Health Science Cluster

Educational programs in this cluster prepare students to plan, manage, and provide therapeutic services, diagnostic services, health informatics, support services, and biotechnology research and development.

**Diagnostic Services – Medical Lab Pathway**
Students will learn to use tests and evaluations that aid in the detection, diagnosis, and treatment of diseases, injuries or other physical conditions.

**Diagnostic Services – Phlebotomy Pathway**
Students will learn the safety and techniques used in phlebotomy, and the skills and knowledge required for infection control.

**Diagnostic Services – Non-invasive Technology in Healthcare Pathway**
Students will learn to use tests and various non-invasive procedures, including EKGs, that aid in the detection of diseases.

**Health Informatics - Health Information Management Pathway**
Students will apply medical office skills and knowledge related to the business side of healthcare and medical information, including medical insurance and coding.

**Health Informatics – Health Information Technology Pathway**
Students will learn the skills used for electronic medical records, the Health Information Exchange, telemedicine, mobile apps and kiosks, and other technology used in the healthcare field.

**Support Services Pathway**
Students will learn skills and acquire knowledge used in the therapeutic environment for the delivery of healthcare, such as central supply, patient transport, and diet and nutrition services.

---

<table>
<thead>
<tr>
<th>Occupation Specialties</th>
<th>Entry Level of Education Needed</th>
<th>2012 Average Annual Wage</th>
<th>Annual Openings 2012-2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biological Scientists</td>
<td>Master's Degree</td>
<td>$71,000</td>
<td>20</td>
</tr>
<tr>
<td>Biomedical Engineers</td>
<td>Bachelor's Degree</td>
<td>$72,300</td>
<td>30</td>
</tr>
<tr>
<td>Environmental Scientist and Specialists</td>
<td>Bachelor's Degree</td>
<td>$51,500</td>
<td>60</td>
</tr>
<tr>
<td>Medical Technologists</td>
<td>Bachelor's Degree</td>
<td>$53,000</td>
<td>210</td>
</tr>
<tr>
<td><strong>Medical and Health Services Managers</strong></td>
<td>Bachelor's Degree + Work Experience</td>
<td>$87,000</td>
<td>510</td>
</tr>
<tr>
<td>Diagnostic Medical Sonographers</td>
<td>Associate's Degree</td>
<td>$59,400</td>
<td>50</td>
</tr>
<tr>
<td>Radiologic Technologists</td>
<td>Associate's Degree</td>
<td>$51,000</td>
<td>240</td>
</tr>
<tr>
<td>Informatics Nurse Specialists</td>
<td>Bachelor's Degree</td>
<td>$78,700</td>
<td>450</td>
</tr>
<tr>
<td>Medical Records &amp; Health Information Technicians</td>
<td>High School</td>
<td>$30,300</td>
<td>250</td>
</tr>
<tr>
<td>Dietitians &amp; Nutritionists</td>
<td>Bachelor's Degree</td>
<td>$52,300</td>
<td>110</td>
</tr>
<tr>
<td>Registered Nurses</td>
<td>Associate's Degree</td>
<td>$63,200</td>
<td>3,300</td>
</tr>
<tr>
<td>Medical and Health Services Managers</td>
<td>Bachelor's Degree</td>
<td>$87,000</td>
<td>510</td>
</tr>
<tr>
<td>Pharmacists</td>
<td>Advanced Degree</td>
<td>$111,500</td>
<td>230</td>
</tr>
<tr>
<td>Physical Therapists</td>
<td>Advanced Degree</td>
<td>$78,800</td>
<td>130</td>
</tr>
</tbody>
</table>

Dr. John D. Barge, State School Superintendent June 2013
Health Science Cluster

Biotechnology Research and Development Pathway
Students will acquire the skills and knowledge required in bioscience human health research and development, and learn how scientists study new disease treatments and invent medical devices to assist patients and improve the accuracy of diagnostic tests.

Therapeutic Services – Nursing Pathway
Students will learn patient care skills that include vital signs, personal care, patient transfer (adhering to the guidelines of the Georgia Medical Care Foundation), and leading to the opportunity to take the Certified Nursing Assistant (CNA) assessment that is helpful for advancing in a nursing career and applying to many nursing schools.

Therapeutic Services – Public Health Pathway
Students will focus on knowledge and skills related to public health, such as providing care, treatment, counseling, and health education information with the goal of changing the health status of the patient over time.

Therapeutic Services – Dental Science Pathway
Students will apply skills used in dental health occupations through practical applications, office procedures, patient management, dental charting, chair-side assisting, dental terminology, and pathology. Students will also learn practical applications of oral health and nutrition, pharmacology and anesthesia, radiology, laboratory procedures, and other specialty areas in dentistry.

Therapeutic Services – Pharmacy Pathway
Students will learn pharmacy calculations and operations, as well as, investigating the career options of pharmacy and how pharmacy skills are needed by other healthcare professions, such as nursing, physician assistants, and physicians.

Therapeutic Services – Emergency Medical Responder Pathway
Students will learn how to help protect the public in an emergency event, including being the first responder at the scene of a traffic accident or medical emergency that requires putting out a fire, treating injuries, or other vital functions.

Therapeutic Services – Public Safety Communications Pathway
Students will apply and learn how emergency management and 911 centers coordinate the efforts of all public safety personnel, including fire and law enforcement in a particular county, district, or community.

Therapeutic Services - Physical Medicine – Personal Trainer Pathway
Students will learn the skills and knowledge involved in physical or occupational therapy careers; as well as, focusing on kinesiology and related skills used in a personal trainer or physical therapy aide role.

Therapeutic Services – Physical Medicine - Sports Medicine Pathway
Students will apply the care, treatment, counseling and health education information related to a career in sports medicine; as well as, injury prevention and skills used in an athletic trainer aide role.

Therapeutic Services – Allied Health & Medicine Pathway
Students will learn about the more than 200 health careers and 80 professions represented in Allied Health, including how technicians (assistants) and therapists/technologists are trained to perform procedures, evaluate patients, diagnose conditions, develop treatment plans; as well as, determining appropriateness and rationale for various treatment plans.

Industry-Validated Credentials
Students have an opportunity to gain valuable skills and knowledge through participation and completion of all required courses in a career pathway. Obtaining such skills will potentially provide students with increased opportunities to earn industry-validated credentials while still in high school, thus leading to increased earning potential throughout the student’s career span.

Postsecondary Transition:

- Students who will continue their education in a Program of Study at one of the University System of Georgia institutions should prepare to take the ACT or SAT for admissions. Admission's testing varies from institution to institution. Students should contact the selected institution for specific testing information. Additional admissions information can be found at Staying On Course. (www.usg.edu/student_affairs/documents/Staying_on_Course.pdf)
- Students who will continue their education in a Program of Study at one of the Technical College System of Georgia institutions should prepare to take the COMPASS test for admissions.
- Students who will continue their education and training in the U.S. Military should take the ASVAB assessment.
- Students should utilize GAcollege411 to select the most appropriate postsecondary opportunities to match their selected career field, including state registered apprenticeships.
- Students can earn both high school and postsecondary credit while in high school. Georgia has multiple dual enrollment program opportunities, including Accel, Dual HOPE, Move On When Ready, and Articulation.
**Student Plan of Study – Therapeutic Services (Nursing)**

**Name____________________________  Date________________________  School______________________________________**

**Parent/Guardian Signature_____________________________  Date_____________  Advisor/Counselor Signature ____________________________ Date_______________**

**Current Area of Interest: Health Science/Therapeutic Services (Nursing) - This PLAN OF STUDY should serve as a guide for the next four years. Courses listed in this plan are only recommended coursework and should be individualized to meet each student’s educational and career goals. All plans will meet minimum high school graduation requirements. Applicants to University System of Georgia and the Technical College System of Georgia institutions should be advised that meeting minimum requirements will not guarantee admission. Postsecondary institutions may set additional requirements.**

**Legend:****

- *Science: Approved 4th Sciences may be used to meet both the required science and required elective in a Career, Technical and Agricultural Education (CTAE) sequence of courses; see Fourth Science Requirements for more information. Student may take science courses in any sequence.*
- *Math: Select Math sequence 1, 2, 3, 4, based on 9th grade entry course.*
- **Students must complete 2 years (2 credits) of the same world language for AP, IB or Dual Enrollment designation.
- Georgia Virtual School and ACCEL courses may be available.
- Fine Arts/Performing Arts Pathways
  - Visual Arts, Dance, Music, Journalism, Theater
  - A fine arts pathway may be followed in any one of the five areas listed above. Upon graduation, students complete a fine arts/performing arts pathway when three courses have been successfully completed in any one of the five areas. A student should consult a counselor or advisor for related coursework.
  - AP, Dual Enrollment and Georgia Virtual School courses may be available.

