

Copy of Math Grade 2 - Module 1

Subject	Grade	Module	Suggested Timeline
Mathematics	2	1	3 weeks

Grade Level Summary

In grade 2, instructional time should focus on four critical areas: (1) extending understanding of base-ten notation; (2) building fluency with addition and subtraction; (3) using standard units of measure; and (4) describing and analyzing shapes and partitioning them into equal-sized pieces (halves, quarters and thirds) while developing an understanding that the more pieces in the whole, the smaller the piece.

Grade Level Modules

Module 1: Fluency of Sums and Differences to 20 and Word Problems to 100

Module 2: Addition? Subtraction with Length, Weight, Capacity, /Time Measurements

Module 3: Place Value, Counting, and Comparison of Numbers to 1000

Module 4: Addition and Subtraction of Numbers to 1000

Module 5: Preparation for Multiplication and Division

Module 6: Comparison, Addition and Subtraction with Length and Money

Module 7: Recognizing Angles, Faces, and Vertices of Shapes, Fractions of Shapes

Module Title

Module 1: Fluency of Sums and Differences to 20 and Word Problems to 100

Module Overview

Students start grade 2 with extensive experience working with numbers to 100. Module 1 establishes a motivating, differentiated fluency program in the first few weeks that will provide each student with enough practice to achieve mastery of the expected fluencies (i.e., adding and subtracting within 20 and within 1000) by the end of the year. Students learn to represent and solve problems using addition and subtraction: a practice that will also continue throughout the year.

Module Objectives

At the end of this module, students will be able to independently use their

learning to:

- Add and subtract numbers within 1000 in the context of one- and two-step word problems
- Fluently add and subtract within 20 using mental strategies
- Use place value understanding and properties of operations to add and subtract

Standards for Mathematical Practice

- MP# 1. Make sense of problems and persevere in solving them
- MP# 2. Reason abstractly and quantitatively
- MP# 3. Construct viable arguments and critique the reasoning of others
- MP# 5. Use appropriate tools strategically
- MP# 6. Attend to precision

[Mathematical Practices](#) resource page on SAS

Focus Standards Addressed in this Module

[CC.2.1.2.B.3](#)

Use place value understanding and properties of operations to add and subtract within 1000.

[CC.2.2.2.A.1](#)

Represent and solve problems involving addition and subtraction within 100.

Important Standards Addressed in this Module

[CC.2.2.2.A.2](#)

Use mental strategies to add and subtract within 20.

Misconceptions

1. Some students end their solution to a two-step problem after they complete the first step. They may have misunderstood the question or only focused on finding the first part of the problem.
2. Many children have misconceptions about the equal sign. Students can misunderstand the use of the equal sign even if they have proficient computational skills.

Proper Conceptions

1. Students need to check their work to see if their answer makes sense in terms of the problem situation. They need many opportunities to solve a variety of two-step problems and develop the habit of reviewing their solution after they think they have finished.
2. The equal sign means —is the same as, however, many primary students think that the equal sign

They might also be predisposed to think of equality in terms of calculating answers rather than as a relation because it is easier for young children to carry out steps to find an answer than to identify relationships among quantities.

3. Students might rely on a key word or phrase in a problem to suggest an operation that will lead to an incorrect solution. They might think that the word *left* always means that subtraction must be used to find a solution.
4. Students may think that when adding two two-digit numbers you must start at the ones place.

Adapted from the following resources compiled by M. Hancock: CCSS, Arizona DOE, Ohio DOE and North Carolina DOE.

tells you that the —answer is coming up. Students need to see examples of number sentences with an operation to the right of the equal sign and the answer on the left, so they do not overgeneralize from those limited examples.

3. Students need to solve problems where key words are contrary to such thinking. For example, the use of the word *left* does not indicate subtraction as a solution method: Debbie took the 8 stickers she no longer wanted and gave them to Anna. Now Debbie has 11 stickers *left*. How many stickers did Debbie have to begin with?

It is important that students avoid using key words to solve problems. The goal is for students to make sense of the problem and understand what it is asking them to do, rather than search for “tricks” and/or guess at the operation needed to solve the problem.

Help students see that numbers can be added in many different ways. When adding $29 + 43$, you can add them by saying $20 + 40 = 60$ and $9 + 3 = 12$ so $60 + 12 = 72$.

Concepts	Competencies	Vocabulary
<ul style="list-style-type: none"> • Place Value • Addition and Subtraction • Properties of Operations 	<ul style="list-style-type: none"> • Add up to four two-digit numbers using strategies based on place value and properties of operations. • Explain why addition and subtraction strategies work, using place value and the properties of operations. • Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20. 	<p>Addend Compose/decompose Place value Sum</p>

- Apply properties of operations as strategies to add and subtract (commutative property of addition; associative property of addition).

Assessment(s)

Assessments from the Math series as well as teacher created will be used.

Suggested Strategies to Support Design of Coherent Instruction

Formative Assessment Look-For should include:

- Can students use strategies to add and subtract or do they only count by ones?
- Can students solve equations with the equal sign in all positions?
- Can students pull out the important information from word problems in order to solve the problem?
- Can students determine whether their answer makes sense?

