## Place Value

Summary
This lesson plan focuses on place value concepts.
Main Core Tie
Mathematics Grade 2
Strand: NUMBER AND OPERATIONS IN BASE TEN (2.NBT) Standard 2.NBT. 1

## Additional Core Ties

Mathematics Grade 2
Strand: NUMBER AND OPERATIONS IN BASE TEN (2.NBT) Standard 2.NBT. 3
Group Size
Large Groups
Materials
Invitation to Learn
Place Value Stamps
Ink Pad
Numeral cards
Place value block cards
Places, Everyone

- Place Value Houses

Single digit card

- Place Value Chart

White paper

- Numeral Strips

Overhead markers
Additional Resources
Articles
The Mailbox the Idea Magazine for Teachers, The Education Center; August/September 1997.
Volume 19, Number 4 (Intermediate)
Books
Place Value (Kid Friendly Computation), by Sarah Morgan
Games
Place Value Quizmo

Background for Teachers
Students should be able to know and understand what basic whole numbers are and what they look like. They should have some understanding of place value and what it represents in a whole number. They should be taught specific vocabulary relating to the lesson before you begin. This should include: Numeral, digit, standard form, expanded form, ones, tens, hundreds, thousands, ten thousands, and horizontal and vertical lines. It would be very helpful if you could show them pictures or examples of each vocabulary word listed above. They should be taught and understand how numbers are used in the world and how important the use of learning to read and write numbers is beneficial in their daily life.

## Intended Learning Outcomes

1. Develop a positive learning attitude toward mathematics.
2. Communicate mathematical ideas and arguments coherently to peers, teachers, and others using the precise language and notation of mathematics.
3. Represent mathematical ideas in a variety of ways.

## Instructional Procedures

Invitation to Learn
This activity is called "Match Game". Each student will receive a card. On the card there will be a numeral or place value blocks. Students will walk around and find their match. Those students with numeral cards will be looking for the person that has the same value on their card that is represented by place value blocks. Those students with place value blocks will be looking for the person that has the same value on their card but is represented by numerals. Once they have found their match they say the number with their partner. They then find another set of partners and they both share their numbers with each other. They return to their seats and write their number in their journal in standard form, expanded form and word form. They can then use their stamps to put the place value blocks for that number in their journal.
Instructional Procedures Places, Everyone
Each student should receive a copy of the Place Value Houses.
The teacher should have a copy of the Place Value Houses on an overhead.
Have students cut out their Place Value Houses and glue them in their journal.
Teach students what each house represents. The first house on the right is called Units that have the values of ones, tens and hundreds. The second house is called Thousands with the values of ones, tens and hundreds and the third house is called Millions with the values of ones, tens and hundreds. Each house will have a group of three digits in a number. Each group is called a period. Explain to students that within each period the names are the same: hundreds, tens, and ones.
Write a four or five digit number on the overhead or chalkboard. (e.g. 6, 348 or 45, 823). Model how to say this number by pointing to where each number would be represented on the houses. Explain to students that when reading or writing a large numeral, it is helpful to break it down into periods and read each period as a simple one, two or three digit numeral. Also help students see that the commas between each house represent pauses when reading a numeral, just as they do in reading text. Whenever a student comes to a comma in reading or writing a large numeral, he knows to pause and say or write a period name. It is very important when you are modeling that you do not say "and" when reading the number. "And" represents a decimal, so when reading 6,348 you would not say six thousand three hundred and forty eight you would say six thousand three hundred forty eight. Model a few numbers to show students how to read large numbers. After you have modeled it a few times have students begin to say and point to the numbers that would be represented on their place value house chart.
Write a number on the overhead or chalkboard that has a 0 (e.g. 35, 207). Explain to students that the value of the first digit's place determines how large the numeral will be and that any empty place to the right of the digit must have a zero place holder. Read this number to the students and point to where each digit would be represented on the place value house chart. Explain that even though you didn't say anything for the zero in the tens place it is very important that they don't forget to put it in when writing the number. Each place value on any digit has to be represented by a numeral.
Divide the class into two groups.
Give each student in each group a single digit card. (0-9)
Teacher reads a number (e.g. 12,543) and the students arrange themselves in the proper
order. Each student in the group will help each other to form the number. Once they have formed the number they raise their hand to show they have completed the number. The teacher then asks them to say the number out loud. You can continue this activity having them create many different numbers with their cards. (See extensions for more ideas to use with this activity.)
After each number they create they can write that number in their journal in standard form, expanded form and word form. They can also use the place value stamps to create the number.
Next, you will need a Place Value Chart there is a black line or your students can make their own by following these simple steps.
a. Lay a sheet of paper horizontally, fold one side in thirds and crease it and fold the other side in thirds and crease it.
b. Open up your sheet. Draw lines along the two vertical creases.
c. Measure and draw a horizontal line one inch from the top edge of your sheet.
d. Beginning on the left side, label the four resulting boxes: Millions, Thousands, and Units.
e. Measure and draw another horizontal line 12 inch below the first one.
f. Beginning on the right side of the paper, measure and draw a vertical line 114 inches from the edge. Extend this line from the first horizontal line down to the bottom edge of the paper. g. Measure and draw another vertical line 114 inches from the first one. Extend this line from the first horizontal line down to the bottom edge of the paper.
h. From left to right, label the three resulting small boxes "H" (hundreds), "T" (tens), and "O" (ones).
i. Continue measuring and drawing vertical lines (114 inches apart) across the paper so that the thousands and millions sections are exactly like the units section.
j. Label the three column headings ("H", "T", and "0") in each section.
k. If you want a pocket at the bottom to hold number strips just fold the bottom up 112 inches and tape or glue on each end.
Once they have their place value chart made you can laminate it and use overhead markers and/or use the Place Value Strips.
Read a number to them and have them place their Place Value Strips in the correct order to create the number provided.
Next have students go to a journal and write the number in standard form, expanded form, and word form. They can also use their place value stamps and stamp them in their journal to create the number given.
Students can work with partners and they can create numbers together or one partner can say a number and the other would create it on their place value chart.

