Overview:

This unit will enable you, the teacher, to use real life issues to teach basic math skills. Using money to help you to teach decimals is a way to bring it home for the students, that math is a necessity no matter what you do in life, because everybody uses money to live.

This unit intended for 5th, 6th, 7th, 8th or 9th grade students who are struggling with basic math concepts. In this unit you will teach students about math with signs, decimals and fractions by using a checkbook register and real life situations. After two to three weeks of lessons, you can use this as a 10 minute “Do Now” at the beginning of class or a 10 minute “Closer” at the end of class.

Students will learn how to add and subtract negative and positive numbers by learning about and then creating a number line to display around your room for the students to use as a guide all year. They will also learn about calculating percents and decimals and then adding and subtracting them. Fractions could also be another subject that could be addressed.

They will also be able to make decisions about how they spend their money or save it. They will learn about a checking account and how to make it work for them, by avoiding high fees and charges by not making costly mistakes due to inaccurate records.

The last stage will be to teach the students about how to balance a checkbook register to a bank statement each month.

Rationale:

My motivation for doing this curriculum is the answers I got from my 9th grade students when I asked them to subtract 3.50 from 200. Most of them gave me an answer of 1.50, not 196.50. Just recently, they were asked to subtract 1 from .85. Most of them gave me
an answer of .84, not negative .15. If students are able to see decimals as dollars and cents, they may be more careful when adding and subtracting. I would hope that if they gave someone $200 for a $3.50 charge and only got $1.50 back, they would start to think something is really wrong here and rethink about how to work with decimals.

When students have a hand in what they are learning, they are more likely to be enthusiastic about learning. In this checkbook project, the students will help you to create the daily entries that they will eventually enter in their checkbook journals and make decisions about what they want to spend their money on, or not spend their money on. Because of this hands on decision making, they will be eager to do the work and, “Heavens Forbid!”, do the math.

The students will see signed numbers in a different light. Usually, when you ask students to add/subtract with signed numbers, a look of panic comes over their faces. If you talk about money in terms of earnings (positive) and spending (negative), they will be able to understand better about signed numbers. Understanding that if you have a paycheck worth $30, but you want to buy a pair of sneakers (kicks) for $55, means that you now have an equation of 30 - 55, that equals -25. What does this mean to them? They can see that this negative number means that they need to earn another $30 paycheck in order to have enough money to buy that new pair of sneakers. The new equation would be 30 - 55 + 30, which equals +5. They understand that the +5 means that they will have 5 bucks to go to the food cart in their new kicks to get some Chinese food and a soda. That they understand.

When I ask students to work on a math problem, they always say, “When am I going to use this in real life, Mrs. Baxt? How is solving systems of linear equations going to help me if I am not going to college?” My response is always, “It will help you graduate high school and prepare you to be disciplined for a better future.” With this project, you can tell them without a doubt, that they will use this in their every day life as every family or single, adult person who is self sufficient, has a checking account. One of my pet peeves is when I hear horror stories about young adults who open new checking accounts without any idea how to maintain a balance and start bouncing checks and overdrawing their checking account to the tune of big fees and fines. In this case, knowledge is money in the bank.

In 1990, according to the National Assessment of Educational Progress, 67% of 4th grade students scored at or above average in simple arithmetic and problem solving. After being exposed to a new, real world, teaching method for 2 years, in 1992 their scores went up to 72% of 4th grade students scored at or above average in simple arithmetic and problem solving.

