

Resource Packet for: PIE Learning Pathway Neighborhood 5.NF.A.1-3

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Resource Packet for: PIE Learning Pathway Neighborhood 5.NF.A.1-3

Fraction Comparison (Neighborhood 5.NF.A.1-3)

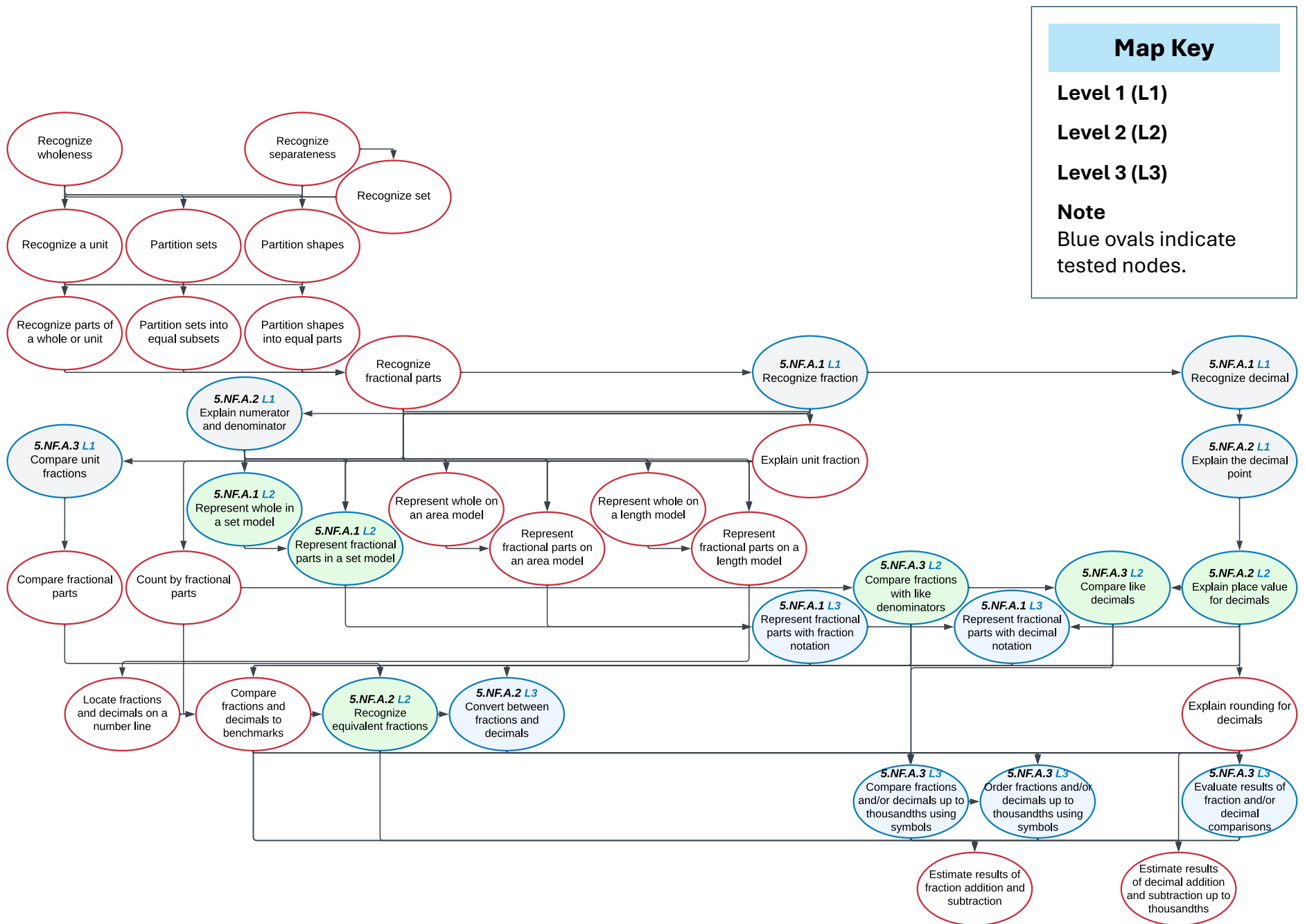
**Understand the relationship between fractions and decimals (denominators that are factors of 100).
(5.NF.A)**

