Copy of Math Grade 1 - Module 1

Subject	Grade	Module	Suggested Timeline
Mathematics	1	1	9 weeks

Grade Level Summary

In grade1, instructional time should focus on four critical areas: (1) developing understanding of addition, subtraction, and strategies for addition and subtraction within 20; (2) developing understanding of whole number relationships and place value, including grouping in tens and ones; (3) developing understanding of linear measurement and measuring lengths as iterating length units; and (4) reasoning about attributes of, and composing and decomposing geometric shapes.

Grade Level Modules

Module 1: Addition and Subtraction of Numbers to 10 and Fluency
Module 2: Place Value, Comparison, Addition and Subtraction of Numbers to 20
Module 3: Ordering / Expressing Length Measurements as Numbers and Telling Time
Module 4: Place Value, Comparison, Addition and Subtraction of Numbers to 40
Module 5: Identify, Compose, and Partition Shapes
Module 6: Place Value, Comparison, Addition and Subtraction of numbers to 100

Module Title

Module 1: Addition and Subtraction of Numbers to 10 and Fluency

Module Overview

In grade 1, work with numbers to 10 continues to be a major stepping-stone in learning the place value system. In Module 1, students work to build fluency with addition and subtraction facts—a major gateway to later grades. Students begin right away with the intention of energetically practicing the entire year. The next major stepping-stone in understanding place value is learning to group “10 ones” as a single unit: 1 ten.

Module Objectives

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

- **Use addition and subtraction within 10 to model and solve word problems using objects, drawings, and equations**
- **Solve word problems with unknowns in different positions**
- **Add and subtract within 20, demonstrating fluency for addition and subtraction within 10**

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# 6. Use appropriate tools strategically
MP# 7. Attend to precision

Mathematical Practices resource page on SAS

Focus Standards Addressed in this Module

CC.2.2.1.A.1

Represent and solve problems involving addition and subtraction within 20.

Important Standards Addressed in this Module

Misconceptions

1. **Many children misunderstand the meaning of the equal sign. The equal sign means —is the same as, but most primary students believe the equal sign tells you that the —answer is coming up to the right of the equal sign. This misconception is over-generalized by only seeing examples of number sentences with an operation to the left of the equal sign and the answer on the right.**
2. **A second misconception that many students have is that it is valid to assume that a key word or phrase in a problem suggests**

Proper Conceptions

1. **First graders need to see equations written multiple ways, for example 5 + 7 = 12 & 12 = 5 + 7.**
2. **Providing problems in which key words like this are used to represent different operations is essential. For example, the use of the word *left* in this problem does not indicate subtraction as a solution method: Jose took the 8 stickers he no longer wanted and gave them to Anna. Now Jose has 11 stickers *left*. How many stickers did Jose have to begin with? Students need to analyze word problems and avoid using**

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.

key words to solve them.

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

Concepts	Competencies	Vocabulary
• Addition and Subtraction	• Use addition and subtraction within 20 to solve word problems by using objects, drawings, and equations with a symbol for the unknown number to represent the problem. • 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. • Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20.	Addend Counting on Compose/decompose Making ten, sum, ones, tens Less than Greater than Equal to Addition, subtraction

Assessment(s)

Suggested Strategies to Support Design of Coherent Instruction

Formative Assessment Look-For should include:

- **Which strategies do students use to add and subtract: counting all, counting on, making 10, and using doubles?**
- **Do students "make sense" of word problems? Do they know what information to use and which operation to use?**
- **Do students understand that adding is putting together and subtracting is taking away, taking apart, or comparing?**
- **Do students understand the relationship between missing addend and subtraction?**
- **Do students represent their work in multiples ways, e.g., drawings, objects, and/or numbers?**

Students will build on the work they did in in Kindergarten by using a variety of mathematical representations (e.g., objects, drawings, and equations) during their work. The unknown symbols should include boxes or pictures, and not letters.

Teachers should be cognizant of the three types of addition and subtraction problems: Result Unknown, Change Unknown, and Start Unknown.

Use informal language (and, minus/subtract, the same as) to describe joining situations (putting together) and separating situations (breaking apart).

Use the addition symbol (+) to represent joining situations, the subtraction symbol (-) to represent separating situations, and the equal sign (=) to represent a relationship regarding quantity between one side of the equation and the other.

A helpful strategy is for students to recognize sets of objects in common patterned arrangements (0-6) to tell how many without counting (subtizing).

Contextual problems that are closely connected to students' lives should be used to develop fluency with addition and subtraction. Students use objects or drawings to represent the different situations.

- **Take From example: Abel has 9 balls. He gave 3 to Susan. How many balls does Abel have now?**
- **Compare example: Abel has 9 balls. Susan has 3 balls. How many more balls does Abel have than Susan? A student will use 9 objects to represent Abel's 9 balls and 3 objects to represent Susan's 3 balls. Then they will compare the 2 sets of objects.**

Note that even though the modeling of the two problems above is different, the equation, 9 - 3 =? Can represent both situations yet the compare example can also be represented by 3 +? = 9 (How many more do I need to make 9?)

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).

Result Unknown: **There are 9 students on the playground. Then 8 more students showed up. How many students are there now? 9 + 8 = __.**

Change Unknown: There are 9 students on the playground. Some more students showed up. There are now 17 students. How many students came? 9 + __ = 17

Start Unknown: Here are some students on the playground. Then 8 more students came. There are now 17 students. How many students were on the

playground in the beginning? ___ + 8 = 17.

