

Objectives

- Solve word problems using a cost chart
- Solve word problems using variables

Teacher Materials

- Chart 8: *Tenths*
- Saltwater Fish transparency, page IA17 (CD)
- Word Problems with Variables transparency, pages IA18a and IA18b (CD)

Student Materials

- Fact Reviews—Multiplication Facts: 0–5 as a factor, pages 18–23 (CD)

Practice and Review**Fraction: tenths**

Review the fractions on the *Tenths* chart. Emphasize that $\frac{10}{10}$ equals 1 whole.

Fact Review: 0–5 as a factor

Review multiplication facts using one of the Fact Review pages.

Introduce the Lesson

Some problems that you need to solve may be complex. It may not be obvious which numbers to add or subtract. When this happens, you need to examine the information more carefully to determine how the problem can be solved. It is honoring to God when Christians use the thinking abilities that God has given to them to solve problems. [BAT: 2e Work]

Teach for Understanding**Solve word problems using a cost chart**

Jason has saved several money gifts from his birthday and Christmas. He already has a saltwater aquarium and a couple of fish, but he has to make some choices about which additional fish to purchase. He has saved \$150.00 for purchasing more fish.

1. Display the Saltwater Fish transparency. Guide the students in mentally estimating the cost of each fish to the nearest \$10.00. Write each estimate beside the appropriate price. *\$20.00, \$30.00, \$50.00, \$60.00, \$70.00, \$120.00, \$130.00*
2. Guide the students in mentally finding the total estimated cost for purchasing 1 of each kind of fish. Write the total estimate for display.
 - **About how much would it cost to purchase 1 of each kind of saltwater fish?** *\$480.00*
 - **Would it be reasonable for Jason to think that he could purchase 1 of each kind of fish? Why?** *No; he does not have enough money.*
 - **Which fish costs the most money?** *Golden Angel*

- **About how much money would Jason have left if he purchased a Golden Angel?** *about \$20.00*
- **Would Jason have enough money left to purchase any of the other fish? How do you know?** *No; they all cost more than \$20.00.*
- **Which fish costs the least?** *Blue Chromis*

Jason decided to buy 1 Blue Chromis and 1 Shortfin Lionfish. How much change will he receive if he gives the cashier a one-hundred dollar bill?

- **What is the question asking you to find?** *how much change Jason will receive*
- **What must you find out first?** *how much the two fish cost altogether*
- **What should your equation be?** *$\$24.95 + \$53.95 = \underline{\quad}$*
Direct the students to solve the equation on paper.
- **How much do the two fish cost?** *\$78.90*
- **What equation should you solve next?** *$\$100.00 - \$78.90 = \underline{\quad}$*
Instruct the students to solve the equation on paper.
- **How much change will Jason receive?** *\$21.10*
- **If Jason decided not to purchase the Shortfin Lionfish, what other saltwater fish could he buy without spending more than \$100.00?** *Accept any correct answer.*

Solve word problems using variables

1. Display the first Word Problems with Variables transparency (IA18a); cover all of the information below the word problems. Read the word problem aloud.
 - **What is the question asking you to find?** *how many fish each person caught*
2. Allow each student time to think of how he would solve this word problem. Choose students to share their ideas.
3. Tell the students that variables or letters can be used to solve this kind of word problem, and that they need to pay close attention to the known information while solving the problem. Remind the students that 1 letter can represent only 1 value.
 - **What letters do you think you can use to represent the number of fish each person caught?** *Answers will vary, but elicit that it is helpful to use letters that will enable you to remember what you need to find: m for Michael's fish, j for Jason's fish, and c for Captain Bailey's fish.*
Uncover on the transparency the names and the corresponding variables: Captain Bailey = *c*, Michael = *m*, and Jason = *j*.
 - **Do you know the exact number of fish that one of these men caught?** *yes Who? Captain Bailey*
 - **How many fish did Captain Bailey catch?** *37*
Uncover *c = 37* fish.
 - **Can you find the number of fish Michael caught using the information you know about Captain Bailey? Why?** *Yes; Michael caught 12 more fish than Captain Bailey.*
 - **What operation do you use to find more?** *addition*
 - **Using a variable to represent the number of fish each person caught, what equation can you write?**
Elicit $m = c + 12$.
(*Note:* An equation with 2 variables is introduced here to emphasize that a known value can be substituted for a variable.)
Uncover *m = c + 12*.
 - **What number or value can be substituted for c?** *37*
Uncover *m = 37 + 12*.
 - **What does 37 + 12 equal?** *49*

Solve and label.

- Eric, Samuel, and Logan participated in the "Underwater Adventures" reading program at their school library. Eric read 33 books. Samuel read 9 fewer books than Eric. Logan read 16 more books than Eric. How many books did each boy read?

Eric	Samuel	Logan
33	$\begin{array}{r} 2\ 13 \\ 33 \\ - 9 \\ \hline 24 \end{array}$	$\begin{array}{r} 33 \\ + 16 \\ \hline 49 \end{array}$

Eric read 33 books
 Samuel read 24 books
 Logan read 49 books

- One book about sharks had 63 pages. A book about coral had 14 fewer pages than the book about sharks. A book about whales had 26 more pages than the book about coral. How many pages did each book have?

