

# FASTBACK

# 295

# Using Microcomputers with Gifted Students

Margaret Perry

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*Using Microcomputers with Gifted Students*

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# **Using Microcomputers with Gifted Students**

by  
Margaret Perry

Library of Congress Catalog Card Number 89-61966

ISBN 0-87367-295-X

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Bloomington, Indiana

This fastback is sponsored by the Western Illinois University Chapter of Phi Delta Kappa, which made a generous contribution toward publication costs.

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## Introduction

Computers and gifted students are an ideal match. Gifted students need to think, to explore, to create. Computers can help them to do these things. Gifted students like to work independently. Computers can help them to do this, too. Gifted students have enormous potential. Computers also have enormous potential and can provide students with the means to use their potential. Today computers are in the home and workplace. Why not integrate them into the place where children spend most of their time — in school?

Computers can provide new and exciting experiences for gifted students, experiences that were not possible 20 years ago. They can instantaneously call up databases from around the world and locate current information. They can calculate complex mathematical problems quickly and accurately. They can write, edit, and revise stories or reports with ease and then illustrate them with computer graphics.

Gifted classrooms need a multitude of experiences to challenge the school's most capable youngsters. Computers can challenge by providing opportunities to think and explore. A computer is not just another classroom machine. Under the direction of a competent teacher, a computer can be an integral part of the curriculum, providing rich and varied experiences for enriching gifted students' thinking skills and knowledge. Let's find out how.

## **Integrating Computers into the Gifted Classroom**

**C**omputers can be used with all students for drill and practice in basic skills. But gifted students don't need drill and practice; they need creative and problem-solving opportunities. For them, a computer should be used as a tool, as a simulator, and as a mentor. For example, an appropriate use of a computer in the gifted classroom is having two or three students working on a challenging simulation, interacting and exchanging ideas on how to solve a problem.

Most students will not be computer programmers in their adult lives. They will use the computer as a tool at home and at work. By integrating the computer as a tool for classroom projects and activities, students will realize the value of using a computer in their day-to-day lives. Computers and software are tools to help in learning. They are a means to an end, not an end in themselves. Therefore, one should not select a software program simply because it looks interesting or fun. Software should be selected to integrate with the ongoing curriculum.

### **Software Selection**

Integrating computers into a gifted classroom begins with the selection of software appropriate for the goals of the particular gifted program. If the program emphasis is creative writing, then the software would be a word-processing program with possible supplements of



a graphics utility (for illustrating original writing) and a database (for organizing information). If the program emphasis is thinking skills and scientific inquiry, then the software might be science simulations and experiments. An example of integrating computers into the science curriculum is *The Voyage of the Mimi*, a curriculum package dealing with whales. This science exploration series integrates videotapes, texts, student activities, and computer programs, and also includes probes, which are attached to the computer and are used to gather information. The complete package provides many explorative opportunities, and the software is carefully integrated with the other materials in the package.

When previewing software for use with gifted students, the following criteria should be considered before purchasing: provides for different levels of ability; includes a branching capability; is reusable, that is, students can profit from using the software more than one time; has an evaluation component; is challenging for students, not a drill and practice exercise; content is accurate and up to date. Try to choose a variety of formats. Published reviews of software can help in selecting good software, but also get recommendations from other gifted educators who have used the software. Also take advantage of the 30-day preview policy many software producers offer. The examples of quality software mentioned in this fastback are indicated in parentheses, and the producer is listed in the "Software Resources" section at the end of the fastback.

## **Computer Programming**

Gifted students are fully capable of doing computer programming. In fact, many gifted students can learn to program simply by reading and following the instructions in a programming manual. However, in a gifted classroom the focus of computer programming should be on the thinking skills involved. When approached as a thinking exercise, programming offers gifted students the opportunity to use both logic and creativity in the step-by-step sequencing, long-range plan-

ning, what-if branching, exploration, and creative problem solving.

In my gifted classes I use the programming language called BASIC. Programming activities include programming grid pictures by learning to read X and Y coordinates and plot points, using computer codes, and setting up programs to solve math word problems. The extensive use of grids and variables in writing computer graphics programs enhances math skills as well as serving as a stimulating creative activity. Frequently gifted students come to class already knowing how to program. Encourage these students to move ahead with activities appropriate for their level of expertise. Try to integrate programming with other assignments. For example, in a unit on weather, students might write a program that will print out a chart comparing Celsius and Fahrenheit temperatures.