Instructional Strategies

As emphasized in the Standards for Mathematical Practice, teachers should provide opportunities for students to participate in shared problem-solving activities to solve word problems. Collaborate in small groups to develop problem-solving strategies using a variety of models such as drawings, words, and equations with symbols for the unknown numbers to find the solutions. Additionally students need the opportunity to explain, write, and reflect on their problem-solving strategies. The situations for the addition and subtraction story problems should involve sums and differences less than or equal to 20 using the numbers 0 to 20.

Students need the opportunity of writing and solving story problems involving three addends with a sum that is less than or equal to 20. For example, each student writes or draws a problem in which three whole things are being combined.

Literature is a wonderful way to incorporate problem-solving in a context that young students can understand. Many literature books that include mathematical ideas and concepts have been written in recent years. For Grade 1, the incorporation of books that contain a problem situation involving addition and subtraction with numbers 0 to 20 should be included in the curriculum.

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

Interdisciplinary Connections

Additional Resources

- **Math Lab**
- **Go Math Standards Practice Book**
- **Literature**
- **Manipulatives**
- **Resource Books from Houghton Mifflin Math**
- **Teacher Created Activities**
- **Work Station Activities**

Created By

First Grade Team

Copy of Math Grade 1 - Module 2

Subject	Grade	Module	Suggested Timeline
Mathematics	1	2	6 weeks

Grade Level Summary

In grade1, instructional time should focus on four critical areas: (1) developing understanding of addition, subtraction, and strategies for addition and subtraction within 20; (2) developing understanding of whole number relationships and place value, including grouping in tens and ones; (3) developing understanding of linear measurement and measuring lengths as iterating length units; and (4) reasoning about attributes of, and composing and decomposing geometric shapes.

Grade Level Modules

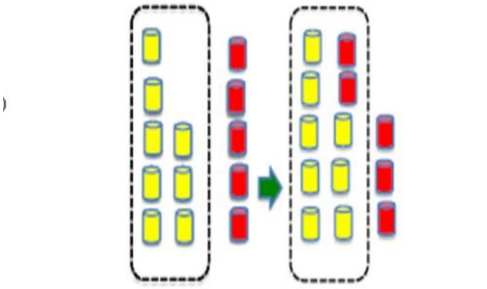
Module 1: Addition and Subtraction of Numbers to 10 and Fluency
Module 2: Place Value, Comparison, Addition and Subtraction of Numbers to 20
Module 3: Ordering / Expressing Length Measurements as Numbers and Telling Time
Module 4: Place Value, Comparison, Addition and Subtraction of Numbers to 40
Module 5: Identify, Compose, and Partition Shapes
Module 6: Place Value, Comparison, Addition and Subtraction of numbers to 100

Module Title

Module 2: Place Value, Comparison, Addition and Subtraction of Numbers to 20

Module Overview

In Module 2, students practice grouping into tens and ones by adding and subtracting numbers to 20. Work begins slowly by modeling “adding and subtracting across a ten” in word problems, with equations, and as part of fluency. Solutions like that shown to the right for 8 + 5 reinforce the need to “make 10.” Learning to “complete a unit” empowers students in later grades to understand “renaming” in the addition algorithm, to add 298 and 35 mentally (i.e., 298 + 2 + 33), and to add measurements like 4 m, 80 cm, and 50 cm.



$8 + 5 = 8 + (2 + 3) = (8 + 2) + 3 = 10 + 3 = 13$

Adding Across a Ten

Module Objectives

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

- **Use addition and subtraction within 20 to solve word problems**
- **Use the concept of tens and ones to represent and compare two-digit numbers**
- **Count by ones and tens beginning with numbers other than 1**
- **Solve word problems that call for the addition of three whole numbers whose sum is less than or equal to 20**

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

Mathematical Practices resource page on SAS

Focus Standards Addressed in this Module

CC.2.1.1.B.1

Extend the counting sequence to read and write numerals to represent objects.

CC.2.1.1.B.2

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

CC.2.2.1.A.1

Represent and solve problems involving addition and subtraction within 20.

CC.2.2.1.A.2

Understand and apply properties of operations and the relationship between addition and

subtraction.

Important Standards Addressed in this Module

Misconceptions	Proper Conceptions
1. Many children misunderstand the meaning of the equal sign. The equal sign means —is the same as, but most primary students believe the equal sign tells you that the —answer is coming up to the right of the equal sign. This misconception is over-generalized by only seeing examples of number sentences with an operation to the left of the equal sign and the answer on the right.	1. First graders need to see equations written multiple ways, for example 5 + 7 = 12 and 12 = 5 + 7.
2. A second 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.	2. Providing problems in which key words like this are used to represent different operations is essential. For example, the use of the word *left* in this problem does not indicate subtraction as a solution method: Seth took the 8 stickers he no longer wanted and gave them to Anna. Now Seth has 11 stickers *left*. How many stickers did Seth have to begin with? Students need to analyze word problems and avoid using key words to solve them.
3. A common misconception is that the commutative property applies to subtraction.	3. After students have discovered and applied the commutative property for addition, ask them to investigate whether this property works for subtraction. Have students share and discuss their reasoning and guide them to conclude that the commutative property does not apply to subtraction.
4. First graders might have informally encountered negative numbers in their lives, so they think they can take away more than the number of items in a given set, resulting in a negative number below zero.	4. Provide many problems situations where students take away all objects from a set, e.g. 19 - 19 = 0 and focus on the meaning of 0 objects and 0 as a number. Ask students to discuss whether they can take away more objects than what they have.
5. Students ignore the need for regrouping when subtracting with numbers 0 to 20 and think that they should always subtract a smaller number from a larger number. For example, students solve 15 – 7 by subtracting 5	5. Students need to relate their understanding of place-value concepts and grouping in tens

from 7 and 0 (0 tens) from 1 to get 12 as the incorrect answer.

