

# Apple Technology in Support of Learning



Basic Tools:  
A Software Guide for Faculty

# About This Guide

We wrote this guide to help a range of faculty and administrators, from computer novices to those who are comfortable using the computer. It provides an overview of the most commonly used computer applications (word processing packages, databases, spreadsheets, and graphics programs). What's more, it offers tips on how to get the most out of these applications, and gives examples of how these tools can make you more productive. It also offers an introduction to computer communications and to HyperCard,<sup>®</sup> a unique tool from Apple that has had some profound effects on educational computing.

In the Appendix you will find an extensive list of resources, with information on organizations and publications that can support your use of technology.

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# Using Computers in Education

**T**. J. Ray, an instructor at the University of Mississippi, uses the computer and a word processing program to help his students learn strategies for successful writing.

James Griffith, an instructor at Southeast Massachusetts University, has created a computer database that allows his students to vastly expand the range of their study of antimicrobial agents.

Thomas Hewett, a psychology instructor at Drexel University, uses a spreadsheet to model neural circuits and neural networks, rendering them more tangible and readily understandable for his students.

Today, increasing capabilities and decreasing costs are bringing more and more computers into the hands of instructors, who are responding by finding new ways to use them. The exciting results can be seen on campuses across the country, and in almost every discipline.

On the most basic level, computers are being used to help faculty deal more efficiently with the organizational work associated with instruction, streamlining tasks such as planning, preparing course materials, and grading.

Most importantly, computers are allowing faculty to explore new approaches to teaching and learning—approaches that offer the promise of more effective education. This can mean anything from reworking lectures and in-class presentations in order to take advantage of computer capabilities, to altering the actual content of the course to incorporate a computer-based component.

## Computing Demystified

With all of these potential benefits, it seems surprising that even more instructors aren't taking advantage of computer technology. One big stumbling block to the growth of computer use has been the continuing perception by many faculty that computers are difficult to learn to use and time-consuming to use for instruction.

Happily, with the Macintosh<sup>®</sup>, this is simply untrue. That's because Macintosh was designed from the start with the focus on the user, not on the technology. The result is a computer that "demystifies" computing, simplifying both learning and use.

The Macintosh differs from other computers in the consistent use of its intuitive interface on virtually all Macintosh programs. Early on, Apple made a decision to promote this consistency, and published guidelines that enabled software developers to do just that. The goal was to shorten the user's learning curve, so

that learning how to use one Macintosh application would teach you much of what you had to know to use another.

This consistency among Macintosh programs has turned many Macintosh users into enthusiastic software explorers. In fact, studies have shown that, on the average, people who use a Macintosh system use many more different software packages than users of other computer systems. And this enthusiasm for software on the part of users is echoed by the enthusiasm of developers, which has led to the availability of a wide variety of programs for the Macintosh. (For more information about the Macintosh operating system, see the Macintosh, MS-DOS, or Windows synopsis listed in the Resources section of this guide.)

## Basic Tools and Templating

Another common misperception regarding computers is the idea that, in order to use the computer effectively in instruction, you must be able to program it. But with the wide variety of software packages available for the Macintosh, this is just not the case. In fact, much can be accomplished with basic commercial software:

- Word processing software, designed to help you create and manipulate text.
- Presentation software, designed to help you present information effectively, either directly from the computer screen or through the creation of materials such as overhead transparencies and lecture notes.
- Databases, designed to help you store, search, and sort through data.
- Spreadsheets, designed to help you with numerical calculations and much more.
- Graphics programs, designed to help you create diagrams and illustrations.

We call these five types of software the “basic tools” of computing.

An approach that is very helpful to instructors in using these tools is templating. Originally, the word *template* applied to spreadsheet files that were formatted for a specific purpose, such as creating a household budget or producing an expense report. All the user had to do was enter the numbers in the appropriate spaces, and the spreadsheet would calculate the results.

Gradually, however, the notion of templating has expanded to encompass the time-saving preparation of model files in any application. For example, you can create a word processing template for multiple-choice tests and simply enter the specifics each time you want to create a new test. You can set up a stationery template to produce consistent correspondence. You can even create a database template formatted for

the entry and manipulation of information, to help your students better organize their research process.

Templates can provide a way for you to tailor your teaching materials to the particular needs of your classroom, syllabus, or discipline. You can create templates for handouts, tests, worksheets, guidelines, data-collection forms for experiments, and much more. Whatever form your templates take, their convenience can streamline your efforts and their easy customization can improve the quality of your teaching materials.

The next seven chapters introduce the most common types of applications and offer specific information about their use in education. These chapters provide numerous examples of creative instructional uses, including many examples of template use.



# Working with Word Processing Software



As you probably know, word processors offer the text creation capabilities of a typewriter, but also let you move individual words and text blocks around easily. Their flexible formatting features include a variety of type styles and typefaces, and most of the current word processors offer such advanced features as built-in spelling checkers, thesauruses, and automatic outlining capabilities.



Word processing on a Macintosh computer offers additional features and functions that can further enhance the process of writing. One such feature is a capability commonly referred to as WYSIWYG, or “What you see is what you get.” This means that what you see on the Macintosh screen—including such details as font, type size, spacing, and even number of lines per page—is exactly the way your document will look when it is printed out.

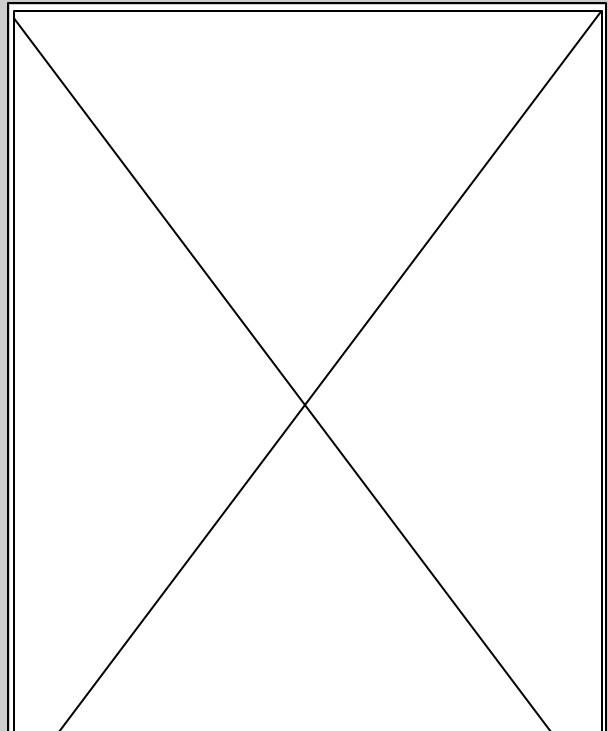
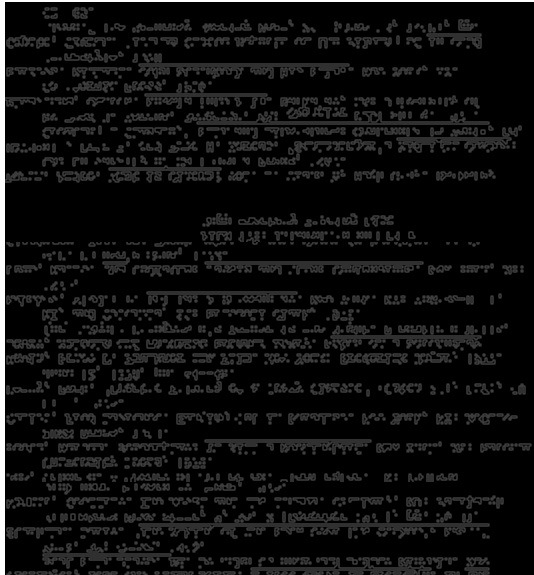
Other Macintosh features, such as rulers and menus, make formatting a simple matter. You set margins, tabs, and line spacing just by manipulating a ruler at the top of the screen. You can center and justify text, create subscripts and superscripts, use italics and boldface, underline or outline words, and change type families and sizes by simply using the pull-down menus.

## Instructional Uses

As an instructor, you undoubtedly write quantities of course materials, and perhaps use slides and other visuals to enhance your presentation or demonstration of these materials. You may also spend time getting your students to improve their written work. It is encouraging, then, to know that using a computer can help to facilitate and enhance your efforts.

## Producing written materials

The most obvious advantage of using word processing software to prepare your course outlines, student handouts, lecture notes, quizzes, and tests is the ease with which it



A word processing package allows you to create documents that are more visually appealing and comprehensible than typewritten documents.

enables you to make changes to your text. For example, if you type a student handout that outlines the required reading for your course, and then discover that one of the articles you planned to use is unavailable, you are pretty much stuck with retyping your handout--or at least using correction fluid, or typing an addendum. Using word processing software, on the other hand, you can just return to your handout file and delete the offending section before printing it out.

Another word processing software advantage is the ease with which it enables you to enhance the written materials you create. Through judicious use of the flexible formatting and style options that the Macintosh offers, you

can easily change line spacing and margins, and choose from a wide variety of fonts, or typefaces. It also gives you access

to a wide variety of type styles, such as boldface, italics, and underlining. The instructional benefits of such features go beyond the superficial: attractive, well-formatted documents are easy to comprehend as well as visually appealing.

A third word processing software advantage is that saving your documents for future use and modification is easy--no more digging through manila folders for last year's final exam master. In the long run, this will both save time and enable you to offer students better-quality, more up-to-date documents.

## Tipson Fonts and Formatting

There is certainly a lot of room for creativity when you use a computer to produce print materials, but some users tend to overdo it, ignoring some of the fundamental rules for preparing printed matter. The Macintosh, for example, offers a wide variety of fonts and styles, and some users immediately seize upon this benefit, producing documents that contain all of the possibilities.

The reader, however, is not helped by text that uses numerous fonts and styles without regard to meaning. Changes in type font, style, or size should be used judiciously, and only to indicate a change in content, to show alternative word choices, denote heading levels, or to create hierarchies of information within a document.

In general, a document should contain no more than two fonts--and frequently only one. Depending on your purpose, you could choose two fonts that are similar, say Times and Courier, or two that are very different, maybe

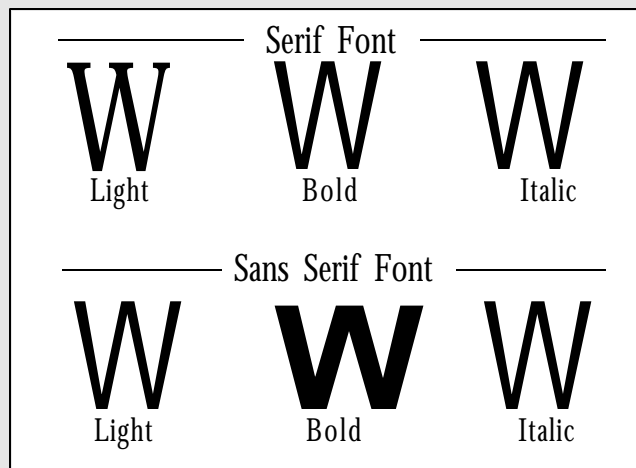
one serif and one sans serif. (A serif typeface--such as Times or Courier--has short lines stemming from, and at an angle to, the top and bottom lines of its letters, whereas

a sans serif typeface--such as Helvetica or Geneva--has no such lines.)

Two different type styles, such as plain and bold or plain and italic, may serve your purpose better, however. The same may be said for different type sizes (the standard size is 12 points).

In short, the best principle to remember when formatting your writing on the computer is that "less is

more," a principle that also applies to the proportion of text to white space. The less text--and the more white space--a document has on a page, the easier it is to read. This is even more true for materials created for projection. A relatively uncluttered screen makes the content both more inviting and easier to read.



## Providing on-screen demonstrations and presentations

In addition to streamlining and enhancing the preparation of written course materials, the computer and a word processing package can also function in the classroom as a blackboard. With the addition of an overhead projector and a liquid-crystal-display (LCD) device such as the Sayett DataShow, anything on the Macintosh screen can be projected onto a display screen in front of a classroom.

Many instructors take advantage of this capability, both to provide initial instruction in writing on the computer and to take their students through the process of revising their work. For example, Paul Kropp, a chemistry professor at the University of North Carolina at Chapel Hill, uses a Macintosh; a word processing package; ChemDraw, a structure drawing program; and a projector to teach his first-year organic chemistry graduate students how to prepare lab reports and other publications on the computer.

He believes his students will need the ability to use a computer in order to function as professionals, so computer writing skills form a core part of the initial organic chemistry course sequence.

## Producing visuals

You can also use the Macintosh to prepare visuals such as overhead transparencies and slides. Creating standard overheads on the Macintosh requires relatively little in the way of equipment: a Macintosh computer, an application program (such as a word processing package), a LaserWriter® printer, and the transparencies on which the overheads are printed. In fact, you may not even need the printer and the transparencies: many copy shops are now set up to handle the production of overheads generated on a Macintosh computer.

## Basic Tools: Word Processing Software

### MacWrite II

MacWrite II is an accessible, easy-to-use word processing package. Features include a complete set of text-entry and editing tools; automatic or discretionary hyphenation; a spelling checker with an expandable 100,000-word dictionary; and an on-line electronic thesaurus with 220,000 synonyms. It also offers double-underline, strike-through, and color capabilities to facilitate on-line editing.

Price: \$249

Substantial education discounts are available.

Clarix Corporation, Box 58168, 5201 Patrick Henry Drive, Santa Clara, CA 95052; (408) 987-7000

### Microsoft Word 4.0

This word processing program includes outlining, revising, proofreading, formatting, and page-previewing capabilities--all fully integrated to give you a versatile writing environment. Features include keyboard shortcuts for fast text editing; a split-window option for viewing different sections of a long document at the same time; customizable menus for automating commonly performed word processing tasks; and automatic hyphenation.

Price: \$395

Education discounts and lab/network pricing are available.

Microsoft Corporation, 16011 N.E. 36th Way, Box 97017, Redmond, WA 98073-9717; (206) 882-8080

### Nisus

Nisus is an award-winning word processor that is currently in use at many universities, including Stanford, Harvard, and Cornell. Features include

the ability to search for and extract references for bibliographies, the ability to type and draw in the same window, and extensive page-layout capabilities.

Price: \$395

Paragon Concepts, Inc., 990 Highland Drive, Suite 312, Solana Beach, CA 92075; 1-800-922-2993

### WordPerfect

This sophisticated word processing program features a 115,000-word spelling checker that looks up phonetic equivalents; a built-in thesaurus that suggests alternate words, including antonyms; and document marking to indicate revisions.

Price: \$395

Education discounts and site licenses are available.

