Unit 1 Number Sense & Algebraic Concepts

Content Area: **Math**
Course(s): **Sample Course**
Time Period: **SeptOct**
Length: **8 weeks & Grade 4**
Status: **Published**

Title Section

Department of Curriculum and Instruction

Belleville Public Schools

Curriculum Guide

Math, Fourth Grade

Unit 1: Number Sense & Algebraic Concepts

Belleville Board of Education

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Board Approved: August 30, 2017

Unit Overview

- Generalize place value understanding for multi-digit whole numbers.
- Use place value understanding and properties of operations to perform multi-digit arithmetic
- Compare and round whole numbers.
- Construct arguments for problem solving.
- Fluently add and subtract multi-digit whole numbers.
- Find sums and differences.
- Develop visual learning.
- Add whole numbers.
- Subtract whole numbers.
- Subtract across zeros.
- Reasoning
- Read and write numbers in expanded form, with numerals, and using number names.
- Recognize the relationship between adjacent digits in a multi-digit number.
- Use place value to compare numbers.
- Use place value to round multi-digit numbers.
- Use previously learned concepts to construct arguments about place value.
- Add and subtract whole numbers mentally using a variety of methods.
- Round greater whole numbers to estimate sums and differences.
- Add numbers to one million with and without regrouping using the standard algorithm.
- Use place value and an algorithm to subtract whole numbers.
- Use number sense and regrouping to subtract across zeros.
- Understand factors.
- Composite and Prime numbers.
- Understanding factors and multiples.
- Use previously learned concepts and skills to reason abstractly and make sense of quantities and their relationships in problem situations.
- **Use extra week to build in Assssment for each Topic and or Unit, as well as Re-teaching and Enrichment.**

NJSLS

MA.4.OA.A.3	Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.
MA.4.OA.B	Gain familiarity with factors and multiples.
MA.4.NBT.A	Generalize place value understanding for multi-digit whole numbers.
MA.4.NBT.A.1	Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right.
MA.4.NBT.A.2	Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.
MA.4.NBT.A.3	Use place value understanding to round multi-digit whole numbers to any place.
MA.4.NBT.B	Use place value understanding and properties of operations to perform multi-digit arithmetic.
MA.4.NBT.B.4	Fluently add and subtract multi-digit whole numbers using the standard algorithm.

Exit Skills

By the end of Grade 4 Mathematics, students in the Belleville Public Schools will be able to:

- **Develop an understanding and fluency with multi-digit multiplication and develop an understanding of dividing to find quotients involving multi-digit dividends. Students will also work toward fluency in addition and subtraction within 1,000,000 using the standard algorithm:** Students generalizetheir understanding of place value to 1,000,000, understanding the relative sizes of numbers in each place. They apply their understanding of modelsfor multiplication (equal-sized groups, arrays, and area models), place value, and properties of operations, in particular the distributive property, as they develop, discuss, and use efficient, accurate, and generalizable methodsto compute products of multi-digit whole numbers. Depending on the numbers and the context, they select and accurately apply appropriate methods to estimate or mentally calculate products. They develop fluency with efficient procedures for multiplying whole numbers; understand and explain whythe procedures work based on place value and properties of operations; and use them to solve problems. Students apply their understanding of models for division, place value, properties of operations, and the relationship of division to multiplication as they develop, discuss, and use efficient, accurate, and generalizable procedures to find quotients involving multi-digit dividends. They select and accurately apply appropriate methods to estimate and mentally calculate quotients, and interpret remainders based upon the context.
- **Develop an understanding of fraction equivalence, addition and subtraction of fractions with like denominators, and multiplication of fractions by whole numbers:**
  Students develop understanding of fraction equivalence and operations with fractions. They recognize that two different fractions can be equal (e.g., 15/9 = 5/3), and they develop methods for generating and recognizing equivalent fractions. Students extend previous understandings about how fractions are built from unit fractions, composing fractions from unit fractions, decomposing fractions into unit fractions, and using the meaning of fractions and the meaning of multiplication to multiply a fraction by a whole number.
- **Understand that geometric figures can be analyzed and classified based on their properties, such as having parallel sides, perpendicular sides, particular angle measures, and symmetry:**

Students describe, analyze, compare, and classify two-dimensional shapes. Through building, drawing, and analyzing two-dimensional shapes, students deepen their understanding of properties of two-dimensional objects and the use of them to solve problems involving symmetry.

