

Exercising for Beads



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by Sarah Mastrianni
Photographs by Kay McKinley



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Chapter 1:

A Colorful Program

■ The after-school health program is a huge hit with the students at Wickford Elementary School. They meet every day to participate in exercises such as walking and running. They enjoy the exercise and the chance to get together.

■ There is an extra reward for the students, too! They earn a bead each time they run or walk a mile during the program. The students pick their favorite color from a box that is filled with beads. The students like to tie the beads to their shoelaces. Students with beaded shoelaces walk up and down the halls of the elementary school. It is easy to figure out which students participate in the health program.



Desiree really enjoys running in the after-school health program. She thinks running is more fun than playing soccer or softball. She has attended the after-school program for the past several months. She spends many days after school running around the track with her classmates. Her effort has paid off. She has already earned ten beads. That means she has run ten miles!

Desiree decided that she wants to earn 16 beads because then she can put eight beads on each shoe. Desiree wonders how many more beads she needs to get 16 beads in all.

Desiree is excited about earning more beads. When she takes a break from running she decides to do a little math.



Desiree is thirsty from running, so she drinks a bottle of water. Then she sits in the shade to rest for a few minutes and thinks about a math problem. She takes a notebook and pencil from her backpack. Desiree wants more beads for her shoelaces. She has earned ten beads already and she wants to have a sum of 16 beads.

She writes a number sentence to help her figure out how many more beads she needs to earn.

$\square + 10 = 16$

She also draws a picture to help her. She does the math. Desiree figures out that she needs six more beads. $6 + 10 = 16$. In just another six miles, Desiree will have eight beads for each sneaker! Before she goes home today, Desiree plans to run a quarter mile.

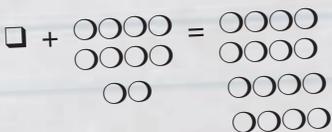
Mr. Leonard, the teacher who helps with the after-school health program, sits down in the shade near Desiree. She looks up to see Mr. Leonard looking at the number sentence in her notebook. Without saying a word, he writes a number sentence of his own.

10 + □ = 16

He draws a picture next to his number sentence, too. Desiree notices that the number sentences they each wrote are different, but the answer is the same. Desiree understands that there are two ways to find the answer to her question. She smiles at Mr. Leonard and then jogs back to the track.

DESIREE

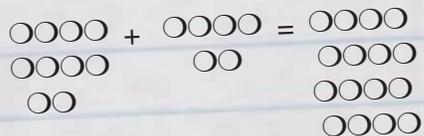
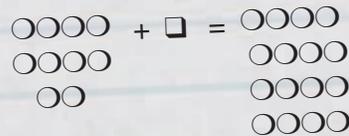
□ + 10 = 16



6 + 10 = 16

MR. LEONARD

10 + □ = 16



10 + 6 = 16



||| Liam and Emilio also have a problem to solve. Each wants to earn 14 beads. The city is hosting a three-mile run next week. Any student who runs or walks in the race will help raise money for the new city park. Any student from Wickford Elementary School who participates in the event will earn three beads.

||| Liam and Emilio will run in next week's community event. They will help raise money for the park and they will each earn three beads. They cannot wait to fill up their sneakers with beads. Now they want to figure out how many more beads they need to earn after the three-mile run to make their goal of 14 beads.



▶ Liam and Emilio find a picnic table close to the track. There, the two classmates get to work on figuring out how many beads they need to reach their goal. Since they just joined the after-school health program, they have not yet earned any beads.

▶ By the end of the week they know they will each have three beads. They also know that they each want to earn 14 beads. They write a number sentence.

▶ $\square + 3 = 14$

▶ They need to find the missing addend. They sketch their ideas on a sheet of paper. They talk about their solution, and Liam and Emilio figure it out. They each will need to earn 11 more beads after the three-mile event.

Chapter 2:

Suzie Gets Excited About the Program

Liam and Emilio are the newest students in the after-school health program. Tucker, however, has attended the program since it began. He told his friend, Suzie, about the three-mile event planned for next week.

Suzie is interested in learning more about the three-mile event and the health program. She stops by the track after school to talk to Tucker and other classmates who participate in the health program. She wants to see for herself what all the excitement is about.

Suzie notices the beads on Tucker's sneakers. Tucker is eager to tell her about them. He mentions he has even more beads at home. Suzie wants to know how many beads Tucker has earned for participating in the after-school program.



