

Unit 4 Fraction Operations

Content Area: **Math**
Course(s): **Sample Course**
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Title Section

Department of Curriculum and Instruction



Belleville Public Schools

Curriculum Guide

Fraction Operations

GRADE 5

Belleville Board of Education

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Unit Overview

- Estimate sums and differences of fractions.
- Find common denominators.
- Add fractions with unlike denominators.
- Subtract fractions with unlike denominators.
- Add and subtract fractions.
- Estimate sums and differences of mixed numbers.
- Use models to add mixed numbers.
- Add mixed numbers.
- Use models to subtract mixed numbers.
- Subtract mixed numbers.
- Problem solving.
- Multiply mixed numbers.
- Multiplication as scaling.
- Use models to multiply a whole number by a fraction and a fraction by a whole number.
- Use models to multiply two fractions.
- Multiply two fractions.
- Area of a rectangle.
- Fractions and division.
- Fractions and mixed numbers as quotients.
- Use multiplication to divide.
- Divide unit fractions by unit fractions.
- Divide unit fractions by non-zero whole numbers.
- Divide whole numbers and unit fractions.

- Solve problems using division of fractions.
- Use extra week to build in Assessment for each Topic and or Unit, as well as Re-teaching and Enrichment.

Exit Skills

By the end of Grade 5 Mathematics, students in the Belleville Public Schools will be able to:

- **Develop fluency with addition and subtraction of fractions, and develop understanding of the multiplication of fractions and of division of fractions in limited cases (unit fractions divided by whole numbers and whole numbers divided by unit fractions):**
Students apply their understanding of fractions and fraction models to represent the addition and subtraction of fractions with unlike denominators as equivalent calculations with like denominators. They develop fluency in calculating sums and differences of fractions, and make reasonable estimates of them. Students also use the meaning of fractions, of multiplication and division, and the relationship between multiplication and division to understand and explain why the procedures for multiplying and dividing fractions make sense (Note: this is limited to the case of dividing unit fractions by whole numbers and whole numbers by unit fractions.).
- **Extend division to two-digit divisors, integrating decimal fractions into the place value system and develop understanding of operations with decimals to hundredths, develop fluency with whole number and decimal operations:**
Students develop understanding of why division procedures work based on the meaning of base-ten numerals and properties of operations. They finalize fluency with multi-digit addition, subtraction, multiplication, and division. They apply their understandings of models for decimals, decimal notation, and properties of operations to add and subtract decimals to hundredths. They develop fluency in these computations, and make reasonable estimates of their results. Students use the relationship between decimals and fractions, as well as the relationship between finite decimals and whole numbers (i.e., a finite decimal multiplied by an appropriate power of 10 is a whole number), to understand and explain why the procedures for multiplying and dividing finite decimals make sense. They compute products and quotients of decimals to hundredths efficiently and accurately.
- **Develop an understanding of volume:**
Students recognize volume as an attribute of three-dimensional space. They understand that volume can be measured by finding the total number of same-size units of volume required to fill the space without gaps or overlaps. They understand that a 1-unit by 1-unit by 1-unit cube is the standard unit for measuring volume. They select appropriate units, strategies, and tools for solving problems that involve estimating and measuring volume. They decompose three-dimensional shapes and find volumes of right rectangular prisms by viewing them as decomposed into layers of arrays of cubes. They measure necessary attributes of shapes in order to determine volumes to solve real-world and mathematical problems.

Enduring Understanding

- Models can be used to show different ways of adding mixed numbers.
- Adding mixed numbers is an extension of adding fractions.
- Models can be used to show different ways of subtracting mixed numbers.
- Subtracting mixed numbers is an extension of subtracting fractions.
- Addition and subtraction of mixed numbers may both be needed to solve a problem.
- Models can be used to show that the product of a whole number and a fraction can be interpreted as a

repeated addition.

- Multiplying a fraction and a whole number involves both multiplication and division. Models can be used to represent multiplying a fraction by a whole number.
- Different methods can be used to multiply fractions and whole numbers. In one method, the whole number is renamed as a fraction, the numerators are multiplied, and then the denominators are multiplied.
- Visual models, such as fraction stripes, number lines, area models, and bar diagrams can be used to represent multiplication of a fraction by a fraction.
- To find the product of two fractions, multiply the numerators and then multiply the denominators. recognize when a product is less than or greater than 1.
- An area model can be used to represent the product of two fractions.
- A fraction can be interpreted as division of the numerator by the denominator.
- A fraction or mixed number can represent the quotient of two whole numbers.
- Models can be used to show how dividing a whole number by a fraction relates to multiplication.
- Visual fraction models can be used to represent and solve problems involving whole numbers divided by unit fractions.
- Dividing a unit fraction by a non-zero whole number can be modeled by showing part of a whole being into equal parts.
- Area models and number lines can be used to represent and solve problems involving whole numbers divided by unit fractions.
- Some problems can be solved by first finding and solving one or more sub-problems and then using the answers to solve the original problem.