Enduring Understanding

- Our number system is based on groups of ten. Whenever we get 10 in one place value, we move to the next greater number.
- Placement of a number into a place-value system has a significant effect on its value.
- In a multi-digit whole number, a digit in one place represents ten times what it would represent in the place immediately to its right.
- Place value can be used to compare numbers.
- Rounding whole numbers is a process for finding the multiple of 10, 100, and so on closet to a given number.
- Good math thinkers use math to explain why they are right. They can talk about the math that others do, too.
- Representing numbers and numerical expressions in equivalent forms can make some calculations easy to do mentally. There is more than one way to do mental calculations.
- There is more than one way to estimate a sum or difference. Estimation gives a way to replace numbers with other numbers that are close and easier to compute.
- The standard addition algorithm for multi-digit numbers breaks the calculation into simpler calculations using place value.
- The standard addition and subtraction algorithms for multi-digit numbers breaks the calculations using place value starting with the ones, then the tens, and so on.
- Good math thinkers know how to think about words and numbers to solve problems.
- Rules can be used to create or extend number sequences that form a pattern. Those patterns sometimes have features not described by the rule.
- Rules can be used to create or extend patterns in tables.
- It is possible to predict a shape in a repeating pattern of shapes.
- Factors of a number *n* can be shown by arranging *n* counters into rows with the same number of counters in each row. The number of rows and the number of counters in each row are factors of *n*.
- Factors of a number can be found in pairs by thinking about multiplication.
- Prime numbers have exactly 2 factors and composite numbers have more than 2.
- The product of any non-zero whole number and a given non-zero whole number is a multiple of both. Factors and multiples are closely related.

Essential Questions

- How are greater numbers written?
- How can whole numbers be compared?
- How are place values related?
- How does the location of a number in a place-value system affect the value of the number?
- How is place value used to round numbers?
- What are standard procedures for adding and subtracting whole numbers?
- How can sums and differences of whole numbers be estimated?
- What makes a computational strategy both effective and efficient?

- How do operations affect numbers?
- How are strategies useful in solving computation problems?
- Why does it help to know inverse relationships?
- How can you use a rule to continue a pattern?
- How can you use a table to extend a pattern?
- How can you use a repeating pattern to predict a shape?
- How can you use arrays or multiplication to find the factors of a number?
- How can you identify prime and composite numbers?
- How can you find multiples of a number?

