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TEACHING and computers®

Published by Scholastic Inc.
February 1987 Vol. 4, Issue 5

COVER ILLUSTRATION:
JAMES TENNISON

10 *Celebrate African-American History Month.*

18 *A groundhog grammarian?*

FEATURES:

CLASSROOM MATERIALS:

COLUMNS AND DEPARTMENTS:

TEACHING AND COMPUTERS® (ISSN 0738-6087) is published eight times during the year; monthly September through April, bimonthly November/December and May/June by Scholastic Inc., 730 Broadway, New York, NY 10003-9538 for $19.95 per year, $11.95 for five or more subscriptions to the same address. Single copy, $3.50. (For Canadian pricing, write our Canadian office, address below.) Second-class postage paid at Monroe, OH 45050-2700 and at additional offices. POSTMASTERS: Send notice of address changes to Office of Publication, TEACHING AND COMPUTERS®, 351 Garver Rd., Box 2700, Monroe, OH 45050-9998. Address subscription correspondence to TEACHING AND COMPUTERS®, P.O. Box 2040, Mahopac, NY 10541. Canadian address: Scholastic-TAB Publications, Ltd., Richmond Hill, Ontario L4C 3G5; in the United Kingdom: Scholastic Publications, Ltd., Westfield Rd., Southam, Leamington Spa, Warwickshire, England DV330JH; in Australia: Ashton Scholastic Pty., Ltd., P.O. Box 579, Gosford, N.S.W. 2250, Australia; and in New Zealand: Ashton Scholastic Ltd., 7-11 Fairfax Ave., Penrose, Auckland 6, New Zealand. Available on microfilm through Xerox University Microfilms, Inc., 300 N. Zeeb Rd., Ann Arbor, MI 48106. Also available on microfiche through Bell & Howell Micro Photo Division, Old Mansfield Rd., Wooster, OH 44691. Printed in U.S.A.

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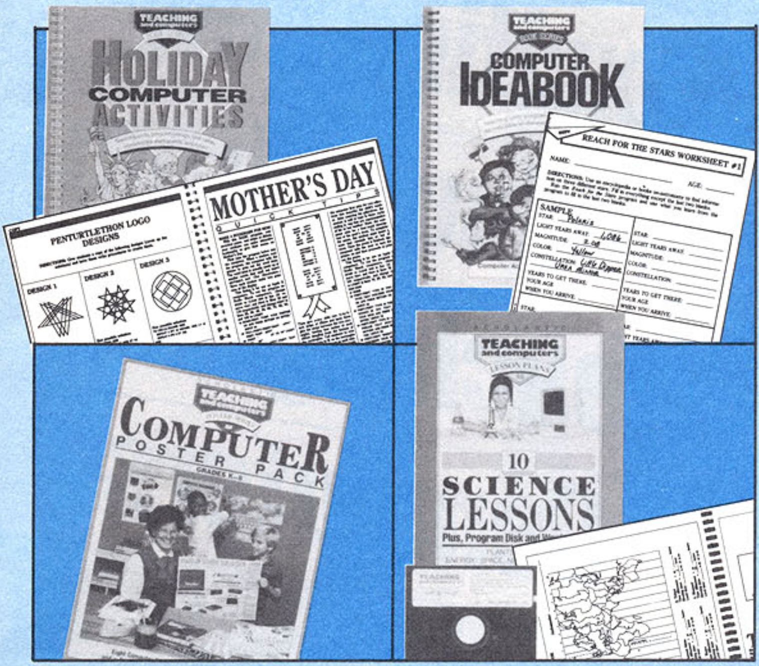

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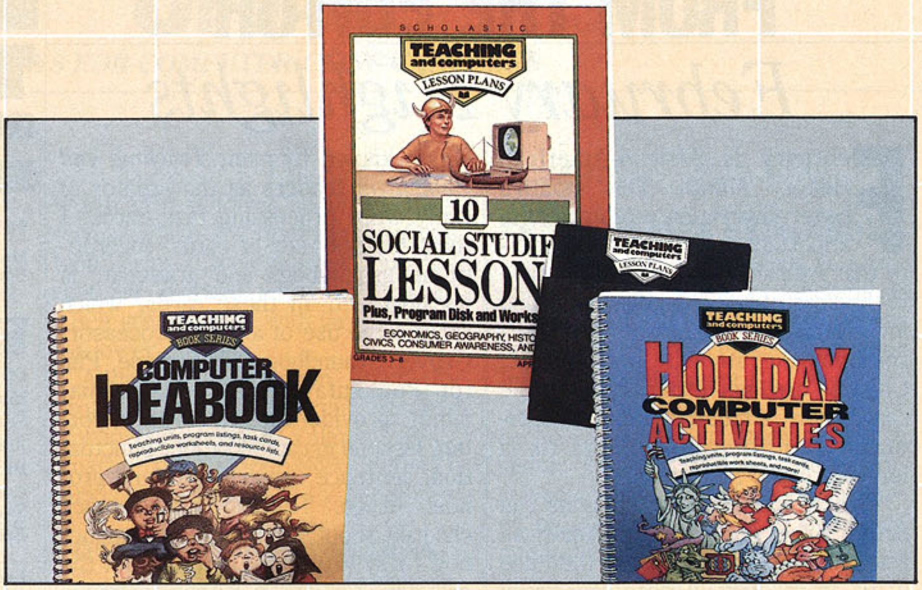

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FROM THE EDITOR

February Highlights

February is African-American History Month. This month's cover illustration celebrates the important contributions to history that African-Americans have made in the area of scientific discovery and invention. How many of these persons do your students know about? Chances are, not many. If that's the case, then **African-American Scientists and Inventors**, page 10, is for your class.

This article tells how students can set up a data file of African-American scientists and inventors and then use it to learn how African-Americans have influenced science during the past three centuries. But this data file project does more than teach a little African-American history. From start to finish, each activity in it is designed to help children develop critical thinking skills.

The article is written by Carol Edwards, the director of Project MiCRO (Minority Computer Resources Opportunity). One of Project MiCRO's main goals is to use computers to teach critical thinking skills. Carol's article proves that she knows her business and that the computer is an ideal tool for such an endeavor.

You'll find a rather unusual combination in this month's other feature article: it's, believe it or not, groundhogs and grammar! This combination is the brain child of teacher Tom Boudrot. Tom is the director of computer instruction for the Alief Independent School District in Houston, Texas. He is known by many *Teaching and Computers* readers as the creator of lively word processing task cards. I think his new set of cards, incorporating groundhogs and grammar, is his best yet. In these cards, which require the use of a word processor, Grover Groundhog and his uncle, Phil (of Punxsutawney, Pennsylvania, fame), provide students with important lessons in capitalization, punctuation, sentence construction, and pronoun usage. The cards also teach children about the legend of Groundhog's Day (February 2) and about the groundhog celebration that continues to take place each year in Punxsutawney. See **Groundhog Grammar**, page 18.

Those of you who teach students with special needs will want to read the **Ask the Experts** column on page 8. In this month's column, computer specialists Eydie Sloane and Madalaine Pugliese tell how the computer can open new vistas for learning disabled, physically challenged, and emotionally handicapped children.

Also in this issue are: a poster on computer history, four task cards that teach students how to write stories with effective dialogue, and lots of quick tips on how to use the computer to celebrate the many holidays that fall in February.

Enjoy!

Mary Dalheim

Taking time out to admire this month's cover illustration are Mary Dalheim (left) and senior editor Mickey Revenaugh (who edited the cover story).

TEACHING and computers

PUBLISHED BY SCHOLASTIC INC.

Maurice R. Robinson, Founder of Scholastic Inc., 1895-1982

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PUBLIC DOMAIN SOFTWARE COLLECTION

A set of 20 diskettes for Apple II series computers is available for only $195 — the cost of the blank diskettes. All programs on the diskettes are in the public domain, have been fully debugged, and have no copyright restrictions. The set is entitled *Public Domain Software on File*. According to its producer, Facts on File Publications, the commercial equivalent of this package is worth more than a thousand dollars.

Although many of the programs are not for educational purposes (some are for business; others are for entertainment or for home management), a good number of them (over 100 of the more than 250 programs) do have educational applications. The package, which comes in a slipcase binder, arrives with a librarian's guide, user's guide, and a poster that describes each program.

Diskettes in the set are guaranteed for 30 days. After this period, lost, stolen, or damaged diskettes can be replaced for $5 each. To order, call toll-free 800/322-8755. In New York, Alaska, and Hawaii call 212/683-2244; or write Facts on File, 460 Park Avenue South, New York, NY 10016.

AUTOMATIC SCORING FOR TEXTBOOK TESTS

A new assistance program by Scantron Corporation enables school districts to automate the scoring of textbook supplemental tests at a very reasonable cost.

A number of textbook publishers, such as Addison-Wesley, D.C. Heath, Houghton Mifflin, and Scott Foresman, have joined Scantron in this effort. They have agreed to prepare *Computer Management System* (*CMS*) software for their textbooks' supplemental tests. The software enables teachers to score the tests with the aide of a Scantron OMR/Data Terminal and a microcomputer. The terminals are loaned to schools by Scantron for an annual fee of $72. Scantron installs the data terminal, trains teachers to use it, and provides servicing.

To qualify for the loan, a school must purchase a minimum of $800 worth of test forms annually. These forms, which are read by the Scantron Terminal, have answer "bubbles" that are marked with a #2 pencil. They are available with large bubbles for lower grades.

Additional information about the program is available from Scantron Corporation, 1361 Valencia Ave., Tustin, CA 92680-9969; 800/421-5066. In California, 714/259-8887.

SOFTWARE SWEEPSTAKES

Learning Well, makers of computer software, board games, and duplicating/reproducible workbooks, is holding a sweepstakes drawing for teachers on May 15, 1987. The winner will receive one copy of each of the 159 educational products in Learning Well's new 1987 catalog.

To enter the drawing, fill out the entry form on the back inside page of the company's 1987 catalog and return it to Learning Well by May 1, 1987. No purchase is necessary.

For a free catalog, write Learning Well, 200 South Service Rd., Roslyn Heights, NY 11577; 800/645-6564. In New York, Hawaii, Canada, and Alaska call 516/621-1540.

NEW PUBLICATION CITES LATEST IN CAI

CAI Effectiveness and Advancing Technologies: An Update, is a nine-page study recently prepared by the Educational Computing Council of the International Communications Industries Association (ICIA).

In addition to providing information on the effects of CAI (computer-assisted instruction) in the K–12 education market, the study explains similarities and differences between CAI hardware, such as videodiscs and interactive videos, telecommunications and distance learning, and two types of compact discs. The study provides statistical data on the use of each CAI tool and describes how each has been piloted in schools across the country.

Copies of the booklet are available for $10 apiece ($5 for ICIA members), from Karen Gourlay, International Communications Industries Association, 3150 Spring St., Fairfax, VA 22031-2399; 703/273-7200.

TEACHER IDEA EXCHANGE

Appleworks users wishing to share ideas and techniques, as well as computer questions and answers, can do so through the Teacher's Idea and Information Exchange.

To become a member, a teacher sends $5, or $4 and a disk of files, to share. In return, the teacher receives a demo disk of files, contributed by others. These files include an updatable school year calendar, a grade book, tips for using *The Newsroom* software, a data base of words often misspelled by students, and a data base of other diskettes available from the exchange. A six-month membership, including a new diskette each month, is $25.

For more information or to join the exchange, send your name, address, position, and school affiliation with a self-addressed stamped envelope to: The Teacher's Idea & Information Exchange, c/o James Carlisle, Rd. 2, Box 754, Cobleskill, NY 12043.

EXCESS INVENTORY DISTRIBUTED TO SCHOOLS

Becoming a member of The National Association for the Exchange of Industrial Resources (NAEIR) entitles a school district or other nonprofit agency to receive computer equipment, office supplies, arts and crafts, sporting goods, and other items free. The NAEIR collects excess inventory from industry and distributes it to its members through quarterly catalogs and order cards.

According to NAEIR, an average member receives $4,500 worth of supplies and equipment a year for the $395 annual dues fee. Members must also pay shipping and handling charges for the items received. NAEIR guarantees new members that if, after the first year, the value of materials received is not at least twice the cost of the annual dues, NAEIR will refund the dues or offer another year's membership free.

For an information kit about NAEIR, write NAEIR, Dept. ER-2, 560 McClure St., P.O. Box 8076, Galesburg, IL 61402; 309/343-0704. ■

CLASSROOM HAPPENINGS

WHAT'S HAPPENING IN COMPUTER CLASSROOMS

YOUNG HACKERS PARTICIPATE IN ALASKAN DOG RACE

Scenes from Iditarod sled dog race (clockwise): starting gate in Anchorage; finish line in Nome; developers of initial checkpoint program; checkpoint operators.

The Iditarod, affectionately known in Alaska as the "Last Great Race on Earth," is a grueling 1,049-mile sled dog race from Anchorage to Nome, Alaska. Now an Alaskan institution, the race commemorates the efforts of the sled dog teams that delivered vials of diphtheria serum to epidemic-stricken Nome in 1925.

On March 7, 1987, the 15th annual Iditarod begins. For the sixth consecutive year, kids and computers are going to be involved. No, you won't find 11- and 12-year-olds out in the Alaskan wilderness at below-zero temperatures, "mushing" dogs and protecting themselves from the elements of nature.

Where you would have found them for the past five years was behind computers at the 27 checkpoints along the Iditarod trail. Since 1981, and until this year, kids in Alaska have operated the checkpoint computers with the aid of a student-created computer program. The program, which worked within a network of Apple and MacIntosh computers, was used to process checkpoint information: arrival and departure times, dog counts, and weather conditions along the trail. The information was then relayed via AlaskaNet satellite network to a mainframe computer in Nome. The data helped race officials determine the need for emergency aid and supplies.

"The race is growing," says Jim Larsen, Iditarod Race Communications Manager. "Unfortunately," he says, "the student-created program no longer meets the needs of the race. This year's race officials decided that a professional software package was necessary."

Though Alaskan school children will no longer be at the forefront of Iditarod, there is still a role for them to play, Jim adds. Anyone with a modem can access AlaskaNet, and many classrooms will be keeping close watch. Their new responsibility: informing their neighbors of who's ahead.

BASEMENT OR NOT, WE'RE A STILL A MUSEUM!

What could *you* do with a museum the size of an average classroom?

"It's easy," says David Tyson, high school biology teacher and curator of the 20-foot-by-30-foot Museum of Humanities, located in the basement of Manhattan's High School for the Humanities. "One thing you can do is open up an idea museum. Ideas don't have to take up a whole lot of space."

That certainly is true. Most of the ideas in David's museum are stored on a handful of diskettes that are used on eight TRS-80 Model III computers. These idea "exhibits," or computer programs, are designed to make kids think — primarily about what they believe.

One program, for example, forces users to decide which of five hypothetical patients should receive a kidney transplant. Another asks kids to select traits that they would like to see in a boyfriend, girlfriend, occupation, or parent. (For example, which would *your* students prefer: a parent who is strict and always at home, or one who is lenient and never at home?)

Still another program has kids answer such questions as: "Does a computer stop existing when you walk out of the room?" Based on responses, this program tells users whether they are objectivist or subjectivist. (Variations on this program help kids decide whether they believe in capitalism or communism; male chauvinism or women's lib; racism or egalitarianism.)

Although many of David's programs are for a junior high or high school audience, there are other programs that younger students could also appreciate. If you use a TRS-80 Model III or Model IV computer and would like to see any of David's programs, send a blank diskette and return envelope with correct postage to: David Tyson, Museum of Humanities c/o High School for the Humanities, 351 West 18 St., New York, NY 10011. David is interested in swapping philosophy ideas and "idea" computer programs, as well. ■

BY JACKIE GLASTHAL

ASK THE EXPERTS

ANSWERS TO YOUR COMPUTER QUESTIONS

Computers and the Special Student

Perhaps even more than for other students, the computer has opened new vistas for the student with special educational needs. This month's questions and answers examine those changes and give some hint of what the future might bring.

Our experts this month are **Eydie Sloane**, computer consultant for special populations and *Teaching and Computers* advisory board member; and **Madalaine K. Pugliese**, coordinator of the Special Education Technology Resource Center for the Boston Public Schools.

Q ***The kids I teach are special — learning disabled, emotionally handicapped, physically handicapped. Why should I get excited about the prospect of computers in my classroom?***

ES: The benefits these interactive machines have for special needs students are enormous. They provide (1) immediacy and variety in feedback and reinforcement; (2) the capacity for hours of necessary repetitive drill and practice; and, of course, (3) the option to use voice input/output and special adaptive devices to enhance academic, social, and communication skills.

MP: For example, visually impaired students benefit from "talking" computers or braille translators. Armed with a modem and a telephone, hearing impaired students can "telecommunicate" with other computer users. Nonverbal students have access to augmentative devices such as the graphic symbol template, which allows them to express themselves without stumbling over the language barrier. Motor impaired students can take advantage of a wide range of adaptive devices *(see third question)* designed to promote access. Learning disabled students can improve written language skills by using a word processor *(see fifth question)*. The attention deficits of emotionally disturbed students can be improved through use of motivating software programs.

Q ***Will my special kids need special kinds of computers? What factors should my district take into consideration when choosing computers for the special needs classroom?***

MP: Decision makers should ask themselves the following questions: (1) What do I want the student to do with the computer? (2) What adaptive devices will facilitate appropriate access? (3) What software do we need to accomplish these goals? After these questions are answered, the next question will be, "What hardware will be compatible with these functions?"

ES: No one computer is perfect for everybody, and no one computer will be perfect for every special needs student. Keep an open mind. Try to match the computer to each student's needs and to his or her Individual Educational Program, as required by Federal Law 94-142.

Q ***What adaptive devices are available for the physically disabled kids in my classroom who are unable to operate a standard computer?***

ES: Physically challenged students who cannot use a standard keyboard have a lot of options on the "input" side of computing. Among the input options available are expanded keyboards and keyguards, which help combine complex functions into one or two keystrokes; mouth pieces, chin straps, and headbands equipped with pointers for pressing keys without use of the hands; touch-screen technology, which allows the computer user to manipulate data through contact with the monitor screen, bypassing the keyboard altogether; adaptive switches, which allow the user to operate the computer by raising an eyebrow, for example, or tilting the head; microbraillers, which convert a standard keyboard to braille; and voice recognition systems which operate the computer by the spoken word.

MP: On the output side, alternative devices include braille printers, magnified video displays, and a variety of speech synthesizers that allow the computer to "talk" to its user. Some commercially produced peripherals also have great implications for use by disabled students: these include joysticks, game paddles, Koala pads and touch windows for input, and synchronized audio cassette tape players.

