



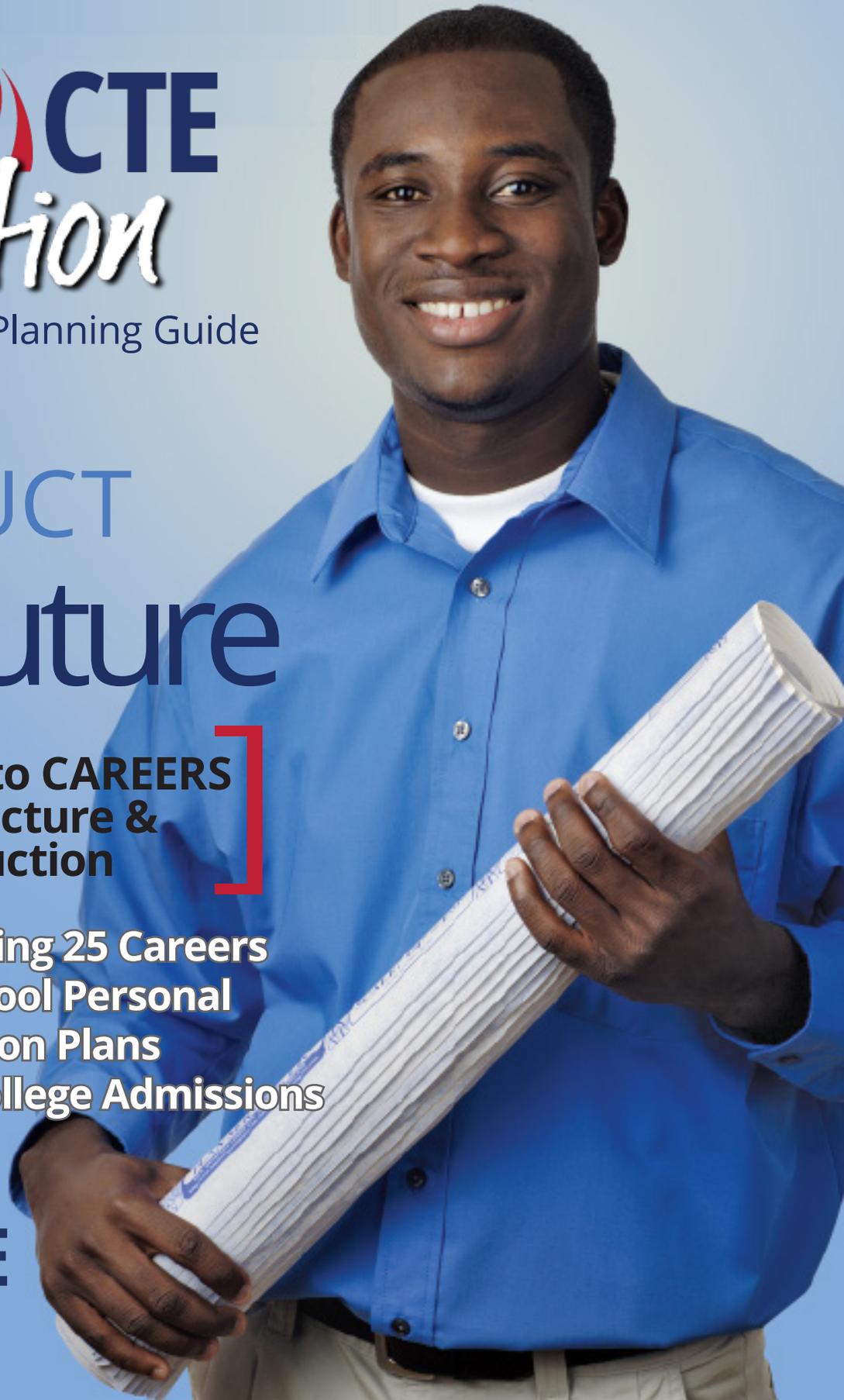
TEXAS  CTE
In Action

A College and Career Planning Guide

CONSTRUCT
Your Future

**[YOUR GUIDE to CAREERS
in Architecture &
Construction]**

- 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.

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.

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



LOOK AROUND YOU. You are likely inside a room in a building, maybe your school. You are in a structure that started with an idea in an architect's head. He or she imagined how tall it would be, how many rooms it would hold, where the walls and doorways would stand. The architect drew up plans that guided teams of people as they went about constructing the building—plumbers, electricians, masons, roofers, framers, and so on. And now that the building is finished, another team of people manage and maintain it, keeping equipment up and running, the spaces clean and organized, and the windows glistening. These are the people who work in the Architecture & Construction cluster. If you like to design and build things, tinker with tools and technology, or decorate homes and offices with flooring, paint, furniture, and art, then Architecture & Construction could be the right career cluster for you.

Building Dreams

**NEARLY 10,000
MEMBERS**

OF THE TEXAS ASSOCIATION OF BUILDERS
(WWW.TEXASBUILDERS.ORG) REPRESENT
702,500 JOBS AND MORE THAN \$31.1
BILLION IN THE TEXAS ECONOMY.

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, Human Resources Director of Environmental Services for Philips 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 magazine 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 Agriculture, Food & Natural Resources.

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.

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

Research Your Career Options

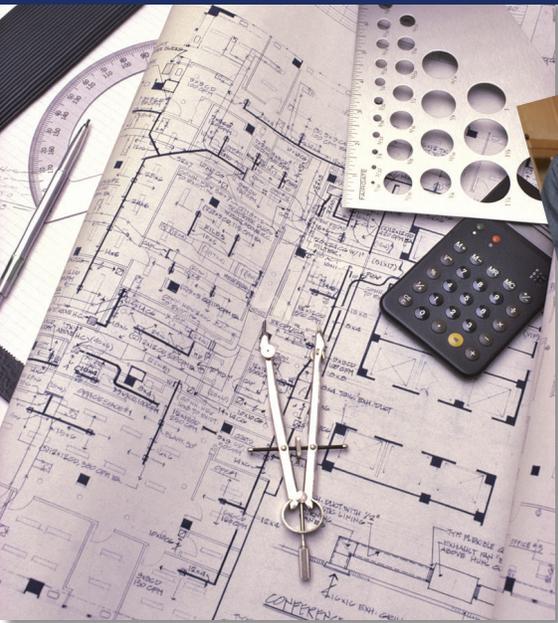
Once you’ve learned about yourself, learn more about your career options. There are thousands of occupations out there of which you may never have heard, and others that do not yet exist because the technologies have not been developed. Fortunately, there are plenty of resources (see inside back cover)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

UNIVERSITY OF TEXAS
SCHOOL OF ARCHITECTURE
STUDENTS TYPICALLY RANKED IN
THE TOP QUARTER OF THEIR HIGH
SCHOOL CLASS AND HAD A HIGH
SCHOOL GPA OF 3.0 OR ABOVE.