### Sample Plan of Study for Career Cluster

<table>
<thead>
<tr>
<th>Grade Level</th>
<th>I. English/Language Arts Total 4 credits</th>
<th>II. Math Total 4 credits</th>
<th>III. Science Total 4 credits</th>
<th>IV. Social Studies Total 3 credits</th>
<th>V. Health/Personal Fitness Total 1 credit</th>
<th>VI. Possible electives in additional pathways (students should check the local course description catalog for these and other electives) Total 4 credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>9th</td>
<td>1 credit</td>
<td>1 credit</td>
<td>*Biology or Dual Enrollment American Government/Civics or AP Government/Politics US or Dual Enrollment</td>
<td>Health $1/2 credit Credit Earned $1/2 credit</td>
<td>Credit Earned $1/2 credit $1/2 credit $1/2 credit</td>
<td><strong>Advanced Academic Pathways</strong> English/Language Arts, Math, Science, Social Studies An advanced academic pathway may be followed in any one of the content areas listed above. Upon graduation, students earn an advanced academic pathway when they complete the required coursework to include at least one AP or one IB or one Dual Enrollment course. An advanced academic pathway should also include at least two credits in one world language. AP, Dual Enrollment and Georgia Virtual School courses may be available.</td>
</tr>
<tr>
<td>10th</td>
<td>1 credit</td>
<td>1 credit</td>
<td>Physical Science or Dual Enrollment World History or AP World History or Dual Enrollment</td>
<td>25.52100 Intro to Healthcare Science or Dual Enrollment</td>
<td><strong>World Language Pathways</strong> 2 credits required for admission to University System Institutions For a listing of world language courses offered at your high school, please check with your advisor, counselor, or local course description catalog. A world language pathway may be followed in any of the world language areas included in the state list of approved courses. Upon graduation, students earn a world language pathway when they complete 3 units in one language. The third course may reflect an AP, IB or Dual Enrollment designation. Georgia Virtual School and ACCS courses may be available.</td>
<td></td>
</tr>
<tr>
<td>11th</td>
<td>1 credit</td>
<td>1 credit</td>
<td>Chemistry or Environmental Science or Earth Systems or APIB or Dual Enrollment United States History AP US History or IB History of the Americas or Dual Enrollment</td>
<td><strong>Proposed course Essentials of Healthcare or Dual Enrollment</strong></td>
<td><strong>Fine Arts/Performing Arts Pathways</strong> A fine arts pathway may be followed in any one of the five areas listed above. Upon graduation, students complete a fine arts/performing arts pathway when three courses have been successfully completed in any one of the five areas. A student should consult a counselor or advisor for related coursework. AP, Dual Enrollment and Georgia Virtual School courses may be available.</td>
<td></td>
</tr>
<tr>
<td>12th</td>
<td>1 credit</td>
<td>1 credit</td>
<td>Any other of the previous courses or Human Anatomy &amp; Physiology or Dual Enrollment 1 credit</td>
<td>Econ/Business/Free Enterprise or AP Micro Econ or IB Econ or Dual Enrollment</td>
<td><strong>Proposed course Nursing Essentials or Dual Enrollment</strong></td>
<td><strong>CTAE Elective Courses:</strong> AP and Georgia Virtual School may be available for CTE courses</td>
</tr>
<tr>
<td>Sample Elective Courses</td>
<td>Other English Elective Courses: Literary Types/Composition Journalism Oral/Written Communication Speech</td>
<td>Other Math Elective Courses: Adv Math Decision Making Math of Industry &amp; Govern Math of Finance</td>
<td>Other Science Elective Courses: Microbiology or Organic Chemistry Sci Research III or IV</td>
<td>Other Social Studies Elective Courses: Humanities Current Issues Psychology Sociology</td>
<td><strong>Proposed course Nursing Essentials or Dual Enrollment</strong></td>
<td><strong>CTAE Elective Courses:</strong> AP and Georgia Virtual School may be available for CTE courses</td>
</tr>
</tbody>
</table>

At the end of the 11th grade, students planning to enter a University System of Georgia Institution or Technical College System of Georgia should take the appropriate admissions test (SAT, ACT, Compass).
Practitioners, nurse anesthetists and clinical nurse specialists.

American Red Cross CPR and First Aid Certification will increase as students specialize in earning certifications to be nurse practitioners. Possible career opportunities in hospital outpatient facilities, such as day surgery, rehabilitation, and chemotherapy. Growth is also expected in long-term care facilities and in home health care. Registered Nurses with a bachelor's degree will have better job prospects in supervisory and managerial positions. Students who will continue their education in a Program of Study at one of the Technical College System of Georgia institutions should prepare to take the COMPASS test for admissions. Students who will continue their education in a Program of Study at one of University System of Georgia institutions should prepare to take the ACT or SAT for admissions. Admission testing varies from institution to institution. Students who will continue their education and training in the U.S. Military should take the ASVAB assessment. Students who will continue their education and training in the U.S. Military should take the ASVAB assessment and apply for more information about your education and training options at Georgia's HOT Careers to 2020 for more information on high-skilled, high-wage and high-demand occupations. See Georgia's HOT Careers to 2020 for more information on high-skilled, high-wage and high-demand occupations.

**Current Georgia Graduation Rule****

<table>
<thead>
<tr>
<th>Coursework</th>
<th>Credits</th>
<th>Career, Technical &amp; Agricultural Education</th>
<th>Annual Openings</th>
<th>Annual Wage</th>
<th>Degree</th>
<th>Entry Level of Education Needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health Science</td>
<td>3 Credits</td>
<td><strong>Occupation Specialties</strong></td>
<td><strong>2,515</strong></td>
<td><strong>$56,200</strong></td>
<td>Associate's Degree</td>
<td>High School Diploma</td>
</tr>
<tr>
<td>English/Language Arts</td>
<td>3 Credits</td>
<td><strong>Occupation Specialties</strong></td>
<td><strong>3,300</strong></td>
<td><strong>$63,200</strong></td>
<td>Bachelor's Degree</td>
<td>High School Diploma</td>
</tr>
<tr>
<td>Science</td>
<td>3 Credits</td>
<td><strong>Occupation Specialties</strong></td>
<td><strong>4,100</strong></td>
<td><strong>$74,800</strong></td>
<td>Bachelor's Degree</td>
<td>High School Diploma</td>
</tr>
<tr>
<td>Social Studies</td>
<td>3 Credits</td>
<td><strong>Occupation Specialties</strong></td>
<td><strong>510</strong></td>
<td><strong>$87,000</strong></td>
<td>Bachelor's Degree</td>
<td>High School Diploma</td>
</tr>
</tbody>
</table>

**Note:** This plan represents minimum graduation requirements. Local systems may require additional coursework. Students must complete 3 credits to complete CTAE pathway and take the end of pathway assessment. Students must complete 2 years of the same world language for admission to Georgia Board of Regents colleges/universities. Students are encouraged to earn both high school and postsecondary credit while in high school. Georgia has multiple dual enrollment programs.
Educational programs in this cluster prepare students for the planning, management, and movement of people, materials, and goods by road, pipeline, air, rail, and water and related professional and technical support services such as transportation infrastructure planning and management, logistics services, mobile equipment, and facility maintenance.

**Automobile Maintenance and Light Repair Pathway**
Students will learn how to research applicable vehicle and service information, service history, precautions, and technical service bulletins. Basic tasks to be covered include fluid changes, belt replacement, brake, and tire service.

**Automobile Service Technology Pathway**
Students will learn intermediate tasks such as servicing transmissions, drive trains and axles, power steering, and electrical systems.

**Master Automobile Service Technology Pathway**
Students will demonstrate an understanding of the components within automobile sub-systems, as well as, the advanced tasks related to automobile service.

**Painting and Refinishing Pathway**
Students will apply the skills needed to obtain a career in the automotive refinish industry, as well as, learning hands-on applications in a project-based setting.

**Nonstructural Analysis and Damage Repair Pathway**
Students will utilize hands-on applications in a project-based setting to complete the skills needed to obtain an entry-level job in the field of non-structural damage repair.

### Occupation Specialties

<table>
<thead>
<tr>
<th>Occupation Specialties</th>
<th>Entry Level of Education Needed</th>
<th>2012 Average Annual Wage</th>
<th>Annual Openings 2012-2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automotive Technician &amp; Mechanics</td>
<td>High School or Registered Apprenticeship</td>
<td>$33,400</td>
<td>570</td>
</tr>
<tr>
<td>Automotive Body &amp; Related Repairers</td>
<td>High School or Registered Apprenticeship</td>
<td>$40,600</td>
<td>100</td>
</tr>
<tr>
<td>Air Traffic Controllers</td>
<td>Associate's Degree</td>
<td>$123,800</td>
<td>40</td>
</tr>
<tr>
<td>Commercial Pilots</td>
<td>Some College</td>
<td>$88,800</td>
<td>80</td>
</tr>
<tr>
<td>Aircraft Mechanics &amp; Service Technicians</td>
<td>Some College</td>
<td>$54,100</td>
<td>40</td>
</tr>
<tr>
<td>Transportation Equipment Painters</td>
<td>High School</td>
<td>$40,300</td>
<td>40</td>
</tr>
<tr>
<td>Logistics Managers</td>
<td>Bachelor's Degree</td>
<td>$68,900</td>
<td>130</td>
</tr>
<tr>
<td>Storage &amp; Distribution Managers</td>
<td>Bachelor's Degree</td>
<td>$77,900</td>
<td>179</td>
</tr>
<tr>
<td>Motorboat Mechanics &amp; Service Technicians</td>
<td>Some College</td>
<td>$35,520</td>
<td>50</td>
</tr>
</tbody>
</table>

Dr. John D. Barge, State School Superintendent June 2013
Transportation, Distribution & Logistics Cluster

**Mechanical and Electrical Components Pathway**
Students will learn how to repair and replace mechanical and electrical components affected in a collision.

**Structural Analysis and Damage Repair Pathway**
Students will learn the theoretical and practical applications needed for an entry-level position, as well as, learn to analyze and restore vehicle structural damage to factory specifications.

**Flight Operations Pathway**
Students will learn the practice of efficient, safe, and cost-effective methods utilized in the aerospace industry, and may build, maintain, repair, and service aircraft equipment and machinery.

**Aircraft Maintenance Pathway**
Students will apply and learn skills related to weight and balance, tube bending and flaring, hose fabrication, hardware identification, safety wiring, budgeting, ordering parts and tools, precision measurements, instruments, electrical symbols, and troubleshooting; as well as, Federal Aviation Administration (FAA) regulations.

**Distribution and Logistics Pathway**
Students will acquire a fundamental understanding of the logistics and supply chain industry for motor carriers, railroad, air, freight, and ocean carriers; as well as, preparing for employment in the logistics and supply chain management industry.

**Marine Engine Technology Pathway**
Students will learn and apply basic skills that include shop and boat safety, safe and appropriate use of tools and measuring devices, technical writing, shop management, and marine engine computer applications.

**Industry-Validated Credentials**
Students have an opportunity to gain valuable skills and knowledge through participation and completion of all required courses in a career pathway. Obtaining such skills will potentially provide students with increased opportunities to earn industry-validated credentials while still in high school, thus leading to increased earning potential throughout the student’s career span.

**Postsecondary Transition:**
- Students who will continue their education in a Program of Study at one of the University System of Georgia institutions should prepare to take the ACT or SAT for admissions. Admission’s testing varies from institution to institution. Students should contact the selected institution for specific testing information. Additional admissions information can be found at Staying On Course. (www.usg.edu/student_affairs/documents/Staying_on_Course.pdf)
- Students who will continue their education in a Program of Study at one of the Technical College System of Georgia institutions should prepare to take the COMPASS test for admissions.
- Students who will continue their education and training in the U.S. Military should take the ASVAB assessment.
- Students should utilize GAcollege411 to select the most appropriate postsecondary opportunities to match their selected career field, including state registered apprenticeships.
- Students can earn both high school and postsecondary credit while in high school. Georgia has multiple dual enrollment program opportunities, including Accel, Dual HOPE, Move On When Ready, and Articulation.
Agriculture, Food & Natural Resources Cluster

Educational programs in this cluster prepare students for the production, processing, marketing, distribution, financing, and development of agricultural commodities and resources; including food, fiber, wood products, natural resources, horticulture, and other plant and animal products/resources.

