

One Vs. One Hundred....

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Grade Levels: 3rd-5th grade

Time Allotment: 60 minute class lesson

Overview: The purpose of this lesson is to teach the difference between digits and their values. Students are often able to go through the steps of addition and subtraction without a thorough understanding of the difference between the digit and the number it represents. Through the use of technology and hands on manipulatives involving money, students will investigate the place value of digits by relating it to money. This lesson can be extended to include place value through thousands as well as decimal place value.

Subject Matter: Math (Place Value)

Learning Objectives:

Students will be able to:

- Understand the relationships in the place-value system, where each place is ten times the value of the place to its right.
- Use the patterns in the place-value system to read and write numbers in standard, expanded and word form.
- Identify the difference between a digit and the number the digit represents
- Compare two whole numbers between 0 and 9,999 using the symbols (>, <, or =) and words (greater than, less than, or equal to).

Standards:

The objectives listed may be used in part to address the Virginia Standards of Learning at <http://www.pen.k12.va.us>

- read, write, and identify the place value of each digit in a three-digit numeral, using numeration models;
- The student will read and write six-digit numerals and identify the place value for each digit
- The student will compare two whole numbers between 0 and 9,999, using symbols (>, <, or =) and words (greater than, less than, or equal to).

Media Components:

Instructional Video:

- Math Mastery: Addition. Lesson 1: Getting Started, Lesson 2: Column Addition
Can be obtained from <http://www.unitedstreaming.com/>

Internet

- Place Value Game
<http://education.jlab.org/placevalue/index.html>
- National Library of Virtual Manipulatives – Base Blocks Addition, Base Blocks Subtraction
http://nlvm.usu.edu/en/nav/grade_g_2.html

These sites lend themselves well to reteaching and enrichment of the concept being taught.

Materials:

For teacher:

- Computer with Internet access
- Projection device such as LCD projector, Smartboard or large screen television monitor;
- Overhead or Elmo
- Variety of large bills in denominations of \$1, \$10, \$100, 5\$, 50\$, \$500, \$2, \$20, \$200
- Large cards with digits 0-9
- Overhead-transparency of a place value chart
- \$1, \$10, \$100 play money
- (student materials may be used with Elmo)

For each pair of students:

- Place Value Mats – 1 per student (See attachment)
- Dice
- Play money in \$100, \$10, and \$1 denominations (30 of each denomination except only one \$100 bill)
- A bank drawer to organize money amounts (see attachment)

- Set of digits 0-9 > < symbols (can be purchased at a craft store or number cards can be used; 3 of each digit)
- Egg cartons to organize digits and symbols (optional)

Teacher Preparation:

- Download United Streaming video clips to desktop and install plug-ins if necessary
- Preview video clips and review lesson
- Cut out and prepare large digit cards 0-9
- Copies of Place Value Charts for each student
- Copies of bank drawers
- Digits organized in egg cartons (students may organize these)

Introductory Activity:

Pretest

1. Hand out one large bill to each student. (denominations of \$1, \$10, \$100, \$2, \$20, \$200, \$5, \$50, \$500)
2. Write a three digit money amount on the overhead using the digits 1, 5, and 2. For example, \$152
3. As you point to each digit in the amount, ask students to hold up their money if they have the bill that represents the number you are pointing to.
4. Repeat the activity with a different three digit number using the digits 1, 5, and 2.
5. As students hold up their money amounts, be prepared for students with \$1, \$10, and \$100 to all hold their cards up as you point to the digit 1 regardless of the digit's position. This gives you a good indication as to which students understand the difference between a digit and the number it represents.

Learning Activity:

Explain to students that in this lesson we will be learning the difference between a digit and the value of the number it represents.

