

Making Sense of Cents

Torriann Martyn Dooley

Objectives

What does it mean to be a “Financially Literate Citizen?” (North Carolina Department of Public Instruction [NCDPI] 2008). How do we teach students to value money as a concrete system of numbers while teaching them economically responsible ways to make meaning of the value of money? We live in a nation and in a state that continuously increases its debt and is unable to handle its financial responsibilities. Children are increasingly exposed to a world of plastic where it is modeled for them that things being purchased are done with a credit card or debit card, and the students do not witness the actual transaction of concrete money (dollars and coins) because it is done through banks. Therefore, students have a decreasing sense of how purchases actually transpire. Some students come from families and homes where the adult role models do not fully understand the meaning and value of money, and take advantage of the credit and debit system that is established and prevalent in our world today. I want to leave a financially independent legacy for my students. Since I am not financially rich, and I am without the means of being a benefactor to meet the needs and wants of all of my students, I want to share with them the wealth that I do have. I am wealthy in knowledge. I can impart to them my knowledge and wisdom and teach them to make meaning of money and how it applies to their lives. I want to empower them to understand the value of money and the responsibility they have to preserve any amount they receive or earn.

This curriculum unit is being designed for second graders, and could be modified to be used by first grade students and even extended to third graders. I am a second grade teacher in a self-contained classroom in a large suburban public school in the Charlotte Mecklenburg Schools district. My school fosters strong parental involvement and participates in the Basic School philosophy which prioritizes “The School as Community, Commitment to Character, Climate for Learning, and Curriculum with Coherence” (Boyer 1995). These priorities promote themed units with integrated connections across the subjects of math, science, social studies, and language arts. They also encourage the use of developing and using relevant and rigorous curriculum for students. The state’s Standard Course of Study, prior knowledge of students, observations and assessments inform instruction in the classroom. Student assessments include district mandated quarterly tests in the subjects of reading, writing, and math, self-reflection, portfolios, grade level pre- and post-unit assessment, formative and summative assessment, and classroom observations. In the classroom and at the school students have access to numerous technologies including computers with internet and instructional software,

calculators, overhead and data projectors, TV, VCR/DVD player, CD player, and cassette players. We have a transient student population that is growing to over 900 students and there is an approximately one to twenty-three teacher to student ratio on my grade level. The student population of my school includes 49% African American, 25% Caucasian, 11% Hispanic, and 15% other. 48% of our students qualify for free and reduced lunch. 67.4% of our 2008-2009 students passed the math end-of-grade test.

With the inherent belief that learning has to make sense to students and be relevant to their lives and their experiences, I want to use this unit to address something that is becoming increasingly important in society, but decreasingly prioritized in education. Our state just recently added money back into the measurement standard in the Standard Course of Study for second grade. Previously coins had been used as a learning tool and students had been exposed to problems to solve that involved various amounts of money, but learning the value of money and solving problems using money is now a responsibility of second grade teachers in the content areas of both mathematics and social studies. Social studies will be integrated into this curriculum unit by allowing students to “describe different types of employment and ways people earn an income, identify the sources and use of revenue in the community, and analyze the changing uses of a community’s economic resources and predict future changes” (NCDPI 2006). This is an appropriate time for students to make the connection because the idea of measurement using money is closely related to the concept of economics. There is a natural connection between the two disciplines, that when taught together students will have a stronger experience understanding both.

By the conclusion of this unit, it is the goal of second grade students to fluently identify the names of coins: penny, nickel, dime, and quarter; and their values. Students will compare quantities and fluently convert between and among the coins, i.e. trade five pennies for one nickel or five nickels for one quarter. Students will accurately solve problems involving money using multiple strategies and showing their responses in various ways, i.e. if the answer is 56 ¢ then students must be able to show change as two quarters, one nickel, one penny, as well as five dimes, six pennies, or eleven nickels, one penny, etc. It is my plan to introduce this curriculum unit towards the beginning of the school year and to build upon each lesson and skill as the year progresses, as developmentally appropriate for the students. I also intend to integrate it throughout the year and throughout other subject areas.

By providing a developmentally appropriate unit, I need to “follow a predictable sequence in which children acquire specific concepts, skills, and abilities and by building on prior experiences and understandings” National Association for the Education of Young Children [NAEYP] 2009). A developmentally appropriate place to start students gaining an understanding of money is to introduce students to coins. The North Carolina Standard Course of Study expects second grade students to “use strategies to count money collections up to one dollar, remember the names and values of coins (penny,

nickel, dime, quarter), and use the symbols \$ and ¢ properly” (NCDPI 2009). Students will use this foundation to begin to compare and convert coins. They will build an understanding that five pennies equals a nickel, or ten cents can be shown using one dime, or two nickels, or one nickel and five pennies, or ten pennies. Then students will use coin values to solve problems. Second grade students “use multiple strategies fluently to solve story problems involving addition and subtraction” (NCDPI 2009). In this unit students will have the experience of using “properties of addition to solve story problems” (NCDPI 2009) by solving problems built around coin values. It is important for students to develop an understanding of money in a relevant context. In this unit I will be posing problems involving money for students to solve. Using money will enable students to “use benchmark numbers to facilitate mental math strategies, estimation, and judging reasonableness of answers” (NCDPI 2009). Benchmark numbers in second grade include fives and tens. Instead of having students recite counting numbers by fives (5, 10, 15, 20) or tens (10, 20, 30, 40), they can do it in the context of counting coins, therefore, making the activity of counting by fives and tens more meaningful while practicing counting values of coins. Students will also “apply strategies to compose and decompose when adding and subtracting whole numbers less than 300” (NCDPI 2009).

