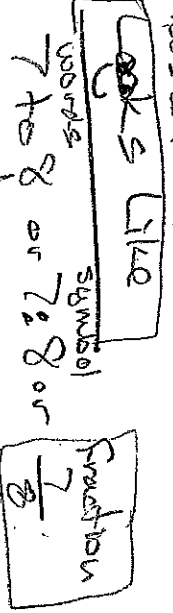


# Ratio

→ a relationship between two quantities usually expressed as a fraction



dogs cats  
 must have  $\frac{3}{2}$  must keep the one in the denominator on the relationships to last

## Application

\* can be simplified  
 $\frac{12}{3} = 4 \leftarrow 4$  cups flour  
 $\frac{1}{3} = 1 \leftarrow 1$  cup sugar

\* can be expanded  
 $\frac{3}{2} \times \frac{2}{2} = \frac{4}{4}$  part water

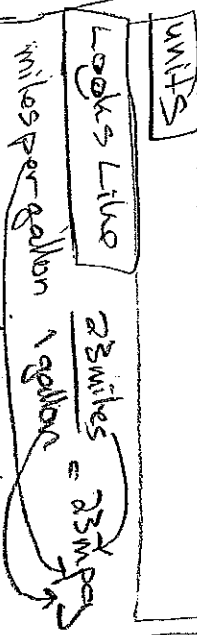
## Standards

- We will solve problems using scale factors, ratios, and proportions,
- We will compute unit rates associated with ratios of fractions,
- We will use proportional relationships to solve multistep ratio problems.

# Ratios, Rates, and Proportions

## Rates

→ a ratio using two different units of measure



## Rate Table

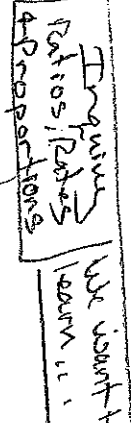
# of oranges	10	5	1	20
cost	\$3	\$1	\$0.20	\$4

## Application

A track racer stride can travel 4.1 km in 2 hr. What is its rate, or speed in kilometers per hour?

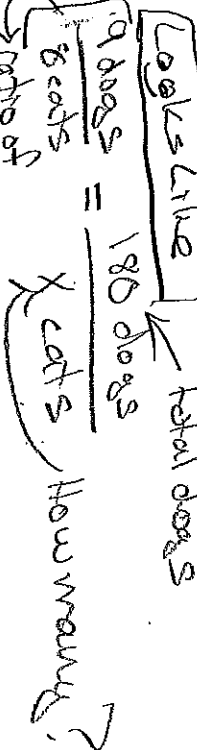
$\frac{4.1 \text{ km}}{2 \text{ hr}} = 2.05 \text{ km/hr}$

We know:



## 1000 miles

→ when two ratios can be said to be equal \* used to find an unknown (algebra)



Scale

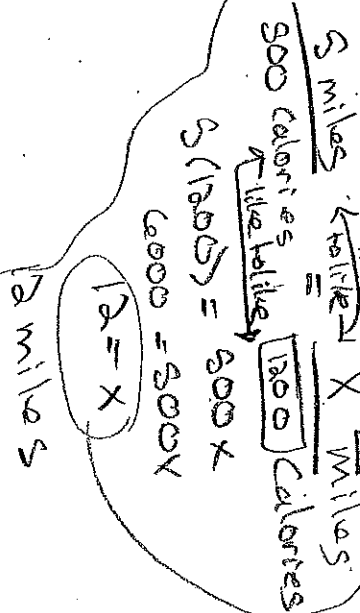
$\frac{9 \times 20 = 180}{8 \times 20 = 160}$

3 cross products

$\frac{9}{8} = \frac{180}{X} \rightarrow 9X = 180(8)$   
 $\frac{9}{8} = \frac{1440}{9} \rightarrow \frac{9X}{9} = \frac{1440}{9}$

## Application

Jogging 5 miles burns about 600 calories. How many miles will you have to run to burn 1,200 calories and a soda?



NMSS:   
 - solve problems involving scale factors, ratios, & proportions   
 • use measures expressed as rates   
 • choose appropriate units of measure and ratios to solve problems

**Unit CMI:** Comparing & Scaling **UNIT PLANNING TOOL (LESSON)** Compute unit rates assoc. with ratios of fractions

**Unit Goals:** • Use ratios, fractions, differences & % to form comparison statements   
 • Apply proportional reasoning to solve for the unknown part when one part of 2 equal ratios are unknown

**Standards:** • recognize & represent proportional relationships between quantities   
 • use proportional relationships to solve multistep ratio & % problems

**Key Concepts**

**Ratios** - relationship between two things

**Rates** - a ratio using two different measures

**Proportions** - when two ratios can be said to be equal

**Visual Models of Concepts**

6 to 2   
 6 : 2   
 $\frac{6}{2}$

\$2.99 per pound   
 25 miles per hour

cost of oranges		
# of oranges	10	3
cost	\$2.99	\$1.99

indirect measurement

**Algorithms/Diagrams**

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

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

$x = 160$

3 lbs cost \$4.99   
 cost per lb?   
 $\frac{4.99}{3} = 99.8\% / \text{lb}$

unit rates

$\frac{4.6 \text{ km}}{2 \text{ h}} = 2.3 \text{ km/hr}$

$\frac{x}{3} = \frac{4}{6}$

$3(4) = 6x$

$12 = 6x$

$2 = x$

**Connections (Real World Applications)**

- receipts
- sculptures
- video games
- architects
- sales - taxes, - commissions
- cost

Predicting Language Functions/Structures Explain

I predict \_\_\_\_\_ because \_\_\_\_\_ . We use two ratios in proportion problems to find \_\_\_\_\_ .

Compare and Contrast

The ratio \_\_\_\_\_ is equivalent to the ratio \_\_\_\_\_ because \_\_\_\_\_ .

A ratio is different than a rate because \_\_\_\_\_ .

rate   
 ratio   
 rate table

proportion   
 scale   
 scaling   
 unit rate

**Vocabulary**   
 equivalent fractions   
 proportional reasoning   
 cross-products   
 unit cost   
 variables

## Focus/Motivation

Brainpop - Scale Drawings  
Proportions

Study Jams - Proportions  
Ratio  
Rate

## Literature

- "Fourscore and 7: Investigating Math in American History" by Betsy Franco
- "Only One" by Marc Harshman
- "Fraction Action" by Loren Leedy
- "Math Curse" by Jon Scieszka & Lane Smith

## Activities

- Real life application problems  
- Predictions