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."

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 Architecture and Construction leading to a Business & Industry Endorsement and then later become interested in a narrower field such as a Building Inspector or Construction Manager.

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 drafter or a four-year degree as a landscape architect.

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.

Architecture & Construction CTSOs

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

- Family, Career and Community Leaders of America (FCCLA) www.texasfccla.org
- SkillsUSA www.skillsusatx.org
- Texas Technology Student Association (TSA) www.texastsa.org



IN 1996,
TEXAS TECH UNIVERSITY
 COLLEGE OF ARCHITECTURE BECAME
 THE FIRST ARCHITECTURE EDUCATION
 PROGRAM IN THE NATION TO OFFER
 A 173-CREDIT-HOUR MASTER OF
 ARCHITECTURE PROFESSIONAL DEGREE.



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 Architecture and Construction cluster, for example, includes construction manager or architect. 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 Architecture and Construction, you might choose to focus on Design/Pre-Construction in high school and college.

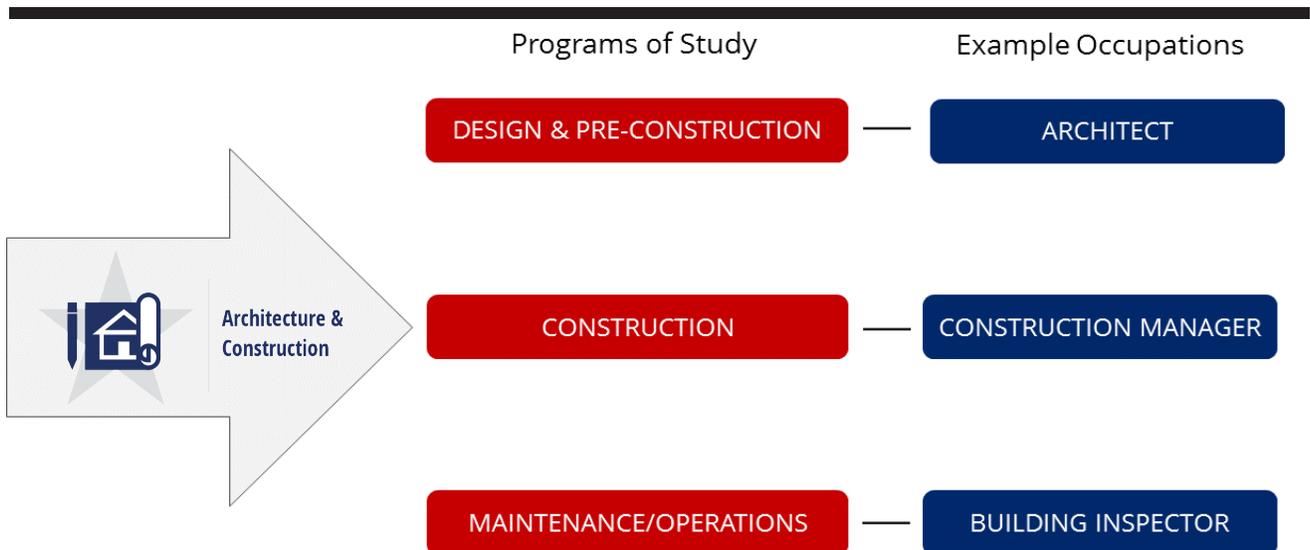
Related Occupations

Each career pathway includes a range of related occupations; agriculture financial manager is an example of an occupation that falls within Design/Pre-Construction. 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 three programs of study within the Architecture and Construction 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

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.

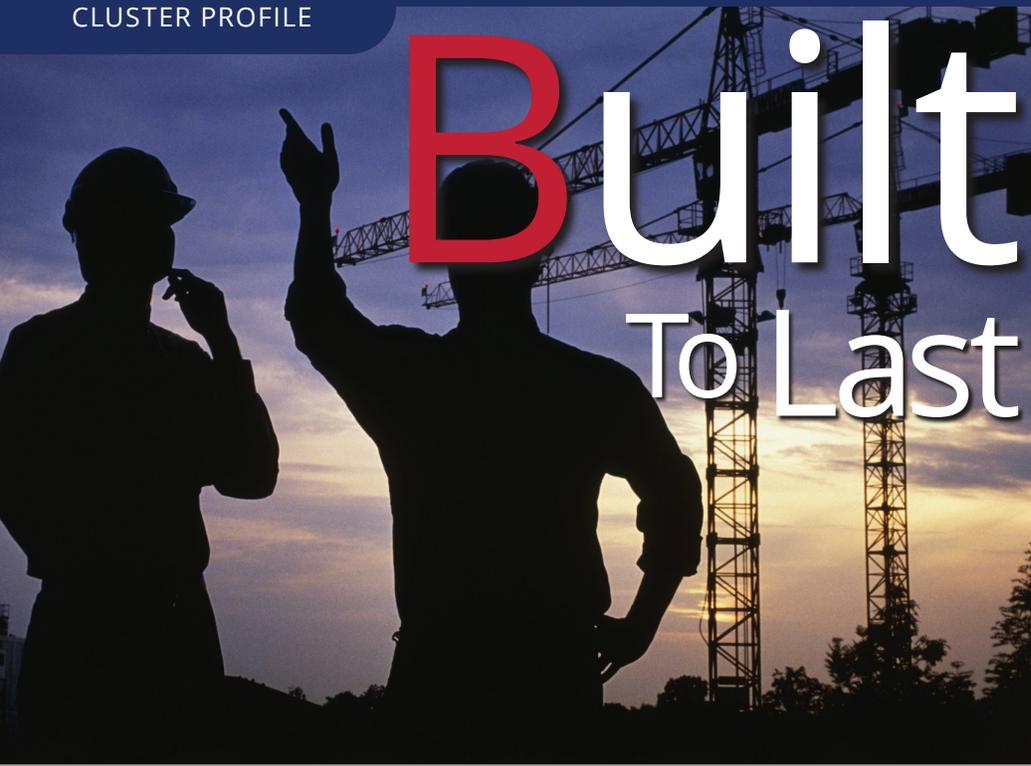
PICK extended learning activities that complement your classes (see page 14). Work on community service projects. Plan for paid and unpaid career learning experiences, such as job shadowing and internships. All these extracurricular activities can give you experience that will help you get into college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

