

Title: Can I Get Your Digits?

Brief Overview:

Students will learn the names and order of place value by manipulating digits to create numbers. They will identify and represent a value of a digit using games, exit cards, assessments, and activities.

NCTM Content Standard/National Science Education Standard:

- Understand the place-value structure of the base-ten number system and be able to represent and compare whole numbers
- Recognize equivalent representations for the same number and generate them by decomposing and composing numbers

Grade/Level:

- 3rd grade (with opportunity for acceleration into 4th)

Duration/Length:

Three lessons- 60 minutes per lesson

Student Outcomes:

Students will be able to:

- Name place value through thousands. (Accelerated will identify through the hundred-thousands place value.)
- Represent a number using numeric, written, and expanded notation form.
- Identify the value of any digit in a number.

Materials and Resources:

Day 1

- Jar of Beans (Any size)
- Count to a Million by Jerry Pallotta
- Tubs of 1's, 10's, 100's and 1000's (if available) base-ten blocks
- Pre-Assessment (Student Resource 1)
- Pre-Assessment Answer Key (Teacher Resource 1)
- Place Value Mat (Student Resource 2 & 3)
- Paper Base-ten Blocks (Student Resource 4)

- Separated into baggies: Digit Cards (Student Resource 5)
- Ticket to Leave (Student Resource 6)
- Ticket to Leave Answer Key (Teacher Resource 2)

Day 2

- Tubs of 1's, 10's, 100's and 1000's (if available) base-ten blocks
- Warm-Up (Student Resource 7)
- Warm-Up Answer Key (Teacher Resource 3)
- Expanded Notation Template (Student Resource 8)
- Expanded Notation Template Example (Teacher Resource 4)
- Transparency of Expanded Notation Template
- Clear sheet protectors (one per student)
- White board markers (one per student)
- How Many Numbers Can You Make? (Student Resource 9-12)
- The Missing Form (Student Resource 13 & 14)
- The Missing Form Answer Key (Teacher Resource 5 & 6)

Day 3

- Tubs of 1's, 10's, 100's and 1000's (if available) base-ten blocks
- Shuffle and Match Cards (Student Resource 15)
- Two different colors of Index Cards (each color should be enough for half of the class)
- Solve the Riddle Worksheet (Student Resource 16 & 17)
- Solve the Riddle Answer Key (Teacher Resource 7 & 8)
- Expanded Notation Template (Student Resource 8)
- Place Value Quiz (Student Resource 18)
- Place Value Quiz Answer Key (Teacher Resource 9)
- Check My Price (Student Resource 19)

Development/Procedures:

Day 1 - Students will understand the place-value structure of the base-ten number system and be able to represent and compare whole numbers through 9,999.

- Pre-assessment – Distribute Pre-test (Student Resource 1). Answers are located on Teacher Resource 1
- Engagement - Show the student the jar of beans and have them estimate how many beans are inside. This will give you a good idea of their number sense. After a 5-8 minute class discussion of their estimates, read Count to a Million by Jerry Pallotta.

- Exploration/Explanation
 - Explain to the students that the objective of the day is to locate and name the place value of a number.
 - Distribute tubs of 1's, 10's, and 100's base ten blocks to each student or pair of students depending on the amount of manipulatives available.
 - Ask the students if they know what each block represents. Challenge students to use the blocks to represent a variety of whole numbers. (If they do not know the value of a block, let them investigate with the 1's cubes to find out its value.)
 - Use the cubes to demonstrate numbers on an overhead or in a group setting. Ex. 45 would be shown using 4 tens blocks and 5 ones blocks. Do 3-4 examples with the students to make sure they understand and are able to name the blocks needed to represent a number.
 - Once students are able to follow your examples, give them a chance to work with the blocks as you do more examples. As you construct a number with the base ten blocks, they should be creating the number at their desk(s) using the Place Value Mat (Student Resource 2 & 3). When students are ready to move to numbers in the thousands place, distribute the paper base-ten blocks (Student Resource 4). You can create a transparency using Student Resource 2 & 3 to help with your guided practice.
 - Ask students to name the value of each digit in a number. For example, 45 is represented using 4 tens blocks and 5 ones blocks. Ask students which number is in the tens place. Once they understand the order of the place value, write a number on the board and ask the place value of different digits in the number..

