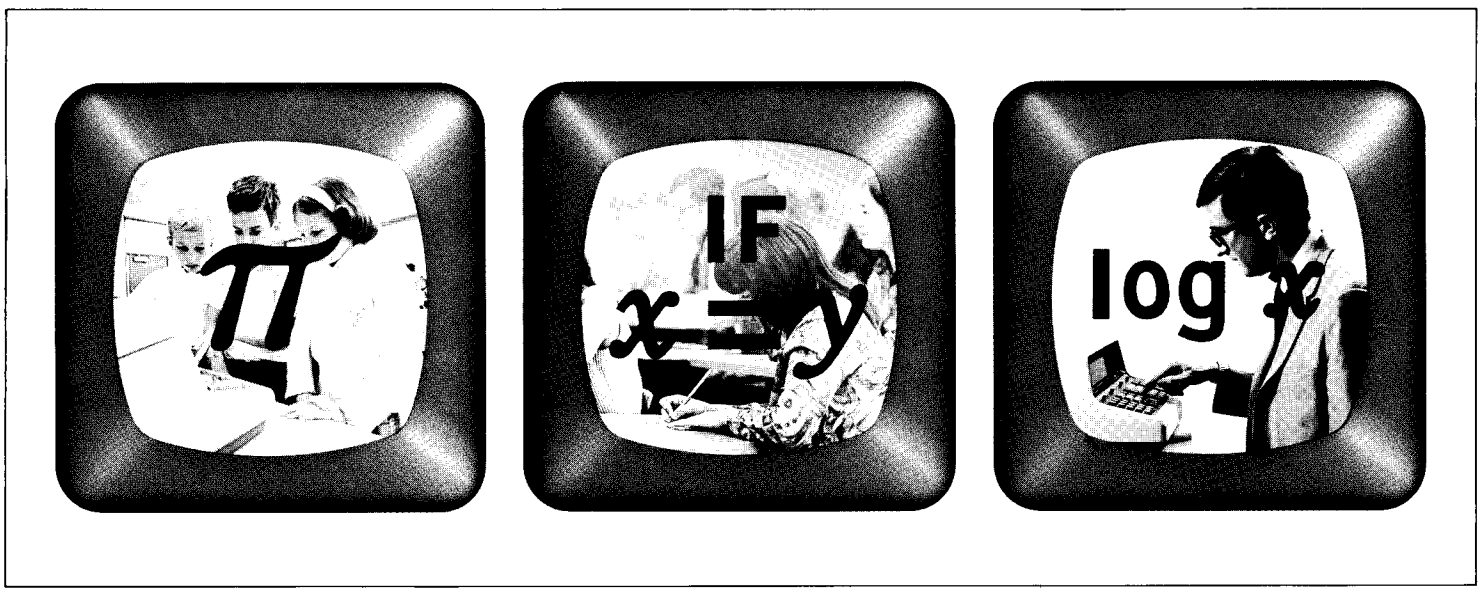


Classroom Calculating System

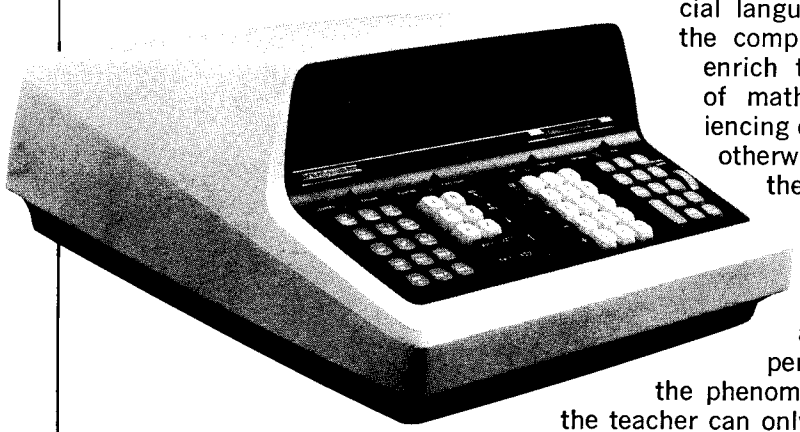
HEWLETT hp PACKARD

Watch any child who is investigating something new. He is excited and fascinated. Now you can help recapture this sense of exploration; take your student and assist him in learning about the world he lives in.

