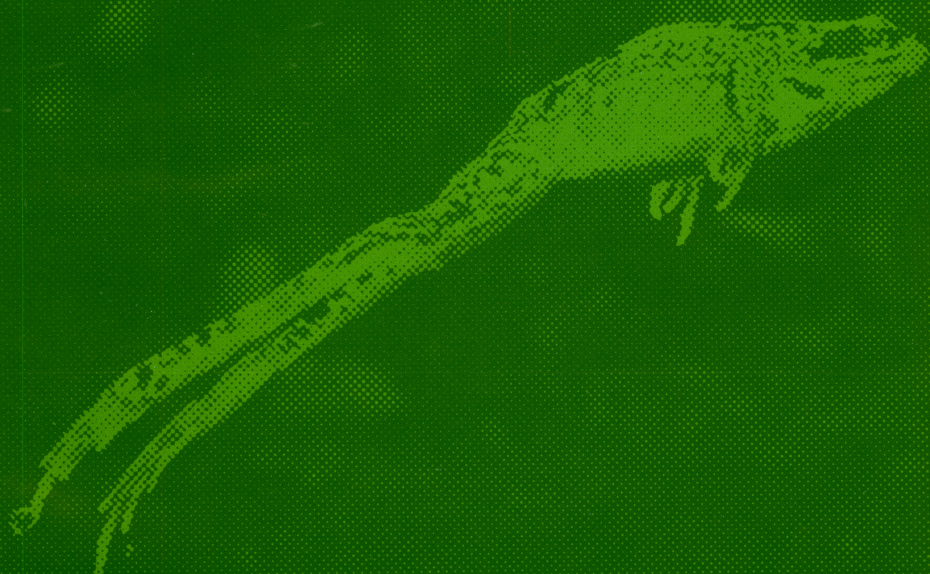


***Addison-Wesley
Mathematics
Problem Solving Software***

Level

3



Addison-Wesley Publishing Company

**ADDISON-WESLEY
MATHEMATICS
PROBLEM SOLVING
SOFTWARE**

Reference Guide



Addison-Wesley Publishing Company

ADDISON-WESLEY MATHEMATICS PROBLEM SOLVING SOFTWARE

Reference Guide

Program developed by
DECISION DEVELOPMENT CORPORATION
Concord, California



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Overview of Addison-Wesley Mathematics Problem Solving Software

Addison-Wesley Mathematics Problem Solving Software is an interactive educational tool for learning mathematics problem solving. The 5-Point Checklist taught in *Addison-Wesley Mathematics* basal texts is used as the basis for solving routine mathematics word problems. Students solve problems through visible actions on the computer as they use the checklist.

Addison-Wesley Mathematics Problem Solving Software is menu-driven and structured with specific key functions, making it accessible to any student. It is ideal for both group and individual instruction. The software can be used as a teaching aid for individual students or large or small groups in a variety of situations:

- extra practice for previously introduced concepts
- review and reteaching
- accelerated or remedial work, at home or in the classroom
- direct instruction
- a classroom storage bank of word problems

Addison-Wesley Problem Solving Software presents a format that allows students to make responsible choices. Using the checklist students identify important components of a word problem. As students isolate the relevant variables, they manipulate information and choose the operation needed to solve the problem. They also have options to correct their work, see an immediate evaluation of their efforts, or use the program resource that provides correct calculations.

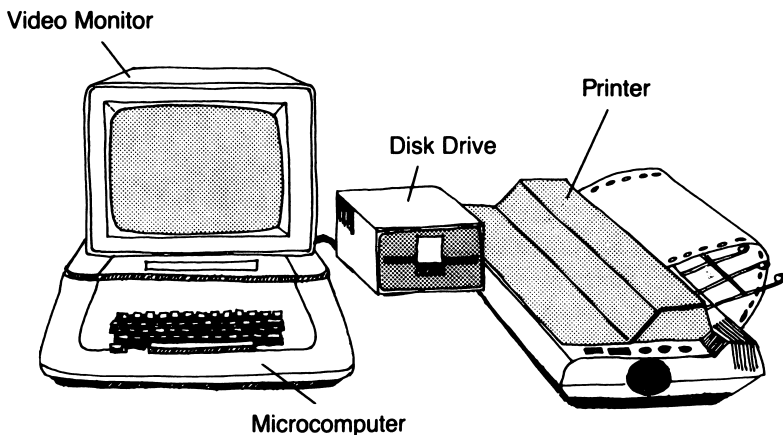
The program is self-paced, and a correction cycle is always available to help students identify where they have difficulties in the problem-solving process. Additionally, *Mathematics Problem Solving Software* assists teachers in recordkeeping and evaluation.

