



From Your Friends at **The MAILBOX®**

Grades
5-6

Problem of the Week

High-Interest Math Problems to
Reinforce Your Curriculum

POW!



- Supports NCTM standards
- Strengthens problem-solving and basic math skills
- Reinforces key problem-solving strategies
- Includes step-by-step lessons for teaching strategies

About This Book

Teaching problem solving just got easier! Your friends at *The Mailbox*® magazine have compiled a resource of 40 high-interest activities that will help students make sense of mathematics and become more confident problem solvers. The tasks in *POW! Problem of the Week Grades 5–6* are designed to give students practice with a variety of problem-solving strategies and lots of different math skills. The activities—20 at each grade level—progress from easy to more challenging, making it easy for you to best meet your students' needs.

This book provides brief descriptions of ten different strategies, including sample problems and solutions.

In addition, there is a special two-page lesson on each strategy that you can use with the whole class to introduce or review that strategy. Each lesson consists of a teacher page and an accompanying student page that shows students step by step how to use the strategy.

Also included is a checklist of the problem-solving process that you can duplicate for students to keep in their folders, plus a handy generic rubric to help you with assessment.

Each of the 40 problem-solving activities consists of a colorful teacher page and a reproducible student page. The teacher page includes the following:

- the overall objective of the problem
- a list of problem-solving strategies students could use to solve the problem
- a list of math skills students will use to solve the problem
- a brief summary of the problem
- a list of important information found in the problem
- an answer key
- a bonus box key
- a list of helpful hints for the teacher to share with students when they need help solving the problem

The student reproducible includes the problem and explains what the student should do to solve it.

Turn to this resource whenever you want your students to have a meaningful problem-solving experience that helps them make sense of mathematics!

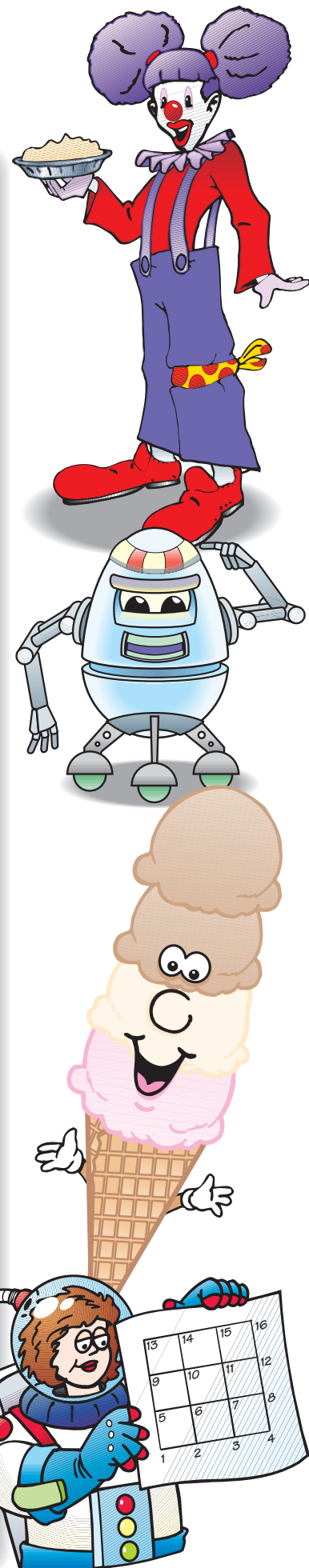
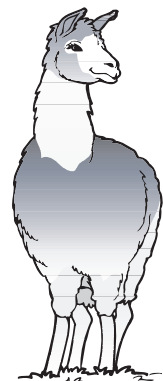
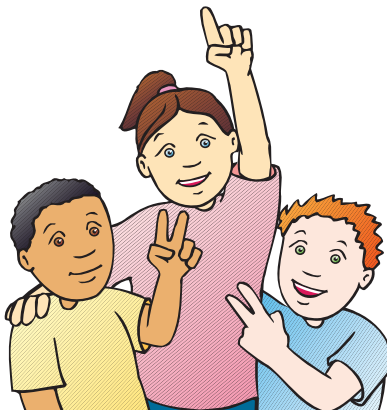
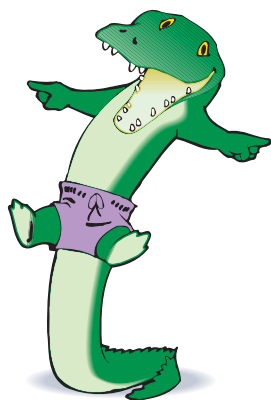