Students interested in applying knowledge and skills related to animal systems, may consider completing one of the following pathways.
Animal Production & Processing Pathway
Animal / Mechanical Systems Pathway
Agriculture Leadership in Animal Production Pathway
Companion Animal Systems Pathway
Veterinary Science Pathway
Equine Science Pathway
Food Animal Systems Pathway

Students interested in applying knowledge and skills related to forestry/natural resources systems, may consider completing one of the following pathways.
Forest / Renewable Energy Pathway
Agriculture Leadership in Aquaculture Pathway
Forest Mechanical Systems Pathway
Agriculture Leadership in Forest Science Pathway
Forest / Natural Resources Management Pathway
Forestry Management Systems Pathway
Forestry / Wildlife Systems Pathway
Environmental Agriculture Systems Pathway

Students interested in applying knowledge and skills related to plant systems, may consider completing one of the following pathways.
Horticulture / Mechanical Systems Pathway
Agriculture Leadership in Plant Science Pathway
Agriculture Leadership in Horticulture Pathway
Landscape Management Systems Pathway
Plant and Floral Design Systems Pathway
Plant and Landscape Systems Pathway
Plant and Floriculture Systems Pathway

<table>
<thead>
<tr>
<th>Occupation Specialties</th>
<th>Entry Level of Education Needed</th>
<th>2012 Average Annual Wage</th>
<th>Annual Openings 2012-2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buyers &amp; Purchasing Agents, Farm Products</td>
<td>High School</td>
<td>$63,400</td>
<td>20</td>
</tr>
<tr>
<td>Environmental Engineers</td>
<td>Bachelor’s Degree</td>
<td>$71,900</td>
<td>60</td>
</tr>
<tr>
<td>Environmental Scientists &amp; Environmental Specialists</td>
<td>Bachelor’s Degree</td>
<td>$51,500</td>
<td>60</td>
</tr>
<tr>
<td>Veterinarians</td>
<td>Advanced Degree</td>
<td>$79,300</td>
<td>10</td>
</tr>
<tr>
<td>Food Science Technicians</td>
<td>Associate’s Degree</td>
<td>$29,700</td>
<td>20</td>
</tr>
<tr>
<td>Animal Trainers</td>
<td>High School</td>
<td>$21,900</td>
<td>30</td>
</tr>
<tr>
<td>Agricultural Inspectors</td>
<td>Bachelor’s Degree</td>
<td>$40,900</td>
<td>20</td>
</tr>
<tr>
<td>Soil &amp; Plant Scientists</td>
<td>Bachelor’s Degree</td>
<td>$68,100</td>
<td>10</td>
</tr>
<tr>
<td>Agricultural Education Teachers</td>
<td>Bachelor’s Degree</td>
<td>$42,000</td>
<td>16</td>
</tr>
</tbody>
</table>

Dr. John D. Barge, State School Superintendent June 2013
Agriculture, Food & Natural Resources Cluster

Students interested in applying knowledge and skills related to agriculture mechanical systems, may consider completing one of the following pathways.

Agriculture Mechanics & Electrical Systems Pathway
Agriculture Mechanics Metal Fabrication Pathway
Agriculture Energy Systems Pathway
Agriculture Mechanics Systems Pathway

Students interested in applying knowledge and skills related to food science systems, may consider completing one of the following pathways.

Food Products & Processing Systems Pathway
Agriculture Leadership in Product Processing Pathway

Students interested in applying knowledge and skills related to diversified agriculture systems, may consider completing one of the following pathways.

Horticulture and Forest Science Pathway
Plant and Mechanical Systems Pathway
Animal and Horticulture Systems Pathway
Forestry and Animal Science Systems Pathway
Agriscience Systems Pathway
Agribusiness Systems Pathway

Industry-Validated Credentials

Students have an opportunity to gain valuable skills and knowledge through participation and completion of all required courses in a career pathway. Obtaining such skills will potentially provide students with increased opportunities to earn industry-validated credentials while still in high school, thus leading to increased earning potential throughout the student's career span.

Postsecondary Transition:

- Students who will continue their education in a Program of Study at one of the University System of Georgia institutions should prepare to take the ACT or SAT for admissions. Admission's testing varies from institution to institution. Students should contact the selected institution for specific testing information. Additional admissions information can be found at Staying On Course. (www.usg.edu/student_affairs/documents/Staying_on_Course.pdf)
- Students who will continue their education in a Program of Study at one of the Technical College System of Georgia institutions should prepare to take the COMPASS test for admissions.
- Students who will continue their education and training in the U.S. Military should take the ASVAB assessment.
- Students should utilize GAcollege411 to select the most appropriate postsecondary opportunities to match their selected career field, including state registered apprenticeships.
- Students can earn both high school and postsecondary credit while in high school. Georgia has multiple dual enrollment program opportunities, including Accel, Dual HOPE, Move On When Ready, and Articulation.
Educational programs in this cluster provide students with the basic knowledge and skills for careers in the legal system, public safety, protective services, and homeland security, including professional and technical support services.

**Corrections Services Pathway**
Students will learn how to oversee individuals who have been arrested and awaiting trial or who have been convicted of a crime and sentenced to serve time in a jail, prison, or correctional facility. While the primary mission of corrections is protection of the public, many people in this field are involved with the treatment, education, and reintegration of offenders.

**Law Enforcement Services Pathway**
Students will be exposed to essential skills and knowledge that are useful in law enforcement, criminal investigations, and forensics. Students may utilize crime scene investigative skills, along with science and mathematics to help solve crimes.

**Security and Protective Services Pathway**
Students will explore the types of security services, as well as the issues and security concerns faced in various work environments and industries, such as cyber security and securing data on mobile devices.
Law, Public Safety, Corrections & Security Cluster

Fire and Emergency Services – Emergency Medical Responder Pathway
Students will learn how to help protect the public in an emergency event, including being the first responder at the scene of a traffic accident or medical emergency that requires putting out a fire, treating injuries, or other vital functions.

Fire and Emergency Services – Public Safety Communications Pathway
Students will learn and apply how emergency management and 911 centers coordinate the efforts of all public safety personnel, including fire and law enforcement in a particular county, district, or community.

Fire and Emergency Services – Firefighting Pathway
Students will learn general emergency protocol for fire and emergency units, which are often the first to an emergency scene requiring putting out a fire, treating injuries, or performing other vital functions. This pathway leads to postsecondary studies in fire science.

Legal Services – Legal Administrative Services Pathway
Students will analyze the structure of the American legal system while examining constitutional legal issues. Knowledge of the components, participants, and steps of a criminal trial and a civil suit, including the appeals process is an essential part of this course.

Legal Services – Applications of Law Pathway
Students will apply the structure of the American legal system while examining constitutional legal issues. Knowledge of the components, participants, and steps of a criminal trial and a civil suit, including the appeals process, is an essential part of this course. Participation in mock trials will be a large component of this course.

Industry-Validated Credentials
Students have an opportunity to gain valuable skills and knowledge through participation and completion of all required courses in a career pathway. Obtaining such skills will potentially provide students with increased opportunities to earn industry-validated credentials while still in high school, thus leading to increased earning potential throughout the student's career span.

Postsecondary Transition:
- Students who will continue their education in a Program of Study at one of the University System of Georgia institutions should prepare to take the ACT or SAT for admissions. Admission's testing varies from institution to institution. Students should contact the selected institution for specific testing information. Additional admissions information can be found at Staying On Course. (www.usg.edu/student_affairs/documents/Staying_on_Course.pdf)
- Students who will continue their education in a Program of Study at one of the Technical College System of Georgia institutions should prepare to take the COMPASS test for admissions.
- Students who will continue their education and training in the U.S. Military should take the ASVAB assessment.
- Students should utilize GAcollege411 to select the most appropriate postsecondary opportunities to match their selected career field, including state registered apprenticeships.
- Students can earn both high school and postsecondary credit while in high school. Georgia has multiple dual enrollment program opportunities, including Accel, Dual HOPE, Move On When Ready, and Articulation.
Educational programs in these pathway areas prepare students for career opportunities that will lead to multiple postsecondary options for advanced studies and skills. Students will be able to use these skills in a university or college setting and/or many career fields.

**Advanced Academic Pathway**
Students may complete an Advanced Academic pathway when three courses from English language arts, mathematics, science, or social studies have been successfully completed and additional criteria met.

**Advanced Academic Pathway in English Language Arts Criteria:**
1. Students need to earn four units of credit in English language arts; and
2. The student’s chosen English language arts pathway will include at least one Advanced Placement course, or one International Baccalaureate course, or one postsecondary course that fulfills a core graduation requirement in English language arts; and
3. Students need to complete two units of sequential course credit in one world language.

**Advanced Academic Pathway in Mathematics Criteria:**
1. Students need to earn four units of credit in mathematics; and
2. The student’s chosen mathematics pathway will include at least one Advanced Placement course, or one International Baccalaureate course, or one postsecondary course that fulfills a core graduation requirement in mathematics; and
3. Students need to complete two units of sequential course credit in one world language.

<table>
<thead>
<tr>
<th>Occupation Specialties</th>
<th>Entry Level of Education Needed</th>
<th>2012 Average Annual Wage</th>
<th>Annual Openings 2012-2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>College / University Professors</td>
<td>Advanced Degrees</td>
<td>$53,117</td>
<td>75</td>
</tr>
<tr>
<td>Actuaries</td>
<td>Bachelor's Degree</td>
<td>$99,961</td>
<td>90</td>
</tr>
<tr>
<td>Scientists</td>
<td>Bachelor’s Degree</td>
<td>$70,778</td>
<td>21</td>
</tr>
<tr>
<td>Physicists</td>
<td>Bachelor’s Degree</td>
<td>$75,161</td>
<td>5</td>
</tr>
<tr>
<td>Chemists</td>
<td>Bachelor’s Degree</td>
<td>$44,543</td>
<td>42</td>
</tr>
<tr>
<td>Hydrologists</td>
<td>Bachelor’s Degree</td>
<td>$67,738</td>
<td>2</td>
</tr>
</tbody>
</table>

*continued on back*
Advanced Academic Pathway in Science Criteria:
1. Students need to earn four units of credit in science; and
2. The student's chosen science pathway will include at least one Advanced Placement course, or one International Baccalaureate course, or one postsecondary course that fulfills a core graduation requirement in science; and
3. Students need to complete two units of sequential course credit in one world language.