Q ***Is there software specifically designed for the special education classroom? Or can regular educational software be modified for my kids' use?***

ES: A great deal of regular educational software works just fine with special students. There are software packages specifically for special kids. Most of them concentrate on developing communications skills. There is also a large variety of both public domain and commercial software specifically for blind students, allowing them to perform word processing and other computer functions with braille, voice synthesis, or a combination of both.

MP: Software should be selected for use because it addresses an individual student's needs, whether or not it is designed for use in special education. Certain characteristics that are especially appropriate for use with students who exhibit learning problems include "talking" software which provides auditory feedback and creates a multisensory learning environment, and screen formats that assist students in organizing information visually. Also helpful are such modification options as flexible pacing and "authoring" capabilities, which will allow you to add content especially suited to your students' needs. Soundness of instructional design should always be considered.

Q ***What about kids whose handicaps are "invisible," in other words, students with learning disabilities? Can the computer help them?***

ES: The computer is actually an ideal tool for kids with learning disabilities, because they can interact with it in whichever sensory mode — visual, auditory, tactile, and/or moto-kinesthetic — best allows them to process information.

MP: Learning disabled students are often hampered in the retrieval, organization, and/or production of information. The computer can be helpful on many fronts. The word processor, for example, with its ease of editing and correcting, lets the learning disabled student who has poor hand coordination "write" more easily and neatly. It lets the disorganized thinker easily reorganize (actually move) words and sentences. In some cases, it can help the poor speller check for and correct spelling errors. A speech synthesizer that can give auditory feedback while checking for spelling errors adds even greater support for the students' writing efforts. In fact, the word processor with speech seems as though it was designed with the learning disabled student in mind!

Other obstacles can also be overcome with the help of the microcomputer. Speech synthesizers can read difficult words with students and software simulations can assist in visualizing mathematical concepts.

Also of primary importance is the issue of self-image. Given these students' probable history of failure in many areas, suddenly we have a tool that allows them to succeed in these same areas. It restores confidence and the exciting feeling of, "I can do it!"

Q ***How can my school or district afford all this special equipment and programming? And how can we be sure the benefits will be worth it?***

ES: Special equipment does not have to be costly. Many major hardware manufacturers now have offices devoted to serving "special needs" customers *(see ninth question)*; sophisticated administrators make the most of these resources by working out discounted school bids, to give one example.

MP: In terms of benefits, we must keep in mind that we are just beginning to realize the great potential benefits that microcomputers offer to special needs students, in terms of educational opportunity, vocational horizons, and the quality of life in general. Special education has the responsibility to plan for the future NOW!

Q ***What new developments can we expect to see in the special education computer field during the next year?***

ES: We can expect to see a greater variety of adaptive devices at lower prices. And with voice recognition and speech synthesis becoming more sophisticated, we can expect to see more software using this technology.

MP: There are some exciting technologies not yet being used to their greatest advantage in special education, including telecommunications, cable TV, interactive video, and artificial intelligence (in robotics and other forms). In addition, a much-needed and potentially powerful resource exchange is emerging among universities, clinical settings, and public schools to assure that disabled students have optimum access to the technologies that will assist them.

Q ***What supportive resources and information services are available for computer-using special ed teachers?***

ES: As I mentioned earlier, many computer hardware manufacturers offer special services for special educators. For example, you can reach the Apple Office of Special Education at 20525 Mariani Avenue, MS 23-D, Cupertino, CA 95014. IBM's National Assistance Center for Persons with Disabilities can be reached by calling (800) IBM-2133.

For information about software packages that might meet your students' needs, you might try the Special Education Software Center, (800) 223-2711.

Closing The Gap is a good resource for training, technical assistance, and information. You can reach this group at P.O. Box 68, Henderson, MN 56044, (612) 248-3294.

Magazines and other periodicals can help you keep abreast of new developments. One newsletter covering special needs in computing is *The Sloane Report*, P.O. Box 561689, Miami, FL 33256, (305) 251-2199.

MP: Community based resources include clinical or hospital evaluation units, universities, and local computer users' groups. Agencies that provide services to the disabled are also good resources.

Q ***Are there any handicapping conditions for which the computer revolution offers no hope?***

MP: Hopefully not! These fascinating and powerful tools have motivated professionals and empowered students in ways never dreamed possible only a few years ago. It is exciting to think that we do not yet know the limits of the possibilities.

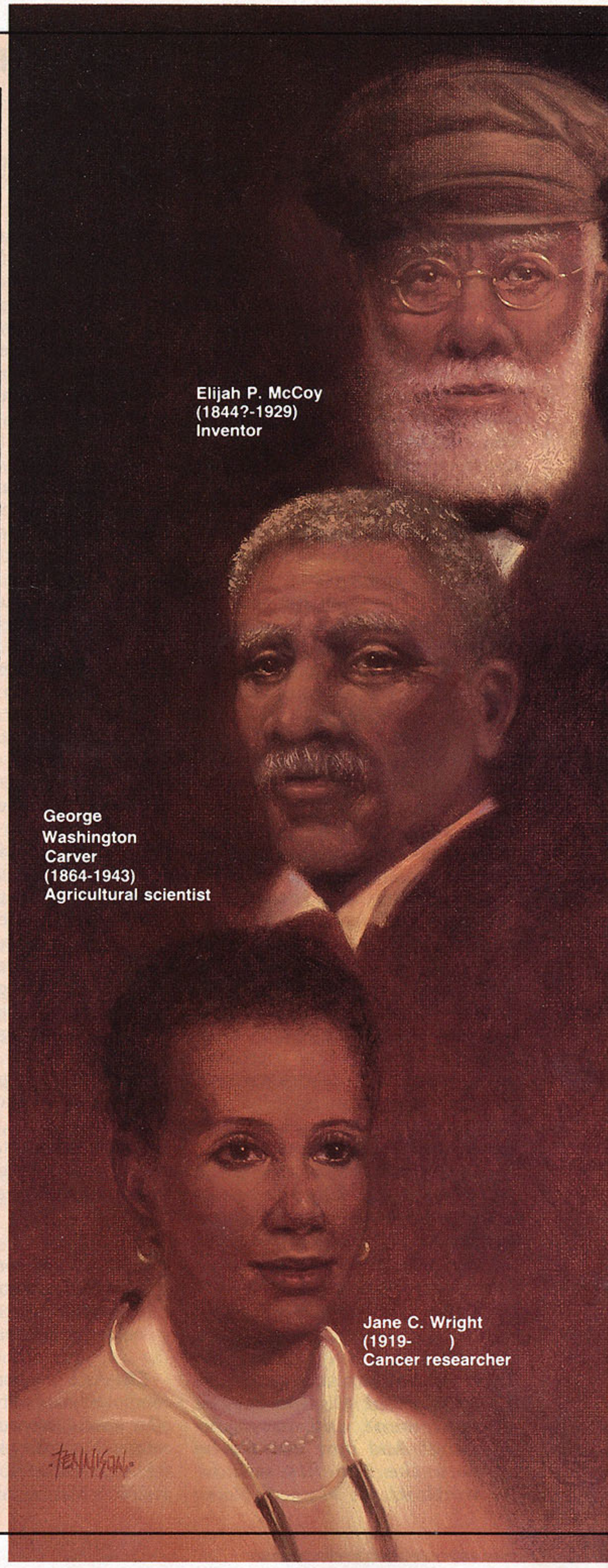
ES: To date, I have never met a special needs individual who could not benefit from some kind of computer technology. I have had success with students who were severely physically handicapped, severely mentally handicapped, totally blind, deaf, learning disabled, emotionally handicapped, autistic, communication disordered, totally nonvocal, deaf-blind, or some combination thereof. It takes effort, enthusiasm, and a lot of patience, but the rewards of seeing a failing student or nonproductive student benefit from computer technology are worth every minute of time invested. ■

AFRICAN-AMERICAN SCIENTISTS AND INVENTORS

A data file project that teaches history and helps develop critical thinking skills

BY CAROL EDWARDS

James Tennison



Benjamin Banneker
(1731-1806)
Mathematician, astronomer

Matthew Henson
(1866-1955)
Explorer

Ronald McNair
(1950-1986)
Laser physicist, astronaut

February is African-American History Month — a time when Americans of all races recognize and honor the contributions that African-Americans have made to this nation throughout its history. Since 1928, when the celebration was initiated by African-American historian and scholar Carter G. Woodson, African-American History Month has served to reinforce positive cultural images among African-American students. It has also given students of other races an opportunity to learn about the varied and significant roles that African-Americans have played in this country's development.

One such role is in the area of scientific discovery and invention. Ask your students to tell you what they know about African-American scientists and inventors, and they will probably name George Washington Carver, the agricultural chemist who invented more than 300 uses for the peanut. In addition to using the peanut to make food products such as candy, dried coffee, cereal, and meat sauce, Carver used it to make cosmetics, paper, dyes, linoleum, and even plastics. (The cultivation of peanuts, by the way, was brought to this country by African people.)

Some of your students may tell you about the accomplishments of Benjamin Banneker, the mathematician and astronomer who helped design the street plan for the nation's capital. They will almost certainly know Ronald McNair, the laser physicist and astronaut who, along with six other crew members of the space shuttle *Challenger,* gave his life to expand the horizons of scientific knowledge about space.

But will your students know Elijah McCoy, inventor of a lubricating cup for railway airbrakes? McCoy's invention in 1892 revolutionized the railway industry. It became so desirable that people began asking for "the real McCoy," an expression we still use today.

Will they know about zoologist Charles Henry Turner, whose studies of ants, bees, and cockroaches made a significant contribution to what was known about insect behavior at the turn of the century?

Will any student mention Angella Ferguson, the pediatrician who pioneered treatment techniques for sickle cell anemia; or Marvin C. Steward,

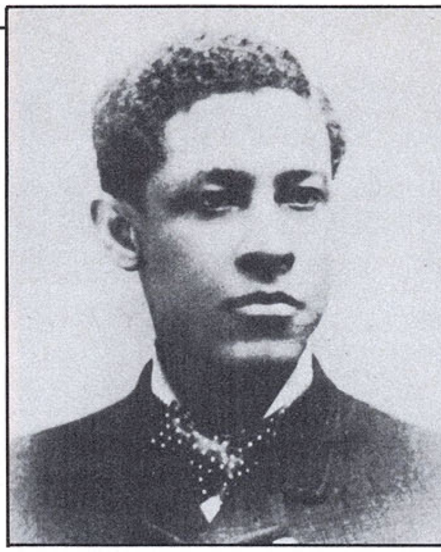
(continued)

inventor of an arithmetic unit for digital computers? If the answer to these questions is no, this data file project is for you.

The project has two goals. The first is to give students an understanding of some historical contributions made by African-American scientists and inventors. The second is to help children develop critical thinking skills by teaching them how to design and manage a data file that they will then use to test hypotheses and draw conclusions about the lives and works of African-American scientists and inventors. The activities in this unit will supply you with an entire month's worth of study, and can easily be expanded to provide several months' worth.

The model data file in this unit was created using the *Scholastic pfs: file* data management program, but the model can be easily adapted for use with virtually any data management software.

If you have never used data management software before, read the "Data Base Primer" on page 17.



Inventor Jan Matzeliger revolutionized the shoe industry in America .

You will need to have a printer for this unit.

THINKING ABOUT THINKING

There are two reasons why a data file project on African-American scientists and inventors is ideal for teaching critical thinking skills. First, the subject matter is familiar enough for students to be involved in decision-making from the earliest phases of research design, yet challenging enough to encourage increasingly sophisticated analysis. Second, learning about the lives of scientists and inventors gives students a firsthand glimpse of applied critical thinking. With your help, students will see parallels in their research process and the processes that inventors and scientists use in their work.

Each of the critical thinking skills in this teaching unit (see "Glossary," on this page) has its own purpose and its own requirements for mastery; you'll want to devote more time and attention to each one than is possible here. When teaching any of the skills, however, you may want to keep the following general principles in mind.

1. Many of the critical thinking skills are linked together, and some of them are "building blocks" for a broader skill or process.

For example, the critical thinking skills of *distinguishing fact from opinion* and *detecting bias* are clearly related to each other. Both of them are component parts of the larger skill, *judging credibility*. Help your students to see the connections among the critical thinking skills, and make sure they master the necessary "building blocks" of each.

2. Each skill or set of skills has a particular purpose that suits it to particular tasks.

Teach students to examine the task at hand for indicators of which skill would be most useful. Suppose your students' research on an African-American scientist turns up two contradictory pieces of information in two reference books. With your aid, students will be able to recognize that judging the credibility of each source will help them decide which is most likely to be correct.

3. All thinking skills can be applied most effectively when a large task is divided into smaller steps.

Because our knowledge of cognitive processes is still limited, we can not yet provide a specific blueprint for exercising each of the critical thinking skills. The one universally useful approach, however, seems to be dividing the large task into small steps. To judge the credibility of a reference book, for example, your

GLOSSARY OF CRITICAL THINKING TERMS

The data file project on African-American scientist and inventors provides an opportunity to teach and reinforce a series of critical thinking skills. Specific skills and processes referred to in the text of the article include:

SKILLS

Association: To form mental connections between facts, ideas, or images.

Classification: To categorize objects or ideas based on established criteria, as when sorting a button collection by size and color.

Deduction: To infer a particular conclusion from a general or universal premise (as in "The weather is cold in winter; February is a winter month; therefore, our Valentine's Day beach party could be a chilling experience.")

Induction: To infer a general conclusion from one or more particular instances (as in, "I got sick on Saturday; I ate onions on Saturday; therefore, onions make me sick.")

Inference: To arrive at a conclusion through reasoning from evidence.

Sequencing: To arrange objects or ideas in a particular order based on their relationship to each other. Types of sequencing include hierarchical (from most important to least important), numerical, and alphabetical.

PROCESSES

Detecting Bias: To determine if an idea is based on prejudice about race, sex, class, ethnicity, religion, age, and so on.

Distinguishing Fact from Opinion: To tell the difference between statements that are objective and can be proven, and those that are subjective and cannot be proven.

Judging Credibility: To determine whether an assertion is believable by way of supporting evidence, authority of source, and so on.

Judging the Relevance of Information: To determine whether information is applicable to solving the problem or making the decision at hand.

Problem Solving: To apply systematic steps to arrive at an effective solution to a problem including: 1) defining the problem; 2) generating alternative solutions; 3) choosing the best alternative; 4) testing the selected solution 5) modifying the solution as needed.

students may decide to look separately at the book's author and the sources of information on which the author drew.

4. If a skill doesn't seem to be working, go back to principles 1, 2, and 3.

When students get stuck in their application of a particular thinking skill, it is often because they've gotten ahead of themselves in putting that skill to work. Encourage them to pause and ask themselves the following questions: Have they broken the task down into its smallest parts? Are they using the most appropriate skill for each sub-task? Do they have a firm grasp on the skill they are using, including its prerequisites and related skills? In the example above, students may find that they cannot judge the credibility of a reference book's author without first researching the author's background and then applying the "building block" skill of detecting bias.

5. There are no wrong answers.

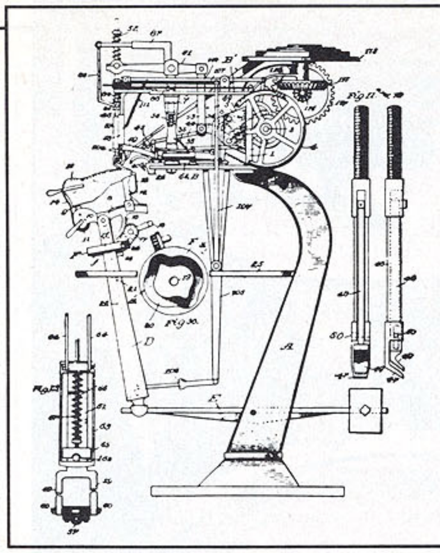
Stress to your students that critical thinking skills *will* lead them to the best possible answer, if they use the skills thoroughly and carefully. In the example of conflicting data on a scientist they are researching, students will know they have chosen "correctly" when they have explored all reasonable possibilities for judging credibility, and made their decision on that basis.

In addition to these five principles, there are certain teaching techniques that will make teaching any material for critical thinking more effective. If you are not already familiar with such techniques, check those listed in the box entitled "Techniques for Teaching Critical Thinking" on page 15. Use these techniques with the activities for this data file project.

Research Resources

Access to research materials is an important consideration in preparing a data file on African-American scientists and inventors. You'll find a list of reference resources on page 16. These are suggested for your preparation as well as for student research later in the teaching unit.

Unfortunately, many libraries are not well stocked with books and periodicals in this area. Moreover, there is an unusually high demand for such materials during African-American



The shoe lasting machine patented by Jan Matzeliger in 1883.

History Month, which sometimes makes materials difficult to obtain.

If you live in a city or town that does not have a large source of books and periodicals about African-Americans, try interlibrary loans from state, regional, or university libraries. Bookmobiles that visit your area may also be a good source of materials. Enlist the aid of your librarian.

You may find that some of the biographies of African-American scientists and inventors written for children are out of print. Write letters to the publishers urging them to reprint these books. Although this action will not bring immediate help, it may prevent similar difficulties in the future.

In general, your best strategy is to pull your resources together well before February.

Reviewing African-American History

In order for students to fully appreciate the accomplishments of African-American scientists and inventors, they'll need some background in African-American history. If they understand what life was like for African-Americans during the eras of the fugitive slave laws, reconstruction, Jim Crow laws, post-World War I and II, and the modern civil rights struggle, they will be able to understand African-American scientists and inventors within the larger context of their times.

Most textbooks give survey treatment to African-American history, but you may well want to make use of additional materials on African-American history from the library. Discuss the major eras of African-American history with your students immediately before launching this data file project.

A Data File for Critical Thinking

What follows is a step-by-step method for creating and using a data file on African-American scientists and inventors that emphasizes critical thinking skills. You should modify the steps in this plan to fit your resources, the skills and needs of your students, and other circumstances.

The first three steps are off-line research and evaluation tasks that lead to the design of the data file. They are followed by more research and data entry. The final step involves managing the data to answer analytical questions and hypotheses.

Step 1: Posing Research Questions

In a data file project that emphasizes critical thinking skills, it is important for the students themselves to make systematic decisions about the design of their research. A great deal of critical thinking takes place during this phase.

To get started, your students should inventory what they already know about this subject, and decide whether their existing knowledge is extensive enough to begin creating a meaningful data file. By asking key questions in a class discussion, you can guide students to a decision on this issue very quickly. For example, have your students name one African-American scientist and inventor with whom they are familiar — then ask them to describe that individual's life. Or ask a broad analytical question, such as how the abolition of slavery affected the lives and work of African-American scientists and inventors. Unless they have had an unusually thorough grounding in African-American history, your students will probably decide that they need more information before they can design (and complete) a data file that will help them answer questions like these.