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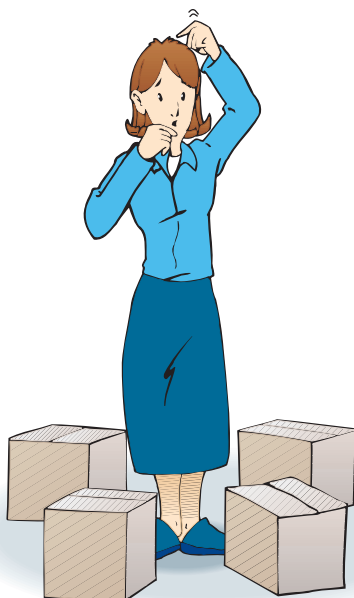
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How to Use This Book



POW! Problem of the Week Grades 5–6 makes teaching the problem-solving process easy. It provides everything you need: helpful background information, engaging teaching lessons, exciting student activities, and a handy assessment rubric! Use this great resource in the following ways:

- **Have students practice the important steps of the problem-solving process (page 5).** Give each student a copy of “Solving the Problem” to keep in a folder. It lists the five key steps in the problem-solving process: read it, think it, solve it, write it, and review it. Have students use the guide with each problem in the book.
- **Assess students’ understanding of the problem-solving process (page 6).** Make a copy of the handy math rubric. Use it and students’ written responses to help you assess their thinking during the problem-solving process and to check their understanding of each strategy.
- **Use the overview of ten problem-solving strategies as a reference (pages 7–11).** Refer to this handy guide for a brief description of and sample problem for each problem-solving strategy.
- **Introduce or review key problem-solving strategies (pages 12–31).** Teach students how to use and apply the problem-solving strategies with the ready-to-use lessons that follow the overview. For each lesson, make a transparency of the student reproducible, plus a copy for each student. Then just follow the directions on the colorful teacher page.
- **Make problem solving fun and exciting with high-interest problems (pages 32–111).** Select from activities that are arranged by grade level and progress in order from less to more challenging. Each activity consists of a page for the teacher and one for the student. Scan the teacher page to find the problem-solving strategies or math skills students need to practice. Read the problem summary and the important information found in the problem. Note that there are even hints to give students who get stuck while solving a problem! Remind students to refer to the steps listed on their “Solving the Problem” page. Use the problems in a variety of ways:

- independent practice or homework
- morning work or free-time activities
- partner or small-group practice
- weekly learning center activities
- whole-group instruction
- assessment



Lessons for Teaching Problem-Solving Strategies

Lesson 1: Act It Out

Description of strategy: The act-it-out strategy involves having problem solvers either role-play or physically manipulate objects, such as paper squares, to help them develop a visual image of the problem's data. The strategy is especially helpful when students need to visualize spatial relationships.

Directions: Cut out the squares at the bottom of the transparency. Then guide students to complete page 13 according to the instructions below.


Getting started: Have students read problem 1. Discuss the questions below one at a time, having students fill in the correct answers on their papers as you write them on the transparency.