Advanced Academic Pathway in Social Studies Criteria:
1. Students need to earn three units of credit in social studies; and
2. The student's chosen social studies pathway will include at least one Advanced Placement course, or one International Baccalaureate course, or one postsecondary course that fulfills a core graduation requirement in social studies; and
3. Students need to complete two units of sequential course credit in one world language.

Fine Arts Pathway
1. Students may complete a Fine Arts pathway when three courses from Visual Arts, Theatre, Dance, Music, or Journalism have been successfully completed.
2. All three courses should be taken within one of the five Fine Arts pathways.

World Language Pathway Criteria:
1. Students need to earn three units of credit in one world language; and
2. The student's chosen world language pathway will include three distinct high school courses in one world language or include two distinct high school courses in one world language and a third reflecting an Advanced Placement course, where Advanced Placement courses in world language are offered; or a third reflecting an International Baccalaureate course, where International Baccalaureate courses in world language are offered, or one postsecondary enrollment course in the same world language reflecting a third course at the college level.

Industry-Validated Credentials
Students have an opportunity to gain valuable skills and knowledge through participation and completion of all required courses in a career pathway. Obtaining such skills will potentially provide students with increased opportunities to earn industry-validated credentials while still in high school, thus leading to increased earning potential throughout the student's career span.

Postsecondary Transition:
- Students who will continue their education in a Program of Study at one of the University System of Georgia institutions should prepare to take the ACT or SAT for admissions. Admission's testing varies from institution to institution. Students should contact the selected institution for specific testing information. Additional admissions information can be found at Staying On Course. (www.usg.edu/student_affairs/documents/Staying_on_Course.pdf)
- Students who will continue their education in a Program of Study at one of the Technical College System of Georgia institutions should prepare to take the COMPASS test for admissions.
- Students who will continue their education and training in the U.S. Military should take the ASVAB assessment.
- Students should utilize GAcollege411 to select the most appropriate postsecondary opportunities to match their selected career field, including state registered apprenticeships.
- Students can earn both high school and postsecondary credit while in high school. Georgia has multiple dual enrollment program opportunities, including Accel, Dual HOPE, Move On When Ready, and Articulation.
Educational programs in this cluster prepare students for careers in designing, planning, managing, building, and maintaining the built environment.

**Architectural Drawing and Design Pathway**
Students will learn drafting techniques through the study of geometric construction; as well as, an introduction to computer-aided drafting and design.

**Carpentry Pathway**
Students will first master basic safety skills, including ladders, scaffolding, trenching, and safety harnesses. In addition, students will be introduced to the State of Georgia Building Codes; as well as, skills needed to lay rafters, stairs and walls, and properly frame doors and windows.

**Electrical Pathway**
Students will learn the theoretical information regarding various conductors and properties, types of insulation, point of termination principles, and Ohm's Law calculations; as well as, identifying types of wire and cable and selection of electrical boxes and fittings.

**Masonry Pathway**
Students will demonstrate theoretical competency in general estimation of masonry materials, concrete footings, paving applications, masonry steps, flue chimney building codes, and concrete applications.

**Plumbing Pathway**
Students will examine the proper use of fittings, drains, waste and venting, copper tubing and steel piping, and the installation of hangers and supports, pipe sizing, residential fixtures and appliances.

---

Dr. John D. Barge, State School Superintendent June 2013
Architecture & Construction Cluster

Machining Operations Pathway
Students will learn introductory skills needed for operation of lathe and milling machines, and other trade equipment; as well as, acquiring skills needed to be successful as a machinist.

Welding Pathway
Students will develop knowledge and apply safe-operating skills needed to demonstrate the proper set of oxyfuel and shield metal arc welding equipment; as well as, creating accurate cuts and performing washing and gouging procedures, checking welding codes and reviewing work pieces, imperfections, common test methods, and evaluating proper work and equipment setups.

Sheet Metal Pathway
Students will master basic sheet metal techniques and basic trade mathematics; as well as, identifying the rate, selection, and use of steel and other metals to develop and fabricate basic sheet metal projects. In addition, students will learn basic parallel line development and skills using fasteners, hangers, and other support systems.

Heating, Ventilation, Air-Conditioning Refrigeration (HVACR) Pathway
Students will develop skills and knowledge for concepts of conditioning air within a given space; as well as, learn about the skills needed to install hardware and systems used by HVACR technicians.

Heating, Ventilation, Air-Conditioning Refrigeration (HVACR)-Electrical Pathway
Students will learn about refrigeration and heating processes of electronic circuitry; as well as, acquire introductory skills and knowledge needed for conduit bending and installation.

Industry-Validated Credentials
Students have an opportunity to gain valuable skills and knowledge through participation and completion of all required courses in a career pathway. Obtaining such skills will potentially provide students with increased opportunities to earn industry-validated credentials while still in high school, thus leading to increased earning potential throughout the student's career span.

Postsecondary Transition:

- Students who will continue their education in a Program of Study at one of the University System of Georgia institutions should prepare to take the ACT or SAT for admissions. Admission's testing varies from institution to institution. Students should contact the selected institution for specific testing information. Additional admissions information can be found at Staying On Course. ([www.usg.edu/student_affairs/documents/Staying_on_Course.pdf](http://www.usg.edu/student_affairs/documents/Staying_on_Course.pdf))
- Students who will continue their education in a Program of Study at one of the Technical College System of Georgia institutions should prepare to take the COMPASS test for admissions.
- Students who will continue their education and training in the U.S. Military should take the ASVAB assessment.
- Students should utilize GAcollege411 to select the most appropriate postsecondary opportunities to match their selected career field, including state registered apprenticeships.
- Students can earn both high school and postsecondary credit while in high school. Georgia has multiple dual enrollment program opportunities, including Accel, Dual HOPE, Move On When Ready, and Articulation.
Human Services Cluster

Educational programs in this cluster prepare students for employment in career pathways that relate to families and human needs such as counseling and mental health services, family and community services, personal care, and consumer services.

**Nutrition & Food Science Pathway**
Students will acquire knowledge about food choices for optimal health for a lifetime, earn fourth science credits, and discuss the basic chemistry concepts of food science and evaluate the effects of processing, preparation, and storage on the quality, safety, wholesomeness, and nutritive value of foods.

**Housing & Community Management Pathway**
Students examine consumer relations and provide a knowledge base for persons interested in a consumer’s perspective of the housing marketplace. Housing issues and policies affecting and affected by consumers are emphasized.

**Interiors, Fashion & Textiles Pathway**
Students will have an opportunity to explore foundations in interior design, fashion, and textiles in this pathway. There will be a focus on principles and elements of design, fundamentals of fashion, textiles, and merchandising.

---

<table>
<thead>
<tr>
<th>Occupation Specialties</th>
<th>Entry Level of Education Needed</th>
<th>2012 Average Annual Wage</th>
<th>Annual Openings 2012-2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial Analysts</td>
<td>Bachelor’s Degree</td>
<td>$78,000</td>
<td>250</td>
</tr>
<tr>
<td>Credit Analysts</td>
<td>Bachelor’s Degree</td>
<td>$61,400</td>
<td>100</td>
</tr>
<tr>
<td>Wholesale &amp; Retail Buyers</td>
<td>Bachelor’s Degree</td>
<td>$58,800</td>
<td>90</td>
</tr>
<tr>
<td>Interior Designers</td>
<td>Bachelor’s Degree</td>
<td>$46,280</td>
<td>100</td>
</tr>
<tr>
<td>Dietitians &amp; Nutritionists</td>
<td>Bachelor’s Degree</td>
<td>$50,000</td>
<td>80</td>
</tr>
<tr>
<td>Food Scientists &amp; Technologists</td>
<td>Bachelor’s Degree</td>
<td>$47,900</td>
<td>10</td>
</tr>
<tr>
<td>Massage Therapists</td>
<td>Some College</td>
<td>$38,300</td>
<td>160</td>
</tr>
<tr>
<td>Barbers</td>
<td>Some College</td>
<td>$27,200</td>
<td>40</td>
</tr>
<tr>
<td>Personal Financial Advisors</td>
<td>Bachelor’s Degree</td>
<td>$97,000</td>
<td>150</td>
</tr>
</tbody>
</table>
Human Services Cluster

Personal Care Services - Cosmetology Pathway
Students will master state rules and regulations, professional image, bacteriology, chemistry fundamentals, safety, and anatomy and physiology. Introductory competencies in the fundamental theory related to diseases and disorders of skin and hair will be covered; as well as, skills required for hair cutting, permanent waving and relaxing, and basic hair and scalp treatments.

Personal Care Services – Barbering Pathway
Students will master state rules and regulations, professional image, bacteriology, chemistry fundamentals, safety, and anatomy and physiology. Introductory competencies in the fundamental theory related to diseases and disorders of skin and hair will be covered; as well as, skills required for hair cutting, permanent waving and relaxing, and basic hair and scalp treatments.

Personal Care Services – Esthetics Pathway
Students will master the safety, infection control, nutrition, customer service, skin analysis, cleansing and exfoliation methods, detailed anatomy, and physiology related to cytology (cells). Additional topics covered include the integumentary, muscular, nervous, and circulatory systems; as well as, detailing diseases and disorders of the integumentary system (skin).

Personal Care Services – Nails Pathway
Students will master the skills for proper ethics and customer care, sanitation, sterilization and infection control, government standards and regulations, anatomy and physiology of the hands, arms and legs, nail structure, and diseases and disorders; as well as, manicure and pedicure skills.

Industry-Validated Credentials
Students have an opportunity to gain valuable skills and knowledge through participation and completion of all required courses in a career pathway. Obtaining such skills will potentially provide students with increased opportunities to earn industry-validated credentials while still in high school, thus leading to increased earning potential throughout the student’s career span.