One problem that is considered “old school” that was once widely taught to third graders is: "A boy has three apples and eats one. How many apples does he have left?" This problem is very simple; 3 - 1 = 2. Bob Bernstein, a math teacher in Philadelphia overseeing the introduction of the new real life standards in a model program in 12 schools, instructs teachers to now ask: "Three boys have two apples. How do we share?"
The new way promotes reading, understanding, thinking, problem solving, organization skills and writing skills. The students have to be able to read the problem and understand what information is being given and what question(s) is being asked of them to solve. They have to start thinking about all the information they are given, use their organizational skills and start problem solving. After they have done all this and have the answer, then they get to put their thought process on paper, along with their answer, using their writing skills to clearly communicate their thoughts on paper. This is so much more than a simple math problem with numbers, an operation sign and an equal sign. This gets kids thinking and using their brain. Everyone knows that the brain is a muscle and if it is not used it atrophies, but using it makes it stronger.

**Objectives:**

After completing this unit, the students will be able to add, subtract, multiply and divide positive and negative (signed) numbers. They will also be able to construct a portion of a number line and help hang it in the proper order around the room. In addition, they will be able to add, subtract, multiply and divide using decimals only, as well as decimals and whole numbers. The number line project is to be done as a class, with each student doing their own assigned portion of the number line.

The final task they will be able to complete is to keep an individual check book journal, make informed decisions about how to spend or save their own money and balance a simulated bank statement with their check book journal.

The four Pennsylvania Academic Standards that are covered in this unit are 2.1., 2.1.8, 2.2 and 2.2.8.

By doing the number line class project, you are touching on standard 2.1. - Numbers, Number Systems and Number Relationships, Types of numbers (e.g., whole, prime, irrational, complex), Equivalent forms (e.g., fractions, decimals, percents) and 2.1.8. - Represent and use numbers in equivalent forms (e.g., integers, fractions, decimals, percents, exponents, scientific notation, square roots). Use the number line model to demonstrate integers and their applications.

When introducing the addition, subtraction, multiplication and division of numbers without decimals, we are touching on standard 2.2. - Computation and Estimation, Basic functions (+, -, ), Reasonableness of answers, Calculators.

We touch on standard 2.2.8. - Add, subtract, multiply and divide different kinds and forms of rational numbers including integers, decimal fractions, percents and proper and improper fractions. Estimate amount of tips and discounts using ratios, proportions and percents when we introduce basic calculations with money such as adding and subtracting in their checkbook journal and calculating percentages for sales tax or discounts.
Strategies:

Establish Routines - By having a set routine, students are less afraid to come to class because they know what is coming. Students love routine because change is scary for them. By having an opening task such as the checkbook journal, a “Do Now” or journal question to begin class with, they will feel more as ease with coming to class and be on time as well.

The creation of a Number Line - creating a number line as a class project is something the students can call their own. It also gives them ownership of the classroom because I will usually be long enough to be hung around the entire perimeter of the classroom.

Math Journaling - This is a perfect way to incorporate Math and English skills. I love to have a math journal question as my “Do Now” because it is a great introduction into the lesson for the day.

One journal question I did the other day, was for a topic to teach the students about factoring, using a tool I call a factoring bridge. My journal question was; “What is a bridge? What is factoring? What do you think is a factoring bridge?” All the students knew what a bridge was, it connects two sides of a road to go over water or train tracks. They knew that factoring was finding the numbers that multiply together to equal a larger number. They guessed that a factoring bridge is a tool to use to connect the numbers that multiply together, which is correct. An example is; find the factors of 24. First, start out with 1, some empty space and 24 on the other side. Next, start filling in the other factors of 24, in pairs. Second step, 1, 2, 12, 24. Third step, 1, 2, 3, 8, 12, 24. Fourth step, 1, 2, 3, 4, 6, 8, 12 24. The students learned that by building their factoring bridge inward, they didn’t miss any of the sets of factors.

Small Groups - Use small groups of students, either 3 or 4 together. Try to group them based on this combination which works for me; 1 hyper or creative student, 1 quiet or serious student, 1 popular student and 1 organized student. Make sure they know that they are all going to get the same grade.

Classroom Discussions - Every so often, to gain control of the class, you should have them stop their group work and have a classroom discussion or lesson about the next step they need to take to progress with the project. Make sure that at least one person in each group is participating, so that they can fill in the others that are not listening.