Explanations and Examples

Students should have ample experiences working on various types of problems that have unknowns in all positions, including:

- **Results Unknown:**

There are 29 students on the playground. Then 18 more students showed up. How many students are there now? ($29+18=$ __)

- **Change Unknown:**

There are 29 students on the playground. Some more students show up. There are now 47 students. How many students came? ($29+$ __= 47)

- **Start Unknown:**

There are some students on the playground. Then 18 more students came. There are now 47 students. How many students were on the playground at the beginning? ($+$ __ $+18=47$)

This standard also calls for students to solve one- and two-step problems using drawings, objects and equations. Students can use place value blocks or hundreds charts, or create drawings of place value blocks or number lines to support their work. Two step-problems include situations where students have to add and subtract within the same problem.

Example:

In the morning there are 25 students in the cafeteria. 18 more students come in. After a few minutes, some students leave. If there are 14 students still in the

cafeteria, how many students left the cafeteria? Write an equation for your problem. (EXPECT students to use *place value blocks (base 10)*, *number line*, *hundreds chart*, etc. to show, solve and explain their reasoning.) Word problems that are connected to students' lives can be used to develop fluency with addition and subtraction.

- **Take From (Result unknown):** David had 63 stickers. He gave 37 to Susan. How many stickers does David have now? $63 - 37 = \underline{\quad}$
- **Add To:** David had \$37. His grandpa gave him some money for his birthday. Now he has \$63. How much money did David's grandpa give him? $\$37 + \underline{\quad} = \63
- **Compare:** David has 63 stickers. Susan has 37 stickers. How many more stickers does David have than Susan? $63 - 37 = \underline{\quad}$ o Even though the modeling of the two problems above is different, the equation, $63 - 37 = \underline{\quad}$ can represent both situations (How many more do I need to make 63?)
- **Take From (Start Unknown):** David had some stickers. He gave 37 to Susan. Now he has 26 stickers. How many stickers did David have before? $\underline{\quad} - 37 = 26$

It is important to attend to the difficulty level of the problem situations in relation to the position of the unknown.

Result Unknown, Total Unknown, and Both Addends Unknown problems are the least complex for students.

The next level of difficulty includes Change Unknown, Addend Unknown, and Difference Unknown The most difficult are Start Unknown and versions of Bigger and Smaller Unknown (compare problems).

This standard focuses on developing an algebraic representation of a word problem through addition and subtraction. The intent is NOT to introduce traditional algorithms or rules, but to —make meaningll of operations.

Second graders should work on ALL problem types regardless of the level of difficulty. Mastery is expected in second grade. Students can use interactive whiteboard or document camera to demonstrate and justify their thinking.

Instructional Strategies

An efficient strategy is one that can be done mentally and quickly. 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. 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.

Have students study how numbers are related to the anchor numbers 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 $10+5=15$. Another example: After multiple experiences with ten-frames, when students add to 9, they mentally SEE 9, but THINK 10 and generalize that $9+8$ is the same thing as $10+7$. Then, apply this same thinking to $19+8$ is the same thing as $20+7$, and so on.

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. Provide simple word problems designed for students to invent and try a particular strategy as they solve it. Have students explain their strategies so their classmates can understand it. Guide the discussion so the focus is on the methods that are most useful. Encourage students to try the strategies that were shared so they can eventually adopt efficient strategies that work for them. 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.

Solving algebraic problems requires emphasizing the most crucial problem solving strategy—understands the situation.

Students now build on their work with one-step problems to solve two-step problems and model and represent their solutions with equations for all the situations mentioned above. The problems should involve sums and differences less than or equal to 100 using the numbers 0 to 100. It is important 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. Students should be given opportunities to represent their work in multiple ways, including explaining their work and justifying their answers. Ask students to write word problems for their classmates to solve. Start by giving students the answer to a problem. Then tell students whether it is an addition or subtraction problem situation. Also let them know that the sums and differences can be less than or equal to 100 using the numbers 0 to 100. For example, ask students to write an addition word problem for their classmates to solve which requires adding four two-digit numbers with 100 as the answer. Students then share, discuss and compare their solution strategies after they solve the problems.

Note: This section is not designed to provide a day-to-day lesson plan view; rather, it is offered as a guide to inform lesson planning.

Differentiation

Based on the individual needs of all students, changes will be made as necessary for optimal student

achievement.

Interdisciplinary Connections

A cross-curricular approach will be utilized during instruction.

Additional Resources

Links to resources that may support the content and/or instruction

- Current math series
- Supplemental materials

Created By

Mercer Elementary Staff

Copy of Math Grade 2 - Module 2

Subject	Grade	Module	Suggested Timeline
Mathematics	2	2	4 weeks

Grade Level Summary

In grade 2, instructional time should focus on four critical areas: (1) extending understanding of base-ten notation; (2) building fluency with addition and subtraction; (3) using standard units of measure; and (4) describing and analyzing shapes and partitioning them into equal-sized pieces (halves, quarters and thirds) while developing an understanding that the more pieces in the whole, the smaller the piece.

Grade Level Modules

Module 1: Fluency of Sums and Differences to 20 and Word Problems to 100

Module 2: Addition / Subtraction with Length, Weight, Capacity, /Time Measurements

Module 3: Place Value, Counting, and Comparison of Numbers to 1000

Module 4: Addition and Subtraction of Numbers to 1000

Module 5: Preparation for Multiplication and Division

Module 6: Comparison, Addition and Subtraction with Length and Money

Module 7: Recognizing Angles, Faces, and Vertices of Shapes, Fractions of Shapes

Module Title

Module 2: Addition and Subtraction with Length, Weight, Capacity, and Time Measurements

Module Overview

In Module 2, students learn to measure and estimate using standard units for length and solve measurement word problems involving addition and subtraction of length. A major objective is for students to use measurement tools with the understanding that linear measure involves an iteration of units and that the smaller a unit, the more iterations are necessary to cover a given length. An underlying goal for this module is for students to learn the meaning of a “unit” in different contexts (e.g., capacity, length, weight, and time). This understanding serves as the foundation of arithmetic, measurement, and geometry in elementary school. In particular, units play a central role in the next module and in the addition and subtraction algorithms of Module 4.

