

These connections are to be used as a resource to integrate and connect related concepts and skills that support and enrich the content standards.



Core Standard

5.1 **Number and Operations and Data Analysis: **Develop an understanding of and fluency with addition and subtraction of fractions and decimals.****

Content Standards

- 5.1.1 Use fraction models to represent the addition and subtraction of fractions with unlike denominators.
- 5.1.2 Use decimal models, place value and number properties to add and subtract decimals (to the thousandths).
- 5.1.3 Select and use appropriate strategies to estimate fraction and decimal sums and differences.
- 5.1.4 Develop fluency with efficient procedures for adding and subtracting fractions and decimals and justify why the procedures work.
- 5.1.5 Solve problems involving the addition and subtraction of fractions and decimals.
- 5.1.6 Use ordered pairs on coordinate graphs to specify locations and describe paths.
- 5.1.7 Construct and analyze double bar, line and circle graphs to solve problems involving fractions and decimals.

Connections to the Standard

Key Connections to Prior Math Knowledge:

- In grade 3 students started representing common fractions and adding fractions with like denominators. (3.1.1 and 3.1.6)
- In grade 4 students compared equivalent fractions and decimals. Now they add and subtract fractions with unlike denominators. (4.1.2)
- In grade 4 students became familiar with decimal notation to the hundredths. (4.1.1) In grade 5 they learn how to express decimals to the thousandth place.
- Estimating fraction and decimal sums in grade 5 continues from estimation that started in grade 4. (4.1.5) Now students develop procedures and justifications for adding and subtracting fractions and decimals.
- In grade 3 students analyzed graphs with quantities expressed in whole numbers. (3.2.7) Now they construct and use graphs with amounts expressed as fractions and decimals.

Key Connections to Future Math Knowledge:

- In grade 6 students will learn to estimate products and quotients with fractions and decimals. 6.1.1
- They will multiply and divide fractions and decimals. (6.1.2 and 6.1.3)
- As they develop and justify procedures for adding and subtracting fractions and decimals in grade 5, they will do the same for multiplying and dividing fractions in grade 6. (6.1.4)
- Working with decimals in grade 5 prepares students for their study of rate, ratio and percent in grade 6. (6.2.1)

Key Connections to Current Grade Level Math Standards

- Practice with fractions and decimal numbers should include reading aloud; writing teacher-dictated, then classmate-dictated numbers; designing fraction and decimal representations with manipulatives; illustrating numbers with pictures; and, especially for ELL, asking students to point to numbers from a list prior to asking them to read the numbers. (5.1)

- Time spent manipulating models of fractions and decimals will enable students to use them capably. Practice with manipulatives leads to ease in illustrating fractions and decimals on paper. Both approaches to developing fraction and decimal concepts facilitate eventual grasp of the concept and allow students to use them in more complex mathematics that follow. (5.1.2 through 5.1.5)
- Coordinate graphing has application in many professions, and initiates an understanding of the four quadrants. Facility in managing the first quadrant will equip students for the complex mathematics they will encounter after working with negative numbers. (5.1.6)
- Graphing provides a visual representation of quantities. Designing a graph promotes comprehension of the concept underlining fractions and decimals. Students who have frequent opportunities to design, draw and explain graphs will be able to access and communicate information visually. (5.1.7)

Key Connections to Other Content Areas:

- Health – Read and understand contents and ingredients labels
- Science
 - Read thermometers and other measuring tools to the nearest thousandth.
 - Graph experiment data using fractional and decimal quantities.
 - Design and read temperature graphs that describe increasing and decreasing tendencies.
- Social Sciences
 - Reproduce maps to a different scale.
 - Specify location on maps that have a superimposed grid.
- Language Arts
 - Write class book in which each student or groups of students prepares an illustrated page with a word problem involving fractions or decimals.
 - Write a process passage that gives instruction including how to go from one place in the classroom to another, using coordinates.

Key Connections to Real World:

- Recipes use fractions to express quantities in the English system; decimals, the metric system.
- The exchange of money usually requires the use of decimals to the hundredth place.
- Shopping with currency requires addition and subtraction of decimals to the hundredth place when using.

Vocabulary

circle graph	double bar graph	line graph
coordinates	fraction	numerator
decimals	graph	tenth
denominator	hundredth	thousands
First quadrant	positive integers (whole numbers)	

Language of Math:

- The importance of the *th* affix
- How to read a fraction
- How to read a decimal
- How to specify coordinates

Common Mistakes and Associated Misconceptions:

- To perform a calculation, students line up operations by number of digits instead of by decimal placement. Hence:

$$\begin{array}{r} 3.256 \\ + 123.4 \\ \hline \end{array}$$

may appear in students' work. To strengthen their number sense, students need repeated practice during which the task is to line up numbers in a list by decimal point.

- When adding fractions, students add denominators, whether like or unlike. The student who does this does not yet grasp the basic concept of fractions, and re-teaching is needed.
- Students continue to assume that a larger denominator means a larger portion. This misconception is more easily corrected if students can use realia, eg. candy bars, fruit, cookies, or plastic or paper fraction manipulatives followed by illustrations to understand the meaning of fractions.

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