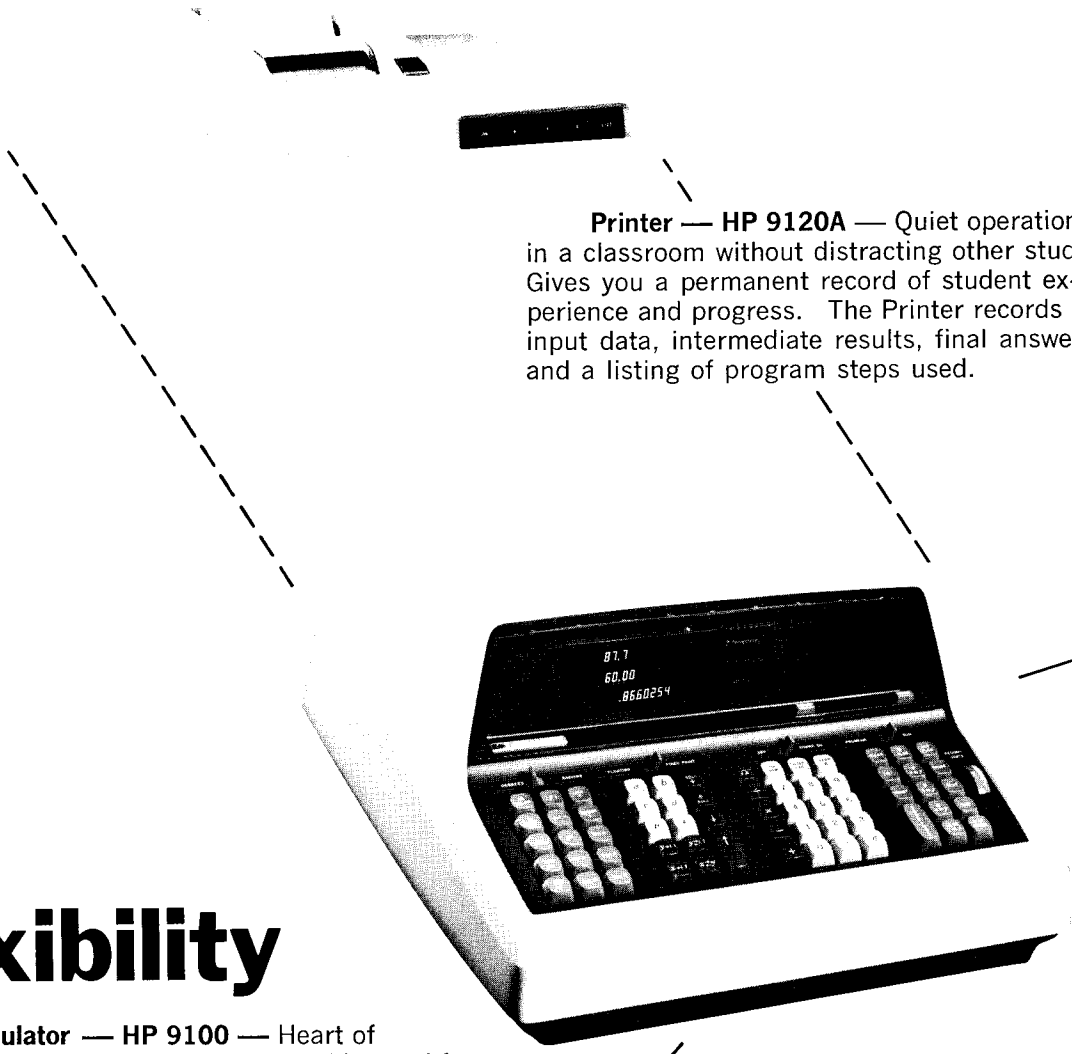
Many concepts (limits, series convergence, complex polynomial roots, etc.) are easily and graphically demonstrated using the -hp- Classroom Calculating System. Now your students can explore these fundamental ideas and discover the consequences at their own pace. Student comprehension and intuitive understanding is promoted through the challenge of developing logical problem solutions while working with the computer.

Oriented to instruction in Math and Science the -hp- 9100 Calculator contains all of the log, trig, and mathematical functions found in introductory texts. These functions are called up and calculated in milliseconds at the press of a single key. Operation is so simple that beginning students can perform complex calculations with a minimum of training.

Extensive program capabilities include conditional qualifiers giving the -hp- 9100 the ability to make looping and branching decisions normally found only on large sophisticated computers. The -hp- Classroom Computer can be programmed by the student from his desk using cards for the Marked Card Reader or by a teacher using a magnetic program card. Programming is easy, and you can converse with the -hp- 9100 directly—without learning a special language. Students use the computer to extend and enrich their understanding of mathematics by experiencing certain events which otherwise would be beyond their reach. This computer enhances the student's ability to learn and understand by allowing him to experience for himself the phenomena which, unaided, the teacher can only describe. Without a computer he would have to deduce what would happen in some cases and to accept it on faith in others.



