K.5 The student will investigate fractions by representing and solving practical problems involving equal sharing with two sharers.

Understanding the Standard	Essential Knowledge and Skills
• Practical situations with fractions should involve real-life problems in which students themselves determine how to subdivide a whole into equal parts, testing those parts to be sure they are equal, and using those parts to re-create the whole. • Fractions can have different meanings: part-whole, division, measurement, ratio, and operator. The focus of this grade level is to develop the idea of equal sharing (division) and part-whole relationships. Fraction notation will be introduced in grade two. • Young children understand equal sharing problems intuitively because of their experiences sharing objects with siblings, friends, etc. Consider the following examples: – Two children sharing six sandwiches – Two children sharing one sandwich – Two children sharing four brownies For two children sharing one sandwich, a child might say that each will get half of the sandwich. For two children sharing four brownies, a child might say they each will get half of the brownies, while another child might say they will get one of the two pieces. • Teachers should use vocabulary such as halves. Students may name the parts as halves but may also use language such as "one piece out of the two pieces" to describe half. Students at this level should not be expected to use fraction vocabulary or notation. Informal, integrated experiences with fractions at this level will help students develop a foundation for deeper learning at later grades. Understanding the language of fractions furthers this development. • Students should be encouraged to create drawings or use concrete objects or other representations to solve problems. • Fraction models at this level should be able to be continuously divided (e.g., cookies, brownies). It is important to use models that can be continuously divided when there are remainders so those remainders can be cut into as many equal parts as needed. • In each fraction model, the fractional parts must be equal shares of a whole. • Equal parts may be different shapes but maintain the same value (e.g., a sandwich could be cut in two equal pieces vertically, horizontally, or diagonally to represent halves). • The fraction name *half* tells the number of equal parts in the whole.	**The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to** • Share a whole equally with two sharers, when given a practical situation. • Represent fair shares concretely or pictorially, when given a practical situation. • Describe shares as equal pieces or parts of the whole (e.g., halves), when given a practical situation.

1.4 The student will

a) represent and solve practical problems involving equal sharing with two or four sharers; and

b) represent and name fractions for halves and fourths, using models.

Understanding the Standard	Essential Knowledge and Skills
• Practical situations with fractions should involve real-life problems in which students themselves determine how to subdivide a whole into equal parts, test those parts to be sure they are equal, and use those parts to re-create the whole. • When working with fractions, the whole must be defined. • Fractions can have different meanings: part-whole, division, measurement, ratio, and operator. The focus of this grade level is to develop the idea of equal sharing (division) and part-whole relationships. Fraction notation will be introduced in grade two. • An equal sharing problem is an idea that young children understand intuitively because of their experiences sharing objects with siblings, friends, etc. Consider the following examples: – Two children sharing six sandwiches – Two children sharing one sandwich – Four children sharing one piece of paper – Four children sharing two brownies • Fraction models that can be continuously divided should be used at this grade (e.g., cookies, brownies). It is important to use models that can be continuously divided when there are remainders so those remainders can be cut into as many equal parts as needed. • Students should be encouraged to observe and state what happens as you add more sharers, noticing that when more sharers are added, the smaller the share will be for each person. • Equal parts may be different shapes but maintain the same value (e.g., a sandwich could be cut in two equal pieces vertically, horizontally, or diagonally to represent halves). • The words *denominator* and *numerator* are not required at this grade, but the concepts of part and whole are required for understanding of a fraction. • Students should use the vocabulary for halves and fourths, but should not be expected to use fraction notation at this level. Informal, integrated experiences with fractions at this level will help students develop a foundation for deeper learning at later grades. Understanding the language of fractions furthers this development.	**The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to** • Share a whole equally with two or four sharers, when given a practical situation. (a) • Represent fair shares pictorially, when given a practical situation. (a) • Describe shares as equal pieces or parts of the whole (e.g., halves, fourths), when given a practical situation. (a) • Represent halves and fourths of a whole, using a region/area model (e.g., pie pieces, pattern blocks, paper folding, and drawings). (b) • Name fractions represented by drawings or concrete materials for halves and fourths. (b)

1.4 The student will

a) represent and solve practical problems involving equal sharing with two or four sharers; and

b) represent and name fractions for halves and fourths, using models.

Understanding the Standard	Essential Knowledge and Skills
• Students should have opportunities to make connections and comparisons among fraction representations by connecting concrete or pictorial representations with spoken representations (e.g., "one-half," "one out of two equal parts, "or "one-half is more than one-fourth of the same whole").	

2.4 The student will

a) name and write fractions represented by a set, region, or length model for halves, fourths, eighths, thirds, and sixths;

b) represent fractional parts with models and with symbols; and

c) compare the unit fractions for halves, fourths, eighths, thirds, and sixths, with models.

