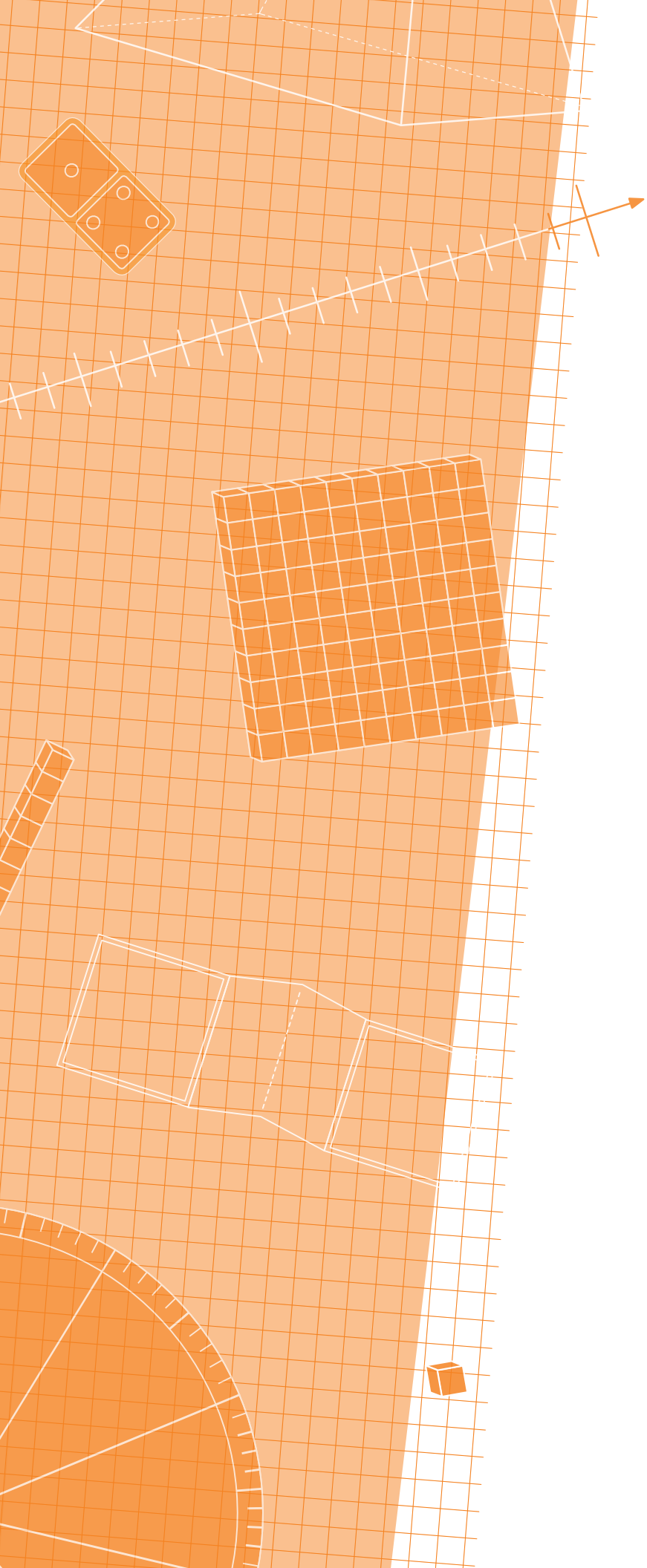

Fractions: Choosing the Best Model to Develop a Concept

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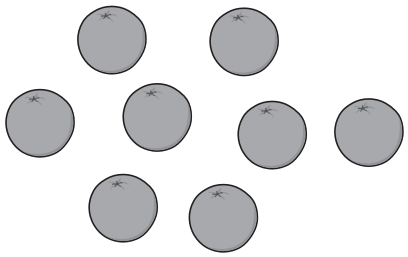
Show $\frac{1}{4}$ in each of these models.

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

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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.

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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.

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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.

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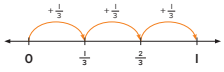
Representing Fractions – Number Line Model



A special type of length model.

The length – 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.

