Georgia Performance Standards Framework for MATHEMATICS – GRADE 3

Unit Organizer: "ADDITION AND SUBTRACTION OF WHOLE NUMBERS" (4 weeks)

OVERVIEW:

In this unit, students continue to develop their understanding and facility with addition and subtraction while furthering their ability to recognize and use place value to manipulate numbers.

To assure that this unit is taught with the appropriate emphasis, depth, and rigor, it is important that the tasks listed under "Evidence of Learning" be reviewed early in the planning process. A variety of resources should be utilized to supplement, but not completely replace, the textbook. Textbooks not only provide much needed content information, but excellent learning activities as well. The tasks in these units illustrate the types of learning activities that should be utilized from a variety of sources.

ENDURING UNDERSTANDINGS:

- Addition means the joining of two or more sets that may or may not be the same size.
- Subtraction has more than one meaning. It not only means the typical "take away" operation, but also can denote finding the difference between sets, such as, in a set of 2 red balloons and 6 green balloons, how many more balloons are green? What is the difference between the number of red and green balloons? (Diminution)
- Addition and subtraction are inverses; one undoes the other.
- We can verify the results of our computation by using the inverse operation.
- Place value is crucial in operating on numbers.
- Estimation helps us see whether our answers are reasonable.
- Adding zero to a number or subtracting zero from a number does not change the original amount.

ESSENTIAL QUESTIONS:

- How do we use addition and subtraction to tell number stories?
- How are addition and subtraction alike?
- How are addition and subtraction different?
- In why type of situations do we subtract?
- In what type of situations do we add?
- What are some ways we use estimation in everyday life?
- Why is place value important?
- How is zero different from any other whole number you might add or subtract?

STANDARDS ADDRESSED IN THIS UNIT

KEY STANDARDS:

M3N2 Students will further develop their skills of addition and subtraction and apply them in problem solving.

a. Use the properties of addition and subtraction to compute and verify the results of computation.
b. Use mental math and estimation strategies to add and subtract.
c. Solve problems requiring addition and subtraction.

M3A1 Students will use mathematical expressions to represent relationships between quantities and interpret given expressions.

c. Use a symbol, such as _ and Δ, to represent an unknown and find the value of the unknown in a number sentence.

RELATED STANDARDS:

M3N1. Students will further develop their understanding of whole numbers and ways of representing them.

a. Identify place values from tenths through ten thousands.
b. Understand the relative sizes of digits in place value notation (10 times, 100 times, 1/10 of a single digit whole number) and ways to represent them.

M3P1. Students will solve problems (using appropriate technology).

a. Build new mathematical knowledge through problem solving.
b. Solve problems that arise in mathematics and in other contexts.
c. Apply and adapt a variety of appropriate strategies to solve problems.
d. Monitor and reflect on the process of mathematical problem solving.

M3P3. Students will communicate mathematically.

a. Organize and consolidate their mathematical thinking through communication.
b. Communicate their mathematical thinking coherently and clearly to peers, teachers, and others.
c. Analyze and evaluate the mathematical thinking and strategies of others.
d. Use the language of mathematics to express mathematical ideas precisely.

M3P5. Students will represent mathematics in multiple ways.

a. Create and use representations to organize, record, and communicate mathematical ideas.
b. Select, apply, and translate among mathematical representations to solve problems.
c. Use representations to model and interpret physical, social, and mathematical phenomena.

CONCEPTS/SKILLS TO MAINTAIN:

It is expected that students will have prior knowledge/experience related to the concepts and skills identified below. It may be necessary to pre-assess in order to determine if time needs to be spent on conceptual activities that help students develop a deeper understanding of these ideas.

- Addition Facts
- Subtraction Facts
- Place Value

SELECTED TERMS AND SYMBOLS:

The following terms and symbols are often misunderstood. These concepts are not an inclusive list and should not be taught in isolation. However, due to evidence of frequent difficulty and misunderstanding associated with these concepts, instructors should pay particular attention to them and how their students are able to explain and apply them.