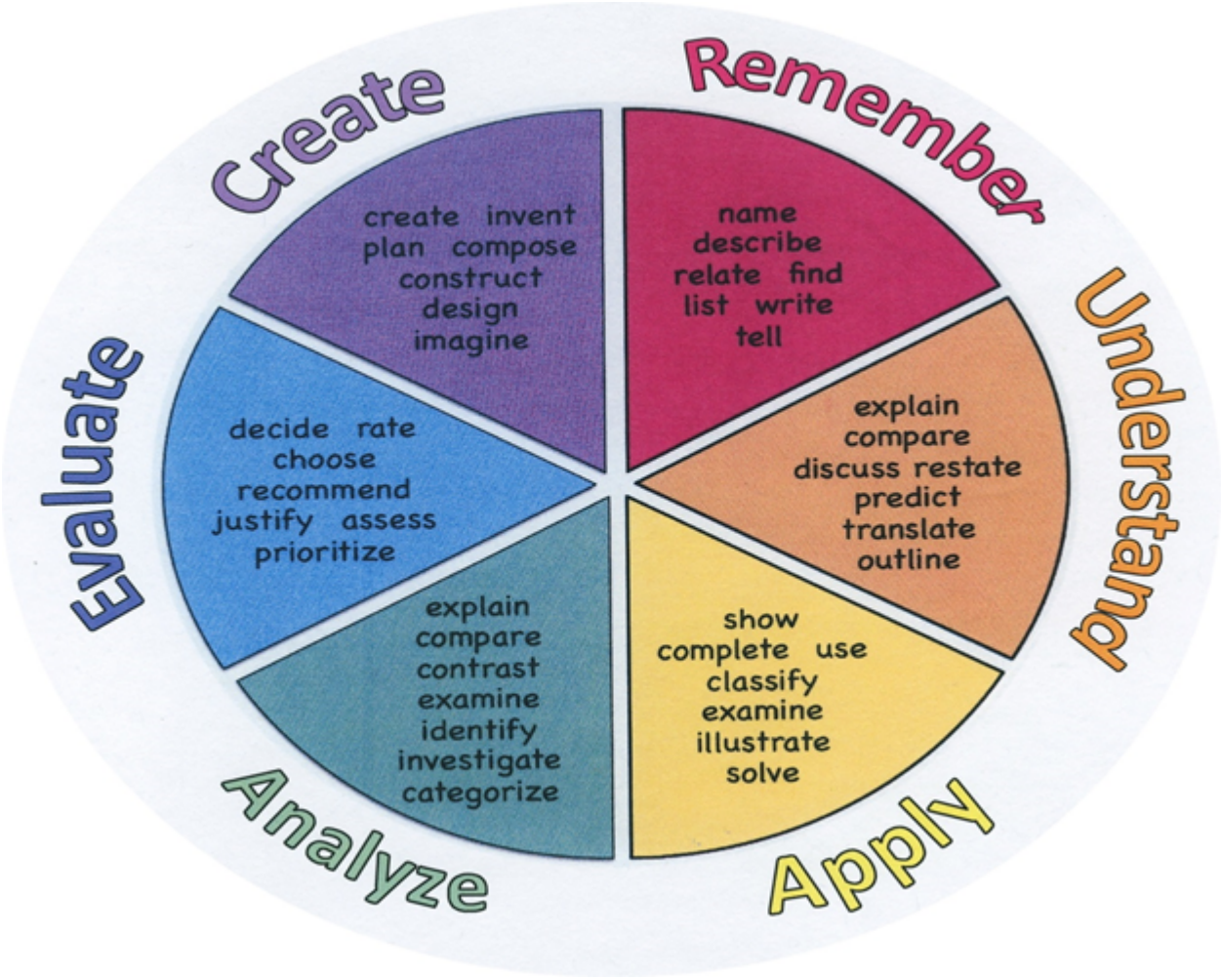
Learning Objectives

After completing place value understanding, students will be able to:

- **Recognize** the relationship between adjacent digits in a multi-digit number**.**
- **Use** place value to round multi-digit numbers**.**
- **Evaluate** previously learned concepts, **identify** reliability of the information, **Construct** arguments about place value, then **Generate** placement of a number into a place in the place value system.

Remember	Understand	Apply	Analyze	Evaluate	Create
Choose	Classify	Choose	Categorize	Appraise	Combine
Describe	Defend	Dramatize	Classify	Judge	Compose
Define	Demonstrate	Explain	Compare	Criticize	Construct
Label	Distinguish	Generalize	Differentiate	Defend	Design
List	Explain	Judge	Distinguish	Compare	Develop
Locate	Express	Organize	Identify	Assess	Formulate
Match	Extend	Paint	Infer	Conclude	Hypothesize
Memorize	Give Examples	Prepare	Point out	Contrast	Invent
Name	Illustrate	Produce	Select	Critique	Make
Omit	Indicate	Select	Subdivide	Determine	Originate
Recite	Interrelate	Show	Survey	Grade	Organize
Select	Interpret	Sketch	Arrange	Justify	Plan
State	Infer	Solve	Breakdown	Measure	Produce
Count	Match	Use	Combine	Rank	Role Play
Draw	Paraphrase	Add	Detect	Rate	Drive
Outline	Represent	Calculate	Diagram	Support	Devise
Point	Restate	Change	Discriminate	Test	Generate
Quote	Rewrite	Classify	Illustrate		Integrate
Recall	Select	Complete	Outline		Prescribe
Recognize	Show	Compute	Point out		Propose
Repeat	Summarize	Discover	Separate		Reconstruct
Reproduce	Tell	Divide			Revise
	Translate	Examine			Rewrite
	Associate	Graph			Transform
	Compute	Interpolate			