6. Often when students learn to use an aid (Pac Man, bird, alligator, etc.) for knowing which comparison sign (<, >, =) to use, the students don't associate the real meaning and name with the sign.

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

and ones to their steps for subtraction. They need to show these relationships for each step using mathematical drawings, ten-frames or base-ten blocks so they can understand an efficient strategy for multi-digit subtraction.

6. The use of the learning aids must be accompanied by the connection to the names: < Less Than, > Greater Than, and = Equal To. More importantly, students need to begin to develop the understanding of what it means for one number to be greater than another. In Grade 1, it means that this number has more tens, or the same number of tens, but with more ones, making it greater. Additionally, the symbols are shortcuts for writing down this relationship. 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).

Concepts	Competencies	Vocabulary
• Numerical Sequence • Place Value • Addition and Subtraction • Properties of Operations	• Count to 120, starting at any number less than 120. • Read and write numerals up to 120 and represent a number of objects with a written numeral. • Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols >, =, and < . • Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit	Addend Counting on Compose/decompose Making ten, sum, tens, Ones, less than, greater than, Equal to, addition, subtraction, compare, place value

number and a multiple of 10 using concrete models or drawings. Relate the strategy to a written method and explain the reasoning used.

- **Subtract multiples of 10 in the range 10-90, using concrete models or drawings. Relate the strategy to a written method and explain the reasoning used.**
- **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.**
- **Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20.**
- **Apply properties of operations as strategies to add and subtract (commutative property of 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)

Suggested Strategies to Support Design of Coherent Instruction

Formative Assessment Look-For should include:

- **Can students add and subtract within 20 to solve word problems?**
- **Can students use the concept of tens and ones to represent and compare two-digit numbers?**
- **Can students count by ones and tens beginning with numbers other than 1?**

Provide opportunities for students to participate in shared problem-solving activities to solve word problems. Collaborate in small groups to develop problem-solving strategies using a variety of models such as drawings, words, and equations with symbols for the unknown numbers to find the

solutions. Additionally students need the opportunity to explain, write, and reflect on their problem-solving strategies. The situations for the addition and subtraction story problems should involve sums and differences less than or equal to 20 using the numbers 0 to 20.

Students need the opportunity to writing and solving story problems involving three addends with a sum that is less than or equal to 20. For example, each student writes or draws a problem in which three whole things are being combined.

Literature is a wonderful way to incorporate problem-solving in a context that young students can understand. Many literature books that include mathematical ideas and concepts have been written in recent years. For Grade 1, the incorporation of books that contain a problem situation involving addition and subtraction with numbers 0 to 20 should be included in the curriculum.

Students also need to apply properties of operations as strategies to add and subtract. Students do not need to use formal terms for these properties. Students should use mathematical tools, such as cubes and counters, and representations such as the number line and a 100 chart to model these ideas. Students need several experiences investigating whether the commutative property works with subtraction. The intent is not for students to experiment with negative numbers but only to recognize that taking 5 from 8 is not the same as taking 8 from 5. Students should recognize that they will be working with numbers later on that will allow them to subtract larger numbers from smaller numbers.

Instruction needs to focus on lessons that help students to discover and apply the commutative and associative properties as strategies for solving addition problems. It is not necessary for students to learn the names for these properties. It is important for students to share, discuss and compare their strategies as a class. The second focus is using the relationship between addition and subtraction as a strategy to solve unknown-addend problems. Students naturally connect counting on to solving subtraction problems. For the problem —15 – 7 =? they think about the number they have to add to 7 to get to 15. First graders should be working with sums and differences less than or equal to 20 using the numbers 0 to 20.

Provide multiple opportunities for students to study the relationship between addition and subtraction in a variety of ways, including games, modeling and real-world situations. Students need to understand that addition and subtraction are related, and that subtraction can be used to solve problems where the addend is unknown. Students use subtraction in the context of unknown addend problems. When determining the answer to a subtraction problem, 12 - 5, students think, —If I have 5, how many more do I need to make 12?‖ Encouraging students to record this symbolically, 5 + ? = 12, will develop their understanding of the relationship between addition and subtraction. Some strategies they may use are counting objects, creating drawings, counting up,

using number lines or 10 frames to determine an answer.