Getting Started

Hardware Requirements

Addison-Wesley Mathematics Problem Solving Software is to be used with:

- Apple® II, IIe, IIe Enhanced, II Plus, or IIc, with 64K of Random Access Memory (RAM)
- A video monitor (color preferred but not required)
- A single disk drive
- A printer (optional)



Components of the Mathematics Problem Solving Software _____

Addison-Wesley Mathematics Problem Solving Software package includes:

- A *Mathematics Problem Solving Software* disk
- A *Mathematics Problem Solving Software* backup disk
- A Reference Guide

The Mathematics Problem Solving disk is for active, general use. Keep the *Mathematics Problem Solving Software* backup disk in a safe but accessible location, and use this backup if problems occur with the original disk. The Reference Guide can be used as a handy teacher's guide and tool to effectively use the software, help write lesson plans, or provide information for substitute teachers or classroom instruction aides. The Reference Guide contains a comprehensive step by step description of the software menu paths for both students and teacher, as well as general information about hardware and software care and management. Be sure to carefully follow the procedure for setting up your computer in the owner's manual for your particular computer.

Care and Maintenance of Computer Hardware and Software _____

Teachers and students should be aware of some important facts about the care and maintenance of computer hardware and software. Novice computer users will find many helpful tips on the subject in this section.

Careful review of the owner's manual for your computer and increasing familiarity through practice with these educational tools are some of the ways you can learn to properly care for your hardware and software. Proper care and maintenance will extend hardware reliability and disk accuracy.

In caring for your hardware, be sure to review the owner's manual of your computer for details regarding specific care. The following general guidelines should be observed:

- Keep your computer work station clear. Items such as food, fluids, clay, paper clips, or magnets may damage the computer if they come in contact with certain pieces of hardware.
- Make sure that your computer is plugged into a wall socket that is properly grounded.
- Use a power strip with an on/off switch if one is available. Besides serving as an extension cord with additional sockets, using the power strip's switch to turn the computer on and off reduces wear and tear on the computer itself.
- Use plastic or cloth sheets to cover and protect hardware that is not being used.
- Have your computer's disk drive(s) aligned, the heads cleaned, and the speed tested at least once a year.

In caring for your computer software, be sure to handle all disks with extreme care. The following general guidelines should be observed to ensure the safety of your software and data, while prolonging the life of your disks:

- Always hold disks by the label or black jacket, carefully avoiding the exposed areas. Disks are easily damaged by oil or perspiration from fingers, as well as dust, fluids, and all other foreign materials. Avoid eating, drinking, or smoking while working with disks.
- Do not touch or try to clean the exposed surface of a disk. Do not use a disk that has been contaminated by foreign material. A contaminated disk will invariably cause read/write errors and may damage your drive mechanism.
- Do not place the disks near magnetized objects. Telephone receivers, magnetic paper clip holders, and all motors have magnetic fields that can erase or scramble information on a disk.
- Do not apply heavy pressure on the disks. Do not place heavy objects on the disks. Do not carry disks between the pages of a book. Do not use ballpoint pens or pencils when writing on labels adhered to the disks. Use felt tip pens to label disks and do so preferably before adhering them to the disk's jacket.

- Do not expose the disks to excessive heat or sunlight. Avoid leaving disks inside a car on a hot day.
- Replace a disk immediately if it becomes contaminated or physically damaged (creased, folded, or torn).
- When not using the disks, store them in a safe place in an upright position. Do not leave disks leaning against or on top of your disk drive(s) or computer; both the heat and magnetic fields from these units can damage disks that are not in use.

Loading the Disk _____

Each time the *Mathematics Problem Solving Software* program is started up, a routine procedure called loading the disk must be completed before use of the program begins. Be sure to check this procedure against your computer's owner's manual.

Note: Write-protection tabs should not be put on disks.