High School Personal Graduation Plan
 Name: Taylor Jones, West High School
 Endorsement: Business & Industry
 Cluster: Architecture & Construction
 Program of Study: Design/Pre-Construction
 Career Goal: Architect
 Postsecondary Goal: Bachelor's Degree in Architecture

Foundation High School Program Requirements (22 Credits)	Business and Industry Endorsement Requirements (26 Credits)
English Language Arts (4 Credits) • English I • English II • English III • Advanced English Course Mathematics (3 Credits) • Algebra I • Geometry • Advanced Mathematics Course Science (3 Credits) • Biology • IPC or Advanced Science Course • Advanced Science Course Social Studies (3 Credits) • U.S. History • U.S. Government (one-half credit) • Economics (one-half credit) • World Geography or World History 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)	Math (1 Additional Credit) Science (1 Additional Credit) Career Related Electives (2 Additional Credits) EXAMPLE CAREER RELATED ELECTIVES Principles of Architecture Architectural Design I Construction Technology I Engineering Design and Presentation Construction Management I Masonry Technology I Practicum in Architectural Design 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 PERFORMANCE ACKNOWLEDGEMENT Outstanding performance • 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

Curricular Experiences: FCCLA, SkillsUSA, Technology Student Association
 Extracurricular Experience: Architectural/Engineering Summer Camps, Association of General Contractor Conferences, Historic Building Tours, Home Tours, Student Council
 Career Learning Experiences: Apprenticeship, Career Preparation—Paid or Unpaid, Internship, Job Shadowing
 Service Learning Experiences: Habitat for Humanity

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.



Built To Last

Architecture & Construction is BOOMING for people who work with their heads and hands.

The opportunities for employment in Architecture & Construction are huge," exclaims Charlene Anthony, executive director of Houston's chapter of Associated General Contractors of America. "The industry is strong and predicted to stay strong. In terms of workforce development, I'd even say it's in a crisis state because there just aren't enough people—at all levels, from professional all the way down to the trades."

Look around any Texas city and

you'll see what Anthony is talking about. Office buildings, hospitals, shopping malls, and other structures are sprouting up everywhere. Subdivisions consisting of everything from condos to mansions are spreading throughout the suburbs. The Dallas Cowboys opened a new stadium which cost \$1.2 billion.

Clearly, Architecture & Construction is a hot cluster when it comes to career opportunities. In fact, construction is among the top ten fastest growing industries in Texas.

Tactile and Analytical

In the building industry, it takes two types of people to construct a structure.

People working in design and pre-construction—such as architects, landscape architects, and interior designers—use their creativity to plan and design buildings and their environments.

Construction, maintenance, and operations workers, on the other hand, are detail-oriented people who like to work with their hands.

What brings these two types together in a common enterprise? Both say it's their love of buildings.

"The most fulfilling part of my job," says Russell Niemann, project manager at the successful Houston construction firm Tribble & Stephens, "is being able to see the results of your work—a building. You look up and there's this finished product."



QUIZ

Is Architecture & Construction the right cluster for you? Take this quick quiz to find out. Answer "yes" or "no" to the following questions.

1.

Do you like to draw?

2.

Are you good at working with tools?

3.

Did you build things with Legos or blocks as a child?

4.

Do you get good grades in math and science?

5.

Do you like working on projects as part of a team?

6.

Have you ever built a tree house or another structure?

7.

Do you enjoy decorating your bedroom or other rooms in your home?

8.

Are you good at following directions?

9.

Do you dream of constructing skyscrapers or other structures?

10.

Do you like working with your hands?

If you answered "yes" to five or more of the above questions, Architecture & Construction may be the right cluster for you. To get a more specific and scientific idea 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)
Civil Engineers	31%	1,285
Cost Estimators	28%	870
First-Line Supervisors of Construction Trades	25%	2,290
Architects	25%	435
Painters, Construction & Maintenance	24%	1,135
Operating Engineers & Other Construction Equipment	23%	1,655
Heating, A/C & Refrigeration Mechanics & Installers	22%	1,090
Electricians	21%	2,015
Interior Designers	21%	230
Carpenters	20%	1,585

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

All-Around Good Workers

What do you need to do to take advantage of the hiring boom in Architecture & Construction?

"It's really good to have a knack for science and math, but you also need to be proficient at reading and understanding," says architect Lynne Cox, adjunct faculty at the University of North Texas in Denton. A successful career in construction or architecture depends on your ability to work with others, and that requires people well-informed in all subjects who can get along with almost anyone.

"A sense of history, art, and architecture history is important," says Cox. "Then there's also the marketing aspect of these careers, so a good business sense is helpful. Basically, there are a lot of people in this field who are good at being generalists."

"Construction is a lot of teamwork," Niemann adds, "so I would think anyone who enjoys being part of sports teams and things of that nature would develop strong teamwork skills. Communication is the most important aspect of this field—face-to-face contact, not just email."

Working Wages

Salaries in both architecture and construction depend on the amount of training you have, the years of experience, and how much responsibility you're willing to assume. "The pay in construction depends on your level," says Anthony. "Carpenters can make \$33,200 a year. Masons might make approximately \$37,023. And of course, if you get into management positions and ownership, it's going to be much higher. Going into a company after a reputable four-year university as a junior project manager, you're going to start out right out of school at about \$51,000 a year."

Be aware that demand for workers and the wages paid in

Architecture & Construction are both closely linked to the Texas economy. While times may be good at one point, an economic downturn can lead to layoffs. The way to protect yourself is to develop skills that make you unique in the job market.

Giving Back

In Architecture & Construction, be ready for interesting work and good pay. But keep in mind, Cox says, that you owe something to the profession as well. "Throughout history," she observes, "buildings have always affected culture as much as they have reflected it. Architecture is as much art as it is science, and I think there's a tremendous responsibility to enhance the community with artistic design."

MORE THAN
5,000
ARCHITECTS,
ASSOCIATES, FORMER
ARCHITECTS, AND
HONORARY MEMBERS
BELONG TO THE
TEXAS SOCIETY OF
ARCHITECTS.



