



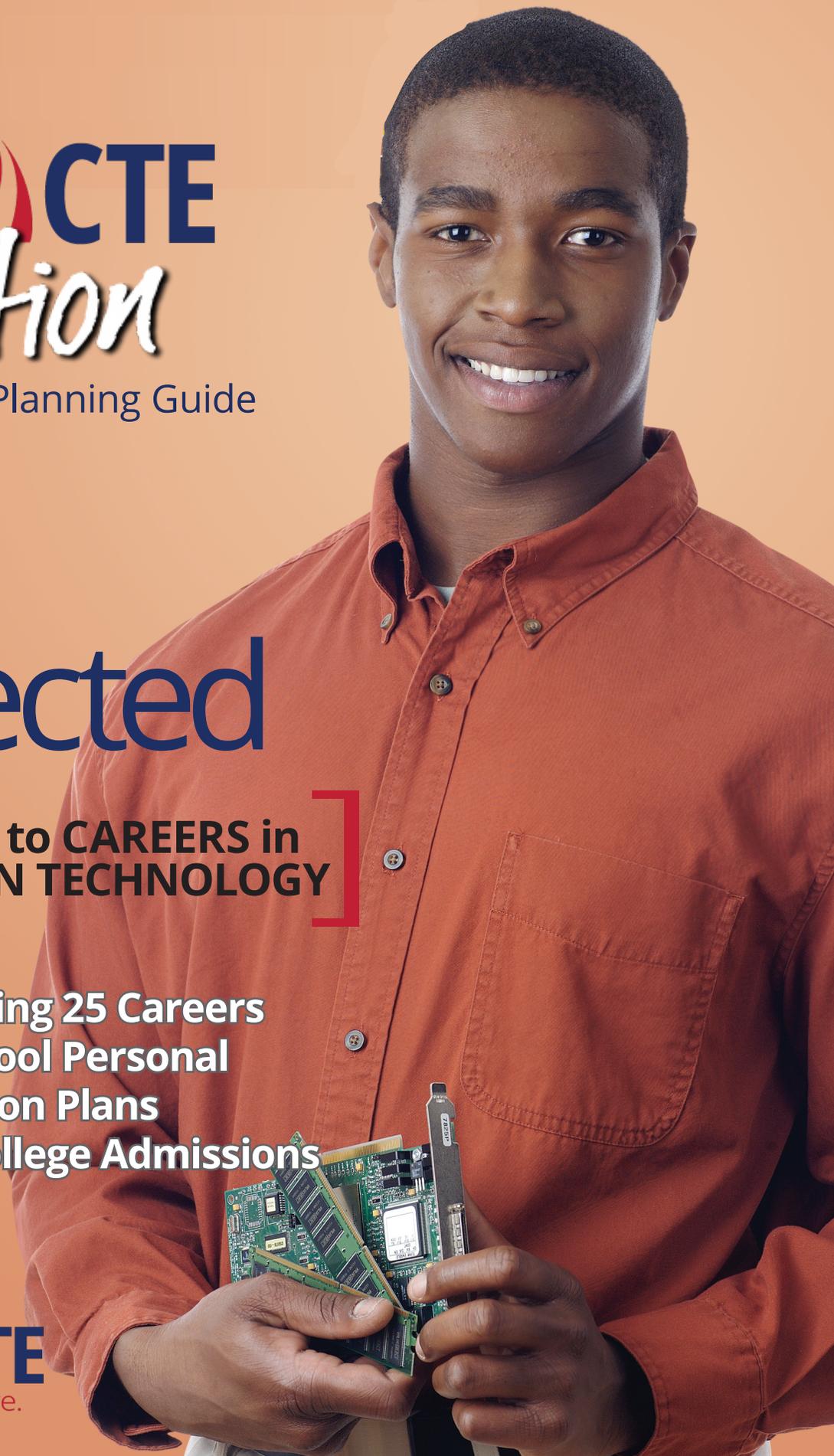
TEXAS CTE *In Action*

A College and Career Planning Guide

GET Connected

**YOUR GUIDE to CAREERS in
INFORMATION TECHNOLOGY**

- Showcasing 25 Careers
- High School Personal Graduation Plans
- Inside College Admissions



Dear Texas Student,

You are probably tired of people asking, “What do you want to be when you grow up?” Some students know exactly what they want to do, but most haven’t got a clue. The idea of choosing a career is intimidating, and it feels like it’s far in the future. There’s little time in the commotion of classes, activities, sports, work, and fun to think about what career you want to pursue after graduation from high school or college.

It pays, though, to take the time to think about your future career. The truth is that you’ll save a lot of time and money if you have a direction in life, as opposed to just finishing high school and worrying about it later. It’s really a matter of dollars and sense. If you choose a career direction now, you can select classes and activities that will make you highly marketable—and highly paid—when you look for work. And it only makes sense to have an idea of what you want to do rather than just wandering aimlessly through school.

Nobody wants that. Not your parents. Not your teachers. Not your friends. They want you to be somebody.

They want you to use your talents, follow your interests, and pursue your ambitions to become great at what you love to do in life. That’s what you should want, too.

So the time is right to take charge of your life and think about the future. You need a plan of action for how to get from where you are today to where you want to be in a few years: starting out on a personally and professionally rewarding career.

**YOU’VE HEARD
THAT ‘INFORMATION
IS POWER.’ WELL,
THIS GUIDE IS
POWER. IT PUTS YOU
IN CHARGE OF YOUR
FUTURE.**

That’s what Texas CTE is all about. The guide you are holding is one of 16 guides to different career clusters. It is designed to help you make smarter decisions about your education and career options.

You’ve heard the phrase, “Information is power.” Well, this guide is power. It puts you squarely in charge of your future, from creating High School Personal Graduation Plans (see page 5) to choosing college or some other form of education or training after high school. Work with your parents, teachers, and counselors to make decisions, but remind everyone that it is your future at stake and that you are taking charge of it.

Get information. Get a plan. Get a clue about your career direction. It’s alright if that direction changes; choosing a direction now is better than having no direction at all. Just promise yourself that you’ll make smart choices about where to focus your time, energy, and passion.

We’re proud that you are taking steps to plan your career direction, and we pledge that your school, teachers, and counselors will do all they can to help you make wise choices on your plans for success. We wish you the best of luck on your journey.



High Tech

TEXAS IS HOME TO MORE THAN
92 GAME
DEVELOPMENT COMPANIES, WHICH
CREATE GAMES FOR COMPUTERS,
HOME CONSOLES, THE INTERNET,
AND MOBILE PHONES.

TEXAS IS AT THE HEART OF THE INFORMATION TECHNOLOGY REVOLUTION. Our state is home to world-class high-tech companies such as Texas Instruments, Dell, and Advanced Microsystems. Countless smaller firms create computer games, set up custom networks, service computer equipment, or develop and manage websites. In fact, every business in Texas needs IT expertise, either from in-house staff or from outside vendors. Keeping electronic data flowing takes both technical expertise and problem-solving savvy. If you are good at grasping how technology works, have an idea for a new website or computer game, or want a career that is always changing, then Information Technology may be the right cluster for you.

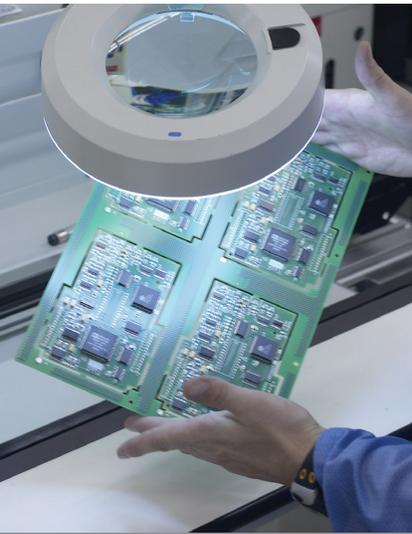
HOT Career Areas

Texas has launched a strategic plan that targets state efforts on six industry clusters that economists say will be the engines of economic growth in Texas. As you plan your future, think about a career in one of these new and emerging sectors.

- Advanced Technologies & Manufacturing
 - Molecular technologist
 - Sensor/robotics engineer
- Aerospace & Defense
 - Aerospace engineer
 - Unmanned autonomous vehicle engineer
- Biotechnology & Life Sciences
 - Bioinformatics specialist
 - Biocontainment technician
- Information & Computer Technology
 - System integrator
 - Computer game developer
- Petroleum Refining & Chemical Products
 - Petrochemical engineer
 - Refinery process design engineer
- Energy
 - Wind/solar energy engineer
 - Geophysical (oil and gas) prospector

THE FIRST STEP toward success is making smart decisions about your education and career options.

Plan for Success



When I was in high school," says Sheryl Kovach, a Human Resources director of Environmental Services at Phillips Services Corporation in Houston, "the only job that I even knew about was receptionist work. I didn't aspire to be a manager or entrepreneur because I really didn't know about those disciplines. I was just looking forward to graduating. That was it. I really didn't know what it was I wanted to do."

Sound familiar? You, too, may not have a clue about what to do with your life.

Don't worry, though. Help is right here in your hands. This is your guide to education and career choices that can shape your future. It's one of 16 career cluster guides published by Texas CTE (www.txcte.org). This edition is all about Information Technology.

Let's start with some basic steps you should take to get organized, plan for the future, and start on the road to success.

Assess Your Talents and Abilities

First, you need to figure out some things about yourself. This step can be as simple as writing down a list of your interests (like video games or rock climbing), your hopes and dreams (like helping others), your talents (like writing or math ability), and your weaknesses (if you're squeamish at the

sight of blood, for example, you might not want to be a doctor).

Follow up on this informal exercise by taking some formal assessments to determine your interests and abilities. Common assessments include Texas Genuine (www.texasgenuine.org) and CareerTech (www.careertech.org).

