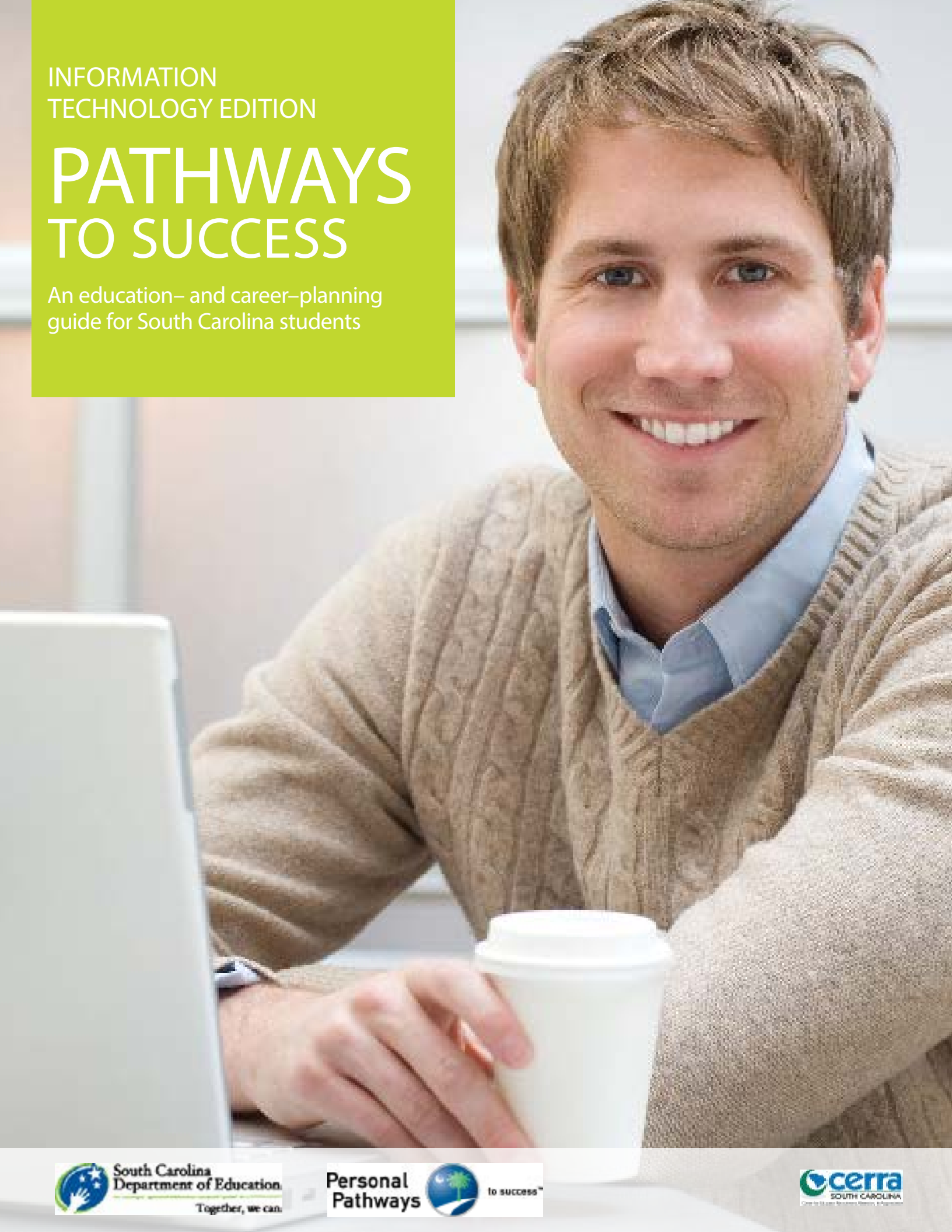INFORMATION
TECHNOLOGY EDITION

PATHWAYS
TO SUCCESS

An education– and career–planning
guide for South Carolina students

South Carolina
Department of Education
Together, we can.

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Pathways to success™

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SOUTH CAROLINA

Log On to the Information Technology Revolution

Information Technology, or IT (pronounced "eye tea"), has transformed the way the world does business, has boosted workers' ability to produce, and even changed the forms of global art and culture. Computers are vitally important to America's present and future prosperity, and the key to our continued leadership in this field is the talented IT specialists who make the "thinking machines" think. If you've got top-notch math skills, a mind that locks onto details, and the creativity to devise solutions to any problem, you could have a future in IT. Read on to find out if this rewarding field is right for you.

Dear South Carolina Student,

"What do you want to be when you grow up?" You've heard it again and again, and if you're like most people in school, you probably feel pretty lost. However, knowing what appeals to you or, better yet, what you want to do, can help you focus on those subjects and activities that will prepare you for the future.

But with so much to think about in life right now, and so many career directions to choose from, choosing a career pathway can be overwhelming. Even worse, what if you were to decide and then change your mind?

How would you like to know more about your options? This guide offers you realistic insight into various career clusters and how they might fit into the way you think and feel.

Pathways to Success can help you get started. It is a series of education- and career-planning guides designed to help you make informed, smart career decisions. You can use this information to eliminate options that aren't attractive, so you can begin focusing on a career direction that is more appealing.

If you change your mind along the way, Pathways to Success can help you redirect your career plans, courses, and extracurricular activities.

In South Carolina, there are 16 career clusters that you can explore. This issue of Pathways to Success introduces you to one of these clusters. The clusters correspond to different fields within the job market (business, healthcare, the arts, agriculture, manufacturing, etc.).

Each issue of Pathways to Success explains what it is like to work in one of the career clusters, what kinds of jobs are available, and what parts of the career cluster are growing fastest. It also spells out the specific ways to prepare yourself for an occupation: majors to choose in high school, what classes to take, opportunities to learn outside of class, and the kind of education and training you can pursue after high school.

Believe it or not, being in school gives you a great chance to explore all of your options. So go for it. Figure out just how you feel about certain subjects. Seek out those things that you feel good about. Then start preparing yourself so you will be able to do the things you like to do "when you grow up."

Contents

Parents, Teachers, and Counselors: This Guide Is for You, Too.