LOGO is another programming language that offers a rich environment for young gifted students to explore geometric concepts. Students can progress from using single keypresses for drawing points and lines to writing programs, subroutines, and interconnected programs to accomplish goals. LOGO also can be used as a tool for insight and discovery. *Logowriter* is a program that allows students to integrate word processing, graphics, and sound. Imagine a science-fiction adventure tale done by a creative gifted youngster using this tool!

## **Integrating Service into the Gifted Classroom**

Gifted children have many intellectual and creative talents. However, we must give attention to other aspects of their development beyond just the academic and creative. One of these is the commitment of service to others. As tomorrow's leaders, gifted students need to develop an awareness of and empathy for others who are not blessed with their talents. One way of doing this is pairing gifted students with students in special classes for the physically handicapped, learning disabled, or mentally handicapped. In these situations, the computer can provide a comfortable and stimulating setting for the student interaction.

One type of service activity gifted students might do is to write computer-assisted instruction programs. Teachers of special classes can send spelling lists, math problems, social studies questions, science facts, or grammar concepts and request a tutorial, drill exercise, or game program. The creative programmers usually jump on the game requests. To create a game that is both challenging and easy to play is a challenge for gifted students. Students also can design programs for various subject areas. After the teacher gives them the content, they design a program to test comprehension and perhaps add graphics for reinforcement and motivation. Students check each other's programs for accuracy before a final teacher check. Gifted students are quite good at finding each other's errors and possible programming problems.

### **Extending Computer Usage to the Home**

Parents who are interested in providing a home computer for their gifted child should be encouraged to purchase a word-processing program and other interesting programs that stretch the mind and cause students to think. Forget the repetitive games. Supplemental programs that could be added include graphic utilities and a database (to keep track of baseball cards or a stamp collection). Students who would like to complete a class assignment on their home computer should be encouraged to do so. If students learn how to use their home system for a class project, they are more likely to continue using it for other school assignments.

Computer use can be a bond between parent and child in the often adversarial teen years. A seventh-grade girl who frequently went to her father for help with programming and word processing reported to me how much she enjoyed working with her dad on something they had in common. Another of my students has been working with her mother on learning word processing. When these students get to high school, they will already be familiar with word processing on their home system and will be able to turn in a beautifully edited term

paper. Then there are the enterprising students, like the boy who typed up all his freshman science notes on his word processor, printed multiple copies, and sold them.

## The Computer as a Tool

The key to a successfully integrated computer classroom for gifted students is to teach with, not about, computers. To achieve the objectives of the gifted education curriculum, use the computer as a tool, not as a toy. Begin by introducing students to the idea of the computer as a helper — to help with writing assignments, to help keep track of information, to compare one set of information with another, and many other functions. Computers can both save time and create impressive products of which students can be proud. For example, in an economics project involving the design, production, and marketing of a product, computers can help with product development, production schedules, inventory control, advertising, and sales. Let's look at ways computers can be used as helpers in the gifted classroom.

### Word Processing

The computer becomes an invaluable tool in gifted classrooms using the process approach to writing (see fastback 193 *The Teaching of Writing in Our Schools*). The process approach involves five stages — prewriting, composing, revising, editing, and publishing — and the computer can have a role at each stage. The student can compose, revise, and edit directly on the computer and obtain a neat, accurate, professional-looking final copy. It is easy to move whole paragraphs, change words, or add and delete sentences. The student

can concentrate fully on the act of writing rather than fret about whether recopying is necessary. No longer will teachers have to listen to "Do I have to recopy it?" And there are grammar and spelling checker programs available to help the student locate errors.

Word processing is even possible for very young gifted students. From programs designed to motivate young children to write (*Story Tree, Kidwriter*) to school-oriented programs (*Magic Slate, Bank Street Writer*) to business-word programs (*Scriptsit, Appleworks*), the computer can help young students present their thoughts in the best possible manner. Young children like drawing pictures and writing stories to go with them. Some programs (*Kidwriter, Logowriter*) provide both these capabilities. Simple word processing can be taught using an LCD (liquid crystal display) projection panel, which is used on top of an overhead projector to show the computer image on a screen. In this way the teacher can demonstrate the fundamental editing commands to all students at the same time.

It is not unusual to have very bright students in a gifted classroom whose handwriting is barely legible and whose spelling makes you wince. Their minds are obviously on bigger things. A word-processing program, including a spelling checker, is a boon for these students in that it compensates for these weaknesses and allows them to produce written work that is on a par with their gifted peers.

## **Database Management**

Research is always an appropriate activity for gifted students. Use of a database can help student researchers find information as well as record, organize, and analyze their information. Informational databases can be accessed by phone link or with specific programs (*Bank Street School Filer Databases, The Electronic Encyclopedia*).