Ask your principal or counselor about the career assessments available at your school.

Research Your Career Options

Once you've learned about yourself, learn more about your career options. There are thousands of occupations out there of which you may never have heard, and others that do not yet exist because the technologies have not been developed. Fortunately, there are plenty of resources (see inside back cover) for you, and they are as close as the nearest computer.

One of the most helpful is the Texas Career Check from the Texas Workforce Commission. It is a vast database of information about hundreds of professions. You can find Texas Career Check at www.texascareercheck.com.

Another good place to start is O*NET (www.onetcenter.org).

Gather information about what you can earn in the careers in which you are interested. Find out whether the careers you are considering have a promising future—are they adding or



TEXAS IS HOME TO OVER 15,000
ELECTRONICS-RELATED FIRMS, EMPLOYING
OVER
196,000 WORKERS
WITH AN AVERAGE ANNUAL SALARY OF \$96,714.



VIDEO GAMES

DEVELOPED IN TEXAS INCLUDE
CALL OF DUTY 3, OVER THE
HEDGE, TONY HAWK'S AMERICAN
WASTELAND, AND READY 2
RUMBLE.

losing jobs? Check out the education you'll need to enter those careers.

The chart on pages 10–11 presents data on 25 possible professions. Remember, though, that these are just a sampling of careers available in the cluster. Go to Texas Career Check, O*NET, or another resource to investigate other careers.

Create Your High School Graduation Plan

Once you have a better idea of your interests and abilities, you are ready to plan for high school and beyond. The High School Personal Graduation Plan, is your plan for preparing for the career of your choice.

First, you should choose a career cluster and an endorsement, not a particular occupational goal. In the eighth grade you might choose Information Technology leading to a Business & Industry Endorsement and then later become interested in a narrower field such as database administrator or computer security.

The program of study you choose—your plan—does not stop with graduation from high school. You could then pursue a two-year degree as a computer technician or a four-year degree as a software engineer.

You should set up a High School Personal Graduation Plan that takes you through career preparation after high school, revising your blueprint as needed as you go along. If your career plans include college study, ask your counselor about tests required for admission to college, such as the PSAT, SAT, or ACT.

Seek Out Special Programs

Many Texas schools offer innovative programs to prepare students for specific career areas. These include career and technical education (CTE) programs, academies, and magnet schools. Once you've decided on a career direction, ask your counselor about special programs in your area that may provide related experiences in your chosen career.

Samuel Odamah enrolled in the architecture program at the University of Texas at Arlington, having found his career calling at Dallas's Skyline Career Development Center, a high school with career programs in a number of different fields.

"Skyline is one of the few schools in the country that offer programs in architecture," Odamah says. "In some careers, Skyline students could even get professional certifications or licenses right in high school. It was a great place because you could find out whether you really wanted to enter a career."

Odamah says that the career cluster system at Skyline taught him the value of planning for his career and his life. "We learned about planning ahead," he says. "Those who plan things ahead of time don't have to catch up. It's just a matter of what a person wants out of life. Planning gives you a better platform for success."

Information Technology CTSOs

One of the best ways to acquire experience in your chosen career is by joining a career and technical student organization (CTSO). In Information Technology, the most helpful CTSOs are:

- Business Professionals of America (BPA)
www.texasbpa.com
- Future Business Leaders of America (FBLA)
www.fblatx.org
- SkillsUSA
www.skillsusatx.org
- Texas Technology Students Association (TSA)
www.texastsa.org

WHAT ARE

Career Clusters & Programs of Study

In Texas, High School Personal Graduation Plans will guide students' high school and college experiences (see next page). As part of this process, students focus their studies within a chosen career cluster and program of study that lead to an endorsement.

A career cluster is a group of occupations and broad industries that share certain features. The Information Technology cluster, for example, includes database administrator and software engineer. Texas has adopted 16 Career Clusters (see back cover), the same ones designated and developed by the U.S. Department of Education.

As the graphic below shows, within each cluster are programs of study, which are more specific groupings of similar occupations. Think of a program of study as being like a college major. In Information Technology, you might choose to focus on Programming & Software Development in high school and college.

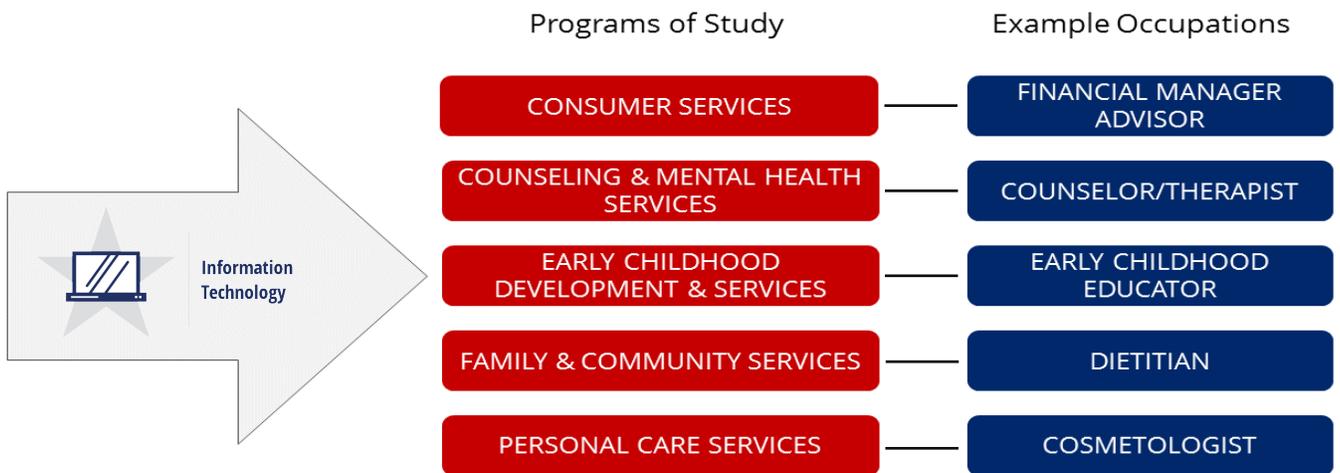
Related Occupations

Each career pathway in a particular cluster includes a range of related occupations; software engineer is an example of an occupation that falls within Programming & Software Development.

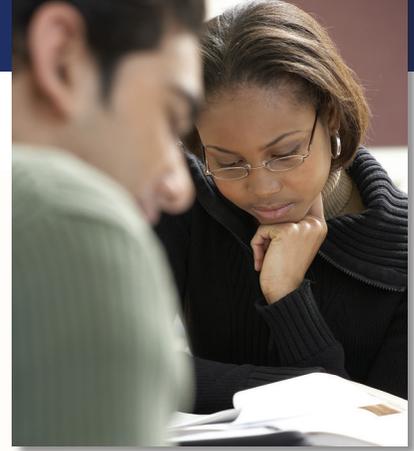
Choosing a career cluster and career pathway will help you acquire the knowledge and skills you'll need to enter your chosen career. It will allow you to follow a seamless course of study from high school into college or other postsecondary education or training. The electives you choose can complement your core academic classes to prepare you for the challenges of the real world of work.

Review Your High School Personal Graduation Plan Each Year

Don't get locked into a cluster and program of study you don't like. You should reexamine your 4-year plan at least once a year and change programs or clusters if your interests have changed. Choosing a cluster and program of study, even if it changes later, means that you'll have a direction in life. The idea is to be aware of what's going on in your life and take control of your future. When you know where your education is going and why, your classes will become more meaningful. You'll make contact with students, teachers, and employers who share your interest in a particular career area. You'll have experiences that are fun and exciting. You'll be on your way to success in school, in a career, and in life.



WHAT IS A High School Personal Graduation Plan ?



It's a smart idea to create a High School Personal Graduation Plan, or 4-year plan, to guide your studies through high school and into college or other postsecondary education or training. Your 4-year plan represents your chance to take control of your education and career choices. Working with your parents/guardians and guidance counselor, you can pick the cluster on which you want to focus your studies as well as your career and

postsecondary education goals. Don't worry. You aren't locked into your choices. You should revisit your 4-year plan at least once a year to update it. You can change clusters, programs of study, and career and postsecondary goals as your interests and ambitions change. Having a plan—even if it changes—is smarter than having no idea of what you want to do and why you are attending school. Here's how to fill out your 4-year plan.

CHOOSE a career cluster on which to focus your high school and college or postsecondary studies. The idea is to offer you a seamless route to follow from high school, through college or other postsecondary education, and into a career. Not all Texas schools offer all clusters, so ask your guidance counselor which clusters are available at your school.

LIST basic information such as your name and school.

PICK a program of study within the cluster. There are five programs within the Information Technology cluster (see page 12).

CHOOSE one or more occupations for which you would like to prepare. Use resources such as Texas Career Check (www.texascareercheck.com) to research your options.

PLAN for what you want to do after high school. Your goal may be to attend a four-year university or two-year college, join the military, or enter an apprenticeship program. Your postsecondary goal should influence the classes you take in high school; for example, you will need certain course credits to qualify for admission to a college.

SKETCH out your schedule of classes for your high school years. You will spend time completing requirement for the Foundation High School Program including electives to earn your endorsement in Business & Industry (26 credits). Planning your 4-year plan will help you get the education and experience you need to start your postsecondary and career goals.

PICK extended learning activities that complement your classes (see page 14). Work on community service projects. Plan for paid and unpaid career learning experiences, such as job shadowing and internships. All these extracurricular activities can give you experience that will help you get into college or land a job.