Ask students to name the ten digits. Explain the digits are 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9 and that they are used to write numbers. 10 is a number not a digit because it uses the two digits 0 and 1

1. Cue the video to 1:18 where you see the place value chart. **Focus for media interaction** by saying, "Digits are arranged in a certain order to make numbers. Each position a digit takes determines the value of the number. These places have names. Listen for the names of three different places a digit can have and what each place means." **Play** and **Pause** when you hear "digits in this column tell about ones." Ask,

“What were the three places for digits that were mentioned?” (Hundreds, tens, and ones). Ask, “What does that mean? Could they be in a different order? Why? Why not?” Allow students to respond to assess their understanding of place value.

2. Say, "I'd like your help to demonstrate what we mean by hundreds, tens and ones." Teacher has three bills displayed at top of the board in the front of the room. From left to right they are a \$100 bill, a \$10 bill and a \$1 bill. Say, “Digits turn into numbers when they are given a position.” Ask for a student volunteer. Give the student the digit 4 card and have them hold it up. Say, “This is the digit 4. When you put it in a place it becomes a number.” (Direct the student to stand in front of the \$1 label.) Now the digit is the number 4. That means you have 4 one dollar bills or 4 ones. Repeat. Say, “This is the digit 4. When you put it in a place it becomes a number.” (Direct the student to stand under in the \$10 bill label) Now you are the number 40. That means you have 4 ten dollar bills or 4 tens.” Repeat. Say, “You are the digit 4. When you are put in a place you become a number.” (Direct the student to stand under the \$100 bill label). Now you are the number 400. That means you have 4 hundred dollar bills or 4 hundreds.” Have the class repeat with you using a different student and a different digit.

3. Now ask for three student volunteers. Give them each a digit card and direct them to choose a position to stand in. Be sure to include the digit 0. (*zero the hero*) In turn ask each student to say their digit, their number, and what the number means. Explain to students that the zero is what we call a place holder. It is important when writing numbers to show when there are no hundreds, tens or ones. Ask students to arrange themselves to represent the greatest number that can be made from their three digits. Do the same to represent the least amount. Continue the activity until you are confident students understand the difference between the digit and the number. Ask if they see a pattern in the way the digits are arranged when trying to make the greatest number or the smallest three digit number. Ask, “What would be the greatest 3-digit number you can make? (999). What would be the smallest three digit number? (100)

4. **Focus for media interaction** by saying, “Listen for how we read three and two digit numbers. Pay attention to what place you begin reading this number.” **Resume** video from paused point where you see the place value chart. **Pause** when you hear, “It starts in the ones column and you see the number 4. **Rewind** to where you see the number 295 and **freeze frame**. Ask, “Who can read this number?” (two hundred ninety-five). Emphasize the word ‘and’ is not used when reading numbers. Ask, “When you read a three digit number, what place do you begin reading?” (hundreds). Ask, “What three digits make up this number? (2,9,5) What is the value of the 2? (200) What does it mean? (there are 2 hundreds) What is the value of the 9? (90) What does than mean? (there are nine tens) What is the value of the 5? (5) What does that mean?” (there are five ones) **Fast forward** to where you see the next number 45. Repeat the same questioning process with this number. Point out the difference between the digits and their values. Repeat the process with the number 4.

5. **Focus for media interaction** by saying, “Be ready to tell me how many digits there are in the next number and what the digits are.” **Resume** video and **pause** when you hear “1, 2, and 3.” Ask, “How many digits are in this number? What are the three digits? (5, 3, and 2) **Focus** by saying, “Listen for what each digit represents.” **Resume** and **pause** when you hear “There are three tens.” Ask, “What does the digit 5 represent? (five hundreds) What is its number value? (500) What does the 3 represent? (three tens) What is its number value? (30) What does the 2 represent? (2 ones) What is its number value?” (2)

Mute the sound.

6. Keep the video on freeze frame on the number 532 as you explain to students that numbers can be written in several ways. The most common way we write a number is in the *standard form* but sometimes we write them in *word form* using words, and sometimes in *expanded form*. That means we write and add the values of each of the digits.

532 – Standard form
500 + 30 + 2 – expanded form
five hundred thirty-two – word form

Emphasize that when reading numbers the word ‘and’ is not used.