Databases on science and social studies are especially useful. Consider a social studies database that allows students to sort through categories of historical information and then analyze links among similar historic events, or one that allows students to compare political

candidates' positions on different election issues. Consider a science database that allows students to sort and analyze scientific data and come up with cause-and-effect explanations for an experiment. How about a database students can use to create future civilizations and then compare their creations by category? Many gifted children love to read. Why not a classroom database of books by category with a short comments section by students who have read the book? These are all possible with computer database management programs.

Creating a database to store the information students have collected in researching a topic has many positive learning outcomes. First, it forces them to think about how to organize their information — what categories will be necessary and what cross-referencing can be done. Instead of just copying the information they collect, students are forced to read it carefully in order to organize it according to the prescribed categories. Later, when calling up the information to write the report, the student can access the needed information easily and write a well-organized report.

## **Publishing Programs**

Gifted children should have a publishing outlet for their various class and independent projects. Publishing is not only an effective way to culminate a project, it provides a tangible method of showing parents what the gifted children are doing and learning.

Computer publishing programs (*Newsroom*, *Publish It*) allow gifted students to combine text and graphics and to use multiple column layouts. Individuals or a pair of students can write articles, which are then incorporated into an attractive newsletter, complete with graphics. A word-processing program with a graphics utility can produce classroom anthologies and professional-looking student books. Young children are especially impressed with their "published" works. Copies can be donated to a classroom or school library for the enjoyment of all.

When working on social studies projects, students can use the publishing program to create a historical newsletter or a newspaper of future events. Video images from a video camera can be transferred to a computer disk (*Computer Eyes*) to enhance the appearance of publications.

## Spreadsheets

Spreadsheets are a computer application that organize and calculate statistical information. They are widely used in business for accounting purposes. Once the spreadsheet format and formulas are set up, new data can be entered and the computer quickly gives a new total. With spreadsheets, a class sales project can be charted and analyzed, voting patterns in an election year can be analyzed, and population forecasts using different birthrates can be calculated. In selecting a spreadsheet topic for the gifted classroom, try to find a program that relates to the curriculum or that appeals to students' interests.

## Graphic Utilities

Messing around with the graphic utilities of a computer is a favorite pastime of gifted students, but graphic utilities have many practical uses in the classroom. One of best-known graphic utilities (*The Print Shop*) provides a library of designs and lettering fonts for making signs, banners, cards, and letterheads. Also, original graphics can be made. *The Print Shop* also will print graphics drawn with other programs.

Detailed graphics can be drawn using such programs as *The Complete Graphics System* and *Dazzle Draw*. Pictures can be printed out on paper or recorded on a videotape. Even animation can be added to background pictures (*The Graphics Magician, Animate*). Graphic utilities also can be used to make transparencies for teacher or student presentations. For an eye-catching effect, color can be added either by using a multicolor ribbon or a transparency marker. Gifted



students can have fun with graphic utilities, while at the same time learning to plan and follow directions, improving their eye-hand coordination, and testing their creative abilities.

## **Peripheral Devices**

Gifted students should have experience using different input and output peripheral devices. Besides the customary keyboard, input devices include the joystick, koala pad, mouse, and touch screen. These are much easier to use for creating graphics than is the keyboard. Each device is a different kinesthetic experience and uses slightly different eye-hand coordination skills. Another input device is a scanner, which reads (scans) text and pictures and transfers them directly from paper to the computer. Output devices, other than a monitor screen, include a printer and plotter. The printer is used to make hard copies for word-processing, database, spreadsheet, and graphic utility programs. A plotter is used for making graphs (including pie graphs).

With a tape recorder you can add audio for storytelling or informational dialogue as graphics appear on the computer screen. The Tandy Color Computer can be used to automatically turn the tape recorder on and off in sequence with the graphics. Of course, a tape recorder can be used independently with any computer by having the students record their dialogue as the graphics appear on the computer screen. Then they rewind the tape and play it whenever the graphics program is run.

## **Create Something!**

The heavy academic emphasis in gifted classrooms should be relieved from time to time with activities that spark students' creative talents and give play to their sense of humor. One such activity is letting students create computer cartoons. Then, after the students have created their cartoons, videotape them and have a cartoon festival.