WordPerfect Corporation, 1555 North Technology Way, Orem, UT 84057; (801) 225-5000

### WriteNow

This program executes the majority of text- and document-handling chores required of most writing applications, for about half the price of the high-end Macintosh word processing packages. Features include a complete set of text-entry, editing, and search commands; headers and footers; and a 100,000-word spelling dictionary that can be customized.

Price: \$195

Education discounts and site licenses are available.

T/Maker Company, 1390 Villa Street, Mountain View, CA 94041;

(415) 962-0195

## Liquid-crystal-display panels

Manufacturer/ Distributor	Model	Computer Compatibility	Sugg. Retail
ASK LCD, Inc. (404) 399-5208	MacScreen Overhead	Macintosh Classic®	\$1,490
Sayett Technology, Inc. (716) 342-0700	DataShow 480	Macintosh II, Classic	\$1,895
	DataShow HR/M	Macintosh Classic	\$1,595
nVIEW Corp. (804) 873-1354	ViewFrame II+2	Macintosh II, IIcx, Classic	\$1,995
Sharp Electronics Corp., Pro Products Division (201) 529-9500	QA-50 Professional Projection Panel	Macintosh II, Classic	\$1,395

Some popular LCD display panels.

## Comparison of presentation applications

	Aldus Persuasion 2.0	Claris MacDraw II 1.1	Microsoft PowerPoint 2.01	Symantec MORE 3.0
Price	\$495	\$399	\$395	\$395
Built-in outliner		.		.
Slide sorter	.			.
Number of enlargement levels	2	5	0	0
Speakers notes and handouts	.		.	.
<b>GRAPHICS</b>				
Master	.	.	.	.
Slide layer				
Automatic graphics	.			
Templates				
Drawing tools*	basicfour, arc freehand, polygon	basicfour, arc freehand	basicfour	basicfour
<b>GRAPHING</b>				
Automatic charting capability	.			
Chart types	9			
*Basicfour tools are line, rectangle, rounded rectangle, and ellipse.				

Some common presentation software packages.

For example, Baylor University economics professor John Pisciotta has for years used PowerPoint, MacDraw, and Microsoft Excel to produce materials to support his course lectures. Initially, he created transparencies, which he projected during class. Then, in 1988, after seeing a demonstration of the Sayett DataShow, he became convinced that projecting actual Macintosh screens was the perfect solution to the problem of organizing and keeping track of transparencies.

Pisciotta prepares a separate PowerPoint file for each text chapter, utilizing images imported from MacDraw and Microsoft Excel. He arranges the PowerPoint "slides" in a tentative order before each class, but frequently deviates from the plan during the course of a lecture, making use of the technology's ability to rapidly locate and display any slide.

In addition to this flexibility, Pisciotta cites other factors that allow him to improve his instruction, namely, the ability to prepare materials up to the last minute, and the ease with which these materials can be modified. A further advantage he mentions is the ability to create "overlay" slide sequences, which he finds highly useful in showing shifts over time.

Another professor who finds presentation software useful is Robert Sandy, a statistics instructor at Indiana University, Purdue University at Indianapolis. He uses PowerPoint and three video projectors to cover a large lecture hall, which can hold as many as 500 students.

Sandy says that teaching statistics requires the presentation of lots of equations, and he likes being able to simply flip through carefully prepared computer slides, rather than being vulnerable to the possibility of making errors on a blackboard. More important to Sandy, however, is the increased degree of interactivity possible with computer-based presentations. He says that if students ask a question during a presentation, he can simply move to the Macintosh and respond visually as well as vocally--something not possible with existing slides or transparencies.

Sandy also makes use of MultiFinder®, the Macintosh system software that allows rapid

switching between programs. Using MultiFinder, and statistics software called Data Desk, he can enhance his PowerPoint lecture presentations with on-screen demonstrations. He says that this combination allows him to move smoothly and rapidly from an explanatory lecture mode to a practical, "Now, let's apply what we just learned" mode--a shift that he believes students find highly useful.

## Tips and techniques for creating presentations

The "less is more" principle for creating print materials with word processing packages also applies to creating slides and other visuals. The following are some specifics you will want to keep in mind:

- Don't crowd your slides with too much text. A good rule of thumb is that you should have no more than four or five words per line and no more than five or six lines per slide.
- Don't mix fonts, type styles, or colors indiscriminately. Your goal is to enhance your communication of content, not to distract students with graphics. As a rule you should use only one font, and one or two type styles per slide.
- In general, you should use sans serif fonts (such as Helvetica) rather than serif fonts, because they tend to be much more readable on the screen.
- Be consistent in your capitalization and punctuation, as well as in your wording. For example, don't mix complete sentences with fragments.
- When using color, remember that bright colors tend to move forward visually, and dark colors to recede. This means that use of lighter colors on a darker background tends to be most effective.
- To ensure visibility, pretest your materials in the actual room and lighting in which you will present them.

## Basic Tools: Presentation Programs

Although you can actually provide on-screen presentations or generate transparencies using any program you like, there is a special class of software developed specifically to aid in the production of presentation materials, such as overheads, slides, speaker's notes, and handouts. Most of these presentation programs, which include Microsoft PowerPoint, Aldus Persuasion, and MORE 3.0, provide tools for the manipulation of text and graphics--in color as well as black-and-white. Their major strength is the ability to create "masters," or "templates," which allow the rapid production of uniform, sophisticated-looking visuals that can be highly effective in the classroom.

You can also use presentation programs to move beyond slides and overheads, to produce electronic animated slides projected directly from the computer.

### Aldus Persuasion

This presentation manager streamlines the entire process of creating persuasive papers and presentations. Features include full word processing capabilities with word wrap, tabs, and multiple indents; a search-and-replace function; and a spelling checker.

Price: \$495

Education discounts are available.

Aldus Corporation, 411 First Avenue, South Seattle, WA 98104-2871; (206) 622-5500

### MacDraw II

This precise, object-oriented drawing package set the standard for this genre of Macintosh graphics software. Features include a variety of basic drawing tools

and shapes; modification tools; text-editing capabilities; and enlargement and reduction capabilities.

Price: \$399

Substantial education discounts are available.

Claris Corporation, Box 58168, 5201 Patrick Henry Drive, Santa Clara, CA 95052; (408) 987-7000

### MORE 3.0

This organizational tool combines powerful outline processing with complete word processing and presentation capabilities. Features include a text processor with a 100,000-word spelling checker and dictionary; an outline processor with style sheets for automatically formatting outlines; graphic design tools; and projection and slide-presentation capabilities.

Price: \$395

Education discounts are available.

Symantec Corporation, 10201 Torre Avenue, Cupertino, CA 95014; (408) 253-9600

### PowerPoint

This full-color presentation manager provides complete text- and graphics-processing capabilities. Features include a writing tool for creating text charts and outlines; graphics capabilities for color and black-and-white documents; and page-layout and presentation capabilities.

Price: \$395

Education discounts are available.

Microsoft Corporation, 16011 N.E. 36th Way, Box 97017, Redmond, WA 98073-9717; (206) 882-8080

## Improving student work

Finally, as you might guess, the same ease of revision that makes preparing course materials on the computer so efficient can also have a profound impact on student writing. Many instructors have found that the quality of student writing improves--and the quantity often grows--when students use a word processing package to produce their written work. (In fact, some teachers find that they have to set exact time deadlines in order to get their students to stop writing and revising.) In addition, features such as built-in spelling checkers and thesauruses help students to correct some of their most basic errors themselves.

For example, Bernadine Branchaw, a business instructor at Western Michigan University, makes using the Macintosh and MacWrite II a key part of her Business Communications class. She begins by introducing her students to the software and going through the basic commands. Making use of the various style and formatting options, she then teaches them to write business letters and other professional documents.

In addition to teaching them how to use the program's built-in spelling checker and how to access an electronic thesaurus, she teaches them how to use the word processing package's Find/Change or Search command as a "style checker." For example, she has them check their writing for overuse of the passive voice by searching for forms of the verb *to be*.

Branchaw says that her students find creating drafts--and revising their work in response to comments--much faster with the computer. She also feels that the use of the various word processing tools--the spelling checker, thesaurus, and "style checker"--has actually improved the quality of student writing in her class.

## Word Processing for Publication

In addition to the written materials they produce in order to teach courses, many instructors are involved in some kind of research, which they must eventually write up for publication. Word processing software is a boon for such scholarly writing, because most packages include features that automatically handle footnotes, indexes, and other aspects of formatting.

Many instructors--including Bernadine Branchaw, the instructor in the previous example--begin by using the Macintosh and a word processing package to create their course materials and end up using these materials as the basis of textbooks, which they also write on the computer.

In fact, it is possible to use a word processing package to format materials for publication, just as a typesetter would. You can set any margins required, add boldface and italics as appropriate, and, in general, exercise personal control over the appearance of your printed work. An increasing number of publishers will even accept manuscripts on disk for publication. (Note: Another type of software, desktop publishing, or page-layout, is specifically designed for the more sophisticated formatting required for publication. For more information on desktop publishing, see the box on page 14.)

## Saving Time with Templates

There are a variety of ways to use templating with a word processing package. For example, the simplest approach might be referred to as "informal templating" or, more accurately, as the "repurposing" of existing documents. For example, Pat Hildebrand, an environmental design instructor at the University of Missouri,

has a standard quiz format that she has prepared in Microsoft Word, as well as a series of Word documents, each covering a specific course topic.

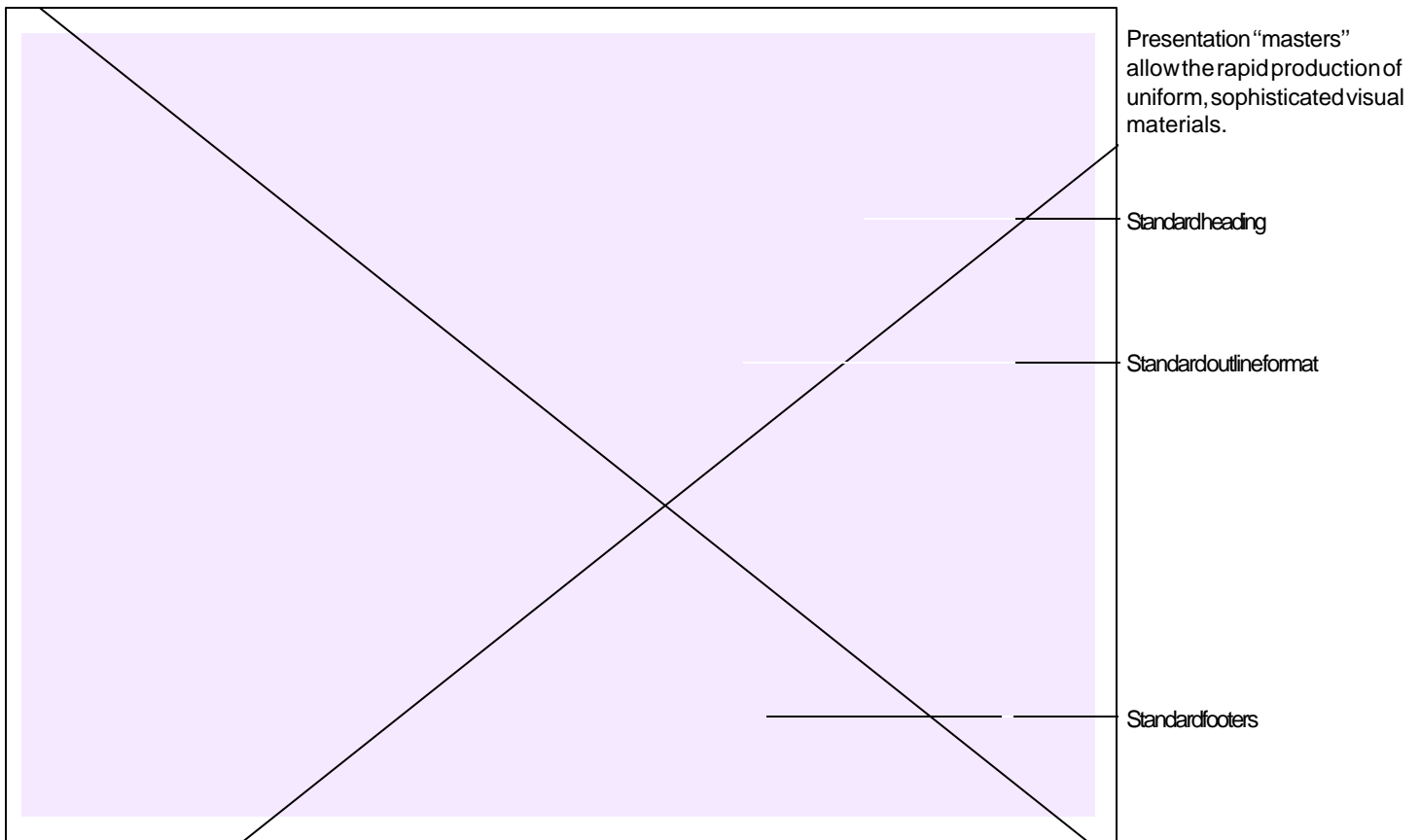
To prepare a test, she simply goes into these documents, copies relevant material, and pastes it into her quiz format. Another possibility with Microsoft Word is to use its “hidden text” feature to attach the answer to each question, as well as information on when the question was last used.

A slightly more involved templating option involves the use of Microsoft Word style sheets, which are essentially detailed formatting templates that you can set up yourself. For example, Fred Muskal, an instructor in the University of the Pacific’s School of Education, has set up a Word style sheet that handles the APA doctoral dissertation format. This style sheet is designed so that it can be used either as a

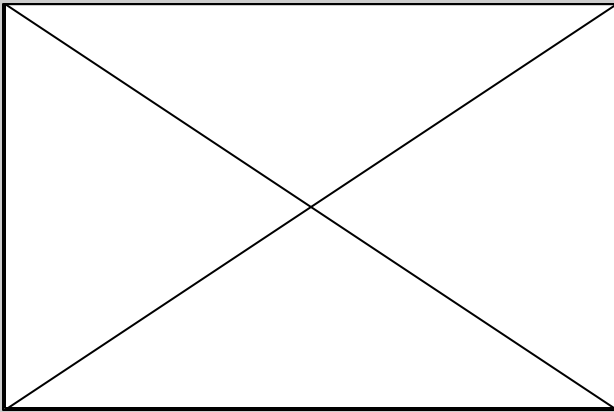
tutorial on the required formatting or as a template to produce it.

A true template both dictates the appearance of the eventual document (its formatting) and offers prompts to determine its content. There are commercial templates designed to help people create resumes, business letters, and much more.

