



SCIENCE, TECHNOLOGY, ENGINEERING & MATHEMATICS (STEM)

A collage of various STEM-related images including pipettes, laboratory equipment, a person using a microscope, a circuit board, technical drawings, a person working with a multimeter, and a person looking at a computer screen. The entire collage is overlaid with a red tint.

CAREER SUCCESS GUIDE

Great Career Ideas • Creating Your Plan • College Resources



Kay Ivey, Governor of Alabama

A MESSAGE FROM THE GOVERNOR

As I've said on many occasions, our people are Alabama's greatest strength, especially our young people, who hold the state's future in their hands. As the guardians of our state's future, students deserve every possible tool to help them—and Alabama—succeed in all areas.

To achieve this, we have created the Alabama SUCCESS Guides, which are designed to assist students in identifying resources regarding

careers, postsecondary education and financial literacy. Through our students, we are positioning our state for even greater accomplishments. They will be well-equipped for careers in Alabama's workforce which will allow them to compete—and excel—in our global economy.

This Alabama SUCCESS Guide is an excellent tool in helping our students of today become our leaders of tomorrow.

ATTENTION PARENTS!

This guide is part of a series created to help students in Alabama learn more about high-demand careers, salaries, the steps they need to take to reach their goals, and the resources that can help them get there.

The workforce has changed since you entered it. Many of the jobs that exist today were not even created when you graduated from high

school, and the pace of change is faster than ever! However, since work skills are transferable to many jobs, by helping your student connect with what they learn in the classroom to real jobs that interest them, they will graduate better equipped for life after high school.

Thank you for talking with your child about what careers interest them – and why. You can help them by

sharing your own work experiences with your child. Ask people in your community who work in jobs that interest your child to share about their careers or let your child visit their workplace. And last, but not least, go with your child to meet with their school counselor or career coach to get them moving in the right direction. Help them prepare for their future...today.



WHAT EMPLOYERS WANT

BYRON DUNN
PRESIDENT
GULF STATES SHIPBUILDERS CONSORTIUM

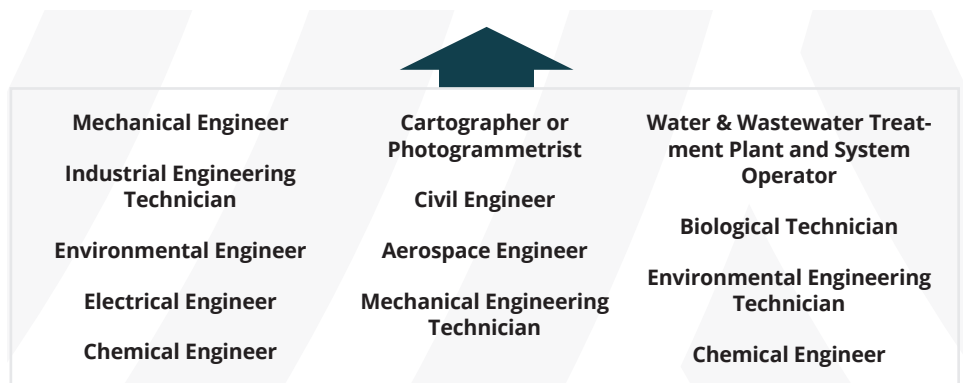
“A STRONG BACKGROUND IN SCIENCE, TECHNOLOGY, ENGINEERING, OR MATH IS REQUIRED TO BE SUCCESSFUL IN ANY FIELD. HAVING A STRONG BACKGROUND IN ALL OF THESE AREAS GIVES SOMEONE THE ABILITY TO SUCCEED AND ADVANCE TO THE HIGHEST LEVELS IN THE FIELD OF THEIR CHOICE.

In years past, someone could earn a good living by simply being strong and working hard at manual labor. Today, every industry from farming to space exploration uses technology that did not even exist when your parents were your age.

You have to understand that learning can never stop. Getting a high school diploma or a college degree is not the end to your education; it is only the beginning. New technologies affect every industry each day in Alabama. You must always be willing and eager to learn new things.”

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SAMPLE OCCUPATIONS



PATHWAYS

CLUSTER: STEM

THINK AGAIN

Now is the time to take a fresh look at Science, Tehnology, Engineering & Mathematics (STEM) careers you may not have considered before.

