Using Bar Models to Find the Fraction and Percent of a Number

Fraction of a Number

What is $\frac{3}{4}$ of 20?

I want to figure out how much is $\frac{3}{4}$ of the number 20. 20 is the whole, or the entire fraction.

What is the numerator? (3)

What is the denominator? (4)

Whisper to your neighbor "Which part of the fraction tells me how many pieces or parts or in the fraction?" (The denominator)

Draw a bar model

The bar represents the "whole" so how much the bar worth?

The denominator tells me how many pieces to divide the bar into; so how many pieces will I draw? (4)

If the entire bar is worth 20 and I have broken it into 4 equal pieces, how much is each piece worth? (5)

20			
5	5	5	5
$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$

Looking at the bar model can you now answer the question; what is $\frac{3}{4}$ of 20?

What is $\frac{3}{4}$ of 20? (15)

What is $\frac{1}{4}$ of 20? (5)

What is $\frac{2}{4}$ or $\frac{1}{2}$ of 20? (10)

What is $\dfrac{2}{5}$ of 30?

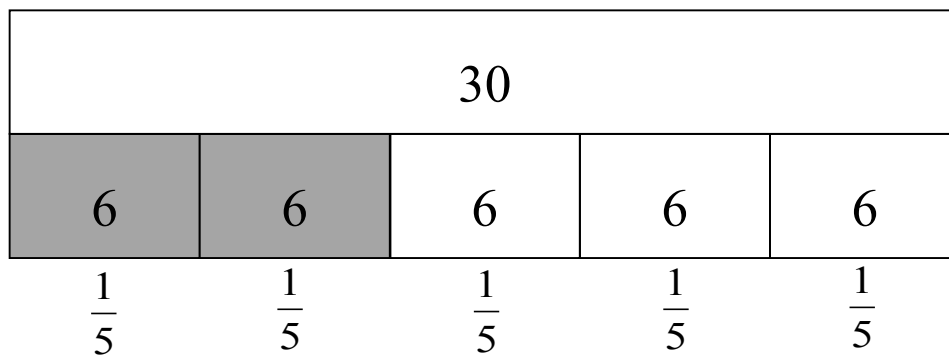What is the whole? (30) What are we trying to find? $\left(\dfrac{2}{5}\text{ of }30\right)$

Draw a bar. If this bar represents the whole; or $\dfrac{5}{5}$, how much is it worth? (30)

What part of the fraction tells me the number of equal parts? (The denominator)

Divide bar into 5 equal parts. What does each part represent? $\left(\dfrac{1}{5}\right)$ What is 30 divided into 5 equal parts?
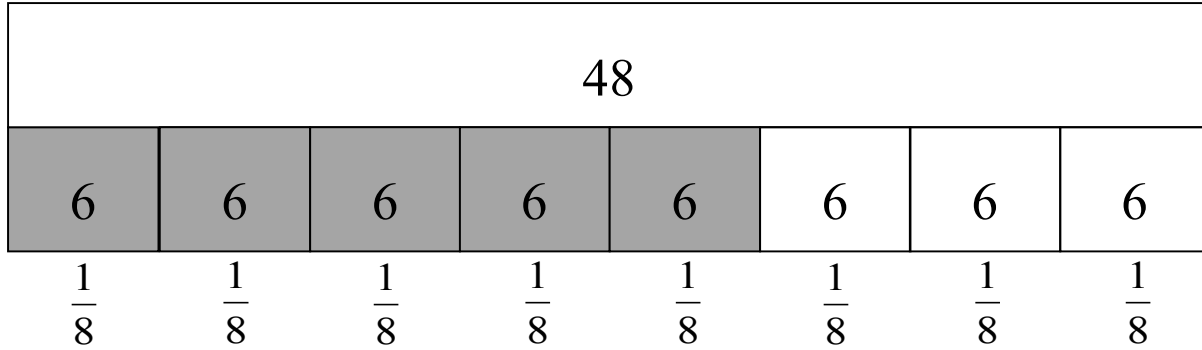
(6)

Label the parts.

30				
6	6	6	6	6
$\dfrac{1}{5}$	$\dfrac{1}{5}$	$\dfrac{1}{5}$	$\dfrac{1}{5}$	$\dfrac{1}{5}$

How much is $\dfrac{2}{5}$ of 30? (12).

Can you identify other fractional parts of 30?

You try:

Find $\dfrac{5}{8}$ of 48?

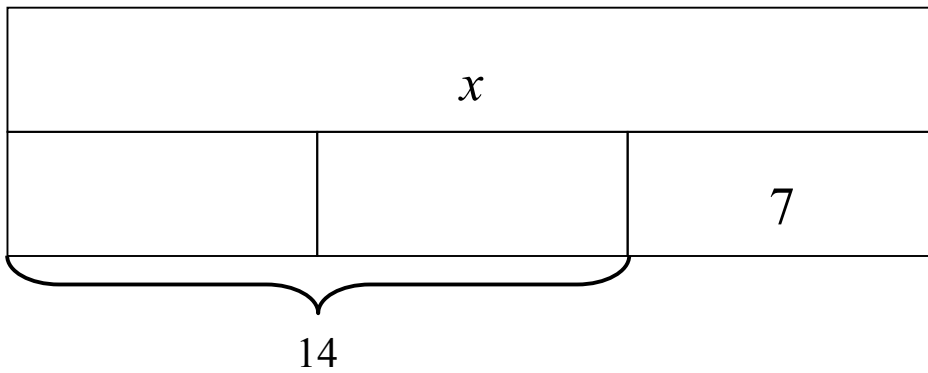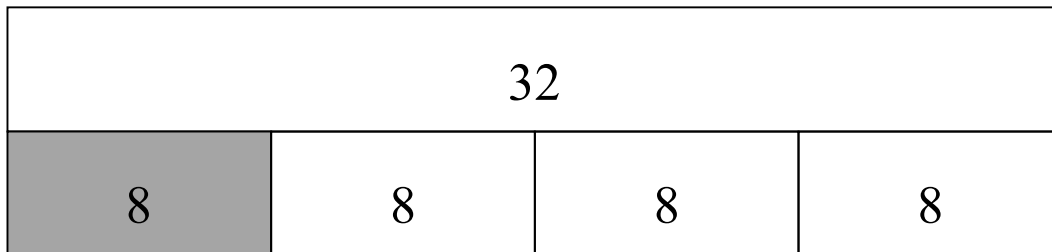| 48							
6	6	6	6	6	6	6	6
$\dfrac{1}{8}$	$\dfrac{1}{8}$	$\dfrac{1}{8}$	$\dfrac{1}{8}$	$\dfrac{1}{8}$	$\dfrac{1}{8}$	$\dfrac{1}{8}$	$\dfrac{1}{8}$

The bar model can be used to find out the whole when you are given a fractional amount. For example:

14 is $\dfrac{2}{3}$ of what number?

x		
		7

14

Exit Card question: What is $\dfrac{1}{4}$ of 32?

32			
8	8	8	8

Extension:

Have students create a word problem that could be solved using information from the bar model. Challenge – have students create a multi-step word problem that can be solved with information from the bar model.

Here is the "traditional method" as presented in one of the adopted math programs:

What is $\dfrac{3}{4}$ of 20?

Step 1 – Divide the whole number by the denominator $20 \div 4 = 5$

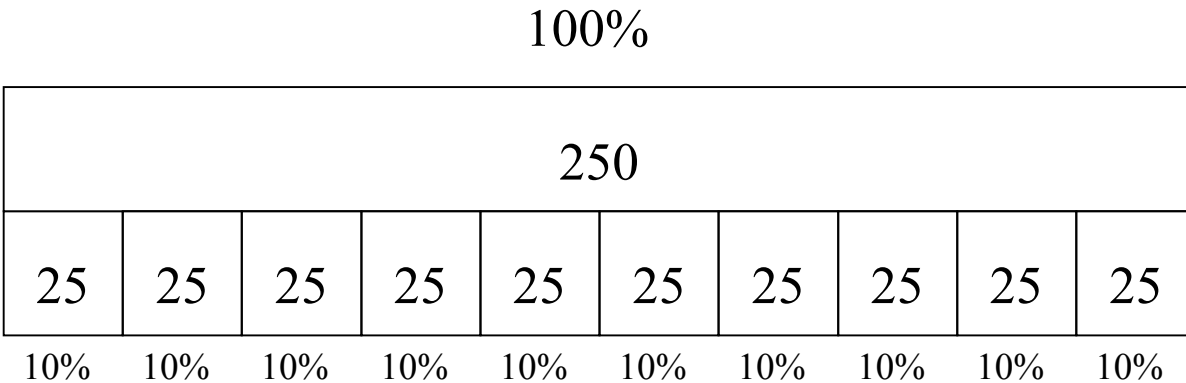Step 2 – Multiply the quotient by the numerator: $5 \times 3 = 15$

$\therefore \dfrac{3}{4} of 20 = 15$

MCC@WCCUSD 2/13/12

Percent of a Number

What is 40% of 250?

Draw a bar model with 10 equal spaces. Why might I choose to draw 10 spaces?

What is 250 ÷ 10? (25)

100%

250									
25	25	25	25	25	25	25	25	25	25
10%	10%	10%	10%	10%	10%	10%	10%	10%	10%

If 10% of 250 is 25, how can you determine 40%?

What other information can you calculate based on this bar model?

What is 90%? (225)

What is 30% (75)

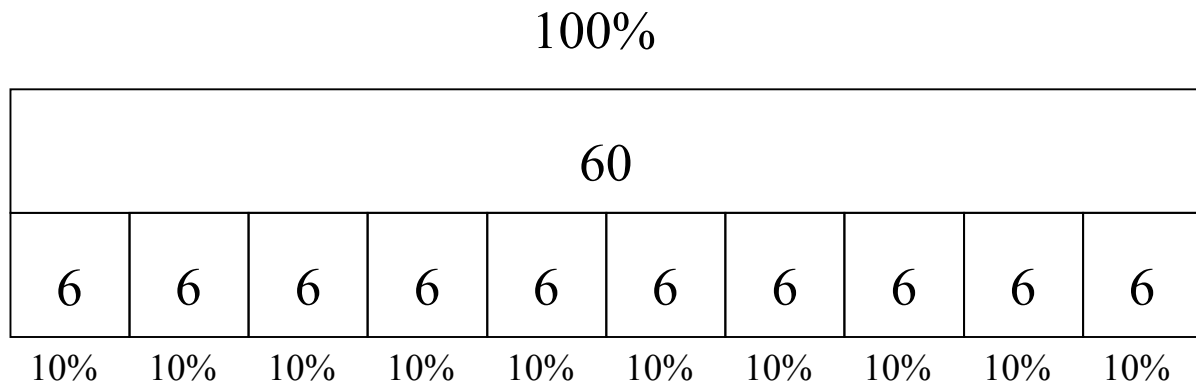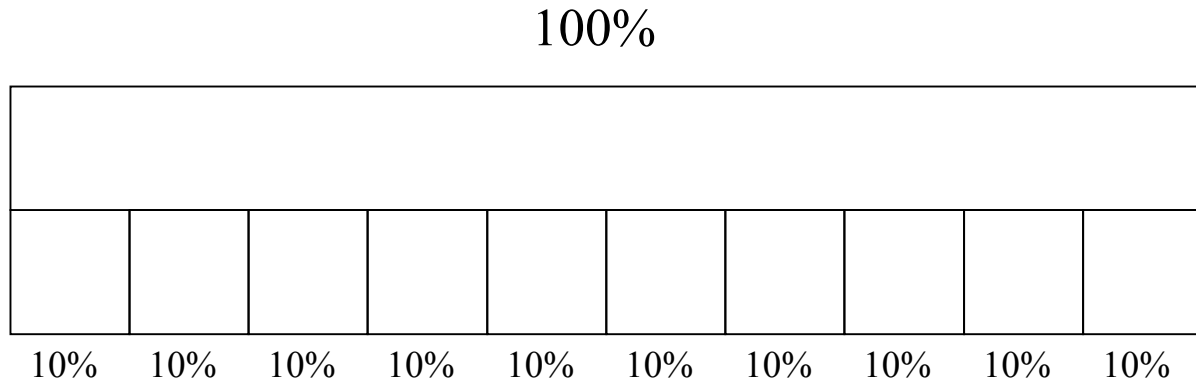Can you figure out 5%? Discuss with your partner how you determine 5%. (12.5)

Extension:

Have students create a word problem that could be solved using information from a percent bar model they create. Challenge – have students create a multi step word problem using information from the bar model.

Example of a possible word problem:

If 70% of the class is right handed, how many students are left handed?

What is 30% of 60?

Ask students to fill in this bar model.

100%

10%	10%	10%	10%	10%	10%	10%	10%	10%	10%

100%

60									
6	6	6	6	6	6	6	6	6	6
10%	10%	10%	10%	10%	10%	10%	10%	10%	10%

10% = 6 so 30%=18

How could you find out 2% of 60 using the bar model you have already created?

(Divide 1 column – or 10% segment in to 5 parts to find 2%, or into 10 segments to find 1% and then double it)

Possible word problem for this bar model: Ali's haircut cost $60. She wants to leave a 15% tip. How much money will she spend?

Warm-Up

CST/CAHSEE: Grade   5

What is 40% of 250?

A   50

B   100

C   150

D   200

What is 90%?

What is 5%?

Review: Grade 4

What is $\frac{3}{4}$ of 20?

What is the complement?

Current: Grade

$$\xleftarrow{\quad \underset{0}{|} \quad | \quad | \quad | \quad | \quad \overset{P}{\underset{\bullet}{|}} \quad | \quad \underset{1}{|} \quad | \quad \rightarrow}$$

A $\frac{1}{8}$

B $\frac{1}{5}$

C $\frac{3}{4}$

D $\frac{7}{8}$

Other: Grade 5
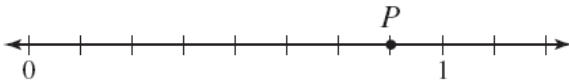
What is 50% of 40?

A   2000

B   200

C   20

D   2

How might someone get the wrong answer?