Students need to make a connection between counting and adding and subtraction. Students use various counting strategies, including counting all, counting on, counting back, and using a number line with numbers up to 20. This standard calls for students to move beyond counting all and become comfortable at counting on and counting back. The counting all strategy requires students to count an entire set. The counting and counting back strategies occur when students are able to hold the —start number in their head and count on from that number. Students' multiple experiences with counting may hinder their understanding of counting on and counting back as connected to addition and subtraction. To help them make these connections when students count on 3 from 4, they should writethis as 4 + 3 = 7. When students count back (3) from 7, they should connect this to 7 – 3 = 4. Students often have difficulty knowing where to begin their count when counting backward. Provide multiple and varied experiences that will help students develop a strong sense of numbers based on comprehension – not rules and procedures. Number sense is a blend of comprehension of numbers and operations and fluency with numbers and operations. 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. Primary students come to understand addition and subtraction as they connect counting and number sequence to these operations. Addition and subtraction also involve part to whole relationships. Students' understanding that the whole is made up of parts is connected to decomposing and composing numbers. The focus is on students being able to fluently add and subtract numbers to 10 and having experiences adding and subtracting within 20. By studying patterns and relationships in addition facts and relating addition and subtraction, students build a foundation for fluency with addition and subtraction facts. Adding and subtracting fluently refers to knowledge of procedures, knowledge of when and how to use them appropriately, and skill in performing them flexibly (use of different strategies), accurately, and efficiently. The use of objects, diagrams, or interactive whiteboards and various strategies will help students develop fluency. It is important for students to be able to use a variety of strategies when adding and subtracting numbers within 20. Students should have ample experiences modeling these operations before working on fluency. Teacher could differentiate using smaller numbers. Also, it is important to move beyond the strategy of counting on. Many times teachers think that counting on is all a child needs, when it is really not much better skill than counting all and can becomes a hindrance when working with larger numbers.

Students use concrete models that represent two sets of numbers. To compare, students first attend to the number of tens, then if necessary, to the number of ones. Students may also use pictures, number lines, and spoken or written words to compare two numbers. Comparative language includes but is not

limited to more than, less than, greater than, most, greatest, least, same as, equal to, and not equal to.

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

Interdisciplinary Connections

Additional Resources

- **Math Lab**
- **Go Math Standards Practice Book**
- **Literature**
- **Manipulatives**
- **Work Station Activities**
- **Resource Books from Houghton Mifflin Math**
- **Teacher Created Activities**

Created By

First Grade Team

Copy of Math Grade 1 - Module 3

Subject	Grade	Module	Suggested Timeline
Mathematics	1	3	4 weeks

Grade Level Summary

In grade 1, instructional time should focus on four critical areas: (1) developing understanding of addition, subtraction, and strategies for addition and subtraction within 20; (2) developing understanding of whole number relationships and place value, including grouping in tens and ones; (3) developing understanding of linear measurement and measuring lengths as iterating length units; and (4) reasoning about attributes of, and composing and decomposing geometric shapes.

Grade Level Modules

Module 1: Addition and Subtraction of Numbers to 10 and Fluency
Module 2: Place Value, Comparison, Addition and Subtraction of Numbers to 20
Module 3: Ordering / Expressing Length Measurements as Numbers and Telling Time
Module 4: Place Value, Comparison, Addition and Subtraction of Numbers to 40
Module 5: Identify, Compose, and Partition Shapes
Module 6: Place Value, Comparison, Addition and Subtraction of numbers to 100

Module Title

Module 3: Ordering and Expressing Length Measurements as Numbers and Telling Time

Module Overview

Module 3, which focuses on measuring lengths indirectly and by iterating length units, gives students time and opportunities to practice and internalize "making a 10" during daily fluency activities. The clock is introduced and students will tell time to the nearest hour and half hour. Introducing measurement in the first half of the academic year also allows for an increased variety of word problems that can be given throughout the year.

Module Objectives

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

- **Measure length with nonstandard units**
- **Measure the length of an object by comparing it to another object**
- **Order objects according to their length**
- **Tell time to the nearest hour and half hour using analog and digital clocks**
- **Use the make a 10 strategy to increase fluency**

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

Mathematical Practices resource page on SAS

Focus Standards Addressed in this Module

CC.2.4.1.A.1

Order lengths and measure them both indirectly and by repeating length units.

CC.2.4.1.A.2

Tell and write time to the nearest half hour using both analog and digital clocks.

Important Standards Addressed in this Module

Misconceptions	Proper Conceptions
1.Some students may view the measurement process as a procedural counting task. Students need numerous experiences measuring lengths with student-made tapes or rulers with numbers in the center of the spaces. They may have gaps or overlaps with the units they are using to measure. They may not understand that the units used to measure must be the same size. 2.Students have difficulty distinguishing the hour and minute hand on the clock.	1.In order for students to be able to compare objects, students need to understand that length is measured from one end point to another end point. They determine which of two objects is longer, by physically aligning the objects. Typical language of length includes taller, shorter, longer, and higher. When students use bigger or smaller as a comparison, they should explain what they mean by the word. Some objects may have more than one measurement of length, so students identify the length they are measuring.

Both the length and the width of an object are measurements of length.
2.Students need many opportunities to work with a clock, manipulating the hands and telling the time.

