

# Unit 3: Title of Unit : Fractions and Decimals

Content Area: **Mathematics**  
Course(s): **Mathematics - Grade 4**  
Time Period: **Generic Time Period**  
Length: **10 Weeks**  
Status: **Published**

## Unit Overview

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Students will extend understanding of fraction equivalence and ordering, build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers, understand the decimal notation for fractions and compare decimal fractions. Students will also represent and interpret data in terms of fractional measurements.

**Benchmark 8 - 10 will be assessed Mid-March**

## Transfer

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Students will be able to independently use their learning to...

extend their understanding of fraction equivalence and ordering of fractions; apply and extend previous understandings of operations with whole numbers to fractions involving addition and subtraction of fractions & mixed numbers; apply & extend understanding of operations involving multiplication of a fraction using a visual fraction model; understand decimal notation for fractions and compare decimal fractions.

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For more information, read the following article by Grant Wiggins.

[http://www.authenticeducation.org/ae\\_bigideas/article.lasso?artid=60](http://www.authenticeducation.org/ae_bigideas/article.lasso?artid=60)

## Meaning

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## Understandings

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Students will understand...

## Chapter 8

- how to find factor pairs of whole numbers
- how to model equivalent fractions
- how to find a fraction that is equivalent to another fraction
- how to compare fractions by using a benchmark fraction
- **how to model fractions on a number line**
- **how to compare fractions on a number line**

## **Chapter 9**

- how to use fraction tiles to model the sum of fractions
- how to add and subtract like fractions
- how to add and subtract mixed numbers
- use an equation to write a fraction as a multiple of a unit fraction
- how to multiply a fraction by a whole number

## **Chapter 10**

- how to use place value to write decimals
- how to use models to represent decimals
- how to compare decimals
- how to use decimal notation to represent fractions
- how to add two fractions with denominators of 10 and 100

## **Essential Questions**

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Students will keep considering...

- How can different fractions name the same amount?
- How can I use operations to model real-world fractions?
- How are fractions and decimals related?

## **Application of Knowledge and Skill**

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## **Students will know...**

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Students will know...

## **Chapter 8**

- a whole number is a multiple of each of its factors
- fractions that represent the same part of a number are equivalent
- the parts of equivalent fractions may be different, but the two fractions themselves are the same size
- multiplication and division can be used to find equivalent fractions
- to create an equivalent fraction, multiply or divide the numerator and denominator of a fraction by the same number
- two fractions with different numerators and different denominators can be compared using a benchmark fraction
- a benchmark fraction is a common fraction like  $\frac{1}{2}$

## **Chapter 9**

- fractions that have the same denominators are called like fractions
- unit fractions can be used to model the addition of like fractions
- adding fractions is like joining parts and subtracting fractions is like separating parts of the same whole
- to add or subtract like fractions, add or subtract the numerators and keep the same denominator
- replace mixed numbers with equivalent improper fractions
- check subtraction of mixed numbers by using addition
- use models
- use repeated addition
- use equations and properties

## **Chapter 10**

- a digit in one place represents 10 times what it represents in the place to its right
- a base ten model can be used to show tenths
- a place value chart can be used to show tenths and hundredths
- use place value
- use a number line
- decimals and fractions can show equivalent amounts
- use models or number lines
- write the tenths fraction as an equivalent fraction with a denominator of 100

## **Students will be skilled at...**

Students will be skilled at how to ...