MYTH: Engineering is boring.

FACTS: Engineers are high-tech explorers who use new and exciting technologies like robotics to solve problems, discover better ways of doing things, and design the latest toys, tools, and modes of transportation. The work involves interesting hands-on projects in both indoor and outdoor settings. Engineering assignments can be found in nearly every Alabama industry, including aeronautics, video game design, shipbuilding, and power generation.

REALITY CHECK

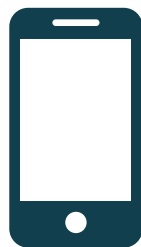
WHAT IT COSTS TO LIVE ON YOUR OWN IN ALABAMA
Estimated 2017-2018 monthly expenses for a 22 year-old living in Birmingham.

NOTE: Keep in mind that your paycheck will be reduced by about 30 percent to cover taxes, retirement, and insurance. What's left is known as your "take-home pay." Subtract 30 percent from the salaries shown on pages 5 and 6 to get a more accurate take-home amount.

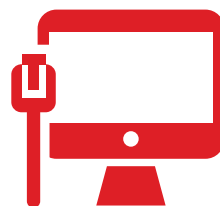
Groceries:
\$350-\$400



Mobile Phone:
\$55



Cable and Internet:
\$80



Gasoline:
\$100
(1,000 miles @ \$3.00 per gallon, 30 mpg)



Rent and Utilities:
\$700-\$850
(1 Bedroom)



Car Payment:
\$350-\$450
(Used 2016)



Car Insurance:
\$60-\$125
(6-Month Policy)



Sources:
RENT: rentbits.com/rb/t/rental-rates/birmingham-al
CAR: carsdirect.com
MOBILE PHONE: att.com, verizon.com
GROCERIES: bestplaces.net
CABLE AND INTERNET: birmingham.mybriighthouse.com
CAR INSURANCE: progressive.com
GAS: gasbuddy.com



MECHANICAL ENGINEER

Job Description: Perform engineering duties in planning and designing tools, engines, machines, and other mechanically functioning equipment. Oversee installation, operation, maintenance, and repair of equipment such as centralized heat, gas, water, and steam systems.

Education: Bachelor's degree

Salary Range: \$63,129 – \$103,603



ENVIRONMENTAL ENGINEER

Job Description: Research, design, plan, or perform engineering duties in the prevention, control, and remediation of environmental hazards using various engineering disciplines. Work may include waste treatment, site remediation, or pollution control technology.

Education: Bachelor's degree

Salary Range: \$49,723 – \$99,087



CARTOGRAPHER OR PHOTOGRAMMETRIST

Job Description: Collect, analyze, and interpret geographic information provided by geodetic surveys, aerial photographs, and satellite data. Research, study, and prepare maps and other spatial data in digital or graphic form for legal, social, political, educational, and design purposes. May work with Geographic Information Systems (GIS).

Education: Bachelor's degree

Salary Range: \$45,288 – \$71,302



INDUSTRIAL ENGINEERING TECHNICIAN

Job Description: Apply engineering theory and principles to problems of industrial layout or manufacturing production, usually under the direction of engineering staff. May perform time and motion studies on worker operations in a variety of industries for purposes such as establishing standard production rates or improving efficiency.

Education: Associate's degree

Salary Range: \$40,382 – \$69,970



ELECTRICAL ENGINEER

Job Description: Research, design, develop, test, or supervise the manufacturing and installation of electrical equipment, components, or systems for commercial, industrial, military, or scientific use.

Education: Bachelor's degree

Salary Range: \$64,266 – \$114,992



CIVIL ENGINEER

Job Description: Perform engineering duties in planning, designing, and overseeing construction and maintenance of building structures, and facilities, such as roads, railroads, airports, bridges, harbors, channels, dams, irrigation projects, pipelines, power plants, and water and sewage systems.

Education: Bachelor's degree and License

Salary Range: \$51,853 – \$93,659



AEROSPACE ENGINEER

Job Description: Perform engineering duties in designing, constructing, and testing aircraft, missiles, and spacecraft. May conduct basic and applied research to evaluate adaptability of materials and equipment to aircraft design and manufacture. May recommend improvements in testing equipment and techniques.