This career cluster guide speaks to students about their education and career paths, but you play a critical role by providing guidance as they plan their futures. Read on and learn more about the Information Technology cluster. Then sit down and talk with your child or a student you are advising. Help craft an Individual Graduation Plan, or IGP, that puts that teen on a personal pathway to success (see "What is an IGP?" on page 6).
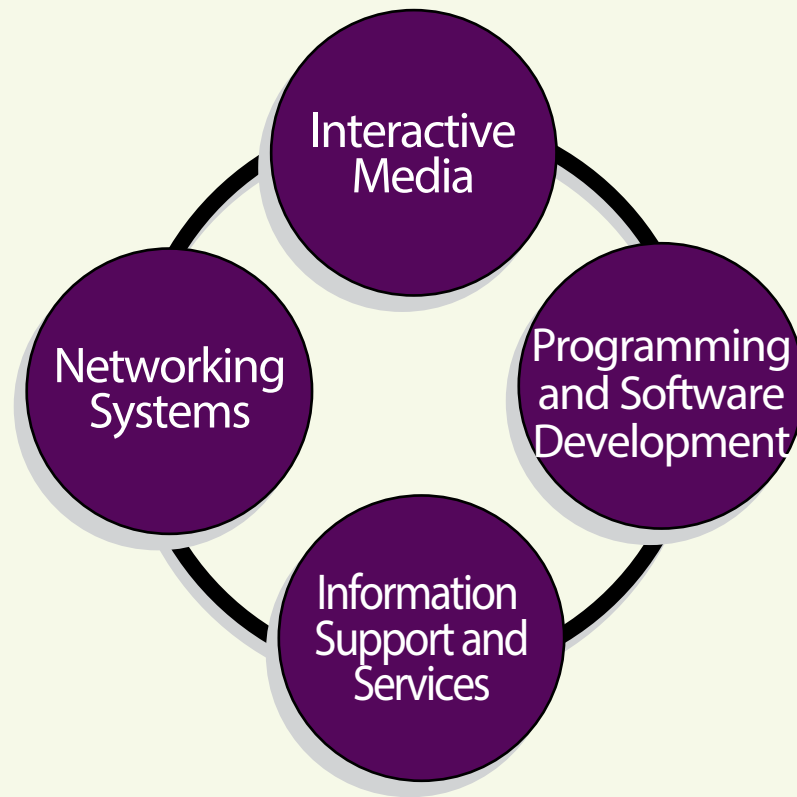
What Are Career Clusters and Majors?

Career clusters help you acquire the knowledge and skills you need to reach your personal career goals. They organize what you learn in school around specific professional fields such as Education and Training or Information Technology. Information Technology, for example, focuses on professions that require highly technical training, while Human Services emphasizes occupations that involve people skills. South Carolina recognizes these 16 career clusters offered at various schools across the state.

- Agriculture, Food, and Natural Resources
- Architecture and Construction
- Arts, A/V Technology, and Communications
- Business, Management, and Administration
- Education and Training
- Finance
- Government and Public Administration
- Health Science
- Hospitality and Tourism
- Human Services
- Information Technology
- Law, Public Safety, Corrections, and Security
- Manufacturing
- Marketing, Sales, and Service
- Science, Technology, Engineering, and Mathematics
- Transportation, Distribution, and Logistics

Majors Clustered Under Information Technology

- Interactive Media
- Programming and Software Development
- Information Support and Services
- Networking Systems

Each cluster consists of career majors, which are based on groups of professions that require similar talents, knowledge, and skills. For example, four majors fall within the Information Technology cluster (see illustration above). Each major provides the required courses, instruction, and experience necessary to move toward employment in specific fields either right after high school or after additional education in college, the military, or elsewhere.

A Model Career Cluster System

Career Awareness (Grades K–5)

Grades K–2
- Students learn about different kinds of work.
- Students are instructed in diversity and gender equity in the workplace.
- Students learn about goal setting and decision making.
- Students learn what it means to be a good worker.

Grades 3–5
- Students use career assessment instruments to identify occupations.
- Students learn about occupations in the various career clusters.
- Students get involved in career guidance classroom activities.

Career Exploration (Grades 6–8)

6th Grade
- Students begin career exploration activities, including identification of learning opportunities in the community.
- Students take career assessment instruments.
- Students identify jobs within the clusters requiring different levels of education.

7th Grade
- Students identify the steps of the career decision-making process.
- Students identify and explore sources of career information.
- Students take career assessment instruments.
- Students explore work-based learning activities including service learning, job shadowing, and mentoring.

8th Grade
- Students pick a cluster of study that they are interested in exploring.
- Students explore work-based learning activities including service learning, job shadowing, and mentoring.
- Students meet with parents, counselors, teachers, guardians, and legal designees to develop both an academic and career portfolio consistent with their academic and career focus.
- Students take career assessment instruments.

Career Preparation (Grades 9–Postsecondary)

9th Grade
- Students may declare majors and focus their elective choices in particular areas.*
- Students review and update their IGPs.
- Students take career assessment instruments.
- Students explore work-based learning activities including service learning, job shadowing, and mentoring.

10th Grade
- Students should declare a career major.*
- Students review and update their IGPs.
- Students take career assessment instruments.
- Students explore work-based learning activities including service learning, job shadowing, and mentoring.

11th Grade
- Students review and update their graduation plans, with particular attention to postsecondary goals.
- Students take career assessment instruments.
- Students explore work-based learning activities including service learning, job shadowing, and mentoring.
- Students may change or modify their career majors.

12th Grade
- Students complete requirements for their majors.
- Students receive recognition for completion of career cluster majors at graduation.
- Students take career assessment instruments.
- Students explore work-based learning activities including service learning, job shadowing, and mentoring.
- Students may change or modify their career majors.

Postsecondary
- Students follow aligned career cluster pathways to a two- or four-year college, the military, other postsecondary education or training, or employment.
- Students obtain rewarding entry-level employment within their chosen clusters.
- Students continue to refine career choices throughout their lifetimes of learning.

* Students are encouraged to review their IGPs and modify or change this focus throughout their secondary school careers with the guidance of educators and parents.

Seven Steps to Success

To make it in IT, you need to assess your abilities, match them with the right occupation, and get the training you need.

Your future career can be fun, or it can make you totally miserable depending on whether you choose one that fits your unique personality, interests, goals, and abilities. Planning to be a nurse, for example, makes no sense if you can't stand the sight of blood. Forget being an engineer if you aren't going to take on advanced math. And if you live to be outdoors, opt out of a profession that keeps you cooped up in an office all day. The truth is, earning a living for about 40 years is a lot more rewarding—financially and otherwise—if you find the profession that fits you perfectly.

The search for your perfect profession starts with creating an Individual Graduation Plan, often called an IGP, to guide you through high school (see "What is an IGP?" on page 6). Every South Carolina student is required to create an IGP, but don't think of it as a hassle. Instead, look at it as a chance to explore your interests and options and to start working toward your personal dream—whether it's to be a movie star or a minister, a CEO or a chef, an entrepreneur, or an engineer.

Here's a step-by-step guide to creating your own Individual Graduation Plan.

■ Step 1: Complete Assessments

Start putting together your IGP by determining your strengths and weaknesses, what you love (or hate) to do with your time, and your hopes and dreams in life. To find the answers to these and other questions, take advantage of career assessment tools such as Holland's Self-Directed Search, ASVAB (Armed Services Vocational Aptitude Battery), and the Kuder Interest Inventory available through your school and online (see "What is an IGP?" on page 6).

■ Step 2: Research Your Career Opportunities

After learning more about yourself, put together a list of careers you might want to resesearch. Get the facts about what each possible profession pays, how many jobs in those professions are available in South Carolina (both now and in the future), and what kind of education you'll need to break into each of them. (For profiles of 25 career options in Information Technology, see page 8). Use the career information resources available through your school's library and the Internet, including SCOIS, O*NET, and COIN (see "Resource Roundup" on page 21). Go beyond the statistics, though, to get the inside story on what those who work in occupations on your list really do every day. Start by contacting professional associations and visiting Web sites, then arrange personal interviews and job shadowing.

