#### **Place Value-able Facts**

#### **Brief Overview:**

In this place value lesson, students will work with *Fun Fact Cards* to explore numbers. It is expected that students are familiar with place value up to the millions place, have some knowledge of comparing numbers, and are knowledgeable about decimals. *However, this is not a lesson that focuses on decimals*. During this lesson, students will represent numbers to the billions place, acknowledge decimal fractions when reading money amounts, be able to represent numbers in standard, word, and expanded forms through exciting activities. While learning, students will be engaged through games like "Find-a-Fact," "Roll, Write, Compare!" and "Order Me Around."

#### NCTM Content Standard:

Number and Operations: Understand numbers, ways of representing numbers, relationships among numbers, and number systems.

• Understand the place-value structure of the base-ten number system and be able to represent and compare whole numbers and decimals.

• Recognize equivalent representations for the same number and generate them by decomposing and composing numbers.

• Develop understanding of fractions as parts of unit wholes, as parts of a collection, as locations on number lines, and as divisions of whole numbers.

#### Grade/Level:

Grades 4 / 5

#### **Duration/Length:**

3 sessions, 60 minutes per session

#### **Student Outcomes:**

Students will:

• Write and represent the place value locations for whole numbers to the billions by using symbols, words, and models.

• Describe, represent, apply, compare, or order the relationships of whole numbers and decimals.

#### Materials and Resources:

#### Day 1

- Student resource "Place Value-able Facts, Pre-Assessment" (one for each student)
- Teacher resource "Place Value-able Facts, Pre-Assessment Answer Key"
- Teacher resource "Picture a Number" (1 Hundred Pennies, 1 Thousand Pennies, 1 Million Stars)

How Big Is a Million by Anna Milbourne

Teacher resource "Fun Fact Cards" (4 sets: *thousands, millions, billions, decimals*)

- Prepare one large *Find a Fact Bag* (a container or plastic bag is fine) so students can pull out a *Fun Fact Card*. Cut out sets of *Fun Fact Cards* that are appropriately leveled for your class.
- Student resource "Place Value Log" (*a vertical and horizontal option*)
- Student resource "Number Line" (*enrich activity*)
- Student resource "Day 1 Assessment"
- Teacher resource "Day 1 Assessment Answer Key"

#### Day 2

- Student resource "Comparing Log Sheet"
- Student resource "Digit Cards"
- Student resource "Roll, Write, Compare!" (1 for each pair of students)
- Student resource "Spinner Challenge Game" (*paper clip, pencil, number cubes or dice*)
- Fun Fact Cards (from Day 1)
- Student resource "Comparing Numbers Assessment"
- Teacher resource "Comparing Numbers Assessment Answer Key"

#### Day 3

- Student resource "Decimal Place Value Chart-Comparing"
- Student resource *Fun Fact Cards* Decimals (*from Day 1*)
- Teacher resource "Order Me Around Rules"
- Teacher resource "Order Me Around Numbers"
- Student resource "Decimal Place Value Log"
- Student resource "Place Value Assessment"
- Teacher resource "Place Value Assessment Key"

#### **Development/Procedures:**

#### Day 1

#### **Pre-assessment**

- Distribute student resource "Place Value-able Facts, Pre-Assessment" to each student.
- Students will identify the given place value amount by circling certain digits and writing numbers in standard, word, and expanded forms. An answer key is provided.

#### Engagement

• Read *How Big is a Million* by Anna Milbourne or show teacher resource, "Picture a Number" to help students visualize the magnitude of numbers.

#### Exploration

• Ask students if they have ever seen a million of anything. Allow students time to think and share responses. Ask students to close their eyes and visualize a million. How big or small would each item have to be if we wanted a million on our chalkboard? Take a look around the room. Could we get a million of anything to fit on your desk?