The definitions below are for teacher reference only and are not to be memorized by the students. Teachers should present these concepts to students with models and real life examples. Students should understand the concepts involved and be able to recognize and/or demonstrate them with words, models, pictures, or numbers.

Addend: A number being added
Associative Property of Addition: When there are three addends, the sum does not change regardless of which two numbers you group together first. As in: 3 + 5 + 2 = (3 + 5) + 2 = 3 + (5 + 2) = 10; 8 + 2 = 3 + 7 = 10
Commutative Property of Addition: The order in which two numbers are added does not change the sum. As in: 9 + 7 = 16 and 7 + 9 = 16
Difference: The answer obtained when you subtract two numbers

Doubling: Adding the same amount twice; or, two times a number
Estimate: A reasonable answer to an operation on numbers
Identity Property of Addition: When zero is added to any number, the sum is the original amount. Or, adding zero to any number does not change a number.
Inverses: Operations that undo each other, such as addition and subtraction as well as multiplication and division.
Operations: Addition, subtraction, multiplication, and division
Sum: Total amount added. Total number of elements in the sets that were combined.

EVIDENCE OF LEARNING:

By the conclusion of this unit, students should be able to demonstrate the following competencies:

- use of mental math to add and subtract
- use of estimation to determine reasonableness of sums and differences computed
- able to read, interpret, solve, and compose simple word problems dealing with addition and subtraction
- understand how to use inverses to verify accuracy of computation
- able to write and solve expressions using symbols in place of numbers
- able to represent numbers from tenths to ten thousands place and accurately read as well as verbalize the same
- demonstrates understanding of the relatives sizes of digits in a number

The following tasks represent the level of depth, rigor, and complexity expected of all third grade students. These tasks or a task of similar depth and rigor should be used to demonstrate evidence of learning.

- What is your Property?
- Animals That Lay Eggs
- Betting on Base Tens
- I Spy a Number
- Numbers on the Calendar
- I Have a Story; You Have a Story
- Round It Before You Add It
- Shake, Roll and Round
- Mental Mathematics
- What's the Story Here?

Culminating Activity: "What's the Story Here?"
Students will produce a book of addition and subtraction stories that illustrate each type of problem studied.

STRATEGIES FOR TEACHING AND LEARNING:

Students should be actively engaged by developing their own understanding.

- Mathematics should be represented in as many ways as possible by using graphs, tables, pictures, symbols, and words.
- Appropriate manipulatives and technology should be used to enhance student learning.
- Students should be given opportunity to revise their work based on timely teacher feedback, peer feedback, and their own reflection.
- Students need to write in mathematics class to explain their thinking, talk about how they perceive topics, and justify their work to others.

Classroom Routines

The importance of continuing the established classroom routines cannot be overstated. Daily routines must include such obvious activities such as taking attendance and lunch count, doing daily graphs, problem of day, and calendar activities at a math meeting board. They should also include less obvious routines, such as how to select materials, how to use materials in a productive manner, how to put materials away, how to interact with others during small group discussion, and how to access classroom technology such as computers and calculators.

Routinely allow plenty of time for children to explore new materials before attempting any directed activity with these new materials. Make it a practice to write in math class by using a math journal, response to the lesson such as - "what I learned today," and regularly writing to justify and explain solutions to problems.

The regular use of the routines is important to the development of students' number sense, flexibility and fluency, which will support students' performances on the tasks in this unit.

TASKS:

The collection of the following tasks represents the level of depth, rigor and complexity expected of all third grade students to demonstrate evidence of learning.

- **What is Your Property**

What is Your Property

- Use small cut-outs or counters to show 3 different examples of how the commutative property of addition works. Write a number sentence for both ways of adding two numbers. Explain the commutative property of addition in your own words.
- Use small cut-outs or counters to show an example of why subtraction is not commutative. Write a sentence or two to explain your thinking.
- Make up an example of the associative property of addition and draw a picture to go with it. Explain what the parentheses in a number sentence mean.

