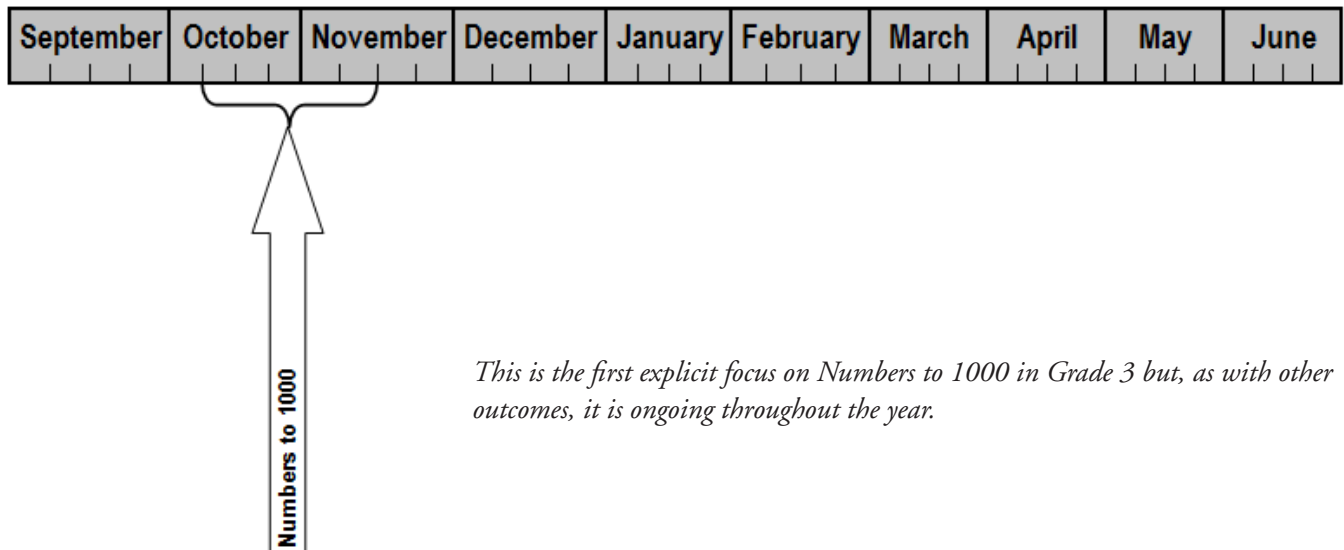


Numbers to 1000

Suggested Time: 5 Weeks



This is the first explicit focus on Numbers to 1000 in Grade 3 but, as with other outcomes, it is ongoing throughout the year.

Unit Overview

Focus and Context

Number permeates through all areas of mathematics in both content standards and process standards. Number sense slowly grows and develops over time, which is why it needs to be a natural part of daily mathematics class. Students with a good sense of number will decompose number, solve problems using number, understand the relationships between numbers and represent numbers in a variety of ways.

In Grade 3, students will build on their experiences with numbers to 100 while investigating the characteristics of numbers 0 – 1000. An active mathematics class enables students to construct meaning in problems while interacting with other students. Through this interaction, students will have a variety of opportunities to extend, reflect and communicate their mathematical knowledge. In addition to group work with problem solving, number sense can be developed in the context of a variety of classroom activities such as use of graphic representations, daily routines, and games explored throughout the curriculum.

Math Connects

“ ‘Really big’ numbers possess the same place-value structure as the smaller numbers that students have worked with in earlier grades. But quantities as large as 1000 or more can be difficult to conceptualize because of their size. ‘Really big’ numbers are best understood in terms of familiar real - world contexts.” (Van de Walle, *Teaching Student Centered Mathematics Grades 3 – 6*, 2006, pg. 39)

When students make connections between mathematical concepts or between mathematical ideas and the real world, it helps consolidate their learning. They see how mathematics connects to real life situations and they can then apply it to their own interests and experiences. When the teaching and learning of mathematics make authentic connections like sharing snacks, counting hockey cards and judging who has the most or least in a game or how many more they need to win, students learn the practical use and purpose of mathematics.

Process Standards Key

[C]	Communication	[PS]	Problem Solving
[CN]	Connections	[R]	Reasoning
[ME]	Mental Mathematics and Estimation	[T]	Technology
		[V]	Visualization

Curriculum Outcomes

STRAND	OUTCOME	PROCESS STANDARDS
Number	3N1 Say the number sequence 0 to 1000 forward and backward by: <ul style="list-style-type: none"> • 5s, 10s or 100s, using any starting point • 3s, using starting points that are multiples of 3 • 4s, using starting points that are multiples of 4 • 25s, using starting points that are multiples of 25. 	[C, CN, ME]
Number	3N2 Represent and describe numbers to 1000, concretely, pictorially and symbolically.	[C, CN, V]
Number	3N3 Compare and order numbers to 1000.	[C, CN, R, V]
Number	3N4 Estimate quantities less than 1000, using referents.	[ME, PS, R, V]
Number	3N5 Illustrate, concretely and pictorially, the meaning of place value for numerals to 1000.	[C, CN, R, V]

Strand: Number

Outcomes

Students will be expected to

3N2 Represent and describe numbers to 1000, concretely, pictorially and symbolically.

[C, CN, V]

Achievement Indicator:

3N2.1 Represent a given number pictorially.

Elaborations—Strategies for Learning and Teaching

Building larger numbers with concrete materials helps students develop a better sense of those numbers. It is important that students have many and varied purposeful experiences with materials that they can count and group in a variety of ways. By Grade 3, many students are familiar with the use of morning (or daily) routines as a ‘jump start’ to daily mathematical thinking. Consistent use of daily routines is an engaging way for students to strengthen and demonstrate their understanding of representing and describing numbers to 1000. There are suggestions of ways to incorporate mathematical concepts in a morning/daily routine throughout this guide.

Connections to real life contexts and to literature are very important to young students. Consider using the book *How Much, How Far, How Heavy, How Long, How Tall is 1000?* by Helen Nolan and Tracy Walker as a ‘springboard’ to begin exploring numbers to 1000. It is important that students see the number 1000 in different ways in order to realize that 1000 can cover a big area or a small area, depending on the size of the items being counted.

Provide opportunities for students to use hundreds charts and collections of materials such as straws, buttons, commercial counters, kidney beans, pennies, paper clips, etc. to represent given numbers over 100. Students will decide on various ways to count the objects, perhaps grouping them in tens and or hundreds. They will require numerous opportunities to group and count objects, in a variety of ways, for given numbers. These experiences are important because then students are able to represent numbers, pictorially, in a variety of ways. E.g.,



325 represented pictorially with buttons

 General Outcome: Develop Number Sense

Suggested Assessment Strategies

Performance

- Show Me the Value - Provide students with place value mats, a deck of 3-digit number cards and counters (popsicle sticks, commercial counters, beans, buttons or small cubes). Ask students to pick a 3-digit number from the deck of number cards and represent the number, using objects. (Small baggies and containers can be used to help student's organize groupings). Ask students to record their groups pictorially. (3N2.1)

Portfolio

- Present students with a number such as 290 (or the number of days that has passed in the current year). Ask students to create a picture representing the number.
E.g., a flower box containing 14 flowers (each with 20 petals) and 1 flower (with 10 petals). (3N2.1)

Resources/Notes

*Math Makes Sense 3***Launch:** The Market

TG pp. 2 – 3

You may use the launch provided or activate prior knowledge using children's literature.