According to the United States Mint, the idea of coins was created in 1785 when Congress decided to create its own currency modeled after the Spanish milled dollar. It was Thomas Jefferson’s legacy to divide the new money into 100 parts. The first coins were created in 1792 and made out of gold, silver and copper. They were valued as cents and half cents. In 1909 the penny features Abraham Lincoln, the first president and person to appear on a coin that was still in circulation. It was valued at 1/100 of a dollar. In 1932, George Washington appeared on the quarter dollar. In 1933, coins were no longer produced from gold, only silver. And, in 1938, Thomas Jefferson came out on the nickel, which was originally named “half disme” meaning half dime. Franklin D. Roosevelt came out on the dime in 1946 in support of his charity the “March of Dimes.” In 1965, coins were no longer minted in silver. They were made from a mixture of metals (The United States Mint 1999).

The *Curriculum and Evaluation Standards for School Mathematics* has been driving curriculum and methodology since 1989 (Fennel, Honi, Bamberger, Rowan, Sammons, and Suarez 2000). Outlining ten standards in mathematics makes the connection between content standards which “address what children learn” (Fennel, et al 2000, 2) and process standards which relate “how children learn and how information is presented” (Fennel, et al 2000, 2). This paper will establish a relationship between the content standard of Number and Operation through the use of all of the five process standards of: problem solving, reasoning and proof, communication, connections, and representation (Fennel, et al 2000, 2) through the investigation of money, specifically the coins: pennies, nickels, dimes, and quarters, and their values as expected by the 2nd grade standard course of study in the state of North Carolina. Since students will be able to manipulate physical coins, or physical models of coins, they will be “developing concepts with concrete

representations which ensure understanding and enables students to create a strong foundation on which to build” (Fennel, et al 2000). In this unit, students will develop their problem solving skills by solving problems involving money. Students will enhance their ability to reason and prove by sharing their responses. “Working on reasoning skills and having children offer explanations of their thinking to defend their answers in the primary grades helps lay the foundation for more formal mathematical argumentation in later grades” (Fennel, et al, 2000). Students will communicate their response with their peers to help their peers evaluate how they solved problems, and to demonstrate how they understand and make sense of things mathematically. They will communicate verbally as well as provide written communication throughout this unit. “As children express their ideas through oral and written language, they have an opportunity to clarify their thinking and reinforce their own comprehension of concepts they are working with. By listening to explanations given by their classmates, children are exposed to ideas they may not have thought of. This provides a greater network of connections among ideas and, in turn, enhances learning” (Fennel, et al, 2000). Students will be using concrete coins to solve problems and represent their solutions. “Representations provide vehicles for expressing and internalizing mathematical thought. They are a critical component in shaping the way children access, understand, express, and utilize mathematical ideas” (Fennel, et al, 2000). Students will combine all of these process standards to investigate and model their understanding of coins.

I am engaged in a class titled “Understanding Fundamental Ideas in Mathematics at a Deep Level” taught by Professor Harold Reiter at the University of North Carolina Charlotte. The purpose of this seminar is to gain an opportunity to experience “deep understanding of elementary ideas like place value through irresistible problems. The trick is to come up with problems with solutions that either require or strongly motivate the development of the area of mathematics to be learned. One could also take the position that mathematics is about problem solving” (Reiter, 2009). I intend to make this process relevant to the needs of my 2nd grade students by developing this curriculum unit around coins and building on the growing knowledge, learning, and understanding my students have of them. Lessons following original learning about the names of coins and their values will invoke students to solve multi-step, multi-answer problems that increase their understanding of coins and their values and fluency with counting money and counting by the numbers 1s, 5s, 10s, and 25. A source for some of these “irresistible problems” (Reiter, 2009) is Hot Math Topics: Money and Time. This book serves as a wealth of creative problems for students to solve. Additionally I will be posing problems for students to solve. I will present the problems to students to solve in a developmentally appropriate manner that allows them to work through the progression and stages of Bloom taxonomy: “remembering, understanding, applying, analyzing, evaluating and creating” (Wilson 2006).