Concepts	Competencies	Vocabulary
• **Measurement** • **Represent and Interpret Data**	• **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.** • **Order three objects by length; compare the lengths of two objects indirectly by using a third object.** • **Use standard and non-standard units of measure to express the length of an objects a whole number of length units.** • **Tell and write time in hours and half hours using analog and digital clocks.**	**Less than** **Greater than** **Length** **Hour, half hour** **Compare, analog** **Compose/decompose** **Making ten**

Assessment(s)

Suggested Strategies to Support Design of Coherent Instruction

Formative Assessment Look-For should include:

- **Can students use units correctly (no gaps or overlaps) to measure length?**
- **Do students use same-size units to measure length?**
- **Can students order objects according to length?**
- **Can students use the make 10 strategy?**
- **Can students tell time to the hour? Half-hour?**
- **Can students write the time shown on a clock?**

Students need to understand what a unit of measure is and how it is used to find a measurement. They need to predict the measurement, find the measurement and then discuss the estimates, errors and the measuring process. It is important for students to measure the same attribute of an object with differently sized units.

It is beneficial to use informal units for beginning measurement activities at all

grade levels because they allow students to focus on the attributes being measured. The numbers for the measurements can be kept manageable by simply adjusting the size of the units. Experiences with informal or nonstandard units promote the need for measuring with standard units.

Measurement units share the attribute being measured. Students need to use as many copies of the length unit as necessary to match the length being measured.

Students need to make their own measuring tools using snap cubes or paperclips.

Have students use reasoning to compare measurements indirectly, for example to order the lengths of Objects A, B and C, examine then compare the lengths of Object A and Object B and the lengths of Object B and Object C. The results of these two comparisons allow students to use reasoning to determine how the length of Object A compares to the length of Object C. For example, to order three objects by their lengths, reason that if Object A is smaller than Object B and Object B is smaller than Object C, then Object A has to be smaller than Object C. The order of objects by their length from smallest to largest would be Object A - Object B - Object C.

Ideas to support telling time:

- **within a day, the hour hand goes around a clock twice (the hand moves only in one direction)**
- **when the hour hand points exactly to a number, the time is exactly on the hour**
- **time on the hour is written in the same manner as it appears on a digital clock**
- **the hour hand moves as time passes, so when it is half way between two numbers it is at the half hour**
- **there are 60 minutes in one hour; so halfway between an hour, 30 minutes have passed**
- **half hour is written with —30‖ after the colon**
- **hour is written with 00 after the colon.**

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

Interdisciplinary Connections

Additional Resources

- **Math Lab**
- **Go Math Standards Practice Book**
- **Literature**
- **Manipulatives**

- **Resource Books from Houghton Mifflin Math**
- **Teacher Created Activities**
- **Work Station Activities**

Created By

First Grade Team

Copy of Math Grade 1 - Module 4

Subject	Grade	Module	Suggested Timeline
Mathematics	1	4	7 weeks

Grade Level Summary

In grade 1, instructional time should focus on four critical areas: (1) developing understanding of addition, subtraction, and strategies for addition and subtraction within 20; (2) developing understanding of whole number relationships and place value, including grouping in tens and ones; (3) developing understanding of linear measurement and measuring lengths as iterating length units; and (4) reasoning about attributes of, and composing and decomposing geometric shapes.

Grade Level Modules

Module 1: Addition and Subtraction of Numbers to 10 and Fluency
Module 2: Place Value, Comparison, Addition and Subtraction of Numbers to 20
Module 3: Ordering / Expressing Length Measurements as Numbers and Telling Time
Module 4: Place Value, Comparison, Addition and Subtraction of Numbers to 40
Module 5: Identify, Compose, and Partition Shapes
Module 6: Place Value, Comparison, Addition and Subtraction of numbers to 100

Module Title

Module 4: Place Value, Comparison, Addition and Subtraction of Numbers to 40

Module Overview

Module 4 returns to understanding place value. Addition and subtraction to 40 rests on firmly establishing a “ten” as a unit that can be counted. In earlier modules, students loosely grouped 10 objects to make a ten. They now transition to conceptualizing that ten as a single unit (using 10 linker cubes stuck together, for example). Students begin to see a problem like 23 + 6 as an opportunity to push the “2 tens” in 23 over to the side and concentrate on the familiar addition problem 3 + 6.

Module Objectives

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

- **Decompose numbers into tens and ones**
- **Represent and solve addition and subtraction problems to 40 using concrete objects, drawings, and equations**
- **Gather and represent data in tables/charts**
- **Use data in tables/charts to solve problems**
- **Represent and solve different types of addition and subtraction word problems**

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
MP# 7: Look for and make use of structure

Mathematical Practices resource page on SAS

Focus Standards Addressed in this Module

CC.2.1.1.B.2

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

CC.2.2.1.A.1

Represent and solve problems involving addition and subtraction within 20.

CC.2.4.1.A.4

Represent and interpret data using tables/charts

Important Standards Addressed in this Module

Misconceptions	Proper Conceptions
1.Many children misunderstand the meaning of the equal sign. The equal sign means is the same as but most primary students believe the equal sign tells you that the answer is coming up to the right of the equal sign. This misconception is over-generalized by	**1.First graders need to see equations written multiple ways, for example 5 + 7 = 12 & 12 = 5 + 7.** **2.Providing problems in which key words like this are used to represent different operations is essential. For example, the use of the word *left* in this**

only seeing examples of number sentences with an operation to the left of the equal sign and the answer on the right.

2.A second 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.

3.Students ignore the need for regrouping when subtracting with numbers 0 to 20 and think that they should always subtract a smaller number from a larger number. For example, students solve 15 – 7 by subtracting 5 from 7 and 0 (0 tens) from 1 to get 12 as the incorrect answer.

problem does not indicate subtraction as a solution method: Jose took the 8 stickers he no longer wanted and gave them to Anna. Now Jose has 11 stickers *left*. How many stickers did Jose have to begin with? Students need to analyze word problems and avoid using key words to solve them.