■ Tucker tells Suzie that he has run 12 miles since joining the program. He shows Suzie the four beads tied to his shoelaces.

■ Suzie does the math for both of them. “If you have run 12 miles, you have earned 12 beads. Four beads are tied on your sneakers, so you must have eight beads at home.”

■ Tucker agrees. “Twelve minus four is eight. You’re right, Suzie. I have eight more beads at home.”

■ Tucker tells Suzie about the three-mile run. Suzie likes the idea of raising money for the park and earning beads. While Suzie is not sure she will run, she knows she will walk during the event to participate.



||| Suzie says good-bye to Tucker. She thanks him for telling her about the three-mile event. She notices two other classmates coming off the track and she walks over to say hello.

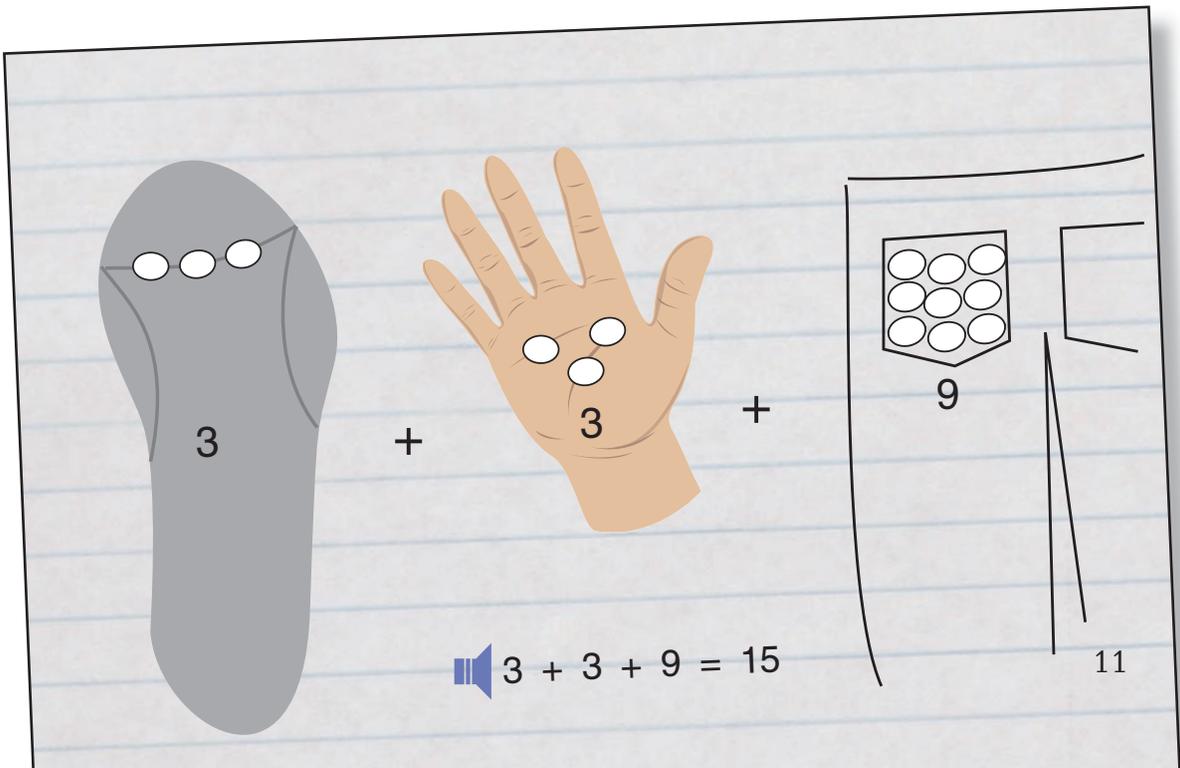
||| Holly and Keisha just finished going around the track for the second time. Now they take a few minutes to cool down and stretch after their runs. Holly takes three beads from her pocket. She ties them on her shoelaces next to three beads that are already there.

||| Suzie asks Holly, "How many beads have you earned in the after-school health program?" "I'm not sure," Holly says. "I never counted all of the beads I have." She reaches into her pocket and takes out nine more colorful beads.

“Wow!” Keisha says. “That means you have earned 15 beads in all.” Her friends look at her. They wonder how she arrived at the number 15 so quickly. Keisha explains how she got the number 15.

Keisha saw Holly take three beads out of her pocket and add them to her shoelaces. She knows that Holly has three beads on her shoelaces already. That means Holly has a total of six beads on her shoelaces. She has nine more in her pocket. Keisha then figures that six plus nine is 15 beads.