Responding to a need of students in Singapore struggling with problem solving, mathematicians created the “Model Method” (Hong, et al, 2009) which involves students

“drawing a pictorial model to represent mathematical quantities (known and unknown) and their relationships (part-whole and comparison) given in a problem to help them visualize and solve the problem” (Hong, et al, 2009). In Singapore the “mathematics curriculum is guided by the Mathematics Framework” (Hong, et al, 2009) which includes an emphasis on the concepts of: numerical, algebraic, geometrical, statistical, probabilistic, and analytical connected to the processes of reasoning, communication and connections, thinking skills and heuristics, application and modeling (Hong, et al, 2009). All involved in the art of solving problems in mathematics. Throughout this unit, students will be engaged in the numeric concept while performing process skills as suggested by the Singapore method. Students will have the opportunity to express the reasoning for their solutions and strategies; communicate their work using pictures, models, and words; solve problems that are relevant to their experiences allowing them to make meaningful connections; utilize their thinking skills and build upon previously taught strategies; apply what they know and how they make sense of things to new situations; and they will experiment with different ways to solve problems as well as how they build the solutions. The Singapore model also encourages students to “monitor and self-regulate their problem-solving processes” (Hong, et al, 2009). Throughout this unit students will be given many opportunities to solve problems and check their work. They will demonstrate their work using “pictorial model” (Hong, et al, 2009) and using it to write an “algebraic equation” (Hong, et al, 2009).

In order for students to understand number better, they need to “recognize small groups or quantities. A major milestone occurs in the early grades when students interpret number in terms of part and whole relationships” (Chapin and Johnson 2006, 17). Students will experience this with benchmark numbers of five and ten when converting coins and realizing that five ones makes five, and two fives make ten, but so do one five and five ones. At the beginning of second grade, we do a variety of activities that give students the experience of making 10. This allows them to start composing and decomposing numbers into different parts. Some of these experiences include the game “Tens Go Fish” (Russell and Economopoulos, 2008) which is played like the game “Go Fish” except that instead of asking for a number that will make a pair, students ask for a number in order to have two (or three) cards that make ten. Another activity we use to build sense of making 10 is called “Make Ten” (Russell and Economopoulos, 2008) where students lay out 20 cards face up in an array of five by four and they take turns choosing two cards that equal ten. Students record their tens combinations for both games, and they even initiate algebraic thinking by having to choose the appropriate number to use in place of a Wild Card.

Activities and lessons will progress through the unit allowing students to use strategies set fourth by Bloom’s Taxonomy. Students will access a variety of cognitive domains in order to grow from remembering the names and values of coins to creating their own problems that compose coin values in a variety of ways. Students will judge which coins are appropriate to use in order to make a purchase.

Strategies

Before introducing the unit, I will pre-assess the students' current knowledge and understanding of coins. I model the assessment from an assessment in the Investigations curriculum that requires students to name coins, tell their value, and point to a stated coin (Russell and Economopoulos 2008). This will tell me what my students already know and which students need additional practice and experiences with building a foundation for this unit. I will use a variety of techniques to teach the students the names of coins and their values. I will choose some songs, raps, and poems from Mrs. Jones' "Money Songs, Rhymes, and Raps" website (Jones 2009) to use with the students to teach them the names and values of the coins. I will continue to assess the students and give them experiences with the coins so the students can learn the coin names and their values. I will give students an opportunity to build background knowledge about coins and the history of money as well as integrate technology by allowing students to explore age appropriate websites. There are two websites students can visit to learn about "The story of Money" (Bulaevsky 2003) which tells the story of how money was developed; and they can learn about American coins (Bulaevsky 2003) from which also includes picture representations of the coins and demonstrates the conversions among the coins.

The next goal, once students have identified coins and their values, will be for them to be able to convert and trade among coins showing values using different representations. I will initiate this process using the activity pages from "One a Penny" (Goudie 2007) that show counting and building coins from one penny to a dime. These pages can be used as an organizational map that models how coin values are equivalent. Students will use them working with a partner and communicating how they are trading their coins and why. This is something they will need to learn and memorize from repeated experiences.

Progressing from looking at and talking about the representation of equivalent trades, students will actively start trading coins by learning about a game. Students will practice trading coins by playing an Investigations game called "Collect 25 ¢" (Russell and Economopolous, 2008). Students take turns with a partner collecting the value of twenty-five cents by rolling a 1-6 number cube (dice) and counting out the number of pennies to correlate with what they roll. Students usually start the game by just laying out the number of pennies they roll and building on their amounts using pennies. As they begin to understand the relationship between pennies and nickels, they will start trading five pennies for one nickel, and build up to trading two nickels for one dime, etc. Students will progress from playing "Collect 25 ¢" to "Collect 50 ¢" where students will be expected to roll a dice and trade coins to collect the amount of 50 cents. The expectation is that with continued practice students will start to show the total amount of money that they have using the smallest number of coins. Once students have demonstrated understanding and master of "Collect 50 ¢" the expectations will heighten to have them

“Collect 75 ¢” and eventually the students will play “Collect \$1.00.” Students will progress through these games over several months and move from one to the next after showing mastery. Students who continue to struggle with “Collect 25 ¢” will have continued experience doing this with some scaffolding by the teacher or peers.

Once students have a foundation for trading coins, they will then be expected to solve story problems written about coins. These problems will be built upon the students’ skills and experience with adding and subtracting one digit and two digit numbers, as well as counting by fives and tens. Before starting this process, prior knowledge that needs to be activated is students’ literacy fluency. Students will be expected to read problems and understand what operation they need to do to solve the problems. Other prior knowledge will be fluency with adding and subtracting and solving problems using multiple strategies. Students will be expected to read the problems, figure out the operation they need to do to solve the problem, and then solve it using a strategy that is familiar to them. When writing responses, students need to show answers using a variety of coin make-ups. For example, if students are solving the problem: If Joe goes into the store and buys candy for 50 ¢ and gum for 15 ¢ how much money does he need? They will need to use a strategy to add $50 + 15$ and then the problem will be extended with students being asked to show two different combinations of coins they could use to make the total amount. Students will then have to record their response showing two quarters, one dime and one nickel, or six dimes and five pennies, or whatever other combination they can compose to show the total answer.