Another activity is letting students create an invention. One software package, *Toy Shop*, allows students to customize and print all pieces necessary to create a toy model. Then comes the hard part — coloring, cutting, and assembling all the pieces according to step-by-step directions. Students also can use word-processing programs to “apply for a patent” for the toy they have invented. And they can use the computer’s graphic utilities to create signs for a display of their new toys. Many other programs allow students to create faces, persons, and creatures. How about creating a computer program to control a personal robot? Robotics is a growing field of computer usage. Many robot kits that interface with the computer are becoming available.

Whatever the computer activity in the gifted classroom, the focus should be on the computer as a tool — a device that allows gifted students do all sorts of intellectual and creative tasks better and more efficiently.

## Stimulation by Simulation

**T**oday's gifted students are tomorrow's leaders. As the next generation's leaders, they will face all sorts of challenges requiring creative problem solving. What better way to gain practice in problem solving than to use the simulation potential of the computer. The branching and interactive features of a good computer simulation allow gifted students to engage in problem solving at many levels as they work in teams to explore the what-if possibilities of the simulation program.

### Social Science Simulations

Economics and other social science simulations allow students to experience the world at a level approaching reality. They can see that the world of business does not operate in a vacuum. A decision in one area has an impact on many other areas. For example, the economics simulation, *The Whatsit Corporation*, shows students how a single decision such as pricing affects labor costs, inventory control, profits, and many other aspects of running a business.

Using the *Whatsit* simulation, student teams operate a franchise for six computer months and try to make sound economic decisions in order to earn a profit. An unexpected event such as a part shortage forces students to be flexible thinkers and makes them realize that not everything is under their control. As students enter different prices

and graph the sales by type of market, the relationship between price and sales is vividly shown. Students then proceed to the actual simulation. Teamwork is stressed, and the student interaction involved in making different decisions leads to heated discussion at times.

## Science Simulations

Science simulations allow gifted students to explore all kinds of scientific phenomena and to do a variety of experiments. (See fast-back 297 *Using Microcomputers in Teaching Science*.) A good science simulation replicates experimental conditions of the laboratory. Some science simulations use probes attached to the computer. For example, *Science Tool Kit* allows students to use heat and light probes to measure actual experimental conditions, with the computer analyzing the data directly from the probe input. Other simulations require students to enter all the data into the computer.

Even an elementary-age gifted student can experiment through such programs as *The Incredible Laboratory*, which allows the students to collect data and formulate hypotheses about the effect of each imaginary chemical on their monster creations. The program can be repeated as many times as wanted using different chemical mixes to create different monsters. The program called *Operation Frog* simulates an actual frog dissection. And students can even reconstruct the frog after dissecting it — an impossible feat in the traditional biology lab but very easy with the computer simulation.

A recent addition to simulations is interactive videodisc. Florida State University's simulation, *Acids, Bases and You*, uses a videodisc to show footage of actual science experiments in which students select various chemical mixtures — a safe way to do an experiment and also cost-effective, since video chemicals are reusable.

Science simulations encourage gifted students to move beyond simple acquisition of facts (although they do that, too) to explore, to test, to experiment. In short, they are learning the methods of scientific inquiry.

## Reading Simulations

Several simulation programs coordinated with reading activities are available for gifted students. *Snooper Troops* and *In Search of the Most Amazing Thing* come with student reading materials and stress thinking, analyzing, and taking notes as well as reading. *Snooper Troops* intergrates nicely with a reading unit on mysteries, as does *In Search of the Most Amazing Thing* with a science-fiction unit. There are other programs related to certain classics (*Swiss Family Robinson*, *Treasure Island*), which involve students in critical thinking as they read these well-known classics. (See fastback 296 *Using Microcomputers for Teaching Reading in the Middle School*.)

## Math Simulations

Gifted students need math experiences that go beyond simple computation. They need experiences that allow them to use their math skills to analyze and solve problems or to make predictions. Using a math simulation such as *Gears*, students devise a formula that allows them to correctly set the gears on an imaginary machine.

## Multi-Skill Simulations

Many simulation programs are available that cover more than one content area and provide practice in a variety of skills. For example, the *Where in the World Is Carmen San Diego* series appears to be a social studies simulation involving the exploration of the United States, Europe, and the world. However, as students get involved in the simulation, they find they are using deductive reasoning skills, learning new vocabulary, and using reference books to research information.

Successfully navigating the five levels of *Robot Odyssey* requires a lot of student planning, attention to detail, and time. Gifted students get so involved in the fun of using electronic circuitry to conquer the sewer system and journey to the skyways that they do not realize the

amount of thinking and planning that is required. This simulation has the added feature of allowing multi-turns, that is, students can stop playing and later pick up where they left off.