Suggest to your students that to begin designing such a data file, they will need to gather enough basic factual information to pose analytical questions (Step 3), develop and test hypotheses, make inferences, and reach conclusions later. *(continued)*

Wide World Photos

Arctic explorer Matthew Henson (right) and his wife were honored at the White House by President Dwight D. Eisenhower in 1954. Henson was the last surviving member of the first successful expedition to the North Pole, 45 years earlier.

For this initial research phase, have students select four African-American scientists and inventors who have done their major work in different eras. An example of a logical historical grouping would be: before the 1880s (pre/post Civil War era), 1880s-1920s (World War I era), 1930s-1950s (World War II era), 1960s-present (modern civil rights era).

Show students how to ask *who, what, where, when,* and *how* questions about their historical figures. For example, if Benjamin Banneker were selected as the pre-1880s scientist, the questions you might model would include: *Who* were major influences on Benjamin Banneker's life? *What* were his major accomplishments? *Where* and *when* did he live? *How* did treatment of African-Americans affect his work?

Have your students brainstorm additional questions for this list. Then ask them to choose eight to ten questions that they think will give them the most important facts about the lives of the African-American scientists and inventors they've selected for research.

Generally, the questions should apply to everyone on the list. Make sure they are questions that can be answered from the research materials available. Unless you have data entry assistance, try to limit questions to those that can be answered relatively succinctly, in one paragraph or less.

After the questions have been selected, make sure every student has the same interpretation of them. As a final test to ensure that appropriate questions have been selected, ask students if the answers to these questions will provide them with the basic facts about the African-American scientists and inventors.

Step 2: Collecting Preliminary Data

In this step, your students will exercise their skills in *classification* and *sequencing*. Through class discussion, agree on a format for preliminary data collection, and design a pencil-and-paper form to match it. Decide with your class how dates, locations, names, titles, and other information will be recorded. For example, if students decide to use full names and titles, they should record Dr. Daniel Hale Williams rather than Daniel H. Williams or "Dr. Dan" (his nickname) Williams. If they decide to enter last name first, they would record Williams, Dr. Daniel Hale. Attention to detail and consistency are habits that should be established from the very beginning of data file creation. A little extra attention at this point will help avoid confusion later.

Encourage students to keep their eyes open, as they research, for one or two interesting facts that are not part of the requested data. These facts may later stimulate additional inquiry and new avenues for analysis.

Divide the students into small groups to collect data on the four selected African-American scientists and inventors. If the groups are too large, you may wish to have some of the students act as data checkers rather than initial data collectors; they would be responsible for checking the accuracy and completeness of their fellow group members' research.

After the data on these four scientists or inventors has been collected and then checked for accuracy, you are ready for the next step.

Step 3: Posing Analytical Questions

In this very important phase of the data file project, your students will have an opportunity to use virtually all of the critical thinking skills described in this unit, but particularly *classification* and *inference.*

As a warm-up, ask children to classify familiar ideas or objects, such as things in a classroom, in as many categories as possible. Make sure they think of unusual, but feasible, categories. Ask them to compare and contrast items that are not usually paired — such as a microcomputer and a banana.

Next, ask students to share stories with the class about how a mistaken inference had consequences for them. (For example, "The last spelling quiz was easy; therefore, I don't need to study for next week's quiz. . . .") Ask students how they might have arrived at a different inference based on the same information.

Once the children have reviewed their thinking skills, they are ready to discuss the information they have gathered as a class during Step 2. Alert them to transfer their practice in critical thinking to their work on African-American scientists and inventors.

As a guide in the discussion of preliminary data, ask your students such questions as: What similarities and differences do you see in the lives of these inventors and scientists? How were they affected by racial prejudice? Are their discoveries still useful? What role did pride in their racial heritage play? What additional information would you like to have about them?

For each question, ask students to identify the factual information that will allow them to answer the question. When dealing with an inferred conclusion, ask them what facts point to a probable answer, or how logic might lead to an answer.

After students have discussed the lives of the African-American scientists and inventors they have researched, ask them to develop some new questions of their own. Suggest to students that they begin some of their questions with the word *why*. Encourage them to make their questions general enough to apply to almost everyone.

Also ask them to develop some hypotheses about the lives of African-American scientists and inventors. For example, one hypothesis might be that conditions prevented African-American scientists and inventors from working in those states where slavery was legal.

Select some of the better questions and hypotheses for further investigation. Eliminate those questions for which insufficient resource material is available.

SAMPLE RECORD

NAME: Williams, Daniel Hale, M.D.
DATE OF BIRTH: 1-18-1856
DATE OF DEATH: 8-4-1931
SCHOOLING: Haire's Classical Academy; Chicago Medical School
FIELD OF STUDY: Medicine
MAJOR ACCOMPLISHMENT: Performed first open heart surgery.
DATE(S) OF ACCOMPLISHMENT: 6-9-1893
PLACE OF WORK: Chicago, IL, Provident Hospital
OTHER ACTIVITIES: Established Provident Hospital, America's first interracial hospital.

This sample record shows some of the facts your students may want to include in designing their data file on African-American scientists and inventors.

Step 4: Designing the Data File

Ask your students what facts they will need to answer the research questions they formulated in Step 3. Suppose the question is "How did war affect African-American scientists and inventors?" Student researchers will want to know whether and when African-American scientists and inventors served in the military, whether their work was supported by the military, and so on.

Based on the kinds of information they wish to obtain, students should designate field (category) names. These fields should be added to those that were found useful during the preliminary data collection to make up the data record design. Some of the fields may not apply to all of the scientists and inventors, but are important where relevant. For example, for those scientists and inventors born before 1864, students may want to record whether they were born free, were manumitted (released) from slavery, or escaped.

Work with students to exercise the critical thinking skill of *sequencing* to create a logical arrangement of fields within the record: NAME, DATE OF BIRTH, DATE OF DEATH, SCHOOLING, FIELD OF STUDY, MAJOR ACCOMPLISHMENT, and so on (see the sample record on this page). Just as in Step 2, make sure all students share the same intepretation of how to make entries in each field. Also decide with them whether to have more than one record per person. Elijah McCoy, for example, patented an ironing table as well as the brake lubricator. Should one or several accomplishments be included in the data file?

Also decide whether you want to limit the amount of space in a field. Some data base programs restrict each field to a relatively small number of characters — a significant factor in the design. Moreover, if students are going to enter data in the computer file themselves, time constraints and keyboarding skills become factors. If students plan to use abbreviations, make sure they are uniform and meaningful.

Be sure to include the names of the students who collected and verified the data, the sources of data, and the entry dates. This information will permit everyone to track the data collection process. It will also provide positive reinforcement to students for their work.

When the data file design is completed, print a blank record and photocopy it to serve as a worksheet for the next step.

Step 5: Collecting More Data

Based on the resource materials you have available, give the students a list of African-American scientists and inventors and their major accomplishments (a sample list is included on page 16). Divide the students into small groups, and let each group select one or more names from the list. (More scientists and inventors can be added to the data file later.)

Remind students to draw upon and share with each other the lessons they learned about effective and efficient data collection techniques in Step 2. In addition, arrange for students to verify each other's completed worksheets. Verifiers should

(continued)

TECHNIQUES FOR TEACHING CRITICAL THINKING

Following are methods you can use to help students become critical thinkers.

Analogy: Use examples of things and situations familiar to students to help explain abstract concepts.

Divergence: Encourage expression of a variety of viewpoints; always ask for more ideas, or unique ideas.

Inquiry: Ask open-ended questions — questions that require descriptive answers, questions that begin with, "What if," "Why," and "What evidence do you have. . . ."

Modelling: Demonstrate while describing.

Peer Interaction: Encourage discussion and minimize lecture; ask students to talk directly to each other rather than through you.

Task-Explicit Positive Reinforcement: State exactly which student behaviors were good, and why; for example, "I like the way you. . .because. . . ."

Verification: Repeat student responses, beginning with, "Did I understand you to say. . . ."

Wait Time: Wait silently at least five seconds for a student's response to a question.

Suggested Reading — *Developing Minds: A Resource Book for Teaching Thinking.* Arthur L. Costa, Editor. Virginia Association for Supervision and Curriculum Development. 1985.

check the format of worksheet entries, spelling, grammar, and punctuation. They should carefully review the clarity and accuracy of entries, making sure all avenues are explored to fill in missing data. Discrepancies or other problems that individual researchers and verifiers cannot resolve can be discussed by the whole class.

AFRICAN-AMERICAN SCIENTISTS AND INVENTORS

Benjamin Banneker: Mathematician, astronomer, city planner.

George Washington Carver: Agricultural scientist.

Lena Edwards: Physician and hospital developer.

Angella D. Ferguson: Sickle cell anemia researcher.

Solomon C. Fuller: Psychiatrist and pathologist.

Matthew Henson: Member of first expedition to reach North Pole.

Lloyd A. Hall: Chemist, refined food sterilization.

Donald Jefferson: Invented digital storage system for data.

Fredrick M. Jones: Invented an X-ray machine.

Howard Jones: Invented UHF antenna.

Step 6: Data Entry

In a data file project that emphasizes critical thinking skills, this is the least important step for direct student involvement.

If you have access to trained parent volunteers, you may want to ask them to enter the worksheet data and duplicate the data file. Arrange for at least one initial training and practice session on the use of your data managment software, and be sure to check the accuracy and legibility of the student worksheets that the volunteers will be handling.

If students are to enter the data themselves, have them trade worksheets so they'll be typing data that they neither researched nor verified. This way, the data entry phase becomes an opportunity to learn about additional scientists and inventors.

Step 7: Using the Data File

In this step, your students will rely most heavily on the critical thinking skills of *induction, deduction,* and *problem solving.*

As a warm-up for induction and deduction, have students examine sets of premises and conclusions to determine which ones do or do not follow logically. For example, if it is true that education is necessary for invention to take place, and that some African-American scientists and inventors had little formal schooling, it is logical to conclude that they received their education through means other than formal schooling. It is not logical to conclude that African-American scientists and inventors accomplished their work with no education. Later, students can use the data file to ascertain probable ways in which African-American scientists and inventors were educated.

In reviewing problem solving with students, emphasize a systematic approach that includes identifying the problem correctly, generating possible solutions, selecting the most logical solution, testing it, and evaluating whether it works. Ask students to review how this process has applied to the development of their data file on African-American scientists and inventors so far.

Once your students have limbered up these thinking skills, go over the list of questions generated during the previous steps of this activity, and help them choose those that can be answered by selecting the appropriate records from the data file. Help students decide which data fields they need to sort and print in order to answer particular questions.

For example, to answer the question "In what geographic region or regions were most of the inventions and discoveries made?" students can sort and print the records by the PLACE OF WORK field. With a printout and a map, the students can then answer the question.

There are many other interesting questions of this type that students can answer by sorting and printing the proper records. What discoveries were made by African-American sci-

REFERENCE MATERIALS

BOOKS

The Black American: A Vision for the Future, with Special Emphasis on Science. J. Rupert Picott, Editor. Association for the Study of African American Life and History, Associated Publishers, Washington, D.C. The Afro-American History Kit. 1983.

Burrell, William F. *Afro-Americans in Science and Exploration: The International Connection.* The Associated Publishers, Washington, D.C. 1986.

Great Negroes Past and Present. Russell L. Adams, Editor. Afro-Am Publishing Co., Chicago, IL. 1981.

A Guide to Magazine Articles, Newspaper Articles and Books Concerning More than 15,000 Black Individuals and Groups. Mary Mace Spradling, Editor. Gale Research Co., Detroit, MI. 1980.

Haber, Louis. *Black Pioneers of Science and Invention.* Harcourt Brace Jovanovich, New York, NY. 1970.

Hayden, Robert C. *Eight Black Inventors.* Addison-Wesley Publishing Co., Inc., Reading, MA. 1972.*

Hayden, Robert C. *Seven Black American Scientists.* Addison-Wesley Publishing Co., Inc., Reading, MA. 1970.*

Hayden, Robert C. and Harris, Jacqueline. *Nine Black American Doctors.* Addison-Wesley Publishing Co., Inc., Reading, MA. 1976.*

Index to Collective Biographies for Young Readers. Judith Silverman, Editor. R. R. Bowker Co., New York, NY. 1979.*

Johnston, Johanna. *A Special Brewery.* Dodd, Mead & Co., New York, NY. 1967.*

The Negro Almanac, A Reference Work on the Afro-American. "Twentieth Century Black Inventions." Harry A. Polski and James Williams, Editors. John Wiley & Sons, New York, NY. 1981.

People Who Made America. Pictorial Encyclopedia. Ida S. Meltzer, Editor. U.S. History Society, Skokie, IL. 1973.

Twentieth Century Black Patentees: A Survey. J. Rupert Picott, Editor. Association for the Study of Afro-American Life and History, National Afro-American History Kit, Washington, D.C. 1979.

PERIODICALS

Ebony Magazine, Johnson Publishing Co., Chicago, IL.

Ebony Jr., Johnson Publishing Co., Chicago, IL. May 1973–1985.*

*Juvenile Reading

Percy L. Julian: Chemist, developed synthetic cortisone.
Ernest E. Just: Biologist.
Lewis L. Latimer: Pioneer in electric lighting.
T.J. Marshall: Invented a fire extinguisher.
Jay Matzeliger: Invented a shoe last machine.
Elijah McCoy: Invented an automatic lubrication device for brakes.
Garrett A. Morgan: Invented a gas mask and a traffic signal.
Norbert Rillieux: Invented a sugar refining process.
Marvin C. Steward: Developed an arithmetic unit for digital computers.
Charles H. Turner: Animal behaviorist.
C.J. Walker: Invented cosmetics and hair care products.
Daniel Hale Williams: First person to perform open heart surgery.
Granville T. Woods: Electrical wizard.
Jane C. Wright: Cancer researcher.
Louis T. Wright: Surgeon and antibiotics researcher.

entists in the field of chemistry, biology, or physics? What household items did African-Americans invent? Which African-American scientists and inventors showed childhood interest in the area of their later work? Were African-American scientists and inventors active in the struggle for legal rights? From what sources did African-American scientists and inventors receive encouragement for their work? Of course, the particular questions students answer depend on the specific information contained in the data file.

Ask the students to try some of the analytical questions posed in Step 3 that cannot be answered directly from facts in the data file, but that may be answered by inference. Some examples: Why do you think many African-American scientists and inventors were community leaders as well, particularly in the fight for civil rights? Why were more of the inventions and discoveries made in urban areas than in rural areas? How did conditions prevent African-American scientists and inventors from working in states where slavery was legal? Which of the discoveries and inventions, if any, are no longer in use today? Why do you think a substantial number of the inventions were things related to the railroad?

Sometimes general information about African-American history will assist students in answering these questions. For example, in answering the last question, it is useful to know that for many years railroad work was one of the best paid sources of employment open to African-Americans.

Extension Activities

In addition to working with the data file long after African-American History Month, there are many other activities that students can take on as extensions of this project.

- March is Women's History Month, and your students could celebrate by building a data file on minority women scientists and inventors. Selected records copied from the African-American scientists and inventors file can serve as the core of this project.

- Invite a contemporary African-American scientist or inventor to speak with your class about his or her work. In preparation for the visit, have students generate a list of questions to ask the guest. If you are unable to locate African-American scientists in your area, arrange for your students to write to some. You can obtain names of appropriate persons from recent magazine articles, universities, or professional associations.

- Ask students to "create" their own invention, designing it on paper, describing its function, and giving it a name. Then have each student inventor present his or her work to the class.

- Have students use a word processing program to write a story entitled, "What Life Would Be Like Without. . .", focusing on one invention or discovery from their African-American scientist and inventor data file.

As you work with this data file, many other ideas will occur to you and your class. Explore them!

Unfortunately, in most curricula, attention to accomplishments of African-American people is still the exception rather than the norm. Activities such as these are one way to help remedy this deficit. ■

Carol Edwards is director of Project MiCRO (Minority Computer Resources Opportunity). Project MiCRO is a multischool computer access and critical thinking skills project of the Southern Coalition for Educational Equity. It is based in Atlanta, GA.

Data Base Primer
For Beginners Only

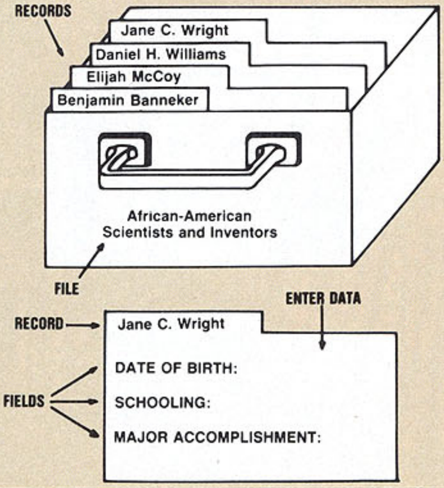
A data base management program is like an electronic filing cabinet or a computerized index-card box. It is a piece of software that lets you organize, store, and retrieve information.

All data management programs contain three important elements: fields, records, and files.

1. Field: A field is a category or item of information. For example, in the data file on African-American scientists and inventors described in this teaching unit, NAME, DATE OF BIRTH, FIELD OF STUDY, and MAJOR ACCOMPLISHMENT are all fields.

2. Record: A record is a collection or listing of related fields. In this teaching unit, data about each African-American scientist or inventor is organized into an individual record, so that George Washington Carver's NAME, DATE OF BIRTH, FIELD OF STUDY, and MAJOR ACCOMPLISHMENT would be in one record, while Jane C. Wright's NAME, DATE OF BIRTH, FIELD OF STUDY and MAJOR ACCOMPLISHMENT would be in another.

3. File: A file is a collection of related records. The record on George Washington Carver, the record on Jane C. Wright, and all the records your students complete during this teaching unit will make up a data file on African-American scientists and inventors.