▫ Step 3: Explore Your Education Options

Use your list of possible professions to investigate your education options in high school and beyond (see "Keep on Learning" on page 18). Identify both two-year and four-year colleges with programs that best fit your career goals. In the same way, find out about obtaining associates' degrees at two-year technical colleges with programs in Information Technology. Also, research opportunities for Information Technology training in the military. Then look at the clusters, majors, and courses offered in high school as well as special programs such as co-op education and dual-credit courses. Learn about academic requirements and tests you may have to take to graduate and get into college, including PACT, PSAT, PLAN, SAT, ACT, and WorkKeys. Also, explore extracurricular activities (see "Hands-On IT Training" on page 16) related to your list of possible professions, including sports, community service groups, band, clubs, and student organizations such as TSA, SkillsUSA, and FBLA.

▫ Step 4: Talk About Your Options With Parents and Counselors

Assessments and research are essential, but input from your parents (or guardians), counselors, and teachers can also help as you narrow your career and education choices. Talk with them about what you are learning as you are assessed—they can help you further identify your strengths, opportunities, and interests. Tell them about your hopes and dreams. Discuss with them career options five, 10, or 20 years from now. Ask them to help with your research by providing resources or using their contacts to set up career exploration experiences such as job shadowing and internships. Time with your guidance staff person may be limited, so make the most of it. Come in with clear and well-researched ideas about your future, and ask what he or she can do to help you get where you want to go in life.

▫ Step 5: Make Your Choices and Document Your Decisions

Now that you are armed with valuable research and good advice from people you trust, it's time to make some decisions. Ask your counselor what format your IGP should follow—it likely will include most of the information shown in "What is an IGP?" on page 6. Select your career objective, cluster, and major, and write them down on your IGP. Fill in a tentative schedule for your high school years. Add to your plan lists of the out-of-class and work experiences you want to pursue and your goal after high school—college, the military, employment, or another option. It's also smart to create a career portfolio, which is a file of material related to the education and career choices in your IGP. This folder might include items such as a resume, samples of your schoolwork, and research and assessment information. Once you have documented your decisions, save your IGP and career portfolio as your school directs.

▫ Step 6: Review and Revise Your IGP Each Year

A good IGP is frequently updated. It expands and changes as you go through high school. At least once at the end of each year, go back to your IGP and revise it as needed. Ask yourself if your decisions are still sound or if you've changed your mind about your career objective or plans after high school. Be realistic, but don't feel locked in to the choices you made earlier. Switching your cluster or major as you learn more about your interests and options in life is okay. Some direction—even if it changes—is better than no direction at all. Use this annual review of your plan to make choices that are intentional, not accidental, as you grow and change.

▫ Step 7: Graduate and Move On to Additional Education or Employment

The goal of an IGP is to give you a clear path to high school graduation, but that's not the end of your road to success. The plan you created will carry you on to college, the military, an apprenticeship, other education or training, or directly into the job market. You likely will continue to evaluate, research, discuss, and refine your career choices after high school and throughout your life.

What is an IGP?

An Individual Graduation Plan (IGP) is like a road map to your future. If you stay on course, you'll reach your destination—graduation—with all the courses, skills, and experience you need to take your education or career to the next level. Here's what a basic IGP includes:

Information such as your name and school.

Your chosen career cluster is a field of study such as Education and Training or Business, Management, and Administration on which you plan to focus in high school and beyond. South Carolina recognizes 16 career clusters (see page 2), although local schools and districts may offer different clusters. This guide is an introduction to the Information Technology cluster.

Out-of-class learning opportunities you want to pursue, such as student organizations or work experiences.

Your plan for what to do after high school—get an associate's or bachelor's degree, enter the armed forces, seek industry certification, find employment, or pursue other options. Be specific—it's just a goal you can change later if needed.

A grade-nine-through-twelve outline of classes you should take, including core academic classes required for graduation and electives. Fill in the specific classes your school offers.

Your chosen career major, a field such as Interactive Media, in which you plan to work when you enter the job market.

Your school may make this type of basic IGP part of your career portfolio—a file or folder that also may contain such information as results of your career-interest assessments, examples of your schoolwork, your scores from standardized tests, and records of your work experiences.

Are You in Line for an IT Career?

A career in Information Technology can put you in the driver's seat of the new economy.

Of the nationwide forecast of six million total new professional jobs, 957,000, or one in six, are computing. Information Technology (IT) is at the heart of the 21st century economy, and as IT generates the jobs of the future, being ready to grab one of them could be the best career move you can make. Computers enable people to make more products faster, and IT continues to boost productivity. In fact, as technical advances in communications converge with ever smaller, faster, and cheaper computer hardware and software, the revolutionary affects of IT on business and the economy are nowhere close to an end.

IT generates well-paid, quality jobs (see "10 Highest-Paying IT Professions" on page 11), and almost half of U.S. workers will be employed by industries or businesses that use IT intensively (see "10 Fastest-Growing IT Professions" on page 11). The state of South Carolina understands the importance of IT to its economic future and actively recruits high-tech businesses. It is already home to major manufacturing and engineering facilities of high-tech companies, including Pirelli, NCR, Intel, Google, and Alcoa Fujikura. State officials are working closely with the University of South Carolina (USC) Columbia Technology Incubator to encourage local IT start-ups. The USC business incubator provides space and resources to support small high-tech businesses, a number of which were set up by USC student entrepreneurs.

If you fit the IT profile—good at math, a stickler for details, with highly developed analytical skills—you are probably considering this cluster already. If things aren't so clear-cut for you, don't rule out IT, particularly if you're a good communicator and like working on team projects. Ninety-two percent of IT employees work in IT departments of non-IT companies—banks, auto manufacturers, utilities, you name it.

Because IT is embedded in companies across the economy, ordinary business skills are also important for IT success. A student interested in computing should think about what other things interest him or her and, perhaps, plan to apply computing to that area.

Quick Quiz

Answer "yes" or "no" to these questions to see if Information Technology is the right career cluster for you.

1. I can install software on a computer.
2. I am skilled at updating information on a Web site.
3. I am able to visualize how a flat drawing of a house or a store would look as a 3-D object.
4. I can hook-up audio-visual equipment, such as speakers to a stereo or a VCR to a television.
5. I am able to write instructions to teach people to use a computer or other technical equipment.
6. I'd like to write a computer program.