#### Explanation

- Use pre-assessment results to determine which set of teacher resource "Fun Fact Cards" to use. Please look at the materials very carefully before you make your bags.
- Use teacher resource "Find a Fact Bag" and allow a student to choose a *Fun Fact Card* and read it aloud.
  - Ask students if they heard a number when listening to the *Fun Fact*. Choose a student volunteer to write the number on the board (or overhead projector / document camera).
- Ask students if there is another way to represent the number written on the board. Student volunteers should give their own examples leading to a discussion about word form, expanded form, picture form, or using base ten blocks or other manipulatives.
- Facilitate an understanding of the three forms students will be using: standard form (number form), word form, and expanded form.

- Distribute student resource "Place Value Logs."
- Choose a student to read a *Fun Fact Card* from the teacher's bag of *Fun Facts*. Direct students to focus on the number as it is being read and assist students as needed.
- Ask all students to write down the number they heard on their place value log.
- Circulate around the room monitoring students' responses and progress.
- Write anecdotal notes while observing students as they complete their place value logs.
- Refer to the place value chart if necessary for student understanding.
- Ask students if they can represent the *Fun Fact* number in a different way. Students should begin to write the number in word form and/or expanded form.
- Encourage students to share their answers with their partner.
- Ask volunteers to explain how they represented the *Fun Fact* number.
  - Allow students to use the vocabulary terms, number form or standard form. Explain that both terms can be used. Accept student responses for word form and expanded form.
- Record student responses on chart paper, overhead projector, smart board, or available board.
- Choose another student to pick another Fun Fact Card.
- Repeat the process of identifying the word form and expanded form of the number represented on the card.

#### Application

• Using the *Fun Fact Cards* with a partner, in a small group, or independently, continue the assignment by writing the word and expanded form of the numbers represented.

#### Differentiation

• Reteach

A small group of students may not be ready to write the expanded and word form for numbers. If students are having difficulty, work with them in a small group. Use a larger place value chart to reinforce the order necessary for understanding place value. Practice saying numbers up to the millions instead of the billions if needed.

• Enrich

Allow this group of students the opportunity to collect their *Fun Fact Card* and move to another area of the room. These students should compare all the numbers represented on the *Fun Fact Card* that they have already worked with and place them on a number line together. The number line can be drawn on a white board (or on chart paper) and cards can be taped onto the flat surface area. You may also consider using string or yarn connected by two chairs (or desks) in your

classroom. Students may then attach the cards in order by using paper clips or by folding the cards over the string. Once numbers have been ordered, those students should complete the student resource "Number Line."

#### Assessment

• Ask all students to return to their seats. Use a projector to read aloud 1 to 3 *Fun Facts*. Have students say the numbers, identify their place value location, write in expanded form, and write in word form. Students may respond on miniature dry erase boards or paper. Ask students to summarize the lesson by completing student resource "Day 1 Assessment."

#### Day 2

#### Engagement

- Ask a student to review yesterday's lesson about place value. A quick review of math vocabulary words should take place during this class discussion.
- Facilitate a discussion about comparing and contrasting based on analyzing students in the classroom by asking, "Do you notice anything you have in common with your neighbor?" Students should look around and begin raising their hands to respond. Guide students to compare likes and differences (Yes, Jane and Cindy are both the same height. In math, what can we say about their height? Is there anything different about them? Yes, Cindy has on pants but Jane is wearing a skirt). Begin to use the same concept with words. Write the words, house and holiday, on the board. Ask: "How are these words alike?" Students should review alphabetical order briefly.

#### Exploration

- Ask students if ordering words in alphabetical order is similar to comparing numbers.
- Encourage students work independently or in pairs to answer the question.
- Choose student volunteers to share their responses.
- Ask: "How is comparing people like comparing words? How is comparing words like comparing numbers?"

#### Explanation

- Distribute student resource "Comparing Log" (*Students can work in pairs, groups, or individually*).
- Roll a large die or number cube four times.

- Direct students to use the digits rolled to create a 4-digit number and write the number on the log.
- Roll the die four more times to create a second 4-digit number. Students now have two numbers to compare.
- Ask: What patterns do you notice? This discussion should evolve into a conversation about comparison symbols used in previous grade levels (<, >, =). "Can we create rules for comparing numbers?" Students should begin making rules for comparing numbers.
- Write a class list of rules that will explain the process of comparing numbers. Be sure to include usage of symbols (<, >, =). *Rules may include Do's and Don'ts based on teacher preference.*
- Refer to the large place value chart if clarification is needed.