3.Students need to relate their understanding of place-value concepts and grouping in tens and ones to their steps for subtraction. They need to show these relationships for each step using mathematical drawings, ten-frames or base-ten blocks so they can understand an efficient strategy for multi-digit subtraction.

Concepts	Competencies	Vocabulary
• Place Value • Addition and Subtraction • Represent and Interpret Data	• Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols >, =, and < . • 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. Relate the strategy to a written method and explain the reasoning used. • Subtract multiples of 10 in the range 10-90, using concrete models or drawings. Relate the strategy to a written method and explain the reasoning used. • Use addition and subtraction within 20 to solve word problems by using objects, drawings, and equations with a	Addend, counting on Compose/decompose Making ten, sum, tens, ones, Less than, greater than, equal to, addition, subtraction, compare Place value Data

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.**
- **Organize, represent, and interpret data with up to three categories. Ask and answer questions about the data.**

Assessment(s)

Suggested Strategies to Support Design of Coherent Instruction

Formative Assessment Look-For should include:

- **Can students decompose numbers into tens and ones?**
- **Can students represent a two-digit number as tens and ones?**
- **Can students represent and solve addition and subtraction problems to 40, including different types of word problems?**
- **Can students gather data and represent it in charts/tables?**
- **Can students solve problems which include finding data in charts/tables?**

Provide opportunities for students to participate in shared problem-solving activities to solve word problems. Collaborate in small groups to develop problem-solving strategies using a variety of models such as drawings, words, and equations with symbols for the unknown numbers to find the solutions. Additionally students need the opportunity to explain, write and reflect on their problem-solving strategies. The situations for the addition and subtraction story problems should involve sums and differences less than or equal to 40 using the numbers 0 to 40.

Students need the opportunity of writing and solving story problems involving three addends with a sum that is less than or equal to 40. For example, each student writes or draws a problem in which three whole things are being combined. Literature is a wonderful way to incorporate problem-solving in a context that young students can understand. Many literature books that include mathematical ideas and concepts have been written in recent years. For Grade 1, the incorporation of books that contain a problem situation involving addition and subtraction with numbers 0 to 40 should be included in the curriculum. As

the teacher reads the story, students use a variety of manipulatives, drawings, or equations to model and find the solution to problems from the story. Counting in groups of 10 as well as grouping objects into 10 groups of 10 will develop students' understanding of place value concepts.

Essential skills for students to develop include making tens (composing) and breaking a number into tens and ones (decomposing). Composing numbers by tens is foundational for representing numbers with numerals by writing the number of tens and the number of leftover ones. Decomposing numbers by tens builds number sense and the awareness that the order of the digits is important. Composing and decomposing numbers involves number relationships and promotes flexibility with mental computation. The beginning concepts of place value are developed in Grade 1 with the understanding of ones and tens. The major concept is that putting ten ones together makes a ten and that there is a way to write that down so the same number is always understood. Students move from counting by ones, to creating groups and ones, to tens and ones. It is essential at this grade for students to see and use multiple representations of making tens using base-ten blocks, bundles of tens and ones, and ten-frames. Making the connections among the representations, the numerals and the words are very important. Students need to connect these different representations for the numbers 0 to 40.

Students learn to read and create bar graphs, picture graphs, and tally charts. Students interpret and discuss the data collected and solve story problems describing the data.

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

Interdisciplinary Connections

Additional Resources

- **Math Lab**
- **Go Math Standards Practice Book**
- **Literature**
- **Manipulatives**
- **Resource Books from Houghton Mifflin Math**
- **Teacher Created Activities**
- **Work Station Activities**

Created By

First Grade team

Copy of Math Grade 1 - Module 5

Subject	Grade	Module	Suggested Timeline
Mathematics	1	5	3 weeks

Grade Level Summary

In grade 1, instructional time should focus on four critical areas: (1) developing understanding of addition, subtraction, and strategies for addition and subtraction within 20; (2) developing understanding of whole number relationships and place value, including grouping in tens and ones; (3) developing understanding of linear measurement and measuring lengths as iterating length units; and (4) reasoning about attributes of, and composing and decomposing geometric shapes.

Grade Level Modules

Module 1: Addition and Subtraction of Numbers to 10 and Fluency
Module 2: Place Value, Comparison, Addition and Subtraction of Numbers to 20
Module 3: Ordering / Expressing Length Measurements as Numbers and Telling Time
Module 4: Place Value, Comparison, Addition and Subtraction of Numbers to 40
Module 5: Identify, Compose, and Partition Shapes
Module 6: Place Value, Comparison, Addition and Subtraction of numbers to 100

Module Title

Module 5: Identify, Compose, and Partition Shapes

Module Overview

In Module 5, students think about attributes of shapes and practice composing and decomposing geometric shapes. They also practice fluency with addition and subtraction within 40 (from Module 4). Thus, this module provides important “internalization time” for students between two intense number-based modules. The module placement also gives more spatially-oriented students the opportunity to build their confidence before they return to arithmetic.