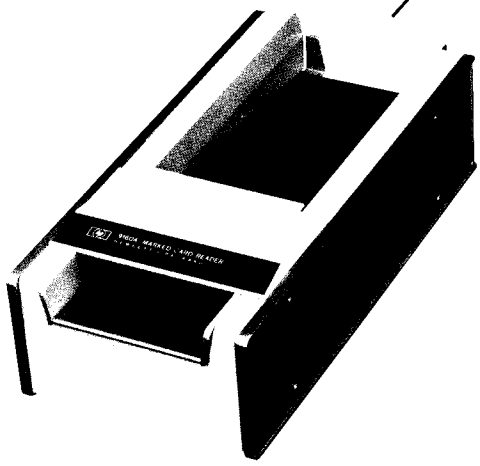
creative learning



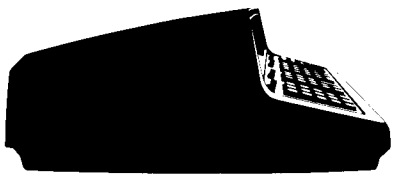
Printer — HP 9120A — Quiet operation in a classroom without distracting other students. Gives you a permanent record of student experience and progress. The Printer records input data, intermediate results, final answers, and a listing of program steps used.

Flexibility

Calculator — HP 9100 — Heart of the most flexible and powerful teaching tool for Math and Science available today. Log and trig functions in a single keystroke enable students to concentrate on the principles being taught, not labor over formidable arithmetic. Any combination of peripherals can be driven by a single 9100 Calculator.



Card Reader — HP 9160A — Simultaneous programming by the entire class. Students write programs and prepare input data in class or at home using an ordinary pencil, reserving Calculator time for actual program execution.

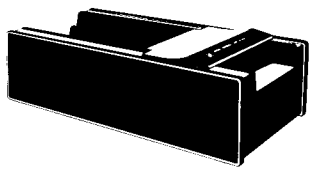


COMPUTER

The -hp- 9100 is a programmable, electronic calculator which performs operations commonly taught in mathematics and science courses. Its log and trig functions are performed with a single keystroke providing fast convenient solutions, even for beginning students.

All calculations are performed using floating point arithmetic with a twelve digit mantissa and a two digit exponent. The two least significant digits, called guard digits, are not displayed and protect the user against round off error. The two digit exponent provides a wide dynamic range, the Calculator handles numbers anywhere in the range $+ 10^{99}$ to $- 10^{98}$. Students do not have to concern themselves with scaling or double precision routines to obtain full ten digit accuracy.

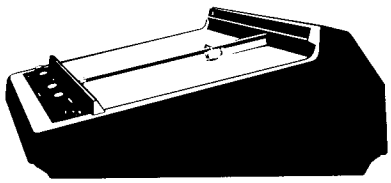
The 9100 is an ideal vehicle for teaching introductory programming. No special languages are required; since students can see and handle the complete calculator they rapidly develop confidence in their ability to master it. A complete set of conditional branching instructions allows students to write nested loops and other decision making programs. Programming instruction can concentrate on problem logic rather than argument range, and language syntax.



CARD READER

The 9160A Marked Card Reader accepts standard size Hollerith cards which have been marked with an ordinary lead pencil. Each card holds up to 28 Calculator instructions; cards may be cascaded for more complex programs. A simple code is used for marking program instructions. Room is provided on each card for flow charts, operating instructions, etc. Errors may be corrected simply by erasing. Alternatively a skip channel is provided; when marked it causes the Calculator to ignore that instruction.

In addition to reading program steps, the 9160A is very useful as a data entry device; numerical data can be entered easily into the 9100 Calculator. The instructor can repetitiously enter sample data to test student programs with great ease.

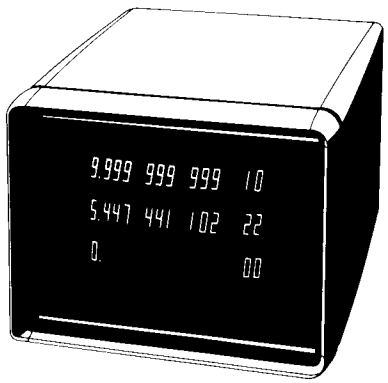


PLOTTER

Perhaps the most exciting feature of the -hp- Classroom Calculating System is the 9125A Plotter. The contents of the Calculator's X and Y registers are considered as the plotter pen coordinates which are transferred to the plotter using the FORMAT command. The plotter pen moves to the new locations specified in X and Y each time it receives a FORMAT instruction.