Education: Bachelor's degree

Salary Range: \$ 76,873 – \$130,508



MECHANICAL ENGINEERING TECHNICIAN

Job Description: Apply theory and principles of mechanical engineering to modify, develop, test, or calibrate machinery and equipment under direction of engineering staff or physical scientists.

Education: Associate's degree

Salary Range: \$36,890 – \$63,713



WATER & WASTEWATER TREATMENT PLANT AND SYSTEM OPERATOR

Job Description: Operate or control an entire process or system of machines, often through the use of control boards, to transfer or treat water or wastewater.

Education: High school diploma or equivalent and License

Salary Range: \$33,370 – \$51,629



BIOLOGICAL TECHNICIAN

Job Description: Assist biological and medical scientists in laboratories. Set up, operate, and maintain laboratory instruments and equipment, monitor experiments, make observations, and calculate and record results. May analyze organic substances, such as blood, food, and drugs.

Education: Bachelor's degree

Salary Range: \$25,757 – \$44,274



ENVIRONMENTAL ENGINEERING TECHNICIAN

Job Description: Apply theory and principles of environmental engineering to modify, test, and operate equipment and devices used in the prevention, control, and remediation of environmental problems, including waste treatment and site remediation, under the direction of engineering staff or scientist. May assist in the development of environmental remediation devices.

Education: Associate's degree

Salary Range: \$36,153 – \$68,547



CHEMICAL ENGINEER

Job Description: Design chemical plant equipment and devise processes for manufacturing chemicals and products, such as gasoline, synthetic rubber, plastics, detergents, cement, paper, and pulp, by applying principles and technology of chemistry, physics, and engineering.

Education: Bachelor's degree

Salary Range: \$74,200 – \$116,477

ERIN PINCOMBE PROJECT DEVELOPMENT ENGINEER

SOUTHERN POWER COMPANY

Graduate of McIntosh High School
Peachtree City, GA

I work on a team that manages the development of new power plants. I want to become an expert in the energy world so I can help solve problems that come with a growing population and delicate environment.

I am an energetic person, but as I child I struggled to control it. Joining different clubs and athletic teams showed me ways to channel my energy and taught me how to communicate regardless of social dynamics. Also, I have always loved science. I took a freshman class at UAB where science professionals talked about their careers.

Reaching out and collaborating with my peers was how I transitioned into engineering. I was excited by the variety of fields that I could apply engineering knowledge. Balancing collegiate soccer, engineering studies, and social groups refined my time management

“I want to become an expert in the energy world so I can help solve problems that come with a growing population and delicate environment.”

skills and gave me a solid ground to show that I could handle an engineering career. I work in a team of people in different fields that manages the development of new power plants. Even though I am an engineer, many of my daily tasks include project management, technology selection, and verifying accuracy of project costs. Our team visits different parts of the USA to find sites for new plants and then meets with local and national officials to prepare for construction. I hope to lead a division of an energy company and be an associate professor in the STEM field where I can share my industry experience.

CHUCK DI LAURA PRESIDENT

NEPTUNE TECHNOLOGY GROUP

Graduate of Saint Joseph Regional High School
Montvale, NJ

I am responsible for the growth, profitability and development of the company. I have reached most of my working goals so my next move is to retire and help others help themselves.

I never had any concrete idea of what I wanted to do while I attended school, but I knew that work was important and the value of the work drove how much money you could make; cutting lawns, shoveling snow, and delivering newspapers as a kid taught me this. So I decided that a job using my brain

“I work with motivated smart people who share my vision and passion for our company.”

would be better than using my hands. I also learned through my many jobs that I liked talking and interacting with people. In college, I decided to get more involved in activities; this taught me the importance of leadership and responsibility. I always focused on doing things better, improving the process, and solving problems. I started to interview with companies until I found the right fit. I worked

as a customer service manager while also training to be a sales person. I was promoted 15 months later to be a Territory Manager for a two-state area. Later I was promoted to Regional Sales Manager for 16 western states and moved to southern California. Promotions and relocations continued adding additional responsibilities until I finally became President of the company. I work with motivated smart people who share my vision and passion for our company. We love our customers, and we love our employees, and it's my responsibility to lead the way.