Think, pair, share - When the students are in their groups, you want to ask them to do a think, pair, share. You can ask them questions to be answered individually and then at your instruction, go back in their groups and share their answers with each other. This process will get the group members communicating with each other about the project.

Independent work - Although, you want the students in small groups most of the time,
you will also want them to do independent work as well. In a group, there will always be a student who does nothing but copy from the other students who are working. If you give them work that they have to do on their own, like eventually keeping their own checkbook journal, which can't be copies because each journal will be different from each other, they will have to prove themselves eventually. Hopefully, they don’t prove to you that they don’t want to do anything at all.

No calculators - This is a strategy that only you, the teacher, can decide what is best for your set of students. According to John Saxon, a math textbook publisher in Norman, Okla. and a former college math instructor, he states, "My contention is that the calculator will cause short-term gains in a few students and long-term damage to many. It won't become apparent for another 10 to 12 years, at which point it will be distressingly apparent." There are arguments on both sides whether to use them or not. Given that most phones have calculators on them, my feeling is to use them, but I also cringe at the thought of a student needing a calculator to subtract $.34 from $1.57. The question is, do you give the students this crutch or not?

Classroom Activities:

You will start by teaching the basic math skills needed to be able to use a checkbook register. These will be full class lessons for about 2 to 3 weeks, depending on the ability of your students to move to the next level. After the skills are mastered, you can use the checkbook registers as an opening or closing 10 minute filler lesson.

Lesson #1

Introduction
The unit will consist of first teaching the number line, so students will be able to understand positive and negative numbers. They will also be able to add and/or subtract these positive and negative numbers. The use of math journaling as an opener to present that days lesson is strongly suggested. In this portion of the unit, the students will create their own portion of a large number line using construction paper and crayons, that will be displayed around the classroom for the students to use as a tool during the school year. The number line part will take between 3 to 7 days to complete, depending on the size of your class and the absentee rate of your class. Remember, each number has to be accounted for, so if students don’t do a number because they are absent, you have to assign that number to another student for extra credit or do it yourself.

Activity
You will create an example of what you want it to look like; the size of the paper, the positioning of the numbers on the paper and the size of the numbers on the paper. Your example should have zero in it and at least one negative number and one positive number. Example; -1, 0, 1 or -2, -1, 0, 1, 2. Decorate it with hobbies or your favorite music artist or sport to make it your own.
This is how you determine each student’s set of numbers. Determine if you want three,
four or five numbers on each piece of paper. For this example’s sake, let us say that we want three numbers for each student’s paper. Then take a notebook and write sets of three numbers starting with what you ended with on your example, in this case you ended with -1 and 1. Keep positive number sets on the right side of the paper and negative number sets on the left side of the paper. Make sure you do this before the class starts. I have gone as high as -169 and +169. Here is an example;

-4 -3 -2     2 3 4
-7 -6 -5     5 6 7

This is the hardest part. Try not to assign the same set of numbers to more than one student. As soon as you assign a set of numbers, write the students name next to the set. When assigning number sets, take into consideration if the student can understand the concept of writing negative numbers for the number line, in other words, only assign negative numbers to the more advanced students. The reason is that for the number line, negative numbers will be written from lowest negative number to highest negative number which is really the highest absolute value to the lowest absolute value. This could be very confusing for some students. For example, when assigning negative two to negative four, it would be written as -4, -3, -2, but positive two to positive four would be written as 2, 3, 4.

Make sure to allow them the freedom to decorate their piece so they make it their own. Of course make sure they have restrictions like, no cursing, no nudity and no gang symbols.

Assess them based on accuracy, neatness, completion and creativity.

Lesson #2

Introduction
After they have mastered using positive and negative numbers, you will move on to decimals. Again, the use of math journaling as an opener to present the days lesson is strongly suggested.

