

Workshop Four Problem Solving

Preparing Skill Strips

Cut on dotted lines to make the skill strips. Place each set of strips in an envelope to distribute to the participants. Teamwork Problem Solving Interpersonal Skills Oral Communication Listening Personal Development Creative Thinking Leadership Motivation Writing Organizational Skills Computation Reading

Fortune 500 Companies

Business Leaders see computation as an important skill, but it is only one of 13 skills desired by Fortune 500 companies. These skills are (in order of importance):

Teamwork
Problem Solving
Interpersonal Skills
Oral Communication
Listening
Personal Development
Creative Thinking
Leadership
Motivation
Writing
Organizational Skills
Computation
Reading

Origin: Sacramento Review, Vol. 9, No. 2, Thursday, April 27, 1997 "Lost in Mathland — California's Controversial New Curriculum

Problem solving means working a problem where the method for solving it is not known in advance.



In order to find a solution, students must draw on their knowledge and through this process, they will often develop new mathematical understandings.

By learning to problem solve, students should acquire ways of thinking, habits of persistence

and curiosity, and confidence in unfamiliar situations that will serve them well outside the mathematics classroom.



Adapted from the NCTM Principals and Standards for School Mathematics 2000

NCTM Problem Solving Standard

Instructional programs from prekindergarten through grade 12 should enable all students to--

- Build new mathematical knowledge through problem solving
- Solve problems that arise in mathematics and other contexts
- Apply and adapt variety of appropriate strategies to solve problems
- Monitor and reflect on the process of mathematical problem solving

Reprint with permission from *Principals and Standards for School Mathematics*, Copyright © 2000 by The National Council of Teachers of Mathematics, Inc.

All rights reserved

Assumption:

The information that you think is true from the knowledge that you already have on the subject. . .

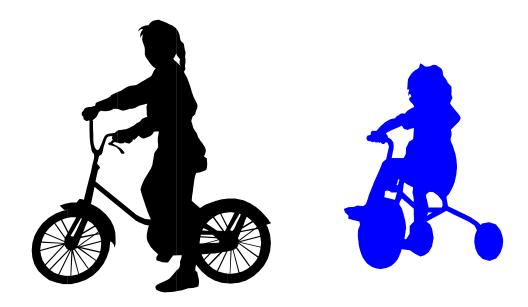


There are seven children riding bicycles or tricycles in the park. Joe counted 19 wheels.



- 1. How many tricycles are they riding?
- 2. Is there more than one solution to this problem?
- 3. How can you be sure?

There are several children riding bicycles or tricycles in the park. Joe counted 21 wheels.



- How many children are in the park, and how many tricycles are they riding?
- 2. Is there more than one solution to this problem?
- 3. If there is more than one solution, what are the solutions? How do you know if you have all the possibilities?

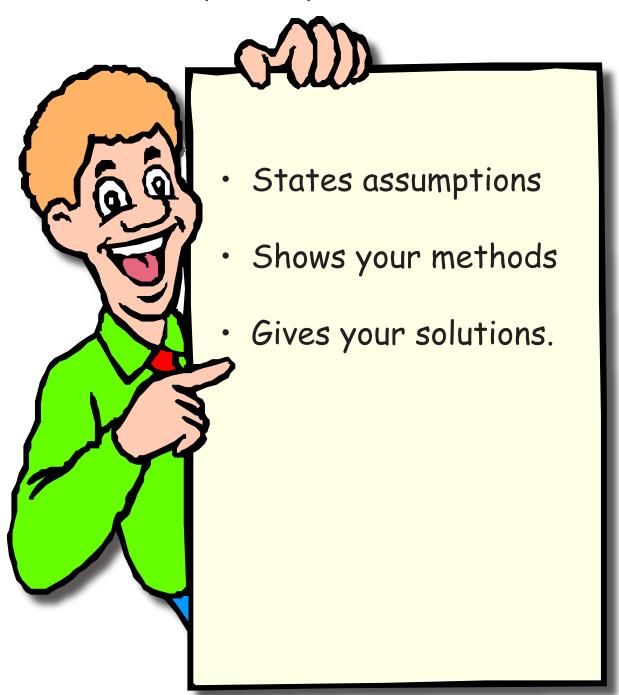
How many pizzas are eaten by the people at your school in a year?