Postsecondary Transition:
- Students who will continue their education in a Program of Study at one of the University System of Georgia institutions should prepare to take the ACT or SAT for admissions. Admission's testing varies from institution to institution. Students should contact the selected institution for specific testing information. Additional admissions information can be found at Staying On Course. ([www.usg.edu/student_affairs/documents/Staying_on_Course.pdf](http://www.usg.edu/student_affairs/documents/Staying_on_Course.pdf))
- Students who will continue their education in a Program of Study at one of the Technical College System of Georgia institutions should prepare to take the COMPASS test for admissions.
- Students who will continue their education and training in the U.S. Military should take the ASVAB assessment.
- Students should utilize GAcollege411 to select the most appropriate postsecondary opportunities to match their selected career field, including state registered apprenticeships.
- Students can earn both high school and postsecondary credit while in high school. Georgia has multiple dual enrollment program opportunities, including Accel, Dual HOPE, Move On When Ready, and Articulation.
Information Technology Cluster

Educational programs in this cluster prepare students to build linkages in information technology occupations for entry level, technical, and professional careers related to the design, development, support and management of hardware, software, multimedia, and systems integration services.

**Web & Digital Design Pathway**
Students will create, design and produce interactive multimedia products and services used in business, training, entertainment, communications, and marketing.

**Programming Pathway**
Students will learn essential skills involved in the design, development, implementation, and maintenance of computer systems and software, requiring knowledge of computer operating systems, programming languages, and software development.

**Computer Science Pathway**
Students will prepare for entry level, technical, and professional IT careers, including the design, development, implementation, and maintenance of computer systems and software, as well as knowledge of computer operating systems, programming languages, and software development required of cutting-edge technologies.

<table>
<thead>
<tr>
<th>Occupation Specialties</th>
<th>Entry Level of Education Needed</th>
<th>2012 Average Annual Wage</th>
<th>Annual Openings 2012-2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer System Analysts</td>
<td>Bachelor’s Degree</td>
<td>$78,000</td>
<td>810</td>
</tr>
<tr>
<td>Application Software Developers</td>
<td>Bachelor’s Degree</td>
<td>$85,700</td>
<td>350</td>
</tr>
<tr>
<td>Computer Support Specialists</td>
<td>Some College</td>
<td>$45,600</td>
<td>990</td>
</tr>
<tr>
<td>Network and Computer System Administrators</td>
<td>Bachelor’s Degree</td>
<td>$73,000</td>
<td>580</td>
</tr>
<tr>
<td>Computer and Information Systems Managers</td>
<td>Bachelor’s Degree</td>
<td>$111,400</td>
<td>370</td>
</tr>
<tr>
<td>Computer Network Support Specialists</td>
<td>Some College</td>
<td>$45,600</td>
<td>190</td>
</tr>
<tr>
<td>Web Developers</td>
<td>Bachelor’s Degree</td>
<td>$79,600</td>
<td>350</td>
</tr>
<tr>
<td>Informatics Nurse Specialists</td>
<td>Bachelor’s Degree</td>
<td>$72,000</td>
<td>810</td>
</tr>
</tbody>
</table>

*continued on back*
Information Technology Cluster

Information Support & Services Pathway
Students will learn to deploy and implement computer systems and software; as well as, provide technical assistance and manage information systems through the creation of technical documentation and information management systems.

Networking Pathway
Students will understand and apply the necessary steps for network analysis, planning, and implementation to include the design, installation, maintenance, and management of network systems.

Health IT (Information Technology) Pathway
Students will learn to connect the healthcare industry with information technology skills that include the design, development, support, and management of hardware, software, multimedia, and systems integration services. Students will connect healthcare industry skills with information technology skills that include capturing, managing, and processing diagnostic images and clinical data.

Industry-Validated Credentials
Students have an opportunity to gain valuable skills and knowledge through participation and completion of all required courses in a career pathway. Obtaining such skills will potentially provide students with increased opportunities to earn industry-validated credentials while still in high school, thus leading to increased earning potential throughout the student's career span.

Postsecondary Transition:
- Students who will continue their education in a Program of Study at one of the University System of Georgia institutions should prepare to take the ACT or SAT for admissions. Admission's testing varies from institution to institution. Students should contact the selected institution for specific testing information. Additional admissions information can be found at Staying On Course. (www.usg.edu/student_affairs/documents/Staying_on_Course.pdf)
- Students who will continue their education in a Program of Study at one of the Technical College System of Georgia institutions should prepare to take the COMPASS test for admissions.
- Students who will continue their education and training in the U.S. Military should take the ASVAB assessment.
- Students should utilize GAcollege411 to select the most appropriate postsecondary opportunities to match their selected career field, including state registered apprenticeships.
- Students can earn both high school and postsecondary credit while in high school. Georgia has multiple dual enrollment program opportunities, including Accel, Dual HOPE, Move On When Ready, and Articulation.
Support Services for Special Populations

**Coordinated Career Academic Education**
Coordinated Career Academic Education (CCAE) and Project Success (PS) programs provide intervention support services to Career, Technical, and Agricultural Education (CTAE) students. Student participation in these courses is only available through teacher referral. These courses are not a career pathway.

These support services provide additional opportunities for students to sharpen academic and employability skills in their chosen Career, Technical, and Agricultural Education (CTAE) pathway. Through participation in a CCAE and/or PS program, students learn about the world of work by achieving academic challenges, project-based learning activities, and participating in a Career and Technical Student Organization (CTSO) aligned with their career goal. The courses in this category are not part of any pathway and do not count toward pathway completion.

**CCAE Level I course / Project Success I course**
CCAE Level I: Career Foundations and Leadership - teaches students the academic skills needed to graduate from high school, along with the introductory employability skills necessary to obtain employment. Other topics covered include basic safety and health, teamwork, work ethic, basic personal finance, career technical student organizations, self-assessment, career pathways, career readiness, and employment performance. There is no pre-requisite for this course.

**CCAE Level II course / Project Success II course**
Career Essentials and Leadership - teaches students the skills necessary to graduate from high school, along with the intermediate employability skills needed to obtain and maintain employment. Students will develop the skills to utilize academic concepts in school, on the job, at home, and in work-based learning settings. In this course, students will create or evaluate their individualized career plan, while learning about successful employment practices that involve personal safety and health issues, negative and positive work behaviors, effective leadership practices, legal situations, and effective technology usage. There is no pre-requisite for this course.

**CCAE Level III course**
Career Transition and Leadership - teaches students the academic skills needed to graduate from high school, along with advanced employability skills needed to obtain and maintain employment. Students will learn how to apply for and obtain work-based learning opportunities; revise individualized career plans; utilize community resources; use critical-thinking skills in school, home, and in the workplace; make ethical choices; as well as, adapt to changes in the workplace. There is no prerequisite for this course.

continued on back
Support Services for Special Populations

Career and Technical Instruction
The Georgia Career and Technical Instruction (CTI) support service is designed to assist high school students with disabilities who are enrolled in Career, Technical, Agricultural Education (CTAE) courses. In these courses students acquire employability skills that ease their transition to postsecondary education or the workforce. The role of the CTI Coordinator is to provide individualized special education transition support to students served under an Individualized Education Plan (IEP) that is necessary for them to achieve their desired postsecondary outcome goal. Career and Technical Instruction program courses are not considered part of the CTAE Career Clusters/Pathways.

Industry-Validated Credentials
Students have an opportunity to gain valuable skills and knowledge through participation and completion of all required courses in a career pathway. Obtaining such skills will potentially provide students with increased opportunities to earn industry-validated credentials while still in high school, thus leading to increased earning potential throughout the student's career span.

Postsecondary Transition:
- Students who will continue their education in a Program of Study at one of the University System of Georgia institutions should prepare to take the ACT or SAT for admissions. Admission's testing varies from institution to institution. Students should contact the selected institution for specific testing information. Additional admissions information can be found at Staying On Course. (www.usg.edu/student_affairs/documents/Staying_on_Course.pdf)
- Students who will continue their education in a Program of Study at one of the Technical College System of Georgia institutions should prepare to take the COMPASS test for admissions.
- Students who will continue their education and training in the U.S. Military should take the ASVAB assessment.
- Students should utilize GAcollege411 to select the most appropriate postsecondary opportunities to match their selected career field, including state registered apprenticeships.
- Students can earn both high school and postsecondary credit while in high school. Georgia has multiple dual enrollment program opportunities, including Accel, Dual HOPE, Move On When Ready, and Articulation.
Finance Cluster

Educational programs in this cluster prepare students to plan and implement related services for financial and investment planning, banking, insurance, and business financial management.

Advanced Accounting Pathway
Students will build skills related to making strategic decisions to report, obtain, save, protect, and grow the financial assets of businesses and individuals. Finance students will use computation, analytical, and interpersonal skills to record, classify, summarize, analyze, and communicate a business's financial information/business transactions for use in management decision making.

Business Accounting Pathway
Students will learn the language of business and financial literacy to navigate financial decisions and make informed choices related to managing finances and budgeting, saving and investing, living independently, earning and reporting income, buying goods and services, using credit, banking, and protecting against risk.

<table>
<thead>
<tr>
<th>Occupation Specialties</th>
<th>Entry Level of Education Needed</th>
<th>2012 Average Annual Wage</th>
<th>Annual Openings 2012-2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accountants and Auditors</td>
<td>HOT Bachelor's Degree</td>
<td>$71,500</td>
<td>1,190</td>
</tr>
<tr>
<td>Financial Analysts</td>
<td>HOT Bachelor's Degree</td>
<td>$78,000</td>
<td>250</td>
</tr>
<tr>
<td>Personal Financial Advisors</td>
<td></td>
<td>$97,500</td>
<td>150</td>
</tr>
<tr>
<td>Loan Officers</td>
<td>HOT Bachelor's Degree</td>
<td>$72,100</td>
<td>300</td>
</tr>
<tr>
<td>Tax Preparers</td>
<td></td>
<td>$44,600</td>
<td>160</td>
</tr>
<tr>
<td>Claims Adjusters, Examiners and Investigators</td>
<td></td>
<td>$58,000</td>
<td>270</td>
</tr>
<tr>
<td>Insurance Underwriters</td>
<td></td>
<td>$61,000</td>
<td>110</td>
</tr>
<tr>
<td>Actuaries</td>
<td></td>
<td>$94,100</td>
<td>30</td>
</tr>
</tbody>
</table>

continued on back
Finance Cluster

Financial Services Pathway
Students will practice computation, analytical and interpersonal skills that are applied to banking, overseeing investments, managing insurance, and financial planning. Students will learn industry skills that are used by businesses and individuals to manage their money, investments, loans, stock or commodity markets, and credit. Students will learn skills to protect individuals and businesses from financial losses; and deliver services and products that transfer risk from an individual or business to an insurance company.

