involving situation 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.
- Fluently add and subtract within 20 using mental strategies. By end of Grade 2, know from memory all sums of two one-digit numbers.
- Determine whether a group of objects (up to 20) has an odd or even number of members, (by pairing objects, or counting them by 2's), write an equation to express an even number as a sum of two equal addends.
- 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.

Units

- 1. Number and Operations in Base 10**
- 2. Measurement and Data**
- 3. Geometry**
- 4. Operations and Algebraic Thinking**

Unit Outlines

1. Number and Operation in Base 10

Standards:

- Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones (706 equals 7 hundreds, 0 tens, and 6 ones).
- Count within 1000; skip-count by 5s, 10s, and 100s.
- Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.
- Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using $>$, $=$, and $<$ symbols to record the results of comparisons.
- Fluently add and subtract within 100 using strategies based on place value, properties of operations and/or the relationship between addition and subtraction.
- Add up to four 2-digit numbers using strategies based upon place value and properties of operations.
- Add and subtract within 1000 using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method. Understand that in adding or subtracting three digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds.
- Mentally add 10 or 100 to a given number 100-900 and mentally subtract 10 or 100 from a given number 100-900.
- Explain why addition and subtraction strategies work, using place value and the properties of operation.

Essential Question:

Students will be able to answer the question(s):

- How can numbers to 1,000 be shown and compared?
- How does the position of a digit in a number affect its value?
- Why do number patterns help in reading and writing numbers to 1,000?
- How do predictable patterns help to understand how numbers work?
- What is the standard procedure for adding and subtracting 2-digit and 3-digit numbers?
- What are efficient methods for mentally finding sums and differences?

Essential Knowledge:

What are the key concepts/vocabulary/ideas that students will have mastery of by the completion of the unit?

- Place value is based on groups of ten.
- Place value can be used to understand addition and subtraction.
- Number patterns repeat.
- Two numbers can be compared using place value.

2. Measurement and Data

Standards:

- Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tape.
- 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.
- Estimate lengths using units of inches, feet, centimeters, and meters.
- Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.
- Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units (by using drawings of rulers) and equations with a symbol for the unknown number to represent the problem.
- Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points corresponding to the numbers 0, 1, 2, and represent whole-number sums and differences within 100 on a number line diagram.
- Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.
- Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using \$ and cent symbols appropriately. Example: If you have two dimes and three pennies how many cents do you have?
- Generate measurement data by measuring lengths of several objects to the nearest whole unit or by making repeated measurements of the same object. Show the measurements by making a line plot, where the horizontal scale is marked off in whole-number units.
- Draw a picture graph and a bar graph (with single unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph.

Essential Question:

Students will be able to answer the question(s):

- What strategies can be used to count money?
- What is the process for measuring length in standard units?
- How do we tell time to 5 minutes?
- How can clocks be used to show data and answer questions?
- How can bar graphs and pictures graphs be used to show data and answer questions?

Essential Knowledge:

What are the key concepts/vocabulary/ideas that students will have mastery of by the completion of the unit?

- Time can be measured.
- Coins have different values and are counted according to their values.
- Data can be collected, classified, and sorted in various ways.
- A specific process is used to measure attributes of unit length.
- There is relationship between estimation and measurement.

3. Geometry

Standards:

- Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces. (Sizes are compared directly or visually, not compared by measuring) Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.
- Partition a rectangle into rows and columns of same-size squares and count to find the total number of them.
- Partition circles and rectangles into two, three, or four equal shares, describe the shares using the words halves, thirds, half of, a third of, etc. and describe the whole as two halves, three thirds, four fourths. Recognize that equal shares of identical wholes need not have the same shape.

Essential Question:

Students will be able to answer the question(s):

- How can shapes be described and compared?
- How do fractions help me describe shapes?
- How can you find the perimeter and area of a given shape?

Essential Knowledge:

What are the key concepts/vocabulary/ideas that students will have mastery of by the completion of the unit?

- Objects can be described and compared using their geometric attributes.
- The perimeter of a shape can be found by measuring the total distance around the shape.
- The area of a shape can be found by counting units.
- Fractions represent equal parts of a whole or a group.

4. Operations and Algebraic Thinking

Standards:

- Use addition and subtraction within 100 to solve one and two- step word problems involving situation 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.
- Fluently add and subtract within 20 using mental strategies. By end of Grade 2, know from memory all sums of two one-digit numbers.
- Determine whether a group of objects (up to 20) has an odd or even number of members, (by pairing objects, or counting them by 2's), write an equation to express an even number as a sum of two equal addends.
- Use addition to find the total number of objects arranged in rectangular arrays, with up to 5 rows and up to 5 columns, write an equation to express the total as a sum of equal addends.

Essential Question:

Students will be able to answer the question(s):

- Why do we have to know how to add and subtract fluently?
- What are strategies for finding addition and subtraction facts?
- How can sums and differences be found mentally?
- How can we put together and take apart numbers to understand word problems?
- What is the relationship between arrays and repeated addition?
- How can you determine whether a number is even or odd?
- How can you use number patterns to solve problems?

Essential Knowledge:

What are the key concepts/vocabulary/ideas that students will have mastery of by the completion of the unit?

- Addition and subtraction can be represented on various models
- Mental strategies help in solving problems quickly and accurately.
- Even numbered objects can be modeled using pairs or arrays.