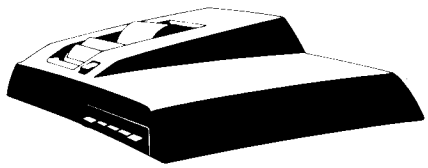
The Plotter is driven by a program loop which increments the independent variable, calculates the corresponding dependent variable, transfers these values to the plotter, and returns to increment x, thus plotting smooth curves. Now you can plot common functions, tan x, sin x, ln x, etc. The study of simple polynomials, axis translation, and roots of equations become graphically obvious. Complete families of related curves can be plotted in minutes.

CLASSROOM DISPLAY



The 9150A Group Display has a large 12" x 16" screen with one inch high numerals providing easy viewing for your entire class. Numerals can be seen with ordinary room illumination. Operation is simple and convenient.

Several display units may be operated from a single calculator for large lecture halls.



PRINTER

Permanent records of input data, computed answers and student program steps, are immediately available from the Model 9120A Printer. Push buttons on the printer allow selection of any combination of the three displayed registers. Printing is accomplished with a PRINT/SPACE instruction. Repeated depressions of this key cause the paper to space after recording the register contents. The contents of the selected registers are recorded on tape exactly as they appear on the screen. The list mode automatically records the program steps. The unique electrosensitive paper permits quiet operation and provides legible permanent copies.

CLASSROOM INSTRUCTION

Remember your last experience with a really exciting and challenging presentation in mathematics, physics, or chemistry? Fascinating and exciting teaching situations in mathematics and science are being created everyday with the Hewlett-Packard Computing System. This new educational medium stresses the logical structure of concepts, fostering intuitive ability rather than rote skills. Concepts such as series can be demonstrated in a dynamic method, walking students through each stage of the development.

You want your students to visualize and organize problems. The Computing System not only develops a logical approach to mathematics, but also strengthens basic arithmetic skills. In essence the students are no longer passive recipients of the classroom experience; now they are asked to become active participants in the learning process.

Many concepts in mathematics and science can be demonstrated with exciting vividness using this system. Series and limits come to life before the student's eyes. However, unlike more conventional demonstration techniques, the computer is not an inanimate object; rather it is an active tool. Students can question the process, change a parameter, and observe the results of their inquiry. No longer does it require hours to calculate complex problems, let the computer do it in seconds.

Classroom instruction should be interesting and exciting. To create this atmosphere students should become active members, participating in concept development. Furthermore, demonstrations should graphically illustrate these concepts.

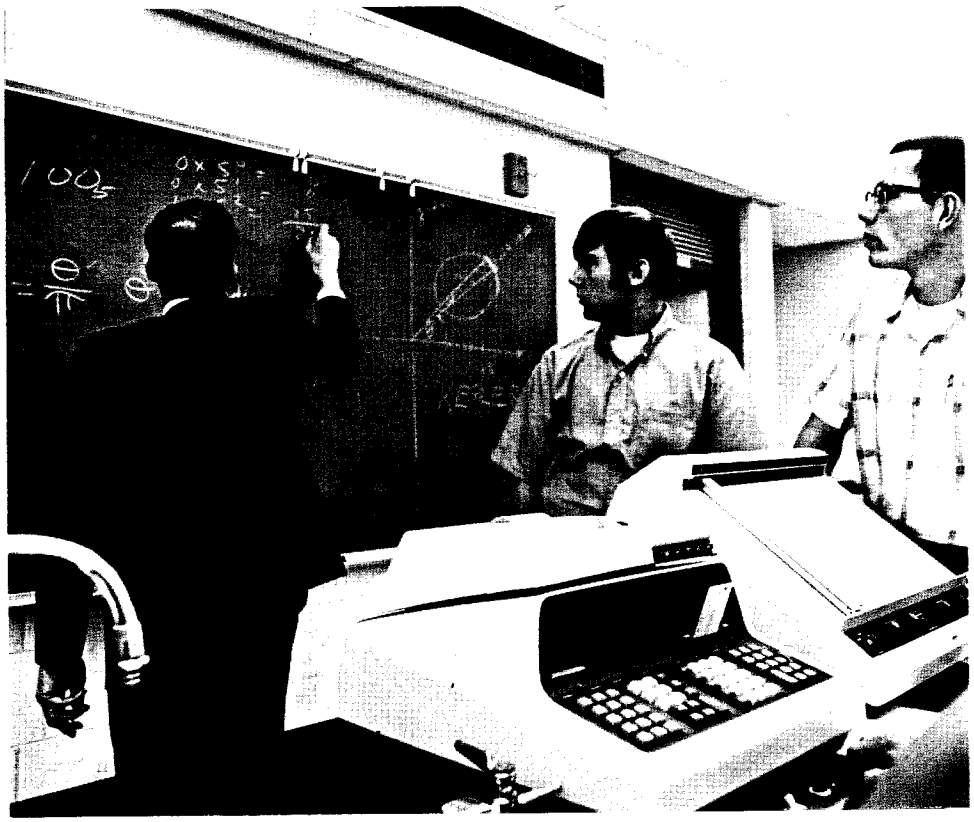
Laboratory instruction takes on a new meaning with the Hewlett-Packard Classroom Calculating System. A computerized approach to laboratories goes far beyond just gathering data for the experiment. It allows the immediate analysis and comparison of experimental data with the theoretical model programmed for the computer. Students can develop the key concepts as they perform the actual experiment. Then these concepts are reinforced as the experiment is performed.