Ex. 4,567 What number is in the hundreds place? (5)
Alter the difficulty of the questions based on student understanding.

- Do this process in reverse several times to ensure that the students understand the concept. Give them the base ten blocks and ask them to tell, show, and represent the number in a variety of ways. Note: remind students that they should NOT be including the word "and" when saying the number.
 - During instruction, informally assess students' understanding in order to create differentiated pairing for the Application Section.
- Application
 - Pair students based on their understanding during instruction.
 - Distribute Digit Cards (Student Resource 5) that have been cut up and placed in baggies
Have students take out the "1", "3", "6", "8" and "," cards and place them on their Place Value Mats in that order.

- Ask for a volunteer to state the number and say where the comma card should be placed.
 - Ask students to name the value of each of the digits (1000, 300, 60, and 8). If necessary, students may use their base 10 blocks to help them.
 - Have students make the largest number possible (8,631) and explain how they determined their answer.
 - Independent work:
 - Students will work with their partners and decide how many cards to use (encourage students to challenge themselves). Each student in a pair should randomly select the specified number of cards.
 - 1st: make the largest number possible
 - 2nd: correctly say the number
 - 3rd: compare each partner's number and place the correct inequality sign between the two numbers.
 - Repeat, making the smallest number possible
 - Return cards to the bags and repeat process 5 more times.
 - During independent work, circulate among the students and help students as needed.
- Assessment
 - Distribute Ticket to Leave Exit Card to each student (Student Resource 6) See Teacher Resource 2 for the answer key.
 - Distribute "Ticket to Leave" to assess students' understanding of place value.

Day 2

Students will recognize equivalent representations for the same number and generate them by decomposing and composing numbers.

- Engagement
 - Warm-Up (Student Resource 7, Teacher Resource 3)
 - Distribute Warm-up which assesses students' understanding of the value of digits in different place values and their ability to explain their thinking.
 - Review the Answer Key with the class so students understand what should be included in their constructed responses.
- Exploration/Explanation
 - Expanded Notation Template (Student Resource 8, Teacher Resource 4)
 - Distribute Expanded Notation Templates in the clear sheet-protectors and white board markers to each student. Place transparency of the template on the overhead projector.

- Write the number 234,689 at the top of the template and model how to decompose the number into each box. For example the digit 2 represents the number 200,000 so they would fill that into the spaces provided. The digit 3 represents 30,000 so they would fill it in. They should continue this pattern to name the expanded form of the number.
 - Tell students that each row represents the value of the digits in the original number.
 - At the bottom of the page, model how each row represents an addend in the expanded notation representation.
 - Repeat with additional examples, having students explain how they completed the table. Note: students can remove their paper from the sheet protector and lay the sheet protector on the overhead projector transparency to share their results.
 - Application
 - ◆ How Many Numbers Can You Make? (Student Resource 9-12)
 - Differentiation
 - Reteach
 - There are two different forms of the worksheet. Student Resource 9 & 10 focuses on three-digit numbers. Have tubs of base-ten cubes available to provide added support for students who are kinesthetic learners.
 - Enrich
 - Student Resource 11 & 12 includes four-digit numbers. Assign students who understand the concept this task.
 - Assessment
 - ◆ The Missing Form (Student Resource 13 & 14, Teacher Resource 5 & 6)
 - ◆ Distribute “The Missing Form” worksheet which will assess students’ ability to represent numbers in standard, written, and expanded notation form.
 - ◆ Use either Student Resource 13 or 14 depending on your students’ abilities.

Day 3: Students will name place value through thousands (Accelerated will identify through the hundred thousands place) and represent a number using numeric, written, and expanded notation form. Students will also identify the value of each digit in a number.