Totals: "Yes" _____ "No" _____

If you answered "yes" to five or more of the questions, then you may have what it takes to make it in Information Technology.
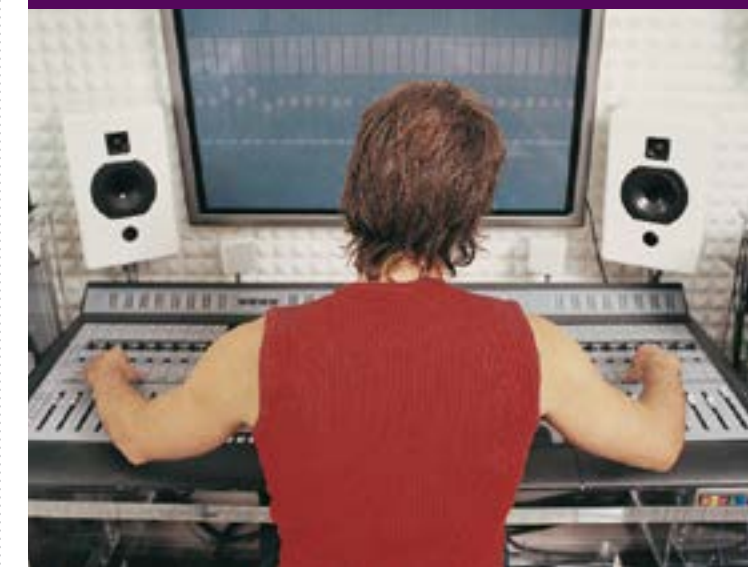
Source: SCOIS (Coin Career) Assessment Tests

25 Career Choices in Information Technology

About This Chart

This chart is a sampling of 25 of the more than 100 occupations that fall within the Information Technology sector of the South Carolina job market. For more information about any Information Technology occupation, check out the South Carolina Occupational Information System (SCOIS). This electronic database is packed with valuable information on careers, colleges, scholarships, and more. SCOIS is available in local schools and at more than 600 other locations throughout South Carolina. Here are explanations for the abbreviations and symbols used in this chart.

Education Requirement Abbreviations

C — 12- or 18-month certificate
AD — Two-year associate's degree
AP — Advanced Placement
BD — Four-year bachelor's degree
HS — High school diploma or GED
MA — Master's degree
NA — Information not available or item does not apply
OJT — On-the-job training
DD — Doctorate degree

Source: www.salary.com

Occupation	SC Salary	Job Growth[1]	Education Required[2]	Career Readiness Certificate Level[3]	Description
Chief Information Security Officer	$113,659	NA	BD	gold	Determines enterprise information security standards.
Enterprise Infrastructure Director	$104,590	NA	BD	gold	Plans and directs administration of the networks and hardware needed to efficiently support organizations' business goals.
E-Commerce Manager	$79,353	NA	BD	silver	Plans and directs the overall policies and goals of organizations' desktop computers and the hardware and software systems that make them work.
Electronic Marketing Manager	$68,843	NA	BD	gold	Oversees an organization's electronic advertising efforts. Responsible for internet, TV, and radio ad design and placement.
IT Project Coordinator	$66,328	NA	BD	gold	Coordinates all IT projects and ensures company resources are utilized appropriately.
Software Designer	$65,150	10.6%	AD, BD	gold	Outlines application programs and then writes the programming code that enables the technical aspects of the program to work properly.
Computer Engineer	$63,700	10.7%	BD, MA	gold	Researches and reports information on the abilities of computers and computer systems and aids in the design of new equipment and systems.
Computer Systems Analyst	$60,470	10.6%	AD, BD	gold	Decides how data is collected, prepared for computers, processed, stored, and made available for users. May design completely new systems.
Computer Programmer	$55,410	12.5%	OJT, AD, BD	gold	Writes step-by-step instructions in special computer languages that tell the computer exactly what it must do to perform a specific task.
IT Postsecondary Instructor	$52,920	17.2%	MA, DD	gold	Conducts higher-level education courses for undergraduate and graduate students and often performs a significant amount of research in IT.
Database Administrator	$51,250	11.9%	BD	gold	Finds ways to efficiently organize and store data, create computer databases, determine user requirements, and test and coordinate changes to databases.
Operations Research Analyst	$50,810	11.4%	BD	gold	Applies scientific and mathematical principles to organizational problems so that managers can evaluate and choose the best course of action.
Network Administrator	$50,021	NA	BD	gold	Installs, configures, and maintains organizations' computer networks.
Web Site Designer	$48,350	11.3%	BD	silver	Designs and constructs Web pages and sites.
Technical Writer	$47,410	8.1%	OJT, AP, AD, BD	gold	Writes repair manuals, catalogs, parts lists, operating instructions, sales promotional materials, and technical reports pertaining to information technology.
Director/Producer	$47,270	17.9%	OJT, AP	gold	Guides and controls all aspects of a dramatic or entertainment production.
Writer and Editor	$45,810	15.6%	BD	gold	Develops fiction and nonfiction prose for publications, media, and advertisements; proofreads the work of writers to meet certain specifications.
Market Research Analyst	$45,600	12.5%	BD	gold	Collects data and information that will assist companies in decision making regarding their products and services.
Technical Trainer	$45,367	NA	BD	silver	Organizes, writes, and conducts technical training programs.
Electronics Technician	$44,640	8.3%	HS, AD, AP	gold	Designs and creates electronic equipment and machines using plans drawn by engineers.
IT Secondary School Teacher	$43,462	17.2%	BD, MA	gold	Instructs junior and senior high students in Information Technology.
Statistician	$41,560	NA	BD, MA	gold	Collects, arranges, analyzes, interprets, and presents numerical data in applied or mathematical areas.
Help Desk Support	$35,346	NA	AD	silver	Identifies, researches, and resolves technical problems experienced by end users of computer systems.
Graphic Designer	$34,300	9.4%	AD, BD	gold	Uses many different methods and materials to communicate ideas, thoughts, and feelings through art.
Computer Maintenance Technician	$33,667	NA	OJT, AD	gold	Arranges and maintains the successful transmission and reception of digital information over distance.

1 The expected percentage increase or decline in the number of positions in the profession in South Carolina through 2008.
2 The minimum educational attainment required to enter the profession; occupations may have different entry-level jobs for those with different degrees.

3 The South Carolina Career Readiness Certificate demonstrates to employers that you have the skills necessary to be successful in your chosen occupation. For more information on the CRC in South Carolina go to www.WorkReadySC.org.

Your IT Future Is Wide Open

Build on the Basics

If you want to make it in the world of work, you've got to master the academic fundamentals. Here's how the basics support success in IT.

• **Math:** The IT revolution is all about numbers. Computers store and process unprecedented volumes of information by first converting it to numbers. If you understand numbers, you can handle IT.

• **English:** The central role IT has taken in business means IT experts must relate just as well to people as they do to machines. To make it in a large organization, you have to know how to communicate.

• **Science:** Studying science puts you in an IT state of mind. Master the scientific method and you've mastered the kind of analytical thinking that is essential for IT success.

• **Humanities:** To thrive in today's IT environment, you must understand the world both on and off the computer screen. Social studies, history, and modern or classical languages connect you with the larger world and give you the edge you need to prosper in a competitive business economy.

• **Arts:** If you can imagine it, you can create it in computing. Let your creative juices flow by fulfilling four-year colleges' and universities' arts requirements for admission.

Launch your journey to a career in IT with a solid academic plan. Computing is a horizontal discipline. Computers are everywhere these days and computing can be applied to virtually any other area of study. Start your career by taking a look at the "Career Major Maps" beginning on page 12 to find out what high school course work might prepare you for a career in Information Technology. Different jobs in this cluster require different skills and training, so you need to examine the options to see what fits you best. If you feel IT is right for you, you should pick a high school career major within the IT cluster (See "What Are Career Clusters and Majors?" on page 2). These majors represent both the education you'll pursue in and out of the classroom and the actual career options available to you in the workforce.