10 Top-Paying Careers

Occupation	Average Wage	Entry-Level Wage	Experienced Wage
Architectural & Engineering	\$77.09	\$46.03	\$92.61
Geoscientist	\$72.87	\$34.60	\$92.00
Civil Engineer	\$47.39	\$28.80	\$56.68
Environmental Engineer	\$47.28	\$25.96	\$57.94
Electrical Engineer	\$47.13	\$30.74	\$55.32
Construction Manager	\$39.81	\$24.66	\$47.38
Architect	\$38.06	\$22.67	\$45.75
Cost Estimator	\$31.38	\$18.33	\$37.91
First-Line Supervisor of Construction Trades & Extraction	\$29.12	\$17.95	\$34.70
Interior Designer	\$27.72	\$15.17	\$34.00

This is a chart of hourly wages for 10 of the top-paying careers in the Architecture & Construction 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

BROAD-BASED SKILLS

"Architecture is a blend of art and science," says Kip Daniel, a principal architect at the Beck Group, a firm based in Dallas that does both architecture and construction. The firm has designed and built major projects as varied as airport terminals and churches, corporate offices and theaters. "What we look for at Beck is people with a broad background who can work in both areas, architecture and construction," he says. "We require a professional degree in architecture for our architects, but there are different areas of expertise. I do conceptual creative design, for example, but other people in the company are more technical. And some have administrative skills. On the construction side, most of our people come from an engineering background," he says.

TECHNICAL SKILLS

Josh Guerra, a designer with a master's degree in architecture in the Dallas office of RTKL, an architecture, engineering, and planning firm, says that prospective architects should take rigorous classes in science and math, including physics. "When you design buildings, you have to deal with gravity and with the way loads are carried," he observes. Computer literacy is a must, he says, particularly the ability to use three-dimensional computer programs. And, of course, specialized skills such as framing, roofing, plumbing, and wiring are essential for construction workers.

TEAMWORK AND LEADERSHIP

Evidence that a job applicant has the drive to finish a project and can work with a team is critical. "Architects need a sense of leadership," says Ed Soltero, a practicing architect who oversees planning and construction at the University of Texas at El Paso. "They need self-motivation, self-starter attitudes, and the ability to work with a team. You typically deal with other consultants."

Ed McGuire, senior vice president for construction at Bob Moore Construction, a mid-sized construction company based in Arlington, says that his company, too, looks for technical and leadership skills. "The construction business has come a long way from the hammer-and-nails image," he observes. "Everyone here is an overachiever, and we go for the self-motivated, gung-ho person who is willing to work long hours."



Building PRIDE

Professionals in Architecture & Construction SHARE THE SATISFACTION of creating their communities.

When you think about what it's like to work in Architecture & Construction, imagine a team of people all pushing toward a single goal. The group includes workers with a wide variety of talents—building design, interior design, landscape design, project management, cost estimation, roofing, plumbing, electrical work, bricklaying, heating and air conditioning, building maintenance, and many other talents. Everyone plays a part in bringing a building project to completion.

Charlene Anthony, executive director of Houston's chapter of Associated General Contractors of America, notes that the team is united by a common sense of accomplishment. "There's a level of pride in the industry, driving around your community and knowing you've

helped build it," she observes. "That's the resounding thing I hear, whether it's building a place of worship or homes or shopping centers—there's a sense of satisfaction in having helped build your community."

Design and Planning

Building projects usually start with an architect and project planners.

"Architecture is a lot more complex than most people believe. It's not just putting lines on paper," notes architect Lynne Cox, adjunct faculty in the Department of Learning Technologies at the University of North Texas in Denton. "It's the ability to translate what those lines will look like once a building is built. Architects envision what no one else has seen. This is the largest form of visual arts."

But architecture is not just about art, she's quick to explain. It's also about function. Designers must understand structural engineering, electrical engineering, and every other aspect of what goes into a building.

"It gets quite involved," Cox notes. "Designing systems gets pretty sophisticated, especially in commercial buildings."

Planning and design is not just about putting up single structures, either. Architects who go into urban planning think even bigger—they plan communities, roadways, landscaping, and



5,850 INTERIOR DESIGNERS

WILL BE WORKING IN THE STATE OF TEXAS IN 2022,
ACCORDING TO THE TEXAS WORKFORCE COMMISSION.

more. "They have to decide where to build the schools, the gas stations, the parks, right down to the municipal parking lots," Cox explains.

The decisions that take place inside buildings can be just as complicated and important as those made on the larger scale. Interior designers make critical judgements that affect the function and environment of rooms in residential homes as well as in commercial structures. They create floor plans, often with computer-aided drafting software, and choose paint, wallpaper, flooring, furnishings, and other elements of interior decor. They work with spaces ranging from cozy breakfast nooks in suburban cottages to the broad expanse of office cubicles filling entire floors of commercial skyscrapers.

Construction

Once interior and external plans are created, they are turned over to a team of contractors and crafts people who handle the construction.

"There's something wonderfully rewarding about watching something

evolve from a drawing," Cox says. Specialists in the construction trades do framing, painting, masonry, flooring, electrical wiring, cabinet making, heating and air conditioning work, glazing (installing windows), and more.

Almost every member of the construction team must be up on the latest technology, Anthony stresses. "Technology has certainly facilitated the forward momentum as far as communications in the world of design go," she says. "The use of software applications is absolutely crucial."

Of course, there are the more "nuts and bolts" aspects of construction, which don't depend on technology but are every bit as crucial. "The ability to read a drawing and translate it is important," says Cox. "In general, someone who builds things wants to measure twice and cut once. That kind of attention to detail is essential in construction jobs."

"Some construction professionals, such as those who do skilled masonry work, are highly skilled artists," Cox notes. "You can really tell a building that has been put

together by a craftsman as opposed to someone who has no vested interest in the outcome."

Maintenance/Operations

Once buildings are finished, they require another team of people to operate and maintain them. These workers clean, repair, upgrade, and service every corner of a structure. They work as painters; groundskeepers; landscapers; roofers; heating, ventilation, and air conditioning experts; and refrigeration mechanics. Cox notes, "If you have a broken window, no one is more important to you than a glazier."

No matter what your academic aptitude, there is likely to be a place for you in Architecture & Construction. The most important requirements for success, says Anthony, are "dedication, maturity, loyalty, clear-mindedness, and a willingness to learn."



5 Cool Careers

CHECK OUT THESE EXCITING CAREERS IN ARCHITECTURE & CONSTRUCTION.

1.

ARCHITECTURAL DRAFTER

Are you the type of person who doodles snazzy cars or skyscrapers on the inside flap of your algebra notebook? If so, you just might be right for a career as an architectural drafter. Essentially, this line of work would have you working alongside the architect, drawing detailed plans of projects according to his or her specifications.

2.

LANDSCAPE ARCHITECT

Being in Architecture & Construction doesn't mean you have to work on buildings themselves. Designing the landscape of residential and commercial projects is an equally exciting and important part of construction. Becoming a landscape architect entails a four- to five-year college degree and, of course, a green thumb.

3.