- Engagement - Shuffle and Match (Student Resource 15A-C)
 - Give each student a card as class begins. Cards are differentiated to meet the needs of the students, ranging from

three-digit to five-digit numbers. Distribute the cards accordingly. Each number is represented on three cards:

- Standard form
 - Written form
 - Expanded notation
- Students need to find the two other people with cards that represent their number in a different way.
 - Depending on the time and number of students, distribute additional sets of cards to students who finish quickly.
 - Go over the answers, making sure that students say the words correctly.
 - To introduce Application Activity, give the students a riddle that can be solved using one of the group's numbers. (ex. "Who has the number whose value for the number 7 is 700?"). Give additional riddles, as necessary.
- Exploration/Explanation
- Based on formal and informal assessments, divide the students into two groups, those who are ready for acceleration and those who need continued support of the targeted concepts. Give one color index card to the Accelerated Group and the other color to the Reteach Group. The Accelerated Group will start with the Application Activity while you work with the Reteach Group. Groups will rotate after ten minutes.
- Reteach Group: Use the Expanded Notation Template (Student Resource 8) to continue exploration of the composition and decomposition of numbers through the thousands place. Exploration should include:
 - Expanded notation to standard format
 - Standard format to expanded notation
 - Identifying the value of each digit in a number
 - Acceleration Group: Use the Expanded Notation Template (Resource 8) to extend exploration of the composition and decomposition of numbers through the hundred thousands place. Introduce the 4th grade term "period" to define each group of three digits separated by a comma (i.e., one's period, thousand's period, million's period). Challenge students to read and write numbers in the millions period. Exploration should include:
 - Expanded notation to standard format
 - Standard format to expanded notation
 - Identifying the value of each digit in a number

- Application
 - Distribute Riddles Worksheet (Student Resource 16 and Teacher Resource 7 for the Re-teach Group and Student Resource 17 and Resource Teacher 8 for the Accelerated Group).
 - Students should read the clues and find the matching number in the number box.
 - When they have solved the five riddles there will be one number remaining in the number box. Students need to create their own riddle for that number.

Summative Assessment:

- (Student Resource 18, Teacher Resource 9)
- Have manipulatives available for students to use.
- Once students complete the Summative Assessment they may work on Check My Price to demonstrate how it's relevant to real world experiences. (Student Resource 19).

Appendix:

- List of related websites (Teacher Resource 10)

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Place Value Pre-Assessment

4, 563

1. What digit is in the tens place? _____
2. What digit is in the ones place? _____
3. What is the value of 5? _____
4. What is 4, 563 in expanded form? _____

5. What is 4, 563 in word form? _____

Challenge:

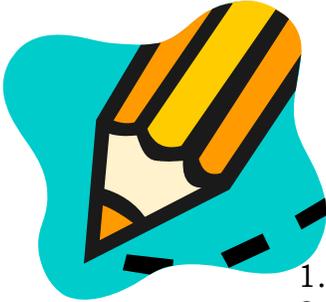
36,257

*6. What is the value of 6? _____

*7. What is the value of 3? _____

Name: _____

Date: _____



Place Value Pre-Assessment

4, 563

1. What digit is in the tens place? _____
2. What digit is in the ones place? _____
3. What is the value of 5? _____
4. What is 4, 563 in expanded form? _____

5. What is 4, 563 in word form? _____

Challenge:

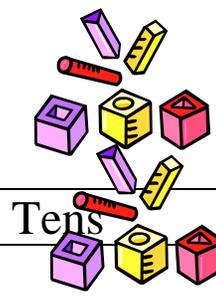
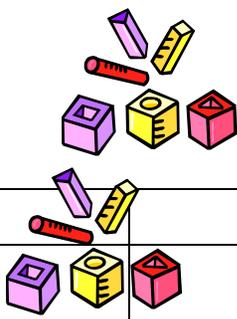
36,257

*6. What is the value of 6? _____

*7. What is the value of 3? _____

Place Value Mat

Student Resource 2



Thousands	Hundreds	Tens	Ones
,			

Student Resource 3

Place Value Mat

Tens Thousands	Thousands	Hundreds	Tens	Ones

Paper Base-Ten Blocks

Student Resource 5

Digit Cards

0	1	2
3	4	5
6	7	8
9	,	>
>	=	

Ticket to Leave

8, 912

1. What digit is in the tens place? _____
2. What digit is in the ones place? _____
3. What is the value of 8? _____
4. *What is 8,912 in word form?* _____