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Discussion, Suggestions, Possible Solutions

"Property" is just one of many words in the English language that has more than one meaning. While it may seem obvious to adults, it may not make sense to children to refer to "mathematical properties" without some explanation. "Difference" might require some elaboration too, as well as the word "sum" and its homophone "some".

Most children find it easy to understand the commutative property of addition, especially if they have seen it modeled and tried it themselves with manipulatives many times. They need to be just as aware that there is no commutative property of subtraction and why.

The identity property of addition is usually easy to understand also. Do not allow students to call the number "zero" the letter "O" since it will only cause more confusion as they begin using variables.

The associative property can be more difficult for third graders to articulate. It is very important that they learn how parentheses work in numerical expressions since the same convention will hold true through

algebra and calculus. They must know to do the operation inside the parentheses first.

*** Teachers' Note: It is inaccurate to say, "You cannot subtract a larger number from a smaller number," since you can; you will get a negative integer. Rather than going into detail about positive and negative integers with third graders, you might say, "You cannot take away 12 pennies when you only have 8 pennies here." Or use some other such example with concrete materials*.

Possible story problems to give to the students:

- *Rashad gave his sisters some of his chewing gum one Saturday. He gave Samantha 2 pieces that morning and 5 pieces after lunch, totaling 7 pieces so far. Later, he gave Samantha 8 more pieces of gum.*
- *His other sister Tina got 8 pieces that morning and 5 pieces after lunch, for a total of 13 pieces so far. Tina got mad because he only gave her 2 pieces that evening. Tina said he did not give her as much gum as he gave Samantha.*
- *Should she be angry? Use your mathematical skills to help Rashad explain or to see how much more gum he should give Tina.*

Note how students group the given numbers. For instance, with Samantha receiving 2, then 5, then 8 pieces of gum, are students able to group the addends several different ways? 2 + 8 = 10 and 5 more = 15; 2 + 5 = 7 and 8 more = 15; 5 + 8 = 3 + 2 + 8 or 3 + 10, which is 13 and then 2 more = 15. Students who incorrectly answer this question usually are not flexible with numbers and need more practice making tens on a simple tens board.

- **Shopping for Healthy Snacks**

Shopping for Healthy Snacks

You have some money to buy snacks. How can you spend exactly $3.55? Find at least three different ways.

Baked chips 45¢	Milk 86¢	Hot chocolate 67¢
Apple 52¢	Low-fat hot dog $1.25	Veggie burger $1.44
Popcorn 49¢	Orange 62¢	Banana 87¢
Bottled water 99¢	Frozen yogurt bar 39¢	Raisins 56¢

List your three different combinations and the total price for each combination.

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Discussion, Suggestions, Possible Solutions

This task requires students to estimate and subtract in order to figure out what to buy as they get closer to the target amount.

Example:

If I buy a hot dog and a hamburger for $2.69, I subtract $2.69 from the total of $3.55 I see that I have 86¢ left to spend. I begin looking at the ones place to see what will add up to 6 and then look in the tens place to see if I can come up with 86¢. I can find no combination that works so I try something else.

If I buy a hot dog and water for $2.24 I know by subtracting that amount from $3.55 that I have $1.31 left to spend. By looking for ones that will add up to a one in the ones place, I see that 45¢for chips and 86¢ for milk will give me the $1.31 I need. To check, I add $1.25, 99¢, 45¢, and 86¢ to total the

target amount of $3.55.

Consider providing calculators for some students to check their work after they come up with their combinations. Remember that this task reinforces important skills in addition to calculations: reasoning, checking, and organizing information to find several different solutions.

Other solutions include:

- *Two veggie burgers and a hot chocolate*
- *One veggie burger, one hot dog, and a milk*
- *Hot dog, orange, two frozen yogurt bars, and two chips*
- *Two waters, two chips, and one hot chocolate*
- *Two hot dogs, popcorn, and raisins*

- **Betting on Base Tens**

Betting on Base Tens

- Roll 3 dice all at once.
- Record the numeral formed when you place the digits in order from smallest to largest
  _____ _____ _____
- Record the new numeral formed when you order them from largest to smallest
  _____ _____ _____
- Beneath your numerals, draw (or build) a model of each number using the smallest number of base ten

pieces possible. Have the flats represent hundreds, the rods represent tens, and the unit cubes represent ones. Use words to write out how each of the two numbers is spoken. Repeat the same exercise two more times and record.

