

Unit 3 Fraction/Decimal Concepts

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Title Section

Department of Curriculum and Instruction



Belleville Public Schools

Curriculum Guide

Math, Fourth Grade

Unit 3: Fraction & Decimal Concepts

Belleville Board of Education

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Unit Overview

- Equivalent fractions and area models.
- Equivalent fractions and number lines.
- Using multiplication and division to find equivalent fractions.
- Comparing fractions.
- Estimate fraction sums and differences.
- Fractions and decimals.
- Fractions and decimals on the number line.
- Compare decimals.
- Solve problems involving money.
- **Use extra week to build in Assessment for each Topic and or Unit, as well as Re-teaching and Enrichment.**

NJSLS

MA.4.MD.A.2

Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.

MA.4.NF.A.1

Explain why a fraction a/b is equivalent to a fraction $(n \times a)/(n \times b)$ by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.

MA.4.NF.A.2	Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as $\frac{1}{2}$. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols $>$, $=$, or $<$, and justify the conclusions, e.g., by using a visual fraction model.
MA.4.NF.B.3	Understand a fraction $\frac{a}{b}$ with $a > 1$ as a sum of fractions $\frac{1}{b}$.
MA.4.NF.C	Understand decimal notation for fractions, and compare decimal fractions.
MA.4.NF.C.5	Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100.
MA.4.NF.C.6	Use decimal notation for fractions with denominators 10 or 100.
MA.4.NF.C.7	Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols $>$, $=$, or $<$, and justify the conclusions, e.g., by using a visual model.

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 generalize their understanding of place value to 1,000,000, understanding the relative sizes of numbers in each place. They apply their understanding of models for 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 methods to 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 why the 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., $\frac{15}{9} = \frac{5}{3}$), 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

- Two fractions that represent the same part of the same whole are equivalent. The two fractions are different names for the same number.
- The same fractional amount can be represented by an infinite set of different but equivalent fractions.
- When the numerator and denominator of a fraction is multiplied by the same whole number greater than 1, it is the same as multiplying the fraction by 1. This gives an equivalent fraction because multiplying by 1 does not change the value of a number.
- When the numerator and denominator of a fraction are divided by a common factor, the result is an equivalent fraction.
- One way to compare two fractions that are parts of the same whole is by comparing each to a benchmark fraction such as $\frac{1}{2}$.
- When two fractions have the same denominator, the fraction with the greater numerator is greater. When two fractions have the same numerator, the fraction with the lesser denominator is greater.
- Models can be used to show addition of fractions as joining parts of the same whole.
- A fraction $\frac{a}{b}$ where $a > b$, can be decomposed into the sum of two or more unit or non-unit fractions in one or more ways where the sum of the fractions is equal to the original fraction.
- Two fractions can be joined or added to find the total. There is a general method for adding fractions with like denominators.
- Models can be used to show subtraction of fractions as separating a part from the same whole.
- The difference between two fractions with like denominators can be found by separating one fractional amount from the other. There is a general method for subtracting fractions with like denominators.
- Fraction addition and subtraction can be thought about as joining and separating segments on the number line. They can also be thought about as counting forward or counting backward on the number line.
- Fraction sums and differences can be estimated by thinking about how each fraction relates to the other fractions that are easy to add and subtract mentally.
- Adding and subtracting mixed numbers is an extension of the ideas and procedures for adding and subtracting fractions.
- Two procedures for adding mixed numbers both involve changing the calculations to a simpler equivalent calculation.
- Two procedures for subtracting mixed numbers both involve changing the calculation to a simpler equivalent calculation. These are extensions of the same procedures used for adding mixed numbers with like denominators.
- A decimal is another way to represent a fraction.
- Points on a number line can represent fractions and decimals. A fraction and a decimal tell the distance a point is from 0 on the number line.
- Place value can be used to compare decimals.
- Fractions and decimals can be used to represent money. Pictorial models and equations can represent problems involving money.

Essential Questions

- Why does one need to use fractions?

- What are some ways to name the same part of a whole?
- How can you compare fractions with unlike denominators?
- How do you add and subtract fractions and mixed numbers with like denominators?
- How can fractions be added and subtracted on the number line?
- How can you write a fraction as a decimal?
- How can you locate points on a number line?
- How do you compare decimals?

Learning Objectives

After understanding the procedures for finding equivalent fractions, students will be able to:

- **Select** the visual model that will **demonstrate** and **solve** the comparison.
- Also, to **arrange** the model in such a manner that it **contrasts** the parts of the whole.
- By **developing** this model, **students** will **generate** the required outcome.

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.6.1.4.C.10	Explain the role of money, savings, debt, and investment in individuals' lives.
SOC.6.1.4.C.11	Recognize the importance of setting long-term goals when making financial decisions within the community.
SOC.6.1.4.C.CS5	Understanding of financial instruments and outcomes assists citizens in making sound decisions about money, savings, spending, and investment.
SOC.6.1.4.C.CS7	Economic opportunities in New Jersey and other states are related to the availability of resources 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.

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 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>