- The standards grouped for the learning pathway neighborhood share a common key idea, fraction comparison, which covers three learning pathways:
 - » Understand that parts of a whole can be expressed as fractions and/or decimals. (5.NF.A.1)
 - » Convert decimals to fractions and fractions to decimals. (5.NF.A.2)
 - » Compare and order fractions and/or decimals to the thousandths place using the symbols $>$, $=$, or $<$, and justify the solution. (5.NF.A.3)

Insights From Research and Data From Missouri Students

This document is informed by research on student learning in mathematics and effective instructional strategies to promote student learning of concepts in this neighborhood. The [Helpful Hints](#) section uses findings from research on mathematics learning to provide instructional suggestions and strengths to build on. The Common Student Errors section is based on results from pilot studies with fifth-grade students in Missouri (in 2024 and 2025) who completed assessments for these standards. At least 25% of students made these errors when responding to multiple-choice items that assessed mastery of the corresponding knowledge or skill.

Learning Pathway: Neighborhood View

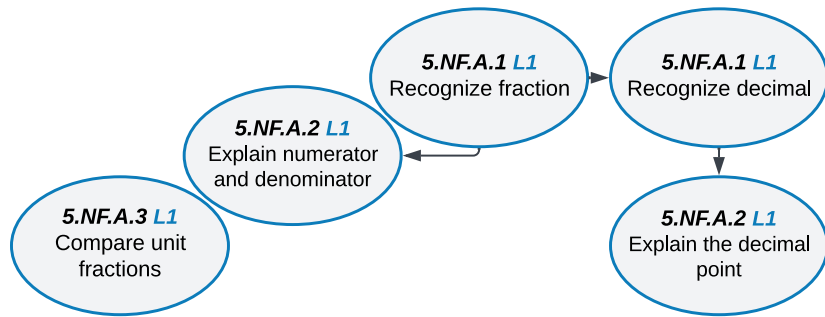


Learning Pathway: Level Clusters View

The neighborhood (on page 3) contains three level clusters. Level 1 Cluster integrates the Level 1 concepts and skills, Level 2 Cluster integrates the Level 2 concepts and skills, and Level 3 Cluster integrates the Level 3 concepts and skills from each of the learning pathways. Each level cluster is summarized below.

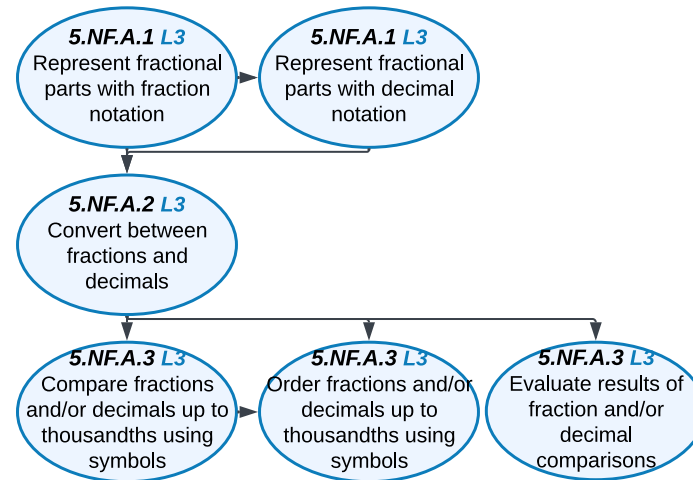
Level 1 Cluster

([more information on pg. 8](#))