GROU

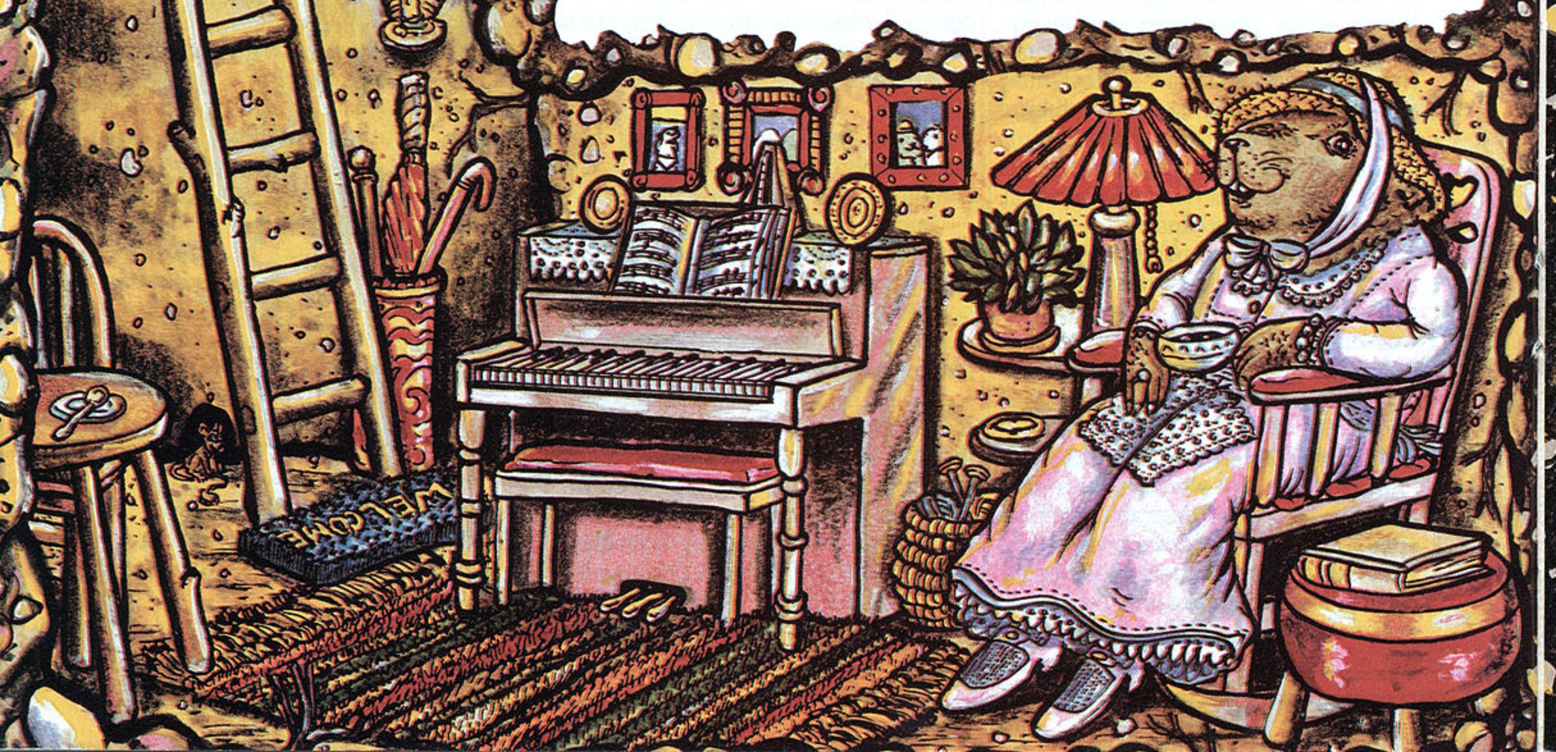
gram

DO YOUR STUDENTS GO UNDERGROUND WHEN IT'S TIME TO STUDY GRAMMAR? LET GROVER GROUNDHOG, THE STAR OF FOUR WORD PROCESSING TASK CARDS, COAX THEM OUT.

Learning or reviewing the rules of capitalization, punctuation, proper sentence construction, and pronoun usage is not always fun, or easy. That's why Grover Groundhog, the hero of the following grammar lessons, is here to help. Grover is no grammar perfectionist himself, but that's all the better. Through the word processing activities provided on four humorous task cards (pages 22 and 31), your students will help Grover grapple with *his* grammar dilemmas—and strengthen their own language skills in the process.

With Grover, your class will also find out what makes Groundhog Day (February 2), so special in Punxsutawney (Pungk-suh-taw-nee), Pennsylvania. Punxsutawney is a small town 85 miles northeast of Pittsburgh. Every year since 1897, all of the residents of the town who belong to the Punxsutawney Groundhog Club have gotten together on the big day to visit "Phil," a local groundhog and "weather forecaster." (Phil, coincidentally, is Grover's uncle on his mother's side.) Club members claim that if Phil sees his shadow when he pokes his head out of his burrow that day, spring will not arrive for another six weeks. If Phil does not see his shadow, spring is on its way and it is

David Anson Russo



NDHOG

mar

BY THOMAS
E. BOUDROT

time for local farmers to plant their crops. (You may want to inform your students that not everyone believes in Phil's abilities as a weather forecaster. According to the National Geographic Society, the groundhog's accuracy during a 60-year period was only 28 percent.)

To complete the activity on each task card in this feature, students must be able to use word processing software to INSERT, DELETE, LOAD, and SAVE text. The following notes outline the teaching objectives for each card. They also list any additional materials and preparation needed to help children meet these objectives. Have students complete the task cards in order.

GRAMMAR TASK CARD 1:
A Capital Idea

Materials: Word processing program, Task Card 1, a data disk or cassette that contains the LETTER data file, and one storage disk or cassette tape per child.

Language Arts Objectives: Students learn to capitalize proper nouns; the pronoun *I*; the first word in a sentence; and the first word in the heading, salutation, and closing of a letter.

Preparation: Use word processing software to type, exactly as shown, the LETTER file (page 20) into the computer. Do not capitalize any words! Save the file on a data disk or cassette under the file name LETTER.

Cut out and laminate Task Card 1. Before assigning the task card to students, teach or review these four common rules of capitalization:

- The first word of every sentence should always be capitalized.

(continued)

LETTER DATA FILE

99 woodchuck lane
new hamster, new hampshire 03256
january 27, 1987

dear grandma,

guess where i am going on monday. uncle phil is inviting me to visit him in punxsutawney, pennsylvania, for groundhog day. he wants to show me how he predicts the weather. someday i may follow in his footsteps, he says.

groundhog day is a big event in punxsutawney. there is a group there called the punxsutawney groundhog club. every year they throw a feast in uncle phil's honor. uncle phil does not always stick around for the feast. if he comes out of his burrow and sees his shadow, he gets frightened and rushes back in. this means that spring will not come for six more weeks. If uncle phil does not see his shadow when he comes out of his burrow, he will stay for the party. this is his way of telling the farmers that he predicts that spring is on its way and that it is time for them to plant their crops.

aside from seeing uncle phil, i want to go shopping in punxsutawney. i will buy you a souvenir of my trip.

your grandson,
grover

Use a word processing program to create the data file above. Type it in exactly as it appears — Task Card #1 asks students to correct capitalization.

- Personal names, geographical names, street names, and the names of official organizations should be capitalized.
- The first word in a greeting or closing of a letter should be capitalized.
- Calendar words (including the days of the week, the months of the year, and most holidays — such as Groundhog Day) should be capitalized.
- The pronoun *I* should be capitalized.

Task Card Activity: Students read a letter from Grover Groundhog to Grandma Groundhog. The letter is filled with capitalization errors because Grover typed it on a broken typewriter. Students use the DELETE and INSERT functions of their word processing program to correct all the capitalization errors. They then save their corrected version of the letter under a new file name on a blank disk or cassette tape.

GRAMMAR TASK CARD 2:
Better Late Than Never

Language Arts Objectives: Students learn how to change present tense verbs to their past tense form.

Materials: Word processing program, Task Card 2, the storage disk or cassette tape that contains the files created during the Task Card 1 activity.

Preparation: Cut out and laminate Task Card 2. Make sure each student has the file he or she saved upon completing the capitalization activity on Task Card 1.

Review with students the following changes that regular and irregular verbs undergo when they are changed to their past tense form:

- Most verbs (called regular verbs) take an *-ed* ending. *Want* becomes *wanted,* for example.
- If a regular verb already ends with an *e*, a second *e* is not added. Instead, one of the *e*'s is dropped. *In-*

POSTCARD DATA FILE

Dear Grandma,

I am back from Uncle Phil's house Uncle Phil was hit of party. Uncle Phil brought his wife, Penelope, to the party. Uncle Phil and Aunt Penelope's son Gregory was there Gregory is two months old.

Did you get your gift I did not mail gift until I left Punxsutawney. I asked Aunt Penelope what get you. Aunt Penelope thought get you mittens. Uncle Phil says there will be early spring mittens are just in case Uncle Phil's forecast is not correct.

Love,
Grover

Use your word processing program to create this data file exactly as it appears. Task Card #3 asks students to correct grammatical errors.

vite becomes *invited*, for example; not *inviteed*.

- When a regular verb ends with a *y*, it may be changed to an *i* before the -*ed* is added. This is true, for example, when the word *hurry* becomes *hurried*.
- With some regular verbs, the ending consonant may be doubled before the -*ed* ending is added. This is the case when *brag* becomes *bragged*.
- Irregular verbs are verbs that follow no specific pattern. As examples, the verb *goes* becomes *went*; *is* becomes *was*.

Task Card Activity: In the excitement of preparing for his trip, Grover never gets to the post office with his letter to Grandma. To mail it now, after his return from Punxsutawney, Grover will have to make changes in it. Many of the verbs must be changed to their *past tense* form because the events Grover wrote about and told Grandma were *going* to happen, *have* now happened. Students identify these verbs and use the INSERT and DELETE functions on their word processing program to change them to show past action. Then, after adjusting the date on the letter accordingly, students save the corrected version of the file under a file name of their own creation.

GRAMMAR TASK CARD 3:
Postcard Sentences

Language Arts Objectives: Students learn how to recognize and correct run-on sentences and sentence fragments.

Materials: Word processing program, Task Card 3, a data disk or cassette tape that contains the POSTCARD data file, and one storage disk or cassette per child.

Preparation: Use word processing software to type, exactly as shown, the POSTCARD data file (above) into the computer. Include all grammatical errors. Then save the file on a disk or cassette under the file name POSTCARD.

Cut out and laminate Task Card 3. Before assigning the task card to students, teach or review the structure of a simple sentence (*subject* and *predicate*). Then provide sample run-on sentences and sentence fragments to your students. Ask children to revise these nonsentences so that each represents correct sentence structure and a complete thought.

Task Card Activity: Grover is so involved with trying to fit a lot of written information onto a small postcard to Grandma, that he ignores good sentence structure almost entirely. Some of his sentences are fragments; others are run-ons. Students must correct Grover's incorrect sentences by adding words to fragments, and separating each run-on into two sentences.

GRAMMAR TASK CARD 4:
Room to Spare

Language Arts Objectives: Students learn how to identify nouns and how to replace them (when appropriate) with correct pronouns.

Materials: Word processing program, Task Card 4, the storage disk or cassette tape that contains the files created during the Task Card 3 activity.

Preparation: Cut out and laminate Task Card 4. Make sure each student has the file he or she saved upon completing the run-on sentence activity on Task Card 3.

Review with your students the definition of the word *pronoun*, and discuss with the class the ways in which pronouns are used. (*Pronouns, such as* he, she, you, they, I *and* it *are used to replace nouns in sentences. A pronoun should only be used when it is clear what noun it is replacing.*)

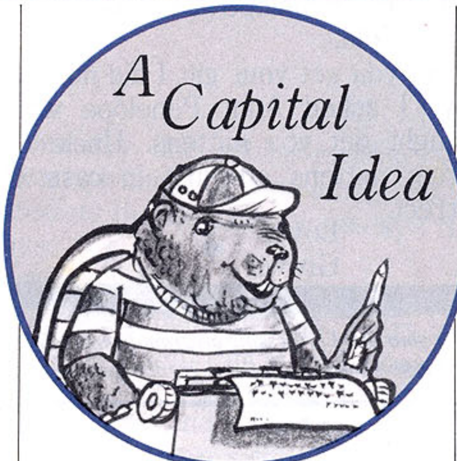
Task Card Activity: To save even more space on his postcard, Grover's mom suggests that Grover replace some of the nouns in his postcard with pronouns. Your students are asked to help Grover with this activity. When they are through, there will be so much extra space on the postcard that students should make up three more sentences and insert them into the note. ■

(See the task cards on pages 22 and 31.)

Thomas E. Boudrot is director of computer instruction in the Alief Independent School District in Houston, TX. He is also the author of *Byte-Sized Activities: The Generic Word Processing Book*.

GRAMMAR

TASK CARD 1



More than anything else, Grover Groundhog loves to travel. This year, for the first time, his parents are allowing him to travel by himself. He's going to see his Uncle Phil who lives in Punxsutawney (Pungk-suh-taw-nee), Pennsylvania. Grover is very excited about the trip! He is so excited, in fact, that when he pulls out the old family typewriter to write a letter about it to Grandma Groundhog in Tuscaloosa, Alabama, he drops the typewriter. When he types the letter to Grandma, he discovers that now the SHIFT key doesn't work. His letter has no capital letters!

1. Boot up your word processing program, load your data disk, and call up the LETTER data file.
2. Read the letter that Grover has written to Grandma about his trip. Don't let Grover mail that letter yet, though! First find all the letters that should be capitalized and make the corrections. If Grover does not use correct capitalization in his letter, Grandma might suggest that he'd be better off staying home to study grammar rules instead of making the trip to Punxsutawney!
3. Save your corrected letter on a cassette tape or a diskette.
4. Go on to Task Card 2.

GRAMMAR

TASK CARD 2

Complete Task Card 1 before you try the activity on this card.

Grover left for Punxsutawney before he was able to mail his letter to Grandma. He threw it into his pack (along with two pieces of bubble gum and an old sock). Then he forgot about it until he started to pack for the ride back home from Uncle Phil's. Grover decided he would mail the letter when he got home. ("Better late than never," he thought to himself.) To do so, though, he knew he would have to change some of his verbs so that they showed action in the past. For example, "Guess where *I'm going* in February?" had to be changed to "Guess where *I went* in February?"

1. Load the file you created and saved from Task Card 1 into your word processor.
2. Pretend that you are Grover writing to Grandma about your trip last month. Wherever necessary, change the verbs in the letter so that they show action in the past. (Be careful! Not all the verbs have to be changed.)
3. Don't forget to change the date in the heading of the letter, too. Make it any date in March.
4. Save your new letter on a tape or diskette.
5. Go on to Task Card 3.

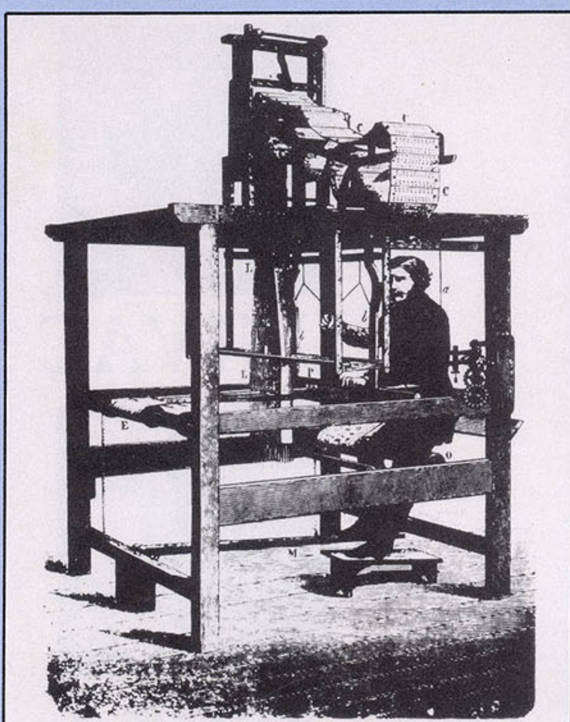
EARLY H

O

SOFTWAR

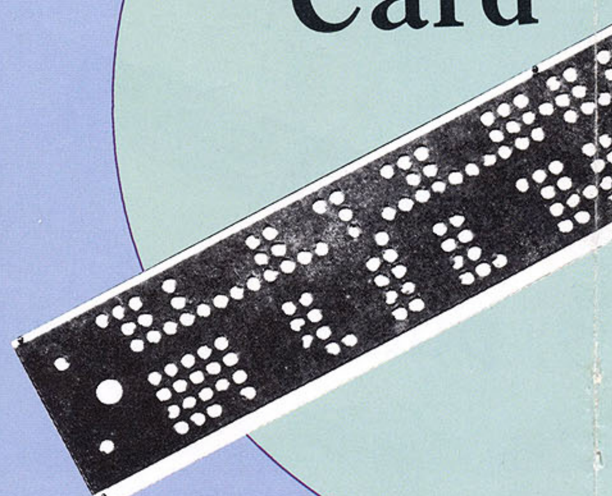
Computers cannot do anything by themselves. They have to be told what to do and how to do it. They have to be given very special instructions. These instructions are called *software*. Software

180



Jacquard's Loom

Punche
Card



190

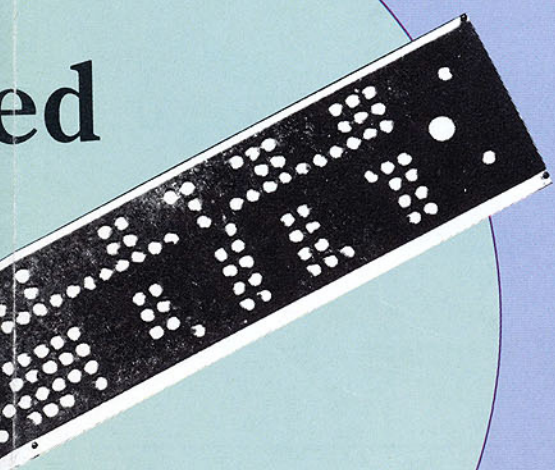
Paper

HISTORY
OF
E DEVICES

has been stored on many different devices throughout history — from punched cards to laser video discs. Below are some of the earliest devices that were used to store software.

00s

ed

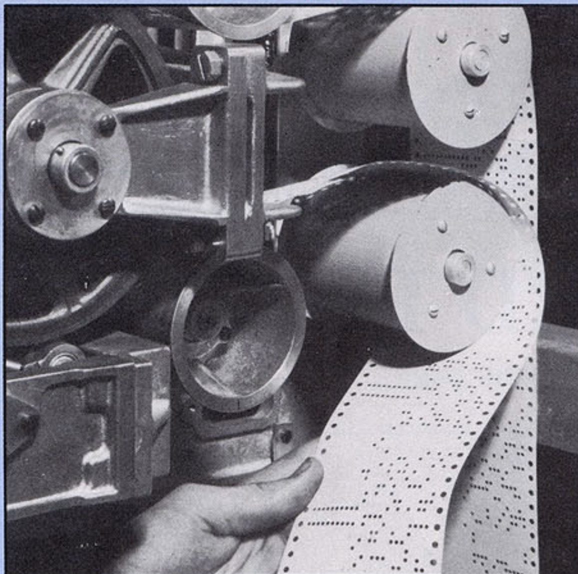


Joseph-Marie Jacquard used cards with holes punched in them to give weaving instructions to his loom. The cards moved through the loom on a belt. How did the cards tell the loom which threads to weave? Each thread on the loom corresponded to a particular spot on a card. If a hole was punched in the card at that spot, as the card moved by, the thread would pass through the hole and become part of a cloth design. This was in 1801.