Students will apply their fluency for adding and subtracting one-digit and two-digit numbers as well as their fluency with trading equivalent coin values to solve higher level problems that involve multiple strategies. A source for these problems is Hot Math Topics: Money and Time (Greenes, et al, 2001). Students will work through problems related to money that will require them to work through different situations. One example problem from this is “I have 4 quarters, 3 dimes, 2 nickels, and 1 penny in my piggy bank. If I shake out 4 coins, what is the least amount of money I will get” (Greenes, et al, 2001). Another problem students will be working through is “There are 9 coins in the duck bank. At least 2 of the coins are dimes. The coins are worth 62 ¢. How many dimes are in the duck bank? Tell how you know” (Greenes, et al, 2001). Students will have access to coins to help sort out and solve these problems. They will also be able to work in pairs or in teams to solve these problems and communicate their responses. These problems utilize all of the skills and understanding the students have previously practiced related to adding and subtracting coin amounts and coin values.

Students will engage in tracking the amount of money the character Alexander has in the story Alexander, Who Used to Be Rich Last Sunday. Students will work this out either in pairs or in small groups by reading the story and calculating the money Alexander and his brothers have and lose throughout the story. The book is about a boy whose grandparents give him money that he frivolously spends and then gets angry

because he's no longer rich. Students will have the opportunity to calculate total amounts of money starting right on the first page which reads, "It isn't fair that my brother Anthony has two dollars and three quarters and one dime and seven nickels and eighteen pennies" (Viorst 1978). Students will start right there calculating the total amount of money Alexander's brother has. As the students continue to read the story, they will subtract the amount of money Alexander spends from the dollar his grandparents gave him. They will keep track of their work by recording it using coin models and numbers. Using this story enables the students to integrate the disciplines of math and literacy. It also serves as a model for students to write their own money problems. Students can demonstrate great understanding of a concept or idea, if they can create their own problem. I would like to take the idea from math and money being found in literacy and use it to have students write their own story problem involving math and money. These problems will be compiled into a class book that will be kept in the math library in the classroom. Each student will get a page to present their money story problem and show a way to work out the solution on the back of the paper. Students will be able to borrow this book to work through solving story problems that other students have created. Integrating the subjects of reading, writing, and mathematics gives the students "helps students see connections within content areas and enables them more easily to understand important concepts and ideas" (Barton and Smith 2000). Planning for an "interdisciplinary outline" requires teachers to "examine and select from appropriate content for their grade level" (Barton and Smith 2000). Alexander, Who Used to Be Rich Last Sunday is an appropriate source for this because the text is appropriate for second grade readers and it allows students to subtract money from \$1.00 or from 100 which is developmentally appropriate for second grade students. It allows for the "right degree of difficulty" (Barton and Smith 2000) and is authentic instruction because "students are engaged in research, organization, synthesis, higher level mathematical or language skills, or a combination of all of these" (Barton and Smith 2000).

Students will conclude the unit by applying their learning to a real-world context. We will take a field trip to the local grocery store and I will provide each student with one dollar. They will have to find as many things they can to purchase for a charity. I want students to have the experience of actually manipulating real money, while making a difference in society. Our school is fortunate to be located in a neighborhood where we will be able to walk to the grocery store, and the store hosts student groups for several learning purposes, so they will be able to accommodate and support the needs and interests of students spending their dollar. One of the goals as well as implications of this activity will be for students to find meaningful things to purchase with their money. Even though the objective is for them to purchase as many things as they can with their dollar, they are also making the purchase for a charity, so there will be restrictions on what they cannot purchase because it will not be accepted, or appreciated. Students and adult supporters will have a copy of the list of approved and disapproved items so they can find wanted items. Tax on items will also provide a constraint. Even though students should be aware of taxes, percentages are not developmentally appropriate for second graders.

They will however have to take it into consideration. One way to address this is to have them all calculate before leaving school how much money they can actually spend to still have enough money for their purchase which will include a tax. Although it is important for them to be aware of this up front so they do not plan on spending every amount of their dollar on items and not have enough for the tax, students will probably not understand why until later in their education. Prior to this field trip experiences, students will have the opportunity to examine the circular put out by the grocery store. The whole class will make predictions as to how many items they think they will be able to get, as well as estimate exactly how much money they think they will spend. Students receive change from making their purchases could have the opportunity to add their change with a peer (or several peers) to make as many additional purchases as possible. After students make their purchases, we will bring their items back to school so they can write about the process they went through to find items to purchase and record how they spent their dollar. This will give students an opportunity to continue to practice using money as a means to demonstrate their understanding of place value and problem solving.