The designated cluster majors sort out your career and education options, and that helps make planning easy. They organize the choices available in ways that clarify how one pathway differs from the next. Information Technology, for example, is divided into four different majors:

• Information Support and Services (page 12)
• Programming and Software Development (page 13)
• Interactive Media (page 14)
• Networking Systems (page 15)

Each of these four majors corresponds to different sets of IT jobs in South Carolina.* If you choose an Information Support and Services major, you could follow that pathway into an associate's degree program in Technical Support, then progress to a bachelor of science degree program in Information Science at a four-year college. Landing a job as a technical support engineer after graduation is your final step. Generally, you need to take four electives in your major area to graduate with a high school major. Look over the Career Major Maps for descriptions of what it takes to work in the four major IT areas and study the sample high school schedules for each major on the pages that follow. The maps also include information about extracurricular activities, options after high school, and jobs for which each major might prepare you. If you find that the path you're on is wrong for you, don't worry. You're trying to find the right path, and you'll have opportunities to review and change your choices along the way.

*Local South Carolina schools and districts may offer fewer career clusters and majors, clusters and majors that are organized differently, or clusters and majors with alternative names.

Inside IT Majors

Read the information at right to find out more about the different IT career destinations—what different jobs are like and what skills you need to do them. Then look over the career major maps beginning on the next page; they'll show you how to get where you want to go.

n Information Support and Services
Workers in information support and services are IT troubleshooters and trainers, as well as organizers of computerized business processes. Their job is to help organizations make the best use of technology. People who troubleshoot users' problems with their computers must
• understand technology from the user's perspective,
• be skilled problem solvers,
• know how to ask the right questions and listen closely to the answers, and
• be patient.

n Programming and Software Development
Programmers use computer languages such as C++, Java, and Visual Basic to write instructions, or code, that tell the computer how to do a particular task. Programmers interview computer users to determine their needs, write the code, test the program for bugs, and debug it so it works as it should. Computer programmers must
• be sticklers for detail,
• work well with clients and end users,
• be masters of computer code and apply it consistently, and
• analyze problems accurately and create effective solutions.

n Interactive Media
Media specialists work as a team to create Web sites, computer games, and the look and feel of the various software applications. To work in Interactive Media, you must
• be able to put words, art, and technology together to communicate with an audience,
• work well with a team of coworkers with different skills, and
• keep up with the latest software used to produce the most engaging images and interfaces for interactive products.

n Network Systems
A quarter of all employees in IT work with computer networks, sets of computers linked together that allow the sharing of information across an organization. To set up these networks and keep them running smoothly, network administrators must
• be detail oriented but able to analyze the effects of local problems on the entire network,
• be ready to react quickly when the network goes down, and
• apply the latest advances in hardware and applications to the maintenance and improvement of the network.

Source: Adapted from the National Workforce Center for Emerging Technology's CyberCareers Web site (www.cybercareers.org/students/central)

When you plan a trip, you need to know two things: how to get where you're going and what it will be like once you do.

10 Fastest-Growing IT Professions

	Occupation	Job Growth
1.	Director/Producer	17.9%
2.	Writer and Editor	15.6%
3.	Computer Programmer	12.5%
4.	Database Administrator	11.9%
5.	Web Site Designer	11.3%
6.	Computer Engineer	10.7%
7.	Software Designer	10.6%
8.	Computer Systems Analyst	10.6%
9.	Graphic Designer	9.4%
10.	Technical Writer	8.1%

Based on expected growth in percentage of jobs available between 2001 and 2008 in South Carolina. Source: SCOIS

10 Highest-Paying IT Professions

	Occupation	Salary
1.	Software Designer	$65,150
2.	Computer Engineer	$63,700
3.	Computer Systems Analyst	$60,470
4.	Computer Programmer	$55,410
5.	Database Administrator	$51,250
6.	Web Site Designer	$48,350
7.	Technical Writer	$47,410
8.	Director/Producer	$47,270
9.	Writer and Editor	$45,810
10.	Graphic Designer	$34,300

Based on annual mean salary in South Carolina. Source: SCOIS

Career Major Map: Information Support and Services

Information Support and Services employees are involved in putting information technology to work for users. Their jobs include designing and building databases of information, providing technical assistance to keep computer systems running smoothly, and finding ways to use computer systems to make enterprise systems—an organization's everyday business operations—run more efficiently.

Required Core for Graduation	Sample Core Choices For additional college entrance requirements, refer to the college of your choice.			
	9	10	11	12
English* Four Units Required	English 1	English 2	English 3	English 4
Math* Four Units Required	Algebra 1 or Math for the Technologies 1	Geometry or Math for the Technologies 2	Algebra 2 or Math for the Technologies 3	Pre-Calculus or Math for the Technologies 4
Science* Four Units Required	Physical Science	Biology or Applied Biology	Chemistry or Chemistry for the Technologies	Physics or Physics for the Technologies
Social Studies Three Units Required	Global Studies 1 or World Geography	Global Studies 2 or Social Studies Elective or World History	U.S. History	Economics/Government
Additional State Requirements	Physical Education or JROTC (one unit) Computer Science (one unit) Electives (seven units)		Pass High School Assessment CTE or Modern or Classical Language (one unit) Art (one unit)	

Courses for Major (Minimum of four credits required)	Complementary Course Work	Extended Learning Opportunity Options Related to Major
Computer Service Technology 1 and 2 Plus two or more of the following: Computer Service Technology 3 and 4 Computer Programming 1, 2, 3, 4 Electronics Home Systems Technology Information Technology Foundations Integrated Business Applications 1 and 2 Networking 1, 2, 3, 4 AP Computer Science Work-Based Credit (Support Services)	Animated Computer Production Computer Applications 1 and 2 Digital Input Technologies Desktop Publishing Digital Imaging 1 and 2 E-Commerce Multimedia Modern or Classical Language	Career Mentoring Shadowing Internship Cooperative Education Senior Project

Professional Opportunities Upon Graduation		
High School Diploma Computer Technician Cabling Installer Computer Hardware Salesperson	Additional Training to 2-year Degree Help Desk Support Specialist Technical Writer Computer Hardware Specialist	4-year Degree & Higher Technical Support Engineer Hardware Design Engineer Enterprise Systems Engineer

*Course selection will depend on satisfying prerequisites.

Career Major Map: Programming and Software Development

Employees in Programming and Software Development design and deploy computer systems and software. Programming and software engineers write the instructions that tell computers how to carry out the multitude of tasks they perform that make them essential to modern living.