Industry-Validated Credentials
Students have an opportunity to gain valuable skills and knowledge through participation and completion of all required courses in a career pathway. Obtaining such skills will potentially provide students with increased opportunities to earn industry-validated credentials while still in high school, thus leading to increased earning potential throughout the student’s career span.

Postsecondary Transition:
- Students who will continue their education in a Program of Study at one of the University System of Georgia institutions should prepare to take the ACT or SAT for admissions. Admission’s testing varies from institution to institution. Students should contact the selected institution for specific testing information. Additional admissions information can be found at Staying On Course. (www.usg.edu/student_affairs/documents/Staying_on_Course.pdf)
- Students who will continue their education in a Program of Study at one of the Technical College System of Georgia institutions should prepare to take the COMPASS test for admissions.
- Students who will continue their education and training in the U.S. Military should take the ASVAB assessment.
- Students should utilize GAcollege411 to select the most appropriate postsecondary opportunities to match their selected career field, including state registered apprenticeships.
- Students can earn both high school and postsecondary credit while in high school. Georgia has multiple dual enrollment program opportunities, including Accel, Dual HOPE, Move On When Ready, and Articulation.
Government & Public Administration Cluster

Educational programs in this cluster prepare students to plan and execute government functions at the local, state and federal levels, including governance, national security, foreign service, planning, revenue and taxation, and regulations.

Public Management and Administration Pathway
Students will develop oral and written communication skills, business employability skills, and learn about the differing roles of government for careers such as a city manager, city council member, county clerk, court administrator, executive director, charitable foundation officer, industrial foundation officer, office manager, analysis officer, and program administration officer.

Air Force, Army, Marine Corps, and Navy Junior Reserve Officer Training Corps (JROTC) Pathways
JROTC pathways offer students the opportunity to enroll in a leadership/citizenship program, while instilling self-esteem, teamwork, and self-discipline.

<table>
<thead>
<tr>
<th>Occupation Specialties</th>
<th>Entry Level of Education Needed</th>
<th>2012 Average Annual Wage</th>
<th>Annual Openings 2012-2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrative Services Managers</td>
<td>High School</td>
<td>$84,100</td>
<td>450</td>
</tr>
<tr>
<td>Human Resources Managers</td>
<td>Bachelor's Degree</td>
<td>$97,400</td>
<td>80</td>
</tr>
<tr>
<td>Urban &amp; Regional Planners</td>
<td>Advanced Degree</td>
<td>$53,900</td>
<td>20</td>
</tr>
<tr>
<td>Social &amp; Community Managers</td>
<td>Bachelor's Degree</td>
<td>$56,200</td>
<td>190</td>
</tr>
<tr>
<td>Postal Service Mail Carriers</td>
<td>High School</td>
<td>$54,000</td>
<td>310</td>
</tr>
<tr>
<td>Nursing Administrators; Registered Nurses (Civilian)</td>
<td>Commissioned Officer</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Computer Programmers (Civilian)</td>
<td>Enlisted</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

continued on back
The main JROTC goals are to have students graduate from high school, attend institutions of higher learning, and pursue meaningful careers particularly in the areas of science, technology, engineering, and mathematics. Furthermore, after all required studies are completed, students are better prepared to become responsible and productive citizens and more successful in future endeavors.

Students have an opportunity to gain valuable skills and knowledge through participation and completion of all required courses in a career pathway. Obtaining such skills will potentially provide students with increased opportunities to earn industry-validated credentials while still in high school, thus leading to increased earning potential throughout the student's career span.

Industry-Validated Credentials
Students have an opportunity to gain valuable skills and knowledge through participation and completion of all required courses in a career pathway. Obtaining such skills will potentially provide students with increased opportunities to earn industry-validated credentials while still in high school, thus leading to increased earning potential throughout the student's career span.

Postsecondary Transition:
- Students who will continue their education in a Program of Study at one of the University System of Georgia institutions should prepare to take the ACT or SAT for admissions. Admission's testing varies from institution to institution. Students should contact the selected institution for specific testing information. Additional admissions information can be found at Staying On Course. ([www.usg.edu/student_affairs/documents/Staying_on_Course.pdf](http://www.usg.edu/student_affairs/documents/Staying_on_Course.pdf))
- Students who will continue their education in a Program of Study at one of the Technical College System of Georgia institutions should prepare to take the COMPASS test for admissions.
- Students who will continue their education and training in the U.S. Military should take the ASVAB assessment.
- Students should utilize GAcollege411 to select the most appropriate postsecondary opportunities to match their selected career field, including state registered apprenticeships.
- Students can earn both high school and postsecondary credit while in high school. Georgia has multiple dual enrollment program opportunities, including Accel, Dual HOPE, Move On When Ready, and Articulation.
Business Management & Administration Cluster

Educational programs in this cluster prepare students for careers in planning, organizing, directing, and evaluating business functions essential to efficient and productive business operations.

**Business and Technology Pathway**
Students will build skills that facilitate business operations through information and communication management, data processing and collection, and project tracking; and focus on careers that plan, organize, direct, and evaluate all or part of a business organization through the allocation and use of financial, human, and material resources.

**Entrepreneurship Pathway**
Students will align business goals that focus on planning, organizing, coordinating, and controlling the resources needed to produce and provide goods and/or services that lead to owning and operating a small business.

<table>
<thead>
<tr>
<th>Occupation Specialties</th>
<th>Entry Level of Education Needed</th>
<th>2012 Average Annual Wage</th>
<th>Annual Openings 2012-2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrative Services Managers</td>
<td>High School</td>
<td>$84,100</td>
<td>450</td>
</tr>
<tr>
<td>Supervisors of Office &amp; Administrative Support</td>
<td>High School</td>
<td>$51,100</td>
<td>2,180</td>
</tr>
<tr>
<td>Management Analysts</td>
<td>Bachelor’s Degree</td>
<td>$98,300</td>
<td>1,500</td>
</tr>
<tr>
<td>Human Resources Managers</td>
<td>Bachelor’s Degree</td>
<td>$97,400</td>
<td>80</td>
</tr>
<tr>
<td>Training and Development Specialists</td>
<td>Bachelor’s Degree</td>
<td>$58,100</td>
<td>400</td>
</tr>
<tr>
<td>Labor Relations Specialists</td>
<td>Some College</td>
<td>$35,300</td>
<td>110</td>
</tr>
<tr>
<td>Small Business Owner/Entrepreneurs</td>
<td>Some College</td>
<td>$90,000</td>
<td>210</td>
</tr>
</tbody>
</table>

continued on back
Business Management & Administration Cluster

Human Resources Management Pathway
Students will focus on the staffing activities that involve planning, recruitment, selection, orientation, training, performance appraisal, compensation, and safety of employees; while maintaining, monitoring, controlling, and planning the use of financial resources to ensure the financial well-being of a business.

Industry-Validated Credentials
Students have an opportunity to gain valuable skills and knowledge through participation and completion of all required courses in a career pathway. Obtaining such skills will potentially provide students with increased opportunities to earn industry-validated credentials while still in high school, thus leading to increased earning potential throughout the student's career span.

Postsecondary Transition:
- Students who will continue their education in a Program of Study at one of the University System of Georgia institutions should prepare to take the ACT or SAT for admissions. Admission's testing varies from institution to institution. Students should contact the selected institution for specific testing information. Additional admissions information can be found at Staying On Course. (www.usg.edu/student_affairs/documents/Staying_on_Course.pdf)
- Students who will continue their education in a Program of Study at one of the Technical College System of Georgia institutions should prepare to take the COMPASS test for admissions.
- Students who will continue their education and training in the U.S. Military should take the ASVAB assessment.
- Students should utilize GAcollege411 to select the most appropriate postsecondary opportunities to match their selected career field, including state registered apprenticeships.
- Students can earn both high school and postsecondary credit while in high school. Georgia has multiple dual enrollment program opportunities, including Accel, Dual HOPE, Move On When Ready, and Articulation.
Educational programs in this cluster prepare students to plan, manage, and provide scientific research and professional and technical services (e.g., physical science, social science, engineering) including laboratory and testing services, and research and development services.

**Engineering and Technology Pathway**

Students will combine hands-on projects and rigorous curriculum to be prepared for challenging postsecondary engineering and technology programs; and build solid technical writing, comprehension, calculation, problem-solving, and technical skills. Students are encouraged to take relevant math and science courses, such as advanced algebra, chemistry, calculus, geometry, trigonometry, physics, design, and engineering concepts.

**Engineering Drafting and Design Pathway**

Students will learn that drafting and design is the process of turning ideas of how things should be constructed into technical drawings. These drawings are based on sketches and calculations made by engineers, surveyors, architects, and/or scientists. The drawings provide visual guidelines such as dimensions,

---

<table>
<thead>
<tr>
<th>Occupation Specialties</th>
<th>Entry Level of Education Needed</th>
<th>2012 Average Annual Wage</th>
<th>Annual Openings 2012-2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electronics Engineers</td>
<td>Bachelor's Degree</td>
<td>$82,600</td>
<td>160</td>
</tr>
<tr>
<td>Electrical &amp; Electronic Engineering Technicians</td>
<td>Associate's Degree</td>
<td>$56,800</td>
<td>90</td>
</tr>
<tr>
<td>Biomedical Engineers</td>
<td>Bachelor's Degree</td>
<td>$72,300</td>
<td>100</td>
</tr>
<tr>
<td>Mechanical Engineers</td>
<td>Bachelor's Degree</td>
<td>$74,700</td>
<td>110</td>
</tr>
<tr>
<td>Civil Drafters</td>
<td>Associate's Degree</td>
<td>$49,700</td>
<td>40</td>
</tr>
<tr>
<td>Electrical Drafters</td>
<td>Some College</td>
<td>$56,900</td>
<td>20</td>
</tr>
</tbody>
</table>

*continued on back*
Science, Technology, Engineering, & Mathematics Cluster

materials to be used, and procedures to be followed to build everything from manufactured products such as spacecraft, automobiles, and industrial machinery to structures such as homes, office buildings, and oil and gas pipelines.