Almost 100 years later, in 1889, Herman Hollerith used a similar punched card to run the first electric tabulating machine. The 1890 census was counted, or tabulated, by using his machine. The holes in these cards stood for population characteristics. For example, a hole in one spot of a card meant a person was single; a hole in another spot meant he or she was married, and so on. The cards were pushed over brushes. Each time a brush found a hole, it gave off an electrical signal that moved a counting gear for that characteristic ahead by one.

00s

Punched paper tape is similar to a long string of punched cards. Rolls of paper tape can store more information than a

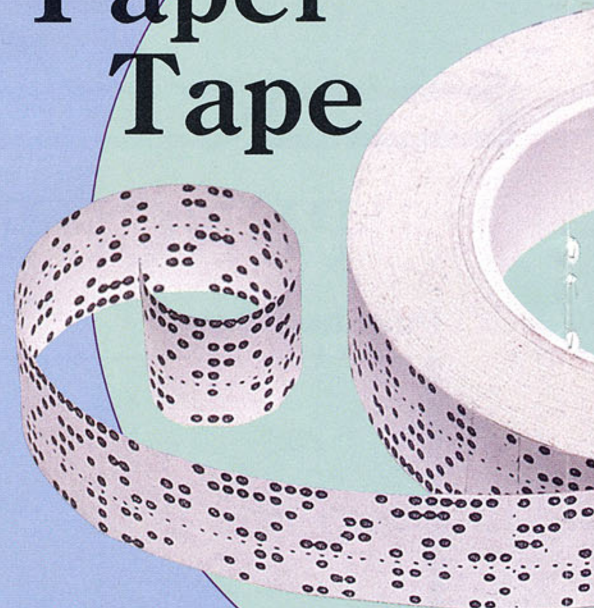


Harvard University Cruft Photo Laboratory

Mark I

190

Paper Tape



Sperry Corp.

UNIVAC

195

C

00s

Punched paper tape is similar to a long string of punched cards. Rolls of paper tape can store more information than a stack of punched cards, and they are easier to handle.

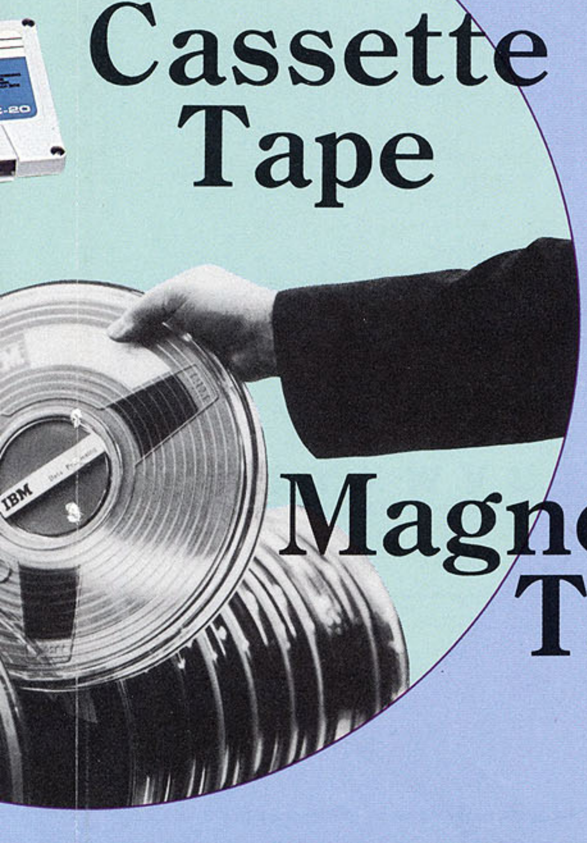
The Mark I computer, built in 1944, read instructions from punched paper tape. Whenever computer operators wanted the computer to do another job, they would change the paper tape.

Today, some telephone company computers and some computers that count votes in large elections still rely on punched cards and paper tapes.

50s

Cassette Tape

Magnetic Tape



A magnetic tape is a plastic strip that has a special coating on one side. This coating contains small magnetic spots throughout. Each time a spot appears it is read by the computer, just as holes in punched cards and paper tape are read. The magnetic tapes used on large computers are at least ½-inch wide and as long as 2,400 feet! Magnetic tapes are stored on large reels. A single tape is able to hold as much information as nearly 500 boxes of punched cards.

UNIVAC, the first computer to be sold to businesses, read information from magnetic tape. Some computers still use magnetic tape to store large amounts of information. Some microcomputers use smaller magnetic tapes to store their information. These tapes look just like the cassettes used to record music, and are read by a regular cassette player that is hooked up to a computer's CPU (brain).

COPY

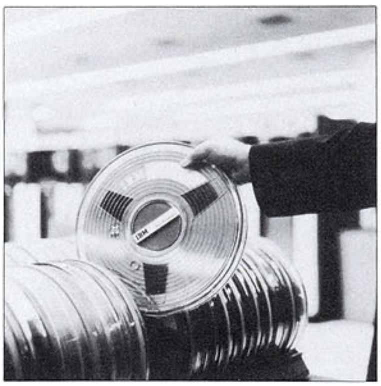
PRIMARY

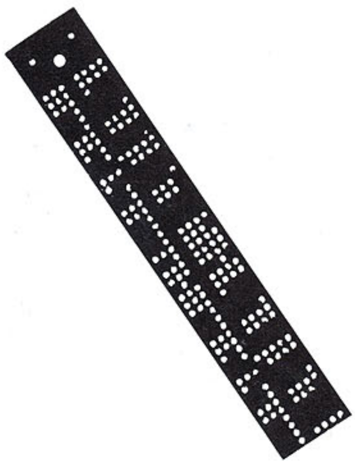
WORKSHEET TO COPY AND USE WITH THIS MONTH'S POSTER

NAME: ______________________________

NAME THE SOFTWARE DEVICE

DIRECTIONS: Look at the software devices below. Write the name of each one under its picture. Use the front of the poster for help.





______________________ ______________________ ______________________

WORD BOX

punched card
magnetic tape
paper tape

COPY

PRIMARY

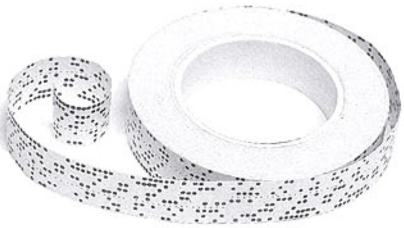
WORKSHEET TO COPY AND USE WITH THIS MONTH'S POSTER

NAME: ______________________________

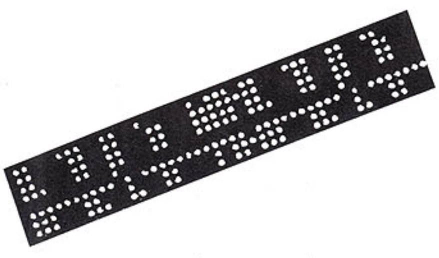
SOFTWARE MACHINES

DIRECTIONS: Look at the pictures below.
Draw a line from the software device to the machine that runs it.
Use the front of the poster for help.

SOFTWARE:



paper tape

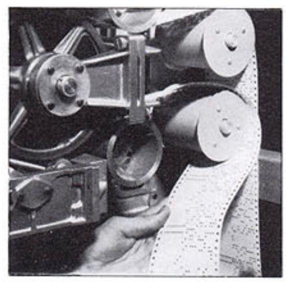


punched card

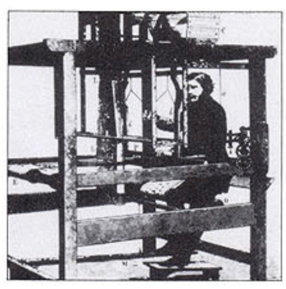
magnetic tape

MACHINE:

UNIVAC



Mark I



loom

COPY

INTERMEDIATE

WORKSHEET TO COPY AND USE WITH THIS MONTH'S POSTER

NAME: ______________________________

PUNCHED CARD PUZZLE

DIRECTIONS: Punched cards are cards with holes in them. They were invented in the early 1800s. Like disks and cassettes, which were invented much later, they store data for computers to use.

To see how punched cards work, look at the drawing of a punched card on page two of this puzzle. Each hole on the card stands for a letter of the alphabet. The position of the hole tells which letter it is. For example, a hole on the far left side of the card stands for an "A." A hole on the far right side stands for a "Z." The holes on this card spell out the name of the person who invented punched cards.

To find out who that person is, cut out the card reader (below) and place it over the top line of the punched card. Line up the solid lines on the sides of the card reader with those on the sides of the punched card. Slide the card reader down the punched card until a hole appears in the center part of the card reader. The first hole should be directly under the "J." Write a "J" in the first blank below. Slide the card reader down to the next hole. What letter does that hole stand for? Put that letter in the second blank. Continue in this manner until you have solved the puzzle.

The inventor of punched cards is:

____ ____ ____ ____ ____ ____ - ____ ____ ____ ____ ____

____ ____ ____ ____ ____ ____ ____ ____

Punched Card Reader

CUT OUT.

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

CUT OUT THIS SECTION.

COPY

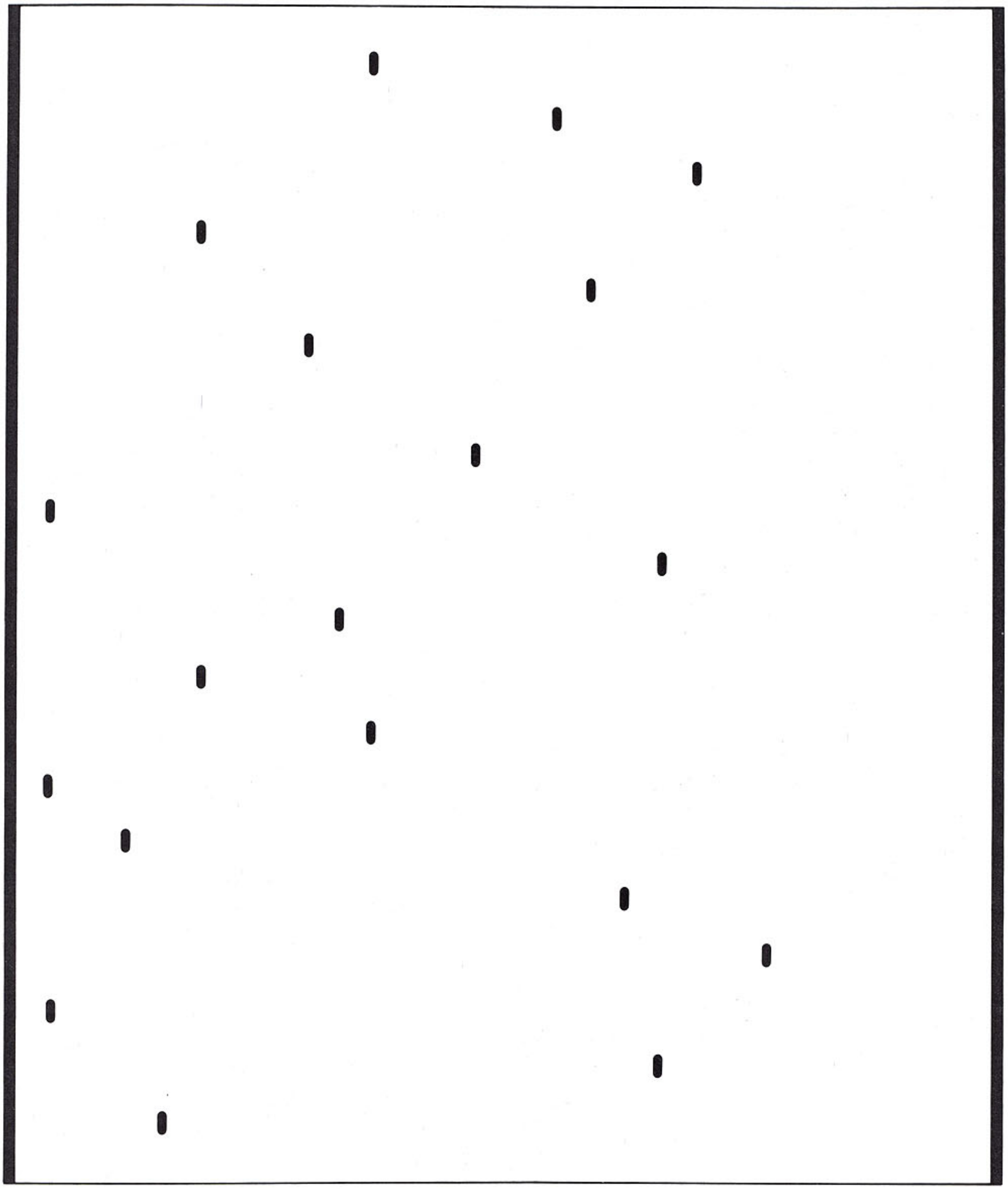
INTERMEDIATE

WORKSHEET TO COPY AND USE WITH THIS MONTH'S POSTER

PUNCHED CARD PUZZLE

See directions on previous page.

Punched Card



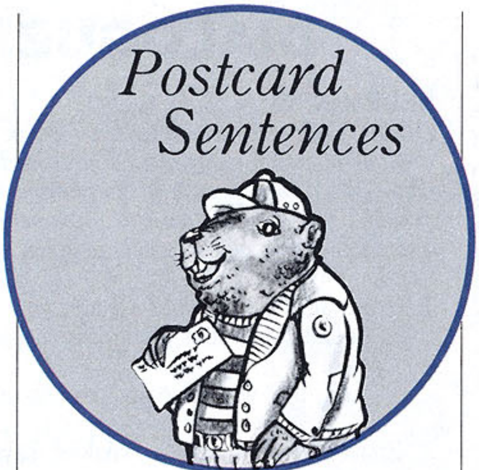
GRAMMAR

TASK CARD 3

Complete Task Card 2 before you try the activity on this card.

After sending that old letter off to Grandma, Grover decided that he should write another one to tell her how much he enjoyed his trip. Grover felt lazy, though, and decided to send a postcard instead. He had a really beautiful one that he bought while he was away.

1. Boot up your word processing program, load your data disk, and call up the POSTCARD data file.
2. Read the postcard that Grover wrote to Grandma after he arrived home from his trip. He sure fit a lot onto that one little card! To do so, though, Grover broke a rule or two of correct grammar. Some of his sentences are *sentence fragments*, or incomplete sentences. Others are *run-on sentences*, sentences that should be more than one sentence.
3. Correct Grover's incorrect grammar. Turn each run-on sentence into two separate sentences that have correct capitalization and punctuation. Add words to the sentence fragments so that they become sentences that have complete thoughts.
4. Save the revised postcard on a tape or diskette.
5. Go on to Task Card 4.



GRAMMAR

TASK CARD 4

Complete Task Card 3 before you try the activities on this card.

Grover let his mom take a look at the postcard before he mailed it off to Grandma. She suggested that he use *pronouns* — noun substitutes, such as *I, you, they, he, she,* and *it* — to make the sentences even shorter. By using pronouns, Grover found that he even had room to spare on the postcard!

1. Boot up your word processing program. Load the file that you saved from Task Card 3 into the word processor.
2. Re-read the file and look for places where pronouns could be used. (Remember though: Before you use a pronoun, Grandma must first know who or what Grover is referring to.)
3. Edit the file so that you use pronouns wherever possible.
4. Now that you have the extra space, add three more sentences to the postcard before you mail it off to Grandma. Be sure to use correct grammar and punctuation.
5. Save the new postcard on a diskette or cassette tape.

WRITER'S CORNER

WORD PROCESSING TASK CARDS

Talkin' Dialogue

TEACHER'S NOTES

Each month the "Writer's Corner" column supplies you with four student activity cards that provide practice with creative writing skills. A different element of creative writing is explored each month. This month, for example, we focus on creating interesting dialogue.

Each column requires you to create a data file. You may want to save the files each month on the same diskette.

PREPARATION

1. Cut out and laminate the four task cards on the pages that follow.
2. Using a word processor, type the data file that appears on this page.
3. Save the file on a diskette under the file name DIALOGUE.
4. Before you have your students use this month's creative writing task cards, you may first want to teach or review these terms: *dialogue, character, expression, tattletale.*
5. Your students will also need to know how to use your word processing software to INSERT and DELETE text.

TASK CARD ACTIVITIES

Task Card 1: Children are given short descriptions of five different characters. Children show, using appropriate dialogue, how the characters might respond to a given situation.

Task Card 2: Children use their own expressions to rewrite dialogue that contains less common expressions (ones that they probably don't use themselves).

Task Card 3: Children create a list of words that could replace the word "says" in a dialogue. They then insert these words in the dialogues already created (from Task Cards 1 and 2).

Task Card 4: Children each write a dialogue based on an actual, unhappy conversation they have had recently. They are then asked to rewrite the dialogue so that the conversation is a happy one. ■

BY JACKIE GLASTHAL

DIALOGUE DATA FILE

SECTION #1:

DIRECTIONS: Pretend that you are in Jonathan's class. Jonathan has brought a snake to school today. Below are short descriptions of five other people in your class. What would each of these persons say upon seeing the snake? Write a sentence or two of dialogue for each person. Be sure to put all dialogue between quotation marks. An example is given.

1. (Example): Professor T. Bone, your teacher, says, "Wait a minute! What's this? I don't remember giving anyone permission to bring a snake to school."

2. Brian, a boy who loves to be a tattletale, says:

3. Emilie, a girl who hates snakes, says:

4. Rene, a girl who loves surprises, says:

5. William, a boy who likes to cause trouble, says:

SECTION #2:

DIRECTIONS: Below are quotes by three more people in Professor T. Bone's class. Read what each one has to say about the snake. Then re-word their dialogue so that the characters are using expressions that are more common to you and your classmates.

1. Sam, a boy who usually dislikes snakes, says, "Shucks! I never reckoned a critter like a snake could be so fine."

2. Francis, the teacher's pet, says, "For crying out loud, Jonathan! Why did you bring a snake to school?"

3. Rebecca, a new girl in school, says "Wow, man. A snake in class. Are classes in this school always so funky?"

SECTION #3:

DIRECTIONS: Below are 10 words that can replace the word "says" in writing. See how many more "says" words you can come up with, and add them to the list. Then replace all "says" words in Sections #1 and #2 of this data file with words from your list. Try not to use the same "says" word more than once. Also, make sure each new "says" word fits the meaning of its sentence.