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## **Chapter 8**

- find the factor pairs of whole numbers, like 70

- use models to show that two fractions, like  $\frac{3}{4}$  and  $\frac{9}{12}$ , are equivalent
- write two fractions that are equivalent to a fraction like  $\frac{3}{8}$
- compare two fractions like  $\frac{2}{5}$  and  $\frac{5}{8}$  using a benchmark fraction

## **Chapter 9**

- use models to show sums like  $\frac{3}{6} + \frac{1}{6}$
- solve subtraction problems like  $\frac{7}{12} - \frac{5}{12}$
- solve subtraction problems like  $3\frac{2}{5} - 1\frac{1}{5}$
- Use an equation to write a fraction like  $\frac{7}{8}$  as a multiple of a unit fraction
- find products like  $3 \times \frac{2}{5}$

## **Chapter 10**

- use place value charts to write decimals like thirty-seven hundredths (0.37)
- use models to represent decimals like five tenths (0.5)
- use a number line to compare decimals like 0.8 and 0.65
- write a fraction and a decimal for models like the one shown below
- add fractions like  $\frac{29}{100}$  and  $\frac{4}{10}$

## **Academic Vocabulary**

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Numerator

Denominator

Benchmark Fraction

Equivalent fractions

Mixed number

Improper Fraction

Factor pair

Composite number

Prime number

Greatest Common Factor (GCF)

Least Common Multiple (LCM)

Simplest form

Like fractions

Associative Property

Decimal

Hundredths

Tenths

Line plot

Compare

Comparison

Generate

Justify

Measurement

Unit

Data

Addition

Decompose

Express

Join

Part

Whole

separate

refer

subtraction

sum

word problem

equation

product

model

multiple

multiplication

whole number

notation

## **Learning Goal Chapter 8- Fractions**

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Students will be able to extend their understanding of fraction equivalence and ordering to fractions with denominators of 2,3,4,5,6,8,10,12 and 100.

## **Daily Targets Chapter 8**

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SWBAT:

- Find factors and multiples of whole numbers (Lesson 1/DOK 1)
- Determine if a number is prime or composite (Lesson 2/DOK 1)
- Explore equivalent fractions (Lesson 3/DOK 2)
- Find equivalent fractions (Lesson 4/DOK 2)
- Write a fraction in simplest form (Lesson 5/DOK 3)
- Compare and order fractions (Lesson 6/DOK 3)
- Use benchmark fractions to compare and order numbers (Lesson 7/DOK 3)
- Use logical reasoning to solve problems (Lesson 8/DOK 4)
- represent mixed numbers by decomposing them into a sum of whole numbers and unit fractions (Lesson 9/DOK4)
- SW write mixed numbers and improper fractions (Lesson 10/DOK 3)

MA.K-12.1	Make sense of problems and persevere in solving them.
MA.4.OA.A	Use the four operations with whole numbers to solve problems.
MA.K-12.2	Reason abstractly and quantitatively.
MA.K-12.3	Construct viable arguments and critique the reasoning of others.
MA.K-12.4	Model with mathematics.
MA.K-12.6	Attend to precision.
MA.K-12.7	Look for and make use of structure.
MA.K-12.8	Look for and express regularity in repeated reasoning.
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.B.3b

Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model.

## **Learning Goal Chapter 9 Operations with Fractions**

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Students will be able to build fractions from unit fractions by applying and extending previous understandings of operations and whole numbers

## **Daily Targets Chapter 9**

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SWBAT:

- Add like fractions (Lessons 1 and 2/ DOK 1)
- Subtract like fractions (Lessons 3 and 4/ DOK 1)
- Work backwards to solve problems (Lesson 5/ DOK 4)
- Add mixed numbers (Lesson 6/DOK 3)
- Subtract mixed numbers (Lesson 7/DOK 3)
- Use models to multiply fractions (Lesson 8/DOK 3)
- Multiply fractions by whole numbers (Lesson 9/DOK 3)

MA.K-12.1

Make sense of problems and persevere in solving them.

MA.K-12.2

Reason abstractly and quantitatively.

MA.K-12.3

Construct viable arguments and critique the reasoning of others.

MA.K-12.4

Model with mathematics.

MA.K-12.5

Use appropriate tools strategically.

MA.K-12.6

Attend to precision.

MA.K-12.7

Look for and make use of structure.

MA.K-12.8

Look for and express regularity in repeated reasoning.