STONEMASON/STONE FABRICATOR

This is the ultimate field for someone who dreads a desk job. Stonemasons and stone fabricators are highly skilled artisans specializing in the use of natural and synthetic stone in constructing walls, walkways, bridges, mantels, and more. Most learn the craft through an apprenticeship, which can last anywhere from a year to five years.

4.

GRAZER, BULLDOZER, AND SCRAPER OPERATOR

Admit it, you loved playing with toy bulldozers as a kid, right? Here's your chance to work with the real thing. It only takes a few months of on-the-job training to become skilled at handling big machinery like grazers, bulldozers, and scrapers.

5.

HISTORIC PRESERVATIONIST

Careers in building aren't always about new construction. As in any other creative field, architects and construction specialists look to the works of past masters for inspiration. In fact, some people specialize in preserving old theaters, schools, homes, and other buildings—restoring these treasures before they become condemned. This is one of the most lucrative and respected specialties in the building world.

Architecture & Construction

Listed below are 25 careers you might consider in the Architecture & Construction cluster. These are occupations available to you at different education levels. Turn to the “Online Info” on the inside back cover for more information. Choose the career that best fit 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
17-1012	Landscape Architect	24%	40	\$66,894	Bachelor's degree
17-1011	Architect, except Landscape and Naval	25%	435	\$79,161	Bachelor's degree
17-1022	Surveyor	18%	195	\$55,966	Bachelor's degree
27-1025	Interior Designer	21%	230	\$57,661	Bachelor's degree
11-9021	Construction Manager	15%	1,970	\$82,806	Bachelor's degree
17-3013	Mechanical Drafter	9%	105	\$60,834	Postsecondary award
17-3011	Architectural and Civil Drafter	6%	205	\$50,669	Postsecondary award
49-2098	Security and Fire Alarm Systems Installer	24%	220	\$39,747	Postsecondary award
13-1051	Cost Estimator	28%	870	\$65,273	Work experience in a related occupation
47-4011	Construction and Building Inspector	23%	345	\$55,035	Work experience in a related occupation
47-2111	Electrician	21%	2,015	\$44,108	Long-term on-the-job training
47-2031	Carpenter	20%	1,585	\$31,798	Long-term on-the-job training
47-2044	Tile and Marble Setter	18%	90	\$32,766	Long-term on-the-job training
47-2021	Brickmason and Blockmason	33%	230	\$37,023	Long-term on-the-job training
47-2043	Floor Sander and Finisher	20%	0	\$30,536	Moderate-term on-the-job training
47-2181	Roofer	9%	190	\$30,139	Moderate-term on-the-job training
47-2081	Drywall and Ceiling Tile Installer	19%	270	\$31,482	Moderate-term on-the-job training
47-4051	Highway Maintenance Worker	18%	175	\$32,332	Moderate-term on-the-job training
53-7021	Crane and Tower Operator	27%	300	\$48,086	Moderate-term on-the-job training
49-9096	Rigger	35%	170	\$45,854	Short-term on-the-job training
47-3013	Electrician-Helper	33%	410	\$29,047	Short-term on-the-job training
47-3012	Carpenter-Helper	22%	145	\$27,999	Short-term on-the-job training
47-3014	Painter, Wallpaperer, Plasterer, and Stucco Mason-Helper	16%	60	\$24,945	Short-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.

are not all the career options in the cluster—they are just a sampling showing the variety of back cover to research all career options in the cluster of your choice and decide on the ones that each column.

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 architect, for example, and you'll see that virtually everyone in the field has 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 33 percent of the people working as cost estimators have a high school diploma, while 38 percent have some college, and 29 percent have four-year degrees or better.

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

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

Education Levels	Job Description
	Plan and design land areas for such projects as parks and other recreational facilities; airports; highways; hospitals; schools; land subdivisions; and commercial, industrial, and residential sites.
	Plan and design structures, such as private residences, office buildings, theaters, factories, and other structural properties.
	Make exact measurements and determine property boundaries. Provide data relevant to the shape, contour, gravitation, location, elevation, or dimensions of land or land features on or near the earth's surface for engineering, mapmaking, mining, land evaluation, construction, and other purposes.
	Plan, design, and furnish interiors of residential, commercial, or industrial buildings. Formulate design that is practical, aesthetic, and conducive to intended purposes, such as raising productivity, selling merchandise, or improving lifestyle. May specialize in a particular field, style, or phase of interior design.
	Plan, direct, coordinate, and budget, usually through subordinate supervisory personnel, activities concerned with the construction and maintenance of structures, facilities, and systems. Participate in the conceptual development of a construction project and oversee its organization, scheduling, and implementation.
	Prepare detailed working diagrams of machinery and mechanical devices, including dimensions, fastening methods, and other engineering information.
	Prepare detailed drawings of architectural and structural features of buildings or drawings and topographical relief maps used in civil engineering projects, such as highways, bridges, and public works. Utilize knowledge of building materials, engineering practices, and mathematics to complete drawings.
	Install, program, maintain, and repair security and fire alarm wiring and equipment. Ensure that work is in accordance with relevant codes.
	Prepare cost estimates for product manufacturing, construction projects, or services to aid management in bidding on or determining price of product or service. May specialize according to particular service performed or type of product manufactured.
	Inspect structures using engineering skills to determine structural soundness and compliance with specifications, building codes, and other regulations. Inspections may be general in nature or may be limited to a specific area, such as electrical systems or plumbing.
	Install, maintain, and repair electrical wiring, equipment, and fixtures. Ensure that work is performed in accordance with relevant codes. May install or service streetlights, intercom systems, or electrical control systems.
	Construct, erect, install, or repair structures and fixtures made of wood, such as concrete forms; building frameworks, including partitions, joists, studding, and rafters; stairways; window and door frames; and hardwood floors. May also install cabinets, siding, drywall, and batt or roll insulation. Includes those who build doors or brattices (ventilation walls or partitions) in underground passageways to control the proper circulation of air through the passageways and to the working places.
	Apply hard tile, marble, and wood tile to walls, floors, ceilings, and roof decks.
	Lay and bind building materials, such as brick, structural tile, concrete block, cinderblock, glass block, and terra-cotta block, with mortar and other substances to construct or repair walls, partitions, arches, sewers, and other structures.
	Scrape and sand wooden floors to smooth surfaces using floor scraper and floor sanding machine, and apply coats of finish.
	Cover roofs of structures with shingles, slate, asphalt, aluminum, wood, and related materials. May spray roofs, sidings, and walls with material to bind, seal, insulate, or soundproof sections of structures.
	Apply plasterboard or other wallboard to ceilings or interior walls of buildings. Apply or mount acoustical tiles or blocks, strips, or sheets of shock-absorbing materials to ceilings and walls of buildings to reduce or reflect sound. Materials may be of decorative quality. Includes lathers who fasten wooden, metal, or rockboard lath to walls, ceilings, or partitions of buildings to provide support base for plaster, fireproofing, or acoustical material.
	Maintain highways, municipal and rural roads, airport runways, and rights-of-way. Duties include patching broken or eroded pavement and repairing guard rails, highway markers, and snow fences. May also mow or clear brush from along road or plow snow from roadway.
	Operate mechanical boom and cable or tower and cable equipment to lift and move materials, machines, or products in many directions.
	Set up or repair rigging for construction projects, manufacturing plants, logging yards, ships and shipyards, or the entertainment industry.
	Help electricians by performing duties of lesser skill. Duties include using, supplying, or holding materials or tools, and cleaning work area and equipment.
	Help carpenters by performing duties of lesser skill. Duties include using, supplying, or holding materials or tools, and cleaning work area and equipment.
	Help painters, paperhangers, plasterers, or stucco masons by performing duties of lesser skill. Duties include using, supplying, or holding materials or tools, and cleaning work area and equipment.

