Unit 1 - Number Sense

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Title Section

Department of Curriculum and Instruction

Belleville Public Schools

Curriculum Guide

MATHEMATICS

GRADE 6 - UNIT 1

Belleville Board of Education

102 Passaic Avenue

Belleville, NJ 07109

Prepared by: Margaret M. Sabino

Dr. Richard Tomko, Superintendent of Schools

Mr. Thomas D'Elia, Director of Curriculum and Instruction

Ms. Diana Kelleher, District Supervisor of ELA/Social Studies

Mr. George Droste, District Supervisor of Math/Science

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Unit Overview

Students should expect to learn from this unit;

- how to model parts of a whole and various fractional representations.
- the relationship between multiplication and division to understand the procedures for dividing fractions
- estimation of benchmark fractions
- distinguish between prime and composite numbers and list factor pairs of numbers
- determine the greatest common factor and least common multiple of two or more numbers
- all operations with decimals including converting terminating and repeating decimals into fractions, determining decimal equivalents of fractions
- use the number line and coordinate plane to model positive and negative integers and fractions
- Use the distributive property to express a sum of two whole numbers
- Understand and order the absolute value of rational numbers

NJSLS

Please link all standards that apply in this section within the curriculum of the unit being written. Please include all New Jersey Student Learning Standards.

MA.6.NS	The Number System
MA.6.NS.A	Apply and extend previous understandings of multiplication and division to divide

	fractions by fractions.
MA.6.NS.A.1	Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem.
MA.6.NS.B	Compute fluently with multi-digit numbers and find common factors and multiples.
MA.6.NS.B.2	Fluently divide multi-digit numbers using the standard algorithm.
MA.6.NS.B.3	Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.
MA.6.NS.B.4	Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor.
MA.6.NS.C	Apply and extend previous understandings of numbers to the system of rational numbers.
MA.6.NS.C.5	Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.
MA.6.NS.C.6	Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.
MA.6.NS.C.6a	Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., –(–3) = 3, and that 0 is its own opposite.
MA.6.NS.C.6b	Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.
MA.6.NS.C.6c	Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.
MA.6.NS.C.7	Understand ordering and absolute value of rational numbers.
MA.6.NS.C.7a	Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram.
MA.6.NS.C.7b	Write, interpret, and explain statements of order for rational numbers in real-world contexts.
MA.6.NS.C.7c	Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation.
MA.6.NS.C.7d	Distinguish comparisons of absolute value from statements about order.
MA.6.NS.C.8	Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.

Exit Skills

What are the skills that the students should have obtained by the end of this unit?

For Example:

By the end of Unit 1 6th grade math students should be able to:
Connect rate and ratio to whole number multiplication ad division and use concepts of ratio and rate to solve problems.

- Students use reasoning about multiplication and dividion to solve ratio and rate problems about quantities. By viewing equivalent ratios and rates as deriving from, and extending, pairs of rows (or columns) in the multiplication table and by analyzing simple drawings that indicate the relative size of quatities, students connect their understanding of multiplication and division with ratios and rates. Thus students expand the scope of problems for which they can use multiplication and division to solve problems, and they connect ratios and fractions. Students solve a wide variety of problems involving ratios and rates.

Complete an understanding of division of fractions and extending the notation of numbers to the system of rational numbers, which includes negataive numbers.

- Students use the meaning of fractions, the meanings of multiplication and division and the relationship between multiplication and division to understand and explain why the procedures for dividing fractions make sense. Students use these operations to solve problems. Students extend their previous understandings of numbers and the ordering of numbers to the full system of rational numbers, which includes negative rational numbers and in particular negative integers. In addition they reason about the order and absolute value of rational numbers.

Enduring Understanding

- The proper operations and procedures must be determined in order to solve problems.
- Factors of a whole number are always less than or equal to the number itself.
- Multiples of a whole number are always greater than or equal to the number itself.
- Positive and negative numbers are used together to describe quantities having opposite directions or values.
- A rational number is a point on a number line.
- Rational numbers on the number line are oriented left to right or bottom to top.
- Rational numbers have an order that exists related to their location on a number line.
- Model and perform operations on fractions, decimals, and mixed numbers.
- Fractions are a part to a whole.
- Define the absolute value of a number
- Plot ordered pairs on a coordinate plane

Essential Questions

- How are numbers related to one another?
- Why would one need to find common factors and multiples?
- What is the difference between prime and composite numbers?
- How does one determine the prime factorization of a number?