Module Objectives

At the end of this module, students will be able to independently use their learning to:

- Use measurement tools
- Understand a “unit” of measurement
- Solve word problems involving addition and subtraction of length
- Understand the relationship between the size of the unit and the number of units needed to cover a given length
- Understand when to estimate and when to use exact measurements
- Estimate lengths

Standards for Mathematical Practice

MP# 1. Make sense of problems and persevere in solving them

MP# 3. Construct viable arguments and critique the reasoning of others

MP# 5. Use appropriate tools strategically

MP# 6. Attend to precision

Focus Standards Addressed in this Module

CC.2.4.2.A.1

Measure and estimate lengths in standard units using appropriate tools.

CC.2.4.2.A.2

Tell and write time to the nearest five minutes using both analog and digital clocks.

CC.2.4.2.A.3

Solve problems and make change using coins and paper currency with appropriate symbols.

CC.2.4.2.A.6

Extend the concepts of addition and subtraction to problems involving length.

Important Standards Addressed in this Module

Misconceptions

1. When some students see standard rulers with numbers on the markings, they believe that the numbers are counting the marks instead of the units or spaces between the marks. Some students might think that they can only measure lengths with a

Proper Conceptions

1. Have students use informal or standard length units to make their own rulers by marking each whole unit with a number in the middle. They will see that the ruler is a representation of a row of units and focus on the spaces.
2. Provide situations where the ruler

- ruler starting at the left edge.
2. 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.
 3. Students may also focus on one attribute of a container when determining which container has more capacity.

- 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 9 inches to adjust for where the measurement started.
3. 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 on real or geared manipulative clocks.
 4. Provide opportunities for students to explore containers of different sizes and shapes when determining capacity.

Adapted from the following resources compiled by M. Hancock: CCSS, Arizona DOE, Ohio DOE and North Carolina DOE.

Concepts	Competencies	Vocabulary
<ul style="list-style-type: none"> • Time and Money • Measurement • Addition and Subtraction 	<ul style="list-style-type: none"> • Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes. • Measure the same length with different-sized units then discuss the measurement made with the smaller unit is more than the measurement made with the larger unit and vice versa. • 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. • Tell and write time from analog and digital clocks to the nearest five minutes. 	<p>Analog/digital Compose/decompose A.m., p.m. Estimate, inch, feet, centimeter, meter, Money – dollar, quarter, dime, nickel, penny</p>

- Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units by using drawings 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.

Assessment(s)

Assessments from the current math series as well as teacher created will be used.

Suggested Strategies to Support Design of Coherent Instruction

Formative Assessment Look-For should include:

- Do students use ruler correctly?
- Do students confuse hour and minute hand?
- Can students estimate measurements reasonably (time, length, capacity)?

Measurement calls for students to measure the length of objects in both customary (inches and feet) and metric (centimeters and meters). Students should have ample experiences choosing objects, identifying the appropriate tool and unit, and then measuring the object. The teacher should allow students to determine which tools and units to use.

Foundational understandings to help with measure concepts:

- Understand that larger units can be subdivided into equivalent units (partition).
- Understand that the same unit can be repeated to determine the measure (iteration).
- Understand the relationship between the size of a unit and the number of units needed (compensatory principal).

Students in second grade will build upon what they learned in first grade from measuring length with non-standard units to the new skill of measuring length

in metric and U.S. Customary with standard units of measure. They should have many experiences measuring the length of objects with rulers, yardsticks, meter sticks, and tape measures. They will need to be taught how to actually use a ruler appropriately to measure the length of an object especially as to where to begin the measuring. It is important to help students locate the starting point on the measuring instrument, especially when some have a protected edge. Asking students such as: —Do you start at the end of the ruler or at the zero? Helps them focus on where to start on the instrument.

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. 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. 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.

The standards also call for students to estimate the lengths of objects using inches, feet, centimeters, and meters. Students should make estimates after seeing a benchmark unit, such as the length of one inch, before making their estimate.

Look at your ruler to see how long one inch is. Now, estimate the length of this paper in inches. Estimation helps develop familiarity with the specific unit of measure being used. To measure the length of a shoe, knowledge of an inch or a centimeter is important so that one can approximate the length in inches or centimeters. Students should begin practicing estimation with items which are familiar to them (length of desk, pencil, favorite book, etc.). Students need experience working with addition and subtraction to solve word problems which include measures of length. It is important that word problems stay within the same unit of measure. Counting on and/or counting back on a number line will help tie this concept to previous knowledge. Some representations students can use include drawings, number lines, rulers, pictures, and/or physical objects.