I will use a variety of means to assess students' work and understanding throughout the unit. I will use checklists to assess their knowledge of the names of coins and their values, and I will conduct this several times marking dates when students have mastered knowing this information. I will record anecdotal notes when observing students interact with coins when playing "Collect 25 ¢" (and the other "Collect" games). I will reference these notes when selecting small groups of students who need remediation with this task, or need more guidance and assistance. I will score student work and create a rubric to assess how they are solving problems and if they are including the appropriate steps to problem solving when they are participating in solving various problems. All of this information will be compiled to interpret what individual students understand and where they need greater levels of support. Instruction will be differentiated and remediation will be offered to students based on their needs and level of understanding. I would also like to include a student interview in the unit, where I ask students some general questions about what they know about money and how they understand it. It would be great to video record this interview prior to starting the unit, and then again at the end of the unit to have information in the students' own words what money means to them and how they make sense of it.

Classroom Activities

Grade Level/Subject: 2 nd Grade/ Math		Topic: Making Cents in Multiple Ways
NCSCOS Standard and Objective	<ul style="list-style-type: none"> • Grade 2 Math NCSCOS 2.M.3.1 Remember the names and values of coins • Grade 2 Math NCSCOS 2.M.3.2 Use the symbols \$ and ¢ properly • Grade 2 Math NCSCOS 2.N.2.4 Apply strategies to 	

	compose and decompose when adding and subtracting whole numbers less than 300
Instructional Objective	<p><u>Performance</u> Students will interact with coin manipulatives to show varying ways to make change. Students will record their compositions on paper.</p> <p><u>Conditions:</u> Students will work individually and in groups to practice making change in a variety of ways.</p> <p><u>Criteria:</u> Students will answer the question asking “What is the most number of coins” with 100% accuracy. They will answer the remaining questions with at least 95% accuracy.</p>
Objective Rationale	Students will extend their prior knowledge of identifying coins and their values by composing assigned values in multiple ways. Students will apply the same criteria to multiple numbers.
Prerequisite Knowledge and Skills	Students know the names and values of coins (penny, nickel, dime, and quarter); they know how to flexibly compare coins (5 pennies = 1 nickel).
Key Terms and Vocabulary	Largest number, least number
Materials	“Make Change” cards (attached below) printed on card stock (one set for each group of approximately 6 students), and lined paper or a math notebook for students to record their information, coin manipulatives or real coins
Content and Strategies	
Engage	Teacher will engage students and model how to solve a problem card by gathering all students together in a whole group to model the scenario. The teacher will say, “I have some coins in my pocket and the coins make 27 ¢. What is the most number of coins I could have?” Students should respond saying, “27” and then ask one student to show by counting out 27 pennies and counting together as a group. Next the teacher will ask, “What is the least amount of coins I could have?” and the students should answer saying, “3,” and then ask them to count out one quarter and two pennies to show 27 ¢. Next ask the students to whisper to the person

	sitting next to them one other way to show 27 ¢. Then call on three students to share their response and have them also show their response using the coin manipulatives. Model for the students how to show their response in their notebook or on paper by drawing and labeling coin amounts or writing numbers and the corresponding coin words.
Explore	Students will work independently or with a partner to complete the “Make Change” cards. Students should be showing their work using the coin manipulatives as well as recording their work in their math notebook or on a sheet of lined paper.
Explain	As students are working I will ask questions about what they are doing and provide examples and clarification as needed. I will use student work samples as well as what they discuss as examples of their current level of understanding. I will review the key concepts, especially at the close of the lesson.
Elaborate/Extend	Extension activities are provided to challenge students to higher level thinking. Students could model composing coin amounts in more than three ways. They could also choose numbers not given and complete the same procedure of telling the most number of coins they could use to show the amount, the least number of coins, and three other ways.
Evaluate	I will look at and assess student work. I will look to see if they are correctly answering the questions as well as accurately composing the amounts.
Plans for Individual Differences	Students will have several cards to choose from, and they will not be required to complete all of the cards. Students will be working at their tables which are heterogeneous groups, so students can ask peers for help or ideas if they need it. If I notice students not using a variety of ways to compose numbers, I will encourage them to think of strategies that they have not used (for example, if they never mention the dime, I will ask them how they could show the number using dimes). Students will have access to the coin manipulatives if they want to use them to help them compose values in different ways. Extension activities are