- Put a star beside the greatest number of all that you rolled. Explain how you know what the largest number possible would be and what the smallest number possible would be when using three dice.

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Discussion, Suggestions, Possible Solutions

Students may use four dice instead of three. If you continue to have them draw/build base tens, you will need to provide the large cube and have it represent the thousands place. Some classrooms have access to base ten stamps and might want to use those instead.

Students may also use three dice of one color and a fourth of a different color to represent tenths. Use a dried black-eyed pea for the decimal. Have students repeat the above activity for ordering numbers but leave off the modeling with base tens and instead have them find the difference between the largest and smallest numbers formed and show how they used the inverse operation to verify their results.

Extension:

If you have a calculator such as the TI-10, have students go back and verify their partner's results with the calculator. Discuss the very important idea that yes, a calculator can yield an incorrect result, if the input was incorrect.

Let students practice basic or even more advanced facts with the calculator by going to the games on calculators like the TI-30 which allows for three levels of practice on each of the operations. The card inside the cover explains how to use the computation practice games.

- **I Spy a Number**

I Spy a Number

Your class has been playing the game "I Spy a Number" and this is how the chart looks:
The range is from 10 to 99.

What is the number? _____

How do you know the digit that goes in the tens place? Explain.

How do you know for sure the digit that goes in the ones place? Explain.

There is one wasted guess. Which one is it and why is it a waste of a turn?

What did the student guess?	How many digits in the guess are correct?	How many places (place value) in the guess are correct?
Guess	**Digit**	**Place**
12	0	0
36	0	0
45	1	1
73	1	1
98	0	0

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Discussion, Suggestions, Possible Solutions

*The directions for playing the game "I Spy a Number" are given below under ** Extra Practice Games. Students must have numerous experiences with the game before they could complete this task.*
The chart makes clear that the digits 1,2,3, and 6 are not going to be found in the target number because next to the guess '12' it shows zero digits correct. The same is true for the guess '36.' The next guess of '45' is a wise guess because the digits 4 and 5 have not been used yet.

We do not know if the 4 is correct or the 5 is correct at this point, but we do know that whether the correct digit is 4 or 5, the digit is in the correct place – either ones or tens. The task now is to find out if the 4 or the 5 is the digit to keep.

73 is not the best guess because we already know that the target number has no three. However, all is not lost, because that leaves us to know that the indicated one digit correct must be the 7 and since the place is also correct, the number has to be seventy-something.

The reason we now know the entire number for sure is that we can eliminate the 4 in forty-five. It was in the tens place and the tens place is filled with 7. Therefore, the five in forty-five must be correct and it is in the ones place. So, seventy-something, is definitely seventy-five.

98 is a wasted guess. Since 45 and 73 indicated one correct digit each and that correct digit in the right place, we at least know that we will find 4, 5, 7, and 3are the only possible digits in the target number. There will not be a nine or an eight.

Even though this task yields one right answer for the target number, the thinking students use to figure that out can be invaluable for you to see. It is expected that the class has played this game many times before students are given I Spy a Number to figure out on their own or with a partner.

****Extra practice games you may choose to use with your class.**

(1) I Spy a Number

This is a whole group game that works well on the overhead. Make a simple chart like this:

Guess	Digits Correct?	Places Correct?

Set a range for students' guesses such as 10 to 100. Write the secret number in a place where you can keep it covered. For example, use the number **68**.

Let a student guess. Record the guess in the 1st column. Are any digits in the guess correct? If not, put a 0 and also put 0 in the places correct.

Guess	Digits Correct?	Places Correct?
37	0	0
48	1	1
58	1	1
68	2	2

(2) Race For a Dollar or Go For Broke

Race For a Dollar or Go For Broke is played exactly as the 2 games listed in the second grade unit (Race to One Hundred or Race to One using base ten blocks) except that the students use play money - dollars, dimes, and pennies and a die.