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 have them mark and label a line on paper with whole-number units that are equally spaced and relevant to the addition or subtraction problem. Then have them show the addition or subtraction using curved lines segments above the number line and between the numbers marked on the number line. For $49 + 5$, 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

Students need to be able to tell and write time after reading analog and digital clocks. Time should be to 5 minute intervals, and students should also use the terms a.m. and p.m. Teachers should help students make the connection between skip counting by 5s and telling time on an analog clock. In first grade, students learned to tell time to the nearest hour and half-hour. Students build on this understanding in second grade by skip-counting by 5 to recognize 5-minute intervals on the clock. They need exposure to both digital and analog clocks. It is important that they can recognize time in both formats and communicate their understanding of time using both numbers and language. Common time phrases include the following: quarter till ____, quarter after ____, ten till ____, ten after ____, and half past ____. Students should understand that there are 2 cycles of 12 hours in a day - a.m. and p.m. Recording their daily actions in a journal would be helpful for making real-world connections and understanding the difference between these two cycles.

Note: This section is not designed to provide a day-to-day lesson plan view; rather, it is offered as a guide to inform lesson planning.

Differentiation

Based on the individual needs of all students, changes will be made as necessary for optimal student achievement.

Interdisciplinary Connections

A cross-curricular approach will be utilized during instruction.

Additional Resources

Links to resources that may support the content and/or instruction

- **current math series**
- **Supplemental materials**

Created By

Mercer Elementary Staff

Copy of Math Grade 2 - Module 3

Subject	Grade	Module	Suggested Timeline
Mathematics	2	3	5 weeks

Grade Level Summary

In grade 2, instructional time should focus on four critical areas: (1) extending understanding of base-ten notation; (2) building fluency with addition and subtraction; (3) using standard units of measure; and (4) describing and analyzing shapes and partitioning them into equal-sized pieces (halves, quarters and thirds) while developing an understanding that the more pieces in the whole, the smaller the piece.

Grade Level Modules

Module 1: Fluency of Sums and Differences to 20 and Word Problems to 100

Module 2: Addition /Subtraction with Length, Weight, Capacity, / Time Measurements

Module 3: Place Value, Counting, and Comparison of Numbers to 1000

Module 4: Addition and Subtraction of Numbers to 1000

Module 5: Preparation for Multiplication and Division

Module 6: Comparison, Addition and Subtraction with Length and Money

Module 7: Recognizing Angles, Faces, and Vertices of Shapes, Fractions of Shapes

Module Title

Module 3: Place Value, Counting, and Comparison of Numbers to 1000

Module Overview

All arithmetic algorithms are manipulations of place value units: ones, tens, hundreds, etc. In Module 3 students extend their understanding of base-ten notation and apply their understanding of place value to count and compare numbers to 1000. In Grade 2 the place value units move from a proportional model to a non-proportional number disk model (see picture). The place value table with number disks is one tool that can be used in grade 2 and beyond for modeling very large numbers and decimals, thus providing students greater facility with and understanding of mental math and algorithms.

Module Objectives

At the end of this module, students will be able to independently use their learning to:

- Count numbers to 1000 by ones, 2s, 5s, 10s, and 100s
- Represent numbers to 1000 using concrete models, drawings, words, and numbers
- Compare numbers to 1000

Standards for Mathematical Practice

MP# 2. Reason abstractly and quantitatively

MP# 7. Look for and make use of structure

MP# 8. Look for and express regularity in repeated reasoning

Focus Standards Addressed in this Module

CC.2.1.2.B.1

Use place value concepts to represent amounts of tens and ones and to compare three digit numbers.

CC.2.1.2.B.2

Use place value concepts to read, write, and skip count to 1000.

Important Standards Addressed in this Module

Misconceptions

1. 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. They may also not think of 358 as 2 hundreds, 15 tens, and 8 ones, or other combinations.
2. Students may think that the 4 in 46 represents 4, not 40. When adding two-digit numbers, some students might start with the digits in the ones place and record the entire sum. Then they add the digits in the tens place and record this sum. Assess students' understanding of *a ten* and provide more experiences

Proper Conceptions

1. 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*. Decomposing a number in various ways helps children be more flexible in their thinking.
2. Students need many experiences representing two- and three-digit numbers with manipulatives that group (base ten blocks) and those that do NOT group, such as counters, etc.
3. Assess students' understanding of *a ten* and provide more experiences modeling

modeling addition with grouped and pregrouped base-ten materials as mentioned above.

subtraction with grouped and pregrouped base-ten materials.

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

Concepts	Competencies	Vocabulary
<ul style="list-style-type: none"> • Place Value 	<ul style="list-style-type: none"> • Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones. • Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using $>$, $=$, and $<$ symbols to record the results of comparisons. • 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. 	<p>Compose/decompose Equivalent, place value, hundreds Expanded form</p>

Assessment(s)

Assessments from the current math series as well as teacher created will be used.

Suggested Strategies to Support Design of Coherent Instruction

Formative Assessment Look-For should include:

- Can students skip count by 2s, 5s, 10s, and 100s?
- Can students represent three-digit numbers with concrete objects, drawings, numbers, and words?
- Can students read and write numbers to 1000?
- Can students compare numbers to 1000?

Explanations and Examples/ Instructional Strategies

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.

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.

Note: This section is not designed to provide a day-to-day lesson plan view; rather, it is offered as a guide to inform lesson planning.

Differentiation

Based on the individual needs of all students, changes will be made as necessary for optimal student achievement.

Interdisciplinary Connections

A cross-curricular approach will be utilized during instruction.

Additional Resources

Links to resources that may support the content and/or instruction

- current math series
- Supplemental materials

Created By

Mercer Elementary Staff

Copy of Math Grade 2 - Module 4

Subject	Grade	Module	Suggested Timeline
Mathematics	2	4	7 weeks

Grade Level Summary

In grade 2, instructional time should focus on four critical areas: (1) extending understanding of base-ten notation; (2) building fluency with addition and subtraction; (3) using standard units of measure; and (4) describing and analyzing shapes and partitioning them into equal-sized pieces (halves, quarters and thirds) while developing an understanding that the more pieces in the whole, the smaller the piece.