DECLARES, ANNOUNCES, RESPONDS, MENTIONS, ASKS, ARGUES, BABBLES, RELATES, COMMENTS, EXCLAIMS

SECTION #4:

DIRECTIONS: 1) Think of a recent conversation you have had with a parent, teacher, or friend. Use a conversation that left you feeling unhappy. Write down the exact words of the conversation as best you can remember them. 2) Now rewrite the dialogue you just wrote the way you wish it had taken place. Change the conversation so that it would have left you feeling happy.

Begin your dialogue here:

Use a word processing program to create the data file above.

WRITING 1

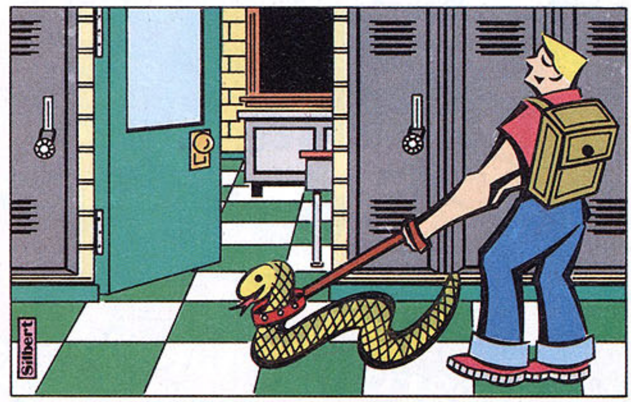
TOPIC: DIALOGUE

Speaking Of Snakes. . .

What would you say if your best friend brought a snake to school one day and wrapped it around your neck? If you hated snakes, you might yell out, "Get that snake off me!" If you were feeling brave, you might say, "What an interesting snake." If you were in a silly mood, you might say, "Cut it out, snake. You are tickling my neck!"

No matter who you are, there is a good chance that what you would say in this, or in any situation, would differ from what others would say.

1. Boot up your word processing program. Load the data disk, and call up the DIALOGUE data file.
2. Read Section #1 in the data file. Descriptions of five made-up classmates are given. What would each say if someone brought a snake to school? Write a sentence or two of *dialogue*, or written conversation, for each. Be sure to write the dialogue between quotation marks. An example is given in the file.
3. Save your work on a blank disk. We will call this disk your personal disk.



WRITING 2

TOPIC: DIALOGUE

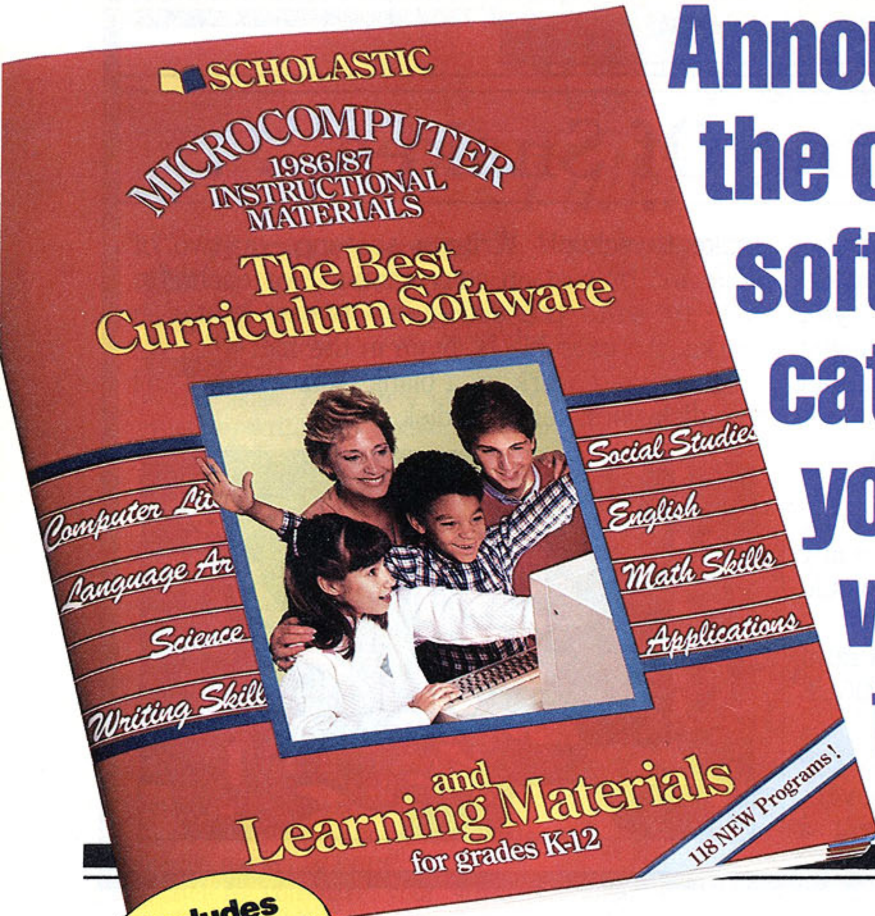
Say It Again, Sam

Complete Task Card 1 before you try the activity on this card.

Even when two or more people are trying to express the same, or a similar thought, you may find that they have very different ways of speaking. Often people say things differently because they come from different parts of the world. Even people living one or two towns away from each other may use different expressions. People also pick up different expressions at their jobs or from their hobbies.

1. Boot up your word processing program. Load the data disk and call up the DIALOGUE data file.
2. Go to Section #2 in the data file. Read what Sam, Francis, and Rebecca have to say about seeing a snake in the classroom. Rewrite their dialogue so that the characters are using expressions that you and your friends would use. Be sure to use quotation marks in your new dialogue wherever needed.
3. Save your work on your personal disk.

Bill Silbert



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WRITING 3

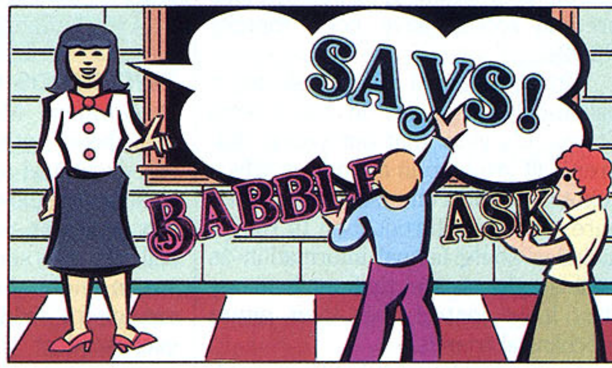
TOPIC: DIALOGUE

Other Ways to Say "Says"

Complete Task Card 2 before you try the activities on this card.

According to some grammar experts, the word "says" is one of the 50 most commonly used words in the English language. "Says" is a good word, but there are other words you could use in its place. If you use "says," or one of its relatives like "said" or "say," too often, your writing may sound boring. From time to time, try words like these instead: *declares, announces, responds, mentions, asks, argues, babbles.*

1. Boot up your word processing program. Load the data disk and call up the DIALOGUE data file.
2. Go to Section #3 in the data file. You will find a list of 10 words that can sometimes replace the word "says" in a dialogue. See how many more "says" words you can add to the list.
3. Now go back and replace all "says" words in Sections #1 and #2 in this data file with a different word from your list. Try not to use the same "says" word more than once.
4. Save your work on your personal disk.



WRITING 4

TOPIC: DIALOGUE

Second Time Around

Complete Task Card 3 before you try the activities on this card.

One of the great things about story writing is being able to make characters say whatever you want them to say.

1. Boot up your word processing program. Load the data disk and call up the DIALOGUE data file.
2. Turn to Section #4 in the data file. Think about a recent conversation that you had with a parent, teacher, or friend. Make it a conversation that left you unhappy. Try to remember the exact words that you and the other person used. Type them into Section #4 of your DIALOGUE data file. (If you can't think of such a conversation, make one up.)
3. Now rewrite the conversation the way you wish it had taken place. Change the conversation so that it would have left you feeling happy.

(For example, if your teacher had a talk with you because of a bad grade you received, rewrite the dialogue so that you are being praised for receiving a good grade.)

4. Save your work on your personal disk.

Learning About Real Robots

Children are fascinated by robots — whether they're the purely pretend variety found in movies and toy stores, or the "real robots" that they'll meet through this month's teaching unit.

But "fascinated" can mean a little scared, too. After all, not all of those pretend robots have been friendly R2D2s.

With commercial robotics already a billion-dollar industry in the United States, it's clear that our young children will grow up in a world in which robots will be common. Let's make sure that their introduction to robots includes some factual information as well as the sense that as humans, they have control over their future mechanical friends.

While educational robots are available for classroom use, much of any primary robotics curriculum can be learned with or without a robot. Through the activities described below, for example, children will learn the difference between working robots and educational robots, look at the similarities and differences between robots and human beings, and learn an important set of "rules" for robots. None of these activities requires an actual robot.

RULES FOR ROBOTS

Preparation: Explain to your class that robots in story books and on television are sometimes shown as the bad guys. To make these pretend robots more like real robots — which are created only to help humans — one famous science story writer made up these "Rules for Robots":

1. A robot may not harm a human being, or let a human being come to harm.
2. A robot must obey commands given to it by human beings, unless doing so would break the first rule.
3. A robot does not do anything to hurt itself unless it must do so to protect a human.

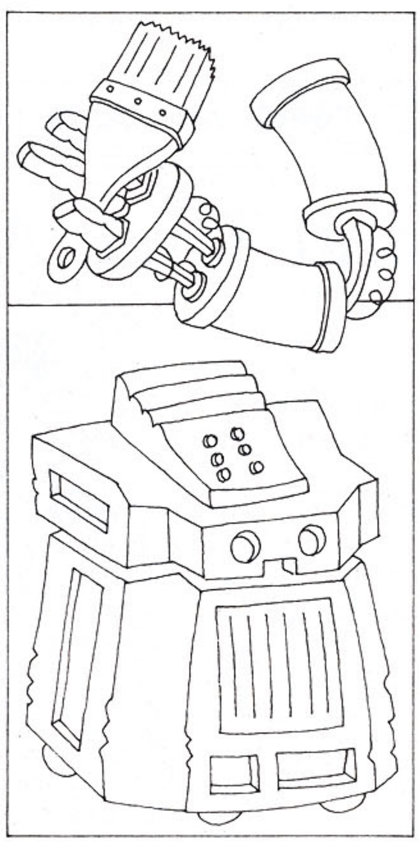
Activity: Help the children make up and dictate to you their own science fiction story about a robot who had to learn the rules about helping humans. Make a class mural together on your bulletin board or wall that illustrates the story.

If your computer has a printer attached, let the children make up and illustrate additional rules for robots on a Koala Pad or with any other graphics package, and add the printouts to the mural as well.

TWO KINDS OF ROBOTS

Preparation: Make a print master that shows both a working robot and an educational or teaching robot (see illustration below). Be sure that both robots are on the same page so that children can see the differences between them, but make them large enough for children to color. Provide each student with a copy from the print master and a box of crayons.

Activity: Lead a discussion about working robots and teaching robots, touching on the following points.



Explain the differences between a working robot (top) and an educational or teaching robot (bottom).

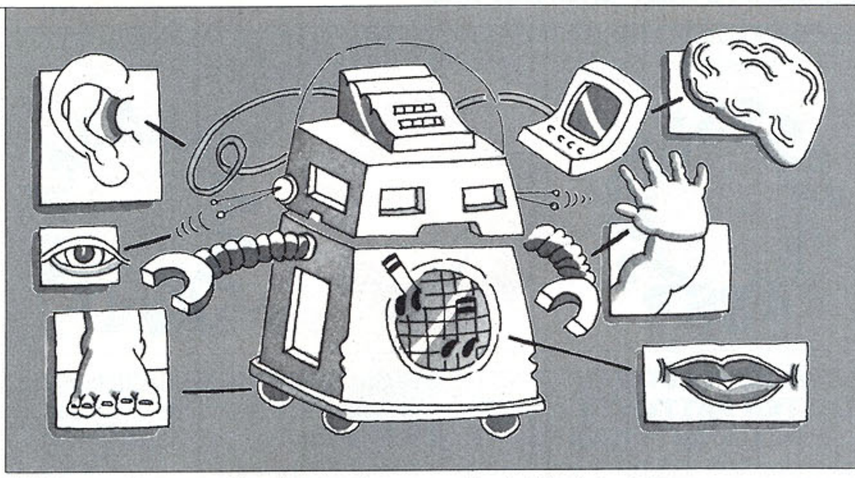
Explain to the children that there are many kinds of robots with many different kinds of jobs to do. Some robots help teach us and some work for us. No matter what their job, though, robots do not know what to do by themselves; we must tell them what we want them to do.

Tell the kids that one of the robots on the paper in front of them is a working robot. Can they point out which one it is? What is the robot doing? *(Painting.)* Explain that a lot of working robots look like nothing more than one long, strong arm that can bend six different ways. They are often called upon to do jobs that would be too dangerous for humans. They can work in hot fires or smelly paint factories and it doesn't bother them a bit! Like all robots, these working robots have computers for brains — that's how they remember their instructions. Some working robots work as far away as space, where they may have built-in television cameras to take pictures to show us what other planets are like. Other working robots are built to help us at home. They can vacuum the rug, walk the dog, take out the trash, bring our mail, serve us dinner, or tell us when a burglar is coming. If the children had a working robot at home, what chores would they want it to do?

Next, turn children's attention to the other robot on the page, and explain that this is a teaching robot. Tell kids that this robot can help us in the classroom. It can ask us about numbers, or help us learn our nursery rhymes. We can tell the robot what we want to learn, and it will do what we ask. In schools where doctors go to learn how to make us well there are robots that are told to be sick. The doctors learn how to make people well by practicing on the robots.

Tell children to choose a crayon and draw a circle around the teaching robot. Then have them draw a rectangle around the working robot. When they have finished, ask them to color the two kinds of robots.

Michael Donato



Children make connections between human and robot "body parts."

PARTS OF A ROBOT

Kids tend to think of robots as metal-clad human beings. Talking about the differences and similarities in human and robot "anatomy" will help children understand what robots can really do — and what they can't.

Preparation: Draw a print master that matches up human abilities (and the body parts that make these possible) with their robot counterparts (see illustration, above). Copy and distribute one each to students, along with a pencil or marker.

Activity: Point to the human and robot parts in each pair as you lead students through the following discussion.

- Thinking: Remind students that we humans use our brains to think. Have them point to the brain on the print master. Explain that a robot's "brain" is a computer, which must be programmed to tell the robot what to do.
- Hearing: While humans have ears, a robot has a cable connecting it to the computer, so it can "hear" the commands that tell it what to do. Some robots also have built-in microphones that can pick up sounds, and may be programmed to honk their horns or flash their lights if they do.
- Reaching: The machine arms that robots have can only move in certain ways — they can bend at angles or rotate, and that's all. People can move their arms in more ways. Ask your students to demonstrate some of the ways their arms can move (such as making an arch over their heads or hugging themselves).
- Talking: Robots can be programmed to talk, but they don't have lips, tongues, or teeth; their "mouths" are speakers similar to those on record players. How is this different from our mouths? Do we have to be programmed to speak?
- Touching: Humans have fingers and skin to touch. Robots touch with their bumpers. They can't feel what they are touching like humans can. Some robots have light or sound sensors that measure distances. Humans don't have these, so they can program robots to do this for them.
- Seeing: Most robots use sonar to "see." Sonar sends off signals and measures the time that it takes for them to come back. Humans see much faster and better than that with their eyes. Most robots cannot see through things like glass.
- Moving: Humans have feet to move and walk, run, hop, or skip. Robots roll around on rollers to go forward and back and to turn.

When you've completed this list of pairs, go back to the beginning. As you point to each human part on the print master, ask your students first to point to its robot counterpart, then to draw a line connecting the two. Finally, have your students color each pair a different color — for example, color the feet and the rollers blue, and the two arms (one human, one robot) bright yellow.

TALK TO A ROBOT

Preparation: Below you will find the commands that tell the educational robot how to move around. These are paired up with similar commands in the Logo language that were introduced in last month's column. If your children are familiar with Logo, point out that the programming language for a robot is somewhat similar to the language they use to move the Logo turtle on the computer screen. (Tell students that educational robots can also honk, flash their lights, and talk — if they are programmed to do so.) The languages a robot can speak include Robot Control Language and Savvy.

Logo Command	Robot Command
FD (Forward)	MDF (Move Distance Forward)
BK (Back)	MDB (Move Distance Back)
RT (Right)	SPIN CLOCKWISE
LT (Left)	SPIN COUNTER-CLOCKWISE

One difference is that the robot moves forward and backward in *feet*, rather than in *steps* like Logo. (The robot SPIN movements are measured in *degrees* just like the Logo left and right turns.) Also, each robot command is expressed in two statements (one for which way to move, the other for how far) rather than a single statement like Logo.

Make a set of flashcards representing each of the four robot motion commands above, plus one each of the following: 1′, 2′, 3′, 4′, 5′, 0°, 45°, 90°. (Just for fun, you might throw in "Honk," "Talk," and "Flash Lights" flashcards, too.)

Activity: Instruct your students to pretend they are educational robots in a classroom. Using pairs of flashcards, have them practice the various kinds of moves that teaching robots might be programmed to make — for example, MDF and 4′ or SPIN CLOCKWISE and 45°. (If your classroom floor is covered with those familiar 12″ X 12″ linoleum tiles, measuring forward and back movement will be a breeze!) ■

Trisha Ainsa is director of the "Computer Literacy in Children" Title VII project at the University of Texas, El Paso.

MICRO IDEAS

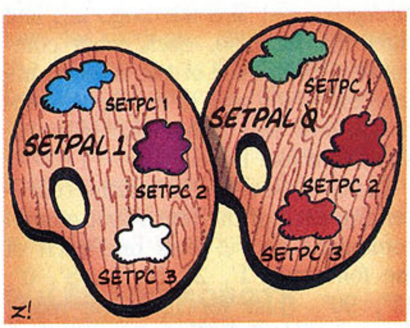
QUICK COMPUTER TIPS AND ACTIVITIES

WHERE TO STORE THE COMPUTER PAPER

By purchasing computer paper in bulk amounts, we have discovered at my school that we are saving money, both on shipping costs and on the price of paper. Space is tight in our school, however, and so finding a place to store these huge, yet economical boxes of paper became a problem. A student in my room supplied a great solution though. Thanks to this child's suggestion, we now pile up the boxes and use them as computer corner room dividers. (We hang posters down the sides of the dividers for decoration.)

We've experienced an additional benefit from this arrangement: Now as kids use the three computers in the back of our room, they no longer distract one another; they're separated by "paper" walls. I, on the other hand, can still keep an eye on them from where I stand.