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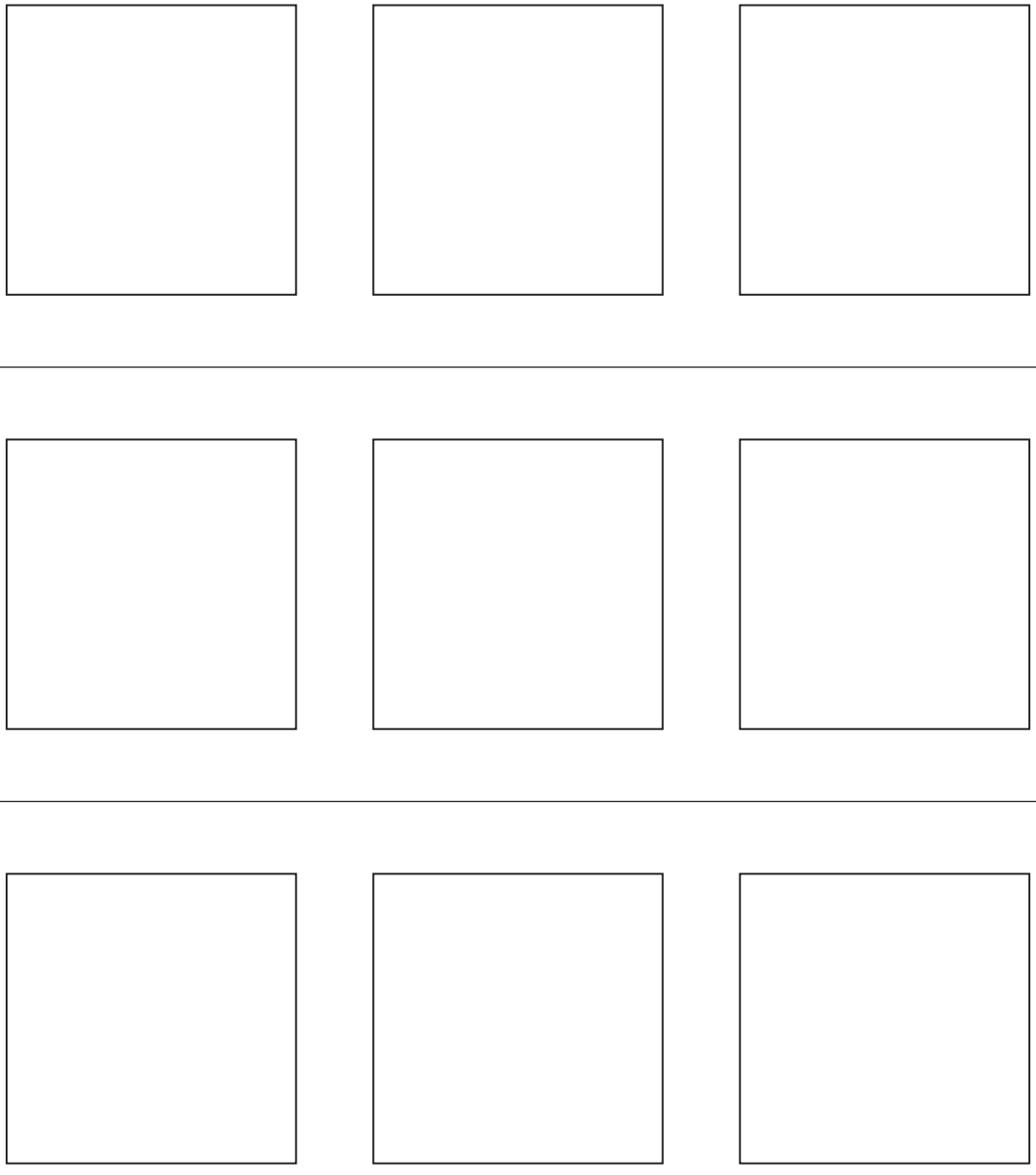
Representing Fractions

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

Suppose that four people are going to share 3 square pizzas. If the pizzas are shared equally, how much pizza does each person get?



Each share is $\frac{\square}{\square}$ of one pizza.

Step Up

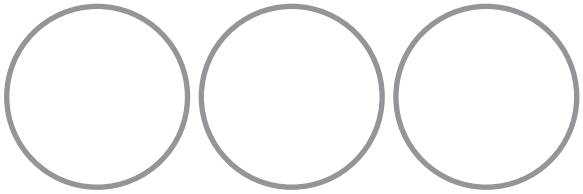
1. Complete these to show how you would solve each problem.
Draw lines and color parts to show each share.

a. Two slices of banana bread are shared equally by 3 people.
How much of one whole slice will be in each share?

____ slices shared by ____ people

$2 \div \square = \square$

b. Three pies are shared equally by 8 people. How much of one whole pie will be in each share?



____ pies shared by ____ people

$\square \div \square = \square$

2. Each large rectangle below is one whole. Complete the sentence, draw lines, and color parts to show each share.

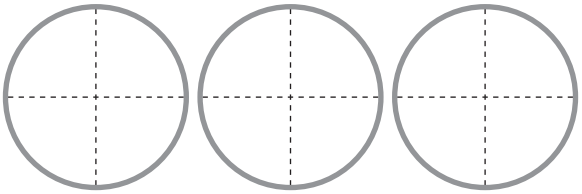
a. $\frac{3}{5}$ is the same as ____ divided by ____

b. $\frac{4}{7}$ is the same as ____ divided by ____

Step Ahead

Complete the sentences so that the quotient in the division sentence is the same as the product in the multiplication sentence. Then use the diagram to show why they are the same.

$3 \div 4 = \square$ $3 \times \square = \square$



Interpreting Fractions

Fractions as…	Numerator	Denominator	Meaning of 3/4
Part of a Whole	number of equal-sized parts indicated	number of equal-sized parts in the whole	3 parts out of 4 equal-sized parts
Numbers or Measures	number or count of equal-sized parts (unit fractions)	number of equal-sized parts (unit fractions) needed to create the whole	• 3 counts (repetitions) of the unit fraction 1/4 • 1/4 + 1/4 + 1/4
Quotients	number of items in the whole	number of shares or equal-sized parts	• 3 ÷ 4 • the result when divided or shared

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 $\frac{4}{3}$

1.5	$2\frac{1}{5}$	$\frac{2}{1}$	$\frac{3}{8}$
$\frac{167}{100}$	$\frac{4}{4}$	1.16	0.7
$\frac{67}{100}$	$\frac{0}{10}$	2.6	$.3$
$1\frac{2}{3}$	2.0	$\frac{9}{4}$	1.05
	3	$\frac{1}{2}$	

unit fractions

common fractions

proper fractions

improper fractions

mixed numbers

decimal fractions

0	1	2	3