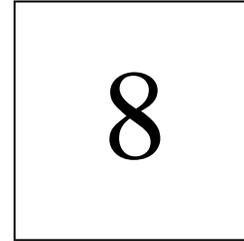
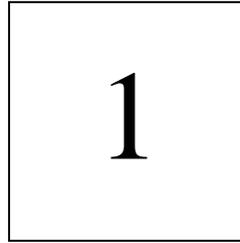
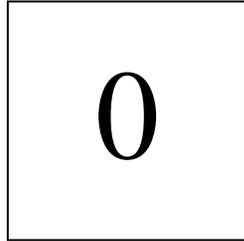
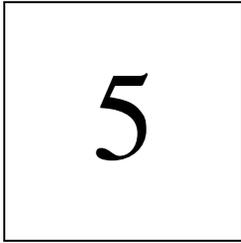


Name: _____

Date : _____

Warm-Up Day 2

Use the digits below to create the largest number possible. After you have arranged them in order, explain your answer in BCR format on the lines given. You can use the digits on the bottom of the page and arrange them in the order you wish.

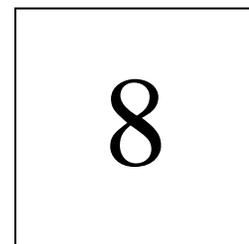
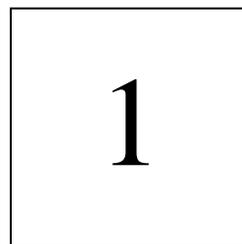
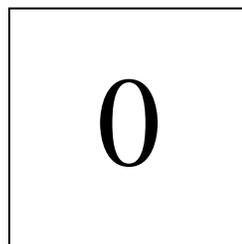
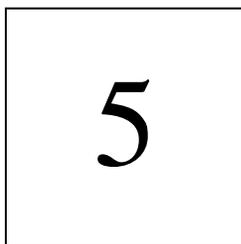


Create the largest number possible. _____

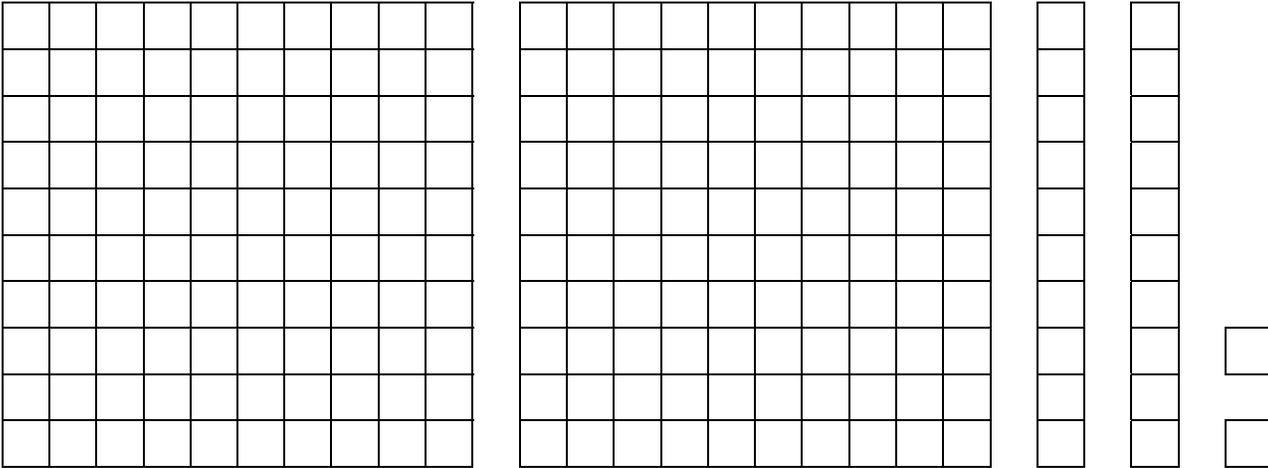
Word Bank

Place	Tens	Largest	Order
Value	Thousand	Digit	
Ones	Smallest	Comma	





How Many Can You Make? (#1)



How many different numbers can you make from 2 hundreds blocks, 2 tens-blocks, and 2 ones-blocks? You can use one, two, three, four, five, or all six blocks. Write each number in standard form and then write it in expanded notation.

Example:

$$201 = 200 + 0 + 1$$

Name _____

How Many Can You Make?