#### Application

- Distribute student resource "Digit Cards," student resource "Roll, Write, Compare!" game sheet, and two dice to each pair of students.
- Play two or three rounds with the class and then allow students to play the game with a partner.

#### Differentiation

• Reteach

Students will continue to play "Roll, Write, Compare!" They may use student resource "Place Value Chart" to help identify the value of their numbers. Once students are able to correctly compare numbers with a place value chart, you can re-introduce the game sheet.

• Enrich

Students may go to the math center and use student resource "Find-a-Fact Spinner Challenge" and play that game.

#### Assessment

• Have students complete student resource "Comparing Numbers Assessment." An answer key is provided.

#### Day 3

#### Engagement

• Pose the following scenario for the entire class: *Koby has less than one pizza*. *Show how much pizza Koby could have.* 

- Students may discuss this question quietly in groups or may choose to work individually.
- A variety of examples could be shown depending on time. Discussion should lead to the idea of fractions and / or decimals.

#### Exploration

- Draw the card "The longest goldfish measured 18.71 inches." from the Find-a-Fact Bag and ask one student to read it to the class.
- How is 18.71 different from the numbers that you have been working with this week?
- How could you change the place value chart you have been using to include decimals?
- Ask students where they have seen numbers that include decimals before.
  Answers should relate to measurement, scores, prices, etc.

#### Explanation

- Distribute student resource "Decimal Place Value Chart-Comparing."
- Direct students to record 18.71 on their place value chart.
- Allow a student volunteer to draw one student resource "Fun Fact Cards Decimals" from the Find-a-Fact Bag.
- Ask students to record the number from the Fun Fact Card on the second row of their decimal place value charts.
- Instruct students to identify which number is greater or less than by recalling ordering numbers from the previous day's lesson.
- Model writing the inequality statement for the class beneath the place value chart.
- Direct students to work in pairs to show mastery of ordering decimals by drawing another card and completing their decimal place value charts.
  - You may choose cards and display them for the class to view or prepare separate card bags for each pair of students.

#### Application

• Refer to teacher resource "Order Me Around - Rules" in order to direct students in a movement activity designed to apply comparing and ordering concepts.

#### Differentiation

• Reteach

Students will use their decimal place value chart to continue comparing decimals. Students may use base ten blocks to represent decimals from *Fun Fact Cards*.

• Enrich

Extend today's lesson by placing decimals in word and expanded form using the student resource "Decimal Place Value Log." Students will experience an additional challenge in completing expanded form.

#### Summative Assessment:

Distribute student resource "Place Value Assessment" in order for students to demonstrate their ability to represent and compare numbers as well as understand place value concepts. An answer key is provided,

#### Authors:

Shawndella B. Taylor Atlanta Preparatory Academy Fulton County, Georgia Kathy Kelbaugh Prettyboy Elementary School Baltimore County, Maryland Name: \_

Place Value-able Facts Pre-Assessment

1. What is one hundred seventy-five thousand, four hundred ninety-six in standard form?

- a. 1,496
- b. 175,496
- c. 17,549
- d. 1,750,496

2. Identify the value of the underlined digit in the number 1,567,420?

- a. 6
- b. 60
- c. 6,000
- d. 60,000
- 3. Choose the correct place value of the underlined digit in the number  $\underline{389,709}$ .
  - a. hundred thousands
  - b. ten thousands
  - c. hundreds
  - d. tens
- 4. Use <, >, = to make this expression true.

78,350 \_\_\_\_\_ 700,000 + 80,000 + 3,000 + 500

Place Value-able Facts Pre-Assessment--Key

1. What is one hundred seventy-five thousand, four hundred ninety-six in standard form?

- e. 1,496
- <mark>f. 175,496</mark>
- g. 17,549
- h. 1,750,496
- 2. Identify the value of the underlined digit in the number 1,567,420?
  - e. 6
  - f. 60
  - g. 6,000
  - <mark>h. 60,000</mark>
- 3. Choose the correct place value of the underlined digit in the number  $\underline{389,709}$ .
  - e. hundred thousands
  - f. ten thousands
  - g. hundreds
  - h. tens
- 4. Use <, >, = to make this expression true.

