

# Unit 1 Number Sense

Content Area: **Math**  
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Time Period: **SeptOct**  
Length: **6 weeks - Grade 6**  
Status: **Published**

## **Title Section**

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## **Department of Curriculum and Instruction**



**Belleville Public Schools**

Curriculum Guide

# Mathematics

## Grade 6 Accelerated

**Belleville Board of Education**

**102 Passaic Avenue**

**Belleville, NJ 07109**

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## **Unit Overview**

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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 greatest common factor and least common multiple of two or more numbers
- All operations with decimals, including converting terminating and repeating decimals into fractions and determining decimal equivalence of fractions
- Use the number line and the coordinate plane to model positive and negative integers and fractions
- Use distributive property to express the sum of two whole numbers
- Understand and order absolute value of rational numbers
- Distinguish comparisons of absolute value from expressions and number sentences
- Write absolute value statements in real-world situations

|              |  |
|--------------|--|
| 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.   |

## Exit Skills

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By the end of Unit 1, 6th grade students should be able to:

- **Connect ratio and rate to whole number multiplication and division and use concepts of ratio and rate to solve problems:**

Students use reasoning about multiplication and division 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 quantities, 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 notion of number to the**

### **system of rational numbers, which includes negative 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 number 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**

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- 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 a 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 all operations on fractions, decimals, and mixed numbers
- Fractions are a part to a whole
- Plot ordered pairs on a coordinate plane
- Define the absolute value of a number
- Compare the value of absolute values using inequality symbols
- Write absolute value statements in real world situations

### **Essential Questions**

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- 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?
- What type(s) of visual models can be used to represent division of fractions?
- How are division and multiplication of a fraction by a fraction related?
- Why is it important to identify fractions as part of a whole?
- How can understanding fractions make your life easier?
- 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 can 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

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 divide and multiply fractions
- Define absolute value of a number
- Differentiate absolute value of all rational numbers
- Write absolute value sentences for real world situations
- Plot and identify 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 objective, 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   | 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<br>Discuss<br>Estimate<br>Extrapolate<br>Generalize<br>Predict | Manipulate<br>Modify<br>Operate<br>Subtract |  |  |  |
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## Interdisciplinary Connections

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- Science
- Social Studies
- Language
- Music
- Health/Nutrition

## Alignment to 21st Century Skills & Technology

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### Key SUBJECTS AND 21st CENTURY THEMES

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

Key subjects include:

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

## 21st Century/Interdisciplinary Themes

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

## **21st Century Skills**

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

## **Technology Infusion**

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

Originally taken from <http://www.coetail.com/vzimmer/files/2013/02/iPadagogy-Wheel.001.jpg>  
And adapted for Windows 8.1 devices by Charlotte Beckhurst @CharBeckhurst



- Preteach new vocabulary and meaning of symbols
- Connect new vocabulary and symbols to background knowledge for experience
- Break down terms to familiar parts, suffixes, or prefixes



- Make dictionary available to learner
- Increase exposure to academic vocabulary and language
- Provide flash cards
- Incorporate as many of learner's senses as possible to enhance retention
- Brainstorm examples of use of new terms or symbols making real world applications
- Engage students in relevant discussions about conceptual processes
- Post and refer to math guides and anchor charts when applicable
- Clarify the relationships between the operations
- Develop graphic representation of math processes
- Make connections to formulae concepts or structures previously learned
- Utilize manipulatives to display structures
- Offer various ways to solve math problems
- Provide opportunities to integrate math technology & art
- Provide graphic organizers and anchor charts for all symbols and formulas
- Create student math journals for terms, formulas, and symbols
- Develop interactive games and activities to promote retention
- Integrate videos
- Utilize graphics, diagrams, and charts

## **Special Education**

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- 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**

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- teaching key aspects of a topic. Eliminate nonessential information
- using videos, illustrations, pictures, and drawings to explain or clarify
- 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 work presented or required
- having peers take notes or providing a copy of the teacher's notes
- providing study guides
- reducing or omitting lengthy outside reading assignments
- tutoring by peers

## **Intervention Strategies**

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- 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
- 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.
- 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
- tutoring by peers
- using authentic assessments with real-life problem-solving
- using videos, illustrations, pictures, and drawings to explain or clarify

## **Evidence of Student Learning-CFU's**

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

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

### **Primary Resources**

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Carnegie Learning Math Series - Course 1

[resources.carnegielearning.com](http://resources.carnegielearning.com)

### **Ancillary Resources**

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[www.AAAMath.com](http://www.AAAMath.com)

[www.ixl.com](http://www.ixl.com)

## Sample Lesson

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CCSS/NJCCCS: 6.RP.3c

Interdisciplinary Connection: Social Studies

Statement of Objective: After calculating percent of a number, students will locate states on the map, investigate sales tax of given state from the Internet, and compute the sales tax from given worksheet with ALL students accurately completing at least 4 out of 6 questions.

Anticipatory Set/Do Now: Name one state that has no sales tax (Answer: Delaware) and what is the NJ sales tax? (Answer: 7%)

Learning Activity: Review Do Now: discuss sales tax in NJ and other parts of the country and connect to real world; then show examples using Khan Academy video. In order to complete this activity, students will use prior knowledge of the previous lesson on how to calculate percent of a number. Give students directions to the activity and provide them with the map of USA. Each group will get a different coast (northeast, southeast, northwest, southwest, midwest); locate those states on the map; find the state sales tax online and solve questions for particular states.

For example, Mr. Gibson's restaurant bill at the infamous, The Ivy in California was \$117.00. Find the sales tax and compute the total amount owed to the restaurant. (The sales tax in CA is 7.5%, so multiply 117 with 0.075 which equals 8.775 or 8.78. Then, add the tax with \$117. Locate California on the map and color it).

Each group will answer at least 3-4 sales tax questions and share their answers in class.

Student Assessment/CFU's: Think-pair-share, teacher observation checklist, illustration (on map)

Materials: Map of USA, color pencils, calculators (if needed), notebooks, worksheets

21st Century Themes and Skills: Information Literacy, Life & Career Skills, Financial, Economic, Business, Entrepreneurial Literacy, Civic Literacy, Communication and Collaboration

Differentiation/Modifications: Provide calculator, modify assignment length, assign student a partner/group, integrate technology, provide map of USA, provide additional time

Integration of Technology: Laptops; Bing Search (for sales tax)