	provided to challenge students.
--	---------------------------------

<p align="center">“Make Change” Card 1</p> <p>You have 76 ¢ in your pocket. What is the most number of coins you could have? What is the least number of coins? What are three more ways to show 76 ¢?</p>	<p align="center">“Make Change” Card 2</p> <p>You have 99 ¢ in your pocket. What is the most number of coins you could have? What is the least number of coins? What are three more ways to show 99 ¢?</p>
<p align="center">“Make Change” Card 3</p> <p>You have 25 ¢ in your pocket. What is the most number of coins you could have? What is the least number of coins? What are three more ways to show 25 ¢?</p>	<p align="center">“Make Change” Card 4</p> <p>You have 57 ¢ in your pocket. What is the most number of coins you could have? What is the least number of coins? What are three more ways to show 57 ¢?</p>
<p align="center">“Make Change” Card 5</p> <p>You have 83 ¢ in your pocket. What is the most number of coins you could have? What is the least number of coins? What are three more ways to show 87 ¢?</p>	<p align="center">“Make Change” Card 6</p> <p>You have 16 ¢ in your pocket. What is the most number of coins you could have? What is the least number of coins? What are three more ways to show 16 ¢?</p>
<p align="center">“Make Change” Card 7</p> <p>You have 38 ¢ in your pocket. What is the most number of coins you could have? What is the least number of coins? What are three more ways to show 38 ¢?</p>	<p align="center">“Make Change” Card 8</p> <p>You have 42 ¢ in your pocket. What is the most number of coins you could have? What is the least number of coins? What are three more ways to show 42 ¢?</p>
<p align="center">“Make Change” Card 9</p> <p>You have 12 ¢ in your pocket. What is the most number of coins you could have? What is the least number of coins? What are three more ways to show 12 ¢?</p>	<p align="center">“Make Change” Card 10</p> <p>You have 89 ¢ in your pocket. What is the most number of coins you could have? What is the least number of coins? What are three more ways to show 89 ¢?</p>
<p align="center">“Make Change” Card 11</p> <p>You have 31 ¢ in your pocket. What is the most number of coins you could</p>	<p align="center">“Make Change” Card 12</p> <p>You have 77 ¢ in your pocket. What is the most number of coins you could</p>

have? What is the least number of coins? What are three more ways to show 31 ¢?	have? What is the least number of coins? What are three more ways to show 77 ¢?
---	---

Grade Level/Subject: 2 nd Grade/ Math		Topic: Problem Solving
NCSCOS Standard and Objective	<ul style="list-style-type: none"> • Grade 2 Math NCSCOS 2.M.3.1 Remember the names and values of coins • Grade 2 Math NCSCOS 2.M.3.2 Use the symbols \$ and ¢ properly • Grade 2 Math NCSCOS 2. N.S Use multiple strategies fluently to solve story problems involving addition and subtraction • Grade 2 Math NCSCOS 2.N.2.4 Apply strategies to compose and decompose when adding and subtracting whole numbers less than 300 	
Instructional Objective	<p><u>Performance</u> Students will identify items they could purchase with a given amount of money.</p> <p><u>Conditions:</u> Students will work individually and in groups to solve problems</p> <p><u>Criteria:</u> Students will solve the problems with 90% accuracy. They will show coin combinations to represent the solution with 100% accuracy.</p>	
Objective Rationale	Students will extend their prior knowledge of identifying coins and their values by composing assigned values in multiple ways. Students will apply the same criteria to multiple numbers.	
Prerequisite Knowledge and Skills	Students know the names and values of coins (penny, nickel, dime, and quarter); they know how to flexibly compare coins (5 pennies = 1 nickel); they can add and subtract two-digit numbers; they can write equations	
Key Terms and Vocabulary	purchase, change, equation	
Materials	picture/amount cards (attached below) printed on card stock (one set for each group of approximately 6 students) and put in baggies labeled “school supply items,” “yard sale items” or “supermarket items, ” record sheet, coin manipulatives or real coins	

Content and Strategies	
Engage	Teacher will call students together in whole group or small group and say, "Today we're going to pretend we're going shopping. In each bag are items you could purchase. We have to figure out how much we would spend if we purchased everything, as well as what we could buy if we only had a set amount of money." Show the three different bags to the students and the record sheet.
Explore	Students will work independently or with a partner to complete the record sheet. Students should be moving cards around and calculating amounts. They should also be using the coin manipulatives to help them figure out coin amounts.
Explain	As students are working I will ask questions about what they are doing and provide examples and clarification as needed. I will use student work samples as well as what they discuss as examples of their current level of understanding. I will encourage students who are only choosing one item to try to find two or three items to purchase within the suggested spending amount. I will ask students to share what they've learned or chosen at the close of the lesson. Since the questions are open-ended, we will discuss why different choices can be correct.
Elaborate/Extend	Students can attempt to calculate and correctly record responses using dollars and cents. Students can also choose change amounts not listed and try to figure out what they could purchase. Students could "play" store with their peers where they price different items in the classroom and try to purchase them from one another.
Evaluate	I will look at and assess student work. I will look to see if they are correctly answering the questions as well as accurately composing the amounts.
Plans for Individual Differences	Students will be working at their tables which are heterogeneous groups, so students can ask peers for help or ideas if they need it. The School Supplies cards are in increments of fives and tens, so they are easier numbers for students to manipulate. I will encourage students who struggle with adding & subtracting to start with that bag. If I notice students not using a variety of ways to compose numbers, I will encourage them to think of strategies that they have not used (for example, if they never mention the dime, I will ask them how they could show the number using dimes). Students will have access to the coin