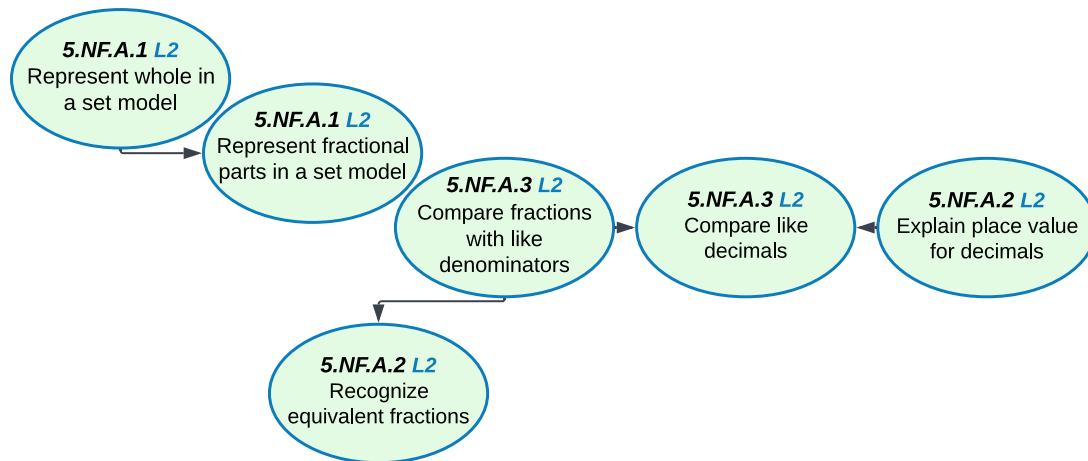
Level 3 Cluster

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Level 2 Cluster

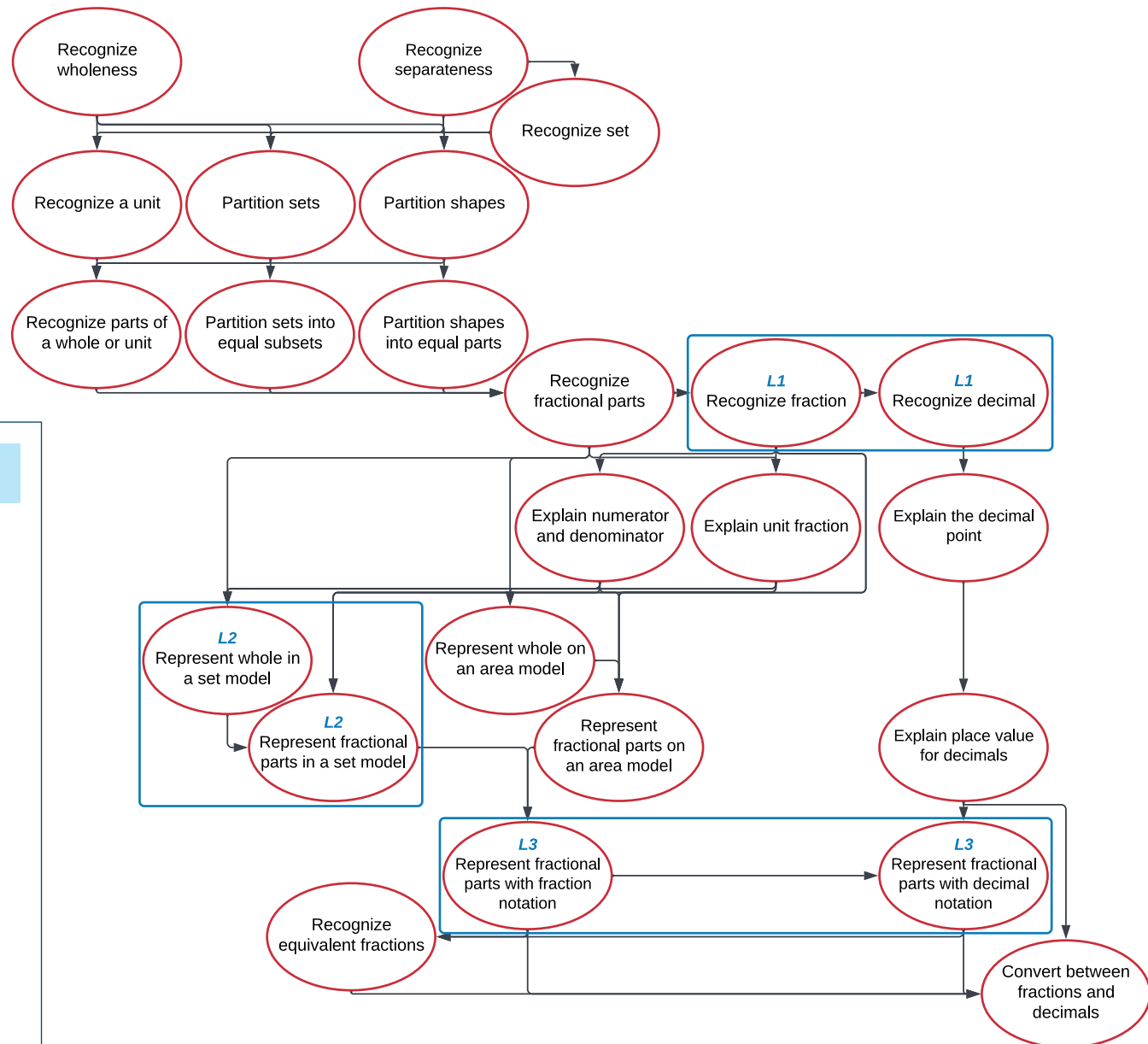
([more information on pg. 10](#))

