

# College- and Career- Readiness Standards for Mathematics



## Exemplar Lesson Plan

# “All About Numbers”

2.NBT.1

2.NBT.3

2.BT.4



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**GRADE: 2**

**Title:** *All About Numbers!*

**Estimated Duration:** 3 days

**Real World Purpose:**

It is essential that students develop a firm understanding of the base ten number system and place value concepts. The knowledge and understanding of these concepts creates a solid foundation for the mathematical skills used in everyday life. Careers in science, engineering and math fields will utilize these skills on a more complex level.

*I Can:*

- **2.NBT.1:** Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones; e.g., 706 equals 7 hundreds, 0 tens, and 6 ones.
- **2.NBT.3:** Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.
- **2.NBT.4** Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using  $>$ ,  $=$ , and  $<$  symbols to record the results of comparisons.

**Prerequisite Skills: Mathematics Standards**

- Count to 120, starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral. (1.NBT.1)
- Understand that the two digits of a two-digit number represent amounts of tens and ones. (1.NBT.2)
- Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols  $>$ ,  $=$ , and  $<$ . (1.NBT.3)

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<p><b>Materials/Resources:</b></p> <ul style="list-style-type: none"> <li>• plastic straws</li> <li>• rubber bands</li> <li>• digit cards</li> <li>• place value dice</li> <li>• ziploc bags</li> <li>• chart paper</li> <li>• markers</li> <li>• base ten cube</li> <li>• base ten flats</li> <li>• base ten rods</li> <li>• base ten units</li> <li>• <b>Attachments (Total: 6)</b></li> </ul>	<p><b>Key Vocabulary:</b> (* = words defined in the MS CCR Mathematics)</p> <ul style="list-style-type: none"> <li>• place value*</li> <li>• hundreds</li> <li>• tens</li> <li>• ones</li> <li>• base ten cube</li> <li>• base ten flat</li> <li>• base ten rod</li> <li>• base ten unit</li> <li>• expanded form</li> <li>• greater than (&gt;)</li> <li>• less than (&lt;)</li> <li>• equal to (=)</li> <li>• numeral</li> <li>• digit</li> </ul>
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**Lesson Introduction**

**Student Exploration Activity:**  
The teacher will pass out bags of plastic straws for students to count. Each bag should contain anywhere between 15 to 50 straws. Students will work in pairs to count and make bundles of ten. Each bundle of ten will be wrapped with a rubber band. Next, the teacher will pass out a bag of base ten rods and base ten units to each pair of students. Students will compare the rods and units to the straws and share their findings. The teacher should guide the conversation so that students see the connection between the base ten flat and the bundle of ten straws as well as the base ten unit to an individual straw. Allow students to count the total amount of straws and base ten blocks. The teacher will observe the students to assess their understanding.

**Lesson Activities**

**Day 1**

1. The teacher will begin the lesson by passing out the **Place Value Chart (Attachment #1)** and introducing the following vocabulary words: *place value, hundreds, tens, ones, base ten flat, base ten rod, and base ten unit*. Explain the meaning of each vocabulary word as you introduce the place value chart and show the “hundreds, tens, and ones” column.
2. Distribute the base ten blocks allowing students to examine them and share their observations.

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3. The teacher will show a base ten unit and explain that each unit represents “one.” Show 3 units and ask students, “What number would represent these base ten units?”
4. Touch each unit while counting aloud, “One, two, three” so that students can clearly see that each unit represents “one.”
5. The teacher will continue this process by showing more base ten units and questioning students about the number being represented. Ask students where the “ones” would be represented on the Place Value Chart.
6. The teacher will show ten units and a base ten rod for students to compare. Discuss which numbers could be represented in the ones column before creating a “ten.” Explain to students that each rod represents a “ten.”
7. The teacher will instruct students to line up 10 base ten units and compare it to a base ten rod.
8. Show students “X” number of rods and allow students to discuss the value of the rods. For example, 4 rods would equal 40. Touch each rod as you count aloud, “Ten, twenty, thirty, forty.” Elaborate as necessary ensuring that students understand the value of the rods.
9. Discuss the “tens” column on the Place Value Chart.
10. The teacher will display a number (for example: 42) and instruct students to identify the number of rods and units that belong on the Place Value Chart. Each student will place the base ten blocks on the Place Value Chart. Ask students, “How many rods are in the tens place on the chart?” and “What would be the value of the rods?”
11. The teacher will write  $40 + 2$  on the board and ask students how that relates to the rods and units on the Place Value Chart.
12. The teacher will continue to display various two digit numbers on the board for students to represent on their Place Value Chart using rods and units.
13. After each number is represented, write the number on the board in expanded form. (Note: The term “expanded form” can be introduced at this point if desired or in the upcoming lesson.)