To further reinforce our base-ten number system, play again with $100, $10, and $1 play money bills.

*** Another version of this game is to multiply each roll of the die by ten and then use the calculator to add in each roll of the die when racing to 1000 and to subtract when racing for zero.*
For instance, each student inputs 1,000 into the calculator and puts 1,000 at the top of their paper. Say the first student rolls 9, multiplies that by 10 to yield 90, records minus 90 on her paper, finds the difference, and subtracts 90 from the 1,000 in the calculator to see that the resulting difference matches hers on paper – 910. Play continues in the same manner.

(3) Make-Ten card game

In pairs, students will shuffle a deck with number cards only and place them face down between them. The first student will turn over the top card and lay it to one side of the overturned deck so that the number shows. From here on, taking turns, the next student will turn over the next card, laying it to the other side of the overturned deck so that 2 numbers are showing. Whenever the 2 cards total ten, the first student to say "Ten!" gets all the cards that have been put face up. Play continues until all the cards have been used. Each student will add up the numbers on his/her cards using paper and pencil and record the sum. Students will trade cards and let their partner add the cards with a calculator. When the amounts agree, the student with the larger total wins that round.

(4) Howdy Partner!

This is a whole class game. The teacher needs to have large playing cards that can be read in the back of the room or index cards with large numerals written on them. Call up 2 students and have them put their backs to each other. Shuffle the cards and then place one on each student's forehead so that they are completely unable to see their own card. They should hold the card in place with a finger. As the teacher counts, "one, two, three" the students take 3 steps away from each other in opposite directions. The teacher will call out the sum, the students will quickly turn to face each other, and seeing the number on their partner's head, they will try to be the first to call out what is on their own head. This works very well with multiplication also.

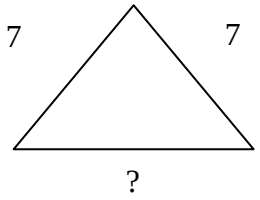
- **What is My Measure?**

What is My Measure?

Use what you know about shapes, perimeter, addition and subtraction to determine the missing measures below. Explain with words and pictures how you know your solution is correct.

1) Find the perimeter of a square whose edge measures 14 centimeters.
2) Find the length of the edge of a square whose perimeter is 20 inches.
3) The perimeter of a rectangle with a length of 21 feet and a width of 3 feet is _____?

4) A rectangle with a perimeter of 36 yards has a length of 14 yards. What is the width of this rectangle? _____
5) The triangle below has a perimeter of 26 meters. Find the length of the missing edge.



Draw and label a rectangle and a triangle with the measure of one side missing and giving the total perimeter. Show how you would solve each situation.

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Discussion, Suggestions, Possible Solutions

Students need to be able to apply their knowledge of geometry to find the measures of the given figures. If the measure of one side of a square is known, they can add that amount four times or multiply times four to find the total perimeter. Be sure they include the increment of measure in their answers. By the same token, they should be able to divide the total perimeter by four to determine the length of each edge. Given the measure of the length of a rectangle (that is not a square) they need to be able to subtract the sum of the two lengths from the total perimeter to find the total lengths of the other two edges. Help them understand why that measure must be divided by two; there are two width measures on a rectangle and they are the same amount. It should be easier to determine the missing length of a triangle by simply adding the two given lengths and subtracting that amount from the total perimeter. To extend this task you might try using pentagons and other shapes with more edges.

- **Numbers on the Calendar**

Numbers on the Calendar

Find the sum of any ten **even** numbers on the calendar. Will the sum be odd or even and why? Describe any patterns that you see.

Repeat the above activity with any ten **odd** numbers on the calendar. Describe any patterns that you see.

Now add the last two numbers on this month's calendar, odd and even. Will the result be odd or even? Explain as fully as possible why you got the result that you did.