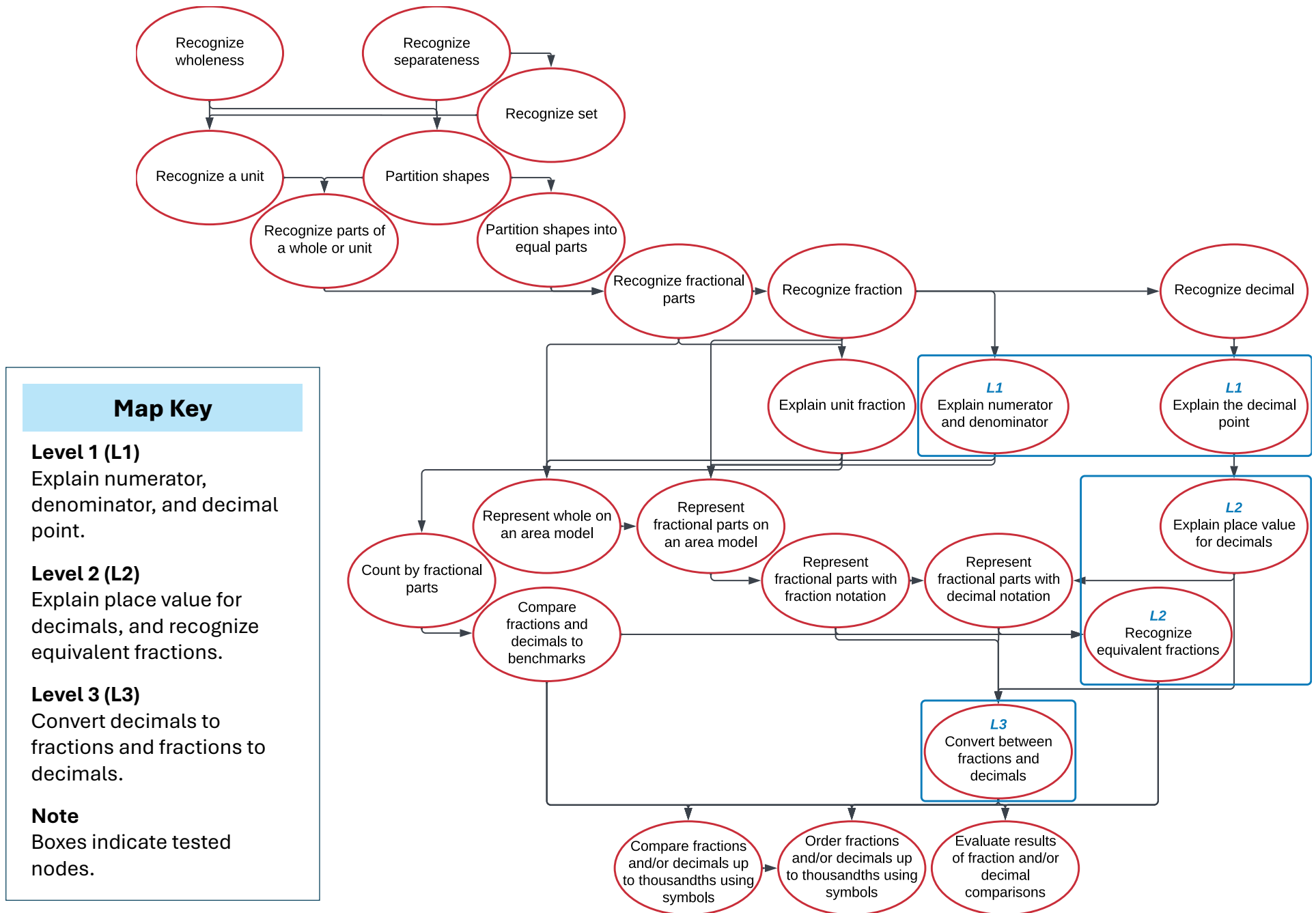


Dive Into the Content of the Standards

Learning Pathway for 5.NF.A.1

Understand that parts of a whole can be expressed as fractions and/or decimals.





Learning Pathway for 5.NF.A.3

Compare and order fractions and/or decimals to the thousandths place using the symbols $>$, $=$, or $<$, and justify the solution.