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14. Allow students to call out a 2 digit number to be represented on the chart.
15. The teacher will introduce the base ten flat to the students.
16. Allow students to compare a base ten flat to a rod. Ask students how many rods it would take to create a base ten flat. Instruct students to lay the rods directly on top of the base ten flat and discuss how many it takes to cover the flat. The teacher will explain that 10 rods are equivalent to 1 flat. Elaborate as necessary to make sure students understand that a bundle of ten “tens” equals one hundred. The teacher will question students about how many base ten units it would take to create a base ten flat.
17. Guide the discussion to ensure that students understand the relationship between the hundreds (flat), tens (rod), and ones (unit).
18. Display a 3 digit number on the board for students to represent on the charts. The teacher will assess students’ understanding and continue to display other 3 digit numbers for the students to practice.
19. Have students remove the base ten manipulatives from the chart as you hand out **Place Value Activity** (*Attachment #2*).
20. The teacher will guide the students in completing **Place Value Activity**. Explain to students how base ten blocks can be represented on the **Place Value Activity** sheet. Allow students to share their work and explain their answer. The teacher should observe student reasoning and understanding.

**Day 2**

**Pre-class Preparation:** The teacher will need to make several copies of Attachment #3, page 2 on card stock, cut each “card out” and place them in small Ziploc bags for students prior to class.

1. The teacher will begin the lesson with a series of questions for the students to discuss and share their thinking.

For example:

- *“How many tens are equivalent to the number 200? How do you know? Show me.”*
- *“How can you represent the number 213 two different ways using base ten manipulatives? Show me.”*
- *“Are 2 tens and 3 ones the same as 3 tens and 2 ones? Why or why not?”*
- *“How are the numbers 73 and 43 alike and how are they different?”*



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- *“How are the numbers 214 and 318 alike and how are they different?”*

Allow students to discuss each question and use a set of base ten blocks to prove their answers to the class.

2. The teacher will hand out bags of base ten flats, rods, and units mixed together. (The total number in each bag should not exceed 200.) The students will work in groups of 3 - 4 to count the total number in each bag. Each group will tell the teacher their total amount. The teacher will record the number on chart paper. Next, the teacher will ask students to identify how many hundreds, tens, and ones are in their number.
3. The teacher will introduce the term “expanded form” to the students. Explain to students that in expanded form, numbers are broken apart by place value. The teacher will use the number recorded on the chart paper to demonstrate how to rewrite a number in expanded form. Next, the teacher will write the number in word form on the chart.
4. The teacher will use the terms “*numeral, word form, and expanded form*” while completing the chart. The teacher will record each group’s responses on the chart.
5. The teacher give each group of students the Ziploc bag of base ten cards she created from Attachment #3,page 2 *Base Ten Blocks Group Activity* and a copy of Attachment #3, page 1 and review the instructions for the group activity. The teacher will work briefly with each group to assess student understanding. When the work is completed, the teacher will allow each group to share their answers with the class.
6. The teacher will observe individual student work when asking the following items:

- *“What number is 100 more than 256? Write the number in expanded form.”*
- *“What number is 10 more than 256? Write the numeral.”*
- *“What number is 1 more than 256? Write the number in word form.”*



Draw base ten blocks to represent the number 256.

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**Day 3**

1. The teacher will begin the lesson by reading aloud the following word problem:

*John and Mary are comparing numbers.*

*John wrote 93 and Mary wrote 125.*

*John says his number is larger because it starts with 9.*

*Mary says her number is larger because it has 3 digits. Who is correct and why?*

Allow students to discuss their thinking with a partner before sharing aloud.