Choose two even numbers with three digits. Choose two odd numbers with three digits. Show what happens in each situation when using the larger numbers: Even + even, Odd + odd, and Even + odd

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Discussion, Suggestions, Possible Solutions

The purpose here is to be sure that students understand that adding two even numbers will yield an even number, adding two odd numbers will yield an even number, and adding an odd and even number will yield and odd number

Some students who recognize that 12 is an even number do not recognize that 312 is even or that 5,812 is even. You might try using base ten blocks to show how larger numbers can be divided into two equal groups, or use a large group of counters to illustrate, and eventually use the calculator to divide large numbers by two and note that there is no remainder.

It is very important that students understand that all even numbers are divisible by two. As simple as that sounds to adults, it trips up many students when they are simplifying fractions. Often they fail to recognize that, for instance, 8/22 can be simplified. They see that 8 is not a factor of 22 but sometimes forget that since both the numerator and denominator are even, thus divisible by two, the fraction can be simplified further (8/22 = 4/11)

- **I Have a Story, You Have a Story**

I Have a Story, You Have a Story

Here is my story:

I had 8 quarters in my pocket but I did not know I also had a hole in my pocket.

I spent 50 cents at a bubble gum machine. When I got home, I found out that I was missing some quarters. There were only three left.

(1) Tell and show how I would find out how much money fell through the hole in my pocket.

(2) Write a story about dimes and a hole in your pocket.

Here is another story:
I have 85 blue marbles now because my friend Jacob gave me 27 blue marbles for my birthday. Here is a number sentence to show what happened. ☐ + 27 = 85.

(3) What number goes in the box?

(4) Write a story for this number sentence and find what number goes in the box. 18 + ☐ = 61

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Discussion, Questions, Possible Solutions

When students make up their own number stories, it provides the teacher with insights into the students' understanding of processes, skills with mathematical language, and computational reasoning. Simplify or extend these situations to help students grasp how to solve addition problems with the use of subtraction. This is also intended to give students practice with adding and subtracting money amounts since they form important benchmarks (5s, 10s, 25s, & 50s) that will also be used in multiplication and division.

Some students will have difficulty with ____ + 27 = 85 simply because they are so accustomed to seeing the number first. We want them to understand that they still will subtract the given number from 85 in order to find what number goes in the blank despite the fact that the number is not given first in this number sentence. We also want them to recognize the ___ + 27 yields the same sum as 27 + ___ due to the commutative property of addition.

- **Shake, Roll and Round**

Shake, Roll and Round

Play with a partner. You will need 2 dice and a calculator.

Roll two dice. Form the smaller number of the two possible and round it. Record.
Form the larger of the two possible numbers and round it. Record.

3	**6**	= 36 round to 40		**6**	**3**	= 63 round to 60	

Rounded sum = 100

Find the sum of the two rounded numbers **mentally** and record. Your partner must agree with your rounding and will then check the sum of the rounded numbers on the calculator. If you were correct, you may keep the points. Whoever has the higher number of points at the end of 10 rolls per person wins this game.

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Discussion, Questions, Possible Solutions

It is also suggested that you use a book like "Mental Math in the Primary Grades" to practice mental math with the class as a whole group. Incorporate rounding in the games they play during recess and build in rounding with the calendar math you do every day. Be sure students make the connection between counting by 10s, multiplying by ten, and rounding to the nearer ten before adding.

Use number lines and models to help students who are having difficulty with rounding to the nearer ten and nearer hundred. The conventions of rounding will continue throughout their math careers. Rounding skills will help them determine reasonableness of answers, a vital skill for standardized tests as well as everyday living.

- **Mental Mathematics**

Mental Mathematics

Solve the following problems as they are placed on the board using no paper or manipulatives – mentally. Be prepared to share your solutions and strategies.

