Problem Solving
Activity 1: Penny Problems

<u>Learning Objectives related to Curriculum</u>: Planning to solve a problem - designing a plan and following it through P-2	<u>Number of Students</u>: 1 or small group
<u>Resources/Materials</u>: Pennies Task cards with diagrams Envelopes with solutions <u>Source Acknowledgment</u>: Bolt, B. *Mathematical Activities*	<u>Activity Description</u>: This activity includes three different penny problems that are outlined on task cards, with the solutions in labeled envelopes. The tasks are clearly described and involve critical thinking skills and the process of guess and test, and working systematically.
<u>CELS</u>: Numeracy, Critical and Creative Thinking, Personal and Social Values and Skills if working as a team	<u>Adaptation/Variation/Extension</u>: -students could add their own penny problems to this activity and have others solve them. -if these are difficult, an example of a similar problem could be done with the whole class.
<u>Evaluation</u>: self assessment anecdotal records performance assessment - notebook	<u>Reflection/Additional Comments</u>: Could be an interesting activity to work on in groups rather than alone and watch what kind of communication takes place.

Problem Solving
Activity 2: Toothpick Problems

Learning Objectives related to Curriculum: Planning to solve a problem - demonstrate understanding of the problem and solve by using the toothpick manipulatives P-1, P-2	Number of Students: 1 or small group
Resources/Materials: Toothpicks Task cards with diagrams Envelopes with solutions Source Acknowledgments: Bolt, B. *Mathematical Activities*,	Activity Description: This activity includes three different toothpick problems that are outlined and diagrammed on task cards, with the solutions in labeled envelopes. The tasks are clearly described and involve critical thinking skills, understanding the problem, the process of guess and test, and working systematically.
CELS: Numeracy, Critical and Creative Thinking, Personal and Social Values and Skills if working as a team	Adaptation/Variation/Extension: -students could add their own toothpick problems to this activity and have others solve them. -if these are difficult, an example of a similar problem could be done with the whole class.
Evaluation: self assessment anecdotal records performance assessment - notebook	Reflection/Additional Comments: Could be an interesting activity to work on in groups rather than alone and watch what kind of communication takes place.

Problem Solving
Activity 3: A Bag of Marbles

Learning Objectives related to Curriculum: Problem solving using given information, working backwards from known information, working systematically P-1, P-2	Number of Students: 1 or small group
Resources/Materials: Task card Bag of Marbles Pencil and paper Source Acknowledgment: Adapted from activity in Saskatchewan Grade 5 Curriculum Guide, page 504	Activity Description: Figure out the following problem: A bag of marbles contains cats-eyes, blue, green, and white marbles. How many of each are there if: • The number of green is half the cats-eyes • There are more white than green • There are three times as many green as blue • There are twelve cats-eyes.
CELS: Numeracy, Critical and Creative Thinking, Personal and Social Values and Skills if working as a team	Adaptation/Variation/Extension: - students could use the marbles to make up other problems for friends to solve -find other objects to make similar problems about
Evaluation: self assessment anecdotal records performance assessment - notebook	Reflection/Additional Comments: There are excellent problems such as these in many problem-solving books. Having the materials to work with (and to help check the solution) makes problem solving more interesting for students.

Problem Solving
Activity 4: The Koala Bear

Learning Objectives related to Curriculum: Problem solving using a picture to understand the problem and figure out a method for solving it. P-1, P-2	Number of Students: 1 or small group
Resources/Materials: Task card Pencil and paper Source Acknowledgment: *Arithmetic Teacher*, October 1984 Volume 32, Number 2	Activity Description: Koala Bear Problem A sleepy koala bear wants to climb to the top of a fruit tree that is 10 meters tall. Each day the bear climbs up 5 meters but at night, while asleep, slides back 4 meters. At this rate how many days will it take the bear to reach the top of the tree. Draw a picture to help you solve the problem. Use scrap paper or graph paper. ******Questions for understanding: How tall is the tree? How far did the bear climb during the day? How far did the bear slip back at night? What does reach the top mean? ******Hints for solving The answer is not ten days. Use your picture to see why.
CELS: Numeracy, Critical and Creative Thinking	Adaptation/Variation/Extension: - students could design a problem around a picture - if difficult, solve a class problem using the picture method to give students the idea
Evaluation: self assessment anecdotal records performance assessment - notebook learning contract	Reflection/Additional Comments: There are excellent problems such as these in many problem-solving books. Students usually enjoy drawing pictures and will welcome this as a problem solving strategy

Problem Solving
Activity 5: Magazine Problem Solving

Learning Objectives related to Curriculum: Designing and using appropriate strategies to solve "real life" problems from magazine P-1, P-2	Number of Students: 1 or 2
Resources/Materials: Task card Pencil and paper Magazine (s)	Activity Description: The task card describes a number of "problems" which can be found using various pages in the magazine. Students must develop strategies to solve the problems
CELS: Numeracy, Critical and Creative Thinking	Adaptation/Variation/Extension: - students could design their own problems and give them to a friend to solve.
Evaluation: self assessment anecdotal records performance assessment - notebook learning contract observation checklist	Reflection/Additional Comments After an example of this activity had been done in class, it may be a good idea to have each student or pair of students look through a magazine and design their own problems which can be solved and then passed on to other students and solved.

Problem Solving
Activity 6: Video Arcade

Learning Objectives related to Curriculum: Problem solving using a table P-2 (m)	Number of Students: 1 or 2
Resources/Materials: Task card with laminated chart Dry erase marker Source Acknowledgment: Bieniek, D. One Minute Challenges, Math and Reasoning	Activity Description: There are four different video games at Lulu's Arcade. Dennis, Olivia, Joey, and Grace each played one video game. Then they each moved to another video game, one they hadn't played yet, until each person had played all four games. During the second round, Dennis played Game 1, and Olivia played Game 3. During the third round, Joey played Game 2 and Grace played Game 4. During the fourth round, Olivia played Game 2 and Grace played Game 3. Figure out which game was played by each child for each of the four rounds.
CELS: Numeracy, Critical and Creative Thinking, Communication if solving problem as a group	Adaptation/Variation/Extension: - students could work as a group to discover the answer to the problem - problem could be "acted out" in class
Evaluation: self assessment anecdotal records performance assessment - notebook	Reflection/Additional Comments Using a chart or table is a useful way to solve many problems. Teachers could demonstrate the use of tables by using them in other ways so students are familiar with how to record information in a table.