Candies™ and Cash!

Student/Class Goal
Students often encounter integers in everyday life, but are unsure how to perform mathematical operations with these numbers.

Outcome (*lesson objective)*
Students will be able to solve addition, subtraction, multiplication, and division problems using integers, understand the concept of absolute value, and apply these methods to real-world events.

Time Frame
2 hours

Standard *Use Math to Solve Problems and Communicate*

NRS EFL 4-6

Number Sense	Benchmarks	Geometry & Measurement	Benchmarks	Processes	Benchmarks
Words to numbers connection		Geometric figures		Word problems	4.25, 5.25, 6.26
Calculation	4.2, 5.1, 6.1	Coordinate system		Problem solving strategies	4.26, 5.26, 6.27
Order of operations	5.2, 6.2	Perimeter/area/volume formulas		Solutions analysis	
Compare/order numbers		Graphing two-dimensional figures		Calculator	4.28, 5.28, 6.29
Estimation		Measurement relationships		Mathematical terminology/symbols	4.29, 5.29, 6.30
Exponents/radical expressions		Pythagorean theorem		Logical progression	
Algebra & Patterns	**Benchmarks**	Measurement applications		Contextual situations	4.31, 5.31, 6.32
Patterns/sequences		Measurement conversions		Mathematical material	
Equations/expressions		Rounding		Logical terms	
Linear/nonlinear representations		**Data Analysis & Probability**	**Benchmarks**	Accuracy/precision	
Graphing		Data interpretation		Real-life applications	
Linear equations		Data displays construction		Independence/range/fluency	
Quadratic equations		Central tendency			
		Probabilities			
		Contextual probability			

Materials
White board
Base 10 or base 20 individual dry erase boards
Number tiles, number line
Picture of a thermometer
Calculators
Two pairs of shoes
Bookkeeping ledger
Integer Word Problems Handout

Learner Prior Knowledge
Addition, subtraction, multiplication, and division of positive whole numbers, decimals, and fractions.

Instructional Activities
Step 1 - The teacher will demonstrate the concept of matched and mismatched shoes to illustrate the rules for multiplying and dividing integers. If a pair of shoes matches, regardless of whether the shoes are red or black, it is positive (your classmates will not laugh at you!) If a pair of shoes does not match, one red and one black shoe, it is negative (your classmates will laugh at you!)

This rule also applies to multiplying and dividing integers. If you multiply or divide two integers with matching signs, your answer will be positive. If you multiply or divide two integers with different signs, your answer will be negative.

Step 2 - Teacher will demonstrate how to relate positive numbers to having money or getting a paycheck and negative numbers to

owing money or getting a bill in order to solve addition integer problems. If you get two paychecks (two positive numbers), you add the two checks to get the total, which is a positive amount. If you get two bills (two negative numbers), you owe the total of the two bills, which is a negative amount. If you get a paycheck and a bill (one positive and one negative number), you first have to find the difference between the two (either how much money you have left after you pay the bill, or how much more money you need in order to pay the whole bill). If your paycheck was more than the bill, you have a positive amount left in your account. If your bill was more than your paycheck, than you have a negative amount in your account.

Step 3 – Students will be shown how to change subtraction problems involving integers into addition problems, to which they can apply the rules they have been taught for the addition of integers. To change subtraction problems to addition, remember "Keep, Change, Flip." Keep the sign of the first number of the problem the same, change the minus sign to a plus sign, then flip the sign of the second number (negative becomes positive and vice versa).

Step 4- The concept of absolute value will be introduced. Absolute value shows the distance a number is from zero on a number line. Applications involving distance will be discussed. For example, if one student lives four blocks east of school, and another student lives four blocks west of school, neither distance is considered negative.

Step 5- Students will practice these skills using problems from *Number Power Algebra* and *Cord Algebra I.*

Step 6- Students will utilize their skills with integers by working on a business bookkeeping ledger.

Teacher Note For more information on ledgers, check out these websites: How to Use a Bookkeeping Ledger or The Cornerstone of Bookkeeping: Your Accounting Ledgers. Bookkeeping Ledger Templates can be downloaded online, created using an Excel spreadsheet, or are available at local office supply stores.

Step 7- Word problems will be introduced that use integers in real-life applications, such as money, temperature, and elevation with the handout *Integer Word Problems*.

Assessment/Evidence (*based on outcome)*
SAMS, teacher-made assessment

Teacher Reflection/Lesson Evaluation
Not yet completed.

Next Steps

Technology Integration-
Integer Word Problems http://www.mathgoodies.com/lessons/vol5/challenge_vol5.html
How to Use a Bookkeeping Ledger http://www.ehow.com/how_5201683_use-bookkeeping-ledger.html
The Cornerstone of Bookkeeping: Your Accounting Ledgers http://www.moneyinstructor.com/art/acctledgers.asp

Purposeful/Transparent
Mathematical terminology is often a barrier to learning concepts for students with math anxiety. The teacher makes the connection for students in a practical way so they understand and can perform the math necessary to be successful.