- In what situation would one want to use the distributive property to add two whole numbers?
- What type(s) of problems require using multi-digit decimal operations?
- How can understanding fractions make your life easier?
- Why is it important to identify fractions as part of a whole?
- What type of visual models can be used to represent division of fractions?
- How are division and multiplication of a fraction by a fraction related?
- How is the opposite value of a number different or similar to the absolute value of a number?
- How can absolute value help model real world phenomena?
- How do we compare positive and negative integers using a number line?
- How can rational numbers help us solve real world situations?
- When and how is a coordinate plane used in real life situations?

Learning Objectives

After completing grade 6 math, students will be able to;

- Distinguish between prime and composite numbers
- Determine the prime factorization of a number using exponents
- Demonstrate the GCF and LCM of two or more numbers using factors
- Compare and order all integers, fractions and decimals on a number line
- Identify and plot all integers, fractions and decimals on a number line
- Construct and compute fraction models to multiply and divide fractions
- Define and differentiate absolute value of all rational numbers
- Plot and indentify points on a coordinate plane

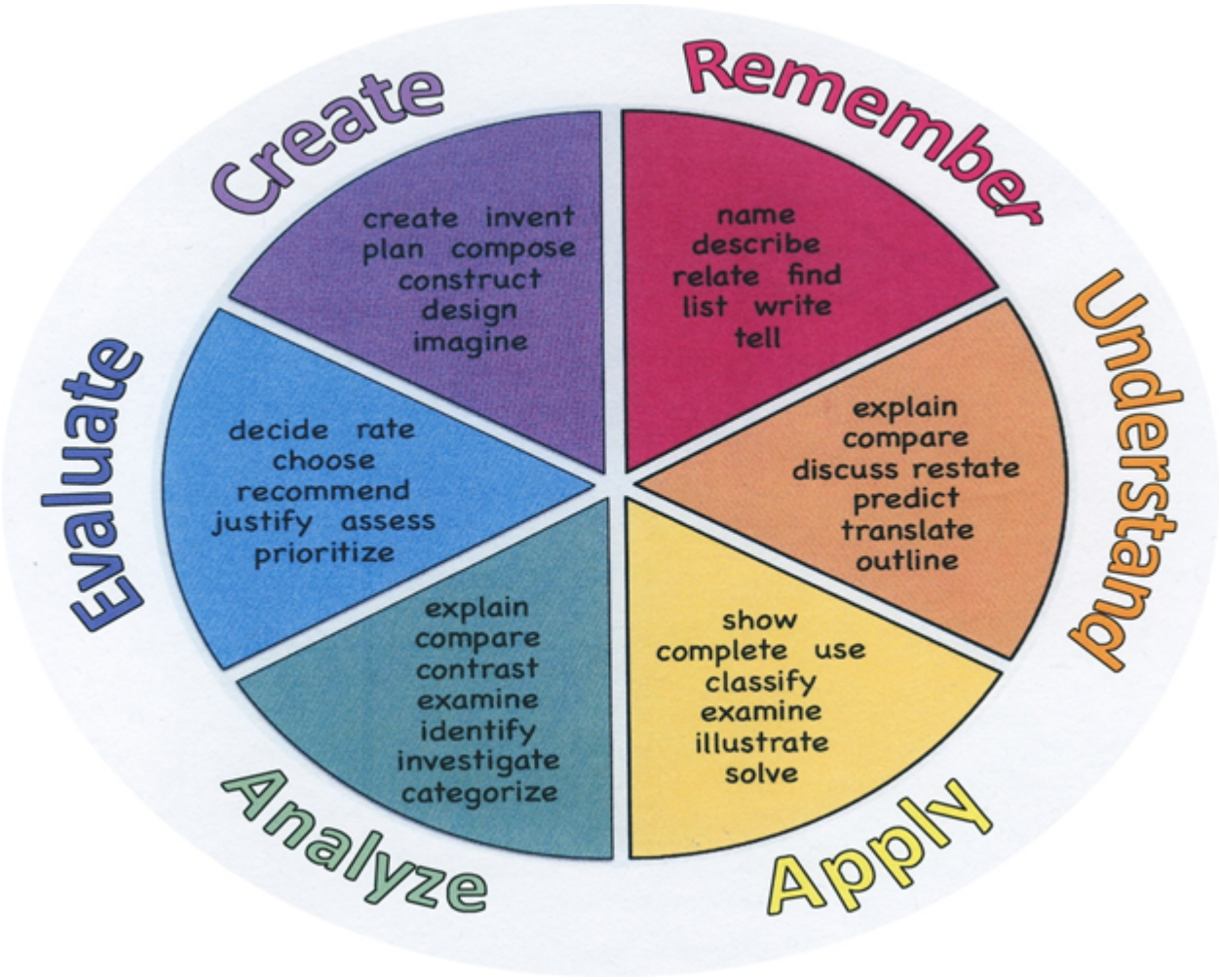
Action Verbs

Below are examples of action verbs associated with each level of the Revised Bloom's Taxonomy. These are useful in writing learning objectives, assignment objectives and exam questions.