Activity
You will talk about how they spend their money and how they know they are getting their correct change. You will start small by adding and subtracting with decimals, finding where decimals are on whole numbers. After they can see that 1, $1 and 1.00 are the same thing, we can move on to multiplying with decimals by helping them to calculate taxes on something they would buy, like music cd’s or taxable specialty clothing or sneakers.

Lesson #3

Introduction
At this point an optional lesson could be to teach dividing with decimals. Try a journal question like, “How many decimal places does money have?” Remind the students that money always has 2 decimal places.

Activity
This could be very tricky with 9th graders. I would talk about division with whole numbers first, then move onto division with decimals. It could be tied into the Balancing Act by talking about buying items in sets or portions of a whole, like BOGO (buy one, get one half off) at Payless Shoes (ask them how much each pair of shoes would wind up costing you), which would allow you to talk about fractions.

Lesson #4

Introduction
Take the students on a trip to a local bank. This will help them to see what happens to their money when it is deposited into their checkbook. They can also see what happens when they write a check, use their mac card or make a withdrawal from a mac machine.

Activity
Have the students take notes about what they saw. Assign some students to take notes on deposits, others about withdrawals and the rest about the different bank personnel. When they get back to class, have the different groups write a one page paper and present their findings to the class.

Lesson #5

Introduction
This lesson will show them exactly what they need to do to make their dreams as an adult come true. Using the computer, they will play a game that will tell them what they need to earn in order to live their desired life style. Try this journal question; “Where do you see yourself in five years?”

Activity
Have the students go online, in class or at home, and play the two games suggested in the student bibliography. The first one is called Jump$tart. It is a way for them to choose what life style they want when they start working and what schooling and earnings they will need to accomplish that goal. The second one is called the Financial Champions Game. It is a game that will test their decision making skills and teach them about banking and money in a way that is not threatening. They can play each game multiple times. Have them print their results page and bring it into class for a class discussion of their results. I would suggest that you, as their teacher, do it too.

Lesson #6

Introduction
Once the basic skills of adding, subtracting, multiplying and dividing positive numbers, negative numbers and decimals are mastered, you can move on to using the checkbook register for them to keep track of their money. This is the fun part and where you can get really creative.

Activity
You can create jobs that students can choose from, that they can really do at this point in their lives like; dog walker, cashier at corner store, babysitting, lawn mowing, snow shoveling or helping out the elderly in their neighborhood with running errands for them. You can assign an hourly wage for each job and decide how many hours each student could work and still keep up their class work. They would start out their checkbook register by logging their first paycheck.

After deciding on the jobs, they would each take ten small pieces of paper and write on them ten different things they would like to buy with their money and how much it would cost with taxes included. These would then be put into a big fish bowl. You could add your own pieces of paper with entries like, “Your grand mom came over on Sunday and gave you $5”, “Your shoe lace broke and you had to buy new ones for $1.59 with 7% tax”, “You lost your notebook and you had to buy a new one for $8.99 with no tax”, “It’s your birthday and Auntie gave you $20. Happy Birthday!”, “You took your girl/guy to the food cart and bought her/him a soda and chips that cost $1.75 with no tax”, “You did a really great job this week and was given a 10% tip of your weekly paycheck from this week”, “You did an outstanding job this week and was given a 15% tip of your weekly paycheck from this week”, “You went above and beyond what was expected of you this week and was given a 20% tip of your weekly paycheck from this week”. Each day, they would pick from the big fish bowl, one of the little pieces of paper with an entry on it and log it into their checkbook register. If the item costs more than they have in their checkbook, they can choose to put it back in the fish bowl. Each week they would log their paycheck, hopefully keeping a positive balance in their checkbook. Don’t forget to impose fees if they go in the red or go below their balance.

You can take it one step further by creating a bank statement for each student to balance their checkbook register monthly, if you feel they could do it.