High School Personal Graduation Plan

Name: Taylor Jones, West High School
 Endorsement: Business and Industry
 Cluster: Information Technology
 Program of Study: Programming & Software Development
 Career Goal: Software Engineer
 Postsecondary Goal: Java Certified Programmer, A+ Certificate, Bachelor's Degree in Software Engineering

Foundation High School Program Requirements (22 Credits)	Business and Industry Endorsement Requirements (26 Credits)
English Language Arts (4 Credits) <ul style="list-style-type: none"> English I English II English III Advanced English Course 	Math (1 Additional Credit) Science (1 Additional Credit) Career Related Electives (2 Additional Credits)
Mathematics (3 Credits) <ul style="list-style-type: none"> Algebra I Geometry Advanced Mathematics Course 	EXAMPLE CAREER RELATED ELECTIVES Principles of Information Technology Computer Programming Advanced Computer Programming Web Technologies Research in Information Technology Solutions Practicum in Information Technology
Science (3 Credits) <ul style="list-style-type: none"> Biology IPC or Advanced Science Course Advanced Science Course 	DISTINGUISHED LEVEL OF ACHIEVEMENT 4 Credits in Mathematics (Must complete Algebra II) 4 Credits in Science Requirements for at least the Business and Industry Endorsement Remaining requirements
Social Studies (3 Credits) <ul style="list-style-type: none"> U.S. History U.S. Government (one-half credit) Economics (one-half credit) World Geography or World History 	PERFORMANCE ACKNOWLEDGEMENT Outstanding performance <ul style="list-style-type: none"> in a dual credit course in bilingualism and biliteracy on an AP test or IB exam on the PSAT, the ACT-Plan, the SAT, or the ACT Earning a nationally or internationally recognized business or industry certification
Physical Education (1 Credit) Languages Other Than English (2 Credits in same language) Fine Arts (1 Credit) Career Related Electives (5 Credits) Proficiency in Speech (Determined locally)	

Curricular Experiences: Business Professionals of America (BPA), Future Business Leaders of America (FBLA), SkillsUSA
 Extracurricular Experience: Computer Tutor, Junior Engineering Technical Society, School Class Officer, UIL
 Career Learning Experiences: Career Preparation—Paid and Unpaid, Internships, Job Shadowing
 Service Learning Experiences: Boy Scouts, Community Service Volunteer, Girl Scouts

A CAREER PORTFOLIO (see page 15) is a good way to organize information about your educational experiences, record results of career interest and abilities assessments, and hold examples of your best work. Include a 4-year plan in your portfolio.

Careers

Everywhere

Every company needs INFORMATION TECHNOLOGY PROFESSIONALS.

Information Technology (IT) is the land of opportunity for Texas students. Since IT spans almost all areas of business and industry, opportunities for IT professionals are everywhere.

"If you're an IT crackerjack, you don't have to work at an IT company," says Lonnie Martin, consultant to several technology companies in Dallas and chairman of the governor's IT cluster team. The Industry Cluster Initiative is a plan to stimulate sectors that economists believe will drive economic expansion in Texas. Information Technology is one of six sectors (see page 1) targeted for job growth. "Companies such as Frito-Lay and JCPenney all need people with IT backgrounds to run their businesses."

IT Opportunities

According to the United States Bureau of Labor and Statistics, the job outlook for IT professionals is very promising through the year 2022.

Salaries for workers in the cluster are attractive as well. Database administrators, for example, make from \$45,624 to \$90,605, and computer software engineers earn \$63,598 to \$110,255.

To earn more, IT professionals often earn certifications in specific technologies. People entering software development, for example, can earn certifications such as A+, Java, I-Net+ and Network+. Programmers earn salaries ranging from \$49,250 to \$95,354, according to the Texas Workforce Commission 2013 Annual Wages.



QUIZ

Is Information Technology the right cluster for you? Take this quiz to find out. Answer "yes" or "no" to the following questions.

- | | | | | | | | | | |
|--|---------------------------------|----------------------------------|-----------------------------|--|--|---|---|---|--|
| 1.
Do you like to tinker with electrical equipment? | 2.
Do you enjoy video games? | 3.
Do you like to play chess? | 4.
Are you good at math? | 5.
Do you pay attention to details? | 6.
Do you like following a blueprint to build things? | 7.
Do you prefer to gather all the facts before making a decision? | 8.
Do you like solving puzzles and brainteasers? | 9.
Do you like working with computers? | 10.
Do you like to keep your things in order and organized? |
|--|---------------------------------|----------------------------------|-----------------------------|--|--|---|---|---|--|

If you answered "yes" to five or more of the above questions, Information Technology may be the right cluster for you. To get a more specific and scientific measurement of your attitudes and abilities, ask your guidance counselor or teacher about taking a career assessment test or interest inventory.

10 Fast-Growing Careers

Occupation	Growth Rate (2012–2022)	Avg Annual Openings (2012–2022)
Information Security Analysts	45%	405
Computer Systems Analysts	32%	2,085
Computer User Support Specialists	27%	2,165
Web Developers	26%	430
Software Developers, Systems Software	26%	1,240
Software Developers, Applications	25%	1,540
Computer Hardware Engineers	24%	400
Computer & Information Systems Managers	24%	675
Computer Network Architects	22%	420
Network & Computer Systems Administrators	22%	1,120

This is a projection of 10 fast-growing careers in Information Technology in Texas from the year 2012 to 2022 and the number of average annual openings in each occupation. Note that whereas the percentage of growth in jobs may be high, the actual number of jobs created may be low. Source: Texas Workforce Commission.

Not Just Technical Skills

IT careers require technical knowledge, but broader skills are valuable, too.

Dan Burgess, an IT project manager for Hanson Aggregates in Dallas, for example, loves the business aspect of his job. He is currently putting together a plan that will standardize business processes for Hanson's computer servers. His team of IT professionals configures and implements all of the company's current software packages. They also write reference guides specific to each department. The reference guides allow employees to familiarize themselves with the software programs as quickly and efficiently as possible.

Burgess believes it takes a person with varied abilities to work in his field. "People stereotype us and they believe all IT professionals are antisocial geeks. That is far from the truth. IT professionals need to be business savvy and possess strong communication skills. The jobs are demanding."

According to Burgess, many of the jobs that are currently in high demand require these additional skills. "Software consulting is a hot career right now," he reports. "Professionals starting at middle level consulting firms can make \$50 to \$150 an hour. Now that our economy is gaining momentum, I believe there will be an even higher demand for this type of professional."

Burgess adds that one of the unique aspects of working in IT is that professionals are able to learn about other industries while performing their job. Not only does Burgess have advanced knowledge of Hanson Aggregates (which produces aggregates, asphalt, ready-mixed concrete, and cement for markets throughout the U.S.) as a business, but he has also become knowledgeable about other departments within the company.

MORE THAN 30 OF SILICON VALLEY'S LARGEST TECHNOLOGY COMPANIES OPERATE MAJOR CORPORATE LOCATIONS IN TEXAS.

Get a Broad Background

Jesus H. Jimenez had his feet in both business and IT as an undergraduate and a professional. Now, as a graduate of the University of Houston, Jimenez is the chief executive officer of ERF Wireless-Wireless Bundled Services, an Internet service provider to such rural areas in Texas as Sealy, Bellville, Cat Spring, Lubbock, Lake Jackson, and Taylor.

Jimenez spent six years in the Navy, where he was able to save money for school. Afterward, he worked in several technical positions from San Diego to Houston. His advice to students comes in the form of thought-provoking questions: "What type of position do you want? What type of hours? Where do you want to be in five years?"

Like Martin, Jimenez suggests students get a broad background in Information Technology.

"Learn about computers, databases, and how information is moved from point A to point B, but also understand how to use information to make business decisions."

If you have a broad base of skills, you can find your niche in IT, he adds. It is also important who students choose as mentors, observes Jimenez. Students should turn to mentors

and surround themselves with people who are positive influences, he advises. Jimenez feels fortunate to have role models such as his current company chairman and former commanding naval officer, who influenced him and taught him a lot about life.

"When I look back for 15 years at the people who influenced me, I realize they were good leaders themselves," Jimenez says.

10 Top-Paying Careers

Occupation	Average Wage	Entry-Level Wage	Experienced Wage
Computer and Information Systems Manager	\$64.97	\$41.66	\$76.62
Computer Information & Research Scientist	\$51.89	\$30.74	\$62.46
Computer Hardware Engineer	\$48.63	\$34.99	\$55.44
Computer Network Architect	\$48.44	\$31.78	\$56.76
Software Developer, Systems Software	\$47.85	\$32.31	\$55.62
Electronics Engineer	\$46.17	\$31.90	\$53.30
Software Developer, Applications	\$45.53	\$30.58	\$53.01
Information Security Analyst	\$42.35	\$27.10	\$49.98
Computer Systems Analyst	\$41.99	\$26.58	\$49.70
Database Administrator	\$30.92	\$18.64	\$37.07

This is a chart of hourly wages for 10 of the top-paying careers in the Information Technology cluster in Texas. Note how entry-level wages are often much lower than pay for the average worker and experienced workers in each profession. Source: Texas Workforce Commission.

What Employers Want

WELL-ROUNDED EMPLOYEES

"An employee must understand how technology fits into the client's business. Technology is a tool, not the answer," says business owner Adam Blumberg, whose Houston-based company, Truistic Solutions, provides IT support and managed IT services. "Our job is to understand business and know where the technology can add revenue and lower costs. Our employees need to have good technical knowledge and know how to adapt technical services to the business's needs."

COMMUNICATION SKILLS

Matt Trost, an Information Technology teacher and web administrator, agrees that IT professionals should have more than technical knowledge to be successful. Trost writes for the Business Professionals of America web page and communicates regularly with clients. "Professionals have to be extremely well-rounded," he says. "Strong writing and communication skills are a must for what I do on a daily basis."