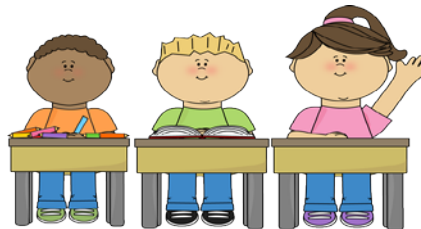


2. The teacher will introduce the  $<$ ,  $>$ , and  $=$  symbols to students. Allow students to brainstorm about the possible meanings of the symbols.
3. The teacher will display the numbers 38 and 56 on the board. Ask students which number is larger or greater than the other one. Display the  $(>)$  symbol and ask students how you could compare these two numbers using the symbol. Guide the discussion so that students understand a number sentence  **$56 > 38$**  could be written comparing these two numbers. The teacher should emphasize the correct reading of the number sentence, “fifty six is greater than thirty eight.”
4. Display the  $(<)$  symbol and ask students how would they compare the same numbers using the symbol. Allow students to respond and display the number sentence  **$38 < 56$**  while reading the number sentence, “thirty-eight is less than fifty six.”
5. Display the  $(=)$  sign and ask students how could they write a number sentence using the same numbers and the symbol. Allow students to explain why that would not be possible. Ask students how would it be possible to write a number sentence using just one of the numbers and the  $(=)$  symbol. Students could write it as  **$38 = 38$**  or  **$56 = 56$** . The teacher should make sure students understand that “thirty eight is equal to thirty eight” but also reading the sentence as “thirty eight is the same as thirty eight.” Elaborate so that students understand the  $=$  symbol means “the same as.” (If students need more clarification with this concept, use 10 base ten units to show that “5 is equal to 5” or that “5 is the same as 5”.)
6. The teacher will introduce place value dice for 100, 10, and 1 to the students. The dice will be used in a place value activity.
7. The teacher will roll the three dice, add the numbers and write the amount on the board. Roll the dice once again and write that number on the board. Have students compare the two numbers and write a number sentence using  $>$ ,  $<$ , or  $=$  symbol.



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8. Allow the students to work in pairs or groups of three using the place value dice and the symbols  $>$ ,  $<$ , and  $=$ . The students will write a number sentence comparing the two numbers using  $>$ ,  $<$ , or  $=$  symbol. One student will roll the three dice and record the number. The next student will roll and record the number. (Example: John rolls 348 and Suzy rolls 298 so they would write “348  $>$  298” or “298  $<$  348.”) The students will write a number sentence comparing the two numbers using  $>$ ,  $<$ , or  $=$  symbol. The students should repeat this procedure to a total of ten number sentences. (Note: if needed, at-risk students should be allowed to use two dice for this activity to allow them to work only with 2 digit numbers.)



### Lesson Closure

1. Real world application – allow students to compare the number of students in kindergarten – fourth grade. The teacher will provide the numbers from each grade and have students compare using  $>$ ,  $<$ , and  $=$  symbol. Then have students order the numbers from greatest to least.
2. Utilize web sites to reinforce lesson concepts:  
[http://www.abcya.com/base\\_ten.htm](http://www.abcya.com/base_ten.htm)  
[http://www.abcya.com/base\\_ten\\_fun.htm](http://www.abcya.com/base_ten_fun.htm)  
[http://www.abcya.com/base\\_ten\\_bingo.htm](http://www.abcya.com/base_ten_bingo.htm)  
[http://www.abcya.com/comparing\\_number\\_values.htm](http://www.abcya.com/comparing_number_values.htm)
3. Students may work independently on “My Name as a Number.” Students will create their names using base ten rods and units

### Essential Questions:

- How does understanding place value help you compare numbers?
- Why is it important to understand place value?
- How can numbers be represented in more than one way?
- How can you compare three digit numbers?

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and calculate the value of their name. The vertical length of each letter should not exceed the length of a base ten rod.



**Standards for Mathematical Practice**

- ✓ Make sense of problems and persevere in solving them.
- ✓ Reason abstractly and quantitatively.
- ✓ Construct viable arguments and critique the reasoning of others.
- ✓ Model with mathematics.
- ✓ Use appropriate tools strategically.
- ✓ Attend to precision.
- ✓ Look for and make use of structure.
- ✓ Look for and express regularity in repeated reasoning.

**Supplemental Activities**

**Intervention**

- The teacher should allow struggling students to use only two-digit numbers in place value and comparing number activities.
- The teacher should work with at-risk students independently providing more experiences in counting the base ten blocks. Allow students more hands-on experiences before transitioning to base ten cards.

**Enrichment**

- Students may use a 4th place value dice (1000) in the activity on Day 3 in comparing numbers and writing number sentences.
- The teacher may extend the lesson to include four digit numbers in place value and comparing number activities. A