- What are you to find out? (*where Hobo is sitting*)
- How many clowns are on the bus? (*5*)
- Where is Klarabell sitting? (*in the front seat*) Koko? (*behind Smiley but in front of Lulu*) Smiley? (*in front of Koko*) Lulu? (*behind Koko*)
- Is it hard to picture in your mind where all of the clowns are sitting? (*Yes, it is very confusing trying to remember where each clown sits in relation to the others.*)
- Would it help to label squares of paper representing the clowns and move them around, or have 5 people role-play the parts of the clowns? Why? (*Yes, using paper squares or having people actually sit in chairs would make it easier to see the clowns' seating arrangement.*)
- What problem-solving strategy could you use? (*act it out*)

Name _____ Problem-solving strategy: act it out

Circus Actions

Sometimes it's hard to decide how to solve a problem. In some cases, you may find it helpful to act it out. You can use items to represent people or objects and move them around as needed. Or you can role-play the action in the problem.

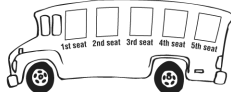


Getting started: Read problem 1. Then look back at the problem to help you answer the questions below. Write your answers on the lines provided.

Problem 1: The clowns at Klarabell's Clown School are going on a field trip to the circus. The 1st 5 bus seats are reserved for them. Klarabell sits in the front seat, Koko sits behind Smiley but in front of Lulu. If Hobo isn't sitting in the 5th seat, where does he sit?

- What are you to find out? _____
- How many clowns are on the bus? _____
- Where is Klarabell sitting? _____ Koko? _____ Smiley? _____ Lulu? _____
- Is it hard to picture in your mind where all of the clowns are sitting? _____
- Would it help to label squares of paper representing the clowns and move them around, or have 5 people role-play the parts of the clowns? _____ Why? _____
- What problem-solving strategy could you use? _____

Solving problem 1: Cut out the squares at the bottom of the page. Label 5 squares each with a different clown's name. (Save the 6th square to use with another problem.) Arrange the 5 squares according to the clues in the problem to show how the clowns were sitting. Then arrange 5 chairs, one behind the other. With 4 other classmates, role-play the problem to show how the clowns were sitting. Check the actual arrangements to see whether they match the problem's clues.



Now use a similar procedure to solve two more problems.

Problem 2: In the first ring, a row of the performers have lined up to watch the clowns pass by. The lion tamer is behind the trapeze artist but in front of the juggler. The horseback rider is in front of the lion tamer but behind the trapeze artist. Which performer is at the front of the line?

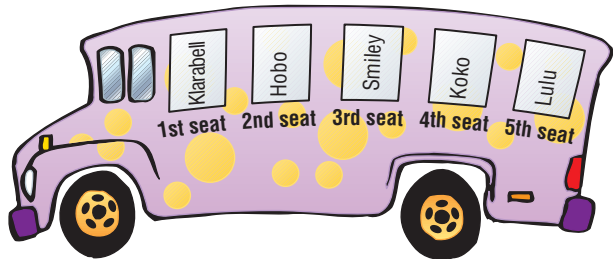
Problem 3: In the center ring, some of the performers have formed a circle. The lion tamer is between the trapeze artist and the juggler. The horseback rider is next to the juggler and the clown. The elephant trainer is next to the clown but not the horseback rider. Which one is between 2 performers whose titles have exactly 4 syllables?

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Solving problem 1: Have students cut out the squares at the bottom of the page and label them with the different clowns' names. Model how to look back at the clues and move the squares around to show how the clowns were seated. Then slowly read the problem aloud, having students verify that the arrangement is correct as shown.



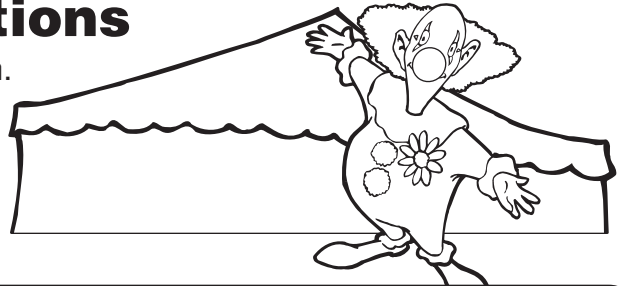
Also have students role-play the problem's solution. Arrange five chairs in front of the room. Choose five volunteers to act out the clown's seating arrangement as you slowly read the problem aloud. Check to see that the arrangement is correct.