Grade Level Modules

Module 1: Fluency of Sums and Differences to 20 and Word Problems to 100

Module 2: Addition / Subtraction with Length, Weight, Capacity, / Time Measurements

Module 3: Place Value, Counting, and Comparison of Numbers to 1000

Module 4: Addition and Subtraction of Numbers to 1000

Module 5: Preparation for Multiplication and Division

Module 6: Comparison, Addition and Subtraction with Length and Money

Module 7: Recognizing Angles, Faces, and Vertices of Shapes, Fractions of Shapes

Module Title

Module 4: Addition and Subtraction of Numbers to 1000

Module Overview

In Module 4, students continue to work with place value units to understand the addition and subtraction algorithms of numbers up to 1000. This work deepens their understanding of base-ten, place value, and properties of operations. It also challenges them to apply their knowledge to one-step and two-step word problems. During this module, students also continue to develop one of the required fluencies of the grade: addition and subtraction within 100.

Module Objectives

At the end of this module, students will be able to independently use their learning to:

- Represent and solve addition and subtraction problems, including word problems, within 1000
- Use place value and properties of operations to find sums and differences
- Improve fluency with addition and subtraction within 100
- Mentally add and subtract within 20

Standards for Mathematical Practice

MP# 1. Make sense of problems and persevere in solving them

MP# 2. Reason abstractly and quantitatively

MP# 3. Construct viable arguments and critique the reasoning of others

MP# 4. Model with mathematics

MP# 5. Use appropriate tools strategically

MP# 8. Look for and express regularity in repeated reasoning

Focus Standards Addressed in this Module

CC.2.1.2.B.3

Use place value understanding and properties of operations to add and subtract within 1000.

CC.2.2.2.A.1

Represent and solve problems involving addition and subtraction within 100.

CC.2.2.2.A.2

Use mental strategies to add and subtract within 20.

Important Standards Addressed in this Module

Misconceptions

1. Students may overgeneralize the idea that answers to addition problems must be greater. Adding 0 to any number results in a sum that is equal to that number. Provide word problems involving 0 and have students model using drawings with an empty space for 0.
2. 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.

Proper Conceptions

1. 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 should be expected to explain why they chose that strategy then show how to use it.
2. 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*.

Concepts	Competencies	Vocabulary
<ul style="list-style-type: none"> • Place Value • Addition and Subtraction • Properties of Operations 	<ul style="list-style-type: none"> • Add up to four two-digit numbers using strategies based on place value and properties of operations. • Add and subtract within 1000. • 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. • Explain why addition and subtraction strategies work, using place value and the properties of operations. • Use addition and subtraction within 100 to solve one- and two-step word problems by using drawings and equations with a symbol for the unknown number to represent the problem. • Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20. • Add and subtract within 20. Use strategies such as counting on; making ten; decomposing a number leading to a ten; using the relationship between addition and subtraction; and creating equivalent but easier or known sums. • Apply properties of operations as strategies to add and subtract (commutative property of 	<p>Addend Compose/decompose Equation Equivalent Place value Sum, hundreds, expanded form</p>

- addition; associative property of addition).
- Understand subtraction as an unknown-addend problem. For example, subtract $10 - 8$ by finding the number that makes 10 when added to 8.

Assessment(s)

Assessments from the current math series as well as teacher created will be used.

Suggested Strategies to Support Design of Coherent Instruction

Formative Assessment Look-For should include:

- Can students represent and solve addition and subtraction problems, including word problems, using concrete objects, equations, and drawings?
- Can students find sums and differences using properties of operations?
- Can students add and subtract mentally within 20?

Explanations and Examples

Students now build on their work with one-step problems to solve two-step problems and model and represent their solutions with equations for all the situations. The problems should involve sums and differences less than or equal to 100 using the numbers 0 to 100. It is important 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 1000 using the numbers 0 to 1000. For example, ask students to write an addition word problem for their classmates to solve which requires adding four two-digit numbers with 1000 as the answer. Students then share, discuss and compare their solution strategies after they solve the problems.

Note: This section is not designed to provide a day-to-day lesson plan view; rather, it is offered as a guide to inform lesson planning.

Differentiation

Based on the individual needs of all students, changes will be made as necessary for optimal student achievement.

Interdisciplinary Connections

A cross-curricular approach will be utilized during instruction.

Additional Resources

Links to resources that may support the content and/or instruction

- *current math series*
- *Supplemental materials*

Created By

Mercer Elementary Staff

Copy of Math Grade 2 - Module 5

Subject	Grade	Module	Suggested Timeline
Mathematics	2	5	7 weeks

Grade Level Summary

In grade 2, instructional time should focus on four critical areas: (1) extending understanding of base-ten notation; (2) building fluency with addition and subtraction; (3) using standard units of measure; and (4) describing and analyzing shapes and partitioning them into equal-sized pieces (halves, quarters and thirds) while developing an understanding that the more pieces in the whole, the smaller the piece.