15. Say, “Let’s practice writing some more numbers in expanded form.” **Resume** video with sound muted. **Pause** when you see the number 45. Point to each digit and ask, “What is the digit? (4) What is the number?” (40) Write the number values $40 + 5 = 45$.

16. **Resume** video and **pause** on the next number 30 when you hear “There are zero ones.” Repeat the process by asking, “What is the digit? (3) What is the number? (30) What is the digit? (0) What is the number value?” (0) Write the number values $30 + 0 = 30$.

17. Say, “Let’s practice writing some numbers.” **Focus for viewing** by saying, “Watch for where you write your hundreds, tens, and ones.” **Resume** and **Pause** when you see “2 hundreds + 4 tens + 3 ones on the screen.” Ask, “Where you will write the digit 2 to show there are 2 hundreds? Where will you write the digit 4 to show there are 4 tens? Where will you write the digit 3 to show there are 3 ones? Let’s see if we are right.” **Resume** and **pause** when you see the number 243. Then ask students to tell you the digit and the number as you write the expanded notation $200 + 40 + 3 = 243$. **Stop** the video. Tell students that now they are going to practice what they’ve learned by playing a game called “Make a Hundred.”

Culminating Activity:

Students will play a game called “Make a Hundred”

1. Give each student pair a bank of money to share – 1- \$100’s, 30 - \$10’s, 30- \$1’s, a set of digits (3 of each digit), symbols, (> , < , and =) and dice.

2. Have students set up their banks on their bank mats and separate their digits and symbols. (egg cartons can be used to separate digits) Each student pair should sit side by side and have their own place value mat displayed in front of them. The bank and digits should be within reach of each student pair.

You can make cards to represent digits and symbols or buy foam rubber digits at a craft store.

3. Taking turns, students will roll the dice. The number on the dice indicates the number of dollars they may add to their mats. One at a time, students roll the dice, go to the bank to get their money and place the dollar amounts in their proper places.

4. After each roll, students are to place their digits under each dollar amount at the bottom of their place value mat to show the amount in standard form. Then they read the amount they have in standard form, then in expanded form, and then tell how many tens and ones they have. They then use the greater than $>$ or less than $<$ symbol to compare their amount to their partners. Once the student has at least ten of each amount, they are to exchange with the bank. Ten \$1 bills can be exchanged for 1 \$10 bill etc.



Example: If they have \$6, they place the digit 6 in the one dollar place. Then they read their number “I have \$6”. They then say their amount in expanded form “6 – that means I have 6 ones.” Their partner does the same thing. After each pair has rolled, placed their money in their wallet and display the digit(s) representing their number, they use the $>$, $<$, or $=$ symbol to compare their amounts.

5. Students continue taking turns rolling the dice and adding money to their Place Value Mats. Each time they display the digits and read the number in both standard form and expanded form and compare their amount to their partners. It is important that the student first go to the bank and then place their digits. The first one to reach the one hundred dollar bill is the winner.

A sample Place Value Mat might look like this:

Place Value Mat

<p>Student says,</p> <p>“I have \$34.”</p> <p>“I have 3 tens and 4 ones.</p> <p>“I have $30 + 4.$”</p>
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Hundreds	Tens	Ones
		
	3	4

Cross Curricular Extensions:

Math

Reading numbers can be extended to the hundred thousands place using video Math Mastery: Lesson 7. Adding Larger Numbers www.unitedstreaming.com

Technology

Place Value Game

This allows students to compete with the computer to create the greatest number using digits given in random order.

Language Arts

Read the book How Much is a Million by Steven Kellogg.

Community Connections:

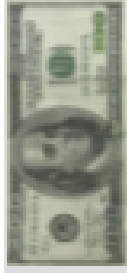
Invite a banker as a guest speaker to discuss the importance of knowing place value and using decimals in counting and recording money amounts in check books, deposits, withdrawals, etc.

If possible, have someone from the census bureau come to take with the class about how populations of people are counted.

Place Value Mat

Hundreds	Tens	Ones

Bank



Hundreds



Tens



Ones