Contextual
This lesson uses a bookkeeping ledger to help students apply the concepts of integers and absolute value.

Building Expertise
Students are given additional practice with integers by completing word problems.

SAMPLE BOOKKEEPING LEDGER

2005 Actual versus Budget YTD

G/L Code	Account Title	Actual	Budget	Remaining $	Remaining %
1000	Advertising	$ 750.75	$ 100,000.00	$ 99,249.25	99.25%
2000	Office Equipment	$ -	$ 100,000.00	$ 100,000.00	100.00%
3000	Printers	$ -	$ 100,000.00	$ 100,000.00	100.00%
4000	Server Costs	$ -	$ 100,000.00	$ 100,000.00	100.00%
5000	Supplies	$ -	$ 50,000.00	$ 50,000.00	100.00%
6000	Client Expenses	$ -	$ 25,000.00	$ 25,000.00	100.00%
7000	Computers	$ 2,500.00	$ 75,000.00	$ 72,500.00	96.67%
8000	Medical Plan	$ -	$ 65,000.00	$ 65,000.00	100.00%
9000	Building Costs	$ -	$ 125,000.00	$ 125,000.00	100.00%
10000	Marketing	$ -	$ 100,000.00	$ 100,000.00	100.00%
11000	Charitables	$ 2,500.00	$ 250,000.00	$ 247,500.00	99.00%
12000	Sponsorships	$ 1,000.00	$ 50,000.00	$ 49,000.00	98.00%
	TOTAL	**$ 6,750.75**	**$ 1,140,000.00**	**$ 1,133,249.25**	**99.41%**

Sample Forms http://www.suite101.com/content/sample-forms-for-small-business-bookkeeping-a145882

Integer Word Problems

1. Katherine is very interested in cryogenics (the science of very low temperatures). With the help of her science teacher she is doing an experiment on the affect of low temperatures on bacteria. She cools one sample of bacteria to a temperature of -51°C and another to -76°C. What was the temperature difference in the two experiments?
A) -127
B) -25
C) 127
D) 25

2. On Tuesday the mailman delivers 3 checks for $5 each and 2 bills for $2 each. If you had a starting balance of $25, what is the ending balance?
A) 26
B) 36
C) 6
D) -26

3. You owe $225. on your credit card. You make a $55. payment and then purchase $87 worth of clothes at Dillard's. What is the integer that represents the balance owed on the credit card?
A) -367
B) -257
C) 257
D) 367

4. If it is -25F in Rantoul and it is 75F in Honolulu, what is the temperature difference between the two cities?
A) -125
B) 50
C) -50
D) 100

5. During the football game, Justin caught three passes. One was for a touchdown and went 52 yards. The other was for a first down and was for 17 yards. The other was on a screen pass that did not work so well and ended up a gain of -10 yards. What was the total yardage gained by Justin on the pass plays?
A) 62
B) -39
C) 69
D) 59

6. James plays in the backfield of the Big Town football team. Last week he ran four plays from the halfback position. He made "gains" measured in yards of 3, 4, 1, and 5. What were his average yards per gain? Round your answer to the nearest tenth of a yard.
A) 13
B) 3
C) 4
D) 3.2

7. In golf, the average score a good player should be able to achieve is called "par." Par for a whole course is calculated by adding up the par scores for each hole. Scores in golf are often expressed at some number either greater than or less than par. Ms. Floop is having a pretty good day at the Megalopolis City Golf Club. Her score so far after 15 holes is -3. If par for 15 holes is 63, what is her score?
A) 63
B) 66
C) 60
D) 65

8. It was a very freaky weather day. The temperature started out at 9°C in the morning and went to -13°C at noon. It stayed at that temperature for six hours and then rose 7°C. How far below the freezing point (0°C) was the temperature at 6 p.m.?
A) 0
B) 12
C) 3
D) 6

9. The mailman delivered a $22 check and 3 - $14 bills today. He also took back 1- $5 bill. What is the total in the mailbox?
A) -59
B) -15
C) 15
D) -25

10. A monkey sits on a limb that is 25 ft above the ground. He swings up 10 ft, climbs up 6 ft more then jumps down 13 ft. How far off the ground is the monkey now?
A) 25 ft
B) 31 ft
C) 54 ft
D) 28 ft

11. Mary has $267 in her checking account. She writes checks for $33, $65, and $112. What is the balance in her account now?
A) 57
B) -57
C) 67
D) -67

12. A submarine dove 836 ft. It rose at a rate of 22 ft per minute. What was the depth of the submarine after 12 minutes?
A) -472 ft
B) 572 ft
C) 472 ft
D) 452 ft