## **The Value of Simulations**

At the beginning of the year, when I introduce my gifted students to computer simulations, I make it a point to stress that these programs are learning activities. Yes, they have elements of fun, and students do "play" with them; but they were chosen with learning objectives in mind, for example, visual reasoning (*The Factory*), deductive reasoning (*Where in the World Is Carmen San Diego*), and scientific reasoning (*Planetary Construction Set*). Gifted students need to know and be able to articulate to their peers, parents, and other teachers that their computer simulation activities, while fun, have specific learning objectives related to them.

Another valuable aspect of computer simulations is the team effort required to play them. Leaders have to convince their followers to agree with and support their decisions. When two leaders join forces, they have to be willing to listen to each other in order to reach a compromise. A good simulation presents many opportunities for thought-provoking discussion between partners.

Still another valuable aspect of simulation is the reality dimension; the decisions students make do affect the outcome. Although there may be more than one right decision, there can be bad decisions as well. With branching capabilities in the simulation, there can be alternate paths that create varying situations for the participants. A simulation is not static just as life is not static. There are decision points along the way that have an impact on what follows. This, too, is life.

## The Computer as Friendly Mentor

Perhaps the most notable characteristic of gifted students is the variety and depth of their interests. Computers allow teachers to address their multiple interests and talents. Science programs are available that allow students to conduct experiments without fear of safety hazards. Economic and statistical forecasting can be done easily with spreadsheet programs. Students can tap into databases via phone lines or satellite, which put vast storehouses of current information at their fingertips. Through computer bulletin board networks, students can meet and "talk" with others who share their special interests, including authorities in a particular field. The computer can truly be a friendly mentor to gifted students.

### Higher Level Drill and Practice

Many computer programs on the market provide drill and practice in basic skills, but few of these are needed in the gifted classroom. However, as gifted students approach the high school years, they will soon face the reality of preparing for college entrance exams. Two types of test items commonly found on these college aptitude exams are analogies and number sequences. Drill and practice programs on analogies (*I.Q. Builder, Analogies*) and on number sequences (*The Pond*) give students practice in these two skills. For example, *The Pond* provides a graphic demonstration of number sequences. A frog

jumps from lily pad to lily pad, and the student has to figure out the correct pattern of steps so the frog does not land in the water. Younger students particularly enjoy this visual approach; and with its multi-levels, it is also appropriate for older children.

## **Tutorials**

Tutorials, particularly those with branching capabilities, are especially appropriate for gifted students who want to pursue a special interest. Databases also can provide more in-depth information on a specific topic. With CD-ROM and encyclopedia disks, students can access a storehouse of information with a simple keypress rather than searching through voluminous reference books. An interactive system that links the computer to videodisc sources can provide access to a wealth of tutorial material. These interactive systems also provide a safe environment for conducting science experiments and learning how to use complex equipment. The day is not far off when these technologies will be widely available in the schools.

## **Telecommunications**

Linking computers via telecommunication networks (phone lines or satellites) is growing rapidly. These computer networks are now being used for banking, shopping, research, and other activities. Computer telecommunications in a school allows gifted students to contact authorities in a particular subject or to communicate via electronic bulletin boards. Electronic pen pals are an excellent use of telecommunications in the classroom.

NASA's *Spacelink* is a free (except for long-distance charges) electronic information system for educators. It is a collection of NASA information and educational materials, including shuttle status reports, current and past NASA research, historical information on the U.S. space program, and current information on such topics as the space station, shuttle payloads, and planetary probes. Also, space science



classroom materials, including lesson plans, can be accessed through *Spacelink*.

## **Artificial Intelligence**

Artificial intelligence (AI) is one of the emerging computer application fields. Gifted students are fascinated with how computers can be taught to think and learn like human beings. The program, *A. I.*, shows students how two main subfields of AI, pattern recognition and game theory, work. And the program challenges students to teach the computer. This program gives students the opportunity to use inductive processes, to experiment, and to analyze results. Other promising AI areas for exploration include speech recognition, foreign language translation, psychology, and medical diagnoses.

## **Community Computer Resources**

People in the community usually are quite willing to show gifted students how computers are used in the world of business. A good way to expose students to the multiple uses of the computer is to take them on a field trip. Places to visit might include the school system's administration office, a bank, a real estate office, or a stock brokerage firm. Inviting speakers is another way to expose gifted students to the exciting world of computers and to the career options in the computer field. Computer topics on which experts in the community might speak include robotics, law enforcement, graphic art, music, medicine, and finance.