Craig Dickinson
Orono, ME



This wall chart helps computer artists learn IBM color codes.

CREATE AN IBM LOGO COLOR CHART

If you use IBM Logo, you are probably aware that the program's color graphics consists of two different palettes of colors, both using the same three pen color numbers.

To clarify this point for young programmers, I created a wall chart of two palettes (see illustration). With it, students can see that when Logo is loaded, Palette 1 is automatically in use with the colors cyan, magenta, and white. If they prefer, they can switch to Palette 0 where they can select from green, red or brown.

Phyllis Crimmel
Falls Church, VA

DISCOVER LOGO LETTER PATTERNS

One of the first programming exercises in Logo that many teachers assign their students is that of drawing an alphabet letter on the computer screen. My idea is to show children how that letter can be used as a "building block" for an elaborate symmetrical letter pattern.

Once a letter is defined as a procedure, demonstrate to students how it can be called up at any angle. (*Turn the turtle 180 degrees and call up the alphabet letter procedure.*) Show your students what an upside-down *A* would look like, for example.

Making a symmetrical letter pattern, one in which the letters correspond in size, shape, *and* relative position on opposite sides of a dividing line or center, is just a little bit trickier. To do this, children must turn the turtle a certain number of degrees, DRAW their letter, turn the turtle the same number of degrees, DRAW the letter again, and so on until a pattern begins to take shape. Challenge your programmers to create a procedure that will repeat the steps needed to create the pattern.

After every child has created a letter pattern, print out the designs, and have the children write their names on the back of their work. Then randomly distribute one pattern to each student in the room. Can the children identify the letter hiding in the pattern that they were handed?

Have each child keep a sheet of paper on which he or she jots down a guess, alongside the name of the person whose pattern he or she is looking at. Then have each child pass that pattern to the child on his or her right. Repeat the process until every child has taken a look at each pattern. Then go around the room and have each programmer tell what letter he or she actually used for his or her pattern. Could anyone identify every letter pattern that he or she saw?

Phyllis Kalowski
Cambridge, MA

VALENTINE'S DAY DATA BASE

Here's a unique way of using a data base program to celebrate Valentine's Day in your classroom. A few days before February 14, set up these data fields (or a variation of these fields) using any data management software program.

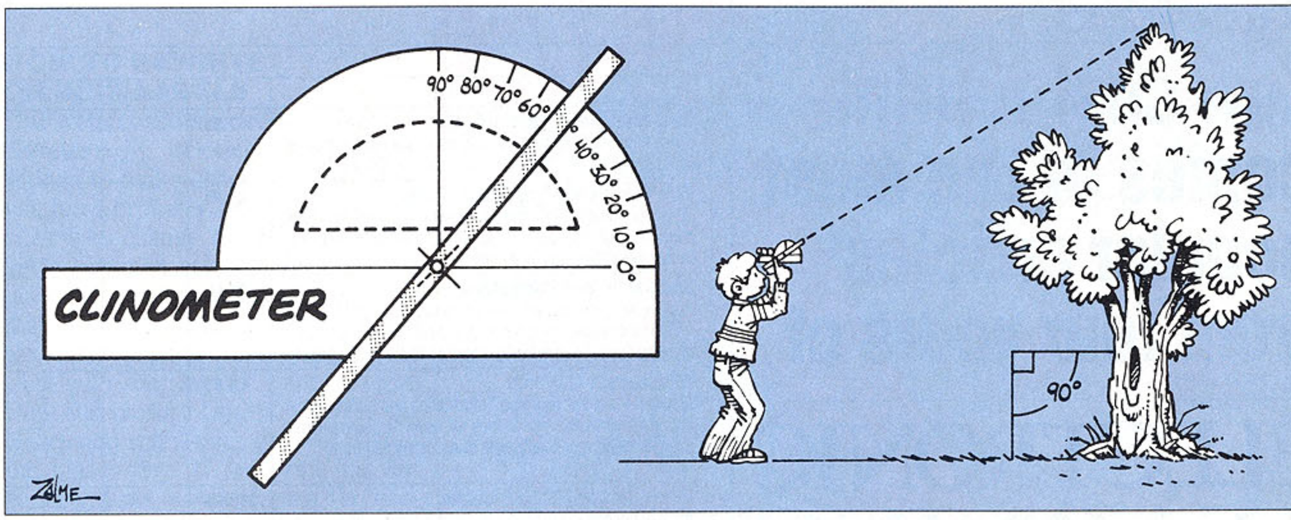
HAPPY VALENTINE'S DAY TO:
YOU ARE AS SWEET AS:
YOU REALLY DESERVE:
AND:
LET'S GET TOGETHER:
FROM YOUR ADMIRER:

During the next couple days, have students go to the computer, one at a time, and fill out as many records as they wish. Each record should be "addressed" to a different classmate, teacher, or teacher's aide. Tell students that they must not, for any reason, look at anyone else's data records.

On Valentine's Day, after everyone in the class (as well as you) has had a chance to create data file valentines, review with your students how to use data base software to sort data records. Then allow each child to make a printout of the records "addressed" to him or her. (Sort by the HAPPY VALENTINE'S DAY TO: field.)

If your students wish, have them share with classmates some of the cutest or funniest valentines that they received.

Craig Dickinson
Orono, ME



A classroom clinometer (left) helps youngsters find the height of objects taller than they are (right).

BASIC PROGRAM TURNS STUDENTS INTO JUNIOR SURVEYORS

For Presidents' Day (February 16 this year), show your students how they can be *surveyors*, just as George Washington, the first President of the United States, once was. A surveyor, explain to students, is someone who figures out the boundaries of a person's land and accurately charts the way that land looks onto a map.

Today, as in Washington's time, many special instruments are used to figure out the way the surface of a person's land looks. One such instrument is a *clinometer*, which measures the angles of slopes and hills as well as the height of objects such as trees and buildings. You can create a classroom clinometer from a sheet of cardboard that is at least 9" X 5". You will also need a straw, protractor, straight pin, pair of scissors, and a marking pen.

Cut the cardboard into the shape shown on this page (the shape of a protractor with a rectangular handle at one end). Then mark the clinometer every 10 degrees, from 0° through 90°.

Take the pin and stick it through both the center of the straw and the point on the clinometer where the "X" is marked. Bend the pin down and fasten it with tape to the back of the instrument.

When your students are ready to use the clinometer, type the following BASIC program listing into your computer and save it on a disk. The calculations that are done by the computer, explain to students, were at one time done entirely by hand.

```
5 REM JUNIOR SURVEYOR PROGRAM
10 CLS
20 INPUT "WHAT IS THE NAME OF THE
   STRUCTURE TO BE MEASURED?";
   S$: CLS
30 INPUT "ENTER YOUR HEIGHT TO
   THE NEAREST FOOT."; H
40 INPUT "ENTER THE ANGLE OF IN-
   CLINATION MEASURED FROM THE
   CLINOMETER."; A: CLS
50 PRINT "ENTER YOUR DISTANCE
   FROM THE ";S$; "USING UNITS OF
   FEET."
60 INPUT DS: CLS
70 A=A*3.14159/180
80 A=TAN(A)
90 D=H/A
100 D= D+DS
110 HS=A*D
120 HS=CINT(HS)
130 PRINT "THE HEIGHT OF THE ";S$; "
   IS "; HS; " FEET."
```

The program listing above runs on the TRS-80 computer. To convert it for use on Apple computers, change CLS to HOME in lines 10, 20, 40, and 60. Change CINT to INT in line 120.

To use the clinometer and the BASIC program listing, take your students into the schoolyard and select a tall object, such as a tree or your school building (or even a hill). Make sure that you take a measurement of how far away from the object a student is standing when he or she uses the clinometer.

Have a child grasp the clinometer by its handle. Then, holding the clinometer so that it forms a P that is perpendicular with the ground (see illustration), tell the child to look through the straw and find the top of the structure being measured. What angle is the straw pointing to now? This angle, tell students, is called the *angle of inclination.*

Have a second child, approximately the same height as the first, repeat the exercise, standing at the exact same point. Their findings should agree. If they do, return to the classroom and run the BASIC program above. Enter the information you have collected as the computer requests it. The computer then calculates the measurements and displays a result — the approximate height of the structure.

If you are working with older students, you may want to explain that the math equation used to find the height of the structure is found in a branch of mathematics called *trigonometry*. One law of trigonometry, explain to students, is that the length of a right triangle — which is what has been formed between the student and the structure (see illustration) — can be found with a math equation, as long as the angle of elevation (the measurement found with the clinometer) and the length of the base (distance from the structure) are known.

Once your students understand how to use the clinometer, divide them into groups of two. Assign each couple a different tree or building to measure.

Richard Bollinger
New City, NY

Ron Zalme

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MICRO IDEAS

HOW TO REWRITE ON DISK LABELS

If you constantly reuse software diskettes by deleting old program listings to make space for new ones, you have probably faced the dilemma of how to change the writing on diskette labels. If you use a felt-tip pen (as most manuals suggest you do so that you don't damage the disk), you can easily change the writing on the label with the help of a cotton swab stick and bleach. Dip the swab in the bleach and rub it over the words. Let the bleach dry. If the print has not entirely disappeared, repeat the process. The type of pen you use may make a difference, but I've found that this procedure works for me.

Antoinette M. Votava
South Bend, IN

PULLING THE PLUG ON STUDENTS

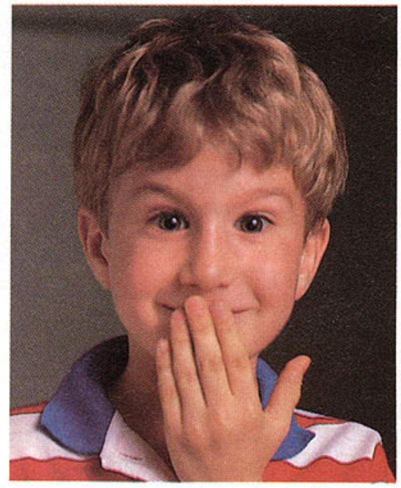
My students became so involved with computers that I couldn't get them to leave the computer lab at the end of class! Other teachers were complaining that kids showed up late to their rooms every day because they hadn't left my room on time. There were even students I couldn't get to leave at 3:15! Turning off the overhead lights as a signal that the period was over did not help. Kids were thrilled to see the way their computer screens glowed in the dark!

Finally I found a solution. All it took was a trip to a hardware store where I purchased a multiple electrical outlet box for each computer work station in the room. I plugged the hardware at each station into its own box, and then plugged each box into the one adjacent to it. The last box was plugged into the wall electrical outlet nearest my desk.

Now I'm in control again. When I give the signal for students to stop working, they have one minute to SAVE whatever they are working on. Otherwise, they are in danger of losing their program listing permanently. Why? Because after that one minute, *I* turn their computers off myself — from the outlet box near my desk.

George Pitlik
Spring, TX ■

"My computer just talked to me!"



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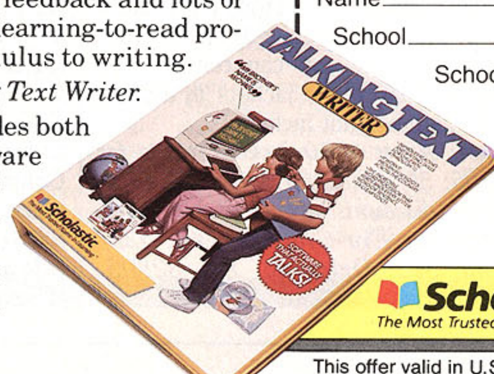

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TOOLS OF THE TRADE

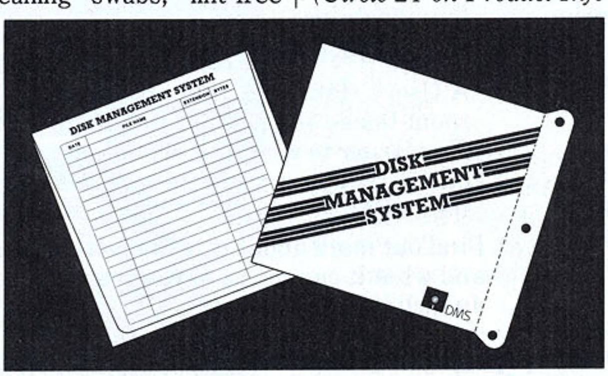
NEW AND USEFUL COMPUTER PRODUCTS

COMPUTER CARE KIT

Philips ECG has produced a "first aid kit" for computers called Computer Care Products. The kit contains all the elements needed to properly clean and maintain computers and other types of electronic equipment. Among its components are a disk-head cleaner, an antistatic spray, and presaturated cleaner pads for computer terminals. The kit also contains lint-free cleaning swabs, lint-free wipes, a jet air-cleaner to rid the keyboard of dust and grime, and an illustrated booklet of step-by-step instructions on how to use the various elements of the kit.

Price: *$39.95 in check or money order.* Contact: *Philips ECG, Inc., P.O. Box 3277, Williamsport, PA 17701. Or, order C.O.D. by calling toll-free 800/233-8767; in Pennsylvania 800/222-9308.*

(Circle 24 on Product Info Card)



FILE MANAGEMENT DISK JACKETS

With the Disk Management System, a set of specialized disk jackets, you can locate computer files without loading disks. New Graphics, Inc. has designed each jacket so that file information for up to 28 files can be recorded on it. For each file, space is provided for a file name, a date, an extension or file-type code, and the number of bytes of memory it contains. Numeric labels are included to reference the jackets to their corresponding disks.

On the left side of each jacket is a perforated tab with three punched holes. This lets you store the jackets in a small three-ringed binder (not included). Or, you can remove the tabs and store the jackets in a standard file box (not included).

Price: *A set of 10 jackets retails for $7.95; 50 jackets for $29.95. Educational discounts are available.* Contact: *New Era Graphics, Inc., 1227 28th St., Orlando, FL 32805.*

(Circle 25 on Product Info Card)

LOGO LEARNING SYSTEM FOR TEACHERS

ON LOGO, published by Media Microworlds, Inc., is a learning system that uses videotapes of presentations by Seymour Papert, as well as print materials and microcomputer diskettes, to teach teachers how to use Logo with students. The system can be used on an individual basis or with inservice training groups. Portions of the learning system are adaptable for use with students.

The system contains approximately six hours of instruction on video tape, plus six diskettes (compatible with *your* version of Logo), and print materials that increase understanding of the Logo language and of learning concepts in general.

The series has three parts: *The New Mindstorms* (four tapes and one diskette) explains the philosophical, theoretical, and methodological underpinnings of Logo. *Hurdles* (four tapes and three diskettes) explains aspects of the language that can be difficult to master, from the "grammar" of Logo to the concepts of variables, naming, and recursion. The last part, *On LogoWriter* (two tapes and two diskettes), illustrates the capabilities of *Logowriter,* a new version of Logo that was developed by LCSI (Logo Computer Systems Inc.) and has word processing capabilities.

Price: *The three parts in the series are available individually ($699 each for* New Mindstorms *and* Hurdles; *$195 for* On LogoWriter), *or as a set ($1,295). A preview tape is $50, the price of which is applied toward the kit if you decide to buy. Any complete tape in the series may be previewed for $75.* Contact: *Media Microworlds Inc., 12 Clayton Terrace, St. Louis, MO 63131; 314/567-0150. Be sure to indicate which version of Logo you use.*

(Circle 3 on Product Info Card) ■

CURRICULUM PLANNER

WHERE TO USE SOFTWARE IN THE CURRICULUM

This month computer consultant Shiela Swett suggests software programs that can be incorporated into language arts curricula for children in grades six through eight.

Shiela has charted her software recommendations according to specific language skills that the programs will help students to develop more fully.

The empty boxes at the far right of her chart let you include software listings of your own.

See page 52 for the publishers' addresses.

SIXTH – EIGHTH GRADE LANGUAGE ARTS

SKILLS	RECOMMENDED SOFTWARE			SCHOOL-OWNED SOFTWARE
READING	**Microzine** (Scholastic). This magazine-on-a-disk offers four varied reading and problem solving programs per issue. You'll find many curriculum applications. Five issues/year. Top quality! For Apple II series. $34.95 each.	**Speed Reader II** (Davidson). Improve speed and comprehension with this six-part reading program. For Apple II series, Macintosh, IBM PC/PCjr, Commodore. $69.95.	**Smart Eyes** (Addison-Wesley). Students use physical eye exercises to improve the rate at which they read. Includes interesting reading-for-meaning activities and record-keeping. For Apple II series, Macintosh. $59.95.	
VOCABULARY	**Word Attack!** (Davidson). Four activities drill word meanings on nine levels; fourth activity is a zippy game. Add your own word lists. For Apple II series, Macintosh, IBM PC/PCjr, Atari, Commodore. $49.95.	**Crossword Magic** (Mindscape). Children create crossword puzzles using vocabulary or spelling words. Good for subject review or quiz. For Apple II series, Atari series, Commodore, IBM PC/PCjr. $59.95.	**Word-A-Mation** (Sunburst). Students learn about synonyms, antonyms, homophones, tense, spelling, and category names as they build word chains using six "word machines." Original! For Apple II series. $59.	
SPELLING	**The Bank Street Speller** (Scholastic). Proofreads students' text and highlights spelling errors onscreen. Built-in dictionary suggests replacement word upon request. For Apple II series, Commodore. $64.95	**Spell It!** (Davidson). Children read a commonly misspelled word, use it in context, unscramble it, and finally spell it. For Apple II series, Atari series, Commodore, IBM PC/PCjr. $49.95.	**The Spelling Machine** (SouthWest EdPsych). Students see words, type them from memory, use in context. Teachers use built-in word list or create own. Management feature. For Apple II series. $49.95.	
GRAMMAR	**Microcomputer Workshop Series** (CBS). Four grammar programs: *Root Words & Suffixes*, *Word Pairs* ($39.95 each); *Capitalization Plus* ($44.95); *Subject-Verb Agreement* ($49.95). Apple II series.	**Grammar Gremlins** (Davidson). Players practice nine grammar rules (punctuation, capitalization, plurals, etc.) in this haunted house game. Pre- and post-tests given. For Apple II series, IBM PC/PCjr. $49.95.	**Wally's Word Works** (Sunburst). Pick up and deposit a word in the correct pocket (part of speech) using word's position and function in the sentence as clues. For Apple II series, Atari series, Commodore. $69.	
WRITING	**Writing Activities & Language Skill Builders** (Scholastic). Students use with *Bank Street Writer*. Revision how-tos and sentence structure tips. For Apple II series, IBM PC/PCjr, Commodore, Atari. $59.95.	**Suspect Sentences** (Ginn & Co.). Students try to match style, content, grammar, and spelling when adding sentences to given literary passages. Sharpens thinking and writing. For Apple IIe, IIc. $59.95.	**Developing Writing Skills** (Queue). Focuses on word choice, sentence structure, and the paragraph. Tutorials, practice sessions, feedback, challenging exercises. Comprehensive. For Apple II series. $115.	
TEACHING TOOLS	**Bank Street Filer** (Broderbund). Great for beginners. I suggest you use it to convert a class reading list to data base form and let students add favorite books and comments. For Apple II series. $69.95.	**Bank Street Writer III** (Scholastic). This word processing program simplifies editing and redrafting for students. Teachers can input own files. For Apple II series, Atari series, Commodore, IBM PC/PCjr. $95.	**Success With Typing** (Scholastic). A solid touch-typing course that prevents poor habits and makes word processing practical and enjoyable. Thorough support materials. For Apple IIe, IIc, IBM PC/PCjr. $69.95.	