1. Remove the *Mathematics Problem Solving Software* disk from the package. With the label facing upwards, gently slide it into the open disk drive (disk drive 1) until it will go no further. Pushing the disk in too roughly or too far will damage the disk.
2. Gently close the disk drive's door, making certain that the disk is all the way in the drive.
3. Turn on the computer. The *Mathematics Problem Solving Software* starts without having to enter a command.
4. Wait until the red IN USE light on the disk drive turns off before proceeding. Remove and insert disks only when the drive's IN USE light is off.

Starting Up the Program _____

Do not be afraid to explore and experiment with as many options available to you as is possible in this first run-through. The *Mathematics Problem Solving Software* is designed to guide you through the program as carefully as possible, offering you relevant options at every step.

1. After about 10 seconds, the title screen appears. Press **RETURN** to move to the credits and copyright screen.

2. You are then asked to type in your name. From here, you may go to either the Teacher Menu or the Student Menu.

If you wish to go to the Teacher Menu, type **TEACHER**, and then press **RETURN**. The Teacher Menu will then be displayed. (See page 7 for information regarding the Teacher Menu.) If not, type any name and press **RETURN**.

3. If the name entered is not on the Student List, a message to that effect appears. The computer then asks if the name entered was the correct name, to be answered by pressing **SPACEBAR** to choose YES or NO, and then pressing **RETURN**. This gives you or the student the chance to reenter a misspelled or incorrectly entered name. A student's name must be entered exactly as it appears on the Student List, or it will not be recognized by the computer.

If YES is chosen, the student is allowed to work the exercises. However, if the name is not on the Student List, none of the student's scores for that particular set of exercises are permanently recorded. If NO is chosen, the program returns to the screen that asks to type in a name. Thus, students can always use the software and no complicated management system prevents their access.

4. Grades 1 and 2: Once a student's name has been entered, a screen with **SHOW ME HOW** and **START** appears. **SHOW ME HOW** provides the student with program rules. Use **SPACEBAR** to highlight **SHOW ME HOW**, press **RETURN**, and review the instructions carefully. Students may skip the program instructions by choosing **START** which moves them directly to the Student Menu.

Grades 3 through 8: Once a student's name has been entered, the Student Menu appears. After a topic has been chosen by pressing **RETURN**, the program rules are accessed at the presentation of the first word problem.

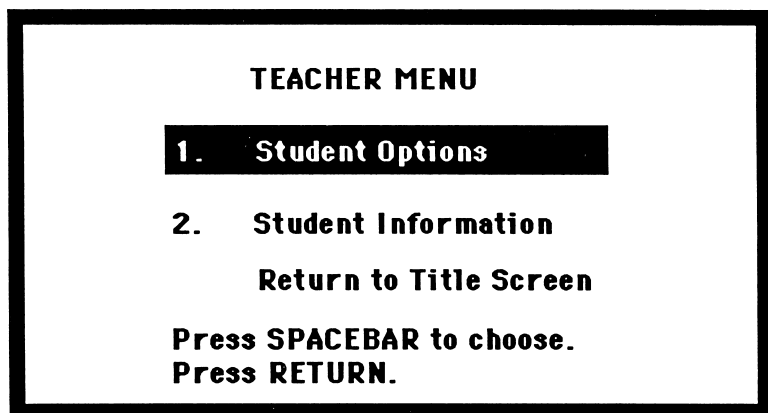
For all grades, typing **SHIFT ?** will access the program rules as you work.

5. Important Note: Once the Student Menu or submenus are on the screen, an option is selected by pressing **SPACEBAR** until the chosen option is highlighted, and then pressing **RETURN**. This is true for all menus.

Working Through the Teacher Menu

To get to the Teacher Menu, type **TEACHER**, and then press **RETURN** when asked to enter a name. The Teacher Menu lists three selections: Student Options, Student Information, and Return to Title Screen. The selection Return to Title Screen allows you to reenter the program once the options have been set for student use.

A screen such as the following will be displayed:



The Teacher Menu of the *Mathematics Problem Solving Software* branches out into submenus. The Student Information submenu branches out further. Always end your use of the Teacher Menu and submenus by choosing Return to the Title Screen at the Teacher Menu and pressing **RETURN**.