Electronics Pathway
Students will build, test, troubleshoot, repair, and modify developmental and production electronic components, parts, and systems, such as computer equipment, missile control instrumentation, electron tubes, test equipment, and machine tool numerical controls, applying principles and theories of electronics, electrical circuitry, engineering mathematics, electronic and electrical testing, and physics.

Industry-Validated Credentials
Students have an opportunity to gain valuable skills and knowledge through participation and completion of all required courses in a career pathway. Obtaining such skills will potentially provide students with increased opportunities to earn industry-validated credentials while still in high school, thus leading to increased earning potential throughout the student's career span.

Postsecondary Transition:
- Students who will continue their education in a Program of Study at one of the University System of Georgia institutions should prepare to take the ACT or SAT for admissions. Admission's testing varies from institution to institution. Students should contact the selected institution for specific testing information. Additional admissions information can be found at Staying On Course. ([www.usg.edu/student_affairs/documents/Staying_on_Course.pdf](http://www.usg.edu/student_affairs/documents/Staying_on_Course.pdf))
- Students who will continue their education in a Program of Study at one of the Technical College System of Georgia institutions should prepare to take the COMPASS test for admissions.
- Students who will continue their education and training in the U.S. Military should take the ASVAB assessment.
- Students should utilize GAcollege411 to select the most appropriate postsecondary opportunities to match their selected career field, including state registered apprenticeships.
- Students can earn both high school and postsecondary credit while in high school. Georgia has multiple dual enrollment program opportunities, including Accel, Dual HOPE, Move On When Ready, and Articulation.
Hospitality & Tourism Cluster

Educational programs in this cluster prepare students for employment in career pathways that relate to families and human needs such as restaurant and food/beverage services, lodging, travel and tourism, recreation, amusement, and attractions.

Culinary Arts Pathway
Students will complete a variety of skills required by the restaurant and food industry such as knife skills, cooking techniques, menu planning, food purchasing and costing, food safety and sanitation, and front of the house service.

Hospitality, Recreation & Tourism Pathway
Students will apply knowledge and skills in marketing, management, promotions, and selling which are required for success in the travel, lodging, tourism, and recreation industries.

<table>
<thead>
<tr>
<th>Occupation Specialties</th>
<th>Entry Level of Education Needed</th>
<th>2012 Average Annual Wage</th>
<th>Annual Openings 2012-2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food Service Managers</td>
<td>Some College</td>
<td>$37,800</td>
<td>30</td>
</tr>
<tr>
<td>Meeting, Convention &amp; Event Planners</td>
<td>Bachelor’s Degree</td>
<td>$45,000</td>
<td>170</td>
</tr>
<tr>
<td>Chefs &amp; Head Cooks</td>
<td>Some College</td>
<td>$37,900</td>
<td>90</td>
</tr>
<tr>
<td>Sports Marketing Managers</td>
<td>Bachelor’s Degree</td>
<td>$60,000</td>
<td>10</td>
</tr>
<tr>
<td>Set and Exhibit Designers</td>
<td>Bachelor’s Degree</td>
<td>$37,000</td>
<td>20</td>
</tr>
<tr>
<td>Lodging Managers</td>
<td>Bachelor’s Degree</td>
<td>$45,100</td>
<td>60</td>
</tr>
</tbody>
</table>

continued on back
Sports and Entertainment Marketing Pathway

Students will apply knowledge and skills in all areas of marketing to promote brands by using sports and entertainment celebrities and events to connect with broad or individual targeted groups of consumers.

Industry-Validated Credentials

Students have an opportunity to gain valuable skills and knowledge through participation and completion of all required courses in a career pathway. Obtaining such skills will potentially provide students with increased opportunities to earn industry-validated credentials while still in high school, thus leading to increased earning potential throughout the student’s career span.

Postsecondary Transition:

- Students who will continue their education in a Program of Study at one of the University System of Georgia institutions should prepare to take the ACT or SAT for admissions. Admission's testing varies from institution to institution. Students should contact the selected institution for specific testing information. Additional admissions information can be found at Staying On Course. ([www.usg.edu/student_affairs/documents/Staying_on_Course.pdf](http://www.usg.edu/student_affairs/documents/Staying_on_Course.pdf))
- Students who will continue their education in a Program of Study at one of the Technical College System of Georgia institutions should prepare to take the COMPASS test for admissions.
- Students who will continue their education and training in the U.S. Military should take the ASVAB assessment.
- Students should utilize GAcollege411 to select the most appropriate postsecondary opportunities to match their selected career field, including state registered apprenticeships.
- Students can earn both high school and postsecondary credit while in high school. Georgia has multiple dual enrollment program opportunities, including Accel, Dual HOPE, Move On When Ready, and Articulation.
Marketing Cluster

Educational programs in this cluster prepare students to plan, manage, and perform marketing activities to reach organizational objectives that include brand management, professional sales, merchandising, marketing communications, promotions, and market research.

Marketing and Management Pathway

Students will focus on managing the processes responsible for identifying, anticipating, and satisfying customer requirements in a manner that is profitable for the business. Student skills include management and entrepreneurship, marketing, buying and merchandising, marketing communications and promotion, professional sales, marketing information management and research, channel management, global marketing, and Internet/online marketing.

<table>
<thead>
<tr>
<th>Occupation Specialties</th>
<th>Entry Level of Education Needed</th>
<th>2012 Average Annual Wage</th>
<th>Annual Openings 2012-2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advertising and Promotions Managers</td>
<td>Bachelor's Degree</td>
<td>$100,300</td>
<td>70</td>
</tr>
<tr>
<td>Wholesale and Retail Buyers</td>
<td>Bachelor's Degree</td>
<td>$58,800</td>
<td>90</td>
</tr>
<tr>
<td>Online Merchants</td>
<td>Bachelor's Degree</td>
<td>$66,000</td>
<td>600</td>
</tr>
<tr>
<td>Sales Managers, Entrepreneurships</td>
<td>Bachelor's Degree</td>
<td>$106,400</td>
<td>550</td>
</tr>
<tr>
<td>Management Analysts</td>
<td>Bachelor's Degree, HOT</td>
<td>$80,700</td>
<td>2,080</td>
</tr>
<tr>
<td>Public Relations and Fund Raising Managers</td>
<td>Bachelor's Degree</td>
<td>$86,200</td>
<td>80</td>
</tr>
<tr>
<td>Marketing Research Analysts and Marketing Specialists</td>
<td>Bachelor's Degree</td>
<td>$59,100</td>
<td>270</td>
</tr>
</tbody>
</table>

continued on back
Marketing Cluster

Fashion, Merchandising, and Retail Management Pathway

Students learn how designers, manufacturers, merchandisers, and retailers collaborate to market and sell thousands of products. Student skills will focus on managing processes related to visual merchandising, buying, researching, advertising, promoting, and selling products globally.

Marketing Communications and Promotions Pathway

Students learn that marketing communication and promotion is primarily concerned with increasing demand for a product/service, positioning a product/service, and differentiating a product/service. Student skills will include generating in-depth oral and written communications, learning marketing communications in relation to specific products and services; using promotions as a key component of the marketing mix, and affecting product/service branding and customer buying behaviors.

Industry-Validated Credentials

Students have an opportunity to gain valuable skills and knowledge through participation and completion of all required courses in a career pathway. Obtaining such skills will potentially provide students with increased opportunities to earn industry-validated credentials while still in high school, thus leading to increased earning potential throughout the student’s career span.

Postsecondary Transition:

- Students who will continue their education in a Program of Study at one of the University System of Georgia institutions should prepare to take the ACT or SAT for admissions. Admission’s testing varies from institution to institution. Students should contact the selected institution for specific testing information. Additional admissions information can be found at Staying On Course. (www.usg.edu/student_affairs/documents/Staying_on_Course.pdf)
- Students who will continue their education in a Program of Study at one of the Technical College System of Georgia institutions should prepare to take the COMPASS test for admissions.
- Students who will continue their education and training in the U.S. Military should take the ASVAB assessment.
- Students should utilize GAcollege411 to select the most appropriate postsecondary opportunities to match their selected career field, including state registered apprenticeships.
- Students can earn both high school and postsecondary credit while in high school. Georgia has multiple dual enrollment program opportunities, including Accel, Dual HOPE, Move On When Ready, and Articulation.
Arts, Audio Video Technology & Communications Cluster

Educational programs in this cluster prepare students to design, produce, exhibit, perform, write, and publish multimedia content that includes visual and performing arts and design, journalism, and entertainment services.

**Audio-Video Technology and Film Pathway**
Students will design, manufacture, operate and/or repair audiovisual equipment; create presentations of sound, video, and data in a variety of formats; gather information, prepare broadcasts, build sets, and operate equipment used to record and transmit programs and/or motion pictures; and operate sound mixing and/or video editing equipment.

**Graphics Communication Pathway**
Students will create, develop, produce, and distribute products that incorporate words and/or pictorial images to convey information, ideas, and feelings, as well as utilizing the technologies of printing, publishing, packaging, electronic imaging, and related industries.

<table>
<thead>
<tr>
<th>Occupation Specialties</th>
<th>Entry Level of Education Needed</th>
<th>2012 Average Annual Wage</th>
<th>Annual Openings 2012-2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desktop Publishers</td>
<td>Associate’s Degree</td>
<td>$37,800</td>
<td>30</td>
</tr>
<tr>
<td>Graphic Designers</td>
<td>Bachelor’s Degree</td>
<td>$49,900</td>
<td>390</td>
</tr>
<tr>
<td>Multimedia Artist and Animators</td>
<td>Bachelor’s Degree</td>
<td>$54,900</td>
<td>150</td>
</tr>
<tr>
<td>Camera Operators, Television, Video and Motion Picture</td>
<td>Bachelor’s Degree</td>
<td>$47,300</td>
<td>30</td>
</tr>
<tr>
<td>Film and Video Editors</td>
<td>Bachelor’s Degree</td>
<td>$45,600</td>
<td>10</td>
</tr>
</tbody>
</table>

Dr. John D. Barge, State School Superintendent June 2013

*continued on back*
Graphics Design Pathway
Students will communicate visually using typography and/or images to convey information; as well as, utilizing a range of cognitive skills, problem-solving skills, aesthetics, and crafts that include typography, visual arts, illustration, photography, and layout.