Solving problems 2 and 3: Guide students through a similar procedure to solve the problems together as a class. Or have students solve the problems independently. Direct students to reuse their cutouts by flipping them over or by erasing them and relabeling. (2: trapeze artist, 3: juggler)

Circus Actions

Sometimes it's hard to decide how to solve a problem. In some cases, you may find it helpful to act it out. You can use items to represent people or objects and move them around as needed. Or you can role-play the action in the problem.



Getting started: Read problem 1. Then look back at the problem to help you answer the questions below. Write your answers on the lines provided.

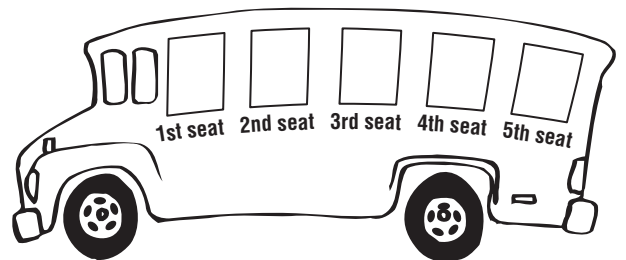
Problem 1: The clowns at Klarabell's Clown School are going on a field trip to the circus. The 1st 5 bus seats are reserved for them. Klarabell sits in the front seat. Koko sits behind Smiley but in front of Lulu. If Hobo isn't sitting in the 5th seat, where does he sit? _____

- What are you to find out? _____

- How many clowns are on the bus? _____
- Where is Klarabell sitting? _____ Koko? _____
Smiley? _____ Lulu? _____
- Is it hard to picture in your mind where all of the clowns are sitting? _____
- Would it help to label squares of paper representing the clowns and move them around, or have 5 people role-play the parts of the clowns? _____ Why? _____

- What problem-solving strategy could you use? _____

Solving problem 1: Cut out the squares at the bottom of the page. Label 5 squares each with a different clown's name. (Save the 6th square to use with another problem.) Arrange the 5 squares according to the clues in the problem to show how the clowns were sitting. Then arrange 5 chairs, one behind the other. With 4 other classmates, role-play the problem to show how the clowns were sitting. Check the actual arrangements to see whether they match the problem's clues.



Now use a similar procedure to solve two more problems.

Problem 2: In the first ring, a few of the performers have lined up to watch the clowns pass by. The lion tamer is behind the trapeze artist but in front of the juggler. The horseback rider is in front of the lion tamer but behind the trapeze artist. Which performer is at the front of the line? _____

Problem 3: In the center ring, some of the performers have formed a circle. The lion tamer is between the trapeze artist and the juggler. The horseback rider is next to the juggler and the clown. The elephant trainer is next to the clown but not the horseback rider. Which one is between 2 performers whose titles have exactly 4 syllables? _____

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Lessons for Teaching Problem-Solving Strategies

Lesson 2: Draw a Picture or Diagram

Description of strategy: Problem solvers use this strategy when a simple picture or diagram helps them visualize a problem. The strategy is especially helpful if a problem involves mapping.

Directions: Guide students to complete page 15 according to the instructions below.

Getting started: Have students read problem 1. Discuss the questions below one at a time, having students fill in the correct answers on their papers as you write them on the transparency.