_____ = _____

_____ = _____

_____ = _____

_____ = _____

_____ = _____

_____ = _____

_____ = _____

_____ = _____

_____ = _____

_____ = _____

_____ = _____

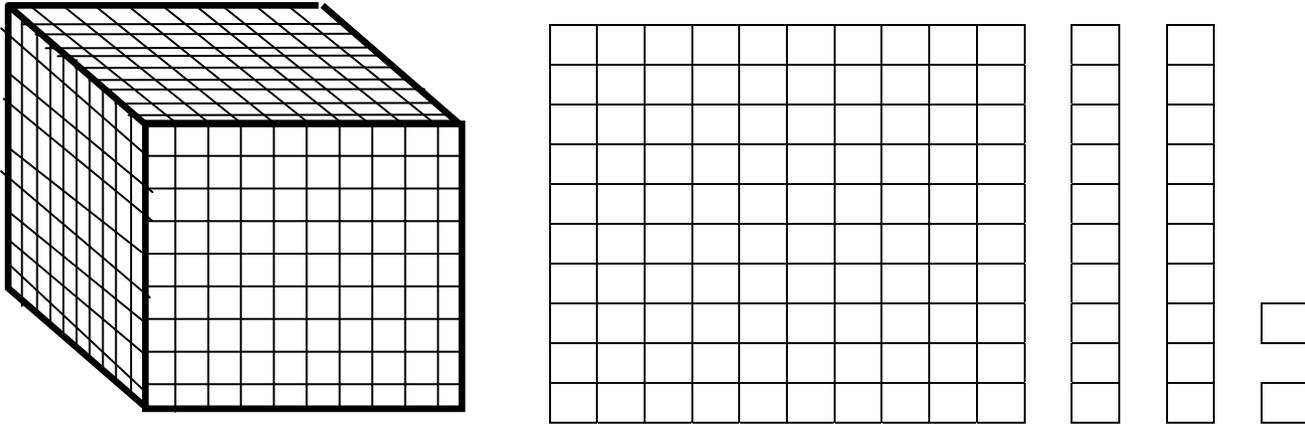
_____ = _____

_____ = _____

_____ = _____

_____ = _____

How Many Can You Make? (#2)



How many different numbers can you make from 1 thousand block, 1 hundred block, 2 tens-blocks, and 2 ones-blocks? You can use one, two, three, four, five, or all six blocks. Write each number in standard form and then write it in expanded notation.

Example:

$$1,012 = 1,000 + 0 + 10 + 2$$

Name _____

How Many Can You Make?

_____ = _____

_____ = _____

_____ = _____

_____ = _____

_____ = _____

_____ = _____

_____ = _____

_____ = _____

_____ = _____

_____ = _____

_____ = _____

_____ = _____

_____ = _____

_____ = _____

_____ = _____

Name: _____



The Missing Forms



Date : _____

Each number below needs to be represented in standard form, expanded form, and in word form. Fill in the chart below with the missing information.

Standard Form	Expanded Form	Word Form
5,632	_____ _____ _____	_____ _____ _____
_____ _____	$7,000 + 100 + 80 + 2$	_____ _____ _____
_____ _____	_____ _____ _____	One thousand two hundred sixty-nine
3,405	_____ _____ _____	_____ _____ _____

Name: _____



The Missing Forms



Date : _____

Each number below needs to be represented in standard form, expanded form, and in word form. Fill in the chart below with the missing information.

Standard Form	Expanded Form	Word Form
58,756	<hr/> <hr/> <hr/>	<hr/> <hr/> <hr/>
<hr/>	$90,000 + 5,000 + 900 + 40 + 4$	<hr/> <hr/> <hr/>
<hr/>	<hr/> <hr/> <hr/>	<p>Seventy-one thousand three hundred forty-three</p>
46,082	<hr/> <hr/> <hr/>	<hr/> <hr/> <hr/>

Shuffle and Match

5, 326	9, 908	6, 547	4, 849
$5,000 + 300 + 20 + 6$	$9,000 + 900 + 8$	$6,000 + 500 + 40 + 7$	$4,000 + 800 + 40 + 9$
Five thousand three hundred twenty- six	Nine thousand nine hundred eight	Six thousand five hundred forty-seven	Four thousand eight hundred forty- nine