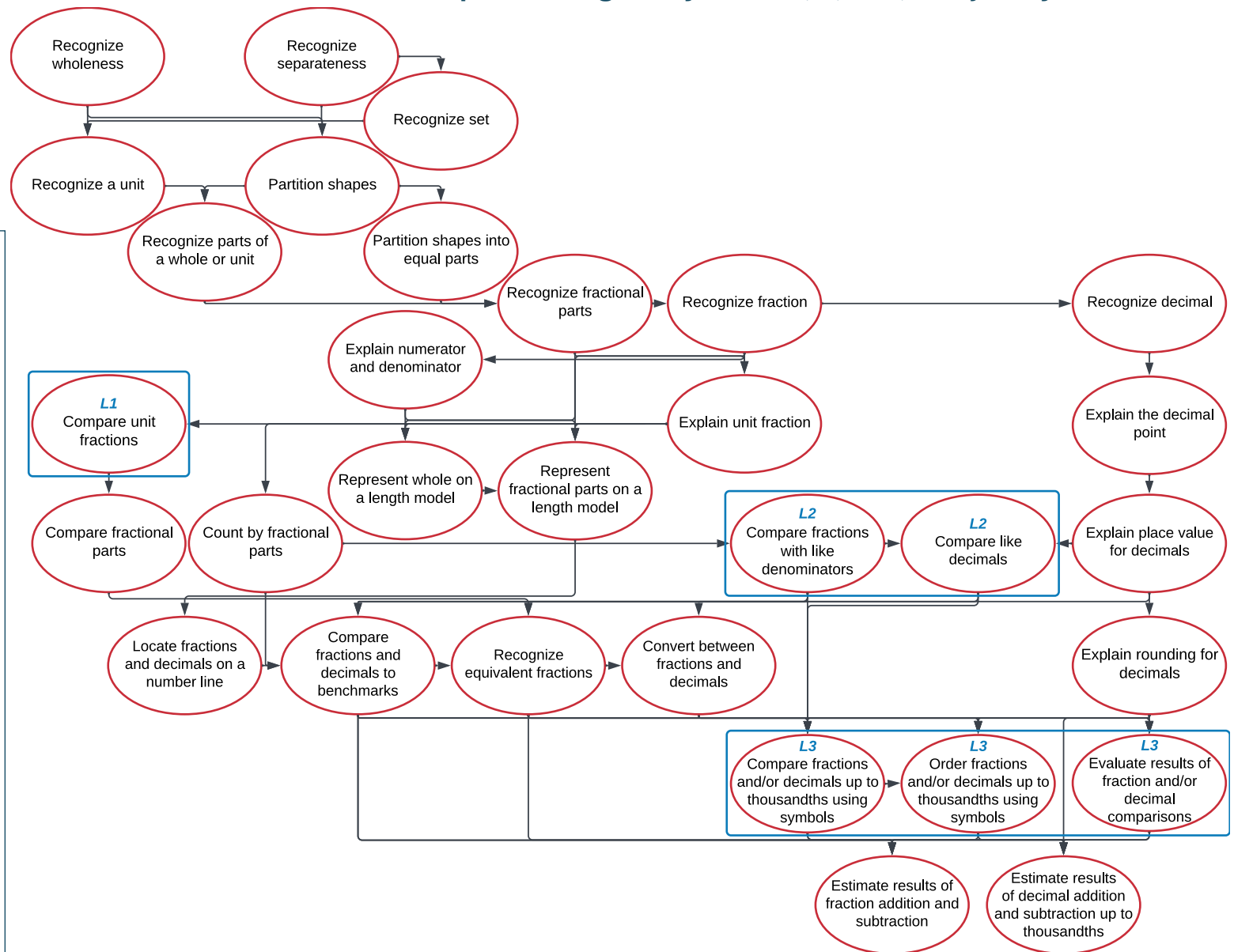
Map Key

Level 1 (L1)
Compare unit fractions.

Level 2 (L2)
Compare fractions with like denominators and like decimals.

Level 3 (L3)
Compare and order fractions and/or decimals up to the thousandths place using symbols ($<$, $>$, $=$) and justify the solution.

Note
Boxes indicate tested nodes.



Fraction Comparison: Helpful Hints

Level 1 Cluster

Fraction Notation

- Students should understand the components of a fraction and connect fraction notation to the quantities it represents.
- Students should be able to interpret the meaning of the numerator and denominator based on a number in fraction notation.

$\frac{5}{8}$ of a square is shaded.

numerator



There are 5 equal parts of the square shaded.

denominator



The whole square is cut into 8 equal-sized parts.