Understanding the Standard	Essential Knowledge and Skills
• Students need opportunities to solve practical problems involving fractions in which students themselves are determining how to subdivide a whole into equal parts, test those parts to be sure they are equal, and use those parts to count the fractional parts and recreate the whole. • Counting unit fractional parts as they build the whole (e.g., one-fourth, two-fourths, three-fourths, and four-fourths), will support students understanding that four-fourths makes one whole and prepares them for the study of multiplying unit fractions (e.g., $4 \times \frac{1}{4}$ is $\frac{4}{4}$ or one whole) in later grades. • When working with fractions, the whole must be defined. • A fraction is a numerical way of representing part of a whole region (i.e., an area model), part of a group (i.e., a set model), or part of a length (i.e., a measurement model). • In a region/area model, the parts must have the same area. • In a set model, the set represents the whole and each item represents an equivalent part of the set. For example, in a set of six counters, one counter represents one-sixth of the set. In the set model, the set can be subdivided into subsets with the same number of items in each subset. For example, a set of six counters can be subdivided into two subsets of three counters each and each subset represents one-half of the whole set. • In the primary grades, students may benefit from experiences with sets that are comprised of congruent figures (e.g., 12 eggs in a carton) before working with sets that have noncongruent parts. • In a length model, each length represents an equal part of the whole. For example, given a strip of paper, students could fold the strip into four equal parts, each part representing one-fourth. Students will notice that there are four one-fourths in the entire length of the strip of paper that has been divided into fourths. • Students need opportunities to use models (region/area or length/measurement) to count fractional parts that go beyond one whole. For instance, if students are counting five pie pieces	**The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to** • Recognize fractions as representing equal-size parts of a whole. (a) • Name and write fractions represented by a set model showing halves, fourths, eighths, thirds, and sixths. (a, b) • Name and write fractions represented by a region/area model showing halves, fourths, eighths, thirds, and sixths. (a, b) • Name and write fractions represented by a length model showing halves, fourths, eighths, thirds, and sixths. (a, b) • Represent, with models and with symbols, fractional parts of a whole for halves, fourths, eighths, thirds, and sixths, using: – region/area models (e.g., pie pieces, pattern blocks, geoboards); – sets (e.g., chips, counters, cubes); and – length/measurement models (e.g., fraction strips or bars, rods, connecting cube trains). (b) • Compare unit fractions for halves, fourths, eighths, thirds, and sixths), using words (greater than, less than or equal to) and symbols (>, <, =), with models. (c) • Using same-size fraction pieces, from region/area models or length/measurement models, count the pieces (e.g., *one-fourth, two-fourths, three-fourths*, etc.) and compare those pieces to one whole (e.g., *four-fourths* will make one whole; *one-fourth* is less than a whole). (c)

2.4 The student will

a) name and write fractions represented by a set, region, or length model for halves, fourths, eighths, thirds, and sixths;
b) represent fractional parts with models and with symbols; and
c) compare the unit fractions for halves, fourths, eighths, thirds, and sixths, with models.

Understanding the Standard	Essential Knowledge and Skills
and building the pie as they count, where each piece is equivalent to one-fourth of a pie, they might say "one-fourth, two-fourths, three-fourths, four-fourths, five-fourths." As a result of building the whole while they are counting, they begin to realize that four-fourths make one whole and the fifth-fourth starts another whole. They will begin to generalize that when the numerator and the denominator are the same, they have one whole. They also will begin to see a fraction as the sum of unit fractions (e.g., three-fourths contains three one-fourths or four-fourths contains four one-fourths which is equal to one whole). This provides students with a visual for when one whole is reached and develops a greater understanding of numerator and denominator. • Students will learn to write names for fractions greater than one and for mixed numbers in grade three. • Creating models that have a fractional value greater than one whole and describing those models as having a whole and leftover equal-sized pieces are the foundation for understanding mixed numbers in grade three. • When given a fractional part of a whole and its value (e.g., one-third), students should explore how many one-thirds it will take to build one whole, to build two wholes, etc. If this ☐ is $\frac{1}{3}$, then this is the whole ☐☐☐. If this is the whole ☐☐☐, then this ☐ is $\frac{1}{3}$. • Students should have experiences dividing a whole into additional parts. As the whole is divided into more parts, students understand that each part becomes smaller (e.g., folding a paper in half one time, creates two halves; folding it in half again, creates four fourths, which is smaller; folding it in half again, creates eight eighths, which is even smaller). The same concept can be applied to thirds and sixths. • The value of a fraction is dependent on both the number of equivalent parts in a whole (denominator) and the number of those parts being considered (numerator). • Students should have opportunities to make connections among fraction representations by connecting concrete or pictorial representations with spoken or symbolic representations.	

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a) name and write fractions represented by a set, region, or length model for halves, fourths, eighths, thirds, and sixths;

b) represent fractional parts with models and with symbols; and

c) compare the unit fractions for halves, fourths, eighths, thirds, and sixths, with models.

Understanding the Standard	Essential Knowledge and Skills
• Informal, integrated experiences with fractions at this level will help students develop a foundation for deeper learning at later grades. Understanding the language of fractions will further this development (e.g., *thirds* means "three equal parts of a whole" or $\frac{1}{3}$ represents one of three equal-size parts when a pizza is shared among three students). • A unit fraction is when there is a one as the numerator. • Using models when comparing unit fractions builds a mental image of fractions and the understanding that as the number of pieces of a whole increases, the size of one single piece decreases (i.e., the larger the denominator the smaller the piece; therefore, $\frac{1}{3} > \frac{1}{4}$).	