- 15 + 7
- 24 + 16
- 99 + 17
- 50 - 12

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Discussion, Suggestions, Possible Solutions

The teacher will begin this activity by placing one problem at a time on the board, preferably horizontally. Be aware that students may initially need time to solve these problems mentally, so try to encourage students to be patient and quiet during this time.
*After allowing enough time for students to consider the problem, then the teacher should lead a discussion by asking several students to share their solution and/or strategy. Simply stating an answer is not enough to make this a rich activity. Encourage students to share different strategies asking them to try and make sense of each solution as it is presented. Remind the students that our goal is to become **efficient** and **flexible** in our thinking and strategies.*

- *15 + 7*
  Students may solve this problem in a variety of ways:
  - *15 + 5 is 20 and 2 more is 22.*
  - *5 + 7 is 12 and 10 more is 22*
  - *10 + 7 is 17, 3 more is 20 and 2 more is 22.*

- *24 + 16*
  Students may solve this problem in a variety of ways:
  - ❖ *20 + 10 is 30 and 4 + 6 is 10, so 30 + 10 is 40.*
  - ❖ *4 + 6 is 10 and 20 + 10 is 30, so 10 + 30 is 40.*
  - ❖ *24 + 6 is 30 and 10 more is 40.*

- *99 + 17*
  Students may solve this problem in a variety of ways:
  - ❖ *99 and 1 more is 100, 100 + 16 (as 1 was taken away to add to the 99) is 116.*
  - ❖ *99 and 1 more is 100, 100 + 17 is 117, but take 1 away that was added to the 99 to get 100 and get 116.*
  - ❖ *Some may attempt a traditional algorithm, but should notice that this is more cumbersome that examining the numbers and using the ideas above to compute.*

- *50 - 12*
  Students may solve this problem in a variety of ways:
  - ❖ *50 – 10 is 40, then 40 – 2 is 38.*
  - ❖ *50 – 2 is 48, them 48 – 10 is 38.*
  - ❖ *You need 8 more to get to 20, then 30 more to get to 50, so the answer is 8 + 30 or 38.*

This is a great opening activity and one that should be visited frequently throughout the year. Students should be encouraged to solve problems in ways that make sense to them. If students have never been encouraged to solve problems mentally, they may be reluctant to share their strategy or may feel that their strategy is not appropriate. If students are reluctant to share different solution, perhaps sharing some solutions and asking students what they think of these would be helpful.

Extension:

When you are playing, vary the problems that you use. Use various operations and numbers.

- **Culminating Task:**

This culminating task represents the level of depth, rigor, and complexity expected of all first grade students to demonstrate evidence of learning.

Unit 1 Culminating Task: "WHAT'S THE STORY HERE?"

Make a book to show all you have learned in this unit. There are many ways to make a simple book; one method follows.

Using a large piece of manila paper, fold it in half lengthwise, open it, fold in half across (do not open) and fold over in half across again. Open the last fold only. Cut from the last fold to the second fold. Last of all, return the paper to the first fold and push it in to make a book.

However your book is made, you will need eight pages with the following:

Page 1 – title, author, publishing date
Page 2 – addition story showing commutative property
Page 3 – addition story showing associative property
Page 4 – addition story showing identity property
Page 5 – subtraction story showing take-away
Page 6 – subtraction story showing comparison
Page 7 – addition story with a string of at least 6 numbers
Page 8 – your choice of an addition or subtraction story with rounding and estimation

- Use at least one two-digit and one three-digit number in each story
- Model the story with an illustration or base ten drawing,
- Put the correct solution on the underside of the paper or in a separate answer key
- Verify your work by using the inverse operation.

Suggestions for Classroom Use

- Peer Review
- Display for parent night
- Place in portfolio
- Photographs

Discussion, Suggestions and Possible Solutions

Once again, the work of creating mathematical stories can give unique insights into a student's mathematical abilities and weaknesses. Adjust the difficulty to meet the needs of special education students as well as mathematically gifted students.
Design a rubric and go over it with the students before this task is attempted so they are aware of your expectations. You may want to consider having the students help you design a rubric. Provide a benchmark to guide their work.

Technology:

If you have PowerPoint available, or a similar program, you might have some students make slides instead of pages. Photographs of the students and their work can be inserted into slides for a presentation for parents this year or to show benchmark work to your students next year.