SOFTWARE SHOWCASE

SOFTWARE RECOMMENDED FOR TEACHERS, BY TEACHERS

COMPARISON KITCHEN

Computer: IBM PC/PCjr, Tandy 1000 (use IBM version), Apple II series
Topic: Visual discrimination
Level: Pre-K–3

Comparison Kitchen is a set of six games that helps develop visual discrimination skills. In the games, children must make visual discriminations by comparing the color, shape, and/or size of baked goods. All action takes place in a kitchen and is conducted by two friendly characters: the Chef and the Baker. Following are short synopses of the six games:

The Baker asks children to match identical cookies in the first of six games presented in Comparison Kitchen.

1. Cookie Hunt asks children to look at a group of three cookies and decide which one matches the sample cookie that the Chef presents. Children must make visual distinctions involving size and shape in order to decide. If they continue to answer correctly, cookies take on finer discriminatory qualities, and four, rather than three, cookies appear in the group.

2. Bake Shop has children help the Baker make a cookie to match the sample cookie pictured on a recipe card. They do this by choosing a cookie cutter that is the correct size and shape from a row of cutters on the right side of the screen. If the choice is correct, the Baker uses the cutter to cut the cookie out of dough. Children then must choose the correct color icing to finish the cookie.

3. Which Is Less? has children watch the Chef cut slices from three different cakes. Children must study the remains of each cake and decide which has the least amount left.

4. Same or Different is a timed activity. The Baker presents two baked goods from the oven. Children press *S* if the goods look the same; *D* if they look different. The goods may vary in size, shape, decoration, and/or color. When time (approximately three minutes) runs out, children receive a score that indicates how many times they pressed the correct letter.

5. & 6. Bake Off 1 and 2 are guessing games that reinforce problem-solving skills associated with the comparison of size. Children use visual clues and deductive reasoning to guess the size of a hidden cake. In Bake Off 1 (one-player version), the player earns points based on the number of guesses used before selecting the correct answer. In Bake Off 2 (two-player version), players compete to see who can be the first to guess the size of the hidden cake.

The animation as well as the color graphics of this program are highly motivating. The content is quite pertinent to the grade level.

Price: $29.95
Policy: $15 backup; 30-day preview
Source: Developmental Learning Materials (DLM), One DLM Park, Allen, TX 75002; 800/527-4747

Evelyn J. Woldman, Computer Consultant, Framingham, MA

BE A WRITER!

Computer: Apple II series
Topic: Language arts and word processing
Level: 2–4

"One day on the mountain Ruby Robot fell down into a dark cave. She was stuck inside. She screamed for Giant George and the dragon."

What was Ruby doing on the mountain? Where's Giant George? Students write all about it in THE RESCUE, one of the 25 files in *Be a Writer!*, a word processing activities program published by Sunburst Communications. *Be a Writer!* is the second program in Sunburst's new language arts series. The series is designed to be used in conjunction with Sunburst's *Magic Slate* word processing software.

In the exercises, students explore narrative, descriptive, and explanatory writing styles by completing unfinished stories, sentences, poems, and half-written correspondence about Giant George, Ruby Robot, the owl, and the dragon.

The 25 activities files also cover specific language objectives. For example, in the ACTION file, students identify verbs in given sentences and change them for verbs of their own.

The program also has exercises that encourage students to become more descriptive with nouns and adjectives. In THE DRAGON file, for example, if a sentence reads, "The dragon lives here," an adjective can be added to change the sentence to "The *huge* dragon lives here."

The CRAZY DAY file teaches the importance of sequential order in writing by giving students the opportunity to organize a series of sentences into one paragraph.

In *Be A Writer!*'s final three lessons, children are asked to write their own poems, letters, and stories by incorporating all the writing skills they have learned from the previous files. Students are provided with sentences or phrases to start them off on these writing projects.

The 25 files follow enough of a storyline that after children have completed all of them, they can print out their files and assemble them into a bound book.

I found *Be A Writer!* to be an outstanding program that can be used to supplement a language arts curriculum. Students are encouraged to use their imagination. This makes their entries personal and individual—something rarely achieved using much of the educational software currently available.

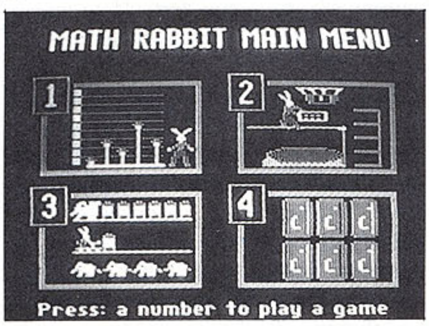
Price: $40
Policy: backup included; 30-day preview
Source: Sunburst Communications, Inc., 39 Washington Avenue, Pleasantville, NY 10570; 800/431-1934; in New York, Alaska, and Canada call collect: 914/769-5030

Kristen Sternberg, Teacher Dalton School, New York, NY

MATH RABBIT

Computer: IBM PC/PCjr, Tandy 1000 (use IBM version), Apple II series
Topic: Math
Level: K–2

Tightrope walkers, elephant trains, fortune tellers, smiling clowns, and an entertaining rabbit provide a circus full of math games in *Math Rabbit.* The games are designed to help primary graders develop skills in counting, adding, and subtracting, as well as in recognizing number relationships and patterns. The program is divided into four main games.



In Math Rabbit, *children can choose to play one of four main games: Clowns' Counting Games, Tightrope Game, Circus Train Game, and Mystery Matching Game.*

1. Clowns' Counting Games is a set of three counting activities. In the first activity, children press the space bar in order to move a vertical bar (with a clown's face on top) up a number line. When students are happy with the number they have created on the line, they key it in and a tone sounds. After seven tries all of the tones play to make a tune. The second activity in this part uses the same number line. The star character of this entire program, Math Rabbit, displays a number on the right side of the line. Students move a bar up the number line until its amount matches Math Rabbit's number. The final activity is similar to the second, only there are no numbers on the number line.

2. Tightrope Game displays Math Rabbit on a tightrope. If children correctly match sets of objects, numbers, or math problems (level of difficulty can be adjusted) to a target number, Math Rabbit dances a tightrope jig.

3. In Circus Train Game, children help Math Rabbit load a circus train with numbers that increase or decrease by the same amount. (Again, level of difficulty can be adjusted.)

4. In Mystery Matching Game, students pay a visit to a circus fortune teller. While in her tent, they play a card game. The game is similar to Concentration, only kids match numbers, sets of objects, or answers to math problems that appear on fortune telling cards.

The program is very good at allowing a myriad of choices within each game. The teacher (or students) always controls pace and content. However, it is a little disappointing that there is no record keeping or report of progress.

The use of graphics and sound are appealing. The immediate feedback is good. The program also offers random selection of problems and, as previously mentioned, lots of opportunity for options. For these reasons, I think many teachers will like this program very much. However, I have a few personal reservations. I believe that the computer is a very expensive machine to use simply as an "animated workbook." There is no real use of the power of the computer in this program. Perhaps I could have justified it a little more if a record keeping component were included.

Price:$39.95
Policy: $10 replacement disk
Source: The Learning Company, 545 Middlefield Road, Menlo Park, CA 94025; 800/852-2256

Evelyn J. Woldman, Computer Consultant, Framingham, MA

I CAN WRITE!

Computer: Apple II series
Topic: Language arts and word processing
Level: 1–3

"Max is a green-eyed, purple-haired, 5,000-year-old monster. He is 2,000 feet tall, eats soup made out of fire and hot lava, and jumps on beds in his spare time."

(continued)

(continued from page 47)

Students can create colorful descriptions such as the one above with *I Can Write!*, a Sunburst Communications language arts program that is designed to be used in conjunction with Sunburst's *Magic Slate* word processing program. *I Can Write!* mixes traditional language arts objectives with writing exercises to introduce primary graders to word processing.

The program includes 25 files (lessons) that use large print (20-column-size letters). The files teach children how nouns and verbs are used, the correct forms for proper names, how words can be grouped together to form meaningful sentences, and more. Throughout the 25 files children are encouraged to express themselves creatively.

For example, "My Feet" is a lively file that introduces children to the idea that verbs are words that show action or movement. The lesson instructs students to list the things they can do with their feet, such as "I jump," or "I climb." Children turn these action phrases into complete sentences with correct punctuation.

The program also has a file that instructs children to replace a word that is underlined in a sentence with a word that means the opposite. For example, if a sentence in the exercise reads, "The monster is sad," the student changes it to say, "The monster is happy." Children then learn how opposites change the meaning of a sentence.

The files follow enough of a storyline that after students complete all of them, they can assemble printouts of their work into a bound book.

The documentation for the program is extensive. The teacher's guide includes warm-up exercises, teaching strategies, discussion topics, and samples of student work. The guide is clear, logical, and easy to use.

I wish *I Can Write!* packages included simple graphics capabilities. That would allow students to enhance their stories tremendously! However, the program is not seriously lacking in any way in its present form.

Price: $40
Policy: Backup included; 30-day preview
Source: Sunburst Communications, Inc., 39 Washington Ave., Pleasantville, NY 10570; 800/431-1934; in New York, Alaska, and Canada call collect: 914/769-5030

Kristen Sternberg, Teacher
Dalton School, New York, NY

DINOSAURS AND SQUIDS
(From the Strategies in Problem Solving Series)

Computer: Apple II series
Topic: Math problem solving
Level: Grades 5–8

Chiang climbs to the top of a cliff and looks down. She counts 12 dinosaur heads. From the boat, Calvin counts 40 dinosaur feet. How many dinosaurs are Tyrannosaurus rex dinosaurs?

In *Dinosaurs and Squids*, students use several problem solving strategies to solve math problems like this one. Strategies include making tables; writing BASIC programs; and searching for pertinent facts about dinosaurs, squids, and other interesting creatures. To perform the math calculations in these problems, kids need only know how to add, subtract, multiply, and divide whole numbers.

The program provides these problems within four different contexts or sections: (1) Main Problem: Dinosaur Dynasty; (2) Review Problem: Seaworthy Sea Creatures; (3) Create a Problem: Answer the Computer's Challenge; and (4) Create a Problem: Challenge the Computer.

Students begin with Dynasty Dinosaur, which presents them with a dinosaur problem like the one previously outlined. (The numbers in the problem are randomly altered from run to run.) After students read the problem, they press RETURN and are given a strategy menu that offers them nine problem solving options. Students may use any combination of options to solve the problem.

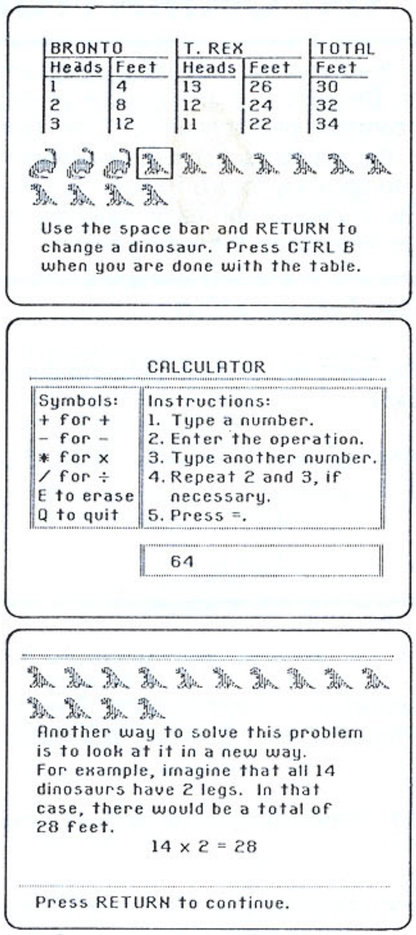
Option 1: "Give your answer" lets students try an answer and have the computer check it.

Option 2: "Read the problem again" lets children return to the problem statement to recheck the wording and data.

Circle 15 on Reader Service Card.

Circle 16 on Reader Service Card.

SOFTWARE SHOWCASE



Screens from Dinos and Squids*: Top lets kids see a table; middle lets kids use an electronic calculator; bottom shows kids a problem solving alternative.*

Option 3: "Get dino definitions" provides students with pertinent facts about each dinosaur in the problem.
Option 4: "Get a hint" provides suggestions for solving the problem.
Option 5: "Make a Table" provides students with an incomplete table and visual representations of dinosaurs. Kids complete the table, and in the process, should be able to solve the problem.
Option 6: "See a table" is a completed table. Students read the table in search of an answer to the problem.
Option 7: "Use the calculator" provides a way for students to do calculations (just as if they were using a calculator) on the computer.
Option 8: "Write a BASIC program" is available for students with beginning programming skills. All problems can be solved with simple BASIC programs. Students can write and run them with the help of this option.

(continued)

(continued on page 49)

Option 9: "See a solution"shows two ways to solve the problem. One way uses a table; the other, step-by-step logic.

After students complete the main problem in Dinosaur Dynasty, they advance to the review problem section called Seaworthy Sea Creatures. A problem about sea creatures appears on the screen. (The numbers in it also change randomly from run to run.) Children must solve this problem using the strategies they learned from the main problem, but without the help of a strategy menu.

In the two Create a Problem sections, students are given a choice of problem solving settings (both have sea motifs) and difficulty levels (tough, very tough, and super tough) from which problems are randomly created. No strategy menu is provided for either of these sections. Once again, children must rely on their own strategizing. In one of these sections, the computer challenges students with a problem; in the other section, students enter numbers into a problem framework and challenge the computer to come up with the answer. In the latter section, children must work out the problem to see if the computer has indeed solved the problem correctly (it always does).

The program's documentation is well-designed. It includes teaching suggestions, 10 reproducible worksheets, and a helpful bibliography.

I have a nice feeling about this program. Though the authors grant that there is no "one right way" to solve problems, they do lead the user to realize there are certain rules of thumb that can be applied to solving problems. This is a very timely program. Many current math assessment tests are focusing on open-ended, nonroutine word problems, yet few textbooks cover this type of material.

Price: $49.95 for initial package; $10.95 for each additional disk
Policy: Backup included; 30-day preview
Source: Scott, Foresman and Company, 1900 East Lake Ave., Glenview, IL 60025; 312/729-3000

J. Craig Dickinson, Teacher
Asa Adams School, Orono, ME ■

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TEACHING and computers February 1987 *(Expires June 1)*

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61	62	63	64	65	66
67	68	69	70	71	72
73	74	75	76	77	78
79	80	81	82	83	84
85	86	87	88	89	90
91	92	93	94	95	96
97	98	99	100	101	102
103	104	105	106	107	108
109	110	111	112	113	114
115	116	117	118	119	120
121	122	123	124	125	126
127	128	129	130	131	132
133	134	135	136	137	138
139	140	141	142	143	144
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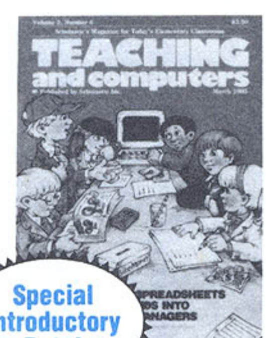

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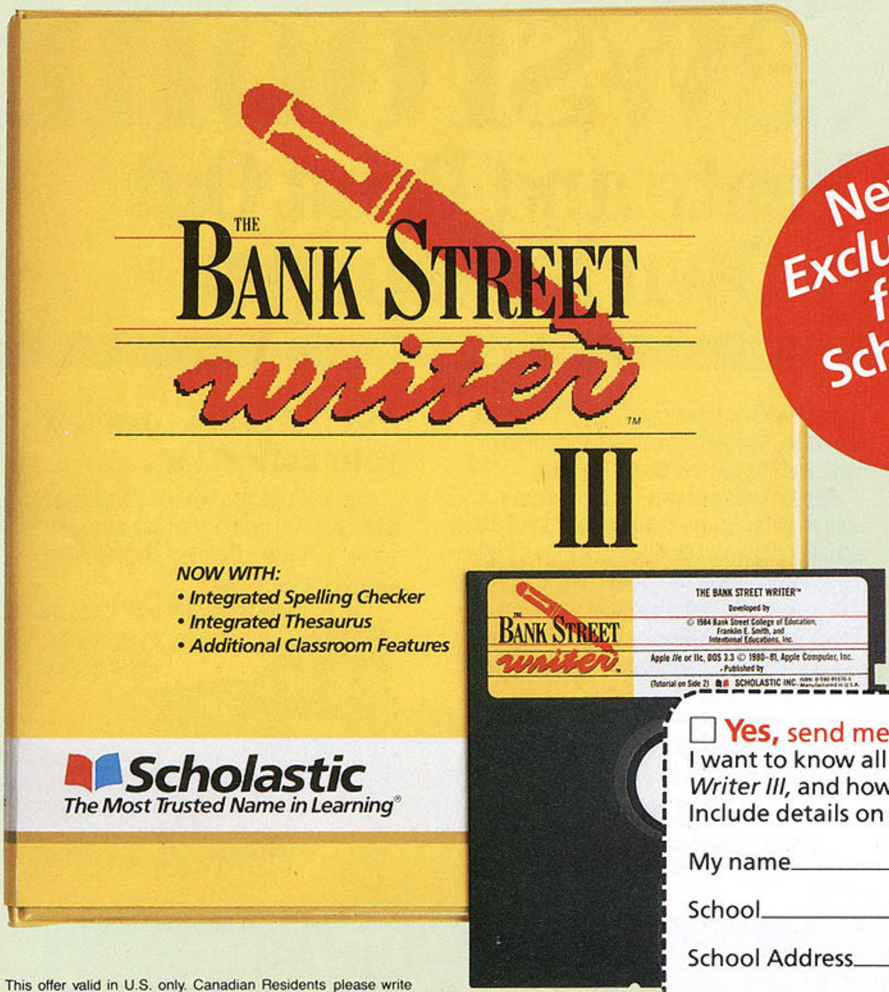

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