Module Objectives

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

- **Identify two- and three-dimensional shapes**
- **Compose geometric shapes from two or more smaller shapes**
- **Decompose geometric shapes into halves and quarters**
- **Identify attributes of geometric shapes**
- **Increase fluency with addition and subtraction**

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

Mathematical Practices resource page on SAS

Focus Standards Addressed in this Module

CC.2.3.1.A.1

Compose and distinguish between two- and three-dimensional shapes based on their attributes.

CC.2.3.1.A.2

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

Important Standards Addressed in this Module

CC.2.2.1.A.1

Represent and solve problems involving addition and subtraction within 20.

Misconceptions

1. **Students may think that a square that has been rotated so that the sides form 45-degree angles with the vertical diagonal is no longer a square but a diamond.**
2. **Some students may think that the size of the equal shares is directly related to the number of equal shares. For example, they think that fourths are larger than halves because there are four**

Proper Conceptions

1. **They need to have experiences with shapes in different orientations. For example, in *building-shapes*, ask students to orient the smaller shapes in different ways.**
2. **Students need to focus on the change in the size of the fractional parts as recommended in the folding shapes strategy. (Focus on Concrete and**

fourths in one whole and only two halves in one whole.

Representational activities).

Concepts	Competencies	Vocabulary
• Two and Three Dimensional • Fractions	• Compose two and three-dimensional shapes and distinguish between attributes. • Build and draw shapes to possess attributes. • Partition circles and rectangles into two and four equal shares. Understand that decomposing into more equal shares creates smaller shares.	Compose/decompose, trapezoids Half circles, quarter-circles, Rectangle Square, circle, triangle, cube Rectangular prism, cone, cylinder Halves, fourths, quarters

Assessment(s)

SAS Assessment Builder
The SAS Assessment Builder tool can be used to create dynamic assessments. Access the SAS Assessment Builder at: http://pdesas.org/Assessment/Assessment/AssessmentQuestions

The following link represents sample questions relevant to the instruction of the module
Math Grd 1 Mod 5_ Assessment Draft 2013.docx

Suggested Strategies to Support Design of Coherent Instruction

Formative Assessment Look-For:

- **Can students identify two- and three-dimensional shapes?**
- **Can they create shapes from smaller shapes?**
- **Can they decompose a shape into halves and fourths?**
- **Can they compare shapes based on their attributes?**

Students can easily form shapes on geoboards using colored rubber bands to represent the sides of a shape. Ask students to create a shape with four sides on their geoboard, and then copy the shape on dot paper. Students can share and describe their shapes as a class while the teacher records the different defining attributes mentioned by the students.

Pattern block pieces can be used to model defining attributes for shapes. Ask students to create their own rule for sorting pattern blocks. Students take turns sharing their sorting rules with their classmates and showing examples that support their rule. The classmates then draw a new shape that fits this same rule after it is shared.

Students can use a variety of manipulatives and real-world objects to build larger shapes. The manipulatives can include paper shapes, pattern blocks, color tiles, triangles cut from squares (isosceles right triangles), tangrams, canned food (right circular cylinders) and gift boxes (cubes or right rectangular prisms).

Folding shapes made from paper enables students to physically feel the shape and form the equal shares. Ask students to fold circles and rectangles first into halves and then into fourths. They should observe and then discuss the change in the size of the parts.

Students may use interactive whiteboards or computer environments to move shapes into different orientations and to enlarge or decrease the size of a shape still keeping the same shape. They can also move a point/vertex of a triangle and identify that the new shape is still a triangle. When they move one point/vertex of a rectangle they should recognize that the resulting shape is no longer a rectangle.

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

Interdisciplinary Connections

Additional Resources

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

- **SAS Voluntary Model Curriculum**
  - **Describing Shapes**
  - **Partitioning Shapes**
  - **Three-Dimensional Shapes**
- **Engage NY 1st Grade Modules**
- **1st Grade Common Core State Standards Flip Book**
- **Lessons designed to "illuminate" the new NCTM Principles and Standards for School Mathematics.**
- ***PARCC* is a 19-state consortium working together to develop next-generation K-12 assessments in math.**
- **Inside Mathematics Resources**
- **Illustrative Mathematics Resources**
- **K-5 Math Teaching Resources**
- **Additional PCS resources**

Created By

Copy of Math Grade 1 - Module 6

Subject	Grade	Module	Suggested Timeline
Mathematics	1	6	7 weeks

Grade Level Summary

In grade 1, instructional time should focus on four critical areas: (1) developing understanding of addition, subtraction, and strategies for addition and subtraction within 20; (2) developing understanding of whole number relationships and place value, including grouping in tens and ones; (3) developing understanding of linear measurement and measuring lengths as iterating length units; and (4) reasoning about attributes of, and composing and decomposing geometric shapes.

Grade Level Modules

Module 1: Addition and Subtraction of Numbers to 10 and Fluency
Module 2: Place Value, Comparison, Addition and Subtraction of Numbers to 20
Module 3: Ordering / Expressing Length Measurements as Numbers and Telling Time
Module 4: Place Value, Comparison, Addition and Subtraction of Numbers to 40
Module 5: Identify, Compose, and Partition Shapes
Module 6: Place Value, Comparison, Addition and Subtraction of numbers to 100

Module Title

Module 6: Place Value, Comparison, Addition and Subtraction of Numbers to 100

Module Overview

Although Module 6 focuses on “adding and subtracting within 100,” the learning goal differs from Module 4, which focuses on addition and subtraction “within 40”. Here, the new level of complexity is to introduce the addition and subtraction algorithms, building off the place value understanding and mental math strategies that were introduced in earlier modules. Students explore the algorithms by using simple examples and the familiar units of 10 made out of linker cubes.

