Student Store
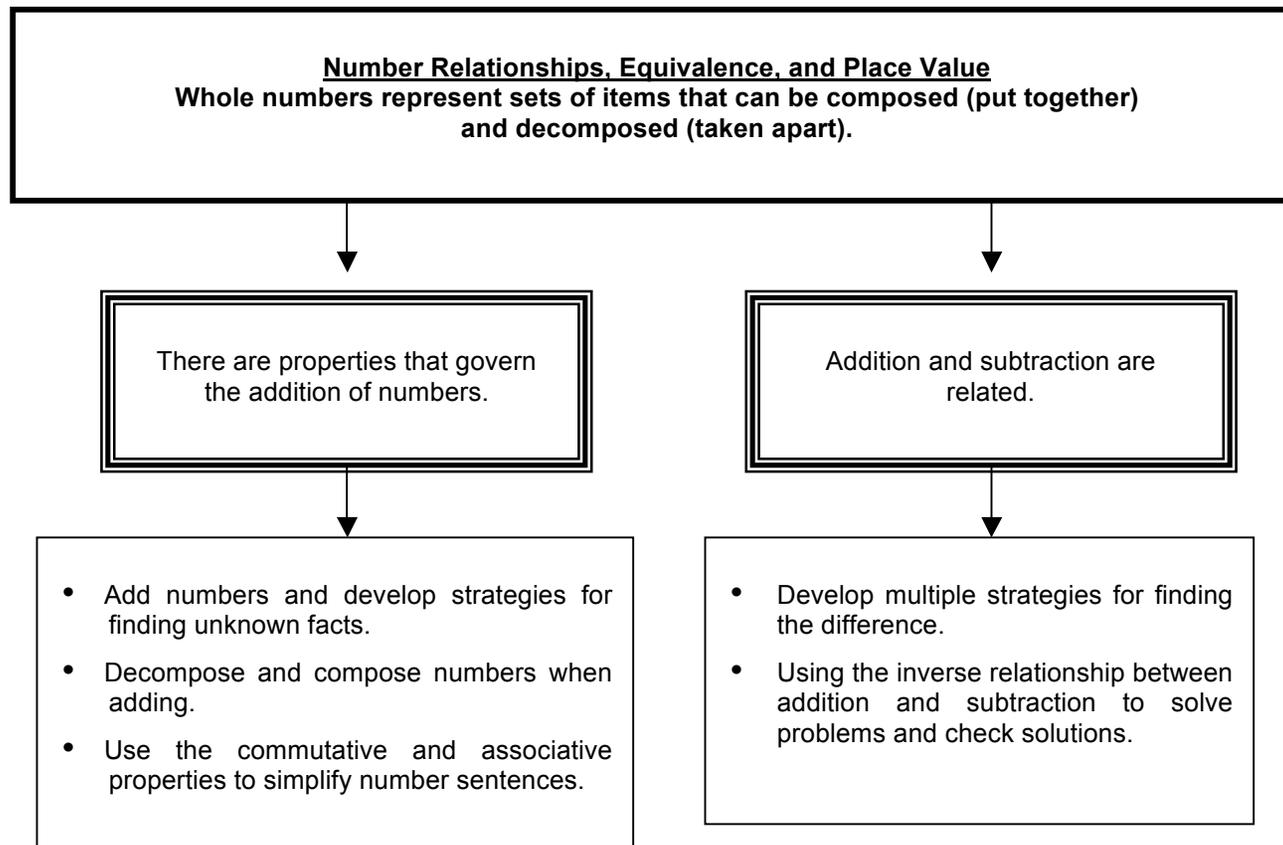**2ND Grade Concept Lesson Plan**

LESSON OVERVIEW

Student Task: Two addends will be compared with a given amount to determine which items a student can buy, and the change received. Multiple ways of solving for each sum will be shared and discussed.

Number Relationships, Equivalence, and Place Value
Whole numbers represent sets of items that can be composed (put together)
and decomposed (taken apart).

There are properties that govern the addition of numbers.

Addition and subtraction are related.

- Add numbers and develop strategies for finding unknown facts.

- Decompose and compose numbers when adding.

- Use the commutative and associative properties to simplify number sentences.

- Develop multiple strategies for finding the difference.

- Using the inverse relationship between addition and subtraction to solve problems and check solutions.