Strengths to Build On

- Students recognize the structure of fraction notation.
- Students use fraction language to describe quantities.
- Students make connections among fraction language, fraction models, and fraction notation.

Common Student Errors

- Students identified the denominator as the top number of a fraction.
- Student confused the numerator and denominator and described the denominator as the number of counted parts rather than the number of equal-sized parts in the whole. In the example “5/8 of a square is shaded,” students interpreted the denominator to mean that 5 equal parts of the square were shaded.

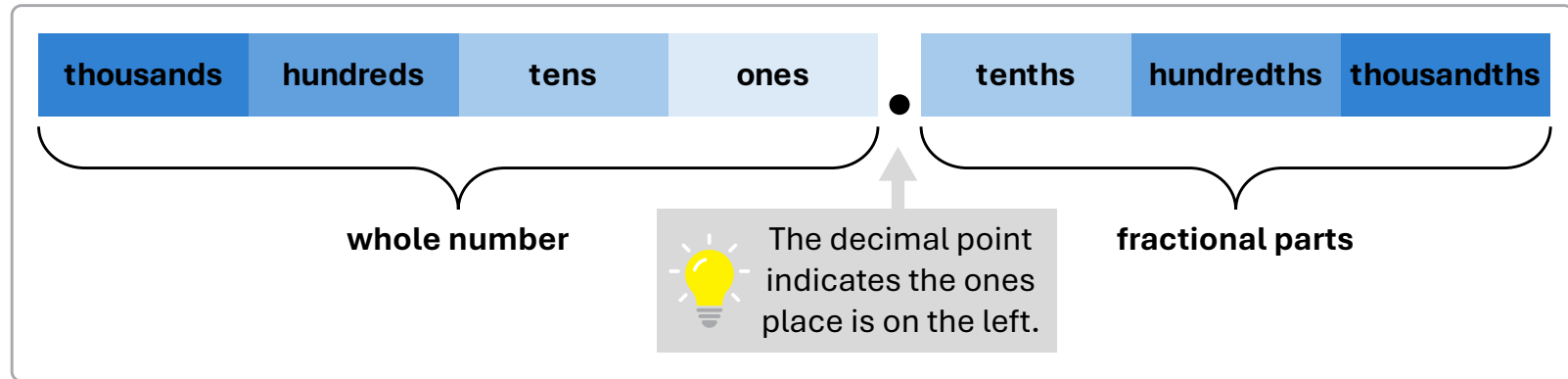
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Fraction Comparison: Helpful Hints

Level 1 Cluster

Decimal Notation

- Students should understand the purpose of the decimal point is to separate the whole number and the fractional parts. The decimal point also indicates the ones place is directly to the left.



Strengths to Build On

- Students recognize that decimal notation is structured by place value.
- Students understand that the value of a digit is based on its position in the number.
- Students understand the structure of whole-number place value and can extend their understanding to place value with decimals.

Common Student Errors

- Students misunderstood the purpose of the decimal point as separating values within a whole number rather than the whole number and fractional parts.
 - » For example, students interpreted the place values of the 4 and 7 in the number 34.79 as the hundreds and tens places using whole-number place value. They thought the decimal point separated the hundreds and tens places and did not consider the fractional parts.