78,350 \_\_\_\_\_ 700,000 + 80,000 + 3,000 + 500

## Picture a Number



100 Pennies



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1,000 Pennies



1,000,000 stars magnified by the Hubble telescope. (too many to see clearly)



## Fun Fact Cards--Thousands

A pair of Levi <sup>™</sup> jeans were sold on eBay for <b>\$60,905</b> in 2005.	A shark may grow and lose <b>23,450</b> teeth in its lifetime.
An average great white shark weighs about <b>2,790</b> lbs.	There are more than <b>1,995</b> roller coasters in the world.
The distance from New York City to Hong Kong is <b>8,437</b> miles.	The highest mountain in the U.S. is Mt. McKinley. It is <b>20,320</b> feet high.
Light travels at a speed of <b>186,000</b> miles per second.	As of 2008, <b>636,919</b> people live in Baltimore, Maryland.

# Fun Fact Cards--Millions

Over <b>26,000,000</b> people watched the 2010 World Cup Soccer Tournament.	Nintendo sold <b>7,526,821</b> Wii systems from 2006 to 2008.
	The Twilight movie,
Earth is	<i>Eclipse</i> , made
<b>93,456,789</b> miles	\$31,708,308 in two
from the sun.	weeks.
The Harry Potter	The population of
series has sold over	New York City is
17,678,943 copies	over 14,598,713
worldwide.	people.
Over <b>402,876,259</b>	The oldest fossil is
people use	135,000,000 years
Facebook.	old. It is a spider
	fossil.

# Fun Fact Cards--Billions

The Star Wars movies have made <b>\$265,789,321,340</b> worldwide.	Saturn is <b>1,423,600,000</b> kilometers from the Sun.
China is the world's most populated country. About 1,274,915,000 people live there.	Neptune is <b>4,488,400,000</b> kilometers from the sun.
In the first 6 months of 2010, Americans spent \$5,940,000,000 at the movies. At any given moment there are more than 12,750,225,900 insects alive in the U.S.	Bill Gates, the founder of Microsoft, earned over \$53,000,000,000 by 2010. The U.S. national debt has grown \$6,110,000,000 per day since 2007.

Guitar Hero for	An Ipod Touch™ is on
XBOX™ costs	sale for <b>\$178.55</b> at
<b>\$39.99</b> .	Target.
A gallon of gasoline costs <b>\$2.87</b> .	A pair of Converse ™ tennis shoes cost <b>\$48.27</b> at Sam's Shoe Store.
A pack of zoo shaped	The average price for
Silly Bandz™ costs	a peppermint candy is
<b>\$4.95</b> .	<b>\$0.07</b> per piece.
A pencil from the school's pencil machine costs <b>\$0.25</b> .	A pack of gum costs <b>\$1.99</b> .

# Fun Fact Cards--Decimals

The longest goldfish measured <b>18.71</b> inches.	The smallest dog is named Brandy and measures <b>15.2</b> cm from nose to the tip of her tail.
A rabbit named	The tallest man on the
Nipper has ears that	planet is <b>2.47</b> meters
measure <b>31.13</b> inches	tall (that is over eight
long.	feet tall)!!!
A group of friends in	Michael Phelps won his
Malaysia created a	7 <sup>th</sup> Olympic gold medal
line of coins that	by completing the 100
stretched for <b>34.56</b>	meter butterfly in
miles.	<b>50.58</b> seconds.