PROBLEM-SOLVING

Cathy Nordt's Houston-based company, i.focus corp., is a recruiting firm for technical professionals serving mainly small to mid-size companies. "Workers have to think like a businessperson instead of a techie," Nordt advises. "Employers want really talented people who can provide solutions to a problem using technology."

Being able to interact with business and industry is vital. "IT is a people business and personal skills are very important," says Nordt.

EXPERIENCE

Toni Flores, an Information Technology teacher in the McAllen Independent School District, directs a program that allows students to receive college credit while working part time for local companies. Students assist corporations by setting up PCs, installing software, and reformatting computers. "This really allows students to get a taste of what it's like in the world of IT," Flores says. "Students who go through this program are able to grow professionally and accept greater responsibility quicker than others. Employers want to see that. They value those qualities in IT professionals."

Blumberg adds that security will be a big issue in the next five to ten years. "Many industries will be saving more data and processing more materials, so companies will need employees who are fully experienced in security software and hardware protocol," he says.

Inside IT

Information Technology is FAST-PACED AND INTENSE.

Those who walk a mile in Robin Hughes's shoes might find themselves power walking.

Hughes works in the fast-paced world of television news as the art director at KHOU-TV in Houston. She never knows what will be waiting for her when she enters the building each morning.

"The first thing I do is check the 'discrepancy report' for the late newscast and address problems if they pertain to me," says Hughes.

Hughes leads a staff of five graphic artists who provide graphic and animation resources for at least five newscasts, the daily morning entertainment show Great Day Houston.

"We also create promos for creative services, sales, public service announcements, and signage," she says. The workload can be demanding. "We can have up to 15 requests in a day with short deadlines, so we typically jump through hoops to get announcements on the air," Hughes says.

Because of the continuous changes in technology, Hughes says future graphic artists must be well rounded. She advises students to "bring more to the table. Study it all: print, moving video, real time and 3-D rendering, and web. Explore and experiment to make yourself more marketable."

Hughes's job is typical of the intense daily duties in Information Technology. Many IT professionals work long hours solving complex technical problems.

Debugging Software

Sean Falbey, a business systems analyst with the University of Texas Health Science Center in Houston, spends part of his time working the bugs out of annual updates to the financial aid department's database. "I test the software so that if

problems arise in the office, I know how to fix it," says Falbey. He adds that having a strong background in math and science has helped him think logically and work efficiently.

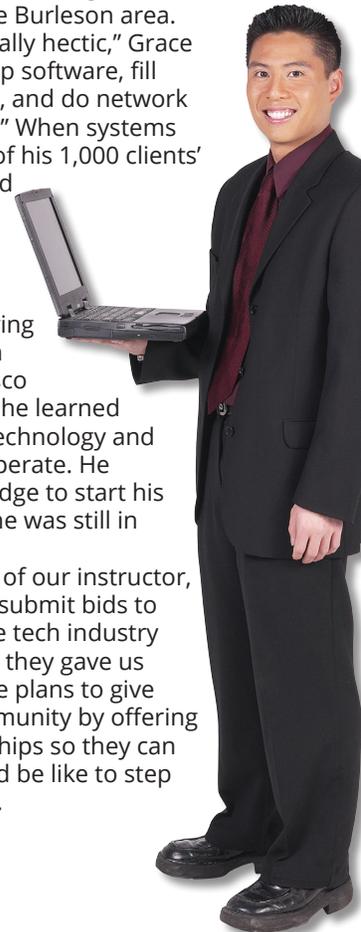
Entrepreneurial Spirit

IT is a good field for people who want to be entrepreneurs. Kevin Grace admits he was already a computer fanatic when he entered an IT class at his school a few years ago. Now the ambitious 19-year-old owns his own networking business called Mithrilcorp in the Burleson area.

"My day is usually hectic," Grace says. "We develop software, fill feature requests, and do network troubleshooting." When systems go down at any of his 1,000 clients' offices, Grace and his employees are there to fix the problems.

Grace learned his problem-solving skills at Burleson High School's Cisco Academy. There he learned about wireless technology and how networks operate. He used the knowledge to start his company while he was still in school.

"With the help of our instructor, we were able to submit bids to companies in the tech industry and, fortunately, they gave us jobs," he says. He plans to give back to the community by offering students internships so they can see what it would be like to step into an IT career.



DALLAS-BASED TEXAS INSTRUMENTS

DEVELOPED THE WORLD'S FIRST COMMERCIAL SILICON TRANSISTORS, INTEGRATED CIRCUIT, AND ELECTRONIC HANDHELD CALCULATOR.

Work at Home

B. J. Farmer, owner and president of Houston-based CITOC (Change Is The Only Constant), which provides hosted and managed IT services, suggests experience can begin at home. "Set up a home network, an email server, or a database," he advises. "Create a virtual environment. Jump in and start doing it."

He says there are different kinds of IT professionals. At CITOC, recognized by the Houston Business Journal as the fastest-growing technology company for four consecutive years, most of the 12 Houston-based employees have what Farmer calls "engineering-heavy backgrounds" in addition to numerous IT certifications, including the Microsoft systems engineer certification.

On any given day, his employees are

working with a company, setting up servers and protecting and connecting local networks. Recently, a publicly traded company system went down, and Farmer and his team got it back online via remote control. "We were able to get the server back up so quickly that no one even knew there was a problem," he says.

Job Security

One hot career in IT is providing computer security.

"Over the next few years, many industries will be saving more data and processing more materials, therefore companies will need employees who are highly trained in security software and hardware protocol," says Adam Blumberg of the Houston-based IT

company Truistic Solutions.

"There is a huge problem with viruses and spyware these days," agrees Toni Flores, an IT teacher in the Mercedes Independent School District. "We must have computer systems that allow people to feel confident going online and accessing their information securely. Those who excel at security and maintenance will do well in the IT field."



5 Cool Careers

CHECK OUT THESE EXCITING CAREERS IN INFORMATION TECHNOLOGY.

1.

SOFTWARE CONSULTANT

Consultants help companies with all types of hardware or software projects. Scott Dugan, a Dallas-based IT project manager, for example, installs and manages software packages for clients who need easy and efficient ways to manage invoices, accounts, and sales transactions. "For consultants, patience is a valuable asset," he says. "Sometimes it takes time to find the root of the problem. There is always a solution; we just have to use the necessary time and brainpower to find it."

2.

ANIMATION SPECIALIST

Animation is one of the glitziest IT careers, but it also requires patience. Ivan Galvan, who works as an animator in Houston, says it can take a month to create three minutes of animation for films or video games. Galvan has been in the business long enough to witness the evolution from simple hand-drawn cartoons to computer generated 3-D music videos. "What will be next?" he wonders.

3.

GRAPHIC DESIGNER

Graphic designers use computers to create materials that include magazine ads, billboards, newspapers, and websites. Carolyn Crump, creative director of American Color Graphics in Houston, knows how to use 10 different computer design programs, including Photoshop and Adobe Illustrator. She constantly challenges herself and her staff to use every tool within each program. She says that with software, "if you can imagine it, you can create it."

4.

MULTIMEDIA SPECIALIST

Newspapers across the nation offer daily online issues, complete with advertisements that move, blink, and tease the consumer to try and buy. The professionals who build these daily and weekly ads and promotional pieces have created a new profession within information technology: multimedia specialist. Says Jake Stiyer, multimedia supervisor for the Houston Chronicle, "my work is a balance between pleasing the client; developing a fun, and usually animated, product for the reader/user; and making sure the ads conform to the paper's advertising guidelines."

5.

WEBSITE ADMINISTRATOR

Every website requires someone to administer it, so this career is growing as fast as the World Wide Web. Richard Smith, a Houston-based website administrator for Copy Central, a division of Cenveo Printing, maintains a site that allows clients to upload print jobs via the Internet and supervises two employees. "To enjoy a career as a website administrator, a person must enjoy solving problems, multitasking, and motivating people," he says.

Information Technology

Listed below are 25 careers you might consider in the Information Technology cluster. These are not available to you at different education levels. Turn to the "Online Info" on the inside back cover to match your talents and ambitions. Here's an explanation of the kind of information presented in each column.

SOC: Stands for Standard Occupational Code, which organizations like the U.S. Department of Labor use to categorize career information. Sometimes you can find data on a career faster by searching for its SOC.

GROWTH: This is the projected annual growth in Texas for the career between 2012 and 2022. Fast-growing occupations may offer greater career opportunities for young adults.

OPENINGS: This is the projected number of job openings for the career in Texas each year. Even though a career may be fast growing, there may not be a lot of positions available. Careers with more openings will give an entry-level worker a better chance of getting a job and greater job security.

WAGES: This is the amount the average person in the career earns in Texas per year. Naturally, entry-level wages are lower than the average, and those for workers with years of experience are generally higher.