BRITNY LOCKRIDGE SOLAR OPERATIONS ENGINEER

SOUTHERN POWER COMPANY

Homeschooled
in Virginia

I work as a Solar Operations Engineer, and ensure clean solar plants stay running. I maximize energy generation and report any causes for plant underperformance.

Before choosing Electrical Engineering as my career path, I changed my mind on what I wanted to do many times from ballerina to marine biologist to fashion designer to architect. But while in middle and high school, I enjoyed challenging subjects like math and science. When it came time to choose a college major, my parents suggested engineering. I

liked the idea of pursuing a degree that was not only in a difficult field, but one where there were few females. My first couple of semesters at UAB proved difficult, but gave me a great sense of accomplishment and fulfillment as I completed each one. I learned how electrical engineering applied to everyday life, and fascination fueled my desire to pursue a challenging career. I developed a keener

“I changed my mind on what I wanted to do many times.”

interest in new and efficient technology and chose to pursue the more specific field of solar energy. I view my career choice as cool and glamorous.

The path to getting your ideal job is a difficult one. It may require you to study difficult subjects or concepts that you do not care for or don't feel apply to what you want to do, but these things are necessary as they teach you problem solving. Perseverance is a very important characteristic to have in any career field, but especially engineering.



ZANE HARTZOG

CIVIL ENGINEER

ALABAMA DEPARTMENT OF TRANSPORTATION

Graduate of Ariton High School
Ariton, AL

I work as part of a team that analyzes the viability of materials and material mix designs that will become working parts of our highway system. I assist in the certification of technicians, laboratories, asphalt plants, and specifications for these materials.

I knew I wanted to build things since I was four years old. I was good at math and science from a young age, but could never pay attention for very long. My mind always wondered to my next project rather than class work. Unstructured learning such as

independent projects and science fairs were more engaging to me than the repetition often found in a traditional classroom setting. I knew I wanted a job that let me build things, and use math and science, which pointed me to engineering. The courses at Enterprise Ozark Community College and at Auburn were difficult. University level science and math classes are a struggle if you've not experienced

"I enjoy the job and feel that what I do is important."

that level of academic challenge and learned good study habits in high school. Upon graduating college, I accepted a position with a construction company after several months of searching and interviewing. I worked there for a few months before being contacted by my current employer and accepting a position as a civil engineer graduate in a testing lab. I've found this to be a good fit for me. I do some hands-on work, lots of problem solving, and I've done a bit of management. I enjoy the job and feel that what I do is important.

CAROLYN KING

SOIL CONSERVATION TECHNICIAN

USDA-NATURAL RESOURCES CONSERVATION SERVICE

Graduate of Jemez Valley High School
Canyon, NM

I am responsible for the implementation of Conservation Farm Plans. I do any of the engineering work for my county (Baldwin) including surveying, designing, and overseeing construction of any structure that is built.

After high school I worked with the U. S. Forest Service in a program called Young Adult Conservation Corps. It wasn't until much later after being a stay-at-home mother of four kids that I was able to apply and get my current job. Without a college degree, I am currently at the top of advancement available to me. All my

educational experience for this job has been "on the job" training. Having people skills and being a good listener helps me accomplish my work objectives and career goals. It also helps to prepare early in school by taking math

"Having people skills and being a good listener helps me accomplish my work objectives and career goals."

and science classes as well as furthering your education, if possible.

I would love to say everything is great, but life is not perfect. I am able to be outside most of the time, which I enjoy. The landowners I work with are farmers, ranchers, and forest owners who I enjoy collaborating with. I make a difference in the landscaping of the environment. I am able to help them with erosion problems. I am able to help them better manage and be a better steward of their property.

TAMARA CUNNINGHAM JOHNSON

IMPLEMENTATION ENGINEER

VERIZON WIRELESS

Graduate of Ramsay High School
Birmingham, AL

I work with the modification of cell towers. This entails working with maintenance contractors and tower crews to ensure all tower equipment has been updated and modified according to the new technological standards and in accordance with the needs of capacity and coverage.

"I've thoroughly enjoyed my path and look forward to what the future holds."