One teacher cannot be an expert in all fields of interest to a class of gifted youngsters. For these students the computer is a mentor, providing an extension of their information sources through databases, tutorials, and electronic networking. Knowing how to access informational resources is a skill that will serve these independent-minded students throughout their life.

## The Computer-Video Connection

**I**t is now possible to share computer-generated products with larger groups by recording off the computer on to videotape and then playing it on a videocassette machine (VCR). This procedure has many uses in the gifted classroom, particularly with computer graphics products. The procedure is very easy to do.

All that is necessary to record off the computer is to connect the RCA cable coming out of the computer (which normally plugs into the computer monitor) into the VCR video jack. If it is a double cable with separate video and audio inputs, just plug them into the VCR's video and audio jacks (if audio is used in the program). Then connect a cable from the VCR video (and audio if used) to the larger screen of a TV monitor. Having the larger TV screen is much more effective than the small computer monitor screen when presenting programs to groups of students or parents. It is even possible to show the program on multiple TV sets in different parts of the room.

In addition to computer graphics, computer-generated headlines or titles can be recorded on a VCR tape and easily edited in with regular video footage. Now that it is possible to film animation sequences with a videotape recorder (Panasonic AG-1950), gifted students are combining computer-generated type for introductions and end credits with their animation filming. The *VCR Companion* was developed specifically to make professional-looking videotape presentations. Producing multi-media presentations requires much planning and or-

ganization and is an excellent way for gifted students to display their talents.

## **Computer Video Stories**

Another challenging project for a group of gifted students is producing computer-video stories. The group writes an original story using the word-processing function of the computer, then uses computer graphics to illustrate it. Each screen (illustration) of the story is videotaped. Then the group dubs audio for the story on the videotape, possibly including a music sound track or special sound effects. If the production turns out well, videotape copies can be made for all group members.

Many learning outcomes result from such a project. Students learn to work cooperatively as they plan and organize the production. They have the satisfaction of carrying a project of their own creation through to completion. They learn the technical skills of merging video and audio modes. And they can exercise their creative talents to produce a unique piece of work. Group computer-video stories or projects in my class have included "The Conquest of Evil" (chronicling the adventures of a magician), "A Day in the Life of a Sardine Family" (what a sardine family does in a typical day), "Winter Is . . ." (an original poem), and "Merry Christmas" (a Christmas songbook with illustrations and music programmed on the computer).

## **The Computer-Operated Slide Show**

Another good project for gifted students is creating a computer-operated slide show. This is very easy to do using interface devices (*VAI Interface*). For example, if students interested in art history want to do an oral report on Impressionistic painters, they need a computer laser disc utility (*Slide Show*), a videodisc player, and the *National Gallery of Art* videodisc program. After programming which Impressionist paintings they want to show, the students can present

their oral report and illustrate their points by bringing up specific paintings on a TV screen at the touch of a key.

More and more videodiscs are coming on the market. In addition to art collections like *National Gallery of Art*, there are science discs (*Astronomy*) and even videodisc encyclopedias (*The Video Encyclopedia of the 20th Century*). This last program contains both still frames and newsreel footage from dramatic historical moments of this century. Videodiscs provide a vast source of visual information that can be used for student research and to enhance oral reports. The computer can be programmed to present individual frames or motion sequences from the disc at the appropriate time in the slide show presentation. In addition, there are such programs as *KoalaPainter* and *Showoff*, which allow students to create and pace original slide shows of computer-drawn pictures.

The computer-video link is a powerful one for the gifted classroom. Student presentations are much more effective with video images. Videodiscs provide access to vast amounts of information of interest to gifted students. And the computer-video technology allows students to undertake projects that truly challenge their creative talents.

## Managing Computer Use in the Gifted Classroom

I am fortunate in having 24 computers in my classroom of gifted seventh-graders. A few were purchased by the school, donated by parents, purchased by the parent-teacher association, or funded by my school district's Office for the Gifted. However, most came from grants that I wrote. Writing grant proposals is a time-consuming and often frustrating process, but it worked for me. I have three different types of computer in my classroom. I regard this as a plus because it allows students to learn how different computers work, and it will give them confidence when they encounter different computers in the future.

While my own situation might be considered ideal, it is quite possible to integrate computer usage into the gifted classroom with as few as three or four computers. This necessitates having students work in pairs or trios so that everyone is on the computer for at least 1½ hours per week. Depending on the software program used, this may mean working individually or as a pair or trio for 15- to 20-minute sessions several times a week.