Mathematical Goals of the Lesson:
The mathematical goals of this lesson are for students to:
*   write number sentences that represent contexts of problems.
*   share and discuss multiple solution paths for solving tasks (tens and ones, counting on from a quantity, compensation).
*   learn that the addends can be combined in any order and the sum will remain the same.
*   learn that subsets of quantities can be broken down and then recombined to make the addition easier and the total will remain the same.
*   develop an understanding of solving for a missing part.

Materials:
*   Base-10 blocks, popsicle sticks pre-grouped into tens and ones, 100s charts, number lines, or dimes and pennies.

Common Core Standards Addressed in the Lesson:
2.OA.1   Use addition and subtraction within 100 to solve one- and two-step word problems involving situations
           of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions,
           e.g., by using drawings and equations with a symbol for the unknown number to represent the
           problem.

2.NBT.7:   Add and subtract within 1000, using concrete models or drawings and strategies based on place value, properties of
           operations, and/or the relationship between addition and subtraction; relate the strategy to a written method…

Math Practice 1 (MP1): Make sense of problems and persevere in solving them.
Math Practice 2 (MP2): Reason abstractly and quantitatively.
Math Practice 3 (MP3): Construct viable arguments and critique the reasoning of others.
Math Practice 4 (MP4): Model with mathematics.
Math Practice 5 (MP5): Use appropriate tools strategically.
Math Practice 6 (MP6): Attend to precision.
Math Practice 7 (MP7): Look for and make use of structure.
Math Practice 8 (MP8): Look for and express regularity in repeated reasoning.

Language Goals:
*   Students will orally explain their strategies in solving addition and subtraction problems using sequencing words.
*   Students will orally compare and contrast solutions to addition and subtraction problems by using subordinate and comparative conjunctions.
*   Students will sequentially explain in writing how they solved or worked through the problem by providing facts and using academic language.
*   Students will ask and answer what, how, and why questions in order to demonstrate their understanding of the inverse relationship between addition and subtraction.

Connections to the Teaching and Learning Framework:
Standard 3:   Delivery of Instruction
                Component 3b: Using Questioning and Discussion Techniques
                        Element 3b1: Quality and Purpose of Questions: Questions are designed to challenge students and elicit high-level thinking.

Academic Language:
The concepts represented by these terms should be reinforced/developed through the lesson:
* Number Sentence
* Sum
* Addends
* Difference

Encourage students to use multiple representations such as drawings, manipulatives, diagrams, words and number(s), to explain their thinking.

Assumption of Prior Knowledge/Experience:
* Students can represent a two-digit number with tens and ones blocks, popsicle sticks, or dimes and pennies.
* Students have solved addition number sentences involving addition of tens (20 + 30, 40 + 30) and a two-digit number plus one-digit numbers (45 + 6, 58 + 4).

Organization of Lesson Plan:
• The left column of the lesson plan describes rationale for particular teacher questions, why particular mathematical ideas are important to address in the lesson, and how standards for mathematical practice are incorporated.
• The right column of the lesson plan describes suggested teacher actions and possible student responses.

Key:
Suggested teacher questions are shown in bold print.
Standards for Mathematical Practice are marked with MP and their number.
Possible student responses are shown in italics.
* indicates key questions in terms of the goals of the lesson.

Lesson Phases:
The phase of the lesson is noted on the left side of each page. This lesson engages students in a Set-Up, Explore, and Share, Discuss, and Analyze Phases of a Lesson.

Addressing the Needs of Sub-Groups: Identify strategies that address the needs of diverse learners, including, ELs, SELs, GATE students, students with disabilities, and other students with special needs.

- Where do you see opportunities for students to have instructional conversations, work in cooperative groups, develop academic vocabulary and use graphic organizers and visual tools?

Universal Access:

Strategies:
1) Prompt them to highlight the item names and item price listed on table. (Explore phase)
2) Have students "Chunk the Task." (Explore phase)
    1) Ask "What do we know?" (Have them highlight the information they know.)
    2) Ask "What are we trying to find out?" (Have them highlight what it is they have to find out.)
    3) Show how much they cost altogether with words, numbers, and pictures.
3) Students may need visual cues for support. Have visual cues posted, such as a place value poster or strategies they are familiar with that may help them with solving the task.
4) Students may need very specific questions that will help them focus (step by step).
5) Students may need to be prompted to refer to peer models for support as they solve the task.
6) Students may need language frames to support them during the discussion.

THE LESSON AT A GLANCE

Linking to prior knowledge:
- If you are using dimes and pennies, ask students to identify the coins and their value.