The menus branch out as follows:

TEACHER MENU

STUDENT OPTIONS

STUDENT INFORMATION
RETURN TO TITLE SCREEN

STUDENT OPTIONS

PRESERVE STUDENT RECORDS
5-POINT CHECKLIST (1st & 2nd)
RETURN TO TEACHER MENU

STUDENT INFORMATION

MAINTAIN STUDENT LIST
MAINTAIN STUDENT RECORDS
RETURN TO TEACHER MENU

STUDENT LIST

SEE NEXT PAGE
SET UP STUDENT LIST
PRINT STUDENT LIST
RETURN TO MENU

STUDENT LIST

SEE RECORD
DELETE RECORD
PRINT RECORDS
RETURN TO MENU

Student Options ---

This selection allows you to set up the conditions and choose the available options for students as they work at the computer. Once these conditions have been set and the available options have been chosen, they will remain as indicated each time students use the program until you decide to alter them.

The options in the Student Options menu are : Preserve Student Records, Guided 5-Point Checklist (for grades 1 and 2), and Return to Teacher Menu. The option Return to Teacher Menu takes you to the previous menu.

- **Preserve Student Records** This option allows up to five records per student to be stored on disk.

If you choose YES on the Preserve Student Records option, the computer will "freeze" after the student has completed the sixth topic. At this point, instruct the student to call you over. The computer will indicate that the student's file is full and ask you to enter a code. Type TEACHER, and press RETURN. You may then print the student's records, or review them with the intent of copying the records from the screen. If a printer is not available, an example of a record sheet is on page 23 of this guide. To print, you will be given instructions accordingly. Once the records have been printed or deleted, the student's file is cleared of those records and ready to store new records.

If you choose NO on the Preserve Student Records option, the student's earliest score will cancel out with every additional score registered as the fifth score. The program will not "freeze." Student records are maintained up to a maximum of five problem solving topics per student at any time.

Below is a sample Student Record:

STUDENT RECORD			
STUDENT NAME: Maria Sanchez			
TOPIC	PROBLEM TYPE	NUMBER	CHECK CORRECT/TRIED
7	Routine	4	Q: 0/0 D: 3/4 P: 4/4 A: 4/4
8	Routine	2	O: 0/0 D: 0/2 P: 0/0 A: 2/2

Print a Record **Return to Menu**

SPACEBAR to choose. Press RETURN.

- **Guided 5-Point Checklist** (Grades 1 and 2 only) This option sets the program to sequentially guide students through the 5-Point Checklist. If you choose YES on the Guided 5-Point Checklist option, the student can solve the problem only by sequentially choosing the five points. If you choose NO on the Guided 5-Point Checklist option, the student can choose points from the checklist in any order.

Student Information ---

This selection allows you to set up a master Student List in order to keep students' scores on a single recordkeeping form. Although any student can work on problems in the *Mathematics Problem Solving Software*, only scores of students entered on the Student List will be recorded on the disk.

There are three options on the Student Information menu: Maintain Student List, Maintain Student Records, and Return to Teacher Menu. The option Return to Teacher Menu allows you to return to the Teacher Menu.

- **Maintain Student List** This option allows you to maintain the Student List by setting up the initial list, viewing the list, adding or deleting names to the list, or printing the list. The following selections are available under the option Maintain Student List:

See Next Page: You may choose to page through screens of the Student List. The Student List can store up to 35 student names and their accompanying records. The 35 names on the Student List are divided into three screens that may be paged through.

Set-up Student List: You may choose to set up or create the initial Student List, add names to, or delete names from the list one at a time or all at once.

When you set up or create the initial list, you will need to decide the format for how the names are to appear in the Student List. For example, you may want to list the students with their surnames first, followed by a comma, followed by their first names. It is important to note that once the students' names are entered in a particular format, those names must be entered in exactly that way if you or a student wish to access any particular student's records.

Print Student List: You may choose to print the Student List in order to work from a hardcopy list of your students' names and to show students how their names must be entered. The program takes you through the procedure step by step. Make sure that your printer is properly connected, and check to see that its power is turned on.

Return to Menu: You may choose to return to the Student Information Menu.