Required Core for Graduation	Sample Core Choices For additional college entrance requirements, refer to the college of your choice.			
	9	10	11	12
English* Four Units Required	English 1	English 2	English 3	English 4
Math* Four Units Required	Algebra 1 or Math for the Technologies 1	Geometry or Math for the Technologies 2	Algebra 2 or Math for the Technologies 3	Pre-Calculus or Math for the Technologies 4
Science* Four Units Required	Physical Science	Biology or Applied Biology	Chemistry or Chemistry for the Technologies	Physics or Physics for the Technologies
Social Studies Three Units Required	Global Studies 1 or World Geography	Global Studies 2 or Social Studies Elective or World History	U.S. History	Economics/Government
Additional State Requirements	Physical Education or JROTC (one unit) Computer Science (one unit) Electives (seven units)		Pass High School Assessment CTE or Modern or Classical Language (one unit) Art (one unit)	

Courses for Major (Minimum of four credits required)	Complementary Course Work	Extended Learning Opportunity Options Related to Major
Computer Programming 1 and 2 or Oracle Management SQL Oracle Management PL/SQL Plus two or more of the following: Animated Computer Production Computer Programming 3 and 4 Information Technology Foundations Web Page Design and Development 1 and 2 Work-Based Credit (Programming) AP Computer Science	Computer Applications 1 and 2 Digital Input Technologies Desktop Publishing Digital Imaging 1 and 2 E-Commerce Integrated Business Applications 1 and 2 Multimedia Modern or Classical Language	Career Mentoring Shadowing Internship Cooperative Education Senior Project

Professional Opportunities Upon Graduation		
High School Diploma PC Support Specialist Technical Support Specialist Web Site Maintenance Specialist	Additional Training to 2-year Degree Computer Programmer Software Applications Manager Help Desk Specialist Systems Analyst	4-year Degree & Higher Computer Software Engineer Gaming Programmer Software Applications Architect Operating Systems Engineer

*Course selection will depend on satisfying prerequisites.

Career Major Map: Interactive Media

Workers in Interactive Media create products that use a variety of media—sound and graphics, computer-generated animation, and video—to communicate to their audience. The computer, unlike a TV set, allows the audience to interact with the material, choosing what to look at and how to view it, and even exchanging messages with the sponsor of the material. Digital media (for example, the World Wide Web, CD-ROMs, and DVDs) are used by different organizations to market products, train employees, and communicate with the public.

Required Core for Graduation	Sample Core Choices For additional college entrance requirements, refer to the college of your choice.			
	9	10	11	12
English* Four Units Required	English 1	English 2	English 3	English 4
Math* Four Units Required	Algebra 1 or MathfortheTechnologies1	Geometry or MathfortheTechnologies2	Algebra 2 or MathfortheTechnologies3	Pre-Calculus or MathfortheTechnologies4
Science* Four Units Required	Physical Science	Biology or Applied Biology	Chemistry or Chemistry for the Technologies	Physics or Physics for the Technologies
Social Studies Three Units Required	Global Studies 1 or World Geography	Global Studies 2 or Social Studies Elective or World History	U.S. History	Economics/Government
Additional State Requirements	Physical Education or JROTC (one unit) Computer Science (one unit) Electives (seven units)		Pass High School Assessment CTE or Modern or Classical Language (one unit) Art (one unit)	

Courses for Major (Minimum of four credits required)	Complementary Course Work	Extended Learning Opportunity Options Related to Major
Animated Computer Production Digital Imaging 1 Plus two or more of the following: Desktop Publishing Digital Imaging Graphic Communications Integrated Business Applications 1 and 2 Information Technology Foundations Multimedia Web Page Design and Development 1 and 2 Work-Based Credit (Interactive Media)	Art 1, 2, 3, 4 AP Studio Art: Two-Dimensional Design AP Studio Art: Three-Dimensional Design AP Studio Art: Drawing AP Computer Science Computer Programming 1, 2, 3, 4 Digital Input Technologies Home Systems Technology IB Visual Arts A and B Digital Art and Design Modern or Classical Language	Career Mentoring Shadowing Internship Cooperative Education Senior Project

Professional Opportunities Upon Graduation		
High School Diploma Web Site Maintenance Specialist Multimedia Specialist Desktop Publishing Specialist Web Page Developer	Additional Training to 2-year Degree Web Designer Graphic Artist Interactive Media Specialist	4-year Degree & Higher Webmaster 3D Animator Virtual Reality Specialist Graphic Designer

*Course selection will depend on satisfying prerequisites.

Career Major Map: Networking Systems

Workers in Networking Systems design and manage sets of computers called networks that are connected to each other or to one main computer. An organization's computer network enables the sharing of information across the organization. Workers in Networking Systems develop and install network software, operating systems, and hardware.

Required Core for Graduation	Sample Core Choices For additional college entrance requirements, refer to the college of your choice.			
	9	10	11	12
English* Four Units Required	English 1	English 2	English 3	English 4
Math* Four Units Required	Algebra 1 or MathfortheTechnologies1	Geometry or MathfortheTechnologies2	Algebra 2 or MathfortheTechnologies3	Pre-Calculus or MathfortheTechnologies4
Science* Four Units Required	Physical Science	Biology or Applied Biology	Chemistry or Chemistry for the Technologies	Physics or Physics for the Technologies
Social Studies Three Units Required	Global Studies 1 or World Geography	Global Studies 2 or Social Studies Elective or World History	U.S. History	Economics/Government
Additional State Requirements	Physical Education or JROTC (one unit) Computer Science (one unit) Electives (seven units)		Pass High School Assessment CTE or Modern or Classical Language (one unit) Art (one unit)	

Courses for Major (Minimum of four credits required)	Complementary Course Work	Extended Learning Opportunity Options Related to Major
Networking 1 and 2 Plus two or more of the following: Computer Service Technology 1, 2, 3, 4 Core Electronics Home Systems Technology Information Technology Foundations Networking 3 and 4 Work-Based Credit (Networking)	Computer Applications 1 and 2 Computer Programming 1, 2, 3, 4 Integrated Business Applications 1 and 2 Oracle SQL and PL/SQL AP Computer Science Modern or Classical Language	Career Mentoring Shadowing Internship Cooperative Education Senior Project

Professional Opportunities Upon Graduation		
High School Diploma Routing Specialist Networking Specialist Electronic Sales Representative	Additional Training to 2-year Degree Telecommunications Manager LAN Administrator Network Technician	4-year Degree & Higher Telecommunications Engineer Network Administrator Network Information Systems Engineer Systems Analyst

*Course selection will depend on satisfying prerequisites.

Hands-On IT Training

Get the practical experience now that you need for IT success.

Banking on Practical Experience

A complete IT education combines study both in and out of the classroom. Learning from real-life experience lets you do the following:

• see how IT serves companies' business needs,

• earn a paycheck,

• practice communication skills and work as part of a larger business team,

• judge which IT careers might suit you best,

• adjust your IGP to reflect where you want your career to go,

• make contacts with employers and possible mentors,

• pick up technical and workplace skills that employers want,

• beef up your resume, and

• jump-start your career or college education.

In IT, on-the-job experience is money in the bank. The single most important factor in IT hiring decisions, according to a recent survey conducted by the Information Technology Association of America, is past work experience. IT hiring managers ranked informal training on-the-job on a par with a four-year college education as the best way to get the skills one needs for success.

What many students don't realize is that real-world, on-the-job learning can and should be a big part of high school education. Classroom instruction is the natural basis for a lifetime of work, but the real payoff in education comes when you learn to put your classroom education to practical use. The best time to begin your hands-on preparation for a future career in information technology or any other field is now.

n Get Down to Business

Ask your teachers and guidance counselor about in-school activities that might lead to out-of-school IT experiences. A good place to begin is with a student organization such as Future Business Leaders of America (FBLA) that has connections with advisors from the local business community (see "IT Business Organizations" on page 17).