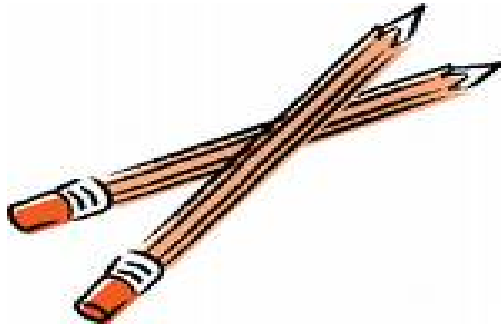
	manipulatives if they want to use them to help them compose values in different ways. Extension activities are provided to challenge students.
--	--

scissors



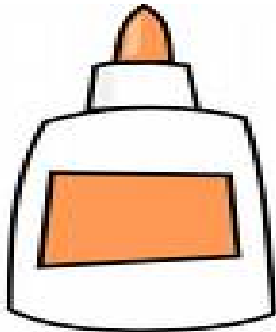
15 ¢

pencils



5¢

glue



25 ¢

notebook



50 ¢

markers



60 ¢

crayons



45 ¢

gum



17¢

can of soup



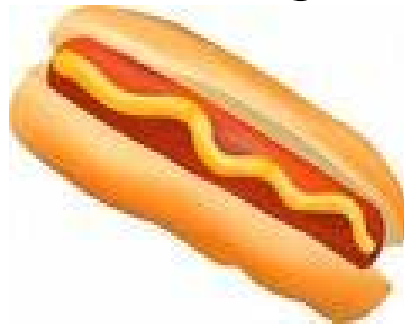
36 ¢

macaroni



74 ¢

hot dog



28 ¢

pizza



46 ¢

apple



23 ¢

Barbie



47 ¢

Yu-Gi-Oh Cards



7 ¢

doll



29 ¢

Hot Wheels



14 ¢

book



21 ¢

t-shirt



39 ¢

Name _____ Date _____ # _____

Circle which bag you're working with:

School Supplies

Supermarket

Yard Sale

Directions: Pretend you are going shopping. Answer the following questions using the items in your bag. Show your work.

If you were going to purchase everything in your bag, how much money would you need?

What coins would you use and how many of each?

_____ quarters _____ dimes _____ nickels _____ pennies

What could you buy with 56 ¢?

How much change would you have left over?

What coins could you have left over?

What could you buy with 99 ¢?

How much change would you have left over?

What coins could you have left over?

Grade Level/Subject: 2 nd Grade/ Math		Topic: Problem Solving
NCSCOS Standard and Objective	<ul style="list-style-type: none"> • Grade 2 Math NCSCOS 2.M.3.1 Remember the names and values of coins • Grade 2 Math NCSCOS 2.M.3.2 Use the symbols \$ and ¢ properly • Grade 2 Math NCSCOS 2. N.S Use multiple strategies fluently to solve story problems involving addition and subtraction • Grade 2 Math NCSCOS 2.N.2.1 Remember addition and related subtraction facts to develop fluency • Grade 2 Math NCSCOS 2.N.2.2 Use the properties of addition to solve story problems • Grade 2 Math NCSCOS 2.N.2.3 Use benchmark numbers to facilitate mental math strategies, estimation, and judging reasonableness of answers • Grade 2 Math NCSCOS 2.N.2.4 Apply strategies to compose and decompose when adding and subtracting whole numbers less than 300 	
Instructional Objective	<p><u>Performance</u> Students will solve story problems involving money scenarios. Students will create their own money story problem for others to solve.</p> <p><u>Conditions:</u> Students will work individually and in groups to solve problems and create problems.</p> <p><u>Criteria:</u> Students will solve the given problems with 90% accuracy. They will show coin combinations to represent the solution with 100% accuracy.</p>	
Objective Rationale	Students will solve story problems that contain financial situations. They will record their solutions by recording the response with possible coin combinations that represent the solution. They will create problems that make sense for their peers to solve.	
Prerequisite Knowledge and Skills	Students know the names and values of coins (penny, nickel, dime, and quarter); they know how to flexibly compare coins (5 pennies = 1 nickel); they can add and subtract two-	

	digit numbers; they can write equations
Key Terms and Vocabulary	equation
Materials	story problem cards (attached below) printed on card stock (one set for each group of approximately 6 students), paper, coin manipulatives or real coins, paper
Content and Strategies	
Engage	Teacher will model solving one of the problem solving cards. Teacher will engage students into helping work out the solution and model possible ways to create the solution using different coin representations.
Explore	Students will work independently or with a partner to solve the problems. Students can complete as many problems as they are able to in the designated time. They should also be using the coin manipulatives to help them figure out coin amounts. Students will use the experience they gained from solving problems to create their own similar problems for others to solve.
Explain	As students are working I will ask questions about what they are doing and provide examples and clarification as needed. I will use student work samples as well as what they discuss as examples of their current level of understanding. I will encourage students who are using the same coins to represent solutions to think of other combinations that will represent the amount. I will ask students to share what they've learned or chosen at the close of the lesson. Since the questions are open-ended, we will discuss why different choices can be correct.
Elaborate/Extend	Students will create their own story problems involving financial situations where they can add and subtract numbers and represent solutions in multiple ways.
Evaluate	I will look at and assess student work. I will look to see if they are correctly answering the questions as well as accurately representing the amounts in a variety of ways.