	Convert Discuss Estimate Extrapolate Generalize Predict	Manipulate Modify Operate Subtract			



Interdisciplinary Connections

LA.K-12.NJSLSA.R	Reading
LA.K-12.NJSLSA.W	Writing
SOC.6.1.4.B.3	Explain how and when it is important to use digital geographic tools, political maps, and globes to measure distances and to determine time zones and locations using latitude and longitude.
SOC.6.1.4.C.10	Explain the role of money, savings, debt, and investment in individuals' lives.
SOC.6.1.4.C.13	Examine the qualities of entrepreneurs in a capitalistic society.
SOC.6.3.4.C.1	Develop and implement a group initiative that addresses an economic issue impacting children.

TECH.8.1.5	Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.

Alignment to 21st Century Skills & Technology

- English, reading or language arts
- World languages
- Arts
- Mathematics
- Economics
- Science
- Geography
- History
- Government and Civics

21st Century/Interdisciplinary Themes

- Civic Literacy
- Environmental Literacy
- Financial, Economic, Business and Entrepreneurial Literacy
- Global Awareness
- Health Literacy

21st Century Skills

- Communication and Collaboration
- Creativity and Innovation
- Critical thinking and Problem Solving
- ICT (Information, Communications and Technology) Literacy
- Information Literacy
- Life and Career Skills
- Media Literacy

Technology Infusion

- Smart Board
- Student Lap-top

Differentiation

Utilize **Quick Check** in order to determine differentiation of instruction. **Assess and differentiate** page will prescribe the differentiated instruction activity.

- Intervention activity.
- Reteach.
- Technology center.
- On-level and advanced activity center.
- Leveled Assignment.

Resources:

- NJDOE: Instructional Supports and Scaffolds for Success in Implementing the Common Core State Standards http://www.state.nj.us/education/modelcurriculum/success/math/k2/

Special Education

- printed copy of board work/notes provided
- additional time for skill mastery
- assistive technology
- behavior management plan
- Center-Based Instruction
- check work frequently for understanding
- computer or electronic device utilizes
- extended time on tests/ quizzes
- have student repeat directions to check for understanding
- highlighted text visual presentation
- modified assignment format
- modified test content
- modified test format
- modified test length
- multiple test sessions
- multi-sensory presentation

- preferential seating
- preview of content, concepts, and vocabulary
- reduced/shortened reading assignments
- Reduced/shortened written assignments
- secure attention before giving instruction/directions
- shortened assignments
- student working with an assigned partner
- teacher initiated weekly assignment sheet
- Use open book, study guides, test prototypes

ELL

- teaching key aspects of a topic. Eliminate nonessential information
- using videos, illustrations, pictures, and drawings to explain or clarif
- allowing products (projects, timelines, demonstrations, models, drawings, dioramas, poster boards, charts, graphs, slide shows, videos, etc.) to demonstrate student's learning;
- allowing students to correct errors (looking for understanding)
- allowing the use of note cards or open-book during testing
- decreasing the amount of workpresented or required
- having peers take notes or providing a copy of the teacher's notes
- modifying tests to reflect selected objectives
- providing study guides
- reducing or omitting lengthy outside reading assignments
- reducing the number of answer choices on a multiple choice test
- tutoring by peers
- using computer word processing spell check and grammar check features
- using true/false, matching, or fill in the blank tests in lieu of essay tests

Intervention Strategies

- allowing students to correct errors (looking for understanding)
- teaching key aspects of a topic. Eliminate nonessential information
- allowing products (projects, timelines, demonstrations, models, drawings, dioramas, poster boards, charts, graphs, slide shows, videos, etc.) to demonstrate student's learning
- allowing students to select from given choices
- allowing the use of note cards or open-book during testing
- collaborating (general education teacher and specialist) to modify vocabulary, omit or modify items to reflect objectives for the student, eliminate sections of the test, and determine how the grade will be determined prior to giving the test.
- decreasing the amount of workpresented or required