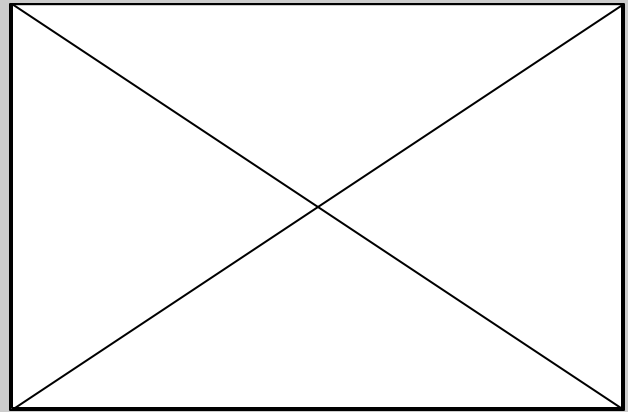
T. J. Ray, a writing instructor at the University of Mississippi, makes use of the templates described in a book called *Strategies for Writing with the Computer*, by Melissa Barth (McGraw-Hill). These templates help students to get started with their writing, by prompting them to consider such issues as audience and organization. It is also an easy matter to create your own templates simply by typing in descriptions of your desired content and then formatting them appropriately.



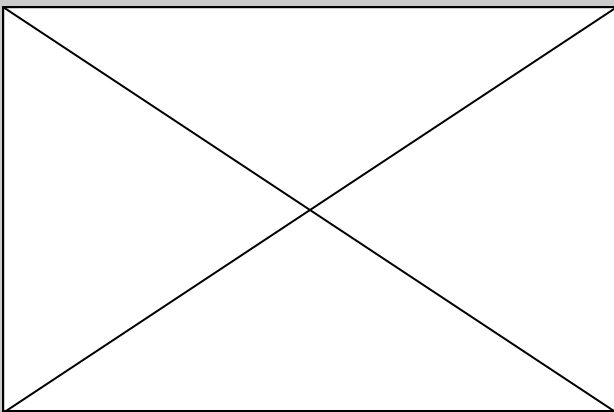
## How to Create a Course Syllabus Template



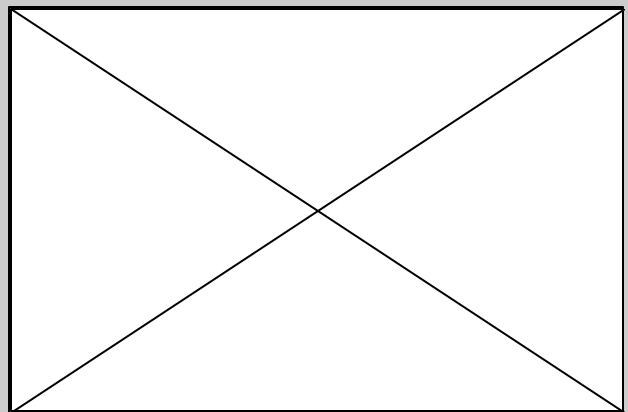
1. Open a new document by double-clicking on the word processing program icon.



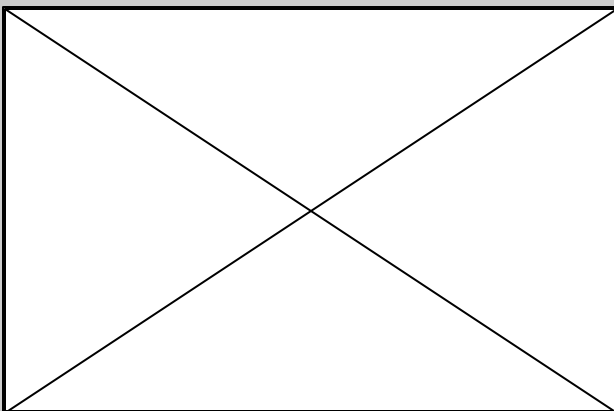
2. Go to the Format menu and choose Show Ruler.



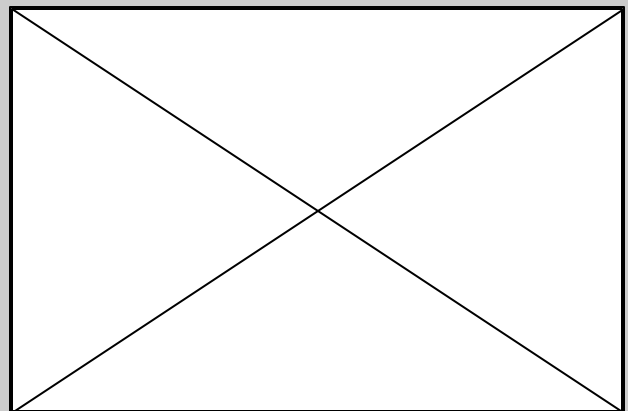
3. Using the ruler, set a tab as shown.



4. Go to the Font menu and choose a font. (We chose Helvetica.)



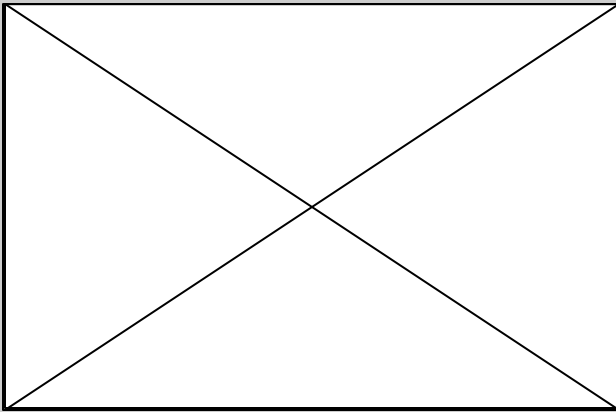
5. Use the tabs and type in your name, college, discipline, and the quarter or semester, as shown. Press return.



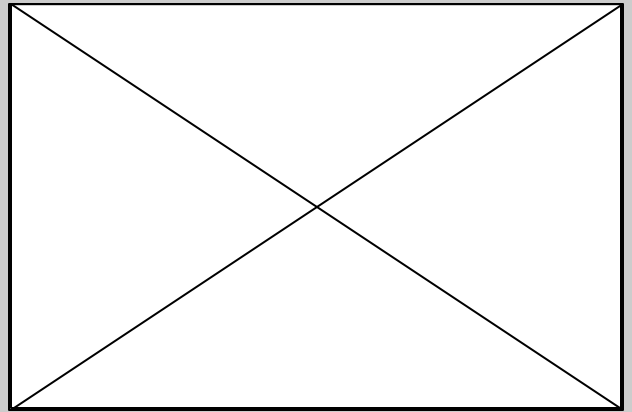
6. Click on the ruler again, then change the format to centered text by selecting it on the ruler, as shown.

Note: This example uses Microsoft Word but can be applied to any Macintosh word processing package.

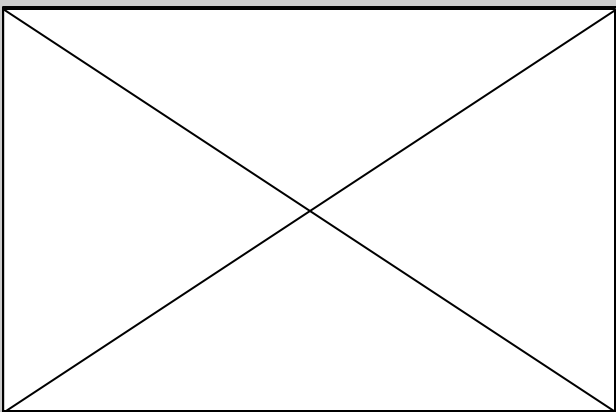




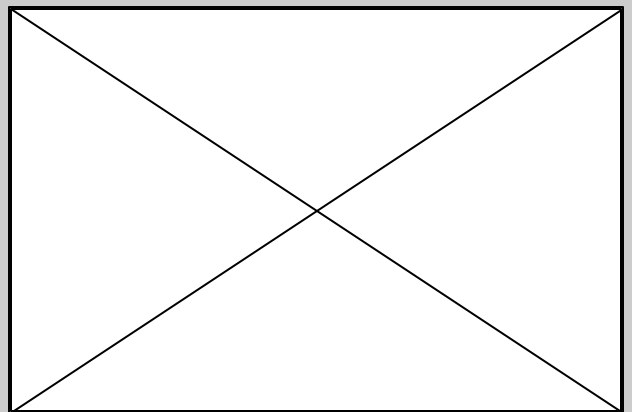
7. Add two lines by pressing Return twice, and then type in the course number and title.



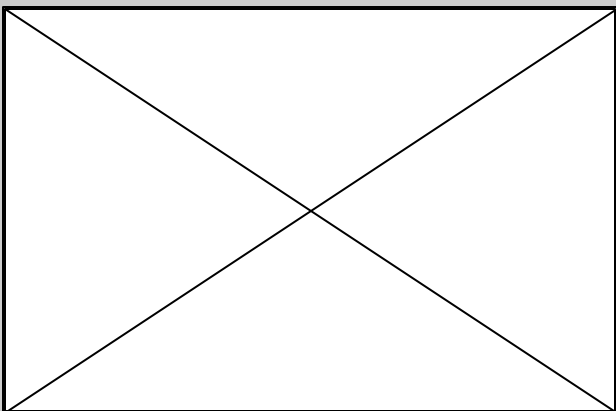
8. Click on the ruler once more; return the format to left-justification by selecting it on the ruler.



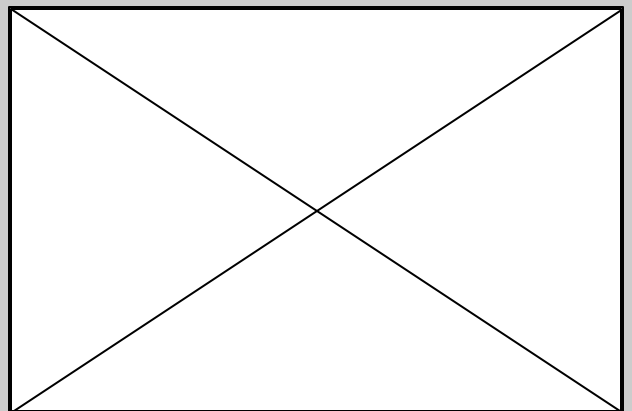
9. Type in your course description. Remember, you don't have to press Return at the end of each line; the Macintosh will automatically wrap the text to the next line.



10. Type in any information about course materials, as shown.

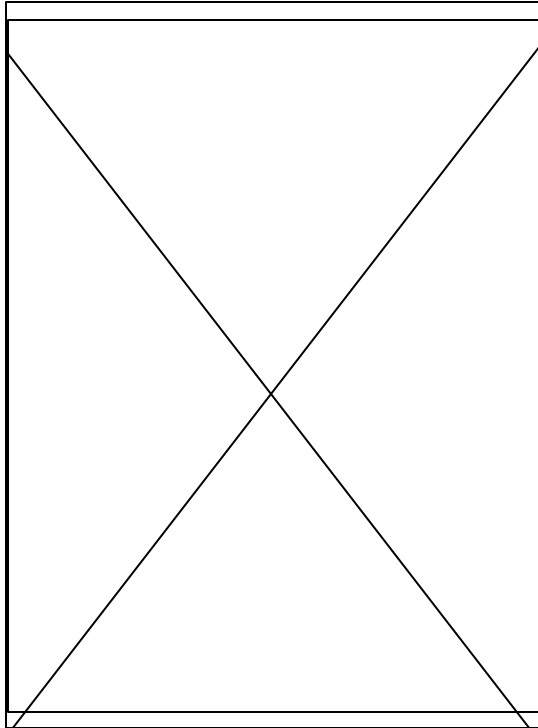


11. Insert a ruler and set extra tabs to format the information on class meetings into columns, as shown. Type in the information.



12. Save your document, using a descriptive name and the date.

The next time you want to create a course syllabus, you can simply reopen this document, alter any specifics as desired, and save the resulting document with a new date and/or name.



## Basic Tools: Desktop Publishing Programs

Today's word processing packages offer powerful formatting capabilities, such as multiple columns and word wrapping, but they are still no match for page-layout programs when it comes to creating sophisticated publications. Programs such as Aldus PageMaker and QuarkXPress offer total control over the appearance of your document--down to minute details, such as text wrapping around even irregularly shaped graphics and control over letterspacing. These page-layout programs can help you to create exceptionally polished looking course materials and to format your documents for publication.

### Aldus PageMaker

Aldus PageMaker is a mainstream desktop publishing application for designing, editing, and producing typeset-quality printed communications. Features include a built-in text editor; graphic design capabilities; powerful typography, formatting, and page-layout capabilities; and the ability to create master page layouts.

Price: \$595

Education discounts and site licenses are available.

Aldus Corporation, 411 First Avenue South,  
Seattle, WA 98104-2871; (206) 622-5500

### QuarkXPress

This high-end, professional electronic publishing system integrates word processing with powerful, precise page-layout, typesetting, and graphics capabilities. Features include a built-in word processor with an 80,000-word spelling checker; graphic design tools; page-layout capabilities; and 32-bit color support.

Price: \$795

Education discounts and site licenses are available.

Quark, Inc., 300 South Jackson Street, Suite 100,  
Denver, CO 80209; (303) 934-2211]

# Working with Databases

**D**atabase programs are designed to help you store, sort, and search through information, and print out reports on information. These capabilities have instructional as well as administrative applications. In essence, a database is the computer equivalent of 3-by-5 index cards; however, it offers a number of additional advantages, such as the ability to search quickly for items that meet specific criteria or to perform multiple sorts (more on this later).

## What Is a Database File?

A database file is made up of records (for example, a listing of all students enrolled in a particular major), and each record consists of fields (name, address, phone number, and so on).

The major actions you perform with a database include designing the record, entering data, and sorting, searching, selecting, and reporting on or printing out that data.

