

In the Palm of Your Hand

BY MARGE HOCTOR



Personal Digital Assistants (commonly called PDAs or handhelds) are becoming more and more a part of every day life. Is there a place in the classroom for these hand-

held wireless devices that provide computing and data storage abilities? Absolutely! Students should be using the same tools in school that they are using at home, including computers and PDAs.

One factor that inhibits the use of computers as a tool is the limited number available in most schools. When students have computer access only one or two hours per week, the teacher must make choices to ensure that the greatest benefit possible is derived from that limited computer time. Many quality technology resources and software programs meet that requirement—so many that students do not have time or access or equipment to use them all. So how does one choose between Internet research, word processing, spreadsheets, quality software, or multimedia projects? Teachers must analyze the standard being taught and their objective for the lesson.

Student use of PDAs can be one solution to this dilemma. They provide the potential to add immeasurably to students' access to technology. With quality programs these affordable devices can be placed in many students' hands and become a useful tool. Although not yet common in most classrooms, the numbers are growing every year as more and more quality software becomes available.

A good start for a PDA resource collection would be a set of mathematical logic/critical thinking software programs developed by Tom O'Brien. These programs are similar to his award-winning software published for the computer by Sunburst Communications Company. They provide practice in skills

such as collecting data, developing and testing hypotheses, predicting, comparing, classifying, ordering and inferring. All of these activities are mandated by most state Math Standards and by the National Council of Teachers of Mathematics as well as in the Mathematical Reasoning section of many state standards. In addition to skills related to math standards, these programs provide practice and reinforcement on the basic and higher level thinking skills that must be integrated into all curricular areas.

These logical problem-solving programs allow students and/or teachers to select challenges ranging from very simple for young children to challenging for most adults. In all activities, the student strives to solve the problem with the fewest number of hints. The following three programs are currently on the market, and more are in the development process.

Find It

The challenge in this program is to determine where the blockers are in a 4X4 grid and which way they deflect a probe. Analysis, prediction, development of hypotheses and if/then thinking are required. In this example, the player has found four of the six blockers; a probe sent from square number 2 will end up in square number 6. With blockers hidden, students send out probes and based on the destination must determine where the blockers are and which way they deflect the probe. The user can select from one to twelve blockers for the challenge.



The activities were extensively field-tested with school children and adults. A wide variety of users were suc-

cessful with all of the activities. Many students whose thinking strategies were very well developed but (lacked) tolerance for memorized rote procedures were challenged and delighted by the activities. ...the activities involve problem solving and inference—the heart of successful thinking

—Tom O'Brien

Treasure Hunt

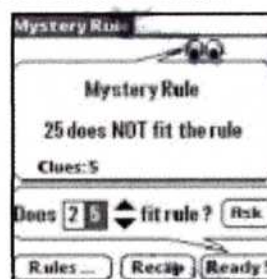
The program includes three visual/logic search challenges for age five through adult. The early activities are very easy but the later ones are very complex and they challenge the most sophisticated users. The user must determine where the jewels are by the clues provided. In Rubies the clue tells you how many jewels are in or touching your box. In Emeralds the clue tells you how many boxes away the jewels are. And Diamonds tells you whether you are hot, warm, or cold. All three games force students to gather information and make hypotheses based on their data.

Research on the Treasure Hunt games was published in *Phi Delta Kappan* (November 2003) and the British journal *Mathematics Teaching* (May 2004), with research still underway and more reports to come.

Mystery Three

In this program, students gather, generate, and use information about numbers; test hypotheses and make inferences about numbers and number principles.

There are three challenges:



- Mystery Rule, where students try to determine a rule by trying various possible options.
- Mystery Number that allows for narrowing clues to determine a number using knowledge of multiplication and division.
- Mystery Woople, in which students deter-