Growing up like most, I had no idea of what I really wanted to do. Of course, you wanted to be just like your favorite singer, or someone on television. But you just weren't really sure. All I've ever loved and liked to do is mathematics. In high school, I was able to intern in nursing. I found out very quickly that was something I didn't enjoy, and it didn't relate to the level of mathematics I knew. In my freshmen year of college at Auburn University, I was able to obtain an internship in engineering. I participated in many hands-on projects and learned the

fundamentals of design by working with team members. This also showed me how to work in a professional environment with others on a range of different projects. It was then that I knew this was the field I wanted to pursue a degree in and also obtain future employment. After obtaining my engineering degree, I began employment and felt this was where I was meant to be. While working, I felt it was in the best interest of my career to continue my education, which led me to obtain my master's. I've thoroughly enjoyed my path and look forward to what the future holds.



MAKE A PLAN

SIT DOWN WITH YOUR PARENTS AND COUNSELOR AND CREATE A PLAN

Map out an Alabama Education Plan (sample below) based on your interests, strengths, and possible career goals. Your plan outlines the courses and electives you'll take in high school, plus related co-curricular organization and career preparation experiences. Your school counselor or career coach will work with you to determine the learning experiences needed for you to complete your plan, such as using distance learning or earning college credit from your local community college. Below is a sample Alabama Education Plan for you to use as a guide.

SAMPLE EDUCATION PLAN FOR THIS CAREER CLUSTER

GRADE 9	GRADE 10	GRADE 11	GRADE 12
FRESHMAN YEAR	SOPHOMORE YEAR	JUNIOR YEAR	SENIOR YEAR
English 9	English 10	English 11	English 12
Algebra I	Geometry	Algebra II	Math Elective
Physical Science	Biology	Chemistry	Physics
World History	United States History 10	United States History 11	US Government/Economics
*Career Preparedness	*Health/Elective	**Elective	**Elective
*LIFE PE	**Elective	**Elective	**Elective
**Elective	**Elective	**Elective	**Elective

*Other Required Courses

**Career & Technical Education and/or Foreign Language and/or Arts Education (3 Credits)

STEM CLUSTER COURSES

Advanced Aeronautics	Biotechnical Engineering-PLTW	Engineering Design and Development-PLTW	Introduction to Engineering Design-PLTW
Advanced Aerospace Technology	Civil Engineering and Architecture-PLTW	Engineering Research and Design	Introduction to Robotics
Aerospace Engineering Applications	Computer Integrated Manufacturing-PLTW	Engineering Systems	Principles of Engineering-PLTW
Aerospace Engineering-PLTW	Digital Electronics-PLTW	Foundations of Engineering	Robotics Applications
Basic Programming for Engineers	Engineering Applications	Fundamentals of Aerospace Technology	Senior Career Pathway Project-Science, Technology, Engineering & Math

CO-CURRICULAR

WORK-BASED LEARNING

SkillsUSA	Job Shadowing	Internship	Work Experience
TSA	Career Day/Fair	Field Trips	Guest Speakers

GETTING READY

MAPPING OUT YOUR PROGRAM

GRADE 8

- Research your career options based on your interests, talents, and goals.
- Create an Alabama Education Plan (see page 9).

GRADE 9 FRESHMAN YEAR

- Choose a career cluster.
- Do your best work in all your classes. Course selection and grades really do count when you are applying to colleges and training programs.
- Keep a folder or portfolio of your activities, awards, accomplishments, and work experience, and add to it during your high school career.

GRADE 10 SOPHOMORE YEAR

- Continue building the strongest possible academic record.
- Consider taking the ACT if you plan to apply to a two-year college or university in the future.
- Consider taking the PSAT (Preliminary SAT/National Merit Scholarship Test) if you plan to apply to a two-year college or university in the future.
- Use the information in your portfolio to create a resumé.
- Apply for summer jobs, internships, or volunteer activities related to your career cluster.

GRADE 11 JUNIOR YEAR

- Take the PSAT/NMSQT.
- Use resources available at your school (books, online tools, college fairs, etc.) to research postsecondary education options related to your career goals.
- Register to take either the ACT or the SAT I and SAT II Subject Tests. (There are testing dates every month from January through June). Registration deadlines are approximately four weeks before each testing date.
- Apply for summer jobs, internships, and volunteer activities related to your career goals.
- Use studentaid.ed.gov to determine your financial aid eligibility.