You know your student understands the concepts when he has written a computer program. There is no need for him to manually perform the monotonous arithmetic which so often detracts from student interest — the Calculator does it.

Calculations, such as curve fitting, once thought too complex for students, can now be performed easily, in seconds. These and other programs, are available in HP's extensive program library. Students can investigate sophisticated analysis at their own speed, advanced students exploring more complex problems.

Laboratory results can be plotted with the 9125A X-Y Plotter providing visualization of the relationship between parameters. Your students will be able to tell at a glance if the relationship is linear or quadratic, where the roots are, and where the limits are. They can plot the theoretical behavior with experimentally measured parameters. Curve fitting from data points can be performed in seconds and plotted on the same graph as the theoretical predictions, providing a side-by-side comparison. The Classroom Calculating System makes your laboratory a more meaningful experience.

LABORATORY SITUATION



As an educator you know independent study is very rewarding, both for the student and for you. Students enjoy solving problems by themselves, it's a challenge. Motivating students to independent study is one of teachings most rewarding experiences.

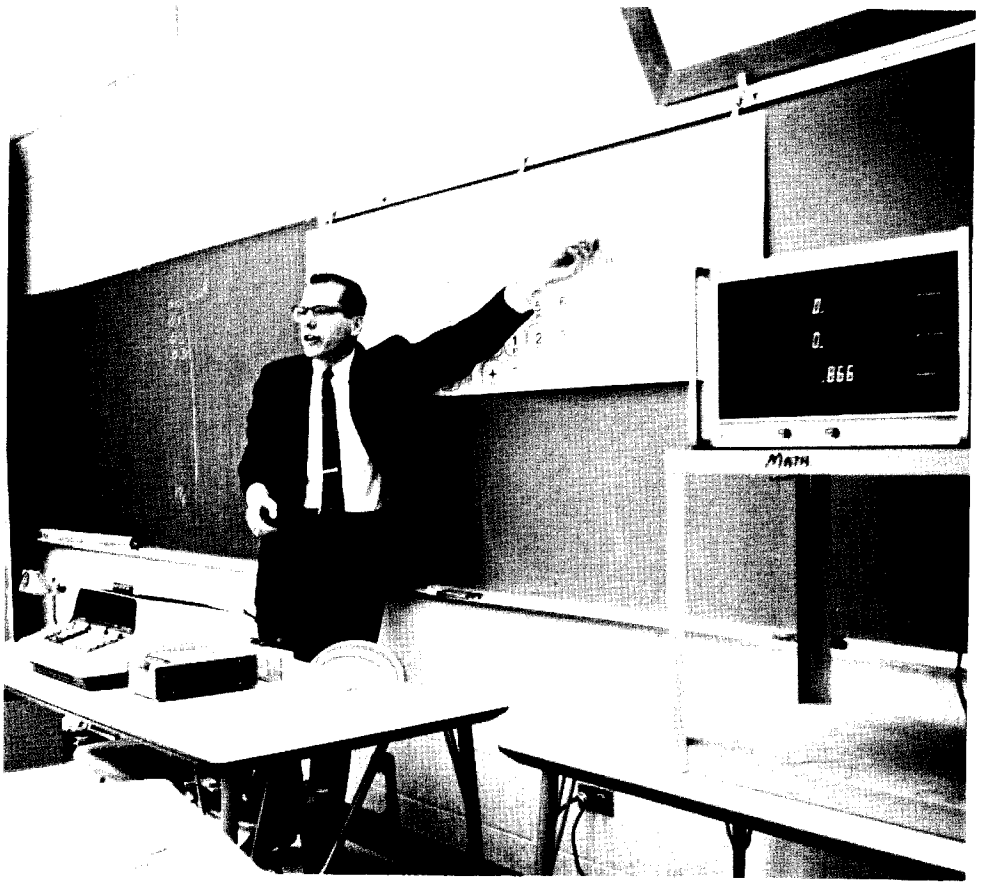
Many students want to investigate problems in greater detail. Others are intrigued by solving homework assignments with a computer. In a school equipped with an -hp- Computing System these provide excellent opportunities for independent study. Now you can offer exciting enrichment of gifted and inquisitive students.