Lesson 1: Counting Large Collections

3N2, 3N5

TG pp. 4 - 7

Children's Literature (provided):

Nolan, Helen and Walker, Tracy.
How Much, How Far, How Heavy, How Long, How Tall is 1000?

Strand: Number

Outcomes

Students will be expected to

3N5 Illustrate, concretely and pictorially, the meaning of place value for numerals to 1000.

[C, CN, R, V]

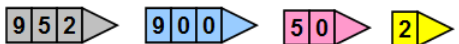
Achievement Indicator:

3N5.1 Explain and show, with counters, the meaning of each digit for a given 3-digit numeral with all digits the same; E.g., for the numeral 222, the first digit represents two hundreds (two hundred counters) the second digit represents two tens (twenty counters) and the third digit represents two ones (two counters).

Elaborations—Strategies for Learning and Teaching

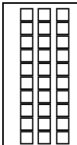
Provide opportunities for students to show each digit in a 3-digit number, using concrete materials, explaining the value of each digit.

Arrow Cards - Provide students with a set of “Arrow Cards” as shown below. “Arrow Cards” can be used to build numbers. Note that each group of arrow cards are a different color and can be placed one on top of the other. E.g., ‘Hundreds’ cards are blue, ‘tens’ cards are pink and ‘ones’ cards are yellow.

Present a multi-digit number, such as 952, to students. Students use arrow cards to build the number. 

Ask students to discuss the meaning of the digits, 9 is 900, 5 is 50, 2 is 2. As students pull the cards apart, they can see that in 952 there are 9 hundreds, 95 tens or 952 ones.

Place Value Concentration – Use this task to reinforce place value concepts. Provide a deck of 12 to 16 cards. Half of the cards should contain 3 digit numbers with one of the digits highlighted. The other half of the cards should contain the value of the highlighted digit represented with base ten blocks and the value written in standard form. Have players lay all cards face down. Player 1 turns over two cards, reading the number card and telling the meaning of the highlighted digit. Then the student checks to see if a match has been made between the highlighted digit and the base ten representation. If a match is made, player 1 keeps the cards and takes another turn. If no match is made, player 1 replaces the cards, face down and player 2 takes a turn. Play continues until all the cards are used. The winner is the player with the greatest number of cards at the end.

		 30
	<p>4<u>3</u>2</p>	

“It’s a match!”

General Outcome: Develop Number Sense

Suggested Assessment Strategies

Student-Teacher Dialogue


- Use the number 111. Ask students to use manipulatives such as beans, counters, blocks, etc. to explain and show the meaning of each digit.

Ask guiding questions such as:

How many beans will you need to show the meaning of the 1 in the tens place? How many beans to show the meaning of the 1 in the hundreds place? (3N5.1)

Performance

- Provide students with a set of cards containing 3-digit numbers, with all digits the same. Ask them to represent the value of one of the digits with base-ten materials.

E.g.,  Students may use 4 rods, or 40 units, to show the value of the digit. (3N5.1)

Resources/Notes

Lesson 1 (Cont'd): Counting Large Collections

3N2, 3N5

TG pp. 4 - 7

Strand: Number

Outcomes

Students will be expected to

3N2 Continued

Achievement Indicators:

3N2.2 Read a given number word (0 to 1000).





3N2.3 Read a given three-digit numeral without using the word 'and', e.g., 321 is three hundred twenty one, NOT three hundred AND twenty one.

Elaborations—Strategies for Learning and Teaching

Students need a variety of experiences using pre-grouped materials such as base ten blocks. It is very important that consistent mathematical language is used when referencing the base ten materials. Students need to know and use appropriate terminology.

Students will continue to benefit from many experiences using groupable models since there is potential for some students to misunderstand the ten to one relationship.

Students may tend to look at numerals alone. For example, for 15, they may simply see a 1 and 5 rather than 1 ten and 5 ones.

Mathematical Name	Picture
small cube / unit	
rod	
flat	
large cube	

Designing games, activities and centres will provide students with opportunities to practice reading number words.

It is important to model reading numbers correctly, without using “and”. 143 should be read as ‘one hundred forty three’ not as ‘one hundred and forty three’

Number Bang – Place number words in paper bag. Without looking, the student picks a card from the bag. If the player can read the card properly, he/she can keep it. If not, the card goes back in the bag and the bag is passed to the next player. If a “BANG” card is drawn, that player must put all his/her cards back in the bag and loses all cards. (Keep the “BANG” card out once it is drawn from the bag.) Play continues until the bag is empty. The player with the most cards, wins.

General Outcome: Develop Number Sense

Suggested Assessment Strategies*Performance*

- Number Concentration – Group students in 2- 4 players. Students use a set of number cards from 0 to 1000 and a set of matching cards with numbers written in words (approximately 12 of each). Direct students to shuffle the two sets of cards together and lay the cards face down. Player one turns over two cards and reads the cards aloud. If the number card matches the word card they keep the cards and play again. If the cards do not match, the cards are placed back on the table and the next player takes a turn. Player 2 proceeds to turn over two cards, reading the cards and looking for a match. Repeat until all cards are matched. The winner is the student with the most cards. Observe students as they read numbers and number words to 1000.

(3N2.2)

Resources/Notes*Math Makes Sense 3***Lesson 2: Modelling 3-Digit Numbers****3N2, 3N5**

TG pp. 8 - 10

Additional Activity:

E-Race to Zero

TG pp. , 53 and 540

Strand: Number

Outcomes

Students will be expected to

3N2 Continued**Achievement Indicator:**

3N2.4 Represent a given number as an expression; e.g., $300 - 44$ for 256 or $20 + 236$

Elaborations—Strategies for Learning and Teaching

It is important to model the correct use of the term ‘expression’ to students. An expression names a number. Sometimes an expression is a number such as 6. Sometimes an expression shows an arithmetic operation, such as $6 + n$.

In later grades, students will learn that an equation is a mathematical sentence indicating that two expressions are equal. An equation contains an equal sign. Students are not expected to understand the difference at this grade level but it is important that they hear the correct terminology being modelled.

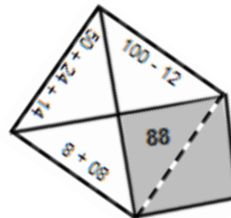
Another important way of representing number is to create different decompositions of the same quantity and record the decompositions as symbolic expressions. It is reasonable that students could possibly express a number in many different ways.

The following suggestions can be incorporated into morning /daily routines:

A.K.A (Also Known As) - Provide a bag of 2- and/or 3-digit numbers (begin with 2-digit numbers). Each day a number is picked from the bag and students write as many expressions as they can for that number, recording each one. Compile a large list of number expressions from the whole class and display around the classroom.

Number of the Day - Students represent the number of the day in as many ways as they can on a ‘foldable’ as shown below. A foldable is a square sheet of paper made by folding the four corners that meet in the center to make four flaps.