MA.4.NF.B.3a	Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.
MA.4.NF.B.3b	Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model.
MA.4.NF.B.3c	Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.
MA.4.NF.B.3d	Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.
MA.4.NF.B.4	Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.
MA.4.NF.B.4b	Understand a multiple of $a/b$ as a multiple of $1/b$ , and use this understanding to multiply a fraction by a whole number.
MA.4.NF.B.4c	Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem.

## Learning Goal Chapter 10- Fractions and Decimals

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Students will be able to understand decimal notation for fractions, and compare decimal fractions

## Daily Targets Chapter 10

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SWBAT...

- Model and describe tenths and hundredths as part of the base-ten system (Lessons 1-3/ DOK 1)
- Identify, read, and write tenths and hundredths as decimals and fractions, using grids and number lines to model the relationship between decimals and fractions (Lessons 4 and 5/DOK 2)
- Use place value and equivalent fractions to add two fractions with respective denominators or 10 and 100 (Lesson 6/DOK 2)
- Compare and order decimals to hundredths by reasoning about their size (Lesson 7/DOK 3)
- Find extra or missing information when solving problems (Lesson 8/DOK 4)

MA.K-12.1	Make sense of problems and persevere in solving them.
MA.K-12.2	Reason abstractly and quantitatively.
MA.K-12.3	Construct viable arguments and critique the reasoning of others.
MA.K-12.4	Model with mathematics.
MA.K-12.5	Use appropriate tools strategically.
MA.K-12.6	Attend to precision.
MA.K-12.7	Look for and make use of structure.
MA.K-12.8	Look for and express regularity in repeated reasoning.



MA.4.NF.B.4a	Understand a fraction $a/b$ as a multiple of $1/b$ .
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.

## Formative Assessment and Performance Opportunities

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- academic games
- centers
- Chapter 10 Project-Bake Sale Equivalents (pg.624)
- Chapter 8 Project- Healthy Recipes (pg.476)
- Chapter 9 Project-Growing Up (pg.554)
- classwork
- Performance Task Chapter 10-Darrel Delivers- Wendell's Weather Report- use the backdrop of a weather rainfall report to convert between fractions and decimals (DOK2, DOK3) Rubric TM684PT2
- Performance Task Chapter 8-Charity Begins at the Market- Find equivalent fractions, factor pairs, and compare fractions within the setting of raising money at a local market (DOK2, DOK3) Rubric- TM 552PT1
- Performance Task Chapter 9- Clara the Cleaner- Use models and equations to compare, add, subtract, and multiply fractions and mixed numbers to determine how much of a variety of ingredients is needed to be added to buckets for cleaning (DOK2, DOK3) Rubric TM622PT1
- Power Up for State Assessment
- projects
- quizzes
- student interviews
- tests

## Summative Assessment

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- Centers
- Classwork
- Common Assessments
- Projects
- Quizzes
- Student Interviews
- Tests

## 21st Century Life and Careers and Technology

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CRP.K-12.CRP2	Apply appropriate academic and technical skills.
CRP.K-12.CRP2.1	Career-ready individuals readily access and use the knowledge and skills acquired through experience and education to be more productive. They make connections between abstract concepts with real-world applications, and they make correct insights about when it is appropriate to apply the use of an academic skill in a workplace situation.
CRP.K-12.CRP4	Communicate clearly and effectively and with reason.
CRP.K-12.CRP4.1	Career-ready individuals communicate thoughts, ideas, and action plans with clarity, whether using written, verbal, and/or visual methods. They communicate in the workplace with clarity and purpose to make maximum use of their own and others' time. They are excellent writers; they master conventions, word choice, and organization, and use effective tone and presentation skills to articulate ideas. They are skilled at interacting with others; they are active listeners and speak clearly and with purpose. Career-ready individuals think about the audience for their communication and prepare accordingly to ensure the desired outcome.
CRP.K-12.CRP8	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP.K-12.CRP8.1	Career-ready individuals readily recognize problems in the workplace, understand the nature of the problem, and devise effective plans to solve the problem. They are aware of problems when they occur and take action quickly to address the problem; they thoughtfully investigate the root cause of the problem prior to introducing solutions. They carefully consider the options to solve the problem. Once a solution is agreed upon, they follow through to ensure the problem is solved, whether through their own actions or the actions of others.
CAEP.9.2.4.A.4	Explain why knowledge and skills acquired in the elementary grades lay the foundation for future academic and career success.
TECH.8.1.5.D	Digital Citizenship: Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.
TECH.8.1.5.D.3	Demonstrate an understanding of the need to practice cyber safety, cyber security, and cyber ethics when using technologies and social media.
TECH.8.1.5.D.CS1	Advocate and practice safe, legal, and responsible use of information and technology.
TECH.8.1.5.D.CS2	Demonstrate personal responsibility for lifelong learning
TECH.8.1.5.E	Research and Information Fluency: Students apply digital tools to gather, evaluate, and use information.
TECH.8.1.5.E.CS3	Evaluate and select information sources and digital tools based on the appropriateness for specific tasks.