- Designing the record involves setting up the fields that you wish to use. These can be as simple as name, address, and phone number--the typical class roster--or as complex as U.S. government census data.
- Entering data is easy once you've set up your fields. Most database programs will simply present you with a blank, formatted record when you open up your file--complete with headings that identify the appropriate contents for each field.
- Sorting is one of the strengths of database programs, enabling you to arrange your records in numeric or alphabetic order, from lowest to highest or vice versa. You can also choose to sort on any field. For example, you

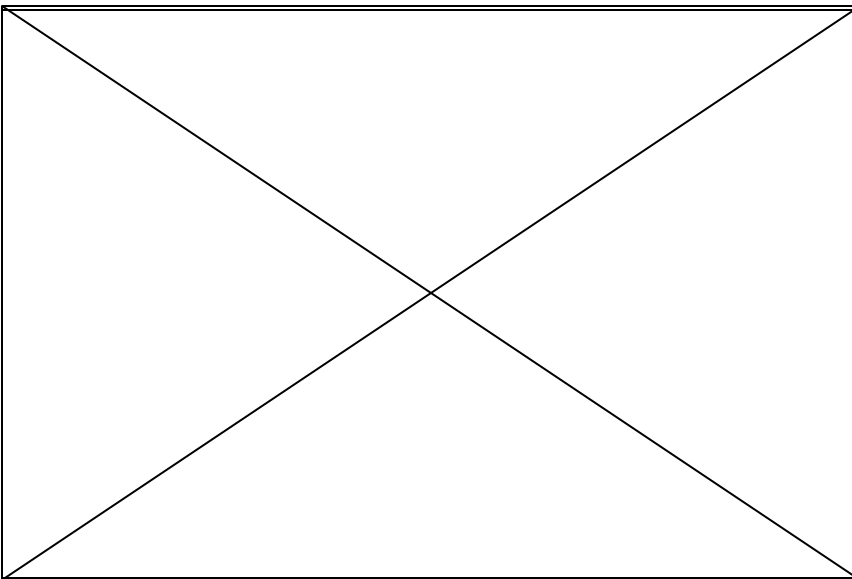
can arrange information by subject or by date.

- Searching lets you find all of the records that contain specific criteria. Using keywords in conjunction with logical operators (such as **and**, **or**, and **not**) makes your search as efficient as possible. Many database programs will also let you search by specifying word roots, called wild cards, accompanied by an asterisk or other symbol. For example, you might enter "architectur\*" to find entries that contain the word "architecture" or "architectural."
- Selecting is similar to searching, but its goal is to set up a subset of the database that consists of all the records that meet your specifications. From your class roster, for example, you might derive a list of all those who live off-campus.
- Reporting or printing generates a hard-copy version of your information. Good database programs will offer a variety of report formats or even allow you to design your own.

## Administrative/ Instructional Uses

We have already mentioned an administrative use for a database: keeping a class roster. Other possible administrative uses are handling grades and creating a test bank (a database of possible test questions that can be quickly selected to generate a test automatically). In addition to these administrative tasks, databases can also have a variety of instructional uses.

First, they offer an efficient way to make vast quantities of information available to students in a highly flexible, usable form. For example, the nutrition and food department at Drexel University developed its own database for use in a variety of classes. Called MacDiet, it contains information on 2,500 foods, covering 24 nutrients per food.



MacDiet allows nutrition students to track their food intake using a database.

In beginning courses, students are asked to keep track of their food intake for three days. They then enter this information into the database and compare their diet to the recommended daily allowance (RDA) of nutrients established by the federal government. Other uses include making comparisons of caloric intake to actual body needs, and planning specialized diets for patients with specific nutritional requirements.

Instructor Shortie McKinney says that using the database (which includes some of the calculating capabilities of a spreadsheet) allows her to give students more complex and intricate assignments, because they don't have to spend time on "tedious calculations." She also points out that use of the database eliminates the issue of student error obscuring an instructional point.

(Incidentally, McKinney herself is a good example of a user of basic computer tools. She uses a variety of word processing and desktop-publishing software to produce course handouts and other materials; the FileMaker database program to keep files on students; and the Microsoft Excel spreadsheet to calculate student grades.)

## Visual Databases

Another instructor who is enhancing his instruction through use of databases is Andrew Gordon, a professor in the Graduate School of Public Affairs at the University of Washington. Gordon's work with databases actually began in Chicago, when he was teaching at Northwestern. There, he and his students prepared a complex geographical database on crime patterns in various neighborhoods, for use by the police and various community groups.

To do this, they used a program called Business Filevision, a database that lets you link graphic objects--in this case, maps--to text information. They could then use the mouse to click on a specific street, for example, and access information relating to that location.

## Basic Tools: Databases

### FileMaker Pro

FileMaker Pro is a full-featured, easy-to-use database manager. Features include predesigned templates for common business activities; rapid search capabilities; data transfer; and professional-quality output for form letters, reports, and mailing labels.

Price: \$299

Substantial education discounts are available.

Claris Corporation, Box 58168, 5201 Patrick Henry Drive, Santa Clara, CA 95052; (408) 727-8227

### Filevision

Filevision is a multilayer drawing program and an integrated database. Each drawing page object can be attached to a database record. Features include color support, data transfer, and a variety of output formats.

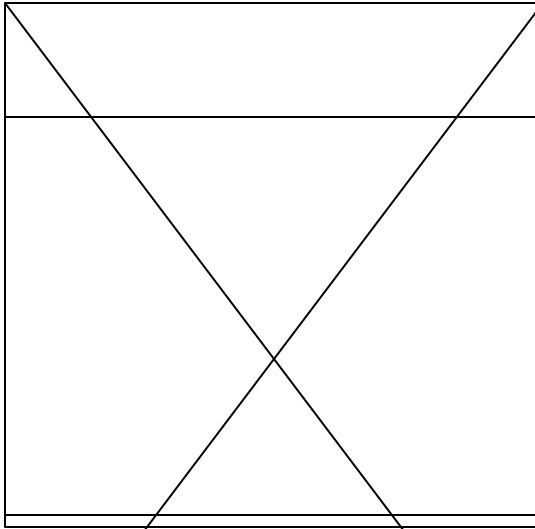
Price: \$495

TSP Software, 4790 Irvine Boulevard, Ste. 105, Irvine, CA 92720; (213) 450-6813

In Washington, Gordon is working on a similar project to support a course on public health policy. Again using Filevision, he and his students are creating a geographical database covering the distribution of health services in the state by county. He is also beginning to make use of HyperCard as a visual database (for more information on HyperCard, see page 28).

Gordon says that, to him, the major benefit of visual databases is their flexibility in displaying and analyzing information, which prompts students to improve their critical thinking and analysis skills. According to him, once you get students to view the geographical database as a tool, they begin to ask questions. For example, the students in his class are taking some of the same maps used in the health services project and using them to analyze information about air pollution and quality of life in various communities across the state.

Pictorial databases can be as simple as a collection of graphics files organized in Macintosh folders. (Folders are the basic unit of organization on the Macintosh desktop; they function like actual folders, in that they contain



related files.) For example, James Griffith, a professor at Southeast Massachusetts University, has created a series of MacPaint files (see the Incorporating Graphics section on page 24) that cover the structure of antimicrobial agents (substances used to treat infections).

He says that creating the visual computer database allowed him to furnish students with a graphic representation of the entire class of agents, instead of the tiny subset covered in written textbooks--"freeing them from the arrogance of the textbooks to examine the relationship between structure and function on their own terms."

## On-line Databases

Another kind of database--the on-line database--may serve as a resource for both research and instruction. On-line databases are vast collections of information, generally stored on large computer systems such as minicomputers or mainframes. You access them by means of a hardware device called a modem and communications software, or other communications tools.

If your school has a campuswide network, it may offer access to some on-line databases. For example, at some schools, you can do a library search from your computer. There are also a number of commercial services that offer a wide variety of educational databases-- everything from Standard and Poor's financial news to mental health abstracts.

At Drake University, for example, journalism instructor Robert Woodward has his Advanced Reporting students use the DIALOG informational database to gather background when researching news stories. He cites three advantages to this approach:

- First, savings in time, because using the on-line database is more efficient than using more conventional research methods.
- Second, increased thoroughness, because students can download and print out the entire listing of relevant materials. (He contrasts it with using the text version of the *Reader's Guide to Periodical Literature*, saying that students often miss article citations as they copy them down.)
- Third, diversity of information, which often enables students to discover new and different interpretations.

Working with an on-line database is much like working with any database. Information is stored in records, which you can search using keywords and logical operators, and eventually print out or download (transfer from the on-line database into your personal computer).

However, as mentioned earlier, gaining access to an on-line database is a form of computer communications, and requires special hardware and software--all of which are covered in Chapter 7 of this guide.

# Working with Spreadsheets

Spreadsheets are tools designed to aid in calculation and numeric projection--some people think of them as “number processors.” Although they were originally based on the standard accounting ledger and designed for business use, spreadsheets have become much more flexible--particularly in regard to handling text--and increasingly widely used. Current educational applications range from grade calculations to “What if?” analysis to complex scientific simulations.

## What Is a Spreadsheet File?

A spreadsheet file is called a worksheet, and worksheets consist of rows and columns. Each intersection of a row and a column is referred to as a cell, and has a distinct name. For example, A1 is the cell located in the upper left corner of your worksheet, at the intersection of the first row (A) and the first column (1). (Some programs use the notation R1C1, for Row 1, Column 1.)

There are three basic types of information that you can enter into a spreadsheet:

- Labels, which provide the explanatory material needed to understand the worksheet.
- Values, which constitute the data, including text, that you will enter into the spreadsheet for calculation and/or projection.
- Formulas, which act on the values you've entered.

Because much numerical calculation is predictable and repetitive, spreadsheets come with a number of standard operators (symbols for standard mathematical or relational operations: addition, subtraction, multiplication, division, percentage, equal to, less than, greater than, and so on), as well as built-in functions

that calculate such things as cosines, natural logarithms, standard deviation, and more. Many spreadsheets also include some automatic graphing features, such as the ability to plot pie charts, bar charts, and scattergrams from the spreadsheet data.

## Administrative/ Instructional Uses

First, the simplest use: spreadsheets are ideal for calculating grades. Whether your method involves a percentage of total points, an average, or a weighted average, it is a relatively simple matter to create a spreadsheet that will handle the calculations for you. You can even play around with changing various parameters to see how that would affect your grading curve.

The use of spreadsheets for grading can also allow you to open up your grading procedures to students. For example, Paul Cohen of Southwest Texas State uses the Wingz spreadsheet for his grading, taking advantage of this software's ability to treat letters and numbers interchangeably. When he returns the next-to-the-last course assignment to his students, he includes a numerical analysis of what each student needs to do on the final to get a good grade in the course, along with some written analysis of his or her work.

Cohen calls the ability to provide students with this kind of projection "not just a convenience, but a pedagogical utility," explaining that students feel more responsible for their own performance when supplied with detailed information about it.

That same ability to change parameters rapidly, or to create projections by entering different values, makes the spreadsheet a useful tool in the classroom for handling "What if?" analysis. For example, Terrence Scout, an associate professor of business at Washington College, has his students use Microsoft Excel extensively in his Strategic

### Using Spreadsheets to Generate Tests

Although most people think of spreadsheets strictly in terms of numbers and calculations, many of today's spreadsheets can handle text as well. Thomas Palm, an economics instructor at Portland State, has made use of that ability by developing a spreadsheet template for generating tests.

Palm explains that most of his questions are mathematical in nature, so it's a relatively simple matter for him to put the appropriate language around the numbers. What's more, he points out, once the initial work is done, creating any subsequent test is trivial: when he changes the language in the spreadsheet, everything is automatically recalculated to create an entirely new test.



Analysis course. He says that the spreadsheet is the perfect tool for handling questions such as "What if sales were to increase by 10 percent?" In the classroom, Scout uses the Macintosh and Microsoft Excel with an overhead projector and an LCD projection pad, so that students can graphically explore the results of various courses of action.

At Drake University Law School, instructor John Edward does much the same thing in his classes on tax law and estate planning. He uses a spreadsheet program with an overhead projector to show his students how the value of an estate can change if different legal approaches are taken. He points out that this kind of modeling (numerous scenarios in rapid succession) is difficult to do on a standard blackboard--and that even if it were possible, the results would be hard for students to read and comprehend.

At Drexel University, which committed to using the Macintosh on a grand scale when the computer debuted in 1984, spreadsheets have been used for years in disciplines from chemistry to food science to programming to psychology.

One of the more unusual applications was created by psychology professor Tom Hewett, who uses the Microsoft Excel spreadsheet in his classes to model neural circuits and neural networks. He cites the relative ease of use, time-efficiency, and flexibility of his models as features that make them desirable tools for such simulations.

Russell Church, a psychology professor at Brown University, uses Microsoft Excel extensively in his Quantitative Methods in Psychology course. Church says that, for him, the key to success in using the spreadsheet is "sheltering students from the arbitrary moves that Excel requires." He explains that most of his students have no spreadsheet background, and that he wants them to be able to view the program as an easy-to-use tool that facilitates their work, so that they concentrate on the reasons behind their calculations rather than on the calculations themselves.

Toward this end, he makes use of a number of macros (preset computer sequences that can

## Spreadsheets: Calculating Aid or Learning Hindrance?

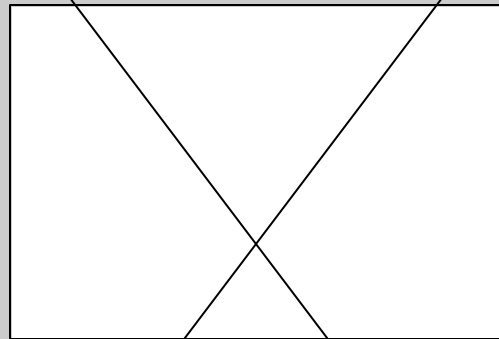
Spreadsheets are increasingly being used as basic calculating tools in the classroom. For some instructors, this use revives the controversy that surrounded the emergence of hand-held electronic calculators in education--the question of whether their use creates lazy students (because they no longer have to deal with the mechanics of calculations) or more thoughtful ones (because de-emphasizing the mechanical aspects of problem solving creates more time to deal with the rationales behind the calculations).

While this debate is probably far from over, a growing number of instructors have come to rely on spreadsheets as calculating tools. These instructors feel strongly that the use of spreadsheets facilitates students' understanding of the concepts involved in their courses.

Terrence Scout, an associate professor of business at Washington College, puts it well: "Numbers do not speak for themselves. Humans

have to interpret them. I do run across students who come up with fantastic ratios and claim they must be right because 'that's what the spreadsheet said,' but if I'm any good as a teacher, they are going to look at those numbers and question them. It all comes down to good teaching."

Wingz



Spreadsheets like Wingz allow instructors to easily update and graph grades.

be triggered by a single keystroke), which were programmed by undergraduate students. As a result, if his students have two columns of numbers that they want to represent as a scattergram, they can simply press a specified key, instead of going through a sequence of commands such as Edit, Copy, and Paste Special. This, according to Church, is exactly what he wants: students find the spreadsheet a helpful tool but concentrate on the meanings behind the mathematical mechanics.