Slower students also enjoy the HP Computer. It permits them to verify their own work, rather than the teacher correcting it. They learn to accept themselves as individuals who are able to solve their own problems, and not requiring supervision of a teacher. The Computer supplies the vital catalyst for a "success experience" in mathematics and science rather than a "failure record."

Many students working independently can use the -hp- Computing System by including the 9160A Card Reader. Students no longer have to tie-up the computer while writing and debugging programs. They may be written almost anywhere, in the classroom, in a study hall, or at home.

The Hewlett-Packard Computer System provides an effective medium for students to investigate mathematics and science. This type of system is equally suited for both the gifted student and the under-achiever. It serves as a substantial supplement to classroom instruction by increasing student interest and motivation while freeing teacher time.

INDEPENDENT STUDY



COMPUTER EDUCATION

With Computers influencing more people in more aspects than ever before, computer education has become vital. Within a few years everyone will have some contact with computers; even now the demand for programmers, system engineers, and technicians, is much higher than the supply. Computers are used extensively today in research, education and industry; and those not prepare to use them are being left behind.

Current techniques in computer education stress basic computer concepts rather than teaching one particular language. Computers are changing so rapidly that any language, while popular today, may become obsolete tomorrow. The HP 9100 Computing System is ideal for teaching programming because it uses fundamental mathematical notation rather than a language with specific and complex syntax. Students are already familiar with this notation, so procedures such as subroutines, nested loops, do loops, if statements, and branching are easily taught. Flow charting is developed as a natural outgrowth of problem solving. Since the computer uses standard mathematical operations, students easily recognize flow charts as the logical organization of their problems. They rapidly gain skill at manipulating the important variables.

The HP Computing System offers a unique opportunity for computer education through direct interaction between the student and the computer. This is only possible on a compact desktop unit. Students develop an appreciation for the computer and become more confident using the HP System.

With the Hewlett-Packard Educational System we have endeavored to enrich your present learning situations, by providing you with a means of looking at mathematics and science from a fascinating new view — that of the computer.

The computer approach is unique because it magnifies awareness of basic relationships and develops manipulative skills. Most important, students enjoy working with the computer and gain tremendous satisfaction from mastering it. The computer approach is intrinsically rewarding — creating spontaneous education.

The computer alone cannot foster creative teaching, it can only provide a stimulating medium with which students learn to visualize vital concepts and relationships. Equally important is educational material which capitalizes on the computer's tremendous potential for instruction.

The Hewlett-Packard Educational Resource Manuals represent a new generation of material conceived for computer oriented mathematics and science instruction. This new material is based on current research which indicates that:

> "The computer approach to mathematics and science is a most effective medium for demonstrating the systematic development of concepts and relationships. Furthermore, it represents a significant achievement in independent study for both gifted and remedial students".

Hewlett-Packard has captured the essence of these studies in new resource manuals.

These resource materials are presented in an entirely new format, supplementary manuals which are keyed to existing texts. This is a departure from efforts which have created comprehensive computer oriented texts that simply duplicate standard texts. This innovation, in keeping with the results from current research, is designed to stress continuity with existing subject matter, optimizing the effectivness of both the computer and the texts. In addition, it greatly reduces costs for instructional material and provides tremendous system flexibility.

Extensive resource materials have been designed to provide tremendous depth for instruction from the secondary to the university levels. Never before has such a comprehensive series of computer-oriented materials been prepared for the secondary schools. Topics include introductory algebra, trigonometry, analytic geometry, advanced algebra, statistics, calculus and physics. On the university level, calculus, differential equations, statistics, and introductory physics provide subjects for resource materials.

Our goal is to present materials in a format permitting the instructor to make the best use of this time and abilities. HP Manuals have been especially designed to minimize teacher preparation. A loose leaf approach permits organization of specific material to conform to your curriculum requirements.