## Extensions

Curriculum Extensions/Adaptations/ Integration
For advanced learners extend the place value house activity by using larger numbers and have students practice saying and writing numbers to the millions.
Some extensions you could use with the single digit cards would be to have each group make the smallest number with their cards and then have them make the largest numbers with their cards. Next have them make a number with the value of 8 in the 10,000 place or a number with a value of 3 in the hundreds place. Have them say and write the numbers that they create.
For advanced learners make another place value chart with four periods which include units, thousands, millions and billions. They can work with partners and create different numbers on their own.
For students with special needs have them pair up with a partner and work together on each of
the activities.
You can extend these activities by taking two numbers and comparing the numbers. Use the symbols $<,>,=$ and $=$. Teach the vocabulary greater than, less than, equal to and not equal to. Family Connections

Students can work with their parents at home by having a parent say a number and the child writes it down in standard form, expanded form and word form.
Students can take home a copy of the Place Value Houses and the parent can write down a number and the child would say the number and point to the value of each numeral on the house. Students could take home their journal and share their place value activities with their parents. Parents can work with students on comparing numbers by writing two different numerals down and having the child pick the correct symbol that would go between each numeral.

## Assessment Plan

Teachers should walk around and assess the students to see if they are creating the numbers she has given them correctly.
Students can say and point to the place value of each numeral, to the teacher, so she can see if they understand.
Another way to assess would be to check the student's journal to see if they understand the concepts taught.
Have students work together and assess each other's journals.

## Bibliography

Research Basis
Ball Loewenberg, D., Research on Teaching Mathematics: Making Subject Matter Knowledge Part of the Equation. Greenwich, CT: JAI Press.
In order to teach mathematics effectively, teachers must understand mathematics themselves? This articles research shows that past efforts to show the relationship of teachers' mathematical knowledge to their teaching mathematics have been largely unsuccessful. The author researches what it means to understand mathematics and the role played by such understanding in teaching. Baxter, J. A., Woodward, J., (2005). Writing in Mathematics: An Alternative Form of Communication for Academically Low-Achieving Students. Learning Disabilities Research and Practice. 20(2), 119135.

In this study they analyze how one teacher used writing to support communication in a seventhgrade, low-track mathematics class. For one school year, they studied four low achieving students in the class. Students wrote in journals on a weekly basis. Using classroom observations and interviews with the teacher, they developed profiles of the four students, capturing their participation in class discussions. The profiles highlighted an important similarity among the four students: marginal participation in both small-group and whole class discussions. However, their analysis of the students' journals identified multiple instance where the students we able to explain their mathematical reasoning, revealing their conceptual understanding, ability to explain, and skill at representing a problem.

## Authors

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