E.g.,

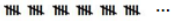

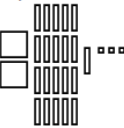



General Outcome: Develop Number Sense

Suggested Assessment Strategies

Paper and Pencil

- Number of the day - provide concrete materials such as coin and base-ten blocks and have access to such visuals as hundreds charts, place value mats, calendars and number lines. Graphic organizers such as tables, charts and 'foldables' (see Elaborations, column 2) can be used for students to organize their thinking. E.g., The Number of the day is 413

Standard Form	Number in Words
413	Four hundred thirteen
Is it odd or even? It is odd!	Represent the number with tallies:  (student continues until 413 tallies are drawn)
Base Ten Representation 1 	Base Ten Representation 2 
Represent it with money (coin or bills) 	Write three number expressions 1. $400 + 13$ 2. $200 + 105 + 108$ 3. $600 - 187$

(3N2.1, 3N2.4)

Resources/Notes

Math Makes Sense 3

Lesson 2 (Cont'd): Modelling 3-Digit Numbers

3N2, 3N5

TG pp. 8 - 10

Strand: Number

Outcomes

Students will be expected to

3N2 Continued

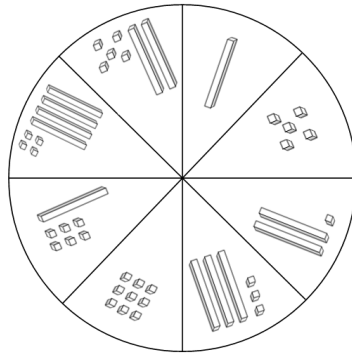
Achievement Indicator:

3N2.5 Represent a given number, using manipulatives such as base ten materials.

Elaborations—Strategies for Learning and Teaching

It is important that students realize a number can be expressed in different ways. For example 234 can mean 2 hundreds, 3 tens and four ones; 23 tens and 4 ones; or 234 ones.

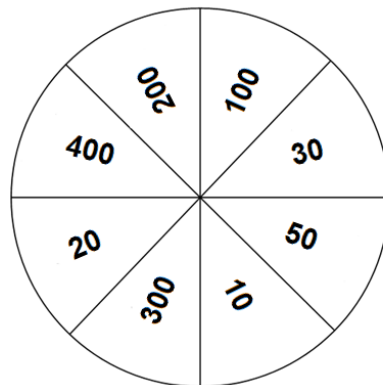
Base Ten Exchange -This is a game for two to four players. Each player will need a place value mat (as shown below), a set of base ten blocks and a spinner.



Hundreds	Tens	Units

Students take turns. The first player spins the spinner, chooses the base ten materials indicated and places them in the appropriate columns of the place value mat. As play continues, students add their next spin to their individual place value mats making all possible exchanges, to have the least amount of base ten blocks, before the next player spins. The first player to get two flats wins. Variation 1: Players start with two flats and remove the indicated amount. The player to clear his/her place value mat first is declared the winner. Variation 2: Start with 1000. Students spin and subtract until someone reaches zero.

Race to 1000 – Provide a spinner, 2 recording sheets and base ten materials for each pair.



Spin Number	My Spin	My Total
1		
2		
3		
4		
5		
6		

(continued)

General Outcome: Develop Number Sense

Suggested Assessment Strategies

Performance

- Ask students to represent numbers with base-ten materials in three different ways. Record each representation.

346			
241			
536			

(3N2.5, 3N2.1)

Student-Teacher Dialogue

- Ask students to choose any three digit number and tell everything they know about that number. (3N2.5, 3N2.1)
- Give students a 3-digit number and ask them to represent it with Base 10 materials. Ask students to explain their representation. Ask: Can you represent it another way? Question their choice of representation. (3N2.5)

Resources/Notes

*Math Makes Sense 3***Lesson 2 (Cont'd):** Modelling
3-Digit Numbers

3N2, 3N5

TG pp. 8 - 10

Strand: Number

Outcomes

Students will be expected to

3N2 Continued**Achievement Indicator:**

3N2.5 Continued

3N5 Continued**Achievement Indicator:**

3N5.2 Explain, using concrete materials, the meaning of zero as a place holder in a given number.

Elaborations—Strategies for Learning and Teaching

Player 1 spins the spinner, represents the number with base-ten materials and records the spin

Player 2 takes a turn. Next, Player 1 spins the spinner again and adds the base-ten materials, regrouping where necessary. He/she records the new total. Play continues with each player spinning, representing with base-ten materials and recording new totals until one of the players reaches 1000.

Students need many experiences building number using base-ten materials and illustrating, pictorially and concretely, their models of number to 1000.

It is important to spend time developing a good understanding of the meaning of zero in numbers. For some students, the number “302” looks like “thirty two”. Students need many experiences using base-ten materials to model numbers with zeros as digits.

Consider using the book, *Counting on Zero*. Before reading the book, ask students to record their thoughts about zero in their math journal.

After reading the book ask students to reread their journal entry and have them record if their opinions have changed. If so how? Why or why not?

(continued)

 General Outcome: Develop Number Sense

Suggested Assessment Strategies

Performance

- Show the student '302' written symbolically and ask him/her to model it with base-ten blocks. Then have the student read the number and represent it in other ways. Ask students to represent the number without flats. Are students modelling the number using 30 rods and 2 small cubes? (3N5.2)
- Observe students as they are record numbers where zero (0) is the place holder. Are they recording 701 as 71 or 7001? (3N5.2)

Journal

- Provide students with the prompt:
How are 38 and 308 different?
Do you think zero (0) is an important number? Why or why not?
(3N5.2)

Resources/Notes

*Math Makes Sense 3***Lesson 2 (Cont'd):** Modelling
3-Digit Numbers

3N2, 3N5

TG pp. 8 - 10

Children's Literature (not
provided):*Counting on Zero* by Highfield
Junior School, Toronto, ON

ISBN 978-0-545-99405-7

Strand: Number

Outcomes

Students will be expected to

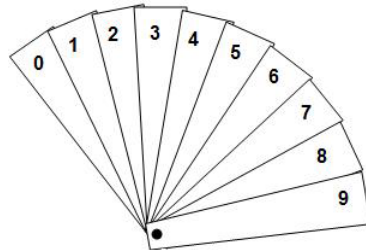
3N5 Continued

Achievement Indicator:

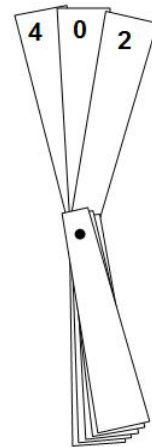
3N5.2 Continued

Elaborations—Strategies for Learning and Teaching

Numeral Wands – Provide a numeral wand for each student. Numeral Wands can be made using card stock and paper fasteners and provide a fun way for students to show what they know.



Choose a leader. The leader says a number to the class and asks students to make it on the numeral wand. Ensure some of the numbers contain zeros. E.g., Ask students to make “four hundred two”, They would manipulate the wand to show a 4, a 0 and a 2 as shown.



Observe students that demonstrate their understanding of the use of zero as place holders. Talk about the place value that a zero holds depending on where it is placed in a number.