Solving for Alisha's total:
- Represent the solution paths and discuss finding Alisha's sum.

Solving for the change remaining:
- Ask students how they represented the change left over.

THE LESSON

Phase	RATIONALE	SUGGESTED TEACHER QUESTIONS/ACTIONS AND POSSIBLE STUDENT RESPONSES

S E T
 	
U P
 	
S E T
 	
U P
	HOW DO YOU SET UP THE TASK?
	
	• <u>Solving the task prior</u> to the lesson is critical so that:
	- you become familiar with strategies students may use.
	- you consider the misconceptions students may have or errors they might make. This will allow you to better understand students' thinking and prepare for questions they may have or that you might ask.
	• It is important that students have <u>access to solving the task</u> from the beginning. The following strategies can be useful in providing such access:
	   -strategically pairing students who complement each other.
	   -providing manipulatives or other concrete materials.
	   -identifying and discussing vocabulary terms that may cause confusion. (MP6)
	   -posting vocabulary terms on a word wall, including the definition and, when possible, a drawing or diagram. <u>It is important not to "teach" the terms prior to the lesson. Instead, use the word wall as a tool to assist students if and when they encounter difficulty with a term.</u>
	
	Linking to Prior Knowledge
	
	It is important that the task have points of entry for students. By connecting the content of the task to previous mathematical knowledge, students will begin to make the connections between what they already know and what we want them to learn.
		HOW DO YOU SET UP THE TASK?
		
		• <u>Solve</u> the task in as many ways as possible <u>prior</u> to the lesson.
		
		• <u>Misconceptions</u> can be expected. What misconceptions do you anticipate? How will you record them?
		
		• <u>Groupings</u> can help facilitate learning. What groupings will you plan? Heterogeneous? Homogeneous?
		
		• <u>Determine</u> what manipulatives you will give to students (coins, popsicle sticks, base-10 blocks, or unifix cubes).
		
		• If students do not understand tens and ones, then use the unifix cubes, the popsicle sticks or the base-10 blocks. If students are proficient with counting by tens, then use dimes and pennies. (MP5)
		
		• What will you <u>hear</u> that let's you know that students understand the task?
		
		Linking to Prior Knowledge
		
		• **Tell me about the manipulatives on your desk.**
		
		• **What is the difference between the coins** *(dimes and pennies)***?**
		
		• **Show 70¢ on the overhead/projector/board**. *(Circulate, assessing students' ability to show 70¢ with the dimes and pennies.) Think-Pair-Share*

Phase	RATIONALE	SUGGESTED TEACHER QUESTIONS/ACTIONS AND POSSIBLE STUDENT RESPONSES

S E T U P
 	
S E T U P
	SETTING THE CONTEXT FOR THE TASK
	
	• Consider the use of realia, labeled with prices or pictures of the items, with price tags drawn on. (MP4)
	• Consider using a large construction paper "placemat" to share manipulatives between partners. (MP5)
	• Asking students to state what they think they are trying to find allows them to put in their own words what they will be doing. It also gives the teacher the opportunity to assess whether or not students understand the problem they are to solve. (MP1)
	
	Set the Expectations
	
	• In addition to instructional objectives, students need behavioral objectives so that we can encourage and recognize the habits of mind of proficient problem solvers.
		SETTING THE CONTEXT FOR THE TASK
		
		Alisha went to the student store at lunch. She had 70¢. She bought 2 items. When she left the store, she had some money left over.
		  1. **Which items could she have bought?**
		  She bought _____and _____. Show how much they cost all together.
		  2. **How much money will she have left? Show how you figured it out in words, pictures and numbers.**
		
		Ask students to think-pair-share: What do you know? What are you trying to find out? Then ask students to share what they know and what they are trying to find, encouraging them to also share something a partner may have shared. Use the talk move of restating as students share. Ask: What questions do you have?
		