SOC	Occupation	Growth	Openings	Wages	Education
15-1011	Computer Information & Research Scientist	24%	675	\$107,933	Doctoral degree
25-1021	Computer Science Teacher, Postsecondary	18%	65	\$79,961	Master's degree
11-3021	Computer and Information Systems Manager	24%	675	\$135,136	Bachelor's plus experience
17-2071	Electrical Engineer	21%	580	\$98,029	Bachelor's degree
15-1133	Software Developers, Systems Software	26%	1,240	\$99,525	Bachelor's degree
15-1132	Software Developers, Applications	25%	1,540	\$94,703	Bachelor's degree
27-3042	Technical Writer	24%	195	\$67,123	Bachelor's degree
15-1021	Computer Programmer	12%	840	\$79,986	Bachelor's degree
17-2061	Computer Hardware Engineer	24%	400	\$101,141	Bachelor's degree
15-1061	Database Administrator	22%	410	\$75,612	Bachelor's degree
15-1051	Computer Systems Analyst	32%	2,085	\$87,340	Bachelor's degree
27-1014	Multimedia Artist and Animator	18%	185	\$51,934	Bachelor's degree
15-1143	Computer Network Architects	22%	420	\$100,750	Bachelor's degree
15-1071	Network and Computer Systems Administrator	22%	1,120	\$80,762	Bachelor's degree
15-1151	Computer User Support Specialist	27%	2,165	\$49,835	Associate's degree
17-3023	Electrical and Electronic Engineering Technician	18%	555	\$61,021	Associate's degree
17-3024	Electromechanical Technician	25%	70	\$53,040	Associate's degree
49-2011	Computer, Automated Teller, and Office Machine Repairer	11%	450	\$33,881	Postsecondary award
43-9031	Desktop Publisher	7%	30	\$33,476	Postsecondary award
49-2098	Security and Fire Alarm Systems Installer	24%	220	\$39,747	Postsecondary award
49-2093	Electrical and Electronics Installer, Transportation Equipment	16%	70	\$52,226	Postsecondary award
49-2094	Electrical and Electronics Repairer, Commercial Equipment	23%	325	\$56,876	Postsecondary award
49-9052	Telecommunications Line Installer and Repairer	20%	535	\$49,812	Long-term on-the-job training
51-4012	Computer Numerically Controlled Machine Tool Programmer	55%	145	\$48,575	Long-term on-the-job training
51-4011	Computer-Controlled Machine Tool Operator	38%	660	\$37,673	Moderate-term on-the-job training

Source: Texas Workforce Commission (TWC)

Note: This chart is a sampling of careers in the cluster, not recommendations from TWC or any other agency or organization. Always do thorough research and consult with your parents/guardians before making a career choice.

of all the career options in the cluster—they are just a sampling showing the variety of occupations
 research all career options in the cluster of your choice and decide on the ones that best fit your

EDUCATION: This is the minimum preferred level of educational attainment for people working in the career in the United States. This can range from short-term on-the-job training to a doctoral degree taking several years of college.

EDUCATION LEVELS: The color bars show the mix of education levels attained by people actually working in the profession in Texas (see bars at right). If a bar features mostly one color, that means that level of education is likely the one you'll need to reach to work in the profession. Look at computer software engineer, systems software, for example, and you'll see that most workers in the field have a college degree or better. If the three colors in the bar are roughly equal in size, that means that there are opportunities in the profession for people of all education levels. For example, about 28 percent of the people working as computer, automated teller, and office machine repairers have a high school diploma, 50 percent have some college, and 22 percent have four-year degrees or better.

High School	Some College	College or Better
Percentage of people in the occupation who have at most high school diplomas	Percentage of people in the occupation who have some college	Percentage of people in the profession who have a four-year college degree or better

JOB DESCRIPTION: These are brief descriptions of each career from O*NET Online (www.onetcenter.org).

Education Levels	Job Description
	Conduct research into fundamental computer and information science as a theorist, designer, or inventor. Solve or develop solutions to problems in the field of computer hardware and software.
	Teach courses in computer science. May specialize in a field within computer science, such as the design and function of computers or operations and research analysis.
	Plan, direct, or coordinate activities in such fields as electronic data processing, information systems, systems analysis, and computer programming.
	Design, develop, test, or supervise the manufacture and installation of electrical equipment, components, or systems for commercial, industrial, military, or scientific use.
	Research, design, develop, and test operating systems-level software, compilers, and network distribution software for medical, industrial, military, communications, aerospace, business, scientific, and general computing applications. Set operational specifications and formulate and analyze software requirements. May design embedded systems software. Apply principles and techniques of computer science, engineering, and mathematical analysis.
	Develop, create, and modify general computer applications software or specialized utility programs. Analyze user needs and develop software solutions. Design software or customize software for client use with the aim of optimizing operational efficiency. May analyze and design databases within an application area, working individually or coordinating database development as part of a team. May supervise computer programmers.
	Write technical materials, such as equipment manuals, appendices, or operating and maintenance instructions.
	Convert project specifications and statements of problems and procedures to detailed logical flow charts for coding into computer language. Develop and write computer programs to store, locate, and retrieve specific documents, data, and information. May program websites.
	Research, design, develop, and test computer or computer-related equipment for commercial, industrial, military, or scientific use. May supervise the manufacture and installation of computer or computer-related equipment and components.
	Coordinate changes to computer databases; test and implement the database, applying knowledge of database management systems. May plan, coordinate, and implement security measures to safeguard computer databases.
	Analyze science, engineering, business, and all other data processing problems for application to electronic data processing systems. Analyze user requirements, procedures, and problems to automate or improve existing systems and review computer system capabilities, work flow, and scheduling limitations.
	Create special effects, animation, or other visual images using film, video, computers, or other electronic tools and media for use in products or creative pieces, such as computer games, movies, music videos, and commercials.
	Design and build data communication networks, including local area networks (LANs), wide area networks (WANs), and intranets. These networks range from a small connection between two offices to a multinational series of globally distributed communications systems.
	Install, configure, and support an organization's local area network (LAN), wide area network (WAN), and Internet system or a segment of a network system. Maintain network hardware and software.
	Provide technical assistance to computer users. Answer questions or resolve computer problems for clients in person, or via telephone or electronically. May provide assistance concerning the use of computer hardware and software, including printing, installation, word processing, electronic mail, and operating systems.
	Apply electrical and electronic theory and related knowledge to design, build, repair, calibrate, and modify electrical components and machinery for subsequent evaluation and use by engineering staff in making engineering design decisions.
	Operate, test, and maintain unmanned, automated, servo-mechanical, or electromechanical equipment. May assist engineers in testing and designing robotics equipment.
	Repair, maintain, or install computers, word processing systems, automated teller machines, and electronic office machines, such as duplicating and fax machines.
	Format typescript and graphic elements using computer software to produce publication-ready material.
	Install, program, maintain, and repair security and fire alarm wiring and equipment.
	Install, adjust, or maintain mobile electronics communication equipment, including sound, sonar, security, navigation, and surveillance systems on trains, watercraft, or other mobile equipment
	Repair, test, adjust, or install electronic equipment, such as industrial controls, transmitters, and antennas.
	String and repair telecommunications cable, including fiber optics and other equipment for transmitting data, messages, or television programming.
	Develop programs to control machining or processing of parts by automatic machine tools, equipment, or systems.
	Operate computer-controlled machines or robots to perform one or more machine functions on metal or plastic work pieces.



HERE ARE the programs of study available within the Information Technology cluster in Texas high schools.* The State has created descriptions of each of these programs of study. These documents detail high school classes you might take, extended learning opportunities, and postsecondary programs.

INFORMATION SUPPORT AND SERVICES

Professionals in this field are involved with the deployment of information technology, including implementing computer systems and software, providing technical assistance, and managing information systems.

WEB AND DIGITAL MEDIA

Specialists in Interactive Media create, design, and produce interactive multimedia products and services.

NETWORK SYSTEMS

In this field, employees plan, implement, and analyze computer networks. Their work includes the design, installation, maintenance, and management of network systems.

PROGRAMMING AND SOFTWARE DEVELOPMENT

Professionals in this field design and implement computer systems and software by applying their expertise in programming languages, operating systems, and software development.

* Not all schools offer all programs of study or clusters. Ask your counselor which programs are available at your school.



Keys to Success

FIND A FUTURE in Information Technology while still in high school.

If high school students master IT courses, they can have a nice jumpstart on a career," says Scott Ford, an A+ academy instructor in the Humble Independent School District.

The A+ academy training program prepares individuals for careers as computer technicians. Students in Humble ISD can also earn the Cisco Networking Academy certification, CCNA.

Ford insists that all students need to realize the impact of the global, technology-driven economy. "Twenty years ago, students were competing against students from other states for jobs," he says. "Now they're competing with students from India, Japan, and elsewhere. The world is connected with teleconferencing in real time across the globe. Students need to be ready to step in and compete for jobs."

With courses and certifications such as those offered in Humble, Texas students can graduate high school prepared for high paying IT jobs.

IT Required

All Texas students need at least one credit in technology applications to graduate from high school.

Many school districts, however, are upgrading their IT programs to make their graduates more marketable.

Hermalinda Garcia is the career and technical chair at Gladys Porter High School in Brownsville. She says she strongly encourages students to go beyond classroom learning to achieve certifications as Microsoft Office, Excel, or Word specialists. She says, "When students realize the possibilities when they pass the certification exams, they think, 'Wow, this could be my career!'"

Get the Basics

Such programs make high school the perfect time to get started on a career in IT. It's smart to start, however, by mastering math, science, English, and social studies.

Why? Computers are just superfast number crunchers, so it helps to understand the mathematics and science underlying their operation. Developing computer-related documents such as web pages and

TEXAS IS THE NO. 1 STATE
FOR NEW DATA CENTERS BY SITE SELECTION
MAGAZINE, 2012.

technical manuals requires excellent reading and writing skills. Students who understand the history and social impact of technology are better positioned to use high-tech tools to solve problems. Getting good grades in rigorous academics gives students the knowledge they need for success in IT.

Programs of Study

When it comes to electives, students can choose among four programs of study in the cluster (see "Program Profiles," page 12).

Two of the three high school campuses in Pflugerville Independent School District, for example, offer specialized IT programs.

Connally High School features classes in Computer Maintenance and Repair, along with Fundamentals of Networking and Networking Essentials.

These courses prepare students for careers as communications analysts, communications engineers, electronics technicians, or telecommunications repairers.

Hendrickson High School offers business database programming. Students attracted to programming might consider careers as operating systems engineers, programmer/applications specialists, or software testers.