If you are utilizing the objectives but want to address rigor use the chart below;

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 Point Quote Recall Recognize Repeat Reproduce	Represent Restate Rewrite Select Show Summarize Tell Translate Associate Compute Convert Discuss Estimate Extrapolate Generalize Predict	Calculate Change Classify Complete Compute Discover Divide Examine Graph Interpolate Manipulate Modify Operate Subtract	Diagram Discriminate Illustrate Outline Point out Separate	Support Test	Devise Generate Integrate Prescribe Propose Reconstruct Revise Rewrite Transform



Interdisciplinary Connections

Please list all and any cross-curricular content standards that link to this Unit.

Science

Social Studies

Health & Nutrition

Music

Alignment to 21st Century Skills & Technology

Key SUBJECTS AND 21st CENTURY THEMES

Mastery of key subjects and 21st century themes is essential for all students in the 21stcentury.

Key subjects include:

- 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
- Life and Career Skills

Technology Infusion

What technology can be used in this unit to enhance learning?

Differentiation

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

Differentiation

- Pre-teach new vocabulary and meaning of symbols
- Connect new vocabulary and symbols to background knowledge and experience
- Break down terms to familiar parts, suffixes and prefixes
- Make dictionaries available to learners
- Increase experience to academic vocabulary and language
- Provide flash cards
- Incorporate as many learners senses as possible to enhance retentention
- Brainstorm examples of use of new terms or symbols making real world applications
- Engage student in relevant discussion about conceptual process
- Post and refer to math guides and anchor charts when applicable
- Clarify the relationships between the operations
- Develop graphic representations of math processes
- Make connections to formulas, concepts or structures preciously learned
- Utilize manipulatives to display structures
- Offer various ways to solve math problems
- Provide opportunities to integrate math, technology and art
- Provide graphic organizers and anchor charts for all symbols and formulas
- Create math journals for terms, formulas and symbols
- Develop interactive games and activities to promote retention
- Integrate videos
- Utilize graphics, diagrams, charts

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 the number of answer choices on a multiple choice test
- tutoring by peers

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 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 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

Please list ways educators may effectively check for understanding in this secion.

- Admit Tickets
- Anticipation Guide
- 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
- Question Stems
- Quickwrite
- Quizzes
- Self- assessments
- Socratic Seminar
- Study Guide
- Teacher Observation Checklist
- Think, Pair, Share
- Unit tests

Primary Resources

Carnegie Learning Textbook Course 1

Standards Solution

NJ Model Curriculum

PARCC/Pearson

Ancillary Resources

Dinah Zike's Foldables-Interactive Study Guides, Macmillan/MacGraw Hill

Glencoe/MacGraw Hill Workbooks

http://www.khanacademy.org

http://mathgoodies.com

http://purplemath.com

http://buzzmath.com

http://IXL.com/math

http://www.ncpublicschools.org/acre/standards/common-core-tools/

http://www.uen.org/commoncore/

http://www.parcconline.org/math-plds

http://www.parcconline.org/mcf/mathematics/parcc-model-content-frameworks-browser

http://ime.math.arizona.edu/progressions/

http://www.nciea.org/publications/Math_LPF_KH11.pdf

http://www.nciea.org/publications/Math%20Expanded%20LPF%205-8_KH11.pdf

http://www.corestandards.org/the-standards/mathematics

Dan Meyer's Three-Act Lessons
https://docs.google.com/spreadsheet/ccc?key=0AjIqyKM9d7ZYdEhtR3BJMmdBWnM2YWxWYVM1UWowTEE#gid=0

Sample Lesson

One Lesson per Curriculum must bein this lesson plan template. I.e. one lesson in one unit

Unit Name:

CCSS/NJCCCS:

Interdisciplinary Connection:

Statement of Objective:

Anticipatory Set/Do Now:

Learning Activity:

Student Assessment/CFU's:

Materials:

21st Century Themes and Skills:

Differentiation/Modifications:

Integration of Technology: