# Word Problems? No Problem!



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	Ticl	kets Sold
	Day of the Week	Number of Tickets Sold
	Monday	197
	Tuesday	364
	Wednesday	?
total of	900 tickets were sold	for the play, how many ti
a total of d on We 300	900 tickets were sold dnesday?	for the play, how many ti
a total of d on We 300 339	900 tickets were sold dnesday?	for the play, how many ti
a total of old on We 300 339 (C) 449	900 tickets were sold dnesday?	for the play, how many ti

What do students need to know to solve this problem? What might cause difficulty for students?



### **Problem Solving Difficulties**



Understanding vocabulary

Identifying relevant information

Ignoring irrelevant information

Interpreting charts and graphs

Identifying appropriate operation(s)

Performing the computation(s)





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# Don't tie key words to operations



# Do teach word-problem schemas





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Students need to understand *key words*. But, key words should not be directly tied to *operations*.





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# Don't tie key words to operations



# Do teach word-problem schemas



#### For every word problem

Regardless of problem type, students need an **attack** strategy for working through the problem

This strategy should work for any problem type

#### **Routine Word Problems**

A library has 126 books about trees.

#### 24. Part A

The library has 48 fewer books about rivers than about trees.

What is the number of books the library has about rivers and what is the total number of books the library has about trees and rivers?

- A 78 and 126
- 8 and 204
- © 48 and 126
- 78 and 204
   78

#### Instructional Word Problems



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#### RIDGES

Read the problem.
I know statement.
Draw a picture.
Goal statement.
Equation development.
Solve the equation.

### RIDE

Read the problem.

dentify the relevant information.

Determine the operation and unit for the answer.

Enter the correct numbers and calculate, then check the answer.



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# Don't tie key words to operations



# Do teach word-problem schemas



# **Schemas**





Problem	Definition		Examples		Equation	Graphic organizer	
Total		Total unknown	Part unknown				
Difference		Difference unknown	Greater unknown	Lesser unknown			Additive Word
Change (increase)		End unknown	Start unknown	Change unknown			l Problems
Change (decrease)		End unknown	Start unknown	Change unknown			



#### Total

#### Parts put together into a total

 Emily saw 4 cardinals and 5 blue jays. How many birds did Emily see?

• 4 + 5 = ?

- Emily saw 9 birds. If 4 of the birds were cardinals, how many were blue jays?
  - 4 + ? = 9
- Emily saw 9 birds. 5 of the birds were blue jays, how many were cardinals?



# "Are parts put together for a total?"







### Total

Additive Word Problems				
A. Megan baked 28 sugar cookies and 24 chocolate chip cookies. Enter the total number of cookies Megan baked in all.	B. Jana has 107 wooden beads and 68 glass beads. How many more wooden beads than glass beads does Jana have?			
C. Martina had some money. Then, she spent \$42 on a sweater. Now, she has \$13. How much money did she have to start with?				

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#### Total

Megan baked 2,8 sugar cookies and 2,4 chocolate chip cookies. Enter the total number of cookies Megan baked in all.





Problem	Definition		Examples		Equation	Graphic organizer	
Total		Total unknown	Part unknown				
Difference		Difference unknown	Greater unknown	Lesser unknown			Additive Word
Change (increase)		End unknown	Start unknown	Change unknown			l Problems
Change (decrease)		End unknown	Start unknown	Change unknown			



#### Difference

#### Greater and less amounts compared for a difference

- Shinead has 9 apples. Amanda has 4 apples. How many more apples does Shinead have? (How many fewer?)
  - 9 4 = ?
- Shinead has 5 more apples than Amanda. If Amanda has 4 apples, how many does Shinead have?
  - ? **4** = **5**
- Amanda has 5 fewer apples than Shinead. Shinead has 9 apples. How many apples does Amanda have?
  - 9 ? = 5





# "Are parts put together for a total?"

Difference

"Are amounts compared for a difference?"







![](_page_25_Picture_3.jpeg)

# Difference

Α.

Megan baked in all.

![](_page_26_Picture_1.jpeg)

Β. Jana has 107 wooden beads and 68 glass beads. Megan baked 28 sugar cookies and 24 chocolate chip cookies. Enter the total number of cookies How many more wooden beads than glass beads does Jana have?

![](_page_26_Picture_3.jpeg)

C. Martina had some money. Then, she spent \$42 on a sweater. Now, she has \$13. How much money did she have to start with?

![](_page_26_Picture_5.jpeg)

#### Difference

Jana has 107 wooden beads and 68 glass beads. How many more wooden beads than glass beads does Jana have?

![](_page_27_Figure_2.jpeg)

# B = 39 more beads

![](_page_27_Picture_5.jpeg)

Problem	Definition		Examples		Equation	Graphic organizer	
Total		Total unknown	Part unknown				
Difference		Difference unknown	Greater unknown	Lesser unknown			Additive Word
Change (increase)		End unknown	Start unknown	Change unknown			l Problems
Change (decrease)		End unknown	Start unknown	Change unknown			

![](_page_28_Picture_1.jpeg)

# Change

#### An amount that **increases** or decreases

- Shannah had \$4. Then she earned \$3 for cleaning her room. How much money does Shannah have now?
  - 4 + 3 = ?
- Shannah has \$4. Then she earned money for cleaning her room. Now Shannah has \$7. How much money did she earn?
  - 4 + ? = 7
- Shannah had some money. Then she made \$3 for cleaning her room. Now she has \$7. How much money did Shannah start with?
  - ? + 3 = 7

![](_page_29_Picture_8.jpeg)

An amount that increases or **decreases** 

- Reece baked 9 cookies. Then, she ate 2 of the cookies. How many cookies does Reece have now?
  - 9 2 = ?
- Reece baked 9 cookies. Then, she ate some of the cookies. Now, she has 7 cookies. How many cookies did Reece eat?
  - 9-?=7
- Reece baked some cookies. She ate 2 of the cookies and has
   7 cookies left. How many cookies did Reece bake?
  - ? 2 = 7

![](_page_30_Picture_8.jpeg)

![](_page_31_Picture_0.jpeg)

# "Are parts put together for a total?"

Difference

"Are amounts compared for a difference?"

### Change

## "Does an amount increase or decrease?"

![](_page_31_Picture_6.jpeg)

![](_page_32_Picture_0.jpeg)

![](_page_32_Picture_2.jpeg)

# Change

Additive Wo	Additive Word Problems		
A. Megan baked 28 sugar cookies and 24 chocolate chip cookies. Enter the total number of cookies Megan baked in all.	B. Jana has 107 wooden beads and 68 glass beads. How many more wooden beads than glass beads does Jana have?		
C. Martina had some money. Then, she spent \$42 on a sweater. Now, she has \$13. How much money did she have to start with?			
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#### Total

G.The animal park has 12 zebras, 25 monkeys, and some giraffes. If the total number of animals is 50, how many giraffes are there?

#### P1 + P2 + P3 = T

![](_page_34_Picture_3.jpeg)

### Change

H. Mrs. Lanier saved \$617 in January. In February, she spent \$249 of the money she saved. She saved \$291 more in March. How much has Mrs. Lanier saved by the end of March?

#### ST - C + C = E

![](_page_35_Picture_3.jpeg)

![](_page_36_Picture_0.jpeg)

What's a Total problem? What's a Difference problem? What's a Change problem?

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# Schema Quiz Time!

![](_page_37_Picture_1.jpeg)

# Change

Pablo goes to a stamp show where he can share, buy, and sell stamps.

#### 26. Part A

The first day, Pablo starts with 744 stamps. He buys 27 stamps from his friend. He then sells 139 stamps.

What is the total number of stamps that Pablo has after the first day of the stamp show?

![](_page_38_Picture_6.jpeg)

![](_page_39_Picture_0.jpeg)

The graph below shows the number of pounds of plastic the Keller family recycled for five months.

**Recycled Plastic** r March April May June July means 20 pounds. Each

Based on the graph, how many more pounds of plastic did the family recycle in July than in April?

![](_page_39_Picture_5.jpeg)

#### Total

r. Conley delivers packages. The bar graph shows the total number of packages e delivered on five days last week.

![](_page_40_Figure_2.jpeg)

#### 10. Part A

What is the total number of packages Mr. Conley delivered on Monday and Tuesday?

- A 300
- ® 340
- © 350
- 360

![](_page_41_Picture_0.jpeg)

# Don't tie key words to operations

![](_page_41_Picture_2.jpeg)

# Do teach word-problem schemas

![](_page_41_Picture_4.jpeg)

Problem type	Definition		Examples		Equation	Graphic organizer	]
Equal Groups		Product unknown	Groups unknown	Number/group unknown			Mul
Comparison		Product unknown					tiplicative Word Problems

![](_page_42_Picture_1.jpeg)

**Groups** multiplied by **number in each group** for a **product** 

- Scott has 2 bags of apples. There are 6 apples in each bag. How many apples does Scott have altogether?
  - 2 × 6 = ?
- Scott has 12 apples. He wants to share them equally among his 2 friends. How many apples will each friend receive?

• 2 × ? = 12

- Scott has 12 apples. He put them into bags containing 6 apples each. How many bags did Scott use?
  - ? × 6 = 12

![](_page_43_Picture_8.jpeg)

# "Are there groups with an equal number in each group?"

![](_page_44_Picture_2.jpeg)

![](_page_45_Figure_1.jpeg)

![](_page_45_Picture_2.jpeg)

Multiplicative	Word Problems
A. Ms. Thompson sold 6 cartons of cherries at the Farmers' Market. Each carton holds 25 cherries. How many cherries did she sell?	B. Susan has 3 times as many books as Mary. Mary has 18 books. Which equation can be solved to figure out how many books Susan has?

Ms. Thompson sold & cartons of cherries at the Farmers' Market. Each carton holds 2/5 cherries. How many cherries did she sell?

![](_page_47_Figure_2.jpeg)

![](_page_47_Picture_3.jpeg)

Problem type	Definition		Examples		Equation	Graphic organizer	]
Equal Groups		Product unknown	Groups unknown	Number/group unknown			Mul
Comparison		Product unknown					tiplicative Word Problems

![](_page_48_Picture_1.jpeg)

#### **Set** multiplied by a number of **times** for a **product**

 Julie picked 6 apples. Amy picked 2 times as many apples as Marcie. How many apples did Lisa pick?

• 6 × 2 = ?

- Amy picked 12 apples. She picked 2 times as many apples as Julie. How many apples did Julie pick?
  - ? × 2 = 12
- Amy picked 12 apples, and Julie picked 6 apples. How many times as many apples did Amy pick?
  - 6 × ? = 12

![](_page_49_Picture_8.jpeg)

"Are there groups with an equal number in each group?"

Comparison

"Is a set compared a number of times?"

![](_page_50_Picture_4.jpeg)

#### Comparison

![](_page_51_Figure_1.jpeg)

![](_page_51_Picture_2.jpeg)

# Comparison

Multiplicative	Word Problems
A. Ms. Thompson sold 6 cartons of cherries at the Farmers' Market. Each carton holds 25 cherries. How many cherries did she sell?	B. Susan has 3 times as many books as Mary. Mary has 18 books. Which equation can be solved to figure out how many books Susan has?

Susan has 3 times as many books as Mary. Mary has 18 books. Which equation can be solved to figure out how many books Susan has?

![](_page_53_Figure_2.jpeg)

![](_page_53_Picture_3.jpeg)

#### **Let's Review**

# What's an Equal Groups problem? What's a Comparison problem?

![](_page_54_Picture_2.jpeg)

# Schema Quiz Time!

![](_page_55_Picture_1.jpeg)

Ryan makes 6 backpacks. He uses  $\frac{3}{4}$  yard of cloth to make each backpack. What is the total amount of cloth, in yards, Ryan uses to make all 6 backpacks?

**A.** 
$$1\frac{1}{2}$$
  
**B.**  $2\frac{1}{4}$   
**C.**  $4\frac{1}{2}$   
**D.**  $6\frac{3}{4}$ 

![](_page_56_Picture_4.jpeg)

Danielle's full-grown dog weighs 10 times as much as her puppy. The puppy weighs 9 pounds.

Enter the number of pounds the full-grown dog weighs.

![](_page_57_Picture_4.jpeg)

# **Schemas**

![](_page_58_Figure_1.jpeg)

![](_page_58_Picture_2.jpeg)

![](_page_59_Picture_0.jpeg)

# Don't tie key words to operations

![](_page_59_Picture_2.jpeg)

# Do teach word-problem schemas

![](_page_59_Picture_4.jpeg)

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![](_page_60_Picture_2.jpeg)

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![](_page_60_Picture_4.jpeg)

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![](_page_60_Picture_6.jpeg)