“Ah!” Holly and Suzie say in agreement. Suzie and Keisha help Holly string the rest of the beads onto her shoelaces.



Chapter 3:

Final Brain Exercise

Today's after-school health program is almost over. The walkers and runners finish their last laps. As they come off the track, they drink some cool water and stretch in the shade. Mr. Leonard gathers all the students together. "It's been another great afternoon of exercise," he says. "It's also been an afternoon of math!"

Mr. Leonard says that before they dismiss for the day, their last exercise will be a brain exercise. He divides the students into two groups. He gives each group a different problem to solve. Both groups are eager to find the answer to the problem. They get to work right away.



- The first group reads the problem Mr. Leonard gave them. It is $4 + \square = 10$. The second group takes a look at their problem, too. It is $10 - \square = 4$. The students discuss how they will find the missing number in their problems.
- Each group uses paper and pencil to draw a picture next to the problem. They find drawing a picture helps them with the math. In no time at all, each team figures out the missing numbers in the problem.
- Mr. Leonard sees the students waving their hands enthusiastically. He asks each group to choose a team leader. The team leaders will explain their group's answer.

 Liam and Holly raise their hands when Mr. Leonard asks for a team leader from each of the groups. They take turns sharing the pictures their groups made and explaining how they looked for the missing numbers that go in the boxes.

 Liam is the first one to describe how his group solved the problem. "Four plus something equals ten," he explains. "Our group figured out that the missing number is six."

 "Ten minus something equals four," Holly says. "Our group figured out the missing number is six."

 Suddenly everyone laughs. The students realize their number sentences have the same solution. Their answer to both problems is the number six.

 LIAM'S GROUP

$$4 + \square = 10$$

$$\begin{array}{c} \circ \circ \circ \circ + \square = \circ \circ \circ \circ \\ \circ \circ \circ \circ \\ \circ \circ \end{array}$$

$$\begin{array}{c} \circ \circ \circ \circ + \circ \circ \circ \circ = \circ \circ \circ \circ \\ \circ \circ \circ \circ \\ \circ \circ \end{array}$$

$$4 + \boxed{6} = 10$$

 HOLLY'S GROUP

$$10 - \square = 4$$

$$\begin{array}{c} \circ \circ \circ \circ \\ \circ \circ \circ \circ - \square = \circ \circ \circ \circ \\ \circ \circ \end{array}$$

$$\begin{array}{c} \circ \circ \circ \circ - \circ \circ \circ \circ = \circ \circ \circ \circ \\ \circ \circ \circ \circ \circ \circ \\ \circ \circ \end{array}$$

$$10 - \boxed{6} = 4$$



“Both groups are correct,” Mr. Leonard says. “Well done, everyone! You have worked hard today on the track and you have worked your brains, too. What will your math teachers say when you tell them you are learning algebra in the after-school health program?”

The students are puzzled by what Mr. Leonard tells them. “How did we learn about algebra today?” Keisha asks.

“Finding the missing numbers is algebra,” Mr. Leonard explains. “I gave you problems with a missing number and you found the answer. Now give your muscles and your brains a rest for the evening. I’ll see you tomorrow for some more exercise.” He waves good-bye as the students head home.

Glossary

-  **addend** a number that is added to another in an addition problem
-  **algebra** math that uses variables to express rules about numbers, number relationships, and operations with numbers
-  **event** a noteworthy activity or social occasion
-  **exercise** to work to improve or maintain physical fitness. Exercise is also something done for practice or training.
-  **sum** the answer to an addition problem
-  **variable** a symbol or a letter that stands for an unknown number

Think and Respond

-  **1.** Christopher is part of the health program at Wickford Elementary School. He has run 12 miles already, which means he has earned 12 beads. His goal is to earn 20 beads. How many more beads does he need?
-  **2.** Pablo wants to earn 10 beads in all so he can put 5 beads on each sneaker. So far he has 0 beads. Pablo will walk 3 miles this week and will earn 3 beads. How many more beads will Pablo need after earning the 3 beads this week? Show how you found your answer.
-  **3.** Francesca discovers she has a hole in her pocket when 3 beads fall at her feet. She reaches into her pocket and discovers she still has 4 beads there. How many beads did Francesca have in her pocket to begin with?



- 4.** Design your own after-school activity in which you earn beads for participating. Then write 2 problems about students who have joined your activity. What are they doing to earn the beads?