# Fun Fact Cards--Decimals

# Fun Fact Cards--Templates



## Place Value Log

Can you represent a number in three ways?

l	Billion	S	Millions			Thousands			Ones		
Hundreds	Tens	Ones	Hundreds	Tens	Ones	Hundreds	Tens	Ones	Hundreds	Tens	Ones
		,			,			,			
		,			,			,			
,								9			
, , , , , , , , , , , , , , , , , , ,								,			

E	Billion	S	٨	Aillion	S	Th	iousan	inds Ones			
Hundreds	Tens	Ones	Hundreds	Tens	Ones	Hundreds	Tens	Ones	Hundreds	Tens	Ones
		,			,			,			
		,			,			,			
								<b>,</b>			
, , ,								,			

Bill	ions			Millions		Т	housand	S		Ones	
Hundreds	Tens	Ones	Hundreds	Tens	Ones	Hundreds	Tens	Ones	Hundreds	Tens	Ones
		,			,			,			
		,									
								;			

Place Value Log





Shawn and Della were playing a number game during recess. They rolled number cubes to place digits on a paper. The person who made the greater number won the game.

### Part A

Della counted 8 digits in the number that she made. She said that her number was in the millions. Was she correct?

### Part B

Use what you know about place value to explain why your answer is correct. Use number and/or words in your explanation.

Shawn and Della were playing a number game during recess. They rolled number cubes to place digits on a paper. The person who made the greater number won the game.

## Part A

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### Part B

Use what you know about place value to explain why your answer is correct. Use number and/or words in your explanation.

Sample: I know that Della is correct because there are three digits in the one's period; three digits in the thousand's period; and three digits in the million's period. I made a place value chart and saw that eight digits fall within the million's period.

10 Mil Mil 1	100 10 Th Th	Th	Н	Т	0
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## Comparing Log

You can use this chart to help you compare two numbers.

Billions			٨	۸illion	S	Thousands			Ones		
Hundreds	Tens	Ones	Hundreds	Tens	Ones	Hundreds	Tens	Ones	Hundreds	Tens	Ones
		,			,			,			
		,			,			,			

Billions			Millions			Thousands			Ones		
Hundreds	Tens	Ones	Hundreds	Tens	Ones	Hundreds	Tens	Ones	Hundreds	Tens	Ones
		,			,			,			
		,			,			,			

Digit Cards				
1	2			
3	4			
5	6			
7	8			
9	0			

Name: \_\_\_\_\_

Date: \_\_\_\_\_

## Roll, Write, Compare!

Directions:

- 1. Players take turns rolling 2 number cubes.
- 2. Add the numbers together to determine how many digit cards will be drawn. If 11 or 12 cards are drawn, students are allowed to choose the cards that they would like to return to the pile.
- 3. Player 1 and Player 2 create their own numbers and record in their columns.
- 4. Compare the numbers and then write < or > in the center column.
- 5. The player with the greater number wins that round.

Player 1	< or	Player 2



Play this game with a bag of Fun Fact cards. Use a paperclip and pencil for the spinner. (Place a pencil through a paperclip with the point of the pencil in the center of the spinner. Use your finger to flick the paperclip.)

Name	Date:
	Comparing Numbers Assessment
1.	Complete the inequalities below using < or >.
	325,907 3,250,907
2.	7,000,000,000 + 900,000,000 + 5,000,000 79,500,000
3.	8,000,000 900,000,000
4.	Which place value has a different value in the numbers below?
	345,873,907 365,873,907
Name	Date:
	Comparing Numbers Assessment
5.	Complete the inequalities below using < or >.
	325,907 3,250,907
6.	7,000,000,000 + 900,000,000 + 5,000,000 79,500,000
7.	8,000,000,000 9,000,000
8.	Which place value has a different value in the numbers below?
	345,873,907 365,873,907

## Comparing Numbers Assessment Key

9. Complete the inequalities below using < or >.



- 10.7,000,000,000 + 900,000,000 + 5,000,000 ->\_ 79,500,000
- 11. 8,000,000,000 <u>></u> 900,000,000
- 12. Which place value has a different value in the numbers below?

345,873,907 365,873,907

\_\_\_\_\_ten million's place\_\_\_\_\_

Name:



## Decimal Place Value Chart

Comparing

Directions: Draw two Fun Fact cards from the bag. Record each Fun Fact number in the chart. Use the chart to help you compare the decimals and write an inequality expression below the chart.