Numeral wands may also be used for several different purposes throughout the year:

- students show a number that comes after/before a number said by the leader
- students make the greatest number
- students show 100 more or 100 less than a number the leader has stated

It is important to note that the number wands can be used as one set of digits 0 – 9 first when they are introduced to them or combine two sets of digits 0 – 9 as students become more comfortable with them and use numbers with double digits.

General Outcome: Develop Number Sense

Suggested Assessment Strategies*Performance*

- Show it/Press It - Say the standard name for a 2 or 3-digit number. Instruct each student to use base-ten materials to show the number and representing it on a calculator, or write it. Pay special attention to the teen numbers and the numbers with zero tens, E.g., 71, 701. Say, “71”. Student builds 71 with base ten materials, records the standard form and keys it on the calculator. Next say “701” and students repeat the process. Van De Walle, *Teaching Student-Centered Mathematics* Grades K-3. (2006) p.140

(3N5.2)

Resources/Notes*Math Makes Sense 3***Lesson 2 (Cont'd):** Modelling
3-Digit Numbers

3N2, 3N5

TG pp. 8 - 10

Strand: Number

Outcomes

Students will be expected to

3N5 Continued

Achievement Indicator:

3N5.3 Record, in more than one way, the number represented by given proportional materials (e.g., base-ten materials) and non-proportional materials (E.g., money).

3N2 Continued

Achievement Indicators:

3N2.6 Write number words for given multiples of ten to 90.

3N2.7 Write number words for given multiples of a hundred to 900.

Elaborations—Strategies for Learning and Teaching

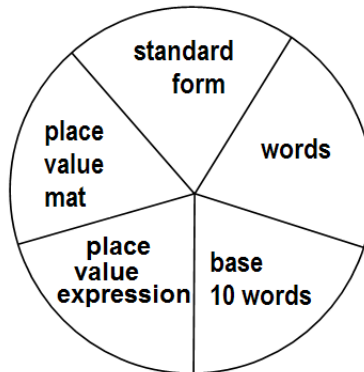
When provided with a model representation, students need to be able to record numbers in more than one way for the given model. For example numbers can be recorded in standard form, base ten words, place value expression or words For example, 234 can be recorded as:

2 hundreds, 3 tens, 4 ones

$200+30+4$

Two hundred thirty four

Make It and Spin It – pair students and provide Number Cards (suitable for the level of the students playing), base-ten blocks, money, counters, a spinner and a recording sheet as shown below:



Form	Representation

One student chooses a number card to find out the number they will be representing and the partner spins the spinner to find out how they will represent the number. They proceed to build the number out of proportional materials (base-ten) or non-proportional materials (money) and to record what they built on the recording sheet. Players switch roles and play again. Observe if students are able to represent numbers in different ways.

The use of Word Walls and math dictionaries are important for students to model appropriate math language. Provide ample opportunities for students to write number words (multiples of ten to 90 and multiples of one hundred to 900) when involved in writing tasks both in mathematics and other subject areas.

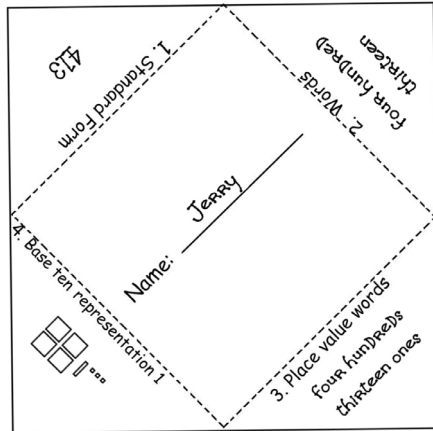
General Outcome: Develop Number Sense

Suggested Assessment Strategies

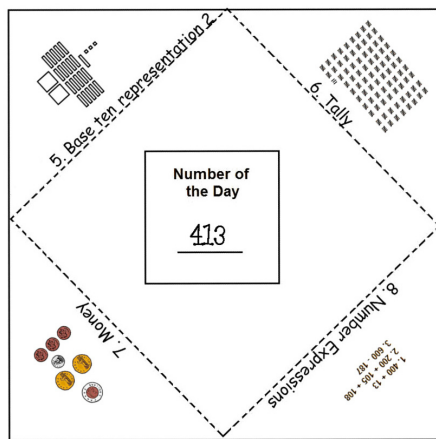
Presentation

- Ask students to represent the number of the day in various ways as requested. Ask students to present their foldable, chart or table to the whole class, small group or to a partner. E.g.,

SIDE 1



SIDE 2



(3N5.3)

Resources/Notes

Math Makes Sense 3

Lesson 3: Showing Numbers in Many Ways

3N2, 3N5

TG pp. 11 – 13

Additional Activity:

One Number, 4 Ways

TG pp. 55 and 56

Strand: Number

Outcomes

Students will be expected to

3N2 Continued**Achievement Indicators:**

3N2.6 Continued

3N2.7 Continued

3N5 Continued**Achievement Indicator:**

3N5.4 Represent a given number in different ways, using proportional and non-proportional materials, and explain how the representations are equivalent; E.g., 351 can be represented as three 100s, five 10s and one 1; or two 100s, fifteen 10s and one 1; or three 100s, four 10s and eleven 1s.

Elaborations—Strategies for Learning and Teaching

Prepare number cards by writing number words for given multiples of a hundred to 900. Provide each student with a number card and tools for recording (a white board and dry erase marker works well). When the activity begins, students move around the room and find a partner. Partner A tells Partner B his/her number without showing the card and partner two writes the number on the white board. When finished, the card is revealed and both check spelling to see if it is correct. The process is then repeated for partner two. When both students have completed the task, they switch cards and look for new partners. This continues until students have had practice writing several words for multiples of ten to 90 or multiples of a hundred to 900.

Proportional materials: base-ten blocks (large cubes, flats, rods, small cubes) are an efficient and valuable model, as they are proportional in size. For example the rod is ten times as big as the small cube, and the flat is ten times as big as the rod and one hundred times as big as the small cube. The large cube is a thousand times bigger than the small cube, etc. This helps with developing number sense, as a number like 100 is ten times bigger than ten.

Money is an example of non-proportional materials. The size of a coin does not reflect its value. E.g., a dime is smaller than a penny, however a dime is worth ten times more.

How Many Ways - Students draw a number from a deck of number cards and represent the number, in different ways, using the base ten blocks or using non-proportional objects.