Lay a Strong Foundation



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

DESIGN & PRE-CONSTRUCTION

Professionals in this field create designs for the construction of cities, homes, and highways. They turn ideas into plans. Designers conceptualize ideas for the inside environments of homes, offices, and retail outlets, as well as hotels and resorts.

CONSTRUCTION

Construction workers build cities, homes, and highways. They construct or remodel buildings used for living and work on structures such as streets, bridges, tunnels, and airports.

MAINTENANCE/OPERATIONS

People working in this field are responsible for the maintenance, repair, and restoration of cities, houses, and highways. They also repair and maintain factory equipment, streets, schools, offices, and homes.

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

TAKE A BROAD SELECTION of subjects to get ready for success in Architecture & Construction.

At first glance, preparing for careers in Architecture & Construction might seem like a matter of picking a specialty within the cluster—carpentry, masonry, electrical work, drafting—and focusing on the specialty with single-minded precision.

Even if you know where your career is headed, it's important to take a variety of courses in high school. That's because Architecture & Construction is a generalist's field involving teamwork and interaction with all sorts of people. Although you can take specialized courses in specific skills such as drafting, don't think your academic classes aren't important.

Communication Is Critical

Those who want to work in Architecture & Construction need to be able to communicate with all different types of people, including contractors, clients, laborers, inspectors, and designers. That

means having a strong foundation in English—reading, writing, speaking, and listening—

is essential.

"You have to demonstrate good communication skills to be taken seriously," says Toby Velasquez, general manager of Pooldeck Construction in Dallas. If you're competing with someone else for a job, he says, the person who is better at writing and speaking will often be selected.

Speaking a foreign language is also a plus in this cluster. Velasquez speaks four languages (Spanish, Italian, and Japanese in addition to English) and says, "I've used all of them on the job at one time or another."

Master Science and Math

Architecture & Construction also requires strong math and science skills. Understanding the physics of how a building is built and knowing the algebra and geometry used for the thousands of specifications and measurements that go into a complex building helps you get ahead in the construction business.

"I would recommend taking rigorous math as well as art courses," says Mary Crites, an architect and principal in the Lubbock office of Parkhill, Smith, and Cooper, Engineers, Architects, and Planners. "I'm a firm believer that, for an architect, the art side can be learned. It does not have to be an innate ability. You have to be good with computers



TEXAS COLLEGE STUDENTS WHO STUDY AT AN ACCREDITED SCHOOL OF ARCHITECTURE CAN BECOME STUDENT MEMBERS OF THE TEXAS SOCIETY OF ARCHITECTS AND BE ELIGIBLE TO SERVE ON ITS COMMITTEES.

and math as well as have an eye for design. I recommend advanced placement math, not regular academic courses."

Choosing Career Electives

Your electives offer the opportunity to focus your studies on one of the three programs of study in Architecture & Construction. These classes will differ according to the program (see "Program Profiles," page 12) you choose.

Construction career electives include Electrical Trades, Bricklaying, Plumbing, Welding, and Stone Masonry.

Electives in the Design & Pre-Construction program of study include Drafting, Interior Design, and Landscaping.

Students in the Maintenance/Operations program can take classes such as Building Maintenance Technology

and Advanced Building Maintenance Technology.

Pursue Skill Certification

Classroom instruction in particular construction trades is sometimes paired with work-based learning opportunities that can help students work toward certification in particular skills.

Organizations such as the National Center for Construction Education and Research (NCCER) and the National Occupational Competency Testing Institute conduct certification testing. The NCCER maintains a national registry of student transcripts and certificates of completion that can be referenced by potential employers when students enter the workforce.

Try a Little of Everything

Educators encourage students interested in Architecture & Construction to take a few courses in each of the three programs of study in the cluster. Even if you never pick up a hammer or saw, you need to know how a building is put together.

Architecture & Construction classes may lead you in a direction you never imagined. Historic preservation, for example, is a hot field as communities seek to refurbish older structures. Another growing area is "green construction," which takes environmental factors, such as energy consumption and pollution, into account as new residential or commercial developments are planned, built, and maintained.

SPOTLIGHT

SCHOOL CONSTRUCTION Architects-to-be Launch Their Careers at Dallas Skyline Career Development Center

"These students are career focused," says Tom Cox. He's director of the Dallas Skyline Career Development Center architecture program, and he says the students participating show a special dedication. "They have chosen a career in Architecture & Construction," he says, "and they are learning the skills to be successful in their career."

"When they go to college, students in the Skyline program know that architecture is not easy," says Samuel Odamah, a former Skyline student now studying architecture at the University of Texas at Arlington. "Of the maybe 50 students who started the Skyline program in the ninth grade, only nine or 10 completed it."

That's because the program is so rigorous. "The first part of the school day you take classes in the courses required for graduation, and then in third and fourth periods you take all architecture courses,"

says Odamah.

"Architects come to school to give tutorials and critique student work," says Cox. "We offer a mentorship program called ACE (architecture, construction, engineering) to our seniors to give them insight into the building industry."

Cox says the program is a perfect fit for the type of person who's always known what he or she wants to do, and who doesn't want to waste any time reaching that goal. "Some cluster students travel great distances to get

to Skyline," he says. "If students spend an hour traveling each way, every day, they are serious about their education."