Spreadsheets can also be used as a programming language, to do complex scientific modeling. As Drexel chemistry professor Allan Smith points out, a lot of science and engineering involves setting up mathematical models--a process that was traditionally done in a programming language such as FORTRAN. This took significant time and required a considerable degree of computer science knowledge. When Multiplan (the first spreadsheet for the Macintosh) became available, Smith created a series of templates to handle chemical equilibrium calculations, which students use in lieu of more complex programming. This allows him to cover more material, without having to make a "teaching detour" to cover sophisticated programming techniques.

## Spreadsheets for the Sciences

Publisher N. Simonson & Company has released a series of textbooks that support the use of spreadsheets for dynamic modeling in the sciences. These books--*Dynamic Models in Biochemistry*, *Dynamic Models in Chemistry*, and *Dynamic Models in Physics*--offer students hands-on exercises in the creation of computer models. They are designed to be used in conjunction with early courses in their respective fields and assume no prior knowledge of how to work with an electronic spreadsheet. For more information, contact N. Simonson & Company, 13450 Maxella Avenue, Suite G225, Marina del Rey, CA 90202; (213) 301-2847.

## Basic Tools: Spreadsheets

The two most popular spreadsheet packages for the Macintosh:

### Microsoft Excel

Microsoft Excel combines the capabilities of a large, fast spreadsheet with powerful database and graphics tools, allowing users to perform any kind of financial planning or analysis. It offers large spreadsheet capacity (over 4 million cells); fast performance; presentation-quality charts and graphs in color; and database features.

Price: \$395

Education discounts are available.

Microsoft Corporation, 16011 N.E. 36th Way, Box 97017, Redmond, WA 98073-9717; (206) 882-8080

### Wingz

Wingz was created to fill the need for a graphical spreadsheet with outstanding presentation capabilities. Features include three-dimensional business graphics, full color support, and advanced desktop presentation abilities.

Price: \$399

Education discounts are available.

Informix Software, Inc., 16011 College Boulevard, Lenexa, KS 66219; (913) 599-7100

# Integrating Applications

Now that you have an overview of the three most commonly used computer applications--word processing software, databases, and spreadsheets--and their individual capabilities and educational uses, you need to know how they can work together so you can use the computer as a truly flexible, powerful tool.

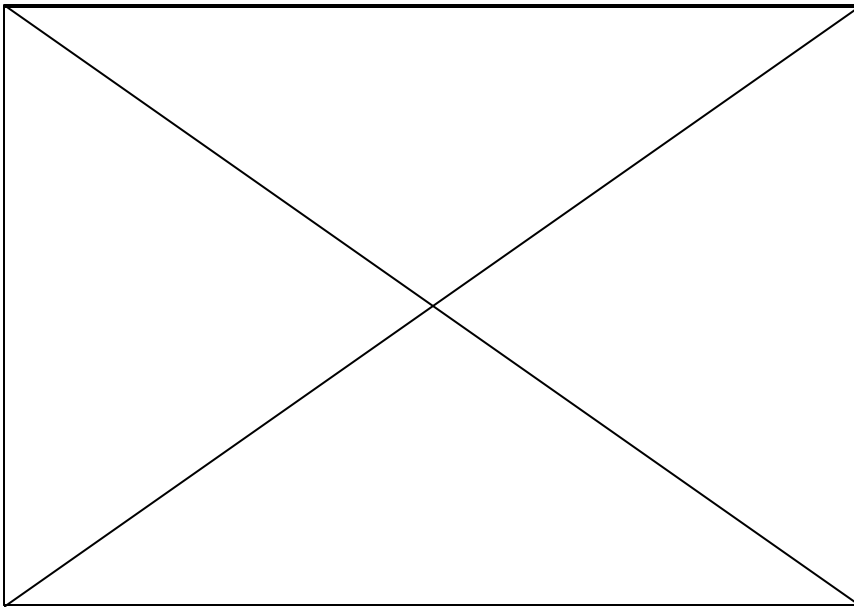
But first, it's important to know how the Macintosh differs from other computers in integrating programs.

## Incorporating Graphics

As mentioned in Chapter 1, all Macintosh programs work consistently, using the same commands and the same procedures. This not only makes it easy to learn to use multiple applications, but also lets you share data between different applications and application types by using the Macintosh commands for cutting (or copying) and pasting.

This capability is important when you need to add graphics to text documents. Depending on your discipline, this can mean anything from illustrating a story to adding a technical diagram to a lab report. In every discipline, graphics can add both aesthetic appeal and informational content to text, and benefit the work of students as well as instructors.

To incorporate a graphic into one of your word processing documents on the Macintosh, you would simply open the graphic on the screen, copy it to the Macintosh Clipboard, quit the drawing application, open your word processing document, indicate where you want to insert the graphic, and then "paste" into your document. (For step-by-step instructions, see the box on page 26.)



McGraw-Hill's Computer Resource Library provides access to a variety of clip-art images. This illustration shows a mainframe network.

## Sources for graphics

There are four main sources for computer graphics: graphics packages, clip-art libraries, screen dumps, and scanned images.

### Graphics packages

These packages, such as MacPaint and MacDraw II, give you a palette of on-screen tools with which to create your own computer artwork. Most graphics programs fall into one of two major categories: paint programs and draw programs.

Paint programs construct their images using bit maps--collections of on-screen dots, or pixels. In a paint program, a line is made up of pixels, which can be manipulated individually. In general, paint programs offer both predrawn shapes and lines that you can manipulate, and tools for freehand drawing, such as a pencil, paintbrush, and spray can. The major strength of these programs is their capacity for rapid free-form drawing and pixel-by-pixel revision.

In a draw program, on the other hand, each line exists as a total unit, rather than as a collection of pixels. This approach is better for uses such as drafting. In fact, draw programs tend to offer tools that resemble those in a drafting kit, such as straight edges, compasses, and French curves.

### Clip art

For those who have neither the time nor the inclination to draw on the computer, there are also commercial clip-art libraries created with the most popular graphics software packages. These consist of collections of predrawn images, ready to cut and paste into your documents. The box on the next page covers some of the available clip-art libraries, which include images ranging from animals and people to detailed maps of the world.

### Screen dumps

A third possible source of graphics is the creation of what are called screen dumps. These are actual images of what you see on your Macintosh screen, captured in the form of

a MacPaint file. They can be highly useful in creating instructional materials that include a computer component. (Notice that we have made extensive use of them in this guide.)

### Scanned images

These are images created by a device called a scanner, which converts existing artwork or a video signal into a set of pixels that can be stored and manipulated on the computer. Once the image is in Macintosh file format, you can alter it or combine it with text or graphics from other Macintosh files. For example, you might use a scanner to import a photograph of someone your class was studying, so that you could incorporate it into your informational handouts.

## Other Uses of Integration

The Macintosh computer can also be used to move information from a database to a word processing document to create a detailed report, or from a database to a spreadsheet for more complex calculations or the preparation of tables. In other words, the integration capabilities of the Macintosh let you use whatever type of application seems best for any job. You can always combine the results as necessary.

For example, Allan Smith's Physical Chemistry students at Drexel may use as many as five different types of software in preparing their lab reports. They may use MacDraw or MacPaint to create figures; Microsoft Excel for tabular calculations and graphs; TKSolverPlus (a mathematical modeling program) for sophisticated statistical work such as regression analysis; an equation-setting program such as Expressionist; and, finally, MacWrite II to write the text that binds together all of these disparate elements. The result, according to Smith, is better, more comprehensive reports and happier students--because they have a sense of mastery over the entire report preparation process.

## Integrated Packages

As you've seen, software tools designed for the Macintosh work well together; but there are also integrated packages that combine the features of several application types. The best known of these is Microsoft Works, which combines the capabilities of a word processor, a database, a spreadsheet, and a communications package in a single easy-to-use piece of software.

In general, the individual modules within integrated packages are less powerful than their single-purpose counterparts, but this does not necessarily mean that they have limited utility for instructional purposes. In fact, some instructors have found that the convenience of being able to use a single program for multiple purposes is much more valuable than the extra power offered by separate packages.

For example, Moorpark College journalism instructor John Grzywacz-Gray uses Microsoft Works as the foundation for all the work on the campus newspaper. Students use the program's word processor function to write and edit their stories, its database to keep track of photo and story assignments, the spreadsheet's graphing and charting capabilities

### Clip Art Libraries

The following is a listing of some of the available clip-art libraries, along with their publishers and contact information:

Anatomy and Physiology Image Library, McGraw-Hill, College Division,  
(212) 512-2000

ArtRoom CD-ROM, Image Club Graphics, 1-800-661-9410

Click Art Portfolio Series, T/Maker, (415) 962-0195

Computer Resource Library, Mitchell/McGraw-Hill, 1-800-435-2665

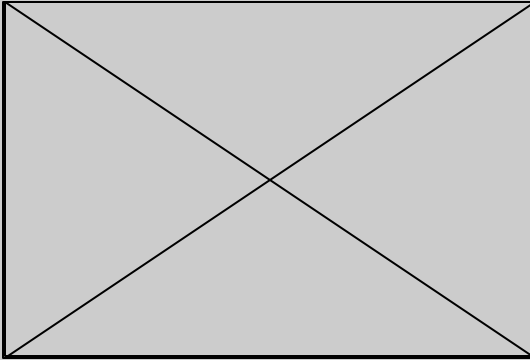
DeskTop Art, Dynamic Graphics, 1-800-255-8800

Images with Impact, 3G Graphics, 1-800-456-0234

MacAtlas Series, MicroMaps Software, 1-800-334-4291

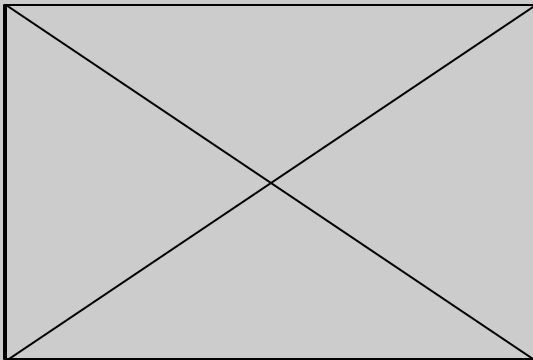
Wet Paint, Dubl-Click Software, (818) 700-9525

## How to Create a Diagram and Insert It into a Class Handout



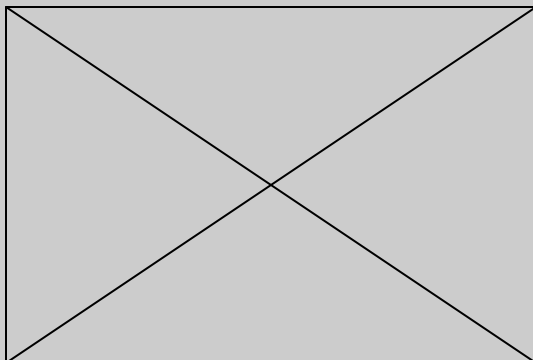
1. Open up your drawing program (MacPaint, MacDraw II, SuperPaint, or another program of your choice).

MacDraw II

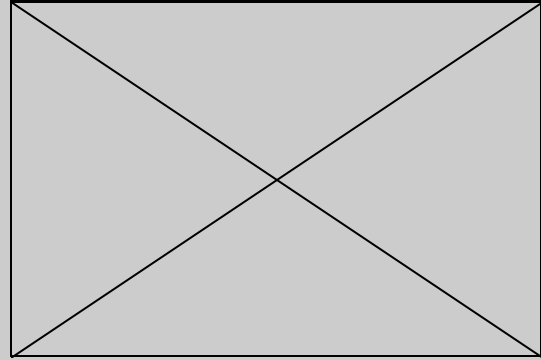


3. Copy it to the Clipboard by selecting the entire diagram and choosing Copy from the Edit menu.\*

Microsoft Word 4.0

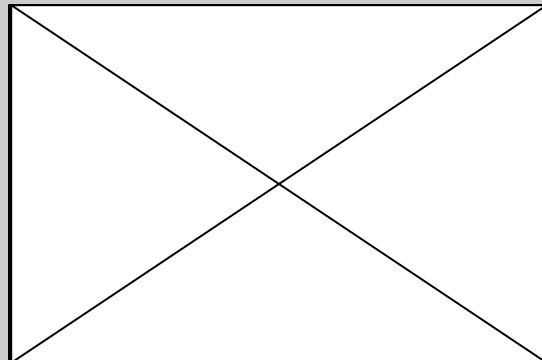


5. Position the cursor where you would like to insert the diagram and select Paste from the Edit menu.



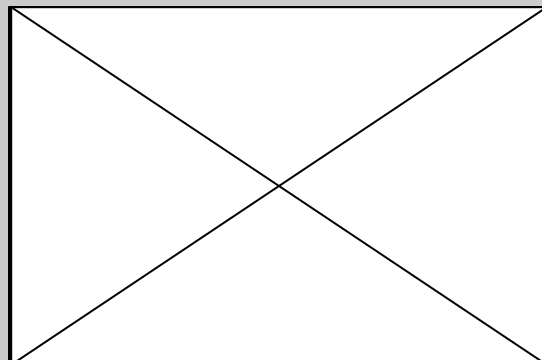
2. Create your diagram.

MacDraw II



4. Quit your drawing program and open up your word processing document (created in MacWrite II, Microsoft Word, WriteNow, or another application).

Microsoft Word 4.0



6. The graphic is now part of the text document. You can even adjust its size by dragging on its corners with the mouse.

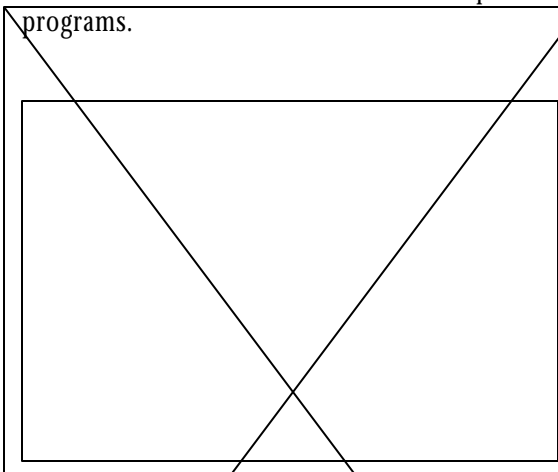
Actually, there is one more thing that you should know. This kind of simple pasting does not allow you to alter the graphic once it's in place, so you should be entirely satisfied with its design before you save it and quit the drawing program. However, most desktop publishing, or page-layout, programs (discussed briefly on page 14) offer more flexibility in terms of manipulating graphics once they are placed in text.