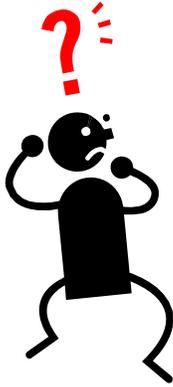
326	908	547	849
$300 + 20 + 6$	$900 + 8$	$500 + 40 + 7$	$800 + 40 + 9$
Three hundred twenty- six	Nine hundred eight	Five hundred forty-seven	Eight hundred forty- nine

65, 326	89, 908	76, 547	14, 849
$60,000 + 5,000$ $+ 300 + 20 + 6$	$80,000 + 9,000$ $+ 900 + 8$	$70,000 + 6,000$ $+ 500 + 40 + 7$	$10,000 + 4,000$ $+ 800 + 40 + 9$
Sixty- five thousand three hundred twenty- six	Eighty- nine thousand nine hundred eight	Seventy- six thousand five hundred forty- seven	Fourteen thousand eight hundred forty- nine

Name _____

Solve the Riddle

Read the clues and choose the correct number from the box.



26	256	963
579	9,863	1,234

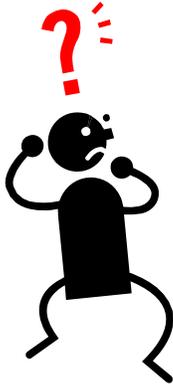
- The value of the 6 is 6 and the value of the 2 is 200.
What number am I? _____
- The number in the hundreds place is 3 times as big as the number in the ones place.
What number am I? _____
- The digits in the ones, tens, and hundreds place are all odd numbers.
What number am I? _____
- The digit in the tens place is a factor of the number in the ones place.
What number am I? _____
- The value of the 9 is 9,000 and the value of the 6 is 60.
What number am I? _____

Challenge: Make your own riddle for the number that has not been used yet.

Name _____

Solve The Riddle

Read the clues and choose the correct number from the box.



645,379	984,672	833,746
370,143	123,643	842,632

6. The value of the 6 is 600 and the value of the 4 is 40.
What number am I? _____
7. The number in the hundred thousands place is the same
as the number in the ones place.
What number am I? _____
8. The digits in the ones, tens, and hundreds place are all
odd numbers.
What number am I? _____
9. The digit in the hundred thousands place is two times the
digit in the ten thousands place .
What number am I? _____
10. The value of the 8 is 80,000 and the value of the 4 is
4,000.
What number am I? _____

Challenge: Make your own riddle for the number that has not been used yet.

Name: _____

Date: _____

Place Value- Quiz

6, 475

1. What digit is in the tens place? _____
2. What digit is in the hundreds place? _____
3. What is the value of 6? _____



4. Fill in the boxes below with the number 5, 632.

Standard Form	Expanded Form	Word Form
_____	_____	_____
_____	_____	_____
_____	_____	_____

5. Create the smallest value with the digits below.

4	6	1	8
---	---	---	---

Part A. _____

Part B. Use words and/or numbers to show what you know about place value to explain why your answer is correct.

6. I am a 4-digit odd number.

The sum of my digits is 10.

The digit in the thousands is a 3.

The digit in the hundreds is half of 10.

The rest of the place values are the same digit.

I am _____

Name: _____

Date: _____

Check My Price

You just arrived at Electronic 'R' Us. You can only buy two items that you want. Circle the two items that you will be purchasing. How much will you spend for these two items? Fill out your check with the total purchase to pay the cashier.



Your Check:

_____ (Your Name)	_____ Date
Pay to the Order of _____ (Name of the Store)	\$ <input style="width: 100px; height: 20px;" type="text"/>
_____ (Word Form of Your total)	_____ Dollars
Place Value Bank For _____	

Name: _____

Date: _____



Place Value Pre-Assessment

4, 563

1. What digit is in the tens place? 6
2. What digit is in the ones place? 3
3. What is the value of 5? 500
4. What is 4, 563 in expanded form? 4,000 + 500 + 60 + 3
5. What is 4, 563 in word form? four thousand five hundred sixty-three

Challenge:

36,257

- *6. What is the value of 6? 6,000
- *7. What is the value of 3? 30,000

Ticket to Leave

8, 912

1. What digit is in the tens place? _____1_____
2. What digit is in the ones place? _____2_____
3. What is the value of 8? _____8,000_____
4. What is 8,912 in word form? __eight thousand nine hundred twelve_____

