Fractions: The Solution to Understanding

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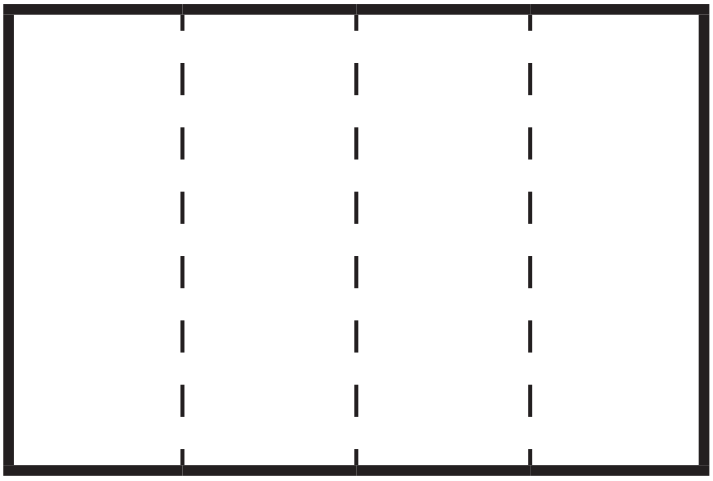
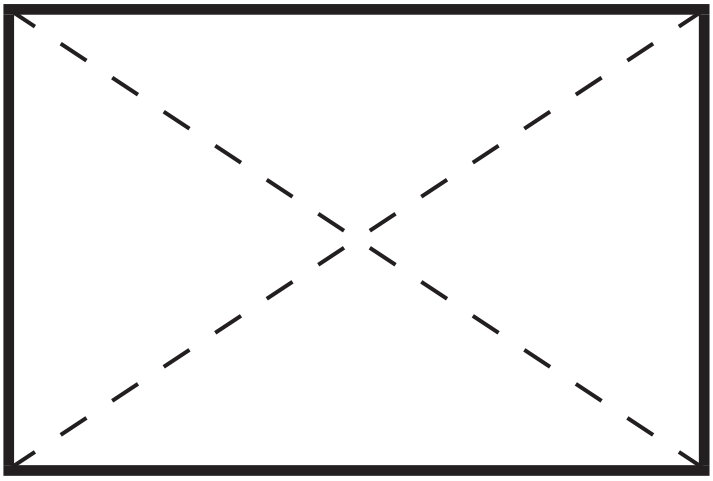