## **Accommodations and Modifications**

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- Interactive Foldables
- Manipulatives (Fraction tiles, linking cubes, counters)
- Vocabulary visuals
- Multiplication Chart
- Divisibility Chart
- Small Groups
- 504 Accommodations
- Interactive Guide: Scaffolded differentiated activities (emerging, expanding and bridging levels)
- TAG Manipulative Kits
- BSI Support
- English Learner Support Interactive Guide (TM68-97)
- ELL Support Strategy - Use the activity in the Vocabulary Check to assess students' ability to extend

their understanding

- Beyond Level Enrichment Resource Guide
- IEP Modifications
- Learning Centers
- RTI Guide in My Math - Chapter Specific
- Provide Visual and Auditory Aides (foldables, songs, chants)
- Reteaching Masters (Chapter Specific)
- Enrichment Masters (Chapter Specific)
- [STMath](#)
- [XtraMath](#)

## Unit Resources

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- AAAMath <http://www.aaamath.com/>
- Brainpop <http://www.brainpop.com/>
- Cool math 4 kids <http://www.coolmath4kids.com/>
- Decimal detective [http://www.mesc.gov.ws/ssn1/Decimal\\_Detective/Decimal\\_Detective.htm](http://www.mesc.gov.ws/ssn1/Decimal_Detective/Decimal_Detective.htm)
- Fraction frenzy <http://www.learningplanet.com/sam/ff/index.asp>
- from <http://www.dpi.state.nc.us/acre/standards/common-core-tools/#unmath>
- Funbrain <http://www.funbrain.com/>
- illustrative mathematics <http://www.illustrativemathematics.org/>
- Linkit
- Math Fact Café <http://www.mathfactcafe.com/>
- Math playground <http://www.mathplayground.com/>
- McGraw-Hill My Math
- NCTM illuminations <http://illuminations.nctm.org/> factor game, product game
- ST Math
- Visual fractions games <http://visualfractions.com/>

## Interdisciplinary Connections

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Leveled reader, *A Force to Reckon With*, presents information about earthquakes, including plate movement and the San Andreas fault. Students will interpret data from charts, maps, and graphs. (4.NF.3.d)

Leveled reader, *Life in the United States*, focuses on population and the four regions established by the United States Census Bureau. Students will interpret data from charts, maps and graphs. (4.NF.2)

SOC.6.1.4.B.CS4

Regions form and change as a result of unique physical/ecological conditions, economies, and cultures.

4-ESS1-1.ESS1.C.1

Local, regional, and global patterns of rock formations reveal changes over time due to earth forces, such as earthquakes. The presence and location of certain fossil types indicate the order in which rock layers were formed.

4-ESS2-2.ESS2.B.1

The locations of mountain ranges, deep ocean trenches, ocean floor structures, earthquakes, and volcanoes occur in patterns. Most earthquakes and volcanoes occur in bands that are often along the boundaries between continents and oceans. Major mountain chains form inside continents or near their edges. Maps can help locate the different land and water features areas of Earth.