\*The Macintosh Clipboard functions just like its real-world counterpart: when you cut or copy text or graphics, it is stored in the Clipboard, where it stays until you either insert ("paste") it somewhere in a file or copy something else to the Clipboard.

to create graphics for stories, and the mail-merge feature (which makes it easy to personalize mass mailings and to print mailing labels from a database) to prepare direct-mail campaigns for advertisers. They even use a combination of Works' mail-merge and database functions to handle the paper's billing.

In fact, the only Microsoft Works function that is being underused at this point, according to Grzywacz-Gray, is communications. However, he is trying to interest students in accessing the AP Wire Service News on CompuServe as a source of stories.

Grzywacz-Gray says that Microsoft Works provides all of the power his students need, and that he finds it much more efficient to teach them to use one program with multiple functions than to teach them to use multiple programs.



Microsoft Works allows instructors to access a word processing program, a spreadsheet, and communications software.

## Basic Tools: Graphics Programs

### FullPaint

FullPaint is a full-screen, high-performance painting application that lets you create professional-quality graphics for use in presentations. It allows you to have as many as four documents open at once, and features movable and hidable tool palettes; ruler units in inches, pixels, or centimeters; and color-printing utilities.

Price: \$99

Education discounts available.

Ashton-Tate, 20101 Hamilton Avenue, Torrance, CA 90502; (213) 329-9989

### MacDraw II

This precise, object-oriented drawing package set the standard for this genre of Macintosh graphics software. Features include a variety of basic drawing tools and shapes; modification tools for rearranging drawings; and enlargement, reduction, and text-editing capabilities.

Price: \$399

Substantial education discounts available.

Claris Corporation, Box 58168, 5201 Patrick Henry Drive, Santa Clara, CA 95052; (408) 987-7000

### MacPaint

Features include movable tool and pattern palettes; six free-form painting tools and five shape tools; special effects; and enlargement and reduction capabilities.

Price: \$125

Education discounts are available.

Claris Corporation, Box 58168, 5201 Patrick Henry Drive, Santa Clara, CA 95052; (408) 987-7000

### SuperPaint

SuperPaint is an all-purpose graphic design and editing tool with which users can produce high-quality graphic images, diagrams, illustrations, and designs for inclusion in reports, presentations, and books. Features include full-screen, 300-dots-per-inch editing of bit-mapped graphic images; multiple, scrolling windows; multiple palettes; and graphics manipulation capabilities.

Price: \$199

Education discounts and site licenses are available.

Silicon Beach Software, Inc., P.O. Box 261430, San Diego, CA 92126; (619) 695-6956

## Basic Tools: Integrated Applications

### Microsoft Works 2.0

Microsoft Works offers word processing, spreadsheet analysis, an easy-to-access database, communications, and desktop publishing. Features include a word processor with spelling checker; a full range of drawing tools; 64 mathematical and statistics functions; and the ability to

send and receive data.

Price: \$295

Education discounts are available.

Microsoft Corporation, 16011 N.E. 36th Way, Box 97017, Redmond, WA 98073-9717; (206) 882-8080

# HyperCard

This unique software package, which comes free with every Macintosh computer, can be described as an information manipulation tool, a database with visual capabilities, or a basic multimedia tool. In fact, HyperCard combines all of these capabilities to create a tool that has changed the very nature of how people interact with the computer--particularly in the field of education, in which it is sparking a proliferation of faculty-developed instructional and research tools.



The strength of HyperCard is its ability to link data in a variety of formats--text, graphics, still photos, animation, and even video (HyperCard and the Macintosh can be used to control a videodisc player). This multimedia capability makes it a truly flexible tool for the creation of discipline-specific instructional programs, or courseware. (For more information on working with multimedia, see the *Multimedia: Getting Started* guide in this series.)

The HyperCard 2.0 program and four stacks are included with all Macintosh computers. Complete stacks, development tools and documentation are available in the HyperCard Development (SRP \$199) from Claris. For HyperCard 1.2.x customers, an upgrade version, which includes additional stacks, is available for \$49. Education discounts and site licenses are available.

For more information, contact Claris Corporation, Box 58168, 5201 Patrick Henry Drive, Santa Clara, CA 95052: (408) 727-8227.

## Examples of Educational Use

The simplest way to use HyperCard is as a graphic database (a database that allows you to reference pictures as well as words). For example, the Document Preparation Facility in Purdue's School of Electrical Engineering uses a HyperCard database to track its vast volume of technical illustrations. Storing actual images of the drawings along with text labels makes it easy to find the appropriate art quickly, according to manager Andy Hughes.

The multimedia capabilities of HyperCard can also be useful in setting up indexes as well as the contexts for videodisc images. For example, at San Jose State University, Kathleen Cohen has developed a HyperCard-based Art and Civilization database. This database helps students to understand and sort through a videodisc of 15,000 images drawn from all

## HyperCard Basics

HyperCard is based on the concept of file cards. In fact, the basic unit of information in HyperCard is called a card. Cards can contain any or all of the following items: text, graphics, other pictures, and/or buttons.

**Text.** You can generate your own text in HyperCard.

**Graphics.** There is a complete MacPaint-like set of tools within HyperCard.

**Other pictures.** These can be imported from graphics programs, from scanners (hardware devices that can convert existing graphics or text into a form the computer can understand), and from clip-art libraries.

**Buttons.** HyperCard buttons produce a specified action, such as moving to another card, cuing a visual effect, or even dialing a phone. They enable you to create links between related cards (connections that let you organize information as you do in your mind--by association and context).

Sets of related and interlinked HyperCard cards form stacks. For example, HyperCard comes with the following sample stacks:

- Desktop stacks for an address file, datebook, "To do" list, calendar, and filing cabinet.
- A stack of U.S. and Canadian area codes with major cities and time zones.
- Idea stacks that offer numerous templates, card designs, and pieces of clip art to get you started.
- Help stacks, in case you run into trouble when working with the program

world cultures--images from cave paintings to fractals.

## HyperCard as an Authoring Tool

HyperCard is also increasingly being used as an authoring tool for the creation of courseware, because its relative ease of operation essentially allows users to write computer applications without programming the computer. This means that many more instructors

are developing their own computer-based tutorials, simulations, and other learning tools.

To illustrate the diverse range of HyperCard use in instruction, here are some courseware examples:

- At the Potsdam College of the State University of New York, an anthropology student and a professor created a HyperCard-based exercise in introductory physical anthropology. Called Missing Link, this exercise introduces a “mystery fossil” through pictures and data, and then provides the necessary tools--text descriptions, a glossary, and a database of pictures--to enable students to identify it.
- At Carnegie-Mellon University, students learn

German reading skills using a stack called Hagar Teaches German. This HyperCard courseware uses German versions of the “Hagar the Horrible” cartoons, accompanied by grammar descriptions, translations, and a glossary.

- Medical students at the University of Utah can learn neuroanatomy by using a stack called HyperBrain, which includes highly detailed graphics and accompanying information. It can also be used with a videodisc called “Slice of Life” to create a true interactive multimedia learning environment.
- At the University of New Hampshire, forestry students can work with a HyperCard stack called SimThin to get realistic feedback about the effects of various approaches to tree removal, including selective logging, house-lot clearing, and clear-cutting. SimThin includes “aerial views” of the forest, maps of trees categorized by age and genotype, and even the sounds of chainsaws, loggers, and falling trees.

Such special-purpose tools, which would once have been impractical because of the programming time required to create them, are rapidly proliferating, thanks to the ease of use of HyperCard. What this means--besides the fact that you, too, might be able to create such programs--is that it is possible that one of your peers has already created a program that might be useful in your teaching. The box on this page provides useful information to help you find out what faculty-developed courseware is available.

## Sources of Information on Faculty-Developed Courseware

### Intellimation

As early as 1986, Apple was supporting the distribution of faculty-developed courseware. Today, that support takes the form of an alliance with Intellimation, a subsidiary of educational publisher ABC-CLIO. Intellimation offers developmental aid and quality control, as well as distribution, for faculty-developed courseware. For more information about its services, or about courseware available through the program, contact Intellimation at P.O. Box 1922, Santa Barbara, CA 93116-1922, or call 1-800-3-INTELL.

### A Reference Guide to Macintosh in Higher Education

Available in both print and HyperCard formats, this guide is a vast collection of Macintosh projects on campuses across the country and even abroad. The HyperCard version can be searched by topic, institution, or keywords. To request a copy of this guide, please write to Apple Computer, Inc., A Reference Guide to Macintosh in Higher Education, 20330 Stevens Creek Blvd., MS: 36HE, Cupertino, CA 95014

### Commercial Stacks

In addition to faculty-developed HyperCard stacks, there are a number of commercial products based on HyperCard. Many of these may have instructional applications; some were even developed specifically for education. Also, an increasing number of textbook publishers are offering HyperCard stacks in conjunction with their textbook offerings.

Heizer Software, a California-based company, puts out a catalog that includes a large section called the Stack Exchange. Most of the stacks found in this publication are relatively inexpensive (\$10-\$50), and topics range from foreign languages to social sciences to mathematics. There is even an Exam Generator stack that can handle multiple-choice, true/false, and essay formats; and a Slide Show Maker stack that facilitates the production of self-running on-screen presentations.

For more information, contact Heizer Software, P.O. Box 232019, Pleasant Hill, CA 94523; (415) 943-7667; Fax: (415) 943-6882

# Basic Computer Communications

With the appropriate equipment, you can use your computer to exchange messages and files with other computer users located in the next room or on the next continent. You can also access information stored on remotely located computers.

This chapter discusses the instructional benefits and uses of computer communications and on-line resources. For more extensive coverage of many communications issues, see the *Creating and Managing an Academic Computing Lab* guide in this series. (Campus organizations can also be extremely helpful with the selection of communications hardware and software.)

# Computer Communications Terminology

To understand the potential instructional benefits of computer communications, it helps to know a few terms and distinctions. First, the term **computer communications** describes several methods of communicating between computers—as does the related term **computer networking**. Basically, the three possible types of computer communications are local-area networking, wide-area networking, and dial-in communications (sometimes referred to as telecommunications).

## Local-area networking

Generally used for the purpose of sharing printers and other peripheral devices, this type of networking involves the connection of computers in relatively close proximity via some form of cabling. With the addition of a file server and electronic-mail software, a local-area network (or LAN) can also allow the exchange of messages or files between connected computers.

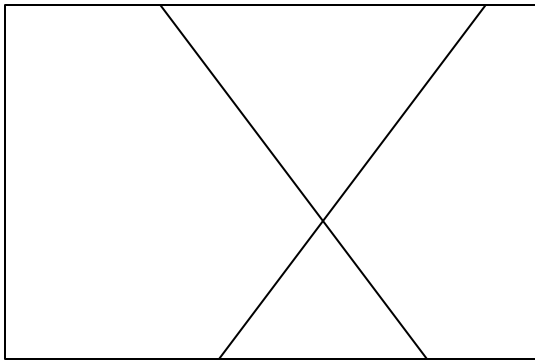
## Wide-area networking

This type of networking involves the connection of numerous local-area networks over a broader geographic area. A campuswide network that connects to a larger computer system such as a minicomputer or mainframe is an example of a wide-area network (or WAN). WANs can be extremely large, covering vast geographic regions and interconnecting numerous institutions.

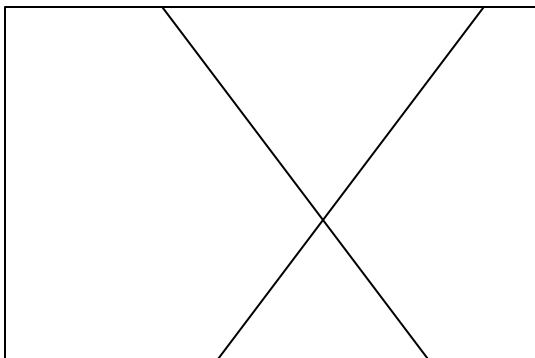
## Dial-in communications or telecommunications

Instead of cables, this type of networking uses a special piece of hardware called a modem (short for MODulator/DEModulator), which translates computer signals into a form of signal that can travel along standard phone lines. The receiving modem then retranslates the phone signals into a form the receiving computer can understand. If you connect a modem to your computer and install the appropriate communications software, you can connect to a number of on-line services, regardless of their location or yours.

Local-area networking is the connection of computers and peripheral devices in close proximity using cables.



Wide-area networking uses telecommunications technology to connect numerous local networks over a larger geographic area.



## On-line Resources

Many campuses have their own on-line resources, such as large informational databases or electronic library catalogs, accessible through a campus WAN or by means of a modem and telephone lines. There are also a number of education-specific WANs, such as BITNET and Internet, that facilitate information exchange between academics located around the world (see the box on this page).

In addition, commercial on-line services such as CompuServe, The Source, Bibliographic Retrieval Services (BRS), and Knowledge Index offer dial-in access to a number of databases on specific topics. There are even commercial on-line databases that specialize in a specific content area, such as Lexus, the legal research database.

Another option is AppleLink, Apple Computer's own on-line information and communications offering. AppleLink offers a variety of product and program information from Apple, and even from some third-party vendors. Its resources include:

- Apple's Technical Information Library, which offers detailed information on Apple products, troubleshooting tips, and other helpful information.
- A higher education bulletin board, with information on products and programs of special interest to those in colleges and universities.
- An on-line version of the Redgate Macintosh Buyer's Guide, one of the most comprehensive listings of Macintosh products available.

AppleLink also provides electronic-mail capability, which means that users can exchange on-line messages with Apple employees and with other higher education subscribers, as well as with those on other networks (see box at right).

### Education-Specific WANs: BITNET and Internet

Education-specific WANs such as BITNET and Internet can give you an electronic connection to a worldwide community of academics and researchers. You can use them to collaborate with a research associate located halfway around the world, and exchange computer messages almost instantaneously.

Network mailing lists on these WANs provide another on-line resource. These are typically run by a participating university, department, or individual faculty member, and cover a broad range of topics and issues. You simply sign up, and you will receive any messages that are posted to the network about that subject.

These WANs all boast impressive institutional membership, but they vary somewhat in their management, orientation, offerings, and costs. BITNET is administered by a common entity called CREN (the Corporation for Research and Educational Networking), while Internet is run by the National Science Foundation (NSF).

Both offer a variety of services, including electronic mail and file transfer between connected institutions. Internet also offers the ability to log on, via the network, to a remote computer, letting users, for example, run a computationally intensive experiment on a supercomputer in another location.

Typically, you connect to any of these networks through a campus LAN that contains a larger system (a minicomputer or mainframe) that will in turn connect you to the WAN.

If you are interested in using an education-specific WAN, you should begin by asking your campus computer support personnel whether your school is already a member and, if so, how to connect.