- What are you to find out? (3 things: the number of swimmers competing in all 3 events, the number competing in both the butterfly and backstroke but not the breaststroke, and the number competing in the backstroke only)
- How many swimmers competed in both the breaststroke and the backstroke only? (3) The butterfly only? (5) The breaststroke only? (6) Both the breaststroke and butterfly, but not the backstroke? (4)
- How many total swimmers competed in the breaststroke? (14) The butterfly? (17) The backstroke? (12)
- Would it help to have a diagram that organizes the 3 groups of swimmers? Why? (Yes, a diagram would help show which swimmers competed in each event.)
- What problem-solving strategy could you use? (draw a picture or diagram)

Name _____ Problem-solving strategy: draw a picture or diagram

Picture This!

Drawing a picture or diagram is helpful in solving some types of math problems. Make drawings to help you solve each problem below.

Getting started: Read problem 1. Then look back at the problem to help you answer the questions below. Write your answers on the lines provided.

- What are you to find out? _____
- How many swimmers competed in both the breaststroke and backstroke only? _____ The butterfly only? _____ The breaststroke only? _____ Both the breaststroke and butterfly, but not the backstroke? _____
- How many total swimmers competed in the breaststroke? _____ The butterfly? _____ The backstroke? _____
- Would it help to have a diagram that organizes the 3 groups of swimmers? _____ Why? _____
- What problem-solving strategy could you use? _____

Solving problem 1: To help you organize the swimmers, use the Venn diagram shown. Reread the problem to find the number of swimmers competing in only 1 event. Write those numbers in the diagram where the circles do not intersect. Reread the problem to find the number of swimmers competing in only 2 events. Write those numbers in the diagram where 2 circles intersect. Finally, reread the problem to determine the numbers to write in the diagram's remaining blank sections so that the totals match the clues. Then check back over your work. Are your answers reasonable?

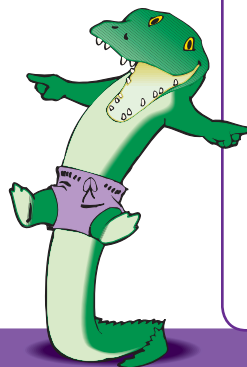
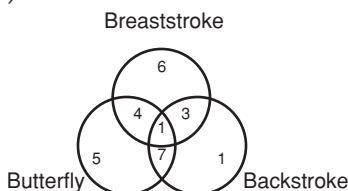
Now draw a picture or diagram to solve each problem below.

Problem 2: The swim meet was a great success! Fifteen ribbons were given on each level: 1st place, 2nd place, and 3rd place. Seven swimmers won 3rd-place ribbons only. No one won 3rd- and 2nd-place ribbons only. Four swimmers won both 1st- and 2nd-place ribbons only. Three swimmers won 1st- and 3rd-place ribbons only. How many swimmers won all 3 ribbons? _____ A 1st-place ribbon only? _____ A 2nd-place ribbon only? _____

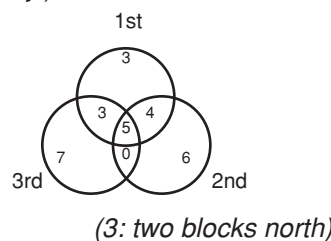
Problem 3: After the swim meet, the Gators decided to take a relaxing walk. From the pool, the team walked 3 blocks north to the bank, then 2 blocks west to the hardware store. They continued by walking 5 blocks south, then 2 blocks east to an ice-cream shop. How far and in what direction does the team need to walk to get back to the pool?

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Solving problem 1: Direct students to reread the problem to find the number of swimmers competing in only one event. Guide students to write those numbers in the diagram where no circles intersect. Repeat this process with the number of swimmers competing in only two events. Guide students to write those numbers in the diagram where two circles intersect. Have students read the problem again, this time writing numbers in the diagram's remaining blank sections to make the totals match the clues. Then have students check their work. (One swimmer competed in all 3 events. Seven swimmers competed in both the butterfly and backstroke, but not the breaststroke. One swimmer competed in the backstroke only.)