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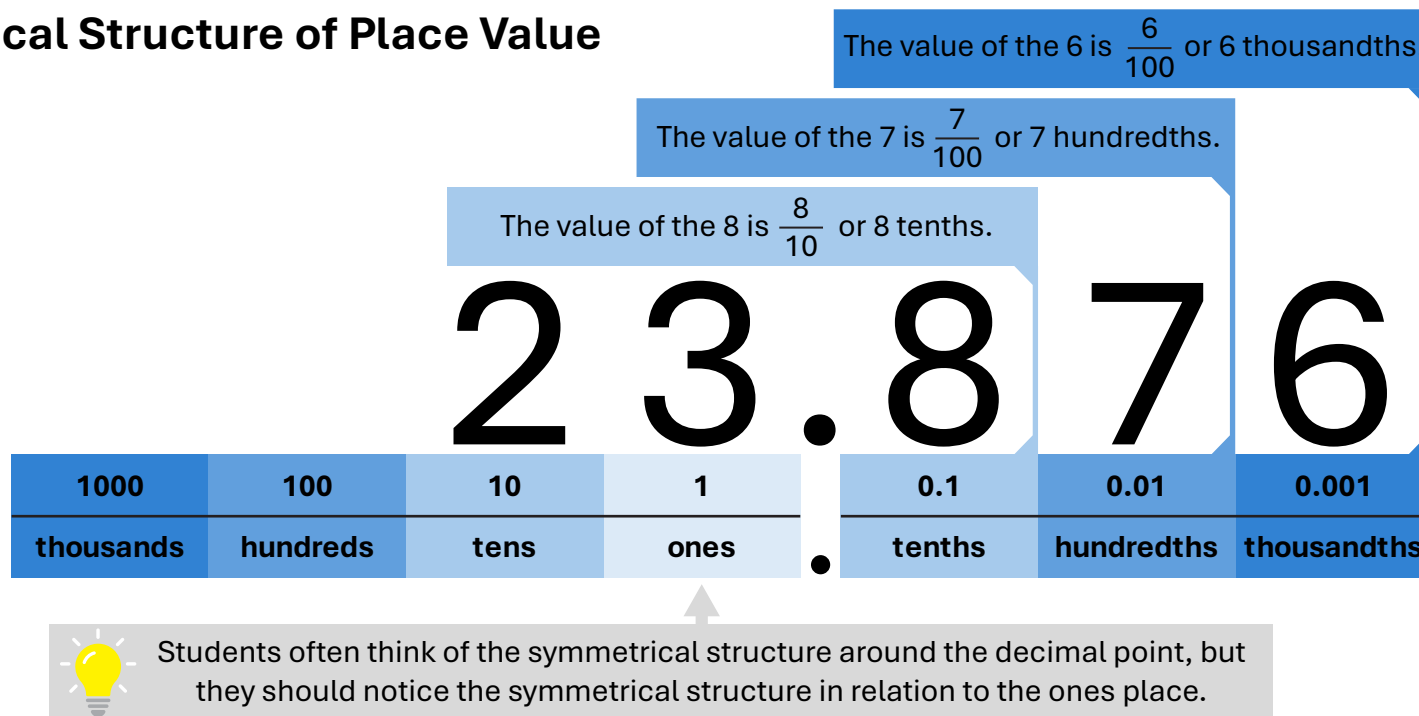
Fraction Comparison: Helpful Hints

Level 2 Cluster

Place Value for Decimals

- Students should understand the structure of decimal notation.
- Students should understand that the decimal point indicates the ones place is on the left.
- Students should be able to identify the value of a digit in a decimal based on place value.

Symmetrical Structure of Place Value



Strengths to Build On

- Students recognize the structure of decimal notation and that the decimal separates the whole number from the fractional parts.
- Students understand that the value of a digit depends on its position in the number.
- Students can apply their understanding of expanded form with whole numbers to interpret the value of digits in decimals.

Common Student Errors

- Students used whole-number, place-value reasoning when describing the value of a decimal number.
- For example:
 - » In the number 23.876, students identified the value of the 6 as 6 ones.
 - » In the number 23.876, students identified the value of the 8 as $\frac{8}{100}$.

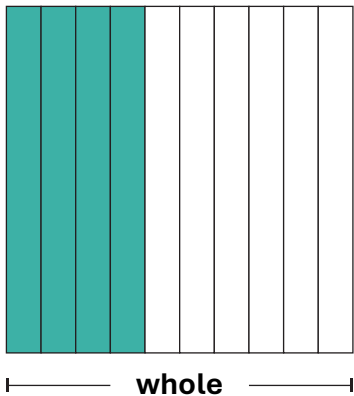
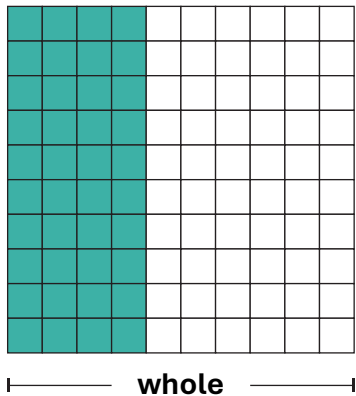
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Fraction Comparison: Helpful Hints

Level 3 Cluster

Represent Fractional Parts with Fraction and Decimal Notation

- Students should recognize the whole as the unit (i.e., the unit is 1).
- Students should recognize the number of parts in the whole or the size of the parts (e.g., hundredths).
- Students should connect the verbal expression of the quantity to the written fraction and decimal notation.