This unit is designed for 5th, 6th, 7th, 8th or 9th grade students who are just starting to work odd jobs and handling money. It is a great way for these students to learn how to manage their money and be able to make smart choices with the money they earn. It will also help them to understand the basic math skills needed to perform Algebra and Geometry that is required for High School which fits into SDP Curriculum.

**Teacher’s Annotated Bibliography:**


Chapter 1, Balancing Your Checkbook - Motivating yourself to maintain your balance correctly, Easy steps for balancing checkbooks, More checking details, Approximation, or “good enough” checking.

Chapter 7, Percentages - Percentages and fractions, Mark-ups and mark-downs, Useful percent tricks, Percent idiocy in the news.

Chapter 15, How Classroom Math Connects to Business Math - A few bitter remarks about high school math, Sums in algebra, sums in money, Geometry on plywood, Thinking about risk.
Student’s Annotated Bibliography:

When the teacher instructs you to, the students should go online and play these two math games, then print your results page and bring it to class for a classroom discussion about everyone’s results

http://www.jumpstart.org/madmoney/pgv_money_re_main.html

http://pa4h.cas.psu.edu/FinancialChampions/index2.htm

My Annotated Bibliography:

Charles Seiter, Ph.D., New York; Hungry Minds, Inc., 1995, Everyday Math for Dummies,
Chapter 1, Balancing Your Checkbook - Motivating yourself to maintain your balance correctly, Easy steps for balancing checkbooks, More checking details, Approximation, or “good enough” checking.
Chapter 5, Taxes and Paychecks - Understanding what all those numbers on your paycheck mean, Filling out your W-4, Determining how much Federal tax to have withheld, “Good enough” tax guessing, Special advice for the self-employed.
Chapter 7, Percentages - Percentages and fractions, Mark-ups and mark-downs, Useful percent tricks, Percent idiocy in the news.
Chapter 15, How Classroom Math Connects to Business Math - A few bitter remarks about high school math, Sums in algebra, sums in money, Geometry on plywood, Thinking about risk.
Chapter 16, Tipping - Tipping and American sociology, The easiest tipping rule on Earth, High-end tipping, Tipping for groups of four and six.

Lisa R Jackson and James L. Rodriguez, guest editors; editors, Richard M. Lerner and Celia B. Fisher School matters: pathways to academic success among African American and Latino adolescents

John B. Hamilton and Herbert E. Buchanan; edited by George William Myers, Elements of high school mathematics: comprising arithmetic, practical geometry and algebra.

Peer tutoring: a study of its effect on mathematic achievement and attitude of ninth grade math I students of Harrisburg High School.

http://middle-school-curriculum.suite101.com/article.cfm/the_pythagorean_theorem


Resources:

Check book registers - at least one for every student and then have 30 extra for new students and lost or stolen registers.
A fish bowl or large container - to hold the daily entries the students will pick each day. Preferably something that is opaque (so students cannot see what they are picking) with a large opening (so students can put their hand in to pick an entry).
Pencils
Paper
Calculators - maybe/maybe not
For the number line -
  Construction paper or poster paper
  Crayons or Markers
  Pencils
  Rulers or yard sticks
  Scissors
  Staples, tacks, tape, string or poster putty - a way to hang the number line around the wall in your room.

Appendices-PA State Standards:

2.1. Numbers, Number Systems and Number Relationships, Types of numbers (e.g., whole, prime, irrational, complex), Equivalent forms (e.g., fractions, decimals, percents)

2.1.8. - Represent and use numbers in equivalent forms (e.g., integers, fractions, decimals, percents, exponents, scientific notation, square roots).
  - Use the number line model to demonstrate integers and their applications.

2.2. Computation and Estimation, Basic functions (+, -, , ), Reasonableness of answers, Calculators

2.2.8. - Add, subtract, multiply and divide different kinds and forms of rational numbers including integers, decimal fractions, percents and proper and improper fractions.
  - Estimate amount of tips and discounts using ratios, proportions and percents.