Solving problems 2 and 3: Guide students through a similar procedure to solve the problems together as a class. Or have students solve the problems independently. For problem 2, direct students to draw another Venn diagram of three intersecting circles. For problem 3, have them draw a 3 x 6 grid. (2: Five swimmers won all 3 ribbons. Three swimmers won 1st-place ribbons only. Six won 2nd-place ribbons only.)



hardware store	<	bank
		pool
		ice-cream store
	>	

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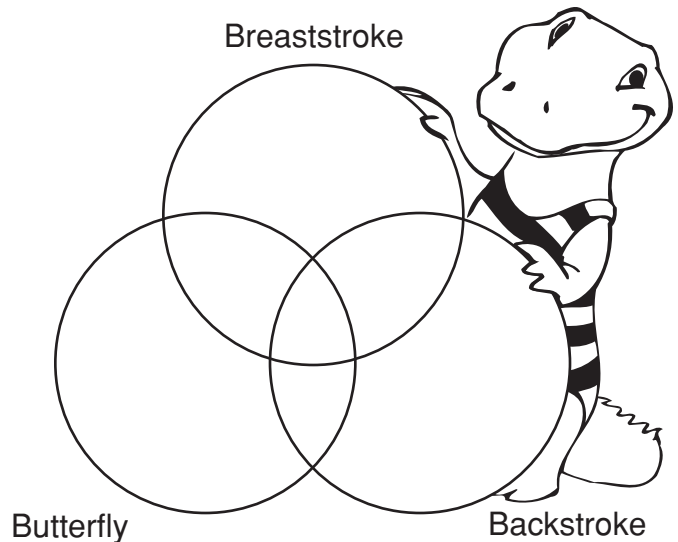
Problem 1: The Glendale Gators participated in a swim meet. Three swimmers competed in both the breaststroke and backstroke only. Five swimmers competed in the butterfly only. Six swimmers signed up to compete in the breaststroke only. Four swimmers competed in both the breaststroke and butterfly, but not the backstroke. Fourteen swimmers total competed in the breaststroke. Seventeen swimmers total competed in the butterfly. Twelve swimmers total competed in the backstroke. How many swimmers competed in all 3 events? _____ In both the butterfly and backstroke, but not the breaststroke? _____ In the backstroke only? _____

- What are you to find out? _____

- How many swimmers competed in both the breaststroke and backstroke only? _____ The butterfly only? _____ The breaststroke only? _____ Both the breaststroke and butterfly, but not the backstroke? _____
- How many total swimmers competed in the breaststroke? _____ The butterfly? _____ The backstroke? _____
- Would it help to have a diagram that organizes the 3 groups of swimmers? _____ Why? _____

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Solving problem 1: To help you organize the swimmers, use the Venn diagram shown. Reread the problem to find the number of swimmers competing in only 1 event. Write those numbers in the diagram where the circles do not intersect. Reread the problem to find the number of swimmers competing in only 2 events. Write those numbers in the diagram where 2 circles intersect. Finally, reread the problem to determine the numbers to write in the diagram's remaining blank sections so that the totals match the clues. Then check back over your work. Are your answers reasonable?



Now draw a picture or diagram to solve each problem below.

Problem 2: The swim meet was a great success! Fifteen ribbons were given on each level: 1st place, 2nd place, and 3rd place. Seven swimmers won 3rd-place ribbons only. No one won 3rd- and 2nd-place ribbons only. Four swimmers won both 1st- and 2nd-place ribbons only. Three swimmers won 1st- and 3rd-place ribbons only. How many swimmers won all 3 ribbons? _____ A 1st-place ribbon only? _____ A 2nd-place ribbon only? _____

Problem 3: After the swim meet, the Gators decided to take a relaxing walk. From the pool, the team walked 3 blocks north to the bank, then 2 blocks west to the hardware store. They continued by walking 5 blocks south, then 2 blocks east to an ice-cream shop. How far and in what direction does the team need to walk to get back to the pool?