Tens	Ones	•	Tenths	Hundredths
		•		
		•		
		-		

Tens	Ones	•	Tenths	Hundredths
		•		
		•		

Tens	Ones	•	Tenths	Hundredths
		•		
		•		



- 1. Divide Students into two groups.
- 2. Place "Order Me Around" cards face down on a table.
- 3. Call students to come up one at a time and choose one card.
- 4. Students now become that digit or symbol. Tape the card to the student.
- 5. Act as "General Order" by choosing Fun Facts out of the Find-a-Fact Bag and ordering the students to "be that number".
- 6. Read a Fun Fact aloud, the first group must arrange themselves in the proper order to represent the number.
- 7. Group 2 will wait for the second card to be drawn to arrange themselves.
- 8. Students who are representing symbols must pay special attention in order to position themselves in the right location.

You may choose to play as many rounds as time allows. Students will enjoy moving around creating numbers and comparison sentences.

#### Variations:

Teacher or students can create a number from the fact cards. Then the teacher can "order" the number to change by calling out:

"Change the tenths place to make the number greater."

"Change the hundredths place to make it less."

"Group 2, create a number that is less than this number."

\*\*\*NOTE "Order Me Around" number cards should be duplicated to accommodate class size. Cards can also be prepared with string to be worn as a necklace.



## Order Me Around Numbers







Decimal Place Value Log					
Tens	Ones	•	Tenths	Hundredths	$\Sigma$
					_
					-

Tens	Ones	•	Tenths	Hundredths
		•		

Name:

Date:

#### Place Value Assessment

- 1. Which is the word form for 215, 097,542?
- a. two million, one hundred fifteen thousand, ninety-seven
- b. two hundred fifteen million, ninety-seven thousand, five hundred forty-two
- c. two hundred fifteen million, nine hundred seventy thousand, five hundred forty two
- d. two billion, fifteen million, nine hundred seven thousand, five hundred forty-two
- 2. Which number has a 5 in the ten thousand's place?
  - a. 509,478
  - b. 15,904,780
  - c. 595,470
  - d. 150,478
- 3. Choose the number that shows

7,000,000,000 + 800,000,000 + 9,000,000 + 200,000 + 30,000 + 6,000 + 50 + 5

- a. 7,809,236,055
- b. 78,923,655
- c. 7,890,236,550
- d. 7,890,236, 505



## Place Value BCR

Kathy's family completed a bicycle race in Baltimore to raise money for a hospital. They finished with the following times in minutes:

28.90 29.09 28.97

**Part A** List the times from least to greatest.



### Part B

Use what you know about decimals and place value to explain why your answer is correct. Use number and/or words in your explanation.

Place Value Asssessment Key

1. Which is the word form for 215, 097,542?

a. two million, one hundred fifteen thousand, ninety-seven

<mark>b. two hundred fifteen million, ninety-seven thousand, five hundred</mark> forty-two

c. two hundred fifteen million, nine hundred seventy thousand, five hundred forty two

d. two billion, fifteen million, nine hundred seven thousand, five hundred forty-two

2. Which number has a 5 in the ten thousand's place?

a. 509,478 b. 15,904,780 c. 595,470 d. 150,478

3. Choose the number that shows

7,000,000,000 + 800,000,000 + 9,000,000 + 200,000 + 30,000 + 6,000 + 50 + 5

a. 7,809,236,055 b. 78,923,655 c. 7,890,236,550 d. 7,890,236, 505

## Place Value BCR—Key

Kathy's family completed a bicycle race in Baltimore to raise money for a hospital. They finished with the following times in minutes:

28.90 29.09 28.97

### Part A

List the times from least to greatest.



### Part B

Use what you know about decimals and place value to explain why your answer is correct. Use number and/or words in your explanation.

Sample Answer: I looked at the number in the ten's place. They are the same, so I went to the one's place. Two numbers have an 8 in the one's place and one had a 9. I knew that 29.09 would be greatest. Then I looked at the tenths place. I saw that there was a 9 in the tenths place in both numbers, so I looked at the hundredths place. O is less than 7 so 28.97 is greater than 28.90.