Essential Questions

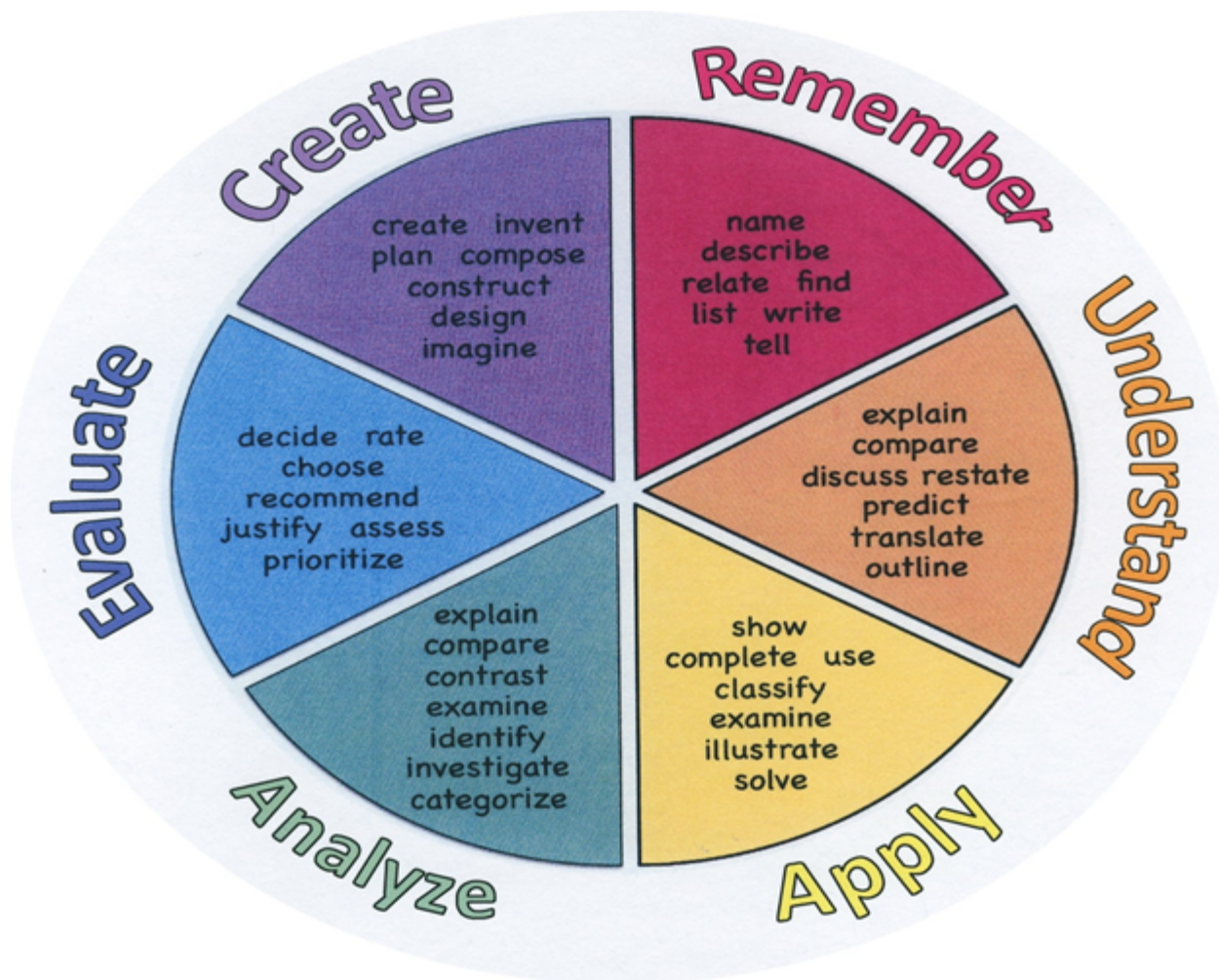
- How can sums and differences of fractions and mixed numbers be estimated?
- What are standard procedures for adding and subtracting fractions and mixed numbers?
- What does it mean to multiply whole numbers and fractions?
- How can multiplication with whole numbers and fractions be shown using models and symbols?
- How are fractions related to division?
- How can you divide with whole numbers and unit fractions?

Learning Objectives

After understanding equivalent fractions, students will be able to:

- **Define** a mixed number, **explain** the procedure, **organize** the numbers then **select** the common denominator.
- Once this is complete, the student must **defend** the computation by **generating** the correct sum.

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	Manipulate			
	Discuss	Modify			
	Estimate	Operate			
	Extrapolate	Subtract			
	Generalize				
	Predict				



Interdisciplinary Connections

LA.K-12.NJSLSA.R	Reading
LA.K-12.NJSLSA.W	Writing
SOC.6.1.8.C	Economics, Innovation, and Technology
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.
TECH.8.1.5.A	Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations.
TECH.8.1.5.A.CS1	Understand and use technology systems
TECH.8.1.5.A.CS2	Select and use applications effectively and productively.

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 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
- 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 work presented 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 2.0
- en-Vision 2.0 Digit 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>