- having peers take notes or providing a copy of the teacher’s notes
- marking students’ correct and acceptable work, not the mistakes
- modifying tests to reflect selected objectives
- providing study guides
- reducing or omitting lengthy outside reading assignments
- reducing the number of answer choices on a multiple choice test
- tutoring by peers
- using authentic assessments with real-life problem-solving
- using true/false, matching, or fill in the blank tests in lieu of essay tests
- using videos, illustrations, pictures, and drawings to explain or clarify

Evidence of Student Learning-CFU's

- Admit Tickets
- Anticipation Guide
- Choral response
- Common benchmarks
- Compare & Contrast
- Create a Multimedia Poster
- Define
- Describe
- Evaluate
- Evaluation rubrics
- Exit Tickets
- Explaining
- Fist- to-Five or Thumb-Ometer
- Illustration
- Journals
- KWL Chart
- Newspaper Headline
- Outline
- Question Stems
- Quickwrite
- Quizzes
- Red Light, Green Light
- Self- assessments
- Socratic Seminar
- Study Guide
- Teacher Observation Checklist

- Think, Pair, Share
- Think, Write, Pair, Share
- Thumbs up
- Top 10 List
- Unit tests

Primary Resources

- en-Vision math 2.0
- en-Vision math 2.0 Digital Resources

Ancillary Resources

New Jersey Center for Teaching and Learning: www.njctl.org

PARCC site: www.parcconline.org

Khan Academy:
www.khanacademy.org

http://www.mathworksheets4kids.com/activities/4th-grade.html

http://www.education.com/worksheets/fourth-grade/math/

http://www.math-drills.com/privacy.php

http://www.internet4classrooms.com/printables/common_core/math_mathematics_4th_fourth_grade/

http://imathworksheets.com/geometry-worksheets-2complementary-angles-worksheets/volume-worksheets/volume-of-a-rectangular-prism/

http://illuminations.nctm.org/Search.aspx?view=search&type=ls&gr=3-5

http://www.k6-geometric-shapes.com/4th-grade-math-Worksheets.html

http://www.math-aids.com/

http://www.mathworksheetsland.com/

http://www.mathsisfun.com/worksheets/multiplication.php

http://www.softschools.com/mathg.jsp

http://interactivesites.weebly.com/addition.html

http://www.worksheetworks.com/math/geometry/measuring-figures/volume.html

http://www.math-salamanders.com/equivalent-fractions-worksheet.html

http://www.printable-math-worksheets.com/multiplication-array.html

Sample Lesson

Unit Name: Place Value Relationships

NJSLS: 4.NBT.A.1

Interdisciplinary Connection: LAL: Connect math and literacy through reading books.

Music: Music countdown, choose a CD and use the number sold to explore place value.

Science: Create a temperature chart comparing 6 states comparing the temperatures using place value.

Health: Make calorie cards and compare the numbers.

Social Studies: Make a population chart for 4 different cities and compare the populations using place value.

Statement of Objective: Recognize the relationship between adjacent digits in a multi-digit number.

Anticipatory Set/Do Now: Daily Common Core Review/Review what you know.

Learning Activity: Students read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Place-value blocks are used to develop this understanding in order to see the relationship between adjacent place values.

Student Assessment/CFU's: Teacher observation, hand signals, choral response, one word.

Materials: en-Vision 2.0, topic 1, page 1, Review what you know, place value chart, word cards pgs. 2-4, visual learning bridge (Aviators), Base-ten blocks, convince me, guided practice, assess and differentiate.

21st Century Themes and Skills: Global Awareness, Financial, Economics, Business, and Entrepreneurial literacy.

Differentiation/Modifications: Ongoing intervention (during the core lesson), Strategic intervention (at the end of the lesson), Intensive intervention (as needed).

Integration of Technology: Technology Center: math tools and math games. A link to specific math tools activity or math games to use with this lesson is provided at pearsonrealize.com