In addition to the series of resource manuals. Hewlett-Packard offers a special Educational Program Library. This library greatly extends the applications for the HP Educational System, providing opportunities for students to investigate not only curricular subjects but also such diversified fields as:

Statistics	
Mechanics	Chemistry
Structures	Electronics
Physics	Thermodynamics
Life Science	Surveying

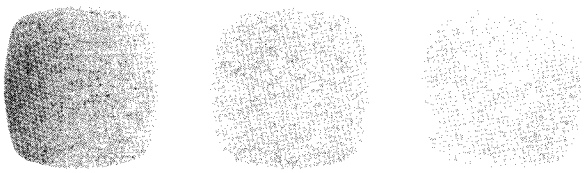
Computer Workbook

The workbook is a specially prepared text for secondary schools which explains the operation and programming of the HP 9100 Calculator. It uses a refreshing new approach to develop general computer concepts from the basic techniques learned for the 9100 Calculator. The text was planned for a short series of classes devoted to teaching the HP Calculator, but it may be easily combined with existing subject matter to be used as a supplementary introduction to computers.

Applicable to a wide range of student ages and abilities, the material is organized into sections of varying difficulty. In particular, remedial students are highly motivated. It is paced so they rapidly acquire an understanding of the calculator's operation and move on to more challenging problems according to their personal ability.

The Student's Edition is written in a unique workbook format, providing space for special exercises. These exercises have been selected for their applicability to general computer techniques. Once completed the workbook serves as a personal reference manual for each student.

In addition, a valuable teacher's edition provides commentary on the subject matter, applications, and problem solutions.



Special Applications

Routine quiz grading, averaging class grades, and figuring grade distributions take time away from creative teaching. All of these operations can and should be automated.

Using the 9160A Card Reader, the HP Calculator grades multiple-choice quizes. Students select answers by blacking the appropriate column on special answer cards. The instructor then inserts the cards in the Card Reader, the Calculator checks each answer, and the 9120A Printer provides a printed output showing any questions missed and the correct answers to those questions. Finally it calculates the class average. At the end of each semester, grade average and standard deviation for each student are available in just seconds.

School administrators find some of the most complex calculations deal with bond discounts interest rates, and analysis of alternative bids. The 9100 Calculator reduces these to simple data entry. The calculator and the plotter are extremely useful in analyzing historical growth rates in student enrollment and calculating the most probable projections.

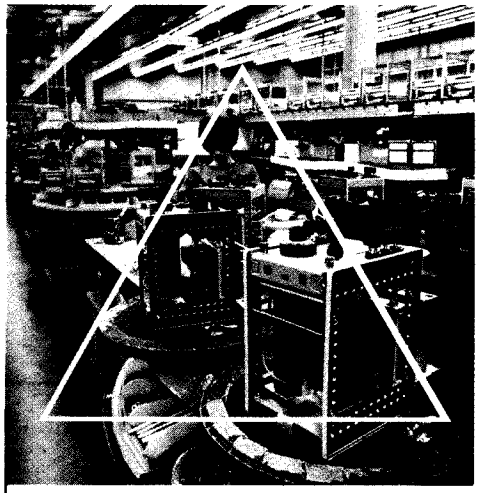
3¢ PER STUDENT PROGRAM

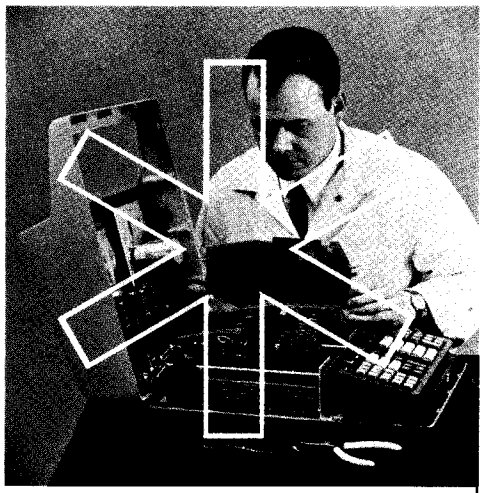
All schools have tight budgets. Yet many schools are getting the equipment which their students vitally need through leasing, Hewlett-Packard offers a wide variety of lease and rental programs. You can rent a Classroom Calculating System on trial for one or two months. Or, you can lease for several years with an option to buy anytime before your lease expires. Lease plans from one to four years, with a wide range of payment schedules, are available. A significant feature is the equity which you build with each lease payment. Up to 90% of your lease or rental payments can be applied toward purchase of your own Classroom Calculating System.

Depending on which peripheral configuration you choose and which lease plan you select it may cost less than $1.00 per hour to lease this -hp- Calculator. Many schools regularly run more than 30 student programs per hour. At 3¢ each can you afford to deny your students the advantages of computer experience? Call your local Hewlett-Packard office, explain your own situation and request information on the lease plan which is right for you!