At the outset, impress on students that work on the computer is an integral part of the curriculum, not a reward for good behavior or a time-filler when other work is completed. Students tend to take it more seriously when they realize it is not "just for fun."

Accept the fact that gifted students will come to your class with varying levels of experience with computers. For some, you need

only to tell them to look it up in the manual if they have any questions. For others, you will need to begin with the basics: how to turn on the computer, how to handle a disk, how to read a menu, how to execute various computer commands. For beginners it helps to demonstrate the use of software with an LCD overhead projection panel. In this way, students can spend the bulk of their time using the software rather than figuring out how to use it. Reading and being able to understand software documentation is an integral part of computer usage.

I have three Apple computers in my room that I use exclusively for prepackaged software. This allows me to have three different programs going at the same time. In a six-week period, we go through three to six software packages, depending on the number of turns students are assigned per package. There are some software packages that require two consecutive turns per student; others work fine with just one turn.

It will be necessary to make a schedule for computer usage and to post it so students will know when their turn comes. Gifted students have a keen sense of equity and will let you know if someone gets more turns than he is supposed to get. A posted schedule helps. It has been my experience that when students come to class knowing that it is their turn on the computer, they start to work before the bell rings and continue working uninterrupted until class is over. Not surprisingly, few discipline problems arise when students are engaged with their computers.

Try to have a computer or two and a printer reserved for word processing. If there are a lot of student reports requiring word processing, a sign-up sheet may be necessary. Students who are hunt-and-peck typists might profit from using a typing program (*Type to Learn*).

## **Modeling Computer Usage**

Students should see their teacher using the computer as part of the classroom routine. Use word processing to prepare handouts or a test

item bank to prepare an examination. Use a spreadsheet or grading program to keep track of grades. Use a database to keep track of supplies inventory. Use graphic utilities to make signs or posters to brighten the gifted classroom. When making a formal presentation, consider using a computer or a computer-controlled video. If students see their teacher using the computer for a variety of functions, it encourages them to also use computers in a variety of ways.

## Evaluating Computer Usage

Let the students know up front how they will be evaluated on computer usage. With word processing, students' printed products serve as evidence of their accomplishments. When engaged in programming, the students' finished programs can be evaluated. Some programs (*The Incredible Laboratory*, *The Factory*) include tests, which the teacher can use to check comprehension of the important concepts in the program. Other programs provide a numerical rating or score of the students' performance (*Power Grid*) or record the number of problems solved correctly (*Where in the World Is Carmen San Diego*). Still another shows performance level in graph form (*Botanical Gardens*). Some programs lend themselves to record keeping and a notebook, which may be evaluated (*Snooper Troops*). A more lifelike evaluation might be performance as reflected in the profit-and-loss statement at the end of a simulation such as *The Whatsit Corporation*.

If students know they will be evaluated on their computer usage, they tend to be more serious about using the software as it was intended. And when they use the program properly, they learn more.

Computers are playing an increasing role in today's world. Graphic designers now use computer screens instead of drafting boards. Musicians use computer synthesizers and blenders. News reporters use word processors. Accountants use spreadsheets. Computers are here to stay.

Our schools must join the computer revolution and integrate computer use into the regular curriculum. Gifted students, in particular,

must become comfortable in using the computer. Start them early. Just as it is easier to learn to swim at age five than at age 21, so is it easier to learn to use a computer at a young age. Gender differences disappear; at age five, girls are as eager as boys to use computers. Computers and gifted students are an ideal match.



## Software Resources

Below is an alphabetical list of the software programs mentioned in this fastback (plus a few others) and their publishers. Publishers' addresses follow.

### Software

- |  |  |
|--|--|
| <i>Acids, Bases and You</i><br>(Florida State)                 | <i>The Electronic Encyclopedia</i><br>(Grolier)                  |
| <i>A. I.</i> (Scholastic)                                      | <i>The Factory</i> (Sunburst)                                    |
| <i>Analogies</i> (Hartley)                                     | <i>The First National Kidisc</i><br>(Voyager)                    |
| <i>Animate</i> (Broderbund)                                    | <i>Gears</i> (Sunburst)  |
| <i>Appleworks</i> (Claris)                                     | <i>The Graphics Magician</i><br>(Penguin)                        |
| <i>Astronomy</i> (Voyager)                                     | <i>The Incredible Laboratory</i><br>(Sunburst)                   |
| <i>Bank Street School Filer</i><br><i>Databases</i> (Sunburst) | <i>In Search of the Most Amazing</i><br><i>Thing</i> (Spinnaker) |
| <i>Bank Street Writer</i> (Scholastic)                         | <i>I.Q. Builder</i> (Tandy)                                      |
| <i>Botanical Gardens</i> (Sunburst)                            | <i>Kidwriter</i> (Spinnaker)                                     |
| <i>The Complete Graphics System</i><br>(Penguin)               | <i>KoalaPainter</i> (Apple)                                      |
| <i>Computer Eye</i> (Digital Vision)                           | <i>Logowriter</i> (LCSI)   |
| <i>Creativity Unlimited</i> (Sunburst)                         | <i>Magic Slate</i> (Sunburst)                                    |
| <i>Dazzle Draw</i> (Broderbund)                                |  |