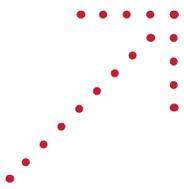
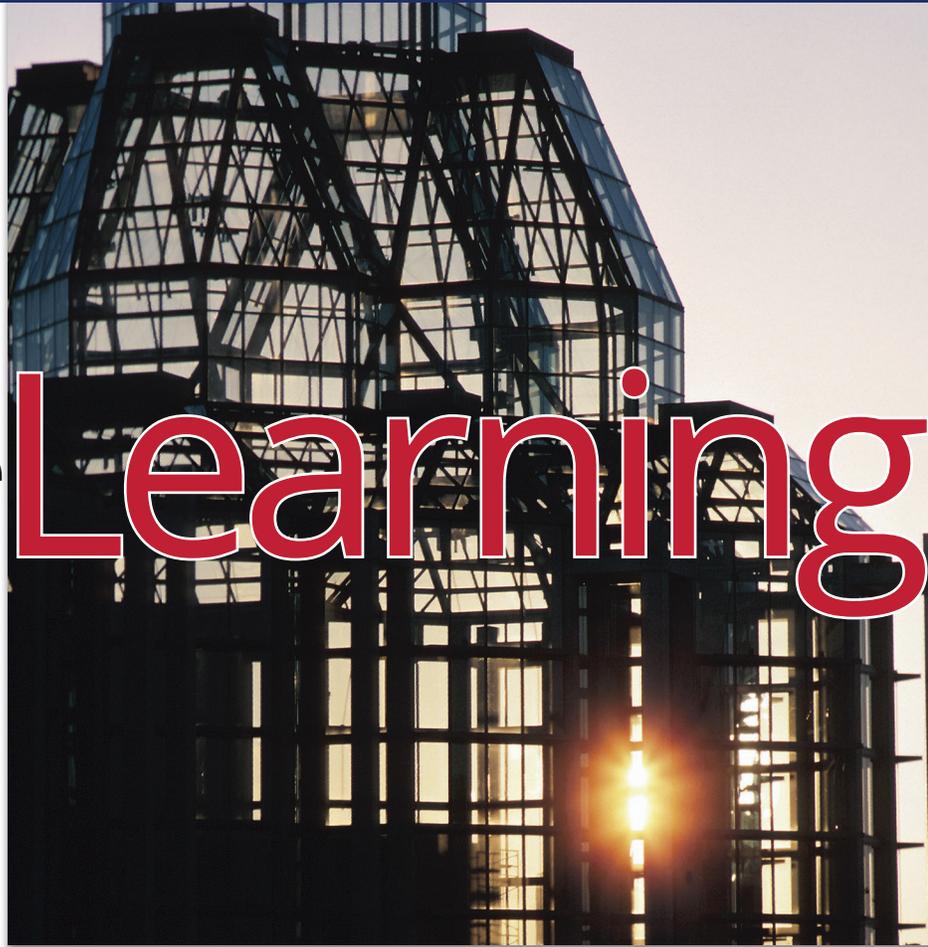
Odamah sums up: "Skyline taught me what I needed to do to prepare for my career choice. We learned about the different schools of architecture in Texas, the history of architecture, and the Architect Registration Exam. I started college ahead of my peers."



In Architecture & Construction, you'll need real-world experience to **MASTER YOUR CRAFT.**

On-site

Learning



In the summer of 2004, Pilot Point High School student Kate Tickner entered Huckabee University, a high school internship program sponsored by the Fort Worth architecture firm, Huckabee, Inc.

The nine students at Huckabee University (now called Next Generation Design Institute) formed three teams of three in a week-long competition for scholarship money.

"Our project was to design a high-end, multiuse retail/housing, restaurant/park development along the coastline at Galveston," Tickner recalls. "We had to fully develop a typical housing unit and then design the retail, restaurant, and park amenities."

Tickner's team won the competition. Now an architecture student at Drury University in Springfield, Missouri, Tickner continues to intern in the summer at Huckabee. "The week I spent at Huckabee really changed my plans for the future. It helped me see that architecture was definitely the route I wanted to follow through college."



Shadowing and Mentoring

Out-of-classroom learning, or extended learning, as it's also called, puts you in the offices and construction sites where buildings are planned and constructed.

It takes a number of different forms. Job shadowing involves going to the workplace and following a professional through the activities of his or her day. Many businesses around the country participate in February of each year in National Groundhog Job Shadow Day, but you can set up job shadows at any time of the year.

Job shadowing can lead to mentoring relationships with professionals in your chosen career. Mentors take students under their wing and advise them on career preparation, academic performance, and even how to prepare for a job interview.

Tosh Chachere, a student in Central High School in Beaumont, met mentor Chuck Mason, who runs a family-owned construction firm, while serving as a counselor at the Rotary Youth Leadership Awards (RYLA), a camp sponsored by Rotary International to teach students

leadership skills.

"Mr. Mason showed a personal interest in me and my future," says Chachere. "He regularly checked up on my progress and helped me out financially when I went off to college."

Internships

Paid or unpaid internships can help you land a job by giving you the chance to show potential employers what you can do. Gary Lopez, who works in human resources with SHW Group, an architectural firm with four offices in Texas, says internships provided for high school students from the Irving and Carrollton independent school districts have helped him find some of his best hires.

"Applying for the internship includes an interview process," Lopez says, "so students gain experience interviewing. Some of our best interns tell their friends about the firm. It's a high achievers network. When students are good, we make them a job offer once they complete college."

THE FORT WORTH-BASED NATIONAL ASSOCIATION OF WOMEN IN CONSTRUCTION

AWARDS MORE THAN \$25,000 IN SCHOLARSHIPS EACH YEAR TO STUDENTS IN CONSTRUCTION-RELATED PROGRAMS.

ONE OF THE
THE TOP CONSTRUCTION
 PROJECTS IN TEXAS WAS THE TERMINAL A
 RENOVATION, PHASE 2 AT THE DALLAS/FT.
 WORTH AIRPORT. THE \$138.74 MILLION
 PROJECT BEGAN IN 2005 AND WAS
 COMPLETED IN 2014.

Apprenticeship

Apprenticeship training is a common entryway into careers in construction. Participants earn certificates in skills such as carpentry, masonry, and electrical work.

Gary Strouz, training director of the Electrical Apprenticeship Training Program in Houston, says his program “combines on-the-job training and classroom studies to produce top-notch electricians. Contractors generally pair up one journeyman electrician with each apprentice.”

Strouz says there are similar programs in the Houston area for plumbers, pipefitters, carpenters, insulators, heavy machine

operators, bricklayers, and painters—“any craft that’s on a construction site.”