Industry-Validated Credentials
Students have an opportunity to gain valuable skills and knowledge through participation and completion of all required courses in a career pathway. Obtaining such skills will potentially provide students with increased opportunities to earn industry-validated credentials while still in high school, thus leading to increased earning potential throughout the student's career span.

Postsecondary Transition:
- Students who will continue their education in a Program of Study at one of the University System of Georgia institutions should prepare to take the ACT or SAT for admissions. Admission's testing varies from institution to institution. Students should contact the selected institution for specific testing information. Additional admissions information can be found at Staying On Course. ([www.usg.edu/student_affairs/documents/Staying_on_Course.pdf](http://www.usg.edu/student_affairs/documents/Staying_on_Course.pdf))
- Students who will continue their education in a Program of Study at one of the Technical College System of Georgia institutions should prepare to take the COMPASS test for admissions.
- Students who will continue their education and training in the U.S. Military should take the ASVAB assessment.
- Students should utilize GAcollege411 to select the most appropriate postsecondary opportunities to match their selected career field, including state registered apprenticeships.
- Students can earn both high school and postsecondary credit while in high school. Georgia has multiple dual enrollment program opportunities, including Accel, Dual HOPE, Move On When Ready, and Articulation.
Education & Training Cluster

Educational programs in this cluster prepare students to plan, manage, and provide education and training services, and related learning support services such as administration, teaching/training, administrative support, and professional support services.

Early Childhood Care & Education Pathway
Students will demonstrate the planning, managing, and providing of education and training services; as well as, related learning support services such as administration, teaching/training, administrative support, and professional support services in an Early Childhood Care setting.

Teaching as a Profession Pathway
Students will examine the teaching profession, study contemporary issues in education, and participate actively in an internship with a teacher mentor.

<table>
<thead>
<tr>
<th>Occupation Specialties</th>
<th>Entry Level of Education Needed</th>
<th>2012 Average Annual Wage</th>
<th>Annual Openings 2012-2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-School Teachers</td>
<td>Associate's Degree</td>
<td>$24,500</td>
<td>730</td>
</tr>
<tr>
<td>Teachers Assistants</td>
<td>High School</td>
<td>$18,800</td>
<td>1670</td>
</tr>
<tr>
<td>Education Administrators, Preschool and Childcare Center/Program</td>
<td>Advanced Degree</td>
<td>$43,900</td>
<td>70</td>
</tr>
<tr>
<td>Postsecondary Business Teachers</td>
<td><strong>Advanced Degree</strong></td>
<td><strong>$85,200</strong></td>
<td><strong>120</strong></td>
</tr>
<tr>
<td>Middle School Teachers, except Special Education and Career Technicians</td>
<td><strong>Bachelor’s Degree</strong></td>
<td><strong>$54,200</strong></td>
<td><strong>790</strong></td>
</tr>
</tbody>
</table>

continued on back
Education & Training Cluster

Students have an opportunity to gain valuable skills and knowledge through participation and completion of all required courses in a career pathway. Obtaining such skills will potentially provide students with increased opportunities to earn industry-validated credentials while still in high school, thus leading to increased earning potential throughout the student’s career span.

Industry-Validated Credentials

Students have an opportunity to gain valuable skills and knowledge through participation and completion of all required courses in a career pathway. Obtaining such skills will potentially provide students with increased opportunities to earn industry-validated credentials while still in high school, thus leading to increased earning potential throughout the student’s career span.

Postsecondary Transition:

- Students who will continue their education in a Program of Study at one of the University System of Georgia institutions should prepare to take the ACT or SAT for admissions. Admission's testing varies from institution to institution. Students should contact the selected institution for specific testing information. Additional admissions information can be found at Staying On Course. ([www.usg.edu/student_affairs/documents/Staying_on_Course.pdf](http://www.usg.edu/student_affairs/documents/Staying_on_Course.pdf))
- Students who will continue their education in a Program of Study at one of the Technical College System of Georgia institutions should prepare to take the COMPASS test for admissions.
- Students who will continue their education and training in the U.S. Military should take the ASVAB assessment.
- Students should utilize GAcollege411 to select the most appropriate postsecondary opportunities to match their selected career field, including state registered apprenticeships.
- Students can earn both high school and postsecondary credit while in high school. Georgia has multiple dual enrollment program opportunities, including Accel, Dual HOPE, Move On When Ready, and Articulation.
Educational programs in this cluster prepare students to plan, manage, and perform the processing of materials into intermediate or final products, and the related professional and technical support activities such as production planning and control, maintenance, and manufacturing/process engineering.

**Integrated Manufacturing Technology Pathway**
Students will familiarize themselves with related careers and develop fundamental technological literacy as they learn about the history, systems, and processes of manufacturing; apply their knowledge of computer aided design (CAD), computer numerical control (CNC), robotics, computer assisted manufacturing (CAM), programmable logic controllers (PLC), automated guided vehicles (AGV), and computer integrated manufacturing (CIM); and learn how businesses engage in the production of products beginning with pre-production activities and continuing through post-production activities.

---

### Occupation Specialties

<table>
<thead>
<tr>
<th>Occupation Specialties</th>
<th>Entry Level of Education Needed</th>
<th>2012 Average Annual Wage</th>
<th>Annual Openings 2012-2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial Engineers</td>
<td>Bachelor's Degree</td>
<td>$76,880</td>
<td>250</td>
</tr>
<tr>
<td>Industrial Engineering Technicians</td>
<td>Associate's Degree</td>
<td>$48,330</td>
<td>45</td>
</tr>
<tr>
<td>Industrial Machinery Mechanics</td>
<td>High School</td>
<td>$42,500</td>
<td>293</td>
</tr>
</tbody>
</table>

*continued on back*
Manufacturing Cluster

Mechatronics Pathway
Students will master the integrated and automated systems of Mechatronics that encompasses a wide range of applications such as: Electronics, Mechanics, Fluid Power, Electrical Control Systems, Programmable Logic Controllers (PLC), Computers, and Robotics.

Industry-Validated Credentials
Students have an opportunity to gain valuable skills and knowledge through participation and completion of all required courses in a career pathway. Obtaining such skills will potentially provide students with increased opportunities to earn industry-validated credentials while still in high school, thus leading to increased earning potential throughout the student's career span.

Postsecondary Transition:
- Students who will continue their education in a Program of Study at one of the University System of Georgia institutions should prepare to take the ACT or SAT for admissions. Admission's testing varies from institution to institution. Students should contact the selected institution for specific testing information. Additional admissions information can be found at Staying On Course. (www.usg.edu/student_affairs/documents/Staying_on_Course.pdf)
- Students who will continue their education in a Program of Study at one of the Technical College System of Georgia institutions should prepare to take the COMPASS test for admissions.
- Students who will continue their education and training in the U.S. Military should take the ASVAB assessment.
- Students should utilize GAcollege411 to select the most appropriate postsecondary opportunities to match their selected career field, including state registered apprenticeships.
- Students can earn both high school and postsecondary credit while in high school. Georgia has multiple dual enrollment program opportunities, including Accel, Dual HOPE, Move On When Ready, and Articulation.
Energy Cluster

Educational programs in this cluster prepare students for careers in planning, managing, and providing support and technical services related to the generation, transmission, and distribution of various types of energy; in addition to engineering design, construction, maintenance, and repair of these systems.

**Energy Systems Pathway**

Students will learn the characteristics, availability, conversion, control, transmission, and storage of energy and power; explore and apply the principles of electrical, fluid, and mechanical power; develop an understanding of the differences between nonrenewable, renewable, and inexhaustible energy sources and how these energy sources affect their world; research alternative energy sources to include the regional implications and economic, environmental, and sustainability issues; and evaluate the positive and negative impacts of nuclear power and its relevancy to various situations in today’s society.

<table>
<thead>
<tr>
<th>Occupation Specialties</th>
<th>Entry Level of Education Needed</th>
<th>2012 Average Annual Wage</th>
<th>Annual Openings 2012-2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical Engineers</td>
<td>Bachelor’s Degree</td>
<td>$86,300</td>
<td>120</td>
</tr>
<tr>
<td>Industrial Production Managers</td>
<td>Bachelor’s Degree</td>
<td>$76,200</td>
<td>130</td>
</tr>
<tr>
<td>Equipment, Cable, Line Repairers/ Installers</td>
<td>Some College</td>
<td>$51,500</td>
<td>60</td>
</tr>
</tbody>
</table>

Dr. John D. Barge, State School Superintendent June 2013

*continued on back*
Energy Cluster

Energy and Power: Generation, Transmission, and Distribution Pathway
Students will develop an understanding of energy systems, applications, and efficiency; explore how energy is converted into useful services and the role of increased efficiency in providing those services with less resources; investigate different forms of efficiency improvements and conservation; design and convert efficient energy systems; explore energy and power systems technologies by using mechanical, electrical, fluid, and alternate systems; evaluate building styles, and the energy-efficient materials used in construction.

Industry-Validated Credentials
Students have an opportunity to gain valuable skills and knowledge through participation and completion of all required courses in a career pathway. Obtaining such skills will potentially provide students with increased opportunities to earn industry-validated credentials while still in high school, thus leading to increased earning potential throughout the student’s career span.

Postsecondary Transition:
- Students who will continue their education in a Program of Study at one of the University System of Georgia institutions should prepare to take the ACT or SAT for admissions. Admission’s testing varies from institution to institution. Students should contact the selected institution for specific testing information. Additional admissions information can be found at Staying On Course. (www.usg.edu/student_affairs/documents/Staying_on_Course.pdf)
- Students who will continue their education in a Program of Study at one of the Technical College System of Georgia institutions should prepare to take the COMPASS test for admissions.
- Students who will continue their education and training in the U.S. Military should take the ASVAB assessment.
- Students should utilize GAcollege411 to select the most appropriate postsecondary opportunities to match their selected career field, including state registered apprenticeships.
- Students can earn both high school and postsecondary credit while in high school. Georgia has multiple dual enrollment program opportunities, including Accel, Dual HOPE, Move On When Ready, and Articulation.