Business Computer Programming I and Computer Science II are also offered for those pursuing these careers. Students who enjoy designing, editing, and marketing websites may consider taking Animation Technology, Business Image Management and Multimedia, or Media Technology II.

Real-World Learning

"The opportunities are there for students," says Geralyn Elmore, director of career and technical education for the Pflugerville Independent School District. "The classes are exciting and filled with real-world applications. Students just need to know what they can do while in high school to prepare for their futures. Parents also need to know the opportunities and how the career clusters prepare their children for college and career success."



SPOTLIGHT

CAREER NETWORKING

The Cisco Networking Academy at Burleson High School Teaches Students the Basics of Connecting Computers

Fewer than 10 years ago, Burleson High School's Information Technology program consisted of just one course, Business Computer Information Systems. Now, the school features Cisco Networking Academy, which allows students to earn certifications in networking technology and, in some cases, income.

Three of Burleson's students started their own Internet company, bid on a number of jobs, and earned more than \$30,000 for each job.

"Part of the business was a web company," says Scott Stephenson, an instructor for the Cisco academy at Burleson. "It's not a fly-by-night company. In fact, it's still in business." Stephenson is proud to say the three young

men made more money last year than he did.

Cisco Systems, which manufactures and sells computer networking equipment, began its academy program in 1977 to educate Information Technology teachers on how to better equip and encourage students to enter IT careers. The program got off the ground in 1999. "Cisco Systems has made a significant investment in the academy program, and I am continually amazed at the resources they provide," says Cisco Networking Academy Training Center Co-director Gay Berryman.

Participating schools invest \$3,500 for Cisco's instructor training. Once certified, teachers bring the online courses to the



classroom, where the students can take as many as four Cisco Certified Network Associate (CCNA) courses.

Stephenson encourages students to earn the Cisco Systems networking certification and others that are available to them. "We really encourage certifications," says Stephenson, who also teaches Cisco classes at Tarrant County Community College in Fort Worth. "Most companies want to see certifications more than anything else."

Hands On

Move career preparation outside the classroom with **EXTENDED LEARNING.**



Richard Mora is a troubleshooter for one of the largest oil and gas companies in Houston. He is part of a staff of three employees who keep more than 150 employees and contractors at El Paso Energy up-to-date with the latest computer applications and make sure the system is operating flawlessly.

Not impressed? Well, Mora started doing this as a senior at Aldine High School in north Houston. He got experience in IT outside the classroom thanks to an internship through Genesys Works, a program established for targeted students to help them gain exposure to professionals and their careers.

“At first I wasn’t interested,” admits Mora. “After about a week or so, I realized that these people were serious. They were really trying to show us something and use our skills.”

“We give students the step-by-step process to apply for college and tell them how to seek the money to pay for it,” says Rita Ebach, director of the Genesys Works Summer Training Program. “The students learn how to write resumes, set goals, and prepare for interviews. We want them to be well-rounded professionals.”

Extended Learning

Genesys Works is one of many programs available to high school students who wish to acquire hands-on IT experience outside the classroom. Extended learning options include job shadowing, internships, apprenticeships, and volunteering, and they are especially prevalent in the IT cluster.

Robert McAndrews, the technology intern program coordinator at the Humble Independent School District Career and Technical Education (CTE) Center, says he’s been able to develop partnerships with a number of businesses in the area. “I match up our intern candidates with interviews and the business selects who they want to work with,” he says.

Kyle Fornet, a former graduate of Humble High School, began his senior school year interning at the Hermann Medical Center in the information security department. “As a computer operator, I install hardware and software, and perform software and hardware troubleshooting,” he says.

Within four months, the hospital hired Fornet as a part-time employee working 16 to 20 hours per week. He says his interest in technology started outside the classroom when he job shadowed

MICHAEL DELL,
FOUNDER AND CEO OF ROUND ROCK-BASED DELL COMPUTER COMPANY,
STARTED HIS COMPANY IN 1984 AS A STUDENT AT THE UNIVERSITY OF
TEXAS AT AUSTIN.



IT COMPANIES IN TEXAS EMPLOY 360,000 PEOPLE.

his father at the age of 14. "I helped my dad install antivirus, spyware removal, and operating systems," Fornet says.

Student Competitions

Students gain hands-on experience through their participation in student organizations such as Future Business Leaders of America, Business Professionals of America, SkillsUSA, and Texas Technology Students Association (TSA) (see "High-Tech Competitions" below). Each hosts competitions that test students' knowledge and skills.

Like Mora, Noe Vasquez entered the

Genesys Works program. Vasquez, a former graduate of Chavez High School in the Houston Independent School District, performed desktop support at Chevron's pipeline division during his senior year.

"I gained a Microsoft certification that is valid around the world, and I met dozens of new people," Vasquez says. "When you think about getting experience in IT, don't just think about today. Think about tomorrow, months from now, years from now. You are pretty much shaping what you want your life to be in the future."

CREATE a Career PORTFOLIO

One valuable tool that can help you get ready for college and beyond is a career portfolio—a collection of items that document your achievements both in and out of school, assembled in one convenient package.

A career portfolio is not simply a resume, although it can certainly include one. So what should go in a career portfolio? A variety of things, depending on your own personal experiences. It could include transcripts and grades; writing samples; letters of recommendation from teachers, mentors, or employers; awards you've received; and items that document other activities, such as internships and job shadowing experiences.

"You need to be specific—dates, how many years, any awards, what they meant, and who you received them from," says Grace Brauchle, who helps students put their portfolios together as the career center coordinator for Lehman High School in Kyle.

Brauchle says portfolios come in handy when students apply for jobs or admission to college. "First impressions are a very big thing," she says, "and you want to be the one whose papers get passed around the office. You want to be the one where the admissions counselors say, 'Wow, look at this one!'"

SPOTLIGHT

HIGH-TECH COMPETITIONS TSA and SkillsUSA Instill Information Technology Skills

Zaira Garate looks forward to community service in the Texas Technology Students Association (TSA) as much as she does to the annual competitions.

"TSA offers amazing opportunities to participate in national community service projects with the American Cancer Society and to compete in dozens of events related to technology," says Garate, who is state president of the student organization and a senior at Porter High School in Brownsville.

TSA contests vary widely. One of the most popular is in AutoCAD, an engineering software program. "In one of the events, students are given an engineering or architectural problem and asked to solve it within a time period," says TSA State Coordinator Curtis Green.

Green adds that Tech Bowl, which is a technology knowledge quiz, also draws a lot of participation. "Each team takes a 100-question exam," he explains. "The 10 top-scoring teams enter a round-robin game show-type event where they are given points for answering questions correctly. Tension builds as teams are eliminated; the final match determines the winner."

"TSA gave me the tools to succeed as a leader," says Garate. "The support of my fellow members and advisors made them like a second family to me."

Students in SkillsUSA also have ample opportunities for technical competition. "The opportunity to compete gives the students incentive to strive to do better," says Ada Kranenberg, program director for Skills USA Championships.

SkillsUSA members compete in more than 75 competitive events, including computer maintenance technology, Internetworking, web design, technical computer applications, and computer programming.



To the Next Level

SUCCESS IN INFORMATION TECHNOLOGY requires education after high school.

Everyone has heard stories of technical geniuses so proficient they were hired straight out of high school by large firms at high salaries.

However, Cathy Nordt, whose Houston-based i.focus corp. helps companies find technical professionals, says students need more than technical genius to build a future in IT. Companies look for well-rounded employees with the skills required for business success, she says.

"It's necessary for students to continue their education by getting advanced training in such areas as presentations, communications, and business management," Nordt advises. "Students should earn a college degree and keep their skills current."

The same rule applies in IT as in other fields: The more education someone has, the better the job options and financial rewards.

Fortunately, Texas offers a full range of options for IT education after high school, ranging from short-term certifications to graduate level college work taking several years.

Certification

Short-term industry certifications provide students a great way to get started in IT. Certifications tell potential employers exactly what skills a job applicant has mastered. Options available include credentials from such companies as Microsoft, Cisco, and Apple. Oftentimes, employees can earn additional credentials while working.

Employers, trainers, and IT workers, for example, can gain certification from programs such as the National Information Technology Apprenticeship System. NITAS, created by the

Computing Technology Industry Association, is an emerging competency-based apprenticeship program that allows flexible credentialing for IT workers who are already employed. The certification program uses a combination of classroom and on-the-job training.

Two-Year College

Another good way to get started in IT is to master skills at a technical college or two-year community college. "In today's employment market," says Debbie Karl, program chair and associate professor of the West Texas division of Texas State Technical College (TSTC), "65 percent of workers need to be skilled—and that means getting a short-term certificate or associate's degree."

Associate's degree and certification programs are offered by most community colleges in such subjects as software design, data management,

TEXAS IS 2ND IN THE U.S. FOR COMPUTER AND VIDEO GAME EMPLOYMENT, WITH **OVER 13,600 INDIVIDUALS** DIRECTLY AND INDIRECTLY EMPLOYED BY THE INDUSTRY.



IN 2013,
DELL COMPUTERS RANKED 9TH
 ON FORBES LIST OF THE 25 BIGGEST
 TECH COMPANIES IN THE U.S.

computer programming, networking, and web development.

"Associate's degrees are extremely helpful in preparing students for the job market," says Keri Gutierrez, the director of publications and news at TSTC in Harlingen. "Students receive hands-on training from professors who are industry professionals in Information Technology."

Four-Year Degrees

Four-year bachelor's degree programs give students the opportunity to build a broader foundation for success. Michael Young, an application analyst with Chevron in Houston, received his bachelor's degree in management information systems from the University of Houston. Like many who choose a four year path, Young benefited from the classes in his technology major.

"The useful classes in college were courses in finance, accounting, and project management," he says. "Those were the ones that apply most to my job now. They provide the foundation."