Though there are training programs for students still in high school, Strouz’s program requires a high school diploma, as well as proof of a passing grade in high school algebra. “You have to do mathematical calculations to do electrical work correctly,” he says. “We hold the students to a high level.”



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

CONSTRUCTION COMPETITION Students Vie for Building Awards in CTSOs

If you’re interested in Architecture & Construction, it’s a good idea to get a jump-start in your field while you’re still in high school. Because that cluster is particularly competitive, students who learn the basics at the high school level can have a competitive edge when they get to college or enter employment.

SkillsUSA, the Technology Student Association (TSA), and Family, Career, and Community Leaders of America (FCCLA) are student organizations that offer membership and activities related to a variety of occupational fields, including Architecture & Construction. In addition to membership, which allows students to form a network of friends with similar interests, there are also local, state, and national competitions.

Competitive events for students entering architecture and design fields include drawing floorplans or blueprints to judges’ specifications and other problem-solving exercises. Students interested in construction careers can compete in carpentry, residential wiring, welding, masonry, cabinetmaking, and more.

“The opportunity to compete really gives the students incentive. They strive to do better and learn skills of teamwork, problem solving, and leadership that you need to be successful on the job,” says Ada Kranenberg, program director for SkillsUSA Championships.

The thrill of competition may be enough motivation for some students to get involved in a CTSO, but Kranenberg suggests that participating in CTSO activities can also help a student take the right direction toward his or her career. “A student can get the experience he or she needs to decide whether to go to a four-year university, a technical school, or an apprenticeship,” she says.

To find out more about CTSOs, see “Architecture & Construction CTSOs” on page 3.





Pick the route AFTER HIGH SCHOOL that fits your personal ambitions in Architecture & Construction.

I was not a disciplined student in high school," admits Samuel Odamah, who attended Dallas Skyline Career Development Center in Dallas, "and even now, as an architecture student at the University of Texas in Arlington, I struggle with that a bit. In college, I've learned from other students that those who prepare well ahead of time and are very organized do better."

Whether, like Odamah, you're aiming for a career in architecture or planning to work in a skilled construction trade, it's important to start early, get organized, and create a blueprint for your future after high school. Here are some options.

Apprenticeships

"Typically," says Kevin Alter, associate professor of architecture at the University of Texas at Austin, "people in construction jobs learn from working apprenticeships." The Apprenticeship and Training Association of Texas, headquartered in Houston, includes apprentice training programs in all major construction trades, including bricklayers, carpenters, cement masons, electricians, ironworkers,

pipefitters, plumbers, and others.

Programs range from three to five years in length and combine classroom training—usually one or two nights a week—with full-time employment and on-the-job training working directly with skilled craftspeople. At the end of the program, trainees are prepared to take licensing exams for state certification.

Gary Strouz, training director with the Electrical Apprenticeship Training Program in Houston, stresses the benefits of working while undergoing training. "Trainees have medical insurance and get a \$2-an-hour raise every year, guaranteed in writing if they meet their obligations," he says.

Trainees in some programs are eligible for postsecondary credit from the Houston Community College System toward college certificates or associate's degrees.



Community and Technical Colleges

Community colleges and the Texas State Technical College System (TSTC) provide a variety of attractive options for students pursuing careers in Architecture & Construction.

Local articulated credit agreements, for example, set up six-year career and technical education programs beginning the first year of high school and continuing through two years at a community college. A typical articulated credit agreement in south Texas links high school studies in the United Independent School District in Laredo with studies at Laredo Community College leading to certificates in air

THE UNIVERSITY OF HOUSTON'S
GERALD D. HINES COLLEGE OF ARCHITECTURE LAUNCHED
THE STATE'S FIRST INDUSTRIAL DESIGN OF MASS
PRODUCED PRODUCTS PROGRAM IN THE FALL OF 2006.

RICE UNIVERSITY
AND UNIVERSITY OF TEXAS AT AUSTIN ARE AMONG
THE TOP TEN UNDERGRADUATE ARCHITECTURE
PROGRAMS IN THE NATION, ACCORDING TO THE
2014 RANKING BY DESIGNINTELLIGENCE.

conditioning and refrigeration.

The four campuses of the TSTC System—Harlingen, Marshall, Waco, and West Texas—offer certificates and associate’s degrees in areas such as building construction technology, framing carpentry, architectural/civil drafting, and other building trades. (Check the TSTC website at www.tstc.edu for program offerings.)

Four-Year Universities

Texas has several universities with well-respected programs in architecture.

Whether you enroll in architecture or another popular major such as construction management depends on your career goals. The architecture curriculum is focused on exploring the creative mind and seeking innovative solutions to problems, whereas construction management tends to be more about the nuts and bolts of buildings. Educators say the two disciplines are equally challenging.

Joe Surber, a construction science major at Texas A&M University, points out that some of the high school classes that have helped him most in his college program are physics, statistics, and English. What would he have studied harder in high school? “I would’ve put more effort into calculus and physics,” he says. “A lot of the math-based classes in my major build off those academic courses.”

According to Audrey Maxwell, project designer at WKMC Architects in Dallas, you can get either a bachelor’s degree in architecture in five years or a master’s degree in six years. Then students take an apprenticeship or internship for approximately 5,600 hours before taking the nine-part Architect Registration Examination in order to be fully qualified to practice. People typically take this exam by divisions and can retake segments until they pass all components.

It’s important to thoroughly research each architecture school and particular program before you apply. Among university architecture programs, Alter notes that there are two different teaching approaches.

“There are more technical programs

that are oriented to the practical aspects of building and there are other programs that take a more artistic approach,” he says.

Additionally, it’s helpful to familiarize yourself with the teaching styles at your school choices. Alter explains, “More than any other major, architecture is one-on-one education. Studio courses are usually 15 students to one teacher. And there are public critiques, which vary from school to school. Some are more aggressive and some are more supportive. So it’s a good idea to visit a class.”

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.

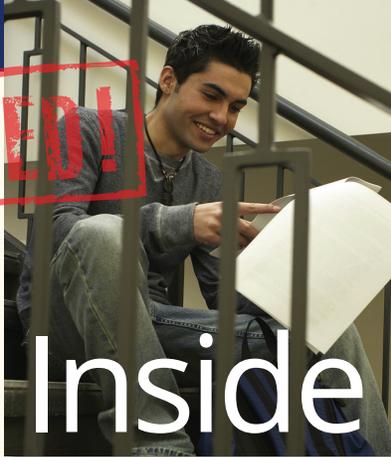


ACCEPTED!

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.

Inside College Admissions



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.



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.

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.

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

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.collegeforalltexas.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) www.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/oco

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.