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<ul style="list-style-type: none"> <li>The teacher should use a 100 chart or number line with students struggling with comparing numbers. Create two digit numbers using base ten blocks. Locate the numbers on the chart or number line so that students can see it.</li> <li>Utilize online games to reinforce standards from previous grades: <a href="http://www.sheppardsoftware.com/mathgames/earlymath/BPGreatLessEqualWords2.swf">www.sheppardsoftware.com/mathgames/earlymath/BPGreatLessEqualWords2.swf</a></li> </ul>	<p>place value chart with ones, tens, hundreds, and thousands could be used.</p> <ul style="list-style-type: none"> <li>Change the instructions on <i>Base Ten Blocks Group Activity (Attachment #3, page 1)</i> so that students are required to combine two base ten cards.</li> <li>Have students use two copies of the <i>Digit Cards (Attachment #6)</i> to create the largest four or five-digit number possible. Repeat procedure to find the smallest number possible.</li> </ul>
<b>Performance Based Assessment Task</b>	
<p><b>Performance Task:</b> Understanding Place Value and Comparing Three-Digit Numbers</p> <p><b>Performance Target:</b> (2.NBT.1, 2.NBT.3, and 2.NBT.4)</p> <ul style="list-style-type: none"> <li>Understand that three digit numbers represent amounts of hundreds, tens, and ones.</li> <li>Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.</li> <li>Compare two two-digit numbers based on meanings of the hundreds, tens, and ones digits, using <math>&gt;</math>, <math>=</math>, and <math>&lt;</math> symbols to record the result of comparisons.</li> </ul> <p><b>Materials:</b></p>	<p><b>Rubric:</b> Understanding Place Value and Comparing Three-Digit Numbers</p> <p>Possible/plausible student responses:</p> <p>(12 points possible)</p> <ol style="list-style-type: none"> <li>Student will receive 1 point for reading the number and 1 point for creating it with base ten blocks. (Total of 2 points)</li> <li>Student will receive 1 point for creating the number in a variety of ways. (Total of 2 points)</li> <li>Student will receive 1 point for correctly creating the largest number possible and 1 point for creating the smallest number possible. (Total of 2 points)</li> </ol>

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- **Greater Than, Less Than, Equal To, and Number Cards** (*Attachment #4*)
- **Understanding Place Value and Comparing Three-Digit Numbers” Rubric Checklist** (*Attachment #5*)
- Two sets of **Digit Cards** (*Attachment #6*)
- Base ten blocks (flats, rods, units)
- Paper and pencil

**Procedures:**

1. The teacher will show students the number “368.” Ask students, “What is this number?” (If students read the number incorrectly, the teacher should read the number.) The teacher will tell students to create the number using base ten blocks.
2. The teacher will show students the number “124.” Ask students to create the number in two different ways using base ten blocks.
3. The teacher will randomly give students 3 digit cards. Ask students to create the largest number possible and to read the number aloud. Have students use the same 3 digit cards to create the smallest number possible and read it aloud.
4. The teacher will give students paper and pencil to write the following numbers in expanded form: 147, 657, and 239.
5. The teacher will use each number card and symbol from *Attachment #4* to have students compare three digit numbers.

4. Student will receive 1 point for each of the three expanded forms written correctly. (Total of 3 points)
5. Student will receive 1 point for each correct number sentence. (Total of 3 points)

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Allow students to use the number cards to create number sentences using  $>$ ,  $=$ , and  $<$ .

6. The teacher will instruct students to create as many number sentences as they can using each symbol.



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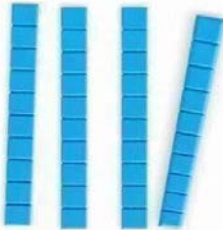
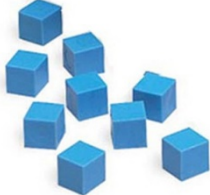
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# Lesson Plan Attachments



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Place Value Chart

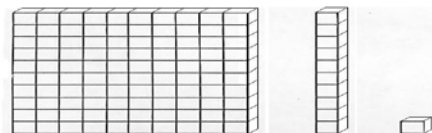
		
<b>Hundreds</b>	<b>Tens</b>	<b>Ones</b>



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Place Value Activity

**Directions:** Draw base ten blocks to represent each number.



flat

rod

unit

**52**

**368**

**120**

**535**





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Base Ten Blocks Group Activity

**Directions:**

1. Shuffle the Base Ten Blocks cards in the Ziploc bag provided by the teacher and place them in a stack on the table.
2. Select the top card.
3. In the space below, place the base ten card in the first section below. Write the numerical form, expanded form, and word form in the remaining sections below.

*Note the teacher may want to make duplicate copies of this page or allow students to use Smart Pal Sleeves<sup>®</sup> or a dry erase board to record their work.*

Base Ten Card	Numerical Form	Expanded Form	Word Form

Base Ten Card	Numerical Form	Expanded Form	Word Form

Base Ten Card	Numerical Form	Expanded Form	Word Form



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Base Ten Blocks Cards

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Greater Than, Less Than, Equal To, and Number Cards

402	238	662
111	325	553
741	377	610

<	>	=
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Understand Place Value and Compare Three-Digit Numbers  
Rubric Checklist

Student Name	Procedure #1 (2 points)	Procedure #2 (2 points)	Procedure #3 (2 points)	Procedure #4 (3 points)	Procedure #5 (3 points)



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Digit Cards

0	1	2	3
4	5	6	7
8	9		