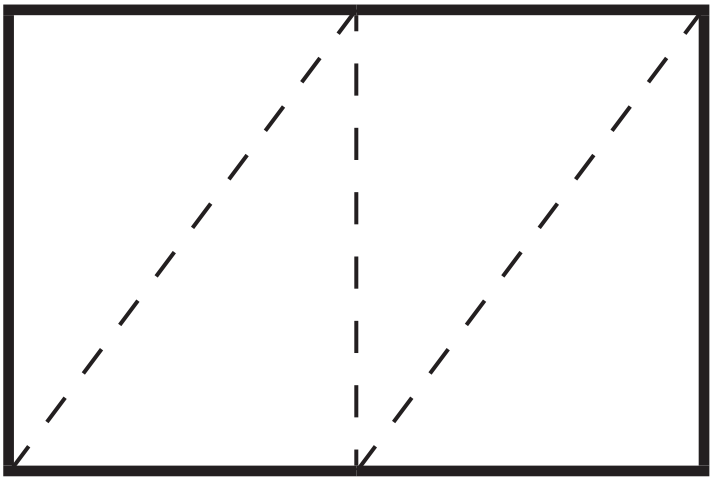
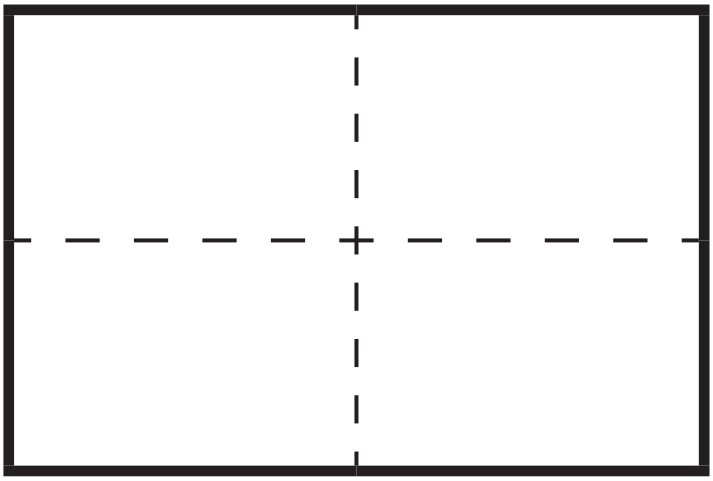
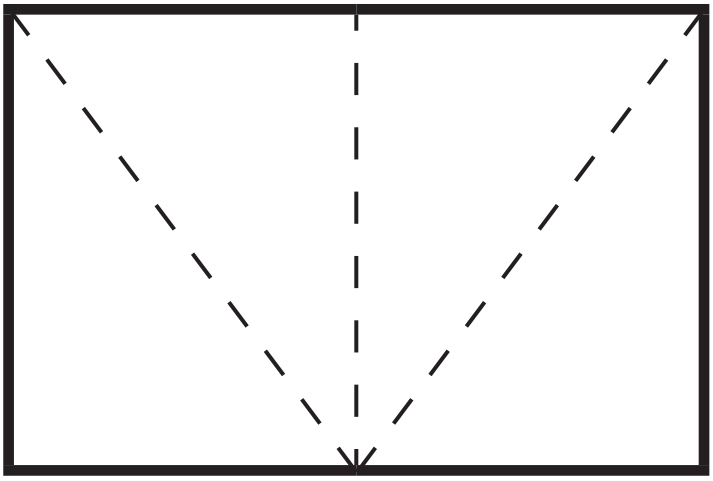
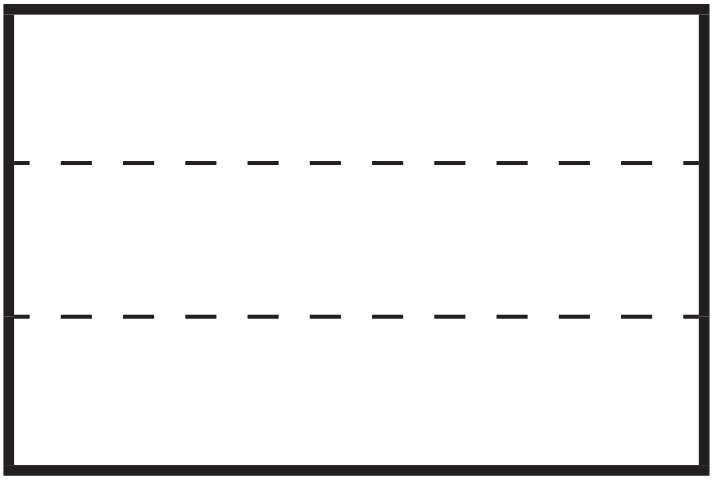