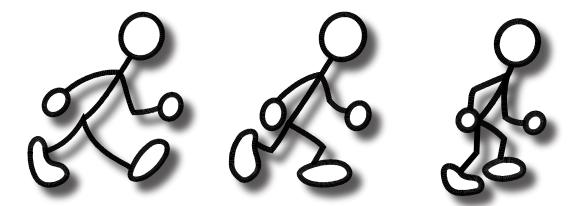


How many gas stations are there in this city?



Share your thinking.
Solve the problem as a team.
Prepare a poster that:





- 1. Leave your poster on the table.
- 2. Walk about to write questions and give positive comments.
- 3. You will be signaled when to move to the next poster.

Instructions for Puzzle for Home

This activity is for a team of 3 people. Your job, working as a team, is to solve the puzzle! Carefully read the directions below before beginning.

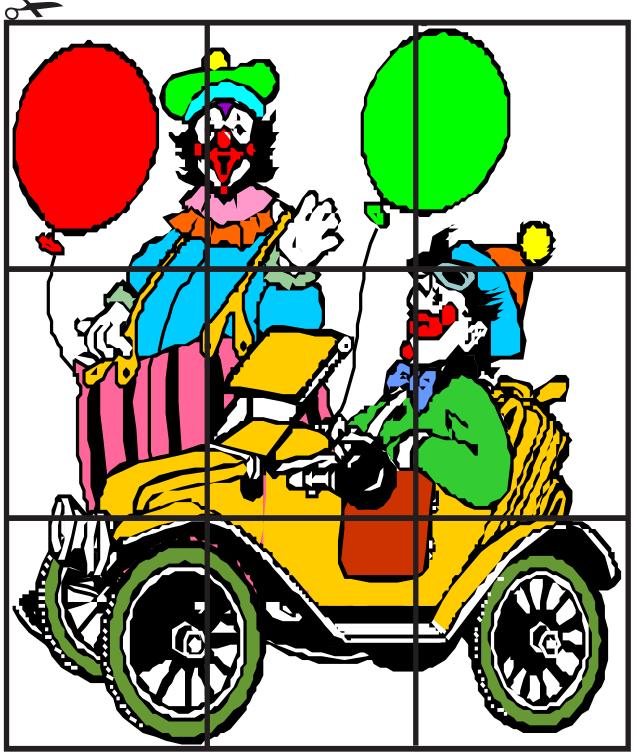
- 1. The envelope contains nine squares that make a picture. Give three squares to each person in your team.
- 2. Take out three different colored markers or crayons and give one to each person. Each person colors on each square what they think is the background in the picture, using only the color they were given.
- 3. Each person places their three squares on the table so everyone can see all of them.
- 4. Without talking, solve the puzzle. Be careful, you can only touch your own pieces!

Workshop Four Problem Solving

Puzzle for Home

Copy the puzzle on cardstock.

Cut out the nine squares and put them in an envelope. Make one set for each participant to take home.



Adapted from Spencer Kagan: Cooperative Learning

Resources

Team Building

Team building opportunities are also all around you. I am sure that you can think of many. They might include:

- Pitching in to get something done as a family
- Playing games or sports
- Building something together
- Completing large puzzles

Problem Solving

Problem solving opportunities are all around you. It is important to practice creating them.

- How long will it take us to get home?
- How many ways can we arrange ourselves around the table or for a picture?
- · How can we budget clothes, food, or school supplies?

On the internet

Most libraries have internet availability. The librarian can help you get on the internet to discover sites related to mathematics. Some of our favorites are:



http://www.figurethis.org/

Figure This! is a website with challenges that provide a fun way for you and your child to explore how math is an important part of everyday life. It poses many problem solving opportunities.

You can get a free challenge book with tips for parents by calling toll-free: 1-877-GO-SOLVE. Ask for the book.



http://mathforum.org/

This website has many opportunities for problem solving. When you enter it, you will see an option for Problem of the Week on the lower right side. Click here and you will have problems at the elementary, middle school and high school levels that are challenging and fun.

Also visit $Ask Dr. Math^{TM}$ in the same right corner. You may ask him questions, and he will answer!