Grade Level Modules

Module 1: Fluency of Sums and Differences to 20 and Word Problems to 100

Module 2: Addition / Subtraction with Length, Weight, Capacity, / Time Measurements

Module 3: Place Value, Counting, and Comparison of Numbers to 1000

Module 4: Addition and Subtraction of Numbers to 1000

Module 5: Preparation for Multiplication and Division

Module 6: Comparison, Addition and Subtraction with Length and Money

Module 7: Recognizing Angles, Faces, and Vertices of Shapes, Fractions of Shapes

Module Title

Module 5: Preparation for Multiplication and Division

Module Overview

In Module 5, students extend their understanding of a unit to build the foundation for multiplication and division. Making equal groups of “four apples each” establishes the unit “four apples” (or just four) that can then be counted: 1 four, 2 fours, 3 fours, etc. Relating the new unit to the one used to create it develops the idea of multiplication: 3 groups of 4 apples equal 12 apples (or 3 fours are 12).

Module Objectives

At the end of this module, students will be able to independently use their learning to:

- Make equal groups of objects and count them
- Partition a set into equal groups
- Arrange a group of objects into an array

Standards for Mathematical Practice

MP# 2. Reason abstractly and quantitatively

MP# 3. Construct viable arguments and critique the reasoning of others

MP# 7. Look for and make use of structure

MP# 8. Look for and express regularity in repeated reasoning

Focus Standards Addressed in this Module

CC.2.2.A.3

Work with equal groups of objects to gain foundations for multiplication.

Important Standards Addressed in this Module

Misconceptions

1. Students may not fully understand the relationship between multiplication and addition (Mulligan & Mitchelmore, 1997) and may persist in counting.
2. Only gradually do students learn that the number of units in a rectangular array can be calculated from the number of units in each row and column.

Proper Conceptions

1. Students need to begin by seeing the connection between equal groups and repeated addition in order to build the connection between repeated addition and multiplication.
2. The rectangular array is a powerful tool for multiplication and students need many opportunities to connect the number of units to the total in the rows and columns.

Concepts

- Equal Groups of Objects

Competencies

- Determine whether a group of objects (up to 20) has an odd or even number of members and 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

Vocabulary

**Addend, equation, equivalent, sum
Odd
Even**

addends.

Assessment(s)

Assessments from the current math series as well as teacher created will be used.

Suggested Strategies to Support Design of Coherent Instruction

Formative Assessment Look-For should include

Explanations and Examples:

Students need to understand that a collection of objects can be one thing or one 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 that will have some objects remaining 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).

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

Build on knowledge of composing and decomposing numbers to investigate arrays with up to 5 rows and up to 5 columns in different orientations. For example, form an array with 3 rows and 4 objects in each row. Represent the total number of objects with equations showing a sum of equal addends two different ways: by rows, $12 = 4 + 4 + 4$; by columns, $12 = 3 + 3 + 3 + 3$. Show that by rotating the array 90° to form 4 rows with 3 objects in each row. Write two different equations to represent 12 as a sum of equal addends: by rows, $12 = 3 + 3 + 3 + 3$; by columns, $12 = 4 + 4 + 4$. Have students discuss this statement and explain their reasoning: The two arrays are different and yet the same.

Ask students to think of a full ten-frame showing 10 circles as an array. One view of the ten-frame is 5 rows with 2 circles in each row. Students count by rows to 10 and write the equation $10 = 2 + 2 + 2 + 2 + 2$. Then students put two full ten-frame together end-to-ends so they form 10 rows of 2 circles or (10 columns of 2 circles). They use this larger array to count by 2s up to 20 and write an equation that shows 20 equal to the sum of ten 2s.

Note: This section is not designed to provide a day-to-day lesson plan view; rather, it is offered as a guide to inform lesson planning.

Differentiation

Based on individual needs of all students, changes will be made as necessary for optimal student achievement.

Interdisciplinary Connections

A cross-curricular approach will be utilized during instruction.

Additional Resources

Links to resources that may support the content and/or instruction

- Current math series
- Supplemental materials

Created By

Mercer Elementary Staff

Copy of Math Grade 2 - Module 6

Subject	Grade	Module	Suggested Timeline
Mathematics	2	6	6 weeks

Grade Level Summary

In grade 2, instructional time should focus on four critical areas: (1) extending understanding of base-ten notation; (2) building fluency with addition and subtraction; (3) using standard units of measure; and (4) describing and analyzing shapes and partitioning them into equal-sized pieces (halves, quarters and thirds) while developing an understanding that the more pieces in the whole, the smaller the piece.

Grade Level Modules

Module 1: Fluency of Sums and Differences to 20 and Word Problems to 100

Module 2: Addition / Subtraction with Length, Weight, Capacity, / Time Measurements

Module 3: Place Value, Counting, and Comparison of Numbers to 1000

Module 4: Addition and Subtraction of Numbers to 1000

Module 5: Preparation for Multiplication and Division

Module 6: Comparison, Addition and Subtraction with Length and Money

Module 7: Recognizing Angles, Faces, and Vertices of Shapes, Fractions of Shapes

Module Title

Module 6: Comparison, Addition and Subtraction with Length and Money

Module Overview

Module 6 provides another opportunity for students to practice their algorithms and problem-solving skills with perhaps the most well-known, interesting units of all: dollars, dimes, and pennies. Measuring and estimating length is revisited in this module in the context of units from both the customary system (e.g., inches and feet) and the Metric System (e.g., centimeters and meters). As they study money and length, students represent data given by measurement and money data using picture graphs, bar graphs, and line plots.