Departments of electrical and computer engineering at Texas A&M University, the University of Texas at Austin, Texas Tech University, and elsewhere offer bachelor's degree programs that provide the opportunity to broaden skills in English, Global Studies, and Political Science courses.

Graduate School

For those who wish to continue their education after receiving a four-year degree, master's and Ph.D. degree programs can provide more specialized knowledge of the Information Technology field.

Graduate degrees in the IT field are available at most Texas universities. They enable pursuit of advanced knowledge and research and usually are required for professionals interested in teaching at the college level.

Professor Sadegh Davari of the University of Houston at Clear Lake explains, "Curriculum is updated frequently to incorporate new technologies into the courses. Since

graduates are well equipped with the latest technology, there is a big demand for them."

Internships

Many IT students take advantage of short-term college internships to practice technical skills in a work setting, polish their business skills, and make professional contacts with potential employers.

"Internships made a difference in my understanding and comprehension of classroom concepts," says Binh Vu, managing technical architect of Quorum Business Solutions in Houston. "Students will never know for sure what they want to do in the field until they try it."

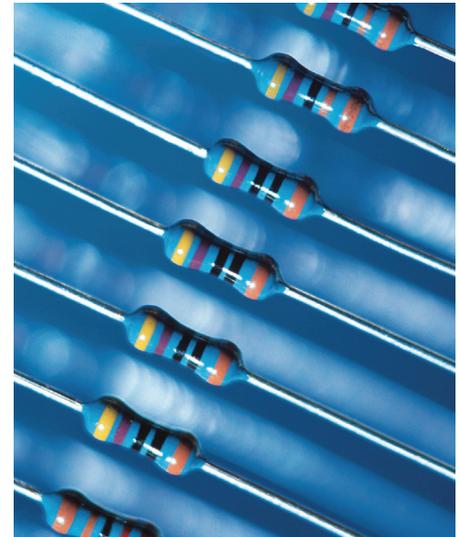
An internship is also a great chance for a student to learn to function in a business setting. "Students experience a day-to-day routine: getting up in the morning, holding a job, and completing assignments. It teaches discipline and time management," says Gary O'Dwyer, executive vice president of Quorum, which provides software solutions to the energy industry.

Military

The U.S. military offers excellent opportunities for those who wish to serve their country while pursuing an education. Recruits who show an aptitude for IT on tests administered at enlistment can receive training to maximize their potential.

Because they have experience working in stressful environments that demand accuracy, military personnel are valuable assets to the civilian workforce. According to James Pinson, a sergeant and an IT specialist in the U.S. Army, there are many advantages to enlisting in the military. "I already have job offers, so I would say it's easy to transition."

Pinson, who is stationed in Houston, also notes that the military is starting to provide Microsoft certification, which gives military personnel the same credentials as IT professionals in civilian life.



Get the CREDIT You Deserve

Dual credit in Texas is a great way to earn college credits toward a postsecondary degree while you're still in high school. Dual credit programs center on "articulation agreements," contracts between the student, his or her high school, and postsecondary institutions the student would like to attend. While most students take basic core courses such as English, history, math, science, and social science, coursework may include areas in Career and Technical Education.

Dual credit courses cover the same material as the equivalent college course, allowing the student to receive credit toward the college degree. It's like a bank account. The credit is banked for you at the college, and you withdraw it when you enroll. Ask your counselor about advanced placement, dual credit, or articulated courses and other opportunities to earn college credit.

ACCEPTED!

SIX THINGS Texas students should know about getting into college

Applying to college is a lot like looking for a job or trying out for a team. You choose something that interests you, and then try your best to convince whoever is in charge that you have what it takes to be part of their organization. But whereas there might be only a few spots open on your high school's varsity football squad, there are thousands of places available in hundreds of colleges each year. Whether you are the first in your family to apply to college or both of your parents have advanced degrees, going through the admissions process can be stressful. Fortunately, there are plenty of free resources available for Texas college-bound students. The best is College for All Texans (www.collegeforalltexas.com), which features a list of all the state's colleges and universities, a checklist for selecting a school, and a link to the online Texas Common Application. To help you get started on your own college search process, here are six steps you should take.

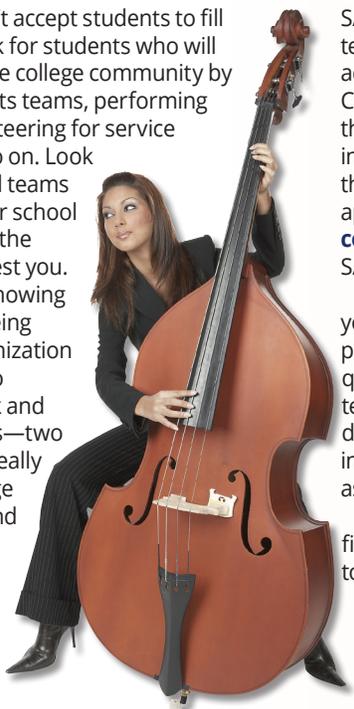
1. Make School Your Job

The first thing college admissions officers look for on your application is your grade point average. It's simple—you have to make the grades in high school to earn your spot in a college. The easiest way to do that is to think of school as your job, starting in your first year. If you show up late for work, slack off, and talk back to the manager, you'll get fired faster than you can say, "Do you want fries with that?" But if you always arrive on time, work really hard, and try to learn from management, then pretty soon you'll probably get a raise or a promotion.

What works on the job works in the classroom, too. Take challenging courses. Turn in all your work on time. Pay attention in class. Contribute to discussions. Ask for help when you don't understand something. By treating school as a career, you'll have a better shot at earning the grades and teacher recommendations that you need to move to the next level.

2. Get Involved in Activities

Colleges don't accept students to fill seats. They look for students who will add to the entire college community by playing on sports teams, performing on stage, volunteering for service projects, and so on. Look at the clubs and teams available at your school and sign up for the ones that interest you. In addition to showing school spirit, being part of an organization is a great way to build teamwork and leadership skills—two traits that can really help your college application stand out from the pack.



3. Build a Resume Portfolio

What if you had to take a final exam on the last three years of a subject and didn't have any notes to study? Well, that's exactly what it's like trying to complete a college application if you haven't kept an ongoing file of all your activities, honors, and employment.

Start your first year and build a career portfolio (see page 15). It's also smart to create a computer file called "college resume" and add to it each time you participate in a service project, win an award, get a new job, and so on. Use technology to create a resume format or ask your parents or guidance counselor for help. When you sit down to complete your college applications, review your career portfolio and call up the resume—all the information you need will be right at your fingertips.

4. Prep for Tests

Most colleges use scores from the SAT, SAT II, or ACT tests in making their admissions decisions. Check which tests the schools you're interested in require and sign up to take them in time to include the scores in your application. College for All Texans (www.collegeforalltexas.com) also has a free ACT, SAT, and GRE prep course.

Spend time preparing for the tests before you walk into the room with your No. 2 pencils and calculator. Go through sample SAT questions at www.collegeboard.org or ACT tests at www.actstudent.org. There are also dozens of test-prep books you can buy, some including software that tracks your progress as you go through sample exams.

Remember: If you don't do well on a test the first time, you usually can take it again and try to improve your score.



Inside College Admissions

5. Make a List of Colleges

Do you want to stay in Texas for college or see another part of the country? Would you be more comfortable at a big university or a small college?

Think about what you would like to study and what matters most to you (like location, size, or religious affiliation), and then start developing a list of colleges that fit your criteria.

Use online tools like www.collegeforalltexas.com or www.collegeboard.org to learn more about each school and take online campus tours. Buy or borrow from the library some of the many college guides available. If possible, schedule visits to the schools you are interested in, or, through the school's admissions office, arrange an interview with a recent grad who lives in your area so you can ask questions about courses, faculty, or anything else.

By the fall of your senior year, narrow the list down to the top five or six choices. While some online applications are free, it can cost up to \$70 per school to apply, so be realistic about how much you can spend on applications.

6. Submit Polished Applications

Once you send in an application to a college there's no taking it back, so make sure you get it right the first time. Double-check your spelling. If you use the same essay for multiple schools, remember to change the name of the school to fit each application. Make sure you have any required standardized test results (ACT, SAT, SAT II) sent to each school.

Be neat and complete, and meet every deadline. Make copies of each application before you hit the send button or pop it in the mail. If you don't receive an email or postcard confirming that your application was received, contact the college to make sure it arrived. Items can get lost or misdirected, especially when thousands of students are sending in applications at the same time. By having copies, you can easily submit again.

EVEN IF you get accepted to college, you'll never be able to pay the bill, right? Wrong! There's financial aid available if you know where to look.

College isn't cheap. With tuition and room and board at private schools often topping \$40,000, and even in-state, public schools costing several thousand dollars a year, you may wonder why you should even apply.

Well, don't worry. Every Texas student can afford to go to college.

"Access and affordability of higher education can be intimidating to students and parents; however, there are numerous resources available to walk you through the process and into an exciting future," says Heather V. Crowson, vice president for enrollment management at Sam Houston State University.

The secret to getting the aid you need to go to school is in filling out the necessary forms, getting good grades, and applying to schools that offer generous financial aid packages. (A financial aid package consists of need- or merit-based scholarships and grants plus work-study jobs and low-interest student loans.)

Here's a quick overview of steps you can take to get the financial aid you need to continue your studies after high school. For more information about the aid available at a specific college or university, go to the school's website and click on the "Admissions and Financial Aid" link. Many schools provide an online form you and your parents can fill out that will give you the estimated financial aid package you might receive if accepted to that school.

Apply: You definitely won't get any financial aid if you don't apply. To figure out how much grant money (which you don't pay back) and loans (which you do pay back) you'll need to afford school, colleges use a formula that factors in your parents' income and investments, your income, the number of kids in the family who will be in college at the same time, and other financial information. Families of all income levels may receive aid, so fill out the forms.