GRADE 12 SENIOR YEAR

- In the fall, apply to postsecondary programs and retake any standardized college admissions tests if you would like to improve your score.
- Beginning in October, complete college financial aid forms. Deadlines and required data differ from school to school, so read the instructions carefully.
- In the spring, choose your postsecondary program on the basis of where you have been accepted, costs, etc.
- Continue doing your best work. All schools require a final transcript before making your acceptance official.

COLLEGE PREP: GETTING ACCEPTED

The college admissions process can be stressful and a bit scary, especially if you are the first in your family to apply. Give yourself the best shot at getting into a college program that matches your goals by following these five steps:

1. MAKE THE GRADE

Your grade point average really does count, so do your best work on every assignment, pay attention in class, and participate in group discussions.

2. MAKE A LIST

Before you can apply to college, you have to figure out what you would like to study and what matters most to you (like college location, size, or religious affiliation). Use the college guides in your local library, school library, school counselor's or career coach's office to start making a list of colleges that interest you. Use online tools like collegeboard.org and accs.cc to learn more about each school and take virtual campus tours.

3. GET INVOLVED

Build teamwork and leadership skills by joining career technical student organizations, clubs, and teams at your school, volunteering for service projects, and participating in church or community activities.

4. PLAN FOR TEST

Most colleges want scores from the ACT, SAT, or SAT II tests. See what tests the schools on your list require, sign up to take them in time to include the scores on your application, and then practice the free SAT sample questions at collegeboard.org or sample ACT tests at actstudent.org.

5. BE NEAT AND COMPLETE

Before you send in a college application, double-check your spelling, make sure nothing is missing, and save a copy just in case you have to submit it again.

PAYING YOUR WAY: FINANCIAL AID

Every Alabama student can afford to go to college. It just takes a little planning. Put your college dreams within financial reach by taking these five steps:

1. CONSIDER A COMMUNITY COLLEGE

Alabama's public and private two-year colleges offer an affordable way to earn an associate's degree or complete enough credits to transfer into a four-year school as a junior. Learn more at accs.cc.

2. WEIGH YOUR OPTIONS

Attending one of Alabama's four-year public or private schools cuts travel costs and other living expenses, as compared to attending schools out of state. In addition, public schools offer reduced in-state tuition, and, if there's a college nearby, you can save even more by living at home.

3. RISE TO THE TOP

Apply to a couple of schools at which your grades and accomplishments put you near the top of the typical applicant pool.

4. DO A LITTLE DIGGING

More than one million local, national, and college-specific scholarships are available each year. Ask your school counselor or career coach for help finding printed scholarship resource guides. To find and apply for scholarships online, sign up for the free college scholarship search source achievealabama.org.

5. APPLY FOR AID

Fill out the Free Application for Federal Student Aid (FAFSA) beginning on October 1 of your Senior year. FAFSA forms and instruction booklets are available at your school counselor's office and online at studentaid.ed.gov. Some schools also require the CSS/Financial Aid Profile form (profileonline.collegeboard.org), and others have their own financial aid forms. Carefully read each college's application to know what forms you need to submit and when.

	AGRICULTURE, FOOD & NATURAL RESOURCES
	ARCHITECTURE & CONSTRUCTION
	ARTS, A/V TECHNOLOGY & COMMUNICATIONS
	BUSINESS MANAGEMENT & ADMINISTRATION
	EDUCATION & TRAINING
	FINANCE
	GOVERNMENT & PUBLIC ADMINISTRATION
	HEALTH SCIENCE
	HOSPITALITY & TOURISM
	HUMAN SERVICES
	INFORMATION TECHNOLOGY
	LAW, PUBLIC SAFETY, CORRECTIONS & SECURITY
	MANUFACTURING
	MARKETING
	STEM
	TRANSPORTATION, DISTRIBUTION & LOGISTICS

CLUSTER PATHWAYS

Engineering

POST SECONDARY LEARNING

COMMUNITY COLLEGE

4-YEAR COLLEGE/UNIVERSITY

WORK-BASED LEARNING

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