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 within 100, including different types of word problems**
- **Use place value concepts and properties of operations to find sums and differences within 100**
- **Increase fluency 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

Mathematical Practices resource page on SAS

Focus Standards Addressed in this Module

CC.2.1.1.B.2

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

CC.2.1.1.B.3

Use place value concepts and properties of operations to add and subtract within 100.

CC.2.2.1.A.1

Represent and solve problems involving addition and subtraction within 20.

CC.2.2.1.A.2

Understand and apply properties of operations and the relationship between addition and subtraction.

Important Standards Addressed in this Module

Misconceptions	Proper Conceptions
1.A common misconception is that the commutative property applies to subtraction. 2.First graders might have informally encountered negative numbers in their lives, so they think they can take away more than the number of items in a	1.After students have discovered and applied the commutative property for addition, ask them to investigate whether this property works for subtraction. Have students share and discuss their reasoning and guide them to conclude that the commutative

given set, resulting in a negative number below zero.

property does not apply to subtraction.
2.Provide many problems situations where students take away all objects from a set, e.g. 19 - 19 = 0 and focus on the meaning of 0 objects and 0 as a number. Ask students to discuss whether they can take away more objects than what they have.

Concepts	Competencies	Vocabulary
• Place Value • Addition and Subtraction • Properties of Operations	• Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols >, =, and < . • 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. Relate the strategy to a written method and explain the reasoning used. • Subtract multiples of 10 in the range 10-90, using concrete models or drawings. Relate the strategy to a written method and explain the reasoning used. • Apply properties of operations as strategies to add and subtract (commutative property of 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.	Addend Counting on Compose/ decompose Making ten, sum, tens, ones Less than Greater than Equal to Addition, subtraction, compare Place value

Assessment(s)

Suggested Strategies to Support Design of Coherent Instruction

Formative Assessment Look-For:

- Can students represent and solve addition and subtraction problems,

including word problems, within 100?

- **Can students decompose two-digit numbers in order to add and subtract?**
- **Can students use the commutative property of addition, e.g., do they know 4 + 5 is the same as 5 + 4, or that 23 + 16 is the same as 16 + 23?**
- **Do they know subtraction is not commutative?**

Instruction needs to focus on lessons that help students to discover and apply the commutative and associative properties as strategies for solving addition problems. It is not necessary for students to learn the names for these properties. It is important for students to share, discuss and compare their strategies as a class. The second focus is using the relationship between addition and subtraction as a strategy to solve unknown-addend problems. Students naturally connect counting on to solving subtraction problems. For the problem —15 – 7 =? ‖ They think about the number they have to add to 7 to get to 15. First graders should be working with sums and differences less than or equal to 100 using the numbers 0 to 100. Provide investigations that require students to identify and then apply a pattern or structure in mathematics. For example, pose a string of addition and subtraction problems involving the same three numbers chosen from the numbers 0 to 20, like 4 + 13 = 17 and 13 + 4 = 17. Students analyze number patterns and create conjectures or guesses. Have students choose other combinations of three numbers and explore to see if the patterns work for all numbers 0 to 100. Students then share and discuss their reasoning. Be sure to highlight students' uses of the commutative and associative properties and the relationship between addition and subtraction.

Provide multiple opportunities for students to study the relationship between addition and subtraction in a variety of ways, including games, modeling and real-world situations. Students need to understand that addition and subtraction are related, and that subtraction can be used to solve problems where the addend is unknown. It is important to provide multiple and varied experiences that will help students develop a strong sense of numbers based on comprehension – not rules and procedures. Number sense is a blend of comprehension of numbers and operations and fluency with numbers and operations. Students gain computational fluency (using efficient and accurate methods for computing) when they are flexible and have many strategies from which to choose from, and as they come to understand the role and meaning of arithmetic operations in number systems. Students should solve problems using concrete models and drawings to support and record their solutions. It is important for them to share the reasoning that supports their solution strategies with their classmates.

Students will usually move to using base-ten concepts, properties of operations, and the relationship between addition and subtraction to invent mental and written strategies for addition and subtraction. Students should use and connect different representations when they solve a problem. They should start by building a concrete model to represent a problem. This will help them form a mental picture of the model. Now students move to using pictures

and drawings to represent and solve the problem. If students skip the first step, building the concrete model, they might use finger counting to solve the problem. Finger counting is an inefficient strategy for adding within 100 and subtracting within multiples of 10 between10 and 90. Have students connect a 0-99 chart or a 1-100 chart to their invented strategy for finding 10 more and 10 less than a given number. Ask them to record their strategy and explain their reasoning. Expand the student work to three or more addends to provide the opportunities to change the order and/or groupings to make tens. This will allow the connections between place-value models and the properties of operations for addition to be seen. Understanding the commutative and associative properties builds flexibility for computation and estimation, a key element of number sense.

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

Interdisciplinary Connections

Additional Resources

- **Math Lab**
- **Go Math Standards Practice Book**
- **Literature**
- **Manipulatives**
- **Resource Books from Houghton Mifflin Math**
- **Teacher Created Activities**
- **Work Station Activities**

Created By

First Grade Team