Financial Aid

BASICS



All schools require the Free Application for Federal Student Aid (FAFSA), which determines eligibility for federal aid, such as work-study, Pell grants, and the Stafford loan program; and for college grants and, sometimes, merit scholarships. Complete the application as soon as possible at the beginning of October your junior year. FAFSA forms and instruction booklets are available in your guidance counselor's office, or you can complete the form online at www.fafsa.ed.gov.

Most private schools also require applicants to complete a school financial aid application and, in some cases, the CSS/Financial Aid Profile form (<https://student.collegeboard.org/css-financial-aid-profile>) which is used to award nonfederal student aid funds. Carefully read each college's application to determine financial aid deadlines and what forms you will need to submit.

Study In-state: Whether you choose a public or a private school, staying in-state for college will cut your costs considerably. Plus, since Texas covers 267,339 square miles, you can "go away" to college without ever leaving the state.

To help ensure that qualified Texas high school graduates with financial need can go to college, the State Legislature established the TEXAS (Towards Excellence, Access, and Success) Grant Program. Grants can be used to study at any public college or university in the state and are equal to the student's tuition and required fees. In 2012-2013, approximately 33,100 students received TEXAS Grants. To apply, fill out the FAFSA.

Another way to score some serious state aid is to get good grades in high school. Texas students who are in the top 10 percent of their graduating class are eligible for automatic admission to any public university in the state. With that automatic admission comes the opportunity to apply for merit scholarships and special programs available at each school.

Take Two at a Community College: The first two years of many college programs are filled with core courses that could easily be taken at a local community college for a lot less money. If you fill out all the forms, do the math, and still can't afford a four-year school, enroll in a community college for the first two years, then transfer to a four-year school.

By living at home, working part-time, and getting required courses out of the way, you could save tens of thousands of dollars in tuition and room and board, and be able to afford to attend the college of your choice for junior and senior years. For a complete list of the state's community colleges, go to the Texas Association of Community Colleges website at www.tacc.org.

Target Your Search: Applying to a couple of colleges where your grades and talents put you near the top of the typical talent pool makes it more likely you'll qualify for merit aid and other special school scholarships and grants. Do a little research on college websites to find schools where your standardized test scores and grade point average rank you in the top 25 percent or so of the most recently accepted first-year class. Colleges want to attract the best and brightest students available, and often will offer attractive scholarship/grant/loan packages to convince those students to come to their school.

There are also more than 1 million local, national, and college-specific scholarships available each year. The trick is to find and apply for scholarships that best fit your strengths and talents. FastWeb (www.fastweb.com) is a free college scholarship search source. Register online and you will start receiving email notices about scholarships, internships, and other opportunities that fit the profile information you submit.



LOOK IT UP! Here are key words and phrases used in this guide that you may not already know.



what does that mean?

Articulation agreements: formal agreements between or among educational organizations (high schools, community colleges, and universities) that align courses and majors in a way that allows students to transition from one institution to another without loss of course credit or time.

Associate's degree: a two-year degree awarded by a community or technical college.

Bachelor's degree: a four-year degree awarded by a university.

Career and technical student organizations (CTSOs): curricular organizations for students that offer activities and competitions related to particular careers.

Career cluster: a way of organizing curricula, instruction, and assessment around specific occupational groups (for example, Information Technology or Health Science) that offers students core academics, coursework related to specific occupations, and extended learning experiences.

Master's degree: a degree awarded by universities for study beyond a bachelor's degree.

Career guidance: structured developmental experiences presented systematically from kindergarten through 12th grade that help students analyze and evaluate abilities, skills, and interests.

Career portfolio: a collection of student work indicating progress made in subjects, activities, or programs. In career cluster systems, portfolios are often used to assess student performance in extended learning experiences.

Doctoral degree: a degree awarded by universities for study beyond a master's degree. Also referred to as a Ph.D. or professional degree.

Dual credit: credit given in both high school and college for college-level courses taken while in high school.

Extended learning experiences: participation in career and technical student organizations, extracurricular activities, job shadowing, internships, or service learning.

Financial aid: scholarships, grants, loans, and work-study funds awarded to students to pay for college expenses.

Internship: an extended learning experience in which students work temporarily at entry-level jobs in careers that interest them.

Job shadowing: an extended learning experience in which students observe professionals in particular careers as they go through a day on the job.

Postsecondary education: education beyond high school. Middle school and high school are referred to as secondary education, so postsecondary means after high school.

Program of study: a way of organizing the curricula and educational activities within a career cluster related to a student's specific academic and career goal.

Service learning: an extended learning experience in which students do volunteer work related to their career goals.

Targeted industry clusters: six industry clusters that have been identified by Texas as high-demand, high-growth sectors paying high wages. As they are developed by the State, these may be hot areas in which to build a rewarding career.

Program of Study: an education plan suggesting the high school courses a student should take to prepare successfully for graduation and transition into postsecondary education. The vision for Texas CTE is that eighth graders, in consultation with their parents/guardians, counselors, and teachers, will select a program of study and create a plan. Plans are to be reviewed and revised at least once each school year.





Online Info

Explore these Internet resources for more about your education and career options.

America's Career InfoNet www.acinet.org/acinet

This is the place to search for occupational information, industry information, and state-specific labor market information.

College for All Texans www.collegeforalltexans.com

Here is everything a Texan needs to know about preparing for, applying for, and paying for college or technical school. And it's all in one up-to-date, easy-to-navigate mega-site almost as big as the state itself. Remember: \$4 billion is available every year to help Texans attend college.

Employability Skills Framework <http://cte.ed.gov/employabilityskills/>

Employability skills are general skills that are necessary for success in the labor market at all employment levels in all sectors. The Employability Skills Framework is a one-stop resource for information and tools to inform the instruction and assessment of employability skills.

My Next Move www.mynextmove.org/

This is a career planning resource for students, parents, career changers, and career advisors.

TEXAS CAREER CHECK

The State of Texas has created a special website for students and others researching careers. It's called Texas Career Check. Texas Career Check lets you explore higher education options by looking at detailed information by school and program of study, AND you can explore careers, occupational information, and postsecondary education options. You'll find a wealth of information about hundreds of career choices. To explore Texas Career Check, go to www.texascareercheck.com.

O*NET (Occupational Information Network) online.onetcenter.org

Also available in schools and libraries, O*NET provides full information on occupations, including compensation, employment prospects, and skill matching for students. Information on compensation is available on a state-by-state basis.

U.S. Department of Labor Occupational Outlook Handbook www.bls.gov/home.htm

This nationally recognized resource offers information on job responsibilities, earnings, working conditions, and job prospects for the future.

Take a Reality Check

The Texas Workforce Commission has created an online resource called Reality Check to help you understand how much money you'll need to live on your own after high school or college and how you can earn it. There are three ways to explore careers, expenses, and earnings. For the first option, which is called "Get a Reality Check," you choose an area you'd like to live in, such as Austin. You then go through a series of screens with real-world costs for items such as housing, clothing, transportation, health care, and personal expenses. The site automatically adds up your estimated monthly expenses, then uses salary information for Texas to show you careers that will make you that much money. The second option, called "Future Salary," starts with the wages you expect to earn, what education you plan to pursue, and the career cluster that interests you. Then it generates a list of careers in which you can make that amount of money. The third option, "Occupation Direct," begins with your occupational choice and the area where you want to live, then shows how your estimated expenses subtract from the salary for your chosen job. The site, which is at www.careerwise.mnscu.edu/careers/realitycheck.html, is a great way to play "what if" when it comes to mixing your job, earnings, and expense options.



The results of Reality Check show you how expenses add up quickly when you are living on your own.

Texas CTE Career Clusters



**Agriculture,
Food &
Natural
Resources**

Processing, production, distribution, and development of agricultural commodities and natural resources



**Architecture &
Construction**

Designing, managing, building, and maintaining the built environment



**Arts, A/V
Technology &
Communications**

Creating, exhibiting, performing, and publishing multimedia content



**Business
Management &
Administration**

Organizing, directing, and evaluating functions essential to productive business operations



**Education &
Training**

Providing education and training services, and related learning support services



Finance

Financial and investment planning, banking, insurance, and business financial management



**Government
& Public
Administration**

Executing governmental functions at the local, state, and federal levels



Health Science

Providing diagnostic and therapeutic services, health informatics, support services, and biotechnology research



**Hospitality
& Tourism**

Managing restaurants and other food services, lodging, attractions, recreation events, and travel-related services



**Human
Services**

Providing for families and serving human needs



**Information
Technology**

Designing, supporting, and managing hardware, software, multimedia, and systems integration



**Law,
Public Safety,
Corrections
& Security**

Providing legal, public safety, protective, and homeland security services



Manufacturing

Processing materials into intermediate or final products



Marketing

Performing marketing activities to reach organizational objectives



**Science,
Technology,
Engineering &
Mathematics**

Performing scientific research and professional and technical services



**Transportation,
Distribution
& Logistics**

Managing movement of people, materials, and goods by road, pipeline, air, rail, and water

About Texas CTE

You may have seen the name Texas CTE on the cover of this magazine. What exactly is that?

Texas CTE is the name of Texas' college and career education initiative. The idea behind it is simple: Planning for the future so that students achieve lifelong success. As Texas CTE grows, you'll see how subjects such as English, math, science, and social studies are relevant to your personal goals and ambitions. You'll get the chance to begin a plan that gets you where you want to go in life. You'll have the opportunity to take courses and engage in extended learning experiences that give you marketable skills. Best of all, you'll be in control of your future. Read all 16 editions of Texas CTE in Action (available through your counselor) to explore Texas' career clusters and start on the road to success.