### How to Subscribe to AppleLink

AppleLink is a commercial network administered by Apple Computer. To use it you need a modem, an AppleLink address, and the AppleLink software. To find out about getting on AppleLink, talk to your Apple education representative. (You might want to start by asking someone on your campus computer staff whether your school already has an AppleLink address that you might use.)

## Getting Started with Communications

The first step toward getting started with computer communications is to select a modem and connect it to your computer. The key features that you want in a modem are Hayes compatibility (which means that the modem makes use of the most commonly used communications protocols) and at least 1200-baud capacity (most commercial networks communicate at this speed).

There are a number of modems that meet these criteria. Some of the best-known are the Apple Modem, the Shiva NetModem, and the Hayes Smartmodem. Be sure to tell your salesperson what kind of computer you have, so that you get the right cable(s) to connect the modem to your system.

Compared with selecting a modem, connecting one is a snap--literally. You simply plug the modem cable into the Modem port (the connector right below the little picture of a phone) in the back of your Macintosh, then connect the modem to a phone jack, following the instructions that come with the modem.

On the software side, there are a number of public-domain and shareware (freely available software for which you pay what you feel is appropriate) programs available that can handle most communications tasks you are likely to attempt. Of these, the two best-known are Red Ryder, which is shareware; and MacKermit, a public-domain program.

### Basic Tools: Information Services

#### BITNET

1112 12th Street NW, Suite 600  
Washington, DC 20036  
(202) 872-4200

#### BRS Information Technologies

A Division of Maxwell Online  
8000 Westpark Drive  
McLean, VA 22102  
1-800-289-4277

#### CompuServe

5000 Arlington Center Boulevard  
P.O. Box 20212  
Columbus, OH 43220  
1-800-848-8199  
(614) 457-0802 (in Ohio)

#### DELPHI

3 Blackstone Street  
Cambridge, MA 02139  
1-800-544-4005

#### DIALOG Information Services

3460 Hillview Avenue, Palo Alto, CA 94304;  
(415) 858-3810

#### GEnie/GEISCO

401 N. Washington Street  
Rockville, MD 20850  
1-800-638-9636

#### The Source

1616 Anderson Road  
McLean, VA 22102  
1-800-336-3366

# Other Useful Tools for Faculty

This chapter offers a brief overview of more specialized software tools that might be useful to you as you become increasingly involved in using the computer. It covers programs designed specifically for one of the following:

- Writing
- Mathematical modeling
- Charting and graphing
- Data analysis and visualization
- Developing multimedia

## Special-Purpose Writing Tools

In addition to word processing software, several other types of software programs have been developed to aid in specific stages of the writing process. For example, optical character recognition (OCR) software, such as OmniPage, enables a computer equipped with a scanner to read in printed matter directly to a computer file, eliminating the need for retyping. Data retrieval software such as On Location can then search through the computer files to find and retrieve the specific information requested—quickly locating key words or phrases.

Idea processors are designed to help writers organize their work. They range from visually oriented “brainstorming” tools such as Inspiration, which let you literally sketch out your ideas, to outlining programs such as MORE 3.0, which help you develop the structure of your document. Some instructors use such programs in conjunction with an LCD display device, first showing the outline of their lecture, and then either revealing increasing detail for each point of the outline, or having students volunteer their own details.

Other tools for writers include on-line reference tools, such as the Electronic English Handbook, and even Webster’s Ninth New Collegiate Dictionary on CD-ROM. These are the electronic equivalents of standard dictionaries, thesauruses, and style guides. There are also a number of diagnostic software packages, such as Tools for Writers and MacProof, which act as electronic editors. Such programs can help writers to avoid everything from simple spelling errors to split infinitives and dangling participles.

Some of the diagnostic programs can even offer useful insights into writing strengths and weaknesses, by examining such things as passive versus active construction, and by analyzing sentence/paragraph length and overall vocabulary level. As mentioned in the word processing section of this guide, many

instructors have discovered that students equipped with such programs can deal with many of their more mechanical writing errors without instructor intervention.

Bibliographical reference tools are also available for scholarly writing to aid in the creation of bibliographies and indexes. Many of these programs, such as EndNote Plus for the Macintosh, not only can facilitate the gathering and organization of this information, but also can generate the final version of a document in a wide range of styles.

Other recent writing tool developments include the increased use of on-line documentation and collaboration packages. Using programs like Markup, and PROSE, instructors can now comment extensively on individual sections of a student’s work, attaching the notations to electronically submitted essays. Such programs allow for a much fuller response to a student’s work than ordinary written comments would permit. With programs like Aspects and Conference Writer, the instructor can even collaborate with the student while the composition is being created, typing comments and suggestions directly into an electronic dialog window on the student’s machine.

## Mathematical Modeling Programs

These programs are designed to solve a variety of mathematical problems, including numerical, algebraic, symbolic, and graphical computations. While used primarily in mathematics and the sciences, they are useful in any discipline where mathematical models are used. Drexel chemistry professor Allan Smith calls mathematical modeling programs a “significant category of tool software.” He explains that though he still uses spreadsheets for certain tasks involving tabular data, he finds math modeling software better suited for much of his work.



Although there are many math packages available, two of the best are **Mathematica** and **Theorist**.

**Mathematica** not only handles numerical, symbolic, and graphical computations, but also provides a rudimentary word processor and a built-in programming language. One of the most interesting features of **Mathematica** --and the one that makes it such an outstanding educational tool--is its ability to create files called Notebooks. Notebooks can contain text, graphics, or **Mathematica** commands, which allow instructors to create "live" textbooks.

**Theorist** performs many of the same tasks as **Mathematica**, such as producing two- and three-dimensional graphics and animations. Unlike **Mathematica**, however, **Theorist** displays equations in "standard" mathematical notation and has a simplified interface. For example, rather than entering equations through a command-line interface, the **Theorist** user selects symbols, functions, and operators from on-screen palettes.

Many of these tools have been developed fairly recently and are just now making significant inroads into the classroom. Many educators believe that **Mathematica**, **Theorist**, and other math programs will profoundly affect the future of mathematics instruction.

## Charting and Graphing Programs

While spreadsheets today provide many general charting and graphing features, some programs are designed specifically for this function. These dedicated graphics packages provide many sophisticated graphing, charting, and presentation options not found in spreadsheets.

Most spreadsheets and graphics packages have basic calculation features and can produce simple pie, bar, and line graphs, but if your needs are more complex or specific, a package such as **DeltaGraph** or **KaleidaGraph** may be

more appropriate. Both can import and export data in a variety of formats and can produce a wealth of general, business, and technical charts and graphs.

## Data Analysis and Visualization Programs

Data analysis and visualization packages make up the newest category of graphics software. These programs take advantage of the graphical and interactive qualities of the computer to make subjects like statistics more readily comprehensible. The ability to see complex mathematical concepts displayed on a computer makes the material covered more concrete to students, who find themselves able to move beyond the mechanics of numbers manipulation to a broader understanding of the meanings behind the numerical data they are examining.

Today, there are several programs that take advantage of the Macintosh computer's power and graphics capabilities to bring scientific visualization within reach of more students than ever before. For example, a series of programs from **SpyGlass, Inc.**, offers a variety of data visualization functions.

These include the transformation of large sets of data into two-dimensional color images, manipulation of the colors within the image, a variety of displays, and even animation. Visual analysis of three-dimensional information, or volumetric data, is another capability made possible by the software, thanks to the computer's ability to render two-dimensional representations that present the compelling illusion of a third.

# Multimedia

One of the newest and most exciting ways to enhance lectures and presentations is through the use of sound, graphics, animations, dynamic simulations, and video--collectively known as interactive multimedia. Educationally, the benefit is the provision of a flexible, interactive learning environment that can meet the needs of students with diverse backgrounds and learning styles.

Many instructors are now developing instructional courseware that includes a

multimedia component. A HyperCard tutorial stack can interface with a videodisc player, for example, and offer instructional text in conjunction with appropriate images and on-screen graphics. There are several avenues of distribution for such faculty-developed courseware, of which the newest avenue is Intellimation (see box on page 30).

The level of technical skill required to create multimedia applications is not that high, which is encouraging for those who may want to try it themselves. For more information on multimedia, see the **Multimedia: Getting Started** guide in this series.

## Basic Tools: Specialized Tools

### Special-Purpose Writing Programs

#### Aspects

Aspects is a collaboration tool that was designed specifically to facilitate "remote" real-time conferencing. Features include on-line discussion capabilities, document sharing, and collaboration among users located in different geographic regions.

Price: \$299

Group Technologies, 1408 N. Fillmore, Suite 10, Arlington, VA 22201; 1-800-476-8781

#### Conference Writer

Conference Writer is a HyperCard-based software package designed to run on an AppleTalk® network connected by LocalTalk® cables. Features include three on-screen windows that can be used for group brainstorming.

Price: \$249

Research Design Associates, 10 Boulevard Avenue, Greenlawn, NY 11740; 1-800-654-8715

#### Electronic English Handbook

This desk accessory reference tool enables Macintosh users to look up rules about English language spelling, grammar, and form. Features include illustrations of each rule with examples, and availability while other applications are being used.

Price: \$29.95

Education discounts and site licenses are available.

Technology Training Associates, 50 Western Avenue, Cambridge, MA 02139; (617) 497-5030

#### EndNote Plus

EndNote Plus is both a desk accessory and a stand-alone application for automatically creating formatted bibliographies and footnotes from references placed within manuscripts during the writing process. Features include the ability to store and manage up to 32,000 bibliographic references, and built-in, modifiable bibliographic style standards.

Price: \$129

Education discounts and site licenses are available.

Niles and Associates, 2200 Powell, Suite 765, Emeryville, CA 94608; (415) 655-6666

#### Inspiration 2.0

Inspiration 2.0 is a fully integrated diagramming and outlining package to capture, organize, refine and communicate ideas and information in professional documents. Features include outliner and notes windows for easy organization of information into reports.

Price: \$249

Ceres Software, Inc. 2520 SW Hamilton Street, Portland, OR 97201; (503) 245-9011.

#### MacProof

This comprehensive text-review program detects mistakes in mechanics, usage, style, and structure and suggests corrections. Features include error explanations; an on-line reference guide to writing style; and availability while other applications are in use.

Price: \$195

Education discounts and site licenses are available.

Lexpertise Linguistic Software, 9 Exchange Place, Suite 900, Salt Lake City, UT 84111; (801) 350-9100

#### MarkUp 2.0

MarkUp 2.0 is an application for workgroup editing and review. It permits group members to simultaneously edit any type of Macintosh document without using the application that created the document.

Price: \$179.95

Education discounts are available.

Mainstay, 5311-B Derry Avenue, Agoura Hills, CA 91301; (818) 991-6540

#### OmniPage 2.1

OmniPage 2.1 is a page recognition program that allows scanners to recognize a variety of pages with a mixture of images and text on a page. Features include recognition of alphanumeric in various layouts, including multiple columns and spreadsheets.

Price: \$795

Caere Corporation, 100 Cooper Court, Los Gatos, CA 95030; 1-800-535-7226

#### On Location

On Location is a desk accessory that locates files quickly, by file name or the words in the files. The application allows users to view and copy information from files without opening their applications. On Location works by building an index of all the files on a volume, containing all of the words in the files.

Price: \$129.95

ON Technology, Inc., 155 2nd Street, Cambridge, MA 02141; (617) 876-0900

#### PROSE

Prose provides an electronic medium for the exchange of papers, comments, and revisions between students and teachers. The application allows the instructor to write comments about the essay in coded "pop-up" windows.

Price: \$16.95

McGraw-Hill Publishing Co., 1221 Avenue of the Americas, New York, NY 10020; (212) 512-2000

#### Tools for Writers

This low-cost writing analysis program was developed at Drexel University. Features include a built-in text-editor; tests that check spelling, grammar, and style; outlining capabilities; and customizable diagnostic features.

Price: \$17

Intellimation, 130 Cremona Drive, Santa Barbara, CA 93117; 1-800-3-INTELL

#### Webster's Ninth New Collegiate Dictionary on CD-ROM

The top-selling reference dictionary from Merriam-Webster is now available on CD-ROM. Features include more than 160,000 dictionary entries; digitally recorded pronunciations of each main entry word; and illustrations.

Price: \$199.95

Education discounts are available. Compatible with AppleShare®.

Highlighted Data, P.O. Box 17229, Washington Dulles International Airport, Washington, DC 20041; (703)533-1939

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## Mathematical Modeling Programs

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### Mathematica

Mathematica is a calculation tool and programming language for researchers, students, engineers, and others. Its extensive graphics capabilities allow it to generate two-dimensional plots, contour plots and shaded color three-dimensional pictures.

Price: \$495, Enhanced Version available for \$795

Education discounts available.

Wolfram Research, Inc., P.O. Box 6059, Champaign, IL 61826; (217)398-0700

### Theorist

Theorist is a WYSIWYG symbolic algebra and graphing program that makes mathematics easy and more productive. Math capabilities include symbolic and numeric integration and differentiation; matrix and linear algebra; and real and complex trigonometry.

Price: \$379.95

Education discounts are available.

Prescience Corporation, 814 Castro Street, San Francisco, CA 94114

### DeltaGraph

DeltaGraph is a full featured two- and three-dimensional business and scientific charting and graphics package. The program features standard integrated drawing tools, multicolor text edit and special-effect fill patterns.

Price: \$195

Education discounts are available.

Deltapoint, Inc., 2 Harris Court, Suite B-1 Monterey, CA 93940; 1-800-367-4334

### KaleidaGraph

KaleidaGraph is a data analysis and graphics application that uses pull-down menus for quick plot selection and user style modifications. Plot types include line graph, scatter plot, probability plot, and pie charts.

Price: \$249

Education discounts are available.

Synergy Software (PCS, Inc.), 2457 Perkiomen Avenue, Reading, MA 19606; (215) 779-0522

### Wingz

Wingz is a graphics spreadsheet that combines numbers, words, graphs and graphic images on a single worksheet. Features include charting with three-dimensional graphics, desktop presentation capabilities, and a text editor.

Price: \$399

Education discounts available.

Informix Software, Inc., Workstation Products Division, 16011 College Blvd., Lenexa, KS 66219; (913)599-7100

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## Data Analysis Programs

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### Data Desk 3.0

Data Desk is a desktop data analysis environment that computes statistics and produces advanced graphics. Features include multidimensional rotating plots, plot brushing, and full integration of graphics and statistics.

Price: \$595

Education discounts are available.

Odesta Corporation, 4084 Commercial Avenue, Northbrook, IL 60062; (708)498-5615

### SpyGlass

A series of programs from Spyglass, Inc. offers a variety of data visualization functions, including the presentation of data as two-dimensional color images, animation, and analysis of three-dimensional information.