- **Maintain Student Records** This option allows you to maintain records of students' work by viewing the students' records, printing the students' records, or deleting the students' records. The records not only contain students' scores from problem solving topics but also how often the different points from the checklist were used by students. The following selections are available under the option Maintain Student Records:

See a Record: You may choose to view or print any student records for up to 35 students. The recordkeeping feature of *Mathematics Problem Solving Software* is designed to store scores for up to five records of problem solving topics per student. The student record identifies each problem solving topic by topic number, problem type, and number of problems presented. The recorded score for each point in the checklist is the number of correctly solved points out of the total number of times each point was attempted:

$$\frac{\text{number of correctly solved checklist points}}{\text{number of times each point attempted}}$$

If a student works on the same problem solving topic consecutively without returning to the Student Menu, that student's score will be recorded cumulatively for up to 99 problems attempted. However, if the student exits the program and repeats that problem solving topic, two separate records will appear.

Delete a Record: You may choose to delete any student records one at a time or all at once.

Print all Records: This option allows you to print all of the student records in order to work from a hardcopy list of your students' records. The program takes you through the procedure step by step. Make sure that your printer is properly connected, and check to see that its power is turned on.

Return to Menu: You may choose to return to the Student Information Menu.

Working Through the Student Menu

Using the Menu

To get to the Student Menu, when presented with the screen that asks that a name be entered, type in a student's name and then press RETURN. The student's name must be entered exactly as it is in the Student List. For grades 1 and 2 highlight START and press RETURN to get to the Student Menu.

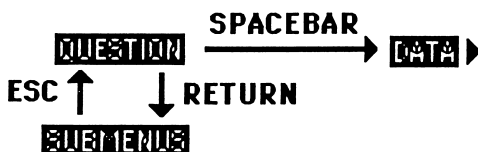
The Student Menu lists chapter titles from *Addison-Wesley Mathematics*. A topic is chosen by pressing SPACEBAR to highlight the topic, and then pressing RETURN. A screen such as the following will be displayed for the Student Menu:

STUDENT MENU		
1.	Basic Facts	
2.	Addition and Subtraction	
3.	Decimals: Addition and Subtraction	
4.	Multiplication	
5.	Division	
	None of these	
Choose a Topic	See Next Page	Quit
SPACEBAR to choose. Press Return.		

Solving Problems _____

After a topic is selected, a word problem appears on the screen for the student to solve. The generated problems include problems from the chosen topic and in grades 3 through 8 review problems from the two previous topics. Each time a topic is selected, the numerals in the problems are randomized. The 5-Point Checklist: Question, Data, Plan, Answer, and Check, and the student's worksheet appear below the word problem.

Using **SPACEBAR**, **RETURN**, and **ESC**, the student moves from point to point in the checklist and in and out of the checklist submenus to solve the problem. Other than typing in numeric entries for data and answers, **SPACEBAR**, **RETURN**, and **ESC** function as the three major program keys in the following manner:



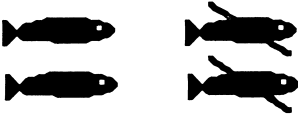
SPACEBAR moves the student from point to point. **RETURN** enters the student's choice in the program and moves the student into the submenus of that choice. **ESC** takes the student back to the previous choices. If a student has difficulty while using the program, typing **SHIFT ?** will access the program rules.

The following is a description of the problem solving process for grades 1 and 2 and grades 3 through 8.

Grades 1 and 2

A screen such as the following will be displayed for grades 1 and 2:

June saw 4 fish.
2 swam away.
How many were left?



$$\begin{array}{r} 4 \\ - 2 \\ \hline 2 \end{array}$$

Question Data Plan Answer Check

SPACEBAR RETURN

Unless the Guided 5-Point Checklist from the Student Options menu in grades 1 and 2 has been selected, the student may choose any point in the checklist. Each of the five points in the checklist is described below.

- **QUESTION** focuses the student's attention on the question in the word problem. The program automatically highlights the question. The student presses **ESC** to return to the 5-Point Checklist.
- **DATA** identifies the data in the word problem. The computer will automatically print the data on the worksheet and highlight the data when it is in the word problem. In some cases graphic data appears with the word problem. The student presses **ESC** to return to the checklist.
- **PLAN** presents choosing an operation as an approach to solving the problem. The student uses **SPACEBAR** to highlight an operation and then presses **RETURN**. The program prints the operation with the data and when applicable, models the problem on the worksheet. The student presses **ESC** to return to the checklist.