		Set the Expectations
		
		• **Show your work with the money/other manipulatives. (MP5)**
		
		• **Write a number sentence that tells how you figured out what she could have bought. (MP4)**
		
		• **Be prepared to tell others how you figured out what she could have bought. (MP3)**
		
		• **Write a sentence that explains what she could have bought and write another number sentence to show how much money she has left. (MP4)**

Phase	RATIONALE	SUGGESTED TEACHER QUESTIONS/ACTIONS AND POSSIBLE STUDENT RESPONSES
E X P L O R E E X P L O R E	**INDEPENDENT PROBLEM-SOLVING TIME** • It is important that students be given private think time to understand and make sense of the problem for themselves and to begin to solve the problem in a way that makes sense to them. (MP1) • As you are circulating, clarify any confusion students may have, but do not tell students how to solve the problem. (MP1) **Partnership Work** **Clarifications About the Task** What do I do if students have difficulty getting started? If students are not clear about what they are trying to figure out, ask the student to tell you about Alisha and her money. If the child is still unclear, then reread the story problem with the student. Before you leave, ask him to restate the problem in his/her own words. (MP1) It is important to ask questions that do not give away the answer or that do not explicitly suggest a solution method. (MP1)	**INDEPENDENT PROBLEM-SOLVING TIME** **Work on the problem by yourself for a few minutes.** Students with Disabilities: Prompt them to highlight the item names and item price listed on table. Have them "Chunk the Task." Ask: • **What do we know?** (Have them highlight the information they know.) • **What are we trying to find out?** (Have them highlight what it is they have to find out.) **Partnership Work** **Clarifications About the Task** What do I do if students have difficulty getting started? Ask questions such as: • **What are you trying to figure out?** • **How will you know if she has enough money to buy the two things you're thinking of?** • **How would you represent this amount using coins?** • **What are other tools that you can use to help you? (number line, hundreds chart, part-part-whole model)** • **What other part of the problem can you begin with in order to figure out one of the things she bought?** • **How can you write a number sentence that tells about buying the two things that you've chosen?**

Phase	RATIONALE	SUGGESTED TEACHER QUESTIONS/ACTIONS AND POSSIBLE STUDENT RESPONSES

E X P L O R E
 	
E X P L O R E
 	
E X P L O R E
	INDEPENDENT PROBLEM-SOLVING TIME (Cont'd.)
	Partnership Work (Cont'd.)
	
	Working with the Manipulatives
	If the student is having difficulty representing the amounts with coins, then replace the coins with materials that they are familiar with using. Use popsicle sticks, base-ten blocks, or unifix cubes because students can count the individual blocks in a set of ten. (MP5)
	
	Writing Number Sentences
	If a student is experiencing difficulty writing number sentences, then ask the child to tell you about the sets that he has shown. As he tells you about his work, record numbers to correspond with the child's explanation. Ask the child how the number sentence matches what he described with the manipulatives so that he has an opportunity to defend his reasoning. This process helps the student make the connection between the concrete representation and a number sentence. (MP3; MP4)
	
	Possible misconceptions or errors:
	
	It is important to have students <u>explain their thinking</u> before assuming they are making an error or having a misconception. (MP3) Record misconceptions for follow-up later.
	   – Students might count a group of ten as if it is one item.
	   – Students may not be able to read the numbers.
	   – Students may experience difficulty crossing a decade when counting (e.g., 29, 30), and they will miscount.
		INDEPENDENT PROBLEM-SOLVING TIME (Cont'd.)
		Partnership Work (Cont'd.)
		
		To help students get focused**:**
		How might you explain your thinking to your partner?
		How can you show your thinking in a model or picture?
		
		Listen to your partner. What is your partner's thinking?
		How do you think it will work?
		
		How can you use estimation to help you?
		
		Possible misconceptions or errors:
		
		<u>Naming a group of ten as one</u>
		If a student counts a group of ten as one unit, then challenge the student by telling the student that you counted 10. Ask the child if he knows why you came up with 10 when you counted.
		
		<u>Difficulty Reading Numbers</u>
		This is 28. Twenty and 8 ones.
		
		<u>Difficulty Crossing a Decade</u>
		Count with me (28, 29, 30, 31).