SERVICE

Hewlett-Packard's worldwide network of service facilities mean unequalled maintenance and service. Each item of equipment can be covered by a service contract. This contract provides preventive care in addition to on site repair if your calculator should experience any type of failure. Routine inspection and preventative maintenance is provided on a regular scheduled basis. In most areas -hp- provides 24 hour response time for repair. The unique modular construction of this equipment allows our trained service personnel to repair any fault in less than one hour. With minimum downtime you receive maximum use from your calculator.





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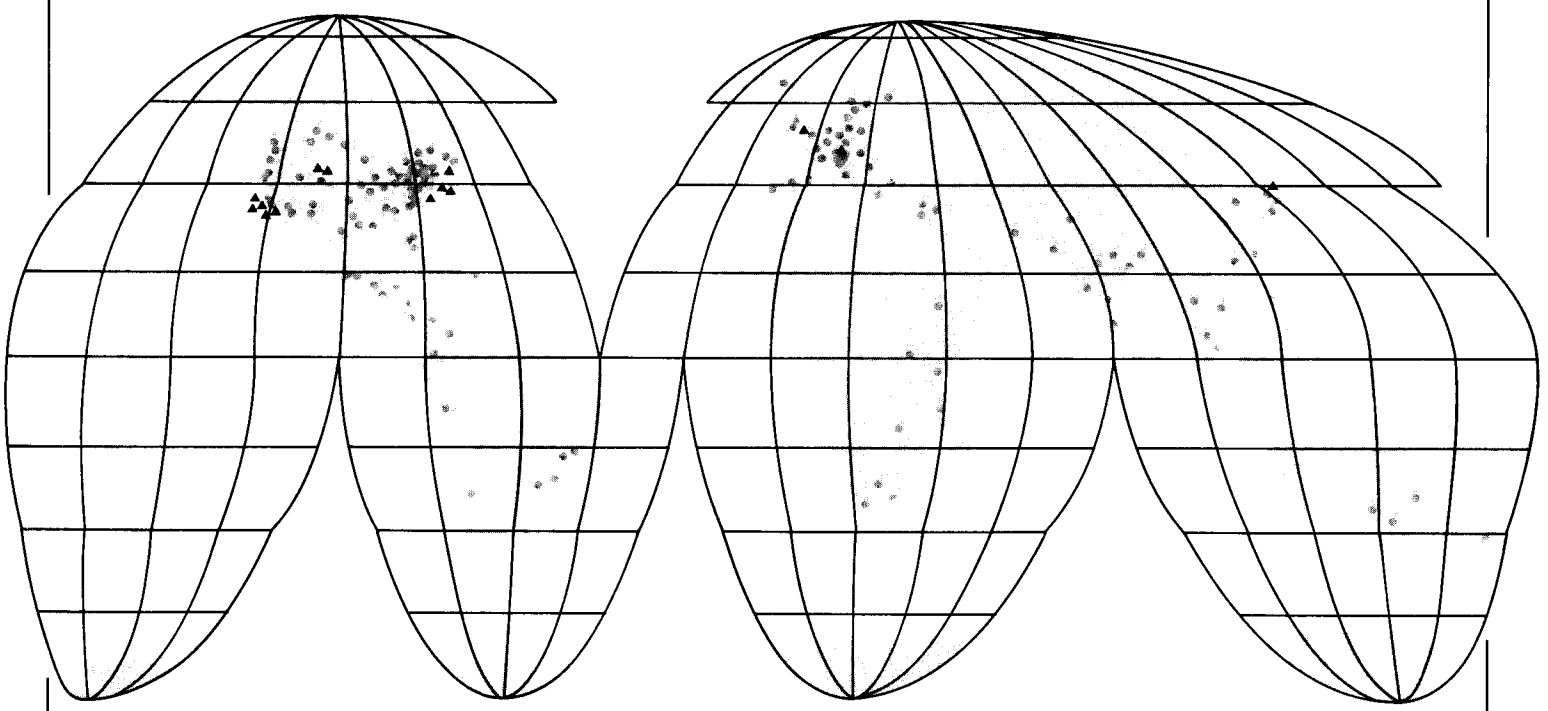

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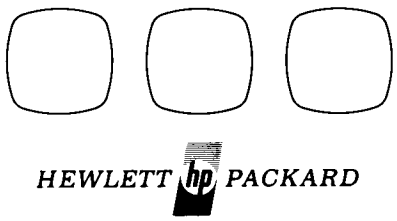

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