General Outcome: Develop Number Sense

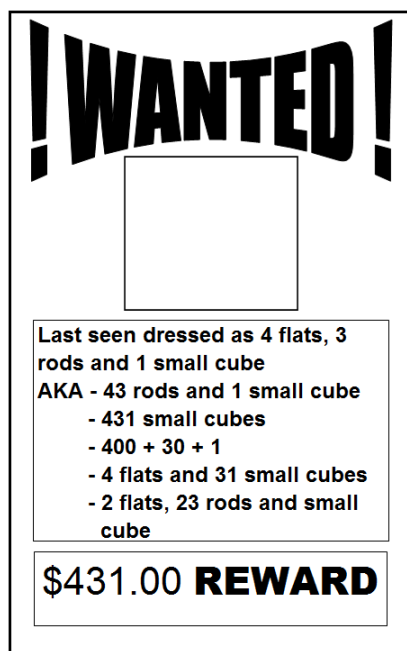
Suggested Assessment Strategies

Performance

- Present students with a number representation. This may be standard form, expanded form, or a model and ask students to record the number in words. (3N2.6, 3N2.7)

Portfolio

- Challenge students to create a wanted poster for a number. Students may be creative about decorating their chosen number. E.g.,



(3N5.4)

Resources/Notes

*Math Makes Sense 3***Lesson 3 (Cont'd):** Showing Numbers in Many Ways

3N2, 3N5

TG pp. 11 – 13

Strand: Number

Outcomes

Students will be expected to

3N2 Continued




3N5 Continued

Problem Solving Strategy:

Use an Organized List

Elaborations—Strategies for Learning and Teaching

Money is something that students use and/or are exposed to in everyday life. How Many Different Ways to Make a Dollar, shown below, can be used to connect the strategy of “making an organized list” to the real world. The strategy of “making an organized list” can be applied when students decompose a dollar by showing the various coin combinations beginning with the least number of coin and ending with the greatest amount of coin.

Coins	Number Expression
	$25\text{c} + 25\text{c} + 25\text{c} + 25\text{c} =$
	
	

To use the strategy “make an organized list”, students must realize that there are many cases of possible answers. By being systematic and listing the cases, students are less likely to leave something out and may, in fact be able to “shortcut” the work. Students must learn to look through the list and eliminate any redundancy.

Communication should be intertwined with problem solving throughout all areas of mathematics. Invite children to talk about their work as they investigate the process of how to find solutions to the problem. As students reflect on, explain and justify their reasoning, they may revise their answers, thus leading to and confirming their own understanding. This allows opportunities for meaningful assessment.

General Outcome: Develop Number Sense

Suggested Assessment Strategies

Performance

- Give students a deck of digit cards 0 – 9 and a recording sheet. Present the following problem to students:

The house number has three different digits.

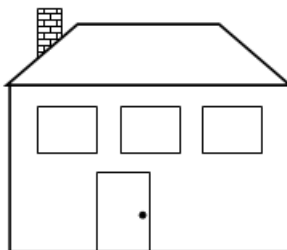
The sum of the three digits is 8

The number does not begin with 0.

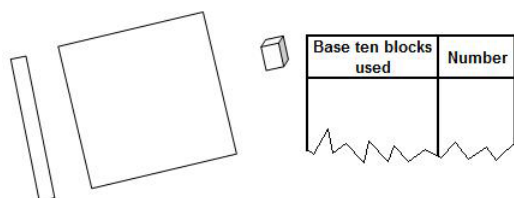
What could the house number be? List all possible numbers.

Recording Sheet:

0	1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---	---



- Give students a flat, rod and a small cube. Ask them to make as many numbers as they can using any or all of the blocks.

*Journal*

- Tell students that you have sixty-five cents in your pocket. Ask them to find all the possible combinations of coin. They may use the strategy of ‘making an organized list’ to present their findings.

Resources/Notes

Math Makes Sense 3

Lesson 4: Strategies Toolkit

3N2, 3N5

TG pp. 14 - 15

Additional Reading (provided):

Small, Marion (2008) *Making Math Meaningful to Canadian Students, K – 8*. p. 37-59

Strand: Number

Outcomes

Students will be expected to

3N3 Compare and order numbers to 1000.

[C, CN, R, V]

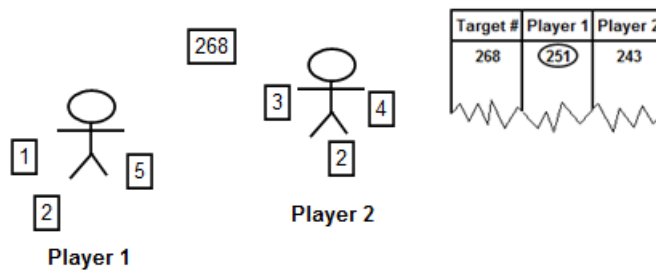
Achievement Indicator:

3N3.1 Place a given set of numbers in ascending or descending order, and verify the result by using a hundred chart (E.g., a one hundred chart, a two hundred chart, a three hundred chart), a number line or by making references to place value.

Elaborations—Strategies for Learning and Teaching

When numbers are represented in their standard or symbolic form, students can use the number of digits to get a sense of their size in order to compare them. Three digit whole numbers are less than a 1000 but greater than any two digit whole number. Students need to be shown how to use symbols $>$ and $<$ to compare numbers. They should be able to name numbers greater than, less than or between given numbers. Students need opportunities to practice using these symbols appropriately. Make a set of number cards containing various numbers to 1000. Ask students to pick two number cards, compare the cards and use the greater than or less than symbols to show their relationship.

Target Number - Organize students in pairs. Player one controls the 3-digit deck and player two controls the 1-digit deck of cards. Player one draws a 3-digit card and places it face-up between the two players. Player two deals three 1-digit cards to each player. Each player makes a number closest to the three digit number card (target number). The winner of the round is the player who has made the number closest to the target number. Players can play several rounds, keeping score of who was closest to the target number for the most rounds.



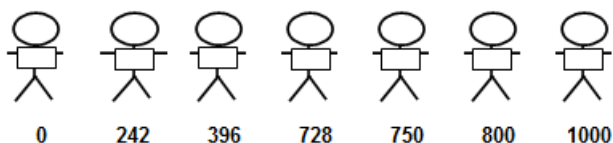
Ordering Numbers - Place a variety of 3-digit number cards in a bag. One student chooses 3 or 4 number cards from the bag and places them in ascending order. Together, with a partner, it is checked using a hundreds chart or a number line. The cards are placed back in the bag and the other partner chooses 3 or 4 cards. This game can also be played placing the numbers in descending order.

General Outcome: Develop Number Sense

Suggested Assessment Strategies

Performance

- Human Number Line – Provide cards showing various numbers to 1000. Choose two students one for each end of the number line who will represent 0 and 1000. Give five to ten students a number card and have them place themselves on the number line. Ask students to explain their thinking.



(3N3.1)

- Ask students to do research to find the average weights of various animals or give them the following information:

Lion	215kg
Zebra	498kg
Ostrich	115 kg
Hippopotamus	1000 kg
Crocodile	520kg
Giraffe	900 kg

Order the animals from least to greatest. Ask students to choose one of the numbers above and represent it in three ways using base-ten blocks.

Students may show their work on a recording sheet:

1st Representation	2nd Representation	3rd Representation

(3N3.1, 3N5.4)

Resources/Notes

Math Makes Sense 3

Lesson 5: Comparing and Ordering Numbers

3N3, 3N5

TG pp. 16 - 19

Additional Activity:

Let's Compare

TG pp. 57 - 59

Clothesline Game

TG pp. and 60

Strand: Number

Outcomes

Students will be expected to

3N3 Continued

Achievement Indicators:

3N3.2 Create as many different 3-digit numerals as possible, given three different digits. Place the numbers in ascending or descending order.