Texas Essential Knowledge and Skills Grades 1-5 Fraction Progression

	Representation & Interpretation	Equivalence & Comparison
Grade 1	**1.6.G** Partition two-dimensional figures into two and four fair shares or equal parts and describe the parts using words. **1.6.H** Identify examples and non-examples of halves and fourths.	**1.6.H** Identify examples and non-examples of halves and fourths.
Grade 2	**2.3.A** Partition objects into equal parts and name the parts, including halves, fourths, and eighths, using words. **2.3.C** Use concrete models to count fractional parts beyond one whole using words and recognize how many parts it takes to equal one whole. **2.3.D** Identify examples and non-examples of halves, fourths, and eighths.	**2.3.A** Partition objects into equal parts and name the parts, including halves, fourths, and eighths, using words. **2.3.B** Explain that the more fractional parts used to make a whole, the smaller the part; and the fewer the fractional parts, the larger the part. **2.3.C** Use concrete models to count fractional parts beyond one whole using words and recognize how many parts it takes to equal one whole. **2.3.D** Identify examples and non-examples of halves, fourths, and eighths.
Grade 3	**3.3.B** Determine the corresponding fraction greater than zero and less than or equal to one with denominators of 2, 3, 4, 6, and 8 given a specified point on a number line. **3.3.C** Explain that the unit fraction 1/b represents the quantity formed by one part of a whole that has been partitioned into b equal parts where b is a non-zero whole number. **3.3.D** Compose and decompose a fraction a/b with a numerator greater than zero and less than or equal to b as a sum of parts 1/b. **3.3.E** Solve problems involving partitioning an object or a set of objects among two or more recipients using pictorial representations of fractions with denominators of 2, 3, 4, 6, and 8. **3.7.A** Represent fractions of halves, fourths, and eighths as distances from zero on a number line.	**3.3.F** Represent equivalent fractions with denominators of 2, 3, 4, 6, and 8 using a variety of objects and pictorial models, including number lines. **3.3.G** Explain that two fractions are equivalent if and only if they are both represented by the same point on the number line or represent the same portion of a same size whole for an area model. **3.3.H** Compare two fractions having the same numerator or denominator in problems by reasoning about their sizes and justifying the conclusion using symbols, words, objects, and pictorial models.

Texas Essential Knowledge and Skills Grades 1-5 Fraction Progression

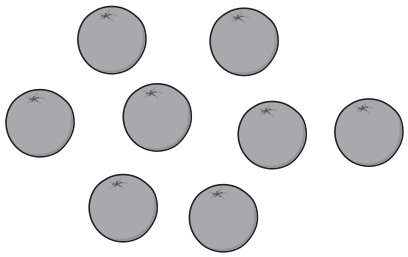
	Representation & Interpretation	Equivalence & Comparison
Grade 4	**4.3.A** Represent a fraction a/b as a sum of fractions 1/b, where a and b are whole numbers and b > 0, including when a > b. **4.3.B** Decompose a fraction in more than one way into a sum of fractions with the same denominator using concrete and pictorial models and recording results with symbolic representations. **4.3.G** Represent fractions and decimals to the tenths or hundredths as distances from zero on a number line.	**4.3.C** Determine if two given fractions are equivalent using a variety of methods. **4.3.D** Compare two fractions with different numerators and different denominators and represent the comparison using the symbols >, =, or <. **4.3.F** Evaluate the reasonableness of sums and differences of fractions using benchmark fractions 0, 1/4, 1/2, 3/4, and 1, referring to the same whole.
Grade 5	**5.2.A** Represent the value of the digit in decimals through the thousandths using expanded notation and numerals.	**5.2.B** Compare and order two decimals to thousandths and represent comparisons using the symbols >, <, or =. **5.2.C** Round decimals to tenths or hundredths.

Show $\frac{1}{4}$ in each of these models.

For each model, consider the following questions:

- What is the whole?
- What does equal-sized mean?
- What does the fraction indicate?
- What attribute is the focus?

Set Model:



Area Model:

Length Model:

Number Line Model:

Representing Fractions

Teachers and students need to consider the following:

- The type of quantity (continuous or discrete?) that the model is intended to represent.
- How the whole is defined.
- What equal-sized means in the model.
- What the fraction indicates.

Representing Fractions
Set Model

The number – a discrete (countable) quantity

The whole is determined by a defined **count** of a collection or set.

The **same number** of items represents equal-sized parts.

The fraction indicates the count of objects in the subset compared to the defined set of objects.

Representing Fractions
Area Model

The area – a continuous (measureable) quantity

The whole is determined by the defined **area** or region.

The **same area** represents equal-sized parts.

The fraction indicates the area of the part compared to the area of the whole.

Representing Fractions
Length Model

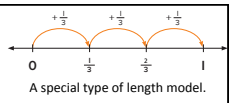
The length – a continuous (measureable) quantity

The whole is determined by a defined **length**.

The **same length** represents equal-sized parts.

The fraction indicates the length of the part compared to the length of the whole.

Representing Fractions
Number Line Model



A special type of length model.