Name: _____



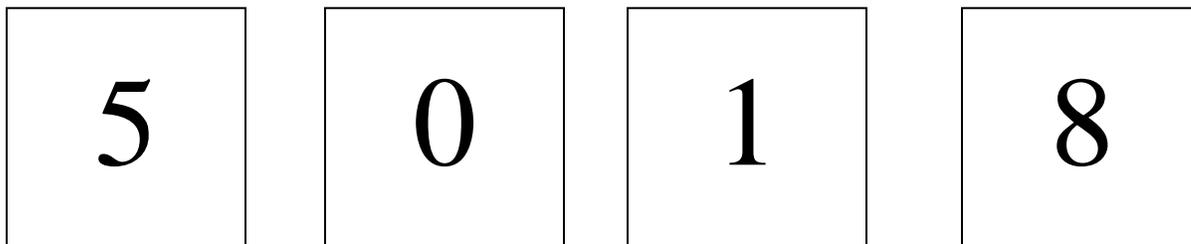
Date: _____

Name: _____

Date : _____

Warm-Up Day 2

Use the digits below to create the largest number possible. After you have arranged them in order, explain your answer in BCR format on the lines given. You can use the digits on the bottom of the page to cut out and arrange them in the order you wish.



Create the largest number possible. 8,510

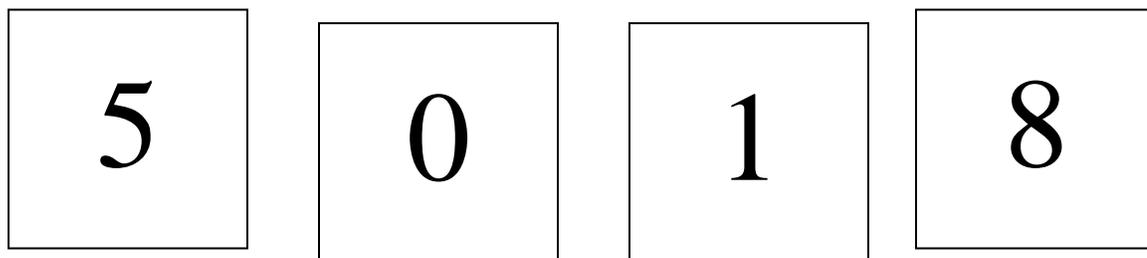
(BCR: Students should try to use as many words from the word bank as possible to explain their reasoning on why they put the digits in the order that they did.)

Examples may include but are not limited to: I decided to put the 8 in the thousands place because it is the largest digit given. The next largest number would go in the next largest place value which is the hundreds place value. I continued with this strategy in the tens and ones place. A comma goes between the 8 and 5 because it goes in front of every three numbers from right to left to separate the periods.

Word Bank

Place	Tens	Largest	Order
Value	Thousand	Digit	
Ones	Smallest	Comma	





Expanded Notation Template

2	3	4	6	8	9
---	---	---	---	---	---

2	0	0	0	0	0
	3	0	0	0	0
		4	0	0	0
			6	0	0
				8	0
					9

Expanded Notation: $200,000+30,000+4,000+600+80+9$

Name: _____



The Missing Forms



Date : _____

Each number below needs to be represented in standard form, expanded form, and in word form. Fill in the chart below with the missing information.

Standard Form	Expanded Form	Word Form
5,632	<u>5,000 + 600 + 30 + 8</u>	<u>Five thousand six hundred thirty-eight</u>
<u>7,182</u>	7,000 + 100 + 80 + 2	<u>Seven thousand one hundred eighty-two</u>
<u>1,269</u>	<u>1,000 + 200 + 60 + 9</u>	One thousand two hundred sixty-nine
3,405	<u>3,000 + 400 + 00 + 5</u>	<u>Three thousand four hundred five</u>

Name: _____



The Missing Forms



Date : _____

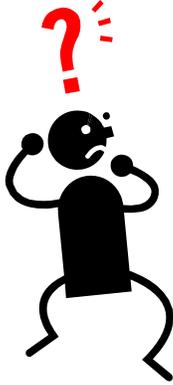
Each number below needs to be represented in standard form, expanded form, and in word form. Fill in the chart below with the missing information.