Most IT jobs are with non-IT companies, and the same goes for out-of-classroom learning experiences. The contacts you're looking for will be with banks, insurance companies, hospitals, and community groups. One natural place to get in touch with local businesses is through business student groups at your high school.

Try to set up job shadowing opportunities with workers in IT. Job shadowing lets students look over the shoulders of real people as they negotiate their way through a day on the job. Just observing what a tech support person or a programmer has to do in the course of a day can help you decide if his or her job might be right for you. Each February, more than a million middle and high school students investigate career possibilities by taking part in national Groundhog Job Shadow Day; make it a point to get involved.

n Find a Mentor

Job shadowing can put you in touch with professionals willing to serve as mentors. While job shadowing lasts only a day, mentoring is a long-term relationship with an experienced professional. Typically, you will work with a mentor as you train on the job as an intern. A mentor is a person you can go to for advice and support as your on-the-job education unfolds.

Having a mentor is like giving your career a personal trainer. You have access to someone who knows how business and IT work and who is willing to talk about the pitfalls, opportunities, and rewards of the working world. Like a talented coach, a mentor can help you develop both the technical skills you need to do the job on a day-to-day basis and the personal qualities that contribute to success in working life over the long haul.

n On the Job

Real-life experience in a working business can assume different forms. Cooperative learning arrangements coordinate classroom instruction with related work in business. Internships are working experiences that are independent of learning in the classroom. Both put you in the thick of the action for extended periods of time, typically three or four hours each day for the course of a semester or full-time in the case of a summer internship.

Internships can be paid or unpaid, but most students find the opportunity to work in a real-life setting invaluable in itself. To track down these opportunities, enlist the aid of everyone you know in your community—your parents or guardians, teachers, guidance counselor, principal, clergy, or friends of the family.

Information Technology employers tend to pick interns with broad interests not limited to computers. For example, Microsoft reports that they look for interns who

• have good grades, but not necessarily the best grades;
• are involved in extracurricular activities such as sports and school clubs;
• have a passion for learning;
• have good basic academic skills in all areas; and
• communicate well.

Once you find an on-the-job learning opportunity, make the most of it. If you're working with a mentor in the company, meet regularly with him or her to keep the relationship going. Since your time on the job is limited, try to concentrate on one or two particular projects. By all means, give every assignment, even the most menial, your best shot. Quality counts in small tasks as well as large, and you'll be surprised how long the impressions that you make in the workplace can follow you through your career.

Make sure while you're working that you get the information you need to plan your career. The more you find out about the work you're doing, the better equipped you'll be to decide if, in the long run, this is the job for you.

IT Business Organizations

One of the key lessons IT students need to learn as they begin their careers is how to thrive in the world of business. Analytically focused IT students can find the political nuances and public relations spins of the business world unsettling. Luckily, two high school organizations provide IT students with the perfect opportunity to adapt to the business world and display their technical prowess in state and national competitions, as well. Here's what these student groups have to offer.

• Future Business Leaders of America (FBLA) – FBLA gives some 240,000 students the chance to practice leadership, organizational, fund-raising, resource-management, and community-service skills as they prepare to participate in state and national competitions. The varied business-skill events at conferences in which the students compete are the centerpieces of the FBLA program. Because of the importance of Information Technology to modern business, IT students are welcome in the organization. IT events, including Web site development, C++ programming, computer applications, computer concepts, desktop publishing, Java programming, Visual Basic programming, and network design play an important part in FBLA competitions. www.fbla-pbl.com

• SkillsUSA – The annual competitions of this career-oriented student organization include a number of science and engineering events, while the activities of its individual chapters help students develop teamwork and networking skills. SkillsUSA serves high school and college students nationwide. The emphasis in SkillsUSA is on career development, but technical competitions are so broad in scope that there is plenty of opportunity to apply your technical knowledge. Choose from events in precision machining technology, robotics, total quality management, and "mechatronics," the industrial discipline integrating pneumatic, electronic, mechanical, and automated systems. www.skillsusa.org

Keep on Learning

In the rapidly changing IT employment market, a strategy of lifelong learning is the key to job secrutiy.

College Connections

Every South Carolina two- and four-year college has a Web site that includes information about admission requirements, majors, fees, financial aid, internships, and scholarship opportunities.

You can find the Web site for any South Carolina public, private, or technical college through one of these sites:

• South Carolina Public Colleges/Universities
  www.state.sc.us/edu/univcoll.html

• South Carolina Technical Colleges
  www.scteched.tec.sc.us

• South Carolina Independent Colleges/Universities
  www.scicu.org

The trick to preparing for work in a rapidly changing industry such as IT is to get the skills that will be in demand five years from now, not the skills that are needed today.

No sector plays as central a role in the modern economy as IT, none offers better employment prospects in the long term, but few undergo quite as much change over time. Experts in the IT job market say workers with the broadest set of skills will be best prepared for the constantly changing IT scene. Nine out of 10 IT jobs are with non-IT businesses. If you can show you not only understand the technology, but how it affects the larger business picture of profit, loss, and competitive advantage, your prospects will be that much brighter. While you may love computers for their own sake, in career terms it helps to think of IT more as a tool to get things done in business, and plan your future accordingly. In a field where advances in technology change everything overnight, a dedication to lifelong learning is the best way to ensure that your skills remain up to date.

n IT Certifications

Obtaining certifications in particular IT skills and technologies is one way to increase your employability. Major IT corporations such as Microsoft, Cisco, and Oracle offer training and certification in the use of their software and other products through courses in high schools, two- and four-year colleges, private training centers, and online. A list of certifications on a resume gives employers a quick summary of your IT skills. Recent hiring surveys conducted by the Information Technology Association of America found that certifications remain very important to employers. Accordingly, certification in the C++ programming language is the skill most in demand. While certifications are not as expensive as a four-year college degree, most of them do have to be renewed periodically. Also, few certification programs provide the big-picture perspective you need to manage IT in the business world. For that, you need broader education at the college level.

n Step One

South Carolina's two- and four-year colleges offer complete IT training. All of the state's first-rate two-year technical colleges offer certifications and associate's degrees in Network Systems and Programming and Software Development. Various partnerships among the state's two- and four-year colleges can make it easy to get the training you need.

Midlands Technical College in Columbia is part of such an arrangement with the University of South Carolina (USC) and secondary school districts. The partnership sets up a pathway leading directly from

high school course work to a bachelor's degree in administrative information management at USC. The courses earn dual credit, or simultaneous units, toward Midlands' associate's degree in computer technology, which students can then transfer in to the USC bachelor's degree program. Four-year colleges across the state, including USC and Clemson, feature math-and research-oriented bachelor's degree programs in computer science, in addition to more practical, application-oriented degree programs in computer engineering. Another USC-Midlands partnership actually helps student entrepreneurs from both schools launch IT businesses at the USC Columbia Technology Business Incubator.

n Military Options

Because of the military's special technical needs, its training programs can be among the best available in particular fields. For example, the Community College of the Air Force (CCAF), the largest technical college in the country, offers more than 50 state-of-the-art courses in avionics, the electronic systems developed for use in aerospace navigation. Servicemen and servicewomen in the Navy, Coast Guard, and Marines are eligible for on-the-job IT training through the United Services Military Apprenticeship Program. Workers register their hours on the job and receive 144 hours of related classroom training for each year of apprenticeship. Upon completion of work and classroom requirements, they receive certifications from the U.S. Department of Labor that they can use in civilian industry. Learn more about training options in the service at www.usace.army.mil (U.S. Army Corps of Engineers), www.goarmy.com (Army), www.navy.com (Navy), www.uscg.mil (Coast Guard), www.airforce.com (Air Force), and www.marines.com (Marines).