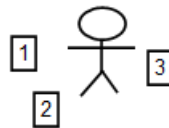
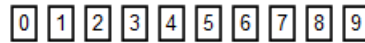
3N3.3 Identify and explain errors in a given ordered sequence (e.g., using a two hundreds /three hundreds chart).

3N3.4 Identify missing numbers in parts of a given hundreds sequence (e.g., using a two hundred/three hundred chart).

3N3.5 Identify errors in a given hundreds sequence (e.g., using a two hundred/three hundred chart).

Elaborations—Strategies for Learning and Teaching

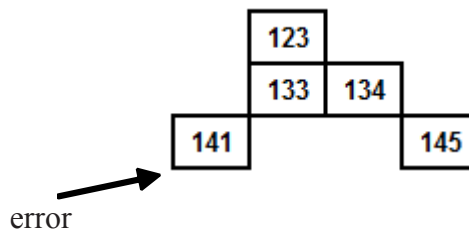
Creating Numbers – Give students a set of digit cards containing numbers 0 – 9 or a ten sector spinner.



Ask students to choose three cards and make as many 3-digit numbers as possible. Ask students to record the numbers from greatest to least or from least to greatest.

Hockey Card Activity – Give pairs of students six hockey cards and adding machine tape (to create number lines). The set of hockey cards is their team. They are assigned a statistic from the back of the hockey card (games played, weight, career goals, etc.). Students write the numbers on ‘Post It’ notes and place the numbers on their number line from least to greatest, using bench marks to help them. Partners post finished number lines on the wall and present it to the rest of the students explaining their thinking for their sequence.

Hundreds Chart Puzzles - Present a piece of the hundreds chart, two hundreds chart, three hundreds chart, etc. Ask students to decide on the missing or incorrect numbers.

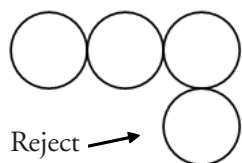


General Outcome: Develop Number Sense

Suggested Assessment Strategies

Performance

- Spin to Win - State the goal of the game before starting. For example, you may ask students to form the largest 3-digit number possible. Then ask students to draw the following diagram on their paper four times (one diagram for each round played).



Designate a person to spin a spinner five times, stating the number aloud for the students to place in any empty circle they wish. They may reject one number by putting it in the “Reject” circle. Once a number has been marked it cannot be erased. Have a student read a large number and display it. Ask: Who has a number that is larger? Compare the numbers. Ask: How do we know it is larger? Is it possible to make a larger number? How? Create a human number line with the students. (Adapted from NCTM Navigation Series *Navigating through Number and Operations in Grade 3-5*) (3N3.2)

Journal

- Give the student four to six 3-digit numbers and have him/her place the cards on a number line and explain their thinking.

(Note: This activity could be a Portfolio/ Presentation assessment piece if students were asked to write the numbers on sticky notes and use a piece of adding machine tape as the number line and then present their number line.) (3N3.1, 3N3.3)

Resources/Notes

Math Makes Sense 3

Lesson 5 (Cont'd): Comparing and Ordering Numbers

3N3, 3N5

TG pp. 16 - 19

NCTM Navigation Series
Navigating through Number and Operations in Grade 3-5

Strand: Number

Outcomes

Students will be expected to

3N1 Say the number sequence 0 to 1000 forward and backward by:

- 5s, 10s or 100s, using any starting point
- 3s, using starting points that are multiples of 3
- 4s, using starting points that are multiples of 4
- 25s, using starting points that are multiples of 25.

[C, CN, ME]

Achievement Indicator:

3N1.1 Extend a given skip counting sequence by 5s, 10s or 100s, forward and backward, using a given starting point.

Elaborations—Strategies for Learning and Teaching

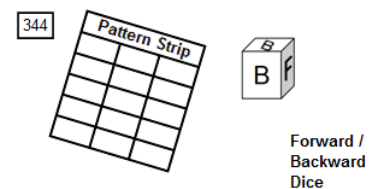
This outcome is partially addressed here. Counting by 3s and 4s will be addressed later.

A solid understanding of the nature of place value patterns and partitioning is fundamental to our base-ten number system. When learning about place value, students benefit from many opportunities to group concrete materials into tens and hundreds. Students should notice how much easier it is to count large groups of objects when they are grouped in 5's, 10's, 25's or 100's. Help students to see the patterns inherent in the number system and recognize the patterns that occur in their environment. The teaching and learning of patterning outcomes 3PR1 and 3PR2 is embedded throughout the curriculum developed on number. These patterns can be taught through activities in a morning routine using calendars, number lines and hundreds charts.

Number Line Task - Provide students with a walk-on number line, a mixture of 1-, 2-, and 3-digit numbers and small 'Post-It' notes. Students draw a number and they flag the next five multiples in a given skip counting pattern with their "Post It" notes. This can be done forwards or backwards. Students can take turns using different color 'Post Its' for different patterns. The number line can then be displayed on a wall for classmates to see the patterns.

Searching for Patterns - Provide students with number lines, hundred charts to 1000, colour pencils, highlighters or crayons, a deck of 3-digit numbers, forward/backward dice and a recording strip.

Ask students to choose how they wish to count, by 5's, 10's, 25's, or 100's and roll the forward/backward dice. Next the student picks a 3-digit number from the deck of cards to get the starting point.



E.g., a student chooses to count by 10s, rolls 'B' (indicating he/she will count backwards), and selects 344 as their starting point.

The student continues the pattern forward to 1000 or backwards to 0, using a number line or colouring hundred charts. Students record their pattern on the recording strip adding strips as they are needed. Note: The strips can be kept and then examined by the students in later sessions to look for the patterns in the ones place, tens place or hundreds place as the skip counting continues to 1000. These strips can then be used for math journal writing, describing increasing/decreasing patterns.

General Outcome: Develop Number Sense

Suggested Assessment Strategies

Performance

- Present students with a number sequence such as:

107, 102, 97 . . .

298, 398, 498 . . .

75, 100, 125 . . .

Ask the students to give the next four numbers in the sequence. After completing this task, students may create their own pattern and record it and explain their pattern. (3N1.1, 3N1.2)

Resources/Notes

Math Makes Sense 3

Lesson 6: Counting by 5s, 10s, 25s and 100s

3N1

TG pp. 20 - 23

Strand: Number

Outcomes

Students will be expected to

3N1 Continued

Achievement Indicators:

3N1.2 Extend a given skip counting sequence by 25s, forward and backward, starting at a given multiple of 25.

3N1.3 Identify and correct errors and omissions in a given skip counting sequence.

3N1.4 Identify and explain the skip counting pattern for a given number sequence.

Elaborations—Strategies for Learning and Teaching

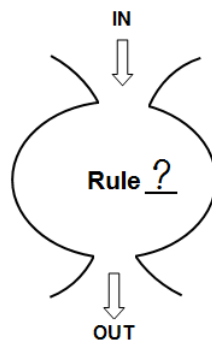
Using a calculator, students can see the counting sequence by 25's. Instruct students to choose a start number (a multiple of 25) and then add 25. Hit the equal sign repeatedly to get the next multiple of 25. When introducing this activity ask students to start with 0 so they can see the initial pattern. Later, students can be asked to start at various numbers that are multiples of 25.