Sharks	Coral	Whales
63	$\begin{array}{r} 5\ 13 \\ 63 \\ - 14 \\ \hline 49 \end{array}$	$\begin{array}{r} 1 \\ 49 \\ + 26 \\ \hline 75 \end{array}$

 = 63 pages

 = 75 pages

 = 49 pages

Solve and label.

- The Cookie House store sold 45-dozen sugar cookies. They sold 24-dozen more chocolate chip cookies than sugar cookies. They sold 19-dozen fewer oatmeal cookies than sugar cookies. How many dozen of each kind of cookie did The Cookie House sell?



Sugar	Chocolate Chip	Oatmeal
45	$\begin{array}{r} 45 \\ + 24 \\ \hline 69 \end{array}$	$\begin{array}{r} 3\ 15 \\ 45 \\ - 19 \\ \hline 26 \end{array}$

 = 45 dozen  = 69 dozen  = 26 dozen

- Mrs. Campbell ordered 12-dozen cookies for the piano recital. After the recital there were 3-dozen cookies left. How many dozen cookies were eaten?

Workspace

$\begin{array}{r} 12 \\ - 3 \\ \hline 9 \end{array}$ 

$12 - 3 = 9$ dozen

Steps and equations may vary.

- Of the 12-dozen cookies Mrs. Campbell ordered, 4 dozen were sugar cookies, and 3 dozen were oatmeal cookies. The rest were chocolate chip cookies. How many dozen were chocolate chip cookies?

Workspace

$\begin{array}{r} 4 \\ + 3 \\ \hline 7 \end{array}$ $\begin{array}{r} 12 \\ - 7 \\ \hline 5 \end{array}$

$4 + 3 = 7$;
 $12 - 7 = 5$ dozen

Subtract.

4. $\begin{array}{r} 15\ 9\ 9 \\ 8\ 5\ 10\ 10 \\ 96,000 \\ - 59,231 \\ \hline 36,769 \end{array}$ 5. $\begin{array}{r} 9\ 9 \\ 4\ 10\ 10\ 18 \\ 5,008 \\ - 2,479 \\ \hline 2,529 \end{array}$ 6. $\begin{array}{r} 9\ 9\ 9 \\ 7\ 10\ 10\ 12 \\ 80,002 \\ - 9,657 \\ \hline 70,345 \end{array}$ 7. $\begin{array}{r} 9\ 9 \\ 2\ 10\ 10\ 10 \\ 3,000 \\ - 1,596 \\ \hline 1,404 \end{array}$

Complete **Daily Review** on page 60.

Uncover $m = 49$ fish. Explain that $m = 49$ fish tells us that Michael caught 49 fish.

- ▶ What do you know about the number of fish Jason caught? *He caught 14 less fish than Captain Bailey.*
- ▶ What operation should you use to find less? *subtraction*
- ▶ Using a variable to represent the number of fish each person caught, what equation can you write? *Elicit $j = c - 14$.*
 Uncover $j = c - 14$.
- ▶ What is the value of c ? *37 fish* Uncover $j = 37 - 14$.
- ▶ What is $37 - 14$? *23* Uncover $j = 23$ fish.
- ▶ How many fish did each person catch? *Captain Bailey caught 37 fish, Michael caught 49 fish, and Jason caught 23 fish.*

- Display the second Word Problems with Variables transparency (IA18b) with all of the information below the word problem covered. Read the word problem aloud.

- ▶ What is the question asking you to find? *how much Captain Bailey's heaviest fish weighs*
- ▶ What letters would you use to represent each fish? *Answers will vary, but elicit j for Jason's fish, m for Michael's fish, and c for Captain Bailey's fish.*

Uncover the names and the corresponding variables: Jason = j , Michael = m , and Captain Bailey = c .

- ▶ Do you know the weight of anyone's fish? *yes whose fish? Jason's* How much did it weigh? *55 pounds*
 Uncover $j = 55$ pounds. Remind the students that you can use this information to find the weight of each of the other two fish.
- ▶ What do you know about the weight of Michael's fish? *It weighed 20 pounds less than Jason's fish.*

- ▶ Using a variable for the weight of each fish, what equation would you write to find the weight of Michael's fish? *Elicit $m = j - 20$.* Uncover $m = j - 20$.
 - ▶ What is the value of j ? *55 pounds*
- Remind the students that you can substitute the value 55 for the j in the equation. Uncover $m = 55 - 20$.
 - ▶ What is $55 - 20$? *35*
 Uncover $m = 35$ pounds. Elicit that $m = 35$ pounds tells us that Michael's fish weighed 35 pounds. Tell the students that you can now think about the rest of the information in the problem.
 - ▶ Using a variable for the weight of each fish, what equation can you write to find the weight of Captain Bailey's fish? *$c = m + 13$* Uncover $c = m + 13$.
 - ▶ What is the value of m ? *35 pounds*
 Uncover $c = 35 + 13$. Explain that you substituted the value of m , 35, for the m in the equation.
 - ▶ What is $35 + 13$? *48* Uncover $c = 48$ pounds.
 - ▶ What is the question asking you to find? *the weight of Captain Bailey's fish*
 - ▶ How much did Captain Bailey's fish weigh? *48 pounds*

 **Worktext pages 55–56, 60 (k)**