Module Objectives

At the end of this module, students will be able to independently use their

learning to:

- Measure and estimate length in both customary and metric units
- Add lengths
- Solve addition and subtraction problems involving money
- Represent data given by measurement and money data using graphs
- Improve fluency with addition and subtraction

Standards for Mathematical Practice

MP# 1: Make sense of problems and persevere in solving them

MP# 2. Reason abstractly and quantitatively

MP# 4. Model with mathematics

MP# 5. Use appropriate tools strategically

MP# 8. Look for and express regularity in repeated reasoning

Focus Standards Addressed in this Module

CC.2.4.2.A.1

Measure and estimate lengths in standard units using appropriate tools.

CC.2.4.2.A.3

Solve problems and make change using coins and paper currency with appropriate symbols.

CC.2.4.2.A.4

Represent and interpret data using line plots, picture graphs, and bar graphs.

CC.2.4.2.A.6

Extend the concepts of addition and subtraction to problems involving length.

Important Standards Addressed in this Module

Misconceptions

1. 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.
2. Some students might think that they can only measure lengths with a ruler starting at the left edge.
3. Students might overgeneralize the value of coins when they count them. They might count

Proper Conceptions

1. Have students use informal or standard length units to make their own rulers by marking each whole unit with a number in the middle. They will see that the ruler is a representation of a row of units and focus on the spaces.
2. 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

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.

4. Sometimes students will record twenty-nine dollars as 29\$. Remind them that the dollar sign goes in front. The cent sign goes after the number and there is no decimal point used with the cent sign.
5. The attributes for the same kind of object can vary. This will cause equal values in an object graph to appear unequal. For example, when making an object graph using shoes for boys and girls, five adjacent boy shoes would likely appear longer than five adjacent girl shoes.

students must subtract 2 inches from the 9 inches to adjust for where the measurement started.

3. 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.
4. Notation takes time to develop. Just keep reminding students of the correct way to use the notation.
5. To standardize the objects, place the objects on the same-sized construction paper or sticky-note, then make the object graph.

Concepts	Competencies	Vocabulary
<ul style="list-style-type: none"> • Measurement • Time and Money • Represent and Interpret Data • Addition and Subtraction 	<ul style="list-style-type: none"> • Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes. • Measure the same length with different-sized units then discuss the measurement made with the smaller unit is more than the measurement made with the larger unit and vice versa. • 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. • Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using \$ and 	<p>Addend, equation, equivalent, line plot, Sum, picture graph, bar graph, inch, feet Centimeter, meter, dollar, quarter, dime, nickel, penny</p>

- **¢ symbols appropriately.**
- **Make a line plot to show measurement data of the lengths of several objects to the nearest whole-number unit.**
- **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 the graph.**
- **Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units by using drawings 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.**

Assessment(s)

Assessments from the math series as well as teacher created will be used.

Suggested Strategies to Support Design of Coherent Instruction

Formative Assessment Look-For should include:

- **Can students measure accurately?**
- **Can students add lengths and use the appropriate units as labels?**
- **Can students add and subtract money?**
- **Can students represent data on a graph?**

Explanations and Examples

Instructional Strategies

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.

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. 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.

Connect the whole-number units on rulers, yardsticks, meter sticks and measuring tapes to number lines showing whole-number units starting at 0. Use these measuring tools to model different representations for whole-number sums and differences less than or equal to 100 using the numbers 0 to 100. Use the meter stick to view units of ten (10 cm) and hundred (100 cm), and to skip count by 5s and 10s. 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 have them mark and label a line on paper with whole-number units that are equally spaced and relevant to the addition or subtraction problem. Then have them show the addition or subtraction using curved lines segments above the number line and between the numbers marked on the number line. For $49 + 5$, 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.

The topic of money begins at Grade 2 and builds on the work in other clusters in this and previous grades. Help students learn money concepts and solidify

their understanding of other topics by providing activities where students make connections between them. For instance, link the value of a dollar bill as 100 cents to the concept of 100 and counting within 1000. Use play money - nickels, dimes, and dollar bills to skip count by 5s, 10s, and 100s. Reinforce place value concepts with the values of dollar bills, dimes, and pennies.

Students use the context of money to find sums and differences less than or equal to 100 using the numbers 0 to 100. They add and subtract to solve one- and two-step word problems involving money situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions. Students use drawings and equations with a symbol for the unknown number to represent the problem. The dollar sign, \$, is used for labeling whole-dollar amounts without decimals, such as \$29. Students need to learn the relationships between the values of a penny, nickel, dime, quarter and dollar bill.

Line plots are useful tools for collecting data because they show the number of things along a numeric scale. The line plot is 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.

At first students should create real object or picture graphs (where the object is drawn rather than a number). On picture graphs record the number 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.

Note: This section is not designed to provide a day-to-day lesson plan view; rather, it is offered as a guide to inform lesson planning.

Differentiation

Based on the individual needs of all students, changes will be made as necessary for optimal student achievement.

Interdisciplinary Connections

A cross-curricular approach will be utilized when teaching.

Additional Resources

Links to resources that may support the content and/or instruction

- current math series
- Supplemental Materials

Created By

Mercer Elementary Staff

Copy of Math Grade 2 - Module 7

Subject	Grade	Module	Suggested Timeline
Mathematics	Mathematics	7	4 weeks

Grade Level Summary

In grade 2, instructional time should focus on four critical areas: (1) extending understanding of base-ten notation; (2) building fluency with addition and subtraction; (3) using standard units of measure; and (4) describing and analyzing shapes and partitioning them into equal-sized pieces (halves, quarters and thirds) while developing an understanding that the more pieces in the whole, the smaller the piece.