- **ANSWER** prompts the student to enter an answer to the word problem. The student may want to use paper and pencil or a calculator for solving arithmetic calculations. The student uses the number keys and the machine-specific arrow keys to enter an answer. Pressing **RETURN** and the corresponding sound confirms the entry of the student's answer into the program. The student presses **ESC** to return to the checklist.
- **CHECK** provides a correction cycle for all of the steps that the student has attempted. The student can check one step at a time or any combination of steps. Only the plans and answers that have been checked will be recorded in the Student Record. After the third incorrect response, the program automatically prints the correct operation and answer. The student may go back to the same problem, get a new problem, or quit to the Student Record through **CHECK**.

Grades 3 through 8

A screen such as the following will be displayed for grades 3 through 8:

Anne had 11 toys. She gave 3 toys to Kay. How many toys did Anne have left?				
Question	Data	Plan	Answer	Check
<hr style="border: 0; border-top: 1px solid black; margin-bottom: 5px;"/> 11 - 3	DATA 11 3	PLAN SUBTRACT	<hr style="border: 0; border-top: 1px solid black; margin-bottom: 5px;"/> ANSWER 8	
SPACEBAR to choose. Press Return.				

Word problems in grades 3 through 8 can involve two screens when the data is presented on a separate screen. The following descriptions of each point in the checklist explain how to use the points and their submenus.

- **QUESTION** focuses the student's attention on the question in the word problem. The student enters the submenu Choose Question and presses **SPACEBAR** to move through the sentences to find the question. Pressing **RETURN** enters the student's choice into the program. See Question retrieves the screen with the question in a multi-screen word problem. Computer Picks Question highlights the question for the student. Pressing **ESC** returns the student to the 5-Point Checklist.
- **DATA** lets the student identify the data in the word problem. The student enters Choose Data and then lists the data in the correct form for a numeric expression. Have the student use the following guidelines for entering data on the worksheet:
 1. Enter numeric data only. Use the machine-specific arrow keys to correct the entry.
 2. Enter one piece of data on each line.
 3. Enter numerals as they are presented in the problem.
 4. Include decimals, commas, and colons only. Do not use the \$ or % signs with the data. Type money and percent as decimals.
 5. To enter a fraction, press backslash (/) before entering the fraction. Use **SPACEBAR** to move from the numerator to the denominator.
 6. Missing data and repeated data must be entered as data.
 7. To access the options More Data, Clear Data, Show Equation, and Order Data (for subtraction and division problems), press **ESC** and then **RETURN**.

See Data presents or retrieves the data screen in a multi-screen word problem. Computer Picks Data lists the correct data in the worksheet and highlights the data that is in the word problem. The student uses **ESC** to go back to a previous menu and to the checklist.

- **PLAN** presents the student with the four operations as an approach for solving the word problems. When the student selects Choose Operation, the four operation symbols appear on the screen for the student to **SPACEBAR** through

and press **RETURN** to choose one. The Order Data option also appears if the student has already chosen the data. When the student selects Computer Picks Plan, the computer will automatically enter the correct operation on the worksheet. Pressing **ESC** returns the student to the checklist.

- **ANSWER** prompts the student to enter an answer to the word problem. The student selects Enter Answer to type in an answer. Have the student use the following guidelines for entering an answer on the worksheet:
 1. Enter numeric answers only. Use the machine-specific arrow keys to correct your entries.
 2. Include the dollar sign (\$), the percent symbol (%), decimals, commas, and colons only.
 3. To type in a fraction, type backslash (/) before entering the fraction. Then use **SPACEBAR** to move from the numerator to the denominator. Fractions must always be entered in lowest terms.
 4. Type **R** before entering a remainder.
 5. When the unit of measurement is specified, calculate the answer in that unit.

The student may want to use paper and pencil or a calculator for solving arithmetic calculations. The program calculates the correct numeric answer when the student selects Computer Enters Answer. The student presses **ESC** to return to the checklist.

- **CHECK** provides a correction cycle for the points in the checklist that the student has attempted. The student can check one step at a time or any combination of steps. When the message "Look above to see your errors" appears, the program highlights points in the checklist done incorrectly. The student then uses the **SPACEBAR** to do the Same Problem, a New Problem, or Quit to the Student Record. Only the points that the student has attempted will be recorded in the Student Record. If the student uses the computer generated responses, the Student Record will not count those attempts. Students must exit the program through **CHECK** for a record to be made of their work.