Price: \$1,195 for bundle.

Educational discounts of up to 50 percent are available.

SpyGlass, Inc., 701 Devonshire Drive, C-17, Champaign, IL 61820; (217)355-1665

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## Testing and Grading Programs

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### EPSTeacher's Assistant

The EPSTeacher's Assistant is a dynamic set of HyperCard stacks designed specifically as a personal manager for school teachers. Features include an appointment calendar system, attendance, grading, and learning plan applications.

Price: \$99

Education discounts are available.

Executive Productivity Systems, 2305 Miller Court, Lakewood, CO 80215; (303)232-3939

### MicroGrade

MicroGrade is a highly flexible full-featured grade keeping program. Features include report generation, class rosters, and statistical analysis of class performance.

Price: \$95

Education discounts are available.

Chariot Software Group, 3659 India Street, Suite 100, San Diego, CA 92103; 1-800-242-7468

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## Multimedia Applications

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### Authorware Professional

Authorware offers various products and services for on-demand learning systems in industry and education. Its products are 42 Macintosh-based authoring and development platforms with full multimedia capabilities.

Authorware, Inc., 8500 Normandale Lake Blvd., 9th Floor, Minneapolis, MN 55437; (612)699-3095

### MacroMind Director V2.0

MacroMind Director is a multimedia presentation and animation tool that lets users easily create and combine animations, graphics and text. These presentations can be synchronized with sound and video.

Price: \$695

Education discounts are available.

MacroMind, Inc., 410 Townsend, Suite 408, San Francisco, CA 94107; (415)442-0200

### MediaTracks

MediaTracks lets users record Macintosh screen action into "tapes" that an audience can watch and listen to at their convenience. Users can edit these tapes, adding text, graphics, and sound.

Price: \$295

Education discounts are available.

Farallon Computing, Inc., 2000 Powell Street, Suite 600, Emeryville, CA 94608; (415)596-9000

# Conclusion

This brief overview of more specialized software concludes this guide to basic software tools for faculty. In its pages, you've encountered the wide range of capabilities offered by using off-the-shelf software for the Macintosh. These tools have the potential to help you with a multitude of efforts, from grading and record keeping to enhancing your instructional presentations.

The software boxes in each chapter can function as a mini-software guide, complete with the information you need to obtain any software package that interests you. An extensive Resources section supplements this information with descriptions and addresses of publications and organizations that can support your instructional computing efforts.

We encourage you to use this guide as you begin to explore using computers in your teaching, and hope that it will spark new ideas and approaches to learning.

# Resources

The following is a list of software mentioned in this guide, as well as several other widely used software applications.

## Software

### Authoring Tools

HyperCard 2.0, Claris Corporation,  
(408) 727-8227

### Word Processing Packages

FullWrite Professional, Ashton-Tate,  
(213) 329-8000

MacWrite II, Claris Corporation,  
(408) 727-8227

Microsoft Word, Microsoft Corporation,  
(206) 882-8080

WordPerfect, WordPerfect Corporation,  
(801) 225-5000

WriteNow, T/Maker, (415) 962-0195

### Presentation Programs

Aldus Persuasion, Aldus Corporation,  
(206) 622-5500

MacDraw II, Claris Corporation,  
(408) 727-8227

MORE 3.0, Symantec Corporation,  
(408) 253-9600

PowerPoint, Microsoft Corporation,  
(206) 882-8080

### Databases

4th Dimension, Acius,  
(408) 252-4444

FileMaker Pro, Claris Corporation,  
(408) 727-8227

Filevision, Marvelin Corp.,  
(213) 450-6813

### Spreadsheets

Full Impact, Ashton-Tate, (213) 329-8000

Microsoft Excel, Microsoft Corporation,  
(206) 882-8080

Multiplan, Microsoft Corporation,  
(206) 882-8080

Wingz, Informix Software, (913) 492-3800

### Graphics Programs

Adobe Illustrator, Adobe Software,  
(415) 961-4400

Aldus Freehand, Aldus, (206) 622-5500

FullPaint, Ashton-Tate, (213) 329-8000

MacDraw II, Claris Corporation, (408) 727-8227

MacPaint, Claris Corporation, (408) 727-8227

SuperPaint, Silicon Beach Software,  
(619) 695-6956

### Integrated Applications

Microsoft Works, Microsoft Corporation,  
(206) 882-8080

### Writing Programs (Special-Purpose)

Aspects, Group Technologies, 1-800-476-8781

Conference Writer, Research Design  
Associates, 1-800-654-8715

Electronic English Handbook, Technology  
Training Associates, (617) 497-5030

EndNote Plus, Niles and Associates,  
(415) 655-6666

MacProof, Lexpertise Linguistic Software,  
(801) 350-9100

MAPLE, Brooks/Cole Publishing, (408) 373-0728

MarkUp 2.0, Mainstay, (818) 991-6540

Mathematica, Wolfram Research,  
1-800-441-MATH

OmniPage 2.1, Caere Corp., 1-800-535-7226

Pro-Cite, Personal Bibliographic Software, Inc.,  
(313) 996-1580

PROSE, McGraw-Hill, (212) 512-2000

Tools for Writers, 1-800-346-8385

Webster's Ninth New Collegiate Dictionary  
on CD-ROM, Highlighted Data, (703) 533-1939

### Desktop Publishing Programs

Aldus PageMaker, Aldus Corporation, (206)  
622-5500

QuarkXPress, Quark, Inc., (303) 934-2211

## General Macintosh Publications

### Periodicals

MacUser, Ziff-Davis Publishing Company,  
P.O. Box 56986 Boulder, CO 80321-6986;  
(303) 447-9330

Macworld, P.O. Box 54529 Boulder, CO 80322-  
4529; 1-800-642-9606

The Macintosh Buyer's Guide, Redgate  
Communications Corporation, 660 Beachland  
Boulevard, Vero Beach, FL 32963;  
(407) 231-6904

### Books

The Apple Macintosh Book, Microsoft Press,  
Redmond, WA; (206) 882-8080

Encyclopedia Macintosh, Sybex Books,  
Alameda, CA; (415) 523-8233

Exploring Macintosh, Concepts in Visually  
Oriented Computing, John Wiley and Sons, New  
York, NY; (212) 850-6000

The Macintosh Bible, Goldstein and Blair,  
Berkeley, CA; (415) 524-4000

Using Macintosh Software, D.C. Heath  
Publishers, Lexington, MA; (617) 862-6650

## Basic Tools Manuals from Microsoft Press

One Microsoft Way, Redmond, WA 98052-6399;  
(206) 882-8080

Desktop Publishing by Design

Excel in Business

Microsoft Excel Business Sourcebook

Microsoft Works for the Apple Macintosh

Word 4 Companion

Working with Word

## Academic Computing Periodicals

The Chronicle of Higher Education.

P.O. Box 1955, Marion, OH 43302;  
(202) 466-1000

\$62.50 per year; published weekly

Each issue contains a section titled, "Computer Notes," which lists new software, technology grants, and university computer projects.

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Education Technology, 720 Palisades Avenue,  
Englewood Cliffs, NJ 07632; (201) 871-4007

\$119 per year; published monthly

"The magazine for managers of change in education."

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EDUCOM Review, 1112 12th Street N.W., Suite  
600, Washington, DC 20036; (202) 872-4200

\$40 per year; published quarterly

A service of EDUCOM, a nonprofit consortium that "facilitates introduction, use, and management of information technology...for higher education." The journal discusses computing and communications in colleges and universities.

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Electronic Learning, Scholastic Professional  
Magazines, P.O. Box 3024, South Eastern  
Pennsylvania, PA 19398; 1-800-544-2917

\$23.95 per year; published monthly (8 issues)

While the majority of its contents address K-12 instruction, reviews of new technologies and software, and a column titled "The MacIntosh College Lab," are relevant to instructors in higher education.

Journal of Computers in Mathematics and  
Science Teaching (JCMST), Association for the  
Advancement of Computing in Education (AACE),  
P.O. Box 2966, Charlottesville, VA 22902

\$40 per year; published quarterly

"JCMST is internationally respected as a professional journal of high quality--serving university, junior college, secondary, and elementary educators and academic libraries. JCMST is the only periodical devoted specifically to teaching mathematics and science with computers at all levels."

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Journal of Educational Computing Research,  
Baywood Publishing Co., P.O. Box 337,  
Amityville, NY 11701; (516) 691-1270

\$109 per year; published quarterly

Publishes original, referenced articles on, and critical reviews of, outcome effects, and the design and development of innovative hardware and software. Also serves as a forum for professional dialogue by publishing correspondence, grant listings, research notes, and reviews. Sample article: "Cognitive Asymmetry, Computer Science Students, and Professional Programmers."

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Query, P.O. Box 2716, Sunnyvale, CA 94087;  
(408) 773-0670, Internet: Query@apple.com

Query is a quarterly magazine published for higher education administrators. Coverage includes information on networking and connectivity, profiles of colleges and universities, news, and resources.

SIGCUE Computers in Higher Education,  
ACM Press, P.O. Box 12114, Church Street,  
Station, New York, NY 10257

\$67 per year; published quarterly

A membership publication of SIGCUE (Special Interest Group for Computer Uses in Education).

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Syllabus, P.O. Box 2716, Sunnyvale, CA 94087;  
(408) 773-0670, AppleLink: Syllabus

A bimonthly publication distributed free to professionals involved in the development, integration, and distribution of technology in higher education. Sponsored by Apple Computer, Inc., Syllabus focuses on the Macintosh line of personal computers and related technologies.

Coverage includes authoring and multimedia tools, books, current news, academic and productivity software, distribution issues, and new academic products.

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T.H.E. Journal, (Technological Horizons in Education), 150 El Camino Real, Suite 112, Tustin, CA 92680-3615

\$29 per year; published monthly (8 issues)

Approximately one-third to one-half of the June 1990 issue was devoted to computers in higher education. One article was titled "An introduction to microcomputer applications packages for university faculty." The focus of the issue is faculty development.

## Other Helpful Publications

### Curriculum Guides

Higher Education Marketing, Apple Computer, Inc., MS-36HE, 20525 Mariani Avenue, Cupertino, CA 95014

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### Macintosh, MS-DOS, or Windows?

This study shows how business users compare the operating environments of Apple Macintosh personal computers, MS-DOS systems, and Microsoft Windows-based systems. Two studies were conducted for Apple Computer, Inc. by Diagnostic Research, an independent international research firm. Part No. M0831LL/A.

Higher Education Marketing, Apple Computer, Inc. MS-36HE, 20525 Mariani Avenue, Cupertino, CA 95014

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### EDUCOM Strategy Series

Computing Across the Curriculum: Academic Perspectives presents faculty, curriculum, and institutional perspectives on instructional computing issues in a variety of disciplines, including chemistry, education, English composition, foreign languages, history, mathematics, physics, and psychology.

Organizing and Managing Information Resources on Campus focuses on the perspectives, logistics, and financing associated with computing on campus.

Transforming Teaching with Technology: Perspectives from Two-Year Colleges provides overviews of the role of technology in higher education, the major issues involved, and how several colleges are addressing these issues.

Academic Computing Publications,  
P.O. Box 804 McKinney, TX 75069;  
(214) 548-2101

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Microsoft 101

This free quarterly newsletter profiles the use of Microsoft products in higher education.

Microsoft Corporation, 1 Microsoft Way,  
Redmond, WA 98052-6399

## Organizations

The Annenberg/CPB Project

901 E Street, N.W. Washington, DC 20004;  
(202) 879-9655

This project seeks to increase opportunities in education by supporting the development of course materials that explore the applications of electronic technologies, including broadcast television and radio, video and audio tape, networked or stand-alone computers, and optical discs.

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CAUSE

4840 Pearl East Circle, Suite 302E, Boulder, CO 80301; (303) 449-4430  
e-mail: info@CAUSE.colorado.edu

CAUSE is a nonprofit professional association whose mission is to promote effective planning, management, development, and evaluation of computing and information technologies in colleges and universities, and to help individual member representatives develop as professionals in the field of information technology management in higher education. Incorporated in 1971, the association serves a membership of over 875 campuses and 2,500 individuals.

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EDUCOM

1112 16th St. N.W., Suite 600, Washington, DC 20036; (202) 872-4200

EDUCOM is the premiere organization for members of the academic community who are concerned with the role of computing and technol-

ogy in higher education. It represents approximately 700 major institutions. EDUCOM also conducts the EDUCOM Software Initiative (ESI)--an association of individuals from more than 100 colleges and corporations who are working to improve conditions affecting the use of software in higher education.

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Intellimation

P.O. Box 1922, Santa Barbara, CA 93116-1922; 1-800-346-8355

Intellimation is dedicated to the development, production, and distribution of high quality innovative, educational media. The firm was formed in 1986 to facilitate the integration of technology into the educational publishing market. In 1987, Intellimation became the exclusive distributor of The Annenberg/CPB Collection, academically rigorous, college-level courses that combine video, audio, print and computer software.

In 1990, Intellimation and Apple Computer, Inc. entered a strategic relationship to provide for the coordinated development and distribution of Macintosh software and interactive multimedia to educators and students.

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The National Center for Research to Improve Post-secondary Teaching and Learning (NCRIPTAL)

2400 School of Education Building, University of Michigan, Ann Arbor, MI 48109; (313) 936-2743

NCRIPTAL actively conducts selected research studies, typically in collaboration with colleges and universities, toward the goal of improving undergraduate instruction. These research activities focus on learning, teaching, and technology, and are dedicated to improving the understanding of the potential uses of educational technology in teaching and learning, as well as the conditions under which that technology can be used most effectively. The EDUCOM/NCRIPTAL Higher Education Software Awards program is designed to encourage faculty members to develop software that is educationally sound.

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Association for the Development of Computer-Based Instruction

Miller Hall-409, Western Washington University, Bellingham, WA 98225; (206) 676-2860

This organization focuses on the design and development of automated learning systems.

## Some Campus Macintosh User Groups That Publish Newsletters

Berkeley Macintosh User's Group (BMUG)  
(largest independent Macintosh user's group)  
(415) 549-BMUG

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M.I.T. MacUser's Group  
(200 members)  
Joanne Larrabu (617) 253-8422

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Stanford M.U.G.  
(700 members)  
Perry Gregg (415) 723-7684

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Iowa Computer-Aided Engineering Network  
(1,800 members)  
University of Iowa, Christopher Foman  
(319) 335-5751





Apple Computer, Inc.  
20525 Mariani Avenue Cupertino, CA 95014 (408) 996-1010 TLX: 171-576  
M1171LL/A