Verbal Expression	Fraction Notation	Decimal Notation
forty hundredths	$\frac{40}{100}$	0.40
four tenths	$\frac{4}{10}$	0.4

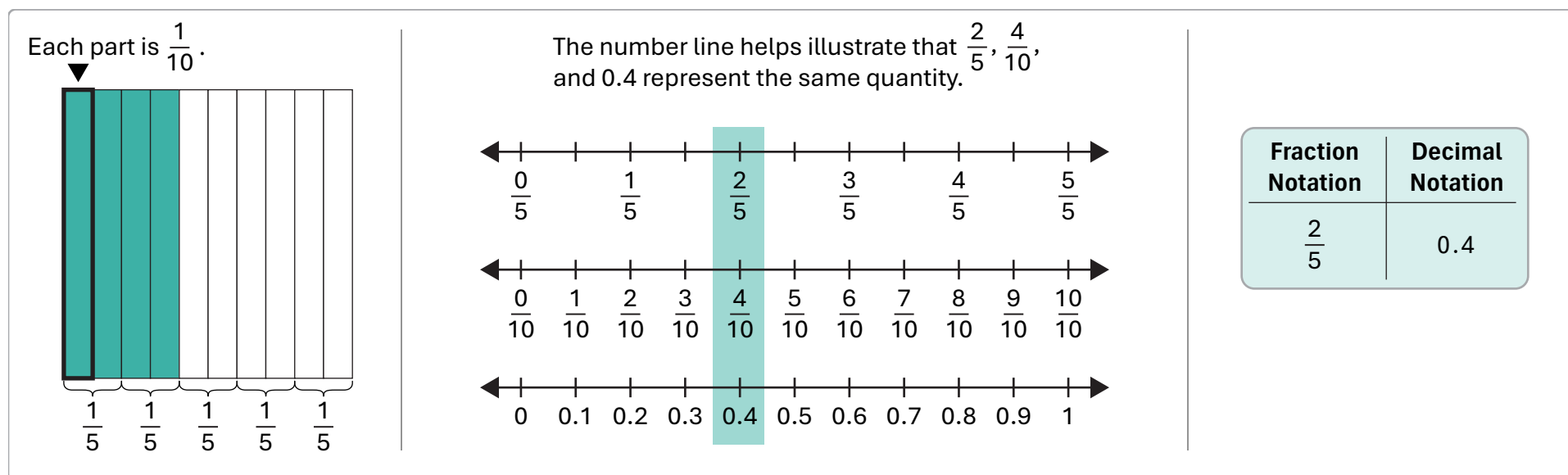
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Fraction Comparison: Helpful Hints

Level 3 Cluster

Converting Fractions to Decimals

- Students should understand the structure of fraction notation and decimal notation.
- Using multiple representations can support understanding of fractions and decimals as equivalent representations of the same quantity.



Strengths to Build On

- Students recognize the structure of fraction and decimal notation.
- Students recognize that fractions and decimals can represent the same quantity.
- Students use multiple representations for fractions and decimals (e.g., 10×10 grids, number lines, written notation).
- Students make connections among fraction language, fraction models, and fraction notation and extend their understanding of fractions to decimals.

Common Student Errors

- Students subtracted the numerator from the denominator. For example, $\frac{2}{5}$ was written as 0.3.
- Students divided the denominator by the numerator. For example, $\frac{4}{10}$ was written as 2.5.
- Students used the numerator of the fraction as the decimal value without attending to the denominator of the fraction. For example, $\frac{4}{25}$ was written as 0.4.

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Fraction Comparison: Helpful Hints

Level 3 Cluster

Converting Fractions to Decimals

- Students should be able to compare fractions and/or decimals and be able to use symbols to show the comparison.
- Students should be able to justify the comparison using various strategies from previous levels (e.g., fraction models, number lines, benchmark numbers).

Strengths to Build On

- Students can identify and create equivalent fractions.
- Students can use multiple representations for fractions and decimals (e.g., 10×10 grids number lines, written notation).
- Students can compare fractions and decimals using benchmark numbers ($0, \frac{1}{2}, 1$).

Common Student Errors

- Students compared fractions using only the numerators. For example, $\frac{4}{100} > \frac{2}{10}$ because $4 > 2$.
- Students identified a common denominator. However, when explaining the comparison between fractions, students used the numerator and denominator of one fraction to explain the comparison. For example, students identified that $\frac{4}{100} < \frac{5}{10}$ because $\frac{5}{10} = \frac{50}{100}$ and $4 < 100$.

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