The distance – a continuous (measureable) quantity

The whole is determined by a unit of **distance** from 0 to 1.

The **same distance** represents equal-sized parts.

The fraction indicates the location of a point in relation to the distance from 0 with regard to the defined unit.

Representing Fractions

Type of Model	Type of Quantity	Whole	Meaning of Equal-Sized Parts	What the Fraction Indicates
Set model	discrete	determined by a defined count of a collection or set	same number of items	the count of objects in the subset compared to the defined set of objects
Area model	continuous	determined by a defined area or region	same area	the area of the indicated part compared to the area of the indicated whole
Length model	continuous	determined by a defined length	same length	the length of the indicated part compared to the length of the indicated whole
Number line model	continuous	unit of distance from 0 to 1	same distance	the location of a point in relation to the distance from 0 with regard to the defined unit

2

Eight circles is $\frac{8}{6}$. What does the whole look like?

Show your thinking.

Reasoning with Fractions

Purple Tank

1

Each shape is one whole.

Which shape does **not** represent three-fourths?

a. 

b. 

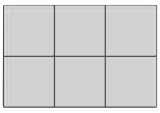
c. 

Reasoning with Fractions

Purple Tank

3

Six blocks is $\frac{3}{4}$. What does one-fourth look like?



Show your thinking.

Reasoning with Fractions

Purple Tank

12

Four friends share three sandwiches. Each friend gets the same amount.

e. Draw a picture to show what each share will look like.

f. What fraction of a sandwich is in each friend's share.

Reasoning with Fractions and Decimals

Red Tank

3

Eight tiles is $\frac{8}{6}$. What does the whole look like?

Show your thinking.

Reasoning with Fractions and Decimals

Green Tank

8

Which picture does not belong?

$\frac{3}{5}$

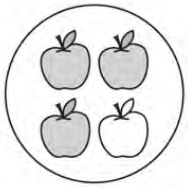
Show or explain your thinking.

Reasoning with Fractions

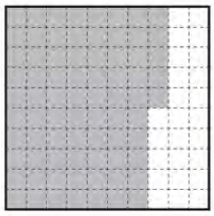
Purple Tank

11

Which representation does not belong?



$\frac{3}{4}$



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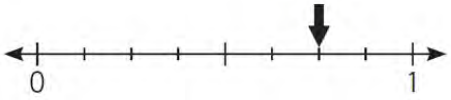


Show or explain your thinking.

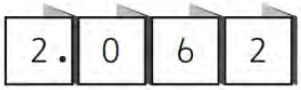
Reasoning with Fractions and Decimals

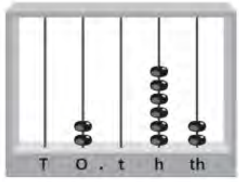
Cranium Crackers

Green Tank

3

Which representation does not belong?





206 hundredths + 2 thousandths

$2\frac{62}{1000}$

Show or explain your thinking.