Paying Your Way

When it comes to financing your education, you should proceed with the idea that, one way or another, money will be found to pay for it. Make a thorough inventory of your background and capabilities and uncover every program that might help students with your goals and interests. In South Carolina, you should be able to find the aid you need.

Residents of South Carolina are eligible for state-specific scholarships—including LIFE Scholarships, Palmetto Fellow Scholarships, and the South Carolina HOPE Scholarship—financed by the South Carolina Education Lottery and other sources.

Sources of funding for IT education range from corporations such as Microsoft, which targets scholarship money to increase the numbers of women and African Americans in IT, to the U.S. military, which pours millions of dollars into education as part of its recruiting efforts, and which specifically funds training to support the technical aspects of its mission. The Reserve Officer Training Corps (ROTC), active on college campuses across South Carolina, pays students to go to school in return for military service in the officer corps after graduation.

To track down financial aid, go to the Internet. Most aid programs have their own Web sites, and financial aid database sites can find aid programs that fit your qualifications with remarkable accuracy. At www.finaid.com, students can search for grants, loans, and military opportunities for specific IT majors. At www.scholarships.com, search categories can pinpoint funds by your location, cultural heritage, income, grade point average, religious affiliation, and more.

To apply for the aid from the billions of dollars distributed by the federal government each year, you must submit a Free Application for Federal Student Aid (FAFSA). You can obtain FAFSA from your guidance office or through the U.S. Department of Education's Web site at www.fafsa.ed.gov.

Resources

Core Requirements for Graduation

High School Graduation

Subjects	Units Required
English/Language Arts	4
Mathematics	4
Science	3
U.S. History and Constitution	1
Economics	0.5
U.S. Government	0.5
Other Social Studies	1
Physical Education or Junior ROTC	1
Computer Science	1
Modern or Classical Language or Career and Technology Education	1
Electives	7
Total *	24

* Must pass the exit examination.

State Certificate

Subjects	Units Required
English/Language Arts	4
Mathematics	4
Science	3
U.S. History and Constitution	1
Economics	0.5
U.S. Government	0.5
Other Social Studies	1
Physical Education or Junior ROTC	1
Computer Science	1
Modern or Classical Language or Career and Technology Education	1
Electives	7
Total *	24

* Must have failed to meet the standard on all subtests of the exit examination.

College Entrance

Subjects	Units Required
English/Language Arts	4
Grammar and Composition	2
English Literature	1
American Literature	1
Mathematics	4
Algebra 1 and 2	2
Geometry	1
Pre-Calculus	1
Modern or Classical Language	2
Laboratory Science Biology, Chemistry, or Physics	3
Social Sciences U.S. History, Economics, and Government	3
Electives	1
Physical Education/ROTC	1
Arts	1
Total	19

The South Carolina Department of Education does not discriminate on the basis of race, color, religion, national origin, age, sex, or disability in admission to, treatment in, or employment in its programs and activities. Inquiries regarding the nondiscrimination policies should be made to the Employee Relations Manager, 1429 Senate Street, Columbia, South Carolina 29201, (803-734-8781). For further information on federal nondiscrimination regulations, including Title IX, contact the Assistant Secretary for Civil Rights at OCR.DC@ed.gov or call 1-800-421-3481.

Resource Roundup

Click your way to more career, educational, and scholarship resources by using the Internet. Here are some useful Web sites to get you started:

Information Technology Web Sites
• Cisco Systems Training and Events, www.cisco.com/en/US/learning
• Computing Technology Industry Association's TechCareer Compass, tcc.comptia.org
• CyberCareers for the Net Generation, www.cybercareers.org/students/central
• High Technology Careers Magazine (Web Edition), www.hightechcareers.com
• Information Technology Association of America, www.itaa.org
• Microsoft Training and Certification, www.microsoft.com/traincert
• Telecommunications Industry Association, www.tiaonline.org

Search the Internet for other professional organizations related to Information Technology careers.

Education and Career Planning Web Sites

Inside South Carolina
• Career Guidance Model, www.careerguidancemodel.org
• South Carolina Chamber of Commerce, www.scchamber.net
• South Carolina Commission on Higher Education, www.che400.state.sc.us
• South Carolina Employment Security Commission, www.sces.org
• South Carolina Higher Education Tuition Grants Commission, www.sctuitiongrants.com
• South Carolina Independent Colleges and Universities, www.scicu.org
• South Carolina Occupational Information System, www.scois.net
• South Carolina Public Colleges and Universities, www.state.sc.us/edu/univcoll.html
• South Carolina Technical College System, www.sctechsystem.com
• WorkKeys, www.workreadysc.org

Outside South Carolina
• America's Career Resource Network Association, www.acrna.net
• Career Communications, Inc., www.carcom.com
• Armed Services Vocational Aptitude Battery (ASVAB), www.todaysmilitary.com/app/tm/nextsteps/asvab
• Career Interests Game, career.missouri.edu/students/explore/thecareerinterestsgame.php
• Career Key, www.careerkey.org
• Coin Career College System, community.coin3.com
• College Board, www.collegeboard.com
• Holland's Self-Directed Search, www.self-directed-search.com
• Kuder, www.sc.kuder.com
• Mapping Your Future, www.mapping-your-future.org
• National Career Development Association, www.ncda.org
• O*NET Online, online.onetcenter.org
• Occupational Outlook Handbook, www.bls.gov/oco
• The Princeton Review, www.review.com
• Salary Information, www.salary.com

* Web site addresses were correct at time of publication but may have changed. If an address is no longer valid, please use an Internet search engine to locate the resource.

Note: Local South Carolina schools and districts may choose to use fewer career clusters, clusters that are organized differently, or clusters with alternative names.

Use these sources to learn more about planning an IT education and career.

Career Guidance Information Sources

Check out these comprehensive sources of career and education information, which are available through your school or public libraries:

SCOIS (South Carolina Occupational Information System)— www.scois.net. An electronic database of information about careers, salaries, job requirements, educational options, scholarships, and more.

O*NET (Occupational Information Network)— online.onetcenter.org. A national occupational information database that helps students make informed decisions about education, training, career choices, and work.

COIN (Coin Career Guidance System)— community.coin3.com. A comprehensive software program with career and college planning information, especially for South Carolina students.

Workkeys— www.workreadysc.org. A comprehensive resource for information about the South Carolina Career Readiness Certificate – how and where to qualify, as well as its value to students and the community.

Kuder— sc.kuder.com. A comprehensive online college and career planning system with links to government and educational information and organizations.