Plans for Individual Differences	<p>Students will be working at their tables which are heterogeneous groups, so students can ask peers for help or ideas if they need it. Some of the problem cards are in increments of fives and tens, so they are easier numbers for students to manipulate. I will encourage students who struggle with adding & subtracting to start with those problems. If I notice students not using a variety of ways to represent solutions, I will encourage them to think of representations they have not used (for example, if they never mention the dime, I will ask them how they could show the solution using dimes). Students will have access to the coin manipulatives if they want to use them to help them compose values in different ways. Extension activities are provided to give students opportunity to use higher level thinking skills in creating their own work.</p>
---	---

<p>Jamariious goes to the store and picks out two video games to rent. One costs 37 ¢ and the other costs 32 ¢. He has three quarters in his pocket.</p> <p>*Does he have enough money to rent the video games? *If so, how much money will he get back? What coins will he get back? *If not, how much more money does he need?</p>	<p>Aaliyah's grandfather gave her 14 coins that equaled 90 ¢. What coins did he give her?</p>
<p>Kayla is shopping at a yard sale and wants to buy a CD that costs 47¢. She has three dimes and two nickels in her pocket.</p> <p>*Does she have enough money to buy the CD? *If so, how much money will she get back? What coins will she get back? *If not, how much more money does she need?</p>	<p>Jordan earned 75 ¢ for making his bed. His mother gave him six coins. What coins did she give him?</p>
<p>Lawrence wanted to buy a can of coke for himself and his brother. One can costs 45 ¢. He had three quarters, one dime, one nickel, and three pennies.</p> <p>*Does he have enough money to the cokes? *If so, how much money will he have left over? What coins will he have left over? *If not, how much more money does he need?</p>	<p>Money fell out of Jaida's wallet. She had 87 ¢ and now she only has two dimes.</p> <p>*How much money did she lose? *What coins did she lose if she originally had 10 coins?</p>

Resources

- Barton, Keith C. and Lynne A. Smith, 2000. Themes or motifs? Aiming for coherence through interdisciplinary outlines. *The Reading Teacher*: 54 (1): 54-63.
- Boyer, Ernest L., 1995. *The basic school: A community for learning*. San Francisco: The Carnegie Foundation for the Advancement of Teaching.
- Bulaevsky, Jacobo, 2003. *The story of money*. Retrieved online {09/09/2009} from URL: <http://arcytech.org/java/money/history.html>
- Bulaevsky, Jacobo, 2003. *Learning about American coins*. Retrieved online {09/09/2009} from URL: http://arcytech.org/java/money/learn_coins.html
- Chapin, Suzanne H. and Art Johnson, 2006. *Math Matters: Understanding the math you teach*. Sausalito: Math Solutions Publications.
- Fennel, Francis, Honi J. Bamberger, Thomas E. Rowan, Kay B. Sammons, and Anna R. Suarez, 2000. *Connect to NCTM standards 2000: Making the standards work at grade 2*. Chicago: Creative Publications, Inc.
- Greenes, Carole, Linda Schulman Dacey, and Rika Spungin, 2001. *Hot math topics: Money and time*. Parsippany: Dale Seymour Publications.
- Goudie, Marcia (2007). *One a penny*. Retrieved online {09/19/2009} from URL <http://www.marcias-lesson-links.com/One%20a%20Penny.pdf>
- Hong, Kho Tek, Yeo Shu Mei, and James Lim, 2009. *The Singapore model method for learning mathematics*. Singapore: Ministry of Education.
- Jones, Sandra (2009). *Money activities and info – Songs, rhymes, and raps*. Retrieved online {09/19/2009} from: URL <http://www.mrsjonesroom.com/songs/money.html>
- National Association for the Education of Young Children (2009). *Developmentally appropriate practice in early childhood programs serving children from birth through age 8*. Retrieved online {10/16/2009} from: URL <http://www.naeyc.org/files/naeyc/file/positions/position%20statement%20Web.pdf>
- North Carolina Department of Public Instruction (2009). Essential standards for K-5 mathematics. Retrieved online {09/19/2009} from: URL. <http://www.ncpublicschools.org/curriculum/mathematics/scos/>

- North Carolina Department of Public Instruction (2008). *Nicky*. Retrieved online {09/19/2009} from: URL <http://www.dpi.state.nc.us/docs/curriculum/socialstudies/elementary/nicky.pdf>
- North Carolina Department of Public Instruction (2006). *Essential standards for elementary social studies*. Retrieved online {09/19/2009} from: URL <http://www.dpi.state.nc.us/curriculum/socialstudies/scos/2003-04/024secondgrade>
- Reiter, Harold, 2009. *Understanding fundamental ideas in mathematics at a deep level*. Retrieved online {09/19/2009} from: URL <http://math.uncc.edu/~hbreiter/Yale/>
- Russell, Susan J. and Karen Economopoulos, 2008. *Investigations in number, data, and space grade 2*. Glenview: Pearson Education, Inc.
- The United States Mint, 1999. *H.I.P. pocket change: Historic highlights*. Retrieved online {09/19/2009} from URL <http://www.usmint.gov/kids/campCoin/timeline/>
- The United States Mint, 1998-2000. *Circulating coins*. Retrieved {09/19/2009} from: URL http://www.usmint.gov/mint_programs/circulatingCoins/
- Viorst, Judith, 1978. *Alexander, who used to be rich last Sunday*. New York: Aladdin Paperbacks.
- Wilson, Leslie Cook, 2006. *Beyond Bloom - A new version of the cognitive taxonomy*. Retrieved online {10/10/2009} from URL <http://www.uwsp.edu/education/lwilson/curric/newtaxonomy.htm>