<i>National Gallery of Art</i> (Voyager)	<i>Story Tree</i> (Scholastic)
<i>Newsroom</i> (Springboard)	<i>The Super Factory</i> (Sunburst)
<i>Operation Frog</i> (Scholastic)	<i>Swiss Family Robinson</i>
<i>Planetary Construction Set</i>	(Spinnaker)
(Sunburst)	<i>Toy Shop</i> (Broderbund)
<i>The Pond</i> (Sunburst)	<i>Treasure Island</i> (Spinnaker)
<i>Power Grid</i> (HRM)	<i>Type to Learn</i> (Sunburst)
<i>The Print Shop</i> (Broderbund)	<i>VAI Interface</i> (Voyager)
<i>Publish It</i> (Timeworks)	<i>VCR Companion</i> (Broderbund)
<i>Robot Odyssey</i> (Learning	<i>The Video Encyclopedia of the</i>
Company)	20th Century (CEL)
<i>Rocky's Boots</i> (Learning	<i>The Voyage of the Mimi</i>
Company)	(Sunburst)
<i>Science Tool Kit</i> (Broderbund)	<i>The Whatsit Corporation</i>
<i>Scriptsit</i> (Tandy)	(Sunburst)
<i>Showoff</i> (Broderbund)	<i>Where in the World Is Carmen</i>
<i>Slide Show</i> (Videodiscovery)	San Diego (Broderbund)
<i>Snooper Troops</i> (Spinnaker)	
<i>Spacelink</i> (NASA)	

## **Publishers' Addresses**

Apple  
 20525 Mariani Avenue  
 Cupertino, CA 95014  
 (408) 996-1010

Broderbund  
 17 Paul Drive  
 San Rafael, CA 94913-2947  
 1-800-527-6263

CEL Educational Resources  
 515 Madison Avenue  
 New York, NY 10022  
 1-800-235-3339

Claris  
 440 Clyde Avenue  
 Mountain View, CA 94043  
 (415) 960-1500

Digital Vision  
66 Eastern Avenue  
Dedham, MA 02026  
1-800-346-0090

Florida State University  
Center for Instructional  
Development and Services  
2003 Apalachee Parkway  
Tallahassee, FL 32301-4829  
(904) 644-2440

Grolier Electronic Publishing,  
Inc.  
Sherman Turnpike  
Danbury, CT 06816  
1-800-858-8858

Hartley Courseware  
Box 419  
Dimondale, MI 48821  
1-800-247-1380

HRM Software  
175 Tompkins Avenue  
Pleasantville, NY 10570  
1-800-431-2050

LCSI  
330 West 58th St., Suite 5M  
New York, NY 10019  
1-800-321-5646

The Learning Company  
6493 Kaiser Drive  
Fremont, CA 94555  
1-800-852-2255

NASA  
Washington, DC 20546  
Computer Access Number:  
205-895-0028  
Data Format 8-NONE-1

Penguin Software  
830 4th Avenue  
P.O. Box 311  
Geneva, IL 60134  
(312) 232-1984

Scholastic Software  
2931 East McCarty Street  
P.O. Box 7502  
Jefferson City, MO 65102  
1-800-541-5513

Spinnaker  
One Kendall Square  
Cambridge, MA 02139  
(617) 494-1200

Springboard  
7808 Creekridge Circle  
Minneapolis, MN 55435  
1-800-654-6301

Sunburst Communications  
39 Washington Avenue  
Pleasantville, NY 10570-2898  
1-800-431-1934

Videodiscovery  
P.O. Box 85878  
Seattle, WA 98145  
206-547-7981

Tandy Corporation/Radio Shack  
One Tandy Center  
Fort Worth, TX 76102  
1-800-433-5628

The Voyager Company  
2139 Manning Avenue  
Los Angeles, CA 90025  
(213) 475-3524

Timeworks  
444 Lake Cook Road  
Deerfield, IL 60015  
(312) 948-9200

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