Standard Form	Expanded Form	Word Form
58, 756	$\begin{array}{r} 50,000 + 8,000 + 700 + 50 \\ + 6 \end{array}$	<u>Fifty-eight thousand</u> <u>seven hundred fifty-six</u>
<u>95,944</u>	$\begin{array}{r} 90, 000 + 5,000 + 900 + 40 \\ + 4 \end{array}$	<u>Ninty-five thousand nine</u> <u>hundred forty-four</u>
<u>71, 343</u>	$\begin{array}{r} 7,000 + 1,000 + 300 + 40 + \\ 3 \end{array}$	Seventy-one thousand three hundred forty- three
46, 082	$\begin{array}{r} 40,000 + 6,000 + 000 + 80 \\ + 2 \end{array}$	<u>Forty-six thousand</u> <u>eighty-two</u>

Name _____

Solve The Riddle

Read the clues and choose the correct number from the box.



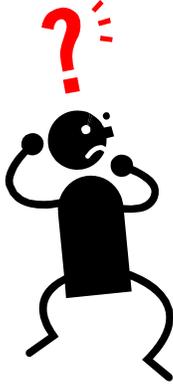
26	256	963
579	9,863	1,234

11. The value of the 6 is 6 and the value of the 2 is 200.
What number am I? _____256_____
12. The number in the hundreds place is 3 times as big as
the number in the ones place.
What number am I? _____963_____
13. The digits in the ones, tens, and hundreds place are all
odd numbers.
What number am I? _____579_____
14. The digit in the tens place is a factor of the number in
the ones place.
What number am I? _____26_____
15. The value of the 9 is 9,000 and the value of the 6 is 60.
What number am I? _____9,863_____

Challenge: Make your own riddle for the number that has not been used yet.

Name _____

Read the clues and choose the correct number from the box.



645,379	984,672	833,746
370,143	123,643	842,632

16. The value of the 6 is 600 and the value of the 4 is 40.
What number am I? 123,643
17. The number in the hundred thousands place is the same as the number in the ones place.
What number am I? 370,143
18. The digits in the ones, tens, and hundreds place are all odd numbers.
What number am I? 645,379
19. The digit in the hundred thousands place is two times the digit in the ten thousands place.
What number am I? 842,632
20. The value of the 8 is 80,000 and the value of the 4 is 4,000.
What number am I? 984,672

Challenge: Make your own riddle for the number that has not been used yet.

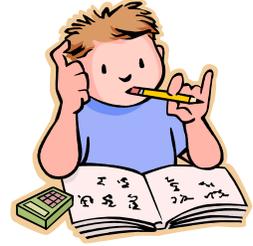
Name: _____

Date: _____

Place Value- Quiz

6, 475

1. What digit is in the tens place? 7
2. What digit is in the hundreds place? 4
3. What is the value of 6? 6,000



4. Fill in the boxes below with the number 5, 632.

Standard Form	Expanded Form	Word Form
<u>5,632</u>	<u>5, 000 + 600 +30 +2</u>	<u>Five thousand six hundred thirty- two</u>

5. Create the smallest value with the digits below.



Part A. 1, 468

Part B. Use words and/or numbers to show what you know about place value to explain why your answer is correct.

Examples may include but are not limited to: I decided to put the one in the thousands place value because it is the smallest digit given. The next smallest number would go in the next largest place value, which is the hundreds place value. I continue with this strategy in the tens and ones place value. A comma goes between 1 and 4 because it goes in front of every three numbers from right to left to separate the periods and helps me to read the number.

6. I am a 4-digit odd number.
 The sum of my digits is 10.
 The digit in the thousands is a 3.
 The digit in the hundreds is half of 10.
 The rest of the place values are the same digit.
 I am 3,511.

Place Value Websites

- Represent numbers up to 100,000 using different formats. After each correct answer, you may shoot at the target to earn points:

www.toonuniversity.com/flash.asp?err=503&engine=15

- Match 3-digit numbers to the correct written format to reveal the hidden picture:

www.dositey.com/2008/addsub/Mystery10.htm

- Create the largest possible number from the digits the computer gives you. Allows for differentiation by letting the player select the number of digits and the number of discards.

education.jlab.org/placevalue/result.html