Grade Level Modules

Module 1: Fluency of Sums and Differences to 20 and Word Problems to 100

Module 2: Addition / Subtraction with Length, Weight, Capacity, /Time Measurements

Module 3: Place Value, Counting, and Comparison of Numbers to 1000

Module 4: Addition and Subtraction of Numbers to 1000

Module 5: Preparation for Multiplication and Division

Module 6: Comparison, Addition and Subtraction with Length and Money

Module 7: Recognizing Angles, Faces, and Vertices of Shapes, Fractions of Shapes

Module Title

Module 7: Recognizing Angles, Faces, and Vertices of Shapes, Fractions of Shapes

Module Overview

Students finish grade 2 by describing and analyzing shapes in terms of their sides and angles. In Module 7, students investigate, describe, and reason about the composition and decomposition of shapes to form other shapes. Through building, drawing, and analyzing two- and three-dimensional shapes, students develop a foundation for understanding area, volume, congruence, similarity, and symmetry in later grades.

Module Objectives

At the end of this module, students will be able to independently use their

learning to:

- Identify, describe, and draw triangles, quadrilaterals, pentagons, and hexagons
- Recognize that equal shares of identical wholes need not have the same shape
- Partition circles and rectangles into two, three, or four equal shares
- Recognize and draw shapes having specified attributes, such as a given number of angles or equal faces

Standards for Mathematical Practice

MP# 2. Reason abstractly and quantitatively

MP# 3. Construct viable arguments and critique the reasoning of others

MP# 4. Model with mathematics

MP# 6. Attend to precision

Focus Standards Addressed in this Module

[CC.2.3.2.A.1](#)

Analyze and draw two- and three-dimensional shapes having specified attributes.

[CC.2.3.2.A.2](#)

Use the understanding of fractions to partition shapes into halves, quarters, and thirds.

Important Standards Addressed in this Module

Misconceptions

1. 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.
2. Students also may believe that a region model represents one out of two, three or four fractional parts without regard to the fact that the parts have to be equal shares, e.g., a circle divided by two equally spaced horizontal lines represents three thirds.

Proper Conceptions

1. This is why is it so important to have young students handle shapes and physically feel that the shape does not change regardless of the orientation, as illustrated below.
2. Show students examples and non-examples and have them explain why the shares are or are not equal.

Concepts

- Shape Attributes

Competencies

- Recognize and draw

Vocabulary

- Fractions
 - shapes having specified attributes. Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.
 - Partition circles and rectangles into two, three, or four equal shares, recognize that equal shares of identical wholes need not have the same shape.
- Compose/ decompose
Pentagon
Quadrilateral
Thirds, fourths, halves,
faces,
Angles, hexagon**

Assessment(s)

Assessments from the current math series as well as teacher created will be used.

Suggested Strategies to Support Design of Coherent Instruction

Formative Assessment Look-For should include:

- Can students partition circles and rectangles into two, three, and four equal parts?
- Can students identify shapes having specified attributes, such as a given number of angles?
- Can students identify, describe, and draw triangles, quadrilaterals, pentagons, and hexagons?
- Can students recognize that equal shares of identical wholes need not have the same shape?
- Can students identify, describe, and draw triangles, quadrilaterals, pentagons, and hexagons.

Explanations and Examples
Instructional Strategies

Students in Grade 2 benefit from the following instructional strategies:

- providing opportunities to manipulate, draw, construct, and represent (e.g., on a geoboard) two-dimensional shapes;
- providing experiences in constructing and manipulating shapes on a computer (e.g., using the drawing tools in KidPix or AppleWorks/Clarworks);
- having them identify triangles, quadrilaterals, pentagons, hexagons, heptagons, and octagons by counting the number of sides or the number of vertices. Examples should include regular and irregular polygons;
- discussing characteristics of two-dimensional shapes and three-dimensional figures so that students develop the concepts and language related to geometric properties;
- providing opportunities to locate and describe examples of two-dimensional shapes and three-dimensional figures in the

environment;

- providing many experiences in sorting and classifying two-dimensional shapes (e.g., according to number of sides or vertices) and three-dimensional figures (e.g., according to the shapes of faces), and in discussing why a shape or figure belongs or does not belong to a certain category;
- having them describe the similarities and differences between two two-dimensional shapes or two three-dimensional figures;
- providing experiences in constructing models of three-dimensional figures using materials (e.g., modeling clay, cardboard cut-outs, and Polydron pieces), and in describing the two-dimensional faces of three-dimensional figures;
- providing experiences in constructing the skeletons of prisms and pyramids using such materials as drinking straws and toothpicks;
- using games that focus students' attention on the properties of two-dimensional shapes and three-dimensional figures. Examples of games include:

– *Guess My Shape/Figure.* In this game, students listen to a description of a two-dimensional shape or a three-dimensional figure and try to identify it. For example, a teacher might use this description: “My figure has two circular faces and a curved surface. What is my figure?”

– *Guess My Rule.* After the teacher or a student has sorted a collection of two-dimensional shapes or three-dimensional figures, students observe the sorted shapes or figures and try to determine the sorting rule.

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.

Note: This section is not designed to provide a day-to-day lesson plan view; rather, it is offered as a guide to inform lesson planning.

Differentiation

Based on the individual needs of all students, changes will be made as necessary for optimal student achievement.

Interdisciplinary Connections

A cross-curricular approach will be utilized during instruction.

Additional Resources

Links to resources that may support the content and/or instruction

- current math series
- Supplemental Materials

Created By

Mercer Elementary Staff