Skip counting is a natural pattern within our number system. Students will have had prior experiences identifying patterns. At this point, many students will be able to identify errors and omissions in skip counting forward and backward. Using number lines and hundreds charts are effective visuals to demonstrate this concept.

Hundred chart mystery numbers - Display a part of a hundred chart with numbers missing in a skip counting sequence. Ask students to fill in the missing numbers.

1	2		4	5		7	8		10
11		13	14		16	17		19	20
22									
31	32			35	36		39		

Guess My Rule – Ask students to work in pairs. One student has the rule which the other student has to guess. The ‘guesser’ records an input number in the table. The ‘rule’ person must apply the rule and tell the output number. Student pairs repeat this until the guesser correctly identifies the rule by saying and writing it. Students then switch places and repeat the activity.



In	Out	Rule
114	119	Add 5
213	218	
216	221	

General Outcome: Develop Number Sense

Suggested Assessment Strategies

Performance

- Display a set of numbers in any given skip count sequence that include errors. Ask students to identify the errors and explain their thinking. (3N1.3)

Student-Teacher Dialogue

- Show students a variety of number patterns counting forwards or backwards. Students name the patterns shown and explain the pattern rule. (3N1.4)

Journal

- Ask students to write about how many ways they can count to 200 (3N1.4)

Resources/Notes

Math Makes Sense 3

Lesson 6 (Cont'd): Counting by 5s, 10s, 25s and 100s

3N1

TG pp. 20 - 23

Strand: Number

Outcomes

Students will be expected to

3N1 Continued

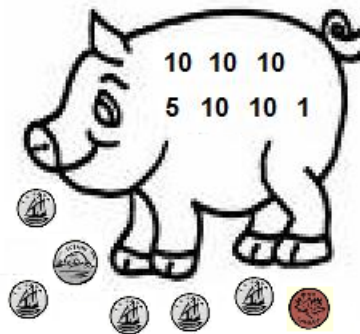
Achievement Indicator:

3N1.5 Determine the value of a given set of coins (nickels, dimes, quarters, loonies) by using skip counting.

Elaborations—Strategies for Learning and Teaching

Students need to recognize how to count coins (e.g., 3 loonies, 2 quarters, 1 dime and 4 nickels - \$1.00, \$2.00, \$3.00, \$3.25, \$3.50, \$3.60, \$3.65, \$3.70, \$3.75, \$3.80). Before students are able to do this they require many opportunities to practise counting loonies, quarters, dimes and nickels separately. It is through a wide range of activities, presented regularly throughout the school year (e.g. counting bags of money, as part of ‘Morning/Daily Routine’) that students often come to recognize that to find the total for a collection of coins, sorting them and counting the larger coins first is easiest.

What’s in your Bank? - Provide ‘Piggy Bank’ cards (such as the example shown below), coins and a recording sheet. Students choose a card and place the correct coin on each number shown. Next, students count the coins and record the amount of money in the piggy bank. Continue with other cards.



General Outcome: Develop Number Sense

Suggested Assessment Strategies

Performance

- Prepare bags of coin with varying amounts. Ask students to choose a bag of coins and count how much money is in the bag, in total, and record their answer. Observe how students count money in games and activities, e.g., are they counting the coins with the greatest value first, are they sorting the coins before they count, etc? (3N1.5)

Student-Teacher Dialogue

- Give the student a variety of coins (or have him/her take a handful). Ask the student to explain how he/she will find the total amount. (3N1.5)

Resources/Notes

Math Makes Sense 3

Lesson 7: Skip Counting with Coins

3N1

TG pp. 24 - 27

Strand: Number

Outcomes

Students will be expected to

3N1 Continued

Achievement Indicator:

3N1.5 Continued

3N5 Continued

Achievement Indicator:

3N5.4 Continued

Elaborations—Strategies for Learning and Teaching

Race to \$1.00 – Provide pairs of students with a game board, play money, number cube and a recording sheet. Instruct Player 1 to roll the number cube, count out that amount of money, place it on the game board and record the total on the recording sheet. Player 2 then does the same. Next, Player 1 takes a second turn - rolls number cube and adds the coins to the game board, making trades where necessary and recording the new total.

Play continues with each player trading pennies for dimes, dimes and nickels for quarters and so on. The winner is the player that reaches \$1.00 first. Variations: race to \$2.00, \$5.00, \$10.00.



\$1.00	25 ¢	10 ¢	1 ¢

Roll	Total

Coin Drop – A student chooses a quantity of money in coins and writes the total on the board for the remainder of the students to see. Without allowing the students to see, he/she begins to slowly drop the coins, one at a time, in a tin bank so the class can hear the coins drop and count how many coins make up the total. Each student problem solves to decide the different coin combinations that it could have been and records their combinations.

General Outcome: Develop Number Sense

Suggested Assessment Strategies

Performance

- Provide play money and a recording sheet for students to problem solve:
Sarah has \$3.51 in her piggy bank. What are the possible combinations of coins she could have? (3N5.4)

Resources/Notes

Math Makes Sense 3

Lesson 8: Representing Numbers with Coins

3N2, 3N5

TG pp. 28 – 30

Strand: Number

Outcomes

Students will be expected to

3N1 Continued

Achievement Indicators:

3N1.6 Extend a given skip counting sequence by 3s, forward and backward, starting at a given multiple of 3.

3N1.7 Extend a given skip counting sequence by 4s, forward and backward, starting at a given multiple of 4.

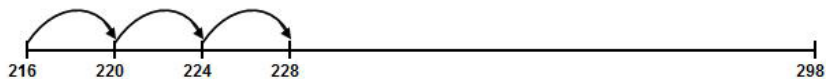
Elaborations—Strategies for Learning and Teaching

Skip counting by 5s, 10s 25s and 100s was already addressed earlier. At this time students work with skip counting by 3s and 4s.

Ask students to visually represent skip counting sequences on a hundred chart. Ask them to colour the number they land on as they skip count forwards/backwards by 3's starting at different multiples of 3.

401	402	403	404	405	406	407	408	409	410
411	412	413	414	415	416	417	418	419	420
421	422	423	424	425	426	427	428	429	430
431	432	433	434	435	436	437	438	439	440
441	442	443	444	445	446	447	448	449	450
451	452	453	454	455	456	457	458	459	460
461	462	463	464	465	466	467	468	469	470
471	472	473	474	475	476	477	478	479	480
481	482	483	484	485	486	487	488	489	490
491	492	493	494	495	496	497	498	499	500

Ask students to use number lines and hundred charts to skip count forwards/ backwards by 4's starting at different multiples of 4. Ask them to record their jumps on the number line or colour in the number on the hundred chart

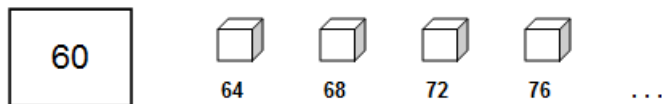


General Outcome: Develop Number Sense

Suggested Assessment Strategies

Student-Teacher Dialogue

- Skip Counting - Choose a start point and for every cube that you show, students need to skip count by 3 or 4 (as per your instructions). In the example below, the starting number is 60 and every cube represents a multiple of 4.