Using Addison-Wesley Mathematics Problem Solving Software in the Classroom

Addison-Wesley Mathematics Problem Solving Software is designed to support the teacher's instruction of mathematics, in conjunction with *Addison-Wesley Mathematics* or other mathematics textbooks. The software can be used creatively in a variety of ways to serve the individual student, class, teacher, and curriculum. It can work effectively in a standard mathematics classroom with a single instructional computer, or in a computer lab plan with a classroom or resource teacher making appropriate computer assignments.

The software can be used in direct instruction. Teachers can use the software while presenting a problem solving lesson to the entire class or a group of students. Students may participate by suggesting how to solve problems on the screen. Understanding the problem solving process can further be improved by going through each of the points in the 5-Point Checklist.

The software can be used in lesson reinforcement and practice. Individual students can use the software to reinforce the 5-Point Checklist presented by the teacher, while providing unlimited opportunity for individual practice within the lessons. By making the software available to the students, students experiencing difficulties in problem solving can go to the computer on their own and be presented with a rich resource of word problems to solve.

The software can be used in cooperative learning. Peer tutoring is effectively supported by the software. Students working at the same level can share responsibility in solving problems, or alternate solving the problems.

The software can be used for reteaching and extra practice for individual students or small groups. Students who need reteaching of previously introduced concepts can use the software and work at their own pace. Advanced students can work ahead and learn at their own pace, while extra practice could be offered to those students who are working on mastery. The computer keeps records of students' work, allowing the teacher to evaluate their efforts and provide appropriate guidance.

The software can be used in review testing. *Mathematics Problem Solving Software* works ideally for students who need to be tested in a given step of problem solving. Testing can be carried out in the classroom or in a lab environment. You may assign specific points in the checklist to be tested for individual students, or you may also want to assign a larger number of problems to be completed in order to establish competency.

Mathematics Problem Solving Software lends itself to use with a variety of classroom management styles.

The software is used well in a computer work study station. Students could be assigned by groups or as individuals for a specific amount of time at the computer during mathematics period or sometime during the day. The software is used well following direct instruction. Here, students could work on one problem each, moving through the entire class in one mathematics period.

The software is effective in a computer lab. Here, individual students could be given assignments from the mathematics or resource teacher. Individual records could be brought back to the teacher or stored for later review on the disk.

The software is also applicable as an occasional replacement for paper and pencil assignment. Groups or individuals may be assigned a topic to be solved on the computer. This assignment can be rotated through the class. Many other possibilities are open to the creative teacher.

The teacher will want to identify the assignments for students at the computer. Individual forms listing students' names and menu selections to get to their assigned topic and checklist points would be helpful. Older or more advanced students will find it just as simple to read their assignments from a chalkboard.

Remediation can be assigned by the teacher with regard to particular steps in problem solving that need reinforcement. For example, a student could have experience with many problems just picking the data.

Rules should be clearly established for students and instructional aides concerning appropriate behavior and proper use of the hardware and software while working at the computer. (See page 3 regarding information on Care and Maintenance of Computer Hardware and Software.)

Students should be made aware of the routine to be followed when their records are full. (See page 9 regarding Preserve Student Records.) If no printer is available to preserve student records, the teacher can put together and distribute a form similar to the one on page 23 of this guide for students to use in copying down their records from the screen.

Special Keys

The following are special keys with special functions in the use of *Addison-Wesley Mathematics Problem Solving Software*:

SHIFT ?	Calls up the program rules.
SPACEBAR	Highlights the options available in all menus and moves cursor from numerator to denominator.
RETURN	Signals the computer that a choice has been made.
← →	Moves the cursor in the workspace. (For the Apple II and II Plus, use the I and J keys.)
ESC	Returns you to the previous step.
ESC ESC	Takes you to the Student Record from the 5-Point Checklist.
R	Signals the computer of a remainder.
/	Signals the computer of a fraction.

STUDENT RECORD

STUDENT NAME:

TOPIC	PROBLEM TYPE	NUMBER	CHECK CORRECT/TRIED

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