Ratios and Rates

Ratio

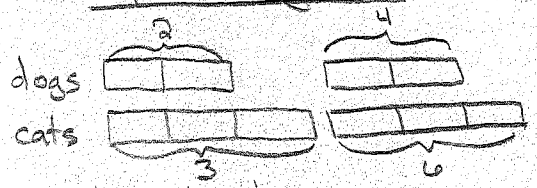
→ a relationship between two quantities, usually expressed as a fraction

Looks Like

words	symbols	fraction bar
dogs to cats	2:3	$\frac{2}{3}$ read as 2 to 3
2 to 3	↑ colon	

Models

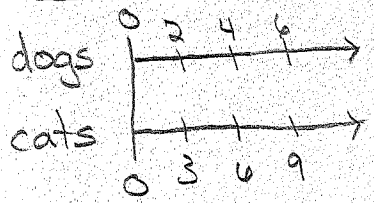
Tape Diagram



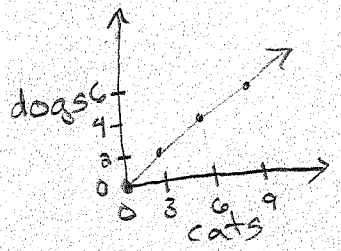
Ratio T-Chart

dogs	cats
2	3
4	6
6	9

Double Number Line



Coordinate Plane



Rates

→ a ratio using two different units of measure

UNITS

Looks Like

35 mph (35 miles per hour)

$2.99/lb ($2.99 per pound)

21 mpg (21 miles per gallon)

35 miles / 1 hour

$2.99 / 1 pound

21 miles / 1 hour

→ when quantity is one it is a UNIT RATE

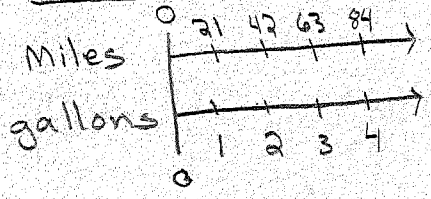
Important to use to compare

Models

Rate Table

miles	35	70	105
hours	1	2	3

Double Number Line



Use Ratio Models

Rate T-Chart

Cost	Pound
$2.99	1
$5.98	2

Walmart	
3 cans	6 cans
$2.25	$4.96
÷3	÷3
unit rate	

Which is a better buy? 3 cans or 6 cans?

Inquiry
Ratios & Rates

STANDARDS and Mathematical Practices

We will understand the context of a problem in order to translate them into ratios and rates.

We will construct and critique arguements regarding accurate representations of ratios and rates.

We will choose appropriate models for a given situation, including tables, expressions, equations, tape diagrams, number lines, etc.

AIM4S³ ™ 6th Grade

UNIT PLANNING TOOL

Unit 2 : Comparing Bits & Pieces

CCSSM:

6.RP.A.1: Understand the concept of a ratio & use ratio language to describe a ratio relationship b/w 2 quantities

6.RP.A.2: Understand the concept of a unit rate

6.RP.A.3: Use rate / ratio reasoning to solve real world & math problems

Math Practices being emphasized:

1. make sense & persevere; students understand the problem's context in order to translate them into ratios/rates.
3. construct arguements: Students construct and critique arguements regarding appropriateness given ratio & rate contexts,
5. tools; Students choose appropriate models for a given situation, including tables, expressions/equations, tape diagrams, number lines, etc.

Essential Questions

- What kind of problems can I solve by using ratios?
- What is the difference between a multiplicative and an additive relationship?
- How are unit rates helpful in solving real-world problems?
- What information do I get when I compare two numbers using a ratio?

Pre and Post Assessments

Pre: Metacognition Boxes
- rate
- ratio
- equivalent fractions
- unit

Post: CMP3 assessments

Performance Assessments

Key Concepts

Ratio - a # that relates 2 quantities or measures w/in a given situation in a multiplicative relationship

Ratios can express comparisons of a part of a whole

A ratio can be a rate.

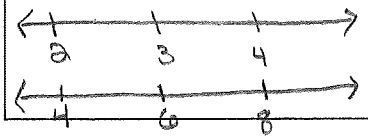
Rate - a comparison of the measures of two different things or quantities; the measuring unit is different for each value.

Visual Models of Concepts

10 x 10 grid

Bar Models

Double Number Lines



Tape Diagrams

Rate Tables

# of ☐	10	5	1
cost	$12	$7	$1.20

Algorithms/Diagrams

$\frac{9}{8} = \frac{180}{x}$

$\frac{9 \times 20}{8 \times 20} = \frac{180}{160}$

$x = 160$

5 lbs cost $4.99
Cost per lb?

$\frac{4.99}{5} = 99.8¢/lb$

unit rates

$\frac{4.6 km}{2 h} = 2.3 km$

$\frac{x}{2} = \frac{4}{6}$

$3(4) = 6x$

$12 = 6x$

$2 = x$

Connections (Real World Applications)

- recipes
- sculptures
- video games
- artists
- architects
- doctors
- engineers
- sales $ - taxes, commission
- cost
- mechanics
- Harry Potter
- surveyors
- statistician

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Language Functions/Structures

Predicting

I predict ____ because ____.

Explain

We use two ratios in proportion problems to find ____

Compare & Contrast

The ratio ____ is equivalent to the ratio ____ because ____

A ratio is different than a rate because ____.

Vocabulary

rate
ratio
rate table
equivalent fractions
tape diagram
proportion
scale
scaling
units
percent
rational number
proportional reasoning
cross products
variables
quantity
unit cost

Focus and Motivation

Video (animation)

Study Jams - Ratio
Rate

Math Snacks - Ratio

Brainpop - Ratio

Activity

Basketpaper Throw

Literature

Fourscore and 7: Investigating Math in American History by Betsy Fran

Only One by Marc Harshman

Fraction Action by Loreen Leedy

Math Curse by Jon Scieszka & Lane Smith

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