(3N1.6, 3N1.7)

Journal

- Ask students if they can count to 500 by fours. Ask them to explain their thinking. (3N1.7)

Resources/Notes

*Math Makes Sense 3***Lesson 9:** Counting by 3s and 4s

3N1

TG pp. 34 - 37

Strand: Number

Outcomes

Students will be expected to

3N4 Estimate quantities less than 1000, using referents.

[ME, PS, R, V]

Achievement Indicators:

3N4.1 Estimate the number of groups of ten in a given quantity, using 10 as a referent (known quantity).

3N4.2 Estimate the number of groups of a hundred in a given quantity, using 100 as a referent.

3N4.3 Estimate a given quantity by comparing it to a referent.

3N4.4 Select an estimate for a given quantity by choosing among three possible choices.

Elaborations—Strategies for Learning and Teaching

Prior to Grade 3, students will have had opportunity to develop their estimation skills.

A referent, or known quantity, is useful as a benchmark or an anchor to acquire a reasonable estimate.

One strategy for using referents to improve an estimate is to know the quantity in a smaller group, and then use that knowledge to estimate the number of objects in a larger group.

The children's literature selection *Betcha! Estimation* by Stuart J. Murphy or *Great Estimations* and/or *Greater Estimations* by Bruce Goldstone can be used as springboard to estimation using 10 or 100 as a referent or to supplement a lesson, like the one below.

Show students two jars of objects, one jar with 10 items and one with 90 items. Use the jar with 10 as a referent.

Guide students' thinking in estimating by asking about how many groups of 10 are there. About how many (name the item) are there?

Provide similar estimation opportunities using 100 as a referent, following the same guiding questions as above.

Estimation Station - Prepare an area called the Estimation Station, where students can visit each day. Place two different groups or piles of objects, one of which would be the referent, at the station. Ask students to estimate the groups of 10 or 100 and then use this knowledge to estimate the quantity.

Show students a quantity of an object, e.g. beans, raisins, popsicle sticks, etc. Provide students with 3 possible choices and have them choose the best estimate and record it. Begin counting and allow students opportunities to change their estimate.

General Outcome: Develop Number Sense

Suggested Assessment Strategies

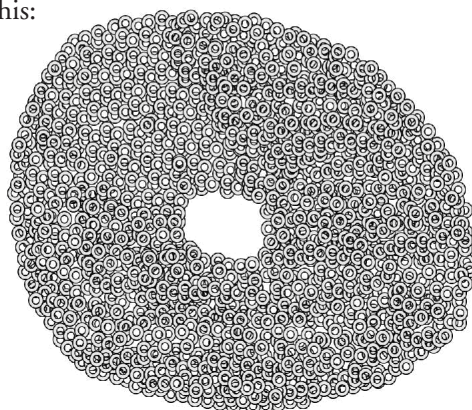
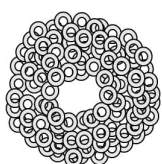
Journal

- Display a clear jar with pennies in it and a clear bag containing 10 (or 100) pennies to use as a referent (depending on the amount in the jar). Ask students to record their estimate in their journal and then write about how they arrived at their estimate.
(3N4.1, 3N4.2, 3N4.3)

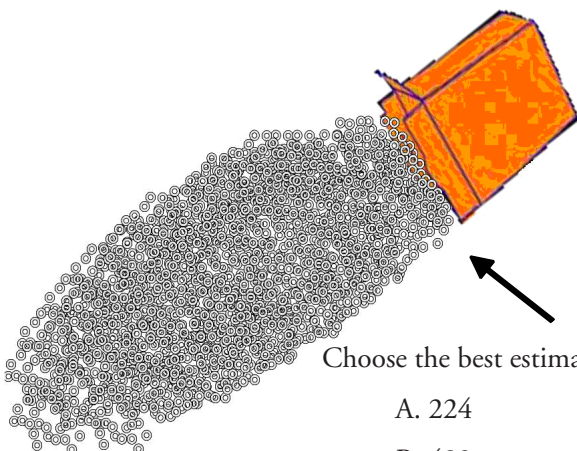
Student-Teacher Dialogue

- Converse with students as they work in various 'Estimation Stations', asking how they arrived at their estimate. (3N4.1, 3N4.2, 3N4.3)
- Show students groups or pictures of objects and give students three possible estimates for example: (based on book, *Greater Estimations* by Bruce Goldstone)

If 100 Cereal-0s look like this:



and 1 000 Cereal-0s look like this



Choose the best estimate for the last picture.

- A. 224
- B. 482
- C. 699

Explain your choice.

(3N4.4)

Resources/Notes

Math Makes Sense 3

Lesson 10: Estimating to 1000

3N4

TG pp. 38 - 40

Children's Literature (not provided):

Murphy, Stuart J. *Betcha! Estimation*

ISBN 9780064467070

Goldstone, Bruce. *Great Estimations*

ISBN 9780805074468

Children's Literature (provided):

Goldstone, Bruce *Greater Estimations*

Strand: Number

Outcomes

Students will be expected to

3N4 Continued

Achievement Indicator:

3N4.5 Select and justify a referent for determining an estimate for a given quantity.

3N2 Represent and describe numbers to 1000, concretely, pictorially and symbolically.

[C, CN, V]


Elaborations—Strategies for Learning and Teaching



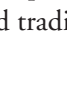

The estimation station can be used to provide opportunities for students to select referents for a given pile and communicate their reasoning.

Although some students will have a clear understanding of the base-ten pattern of our place value system, many will still be in the early stages of development. It is important that students be provided with regular opportunities to represent numbers concretely, pictorially and symbolically to strengthen their knowledge. Students should recognize that 1000 is just another expression for ten hundreds.

Construct a Cube - Provide pairs of students with a place value mat, interlocking base ten materials (19 rods, 9 flats, 1 large cube), recording sheet and a 20-sided number cube.

Place Value Mat: E.g., if 9 was rolled

Thousands	Hundreds	Tens	Ones
			

Number Rolled	Total
9	90

Student 1 rolls the number cube, uses the rods to build the number and records the number on the recording sheet. Student 2 repeats the process. The pair will quickly realize that they do not have enough rods and will have to “trade” for a flat in order for the activity to continue. A running total is kept on the recording sheet. Students continue to take turns rolling and trading until they have made 1000 (large cube).

Achievement Indicator:

3N2.5 Continued

Using a journal and base-ten materials, ask students to represent a given number in three ways.

General Outcome: Develop Number Sense

Suggested Assessment Strategies*Journal*

- Display a quantity of an item such as a bag of marshmallows, pretzels, goldfish crackers, raisins, etc. Ask students to choose a referent to estimate the quantity and explain your choice. (3N4.5)

Performance

- Ask students to make any 3-digit number using base-ten blocks. Next ask students to write down the number and read it. Students can then use a different combination of base-ten blocks to make the same number and/or use money to represent the number. After completing this activity, ask students to choose one of the representations and explain how it shows the number. (3N2.5)

Resources/Notes*Math Makes Sense 3***Lesson 11: How Much is 1000?****3N1**

TG pp. 38 - 40

Game: Race to 1000

TG p. 41