Phase	RATIONALE	SUGGESTED TEACHER QUESTIONS/ACTIONS AND POSSIBLE STUDENT RESPONSES
S H A R E D I C U S S A N D A N A L Y Z E	**FACILITATING THE SHARE, DISCUSS, AND ANALYZE PHASE OF THE LESSON** **What solution paths will be shared, in what order, and why?** The purpose of the classroom discussion is to assist the teacher in making certain that the goals of the lesson are achieved by students. Questions and discussions should focus on the important mathematics and processes that were identified for the lesson. Make sure to mark for students that this is the most important part of the lesson and that you expect them to listen attentively, ask questions of each other, defend their reasoning, and make connections between others' solution paths and their own. (MP3, MP7) **Making Connections Between the Manipulatives and the Number Sentence** After students explain their methods using the manipulatives, it is important to ask them to use the same method with the number sentence. For example, if students count all of the dimes then you need to ask the students to identify the dimes in the number sentence. (MP2; MP4) **Commutative Property** Some students will think that switching the addends around changes the sum. It is important to give students an opportunity to prove that the amount remains the same. (MP2; MP3) **Place Value** Students may have difficulty switching between counting up in the tens place and then counting up in the ones place, and vice versa; or they may count up in the tens place with the other number's digit in the ones place. (MP2) **Using Friendly Numbers** Some students may calculate the total by using friendly numbers, meaning numbers that end in zero or five. The total can be calculated by using mental math. (MP2)	**FACILITATING THE SHARE, DISCUSS, AND ANALYZE PHASE OF THE LESSON** **What two items do you think Alisha might have bought? How do you know?** • **Please show us how you figured it out.** • **Why did you choose that way/strategy?** • **How did you know that she had enough money to buy those two items?** • **What is your strategy for adding on?** • **How did you decide how much money was left?** • **Who understands the method that was just shared? Who can put the method into his / her own words?** • **Who solved for the sum in a different way? Please explain your thinking.** • **I'm hearing that there is more than one answer that works. How can we have more than one answer to a problem?** • **What's the same and what's different in the solutions shared?** • **In one strategy we added 39¢ + 22¢. What will we get if we add 22¢ and 39¢? How do adding numbers in a different order work?** • **What models can we use to show this type of problem?** • **What tools did you feel were most helpful, and how did you use them?**

Phase	RATIONALE	SUGGESTED TEACHER QUESTIONS/ACTIONS AND POSSIBLE STUDENT RESPONSES
S H A R E D I S C U S S A N D A N A L Y Z E	**FACILITATING THE SHARE, DISCUSS, AND ANALYZE PHASE OF THE LESSON (Cont'd.)** **Decomposing and Recomposing** Some students might decompose the tens and ones into other combinations, for example, paper at 32¢ may be thought of as 25¢ and 7¢. A 29¢ pencil may be thought of as 25¢ and 4¢. Two quarters is 50¢. 7¢ and 4¢ is 11¢. 50¢ and 11¢ is 61¢. Ask students how we are able to break up an amount and add it to another amount. (MP2) Looking at the solution in more than one way will deepen students' conceptual understanding and help them check to see if their answers make sense. (MP2) Allowing for multiple representations helps students to make use of structure, see patterns, and reason mathematically. Consider how you might reach your mathematical goals in the context of student thinking. This will empower them to defend their reasoning and communicate to others. (MP3, MP6, MP7) Varieties of Sharing Protocols (MP3; MP6; MP7): • Student shares own work at projecting device, or in front of class, and fields questions • Anonymous Sharing: Teacher has students write their names on the back of the paper, collects work, orders it, and projects it for the class to discuss. The student who did the work does not comment. How does this solution match the problem? What might the thinking be? How can we make it more complete? The goal is not to identify the student but instead to talk about the strategies. • Gallery Walk: Student work is posted around the room, students walk around the room to see it, teacher facilitates a discussion around specific work afterwards. • Students work in pairs to create their work with markers on construction paper and solutions are shared as above.	**FACILITATING THE SHARE, DISCUSS, AND ANALYZE PHASE OF THE LESSON (Cont'd.)** • **Your partner used a number line. You used base ten blocks. How can you use the amounts that you've chosen on a different model? What might be the same or different? Let's try different tools and find out.** **Summary** • **What are all of the different combinations of things that Alisha can buy and have change left over?** • **How did this problem help us think about strategies for adding and subtracting two-digit numbers?** • **How did working with a partner help us better understand the concept of adding and subtracting two-digit numbers?** • **Extension: How can we figure out the combinations of things that Alisha cannot buy?**

Student Store

Alisha went to the student store at lunch.

She had 70¢. She bought two items. When she left the store, she had some money left over.

Item	Cost
Pen	39¢
Stickers	22¢
Eraser	42¢
Pencil	29¢
Paper	32¢

1. Which two items could she have bought?   _____and _____

    Show how much they cost altogether with words, numbers and pictures.

Item	Cost
Pen	39¢
Stickers	22¢
Eraser	42¢
Pencil	29¢
Paper	32¢

2. How much money did she have left? _____

   Show how you figured it out in words, numbers and pictures.

Extension:

What two items could Alisha not buy? _____and _____

Show how your figured it out in words, numbers and pictures.