Reasoning with Fractions and Decimals

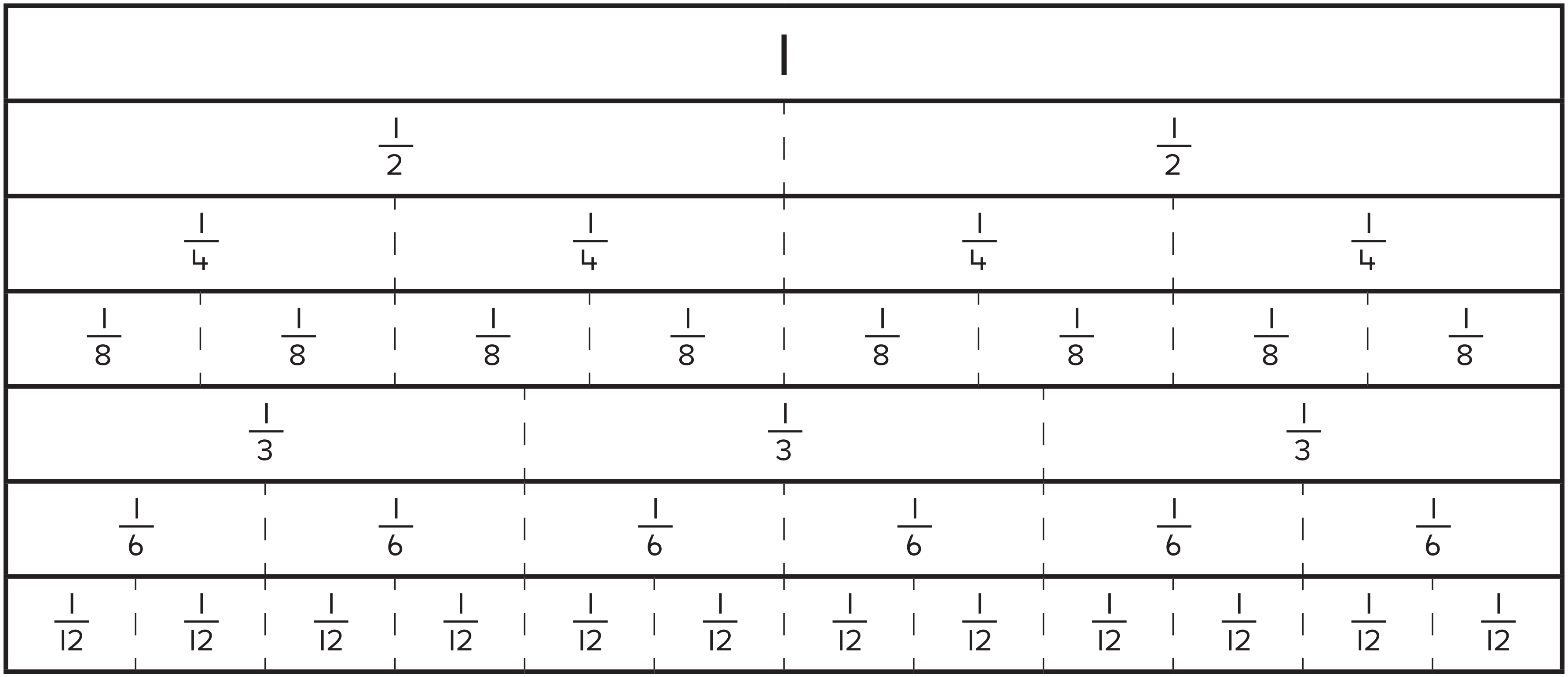
Fast Figurers

Red Tank

4 Comparing Fractions

Reasoning with Unit Fractions	Using Common Denominators	Using Common Numerators	Using Benchmarks
$\frac{1}{3}$ or $\frac{1}{5}$	$\frac{10}{12}$ or $\frac{4}{6}$	$\frac{12}{18}$ or $\frac{4}{7}$	$\frac{2}{3}$ or $\frac{4}{5}$
$\frac{4}{3}$ or $\frac{7}{6}$	$\frac{16}{12}$ or $\frac{5}{3}$	$\frac{2}{6}$ or $\frac{6}{15}$	$\frac{6}{5}$ or $\frac{5}{6}$
$\frac{4}{5}$ or $\frac{7}{8}$	$\frac{12}{10}$ or $\frac{26}{20}$	$\frac{5}{12}$ or $\frac{10}{16}$	$\frac{3}{7}$ or $\frac{5}{8}$
$\frac{5}{6}$ or $\frac{3}{4}$	$\frac{7}{4}$ or $\frac{8}{6}$	$\frac{3}{5}$ or $\frac{6}{7}$	$\frac{7}{8}$ or $\frac{4}{3}$

Fraction Fill-up



Two or more players

Each player needs a fraction wall. The group needs one cube.

Write these fractions on the cube $\frac{1}{2}$ $\frac{1}{3}$ $\frac{1}{4}$ $\frac{1}{6}$ $\frac{1}{8}$ $\frac{1}{12}$

Take turns to roll the cube. Shade that fraction on a single strip if space allows. It can be the fraction shown on the cube or an equivalent fraction.

The winner is the first person to exactly fill 2 strips (other than the strips that shows one whole.).