

Science Courses

Four credits of science are required for the Alabama High School Diploma. Biology AND Physical Science or Chemistry are required for all diploma types.

Samples of Course Sequences for High School Science

Pathways	(Grade 8)	Grade 9	Grade 10	Grade 11	Grade 12
1	Physical Science or Adv Physical Science (A or B Average)	Adv Biology	Adv Chemistry	Adv Anatomy & Physiology	AP Biology
2	Physical Science or Adv Physical Science (A or B Average)	Adv Biology	Adv Chemistry	AP Physics 1	AP Physics 2
3	Physical Science or Adv Physical Science (A or B Average)	Adv Biology	Adv Chemistry	AP Chemistry	Choose one: <ul style="list-style-type: none"> ▪ Adv Anatomy & Physiology ▪ AP Biology ▪ Earth & Space Science ▪ Environmental Science ▪ Forensic Science ▪ AP Physics 1
4	Physical Science	Biology	Chemistry	Choose two over the next two years: <ul style="list-style-type: none"> ▪ Adv Anatomy & Physiology ▪ Earth & Space Science ▪ Environmental Science ▪ Forensic Science 	
5	Physical Science	Biology	Physical Science	Chemistry	Choose one: <ul style="list-style-type: none"> ▪ Adv Anatomy & Physiology ▪ Earth & Space Science ▪ Environmental Science ▪ Forensic Science
6	Physical Science	Biology	Physical Science	Environmental Science	Earth & Space Science
7 Dual Enrollment	Adv Physical Science	Adv Biology	Adv Chemistry	BIO 103	BIO 104
8 Essentials Pathway	Physical Science	Essentials: Biology	Essentials: Physical Science	Essentials: Environmental Science	Essentials: Earth & Space Science
9 AAS Pathway	AAS: Science 8	AAS: Science 9	AAS: Science 10	AAS: Science 11	AAS: Science 12

220011

Biology

1 Credit

Grade 9

their effect on the environment. This course is appropriate for students interested in a wide range of postsecondary options.

Prerequisite(s): Biology and Physical Science or Chemistry

Summer Assignment: Yes

NCAA: Approved

Fee: None or \$25.00 (If this course is used to fulfill one of the four science credits required for an Alabama High School Diploma, there is no fee. However, if this course is taken beyond the four sciences needed for an Alabama High School Diploma, then a fee of \$25.00 will incur.)

220051 Physical Science 1 Credit Grade 10

Physical Science is a conceptual, inquiry-based course that provides students with an investigation of the basic concepts of chemistry and physics. Content standards covered in this course include matter and its interactions, forces and motion, energy and waves. This course is appropriate for students interested in a wide range of postsecondary options.

Prerequisite(s): Biology or Advanced Biology

Note: This course will satisfy the physical science requirement needed for graduation.

Summer Assignment: Yes

NCAA: Approved

Fee: None

220061 Chemistry 1 Credit Grades 10-12

Chemistry is a mathematics-heavy course that applies mathematical concept to chemical interactions. Content standards include matter and its interactions, energy transformations, changes in matter, chemical reactions, stoichiometric calculations, etc. This course is appropriate for students interested in a wide range of postsecondary options.

Prerequisite(s): Completion of Biology or Advanced Biology, and completion of Algebra I (or Algebra A and B).

Note: This course will satisfy the physical science requirement needed for graduation.

Summer Assignment: Yes

NCAA: Approved

Fee: \$25.00

220063aa Chemistry Advanced SV 1 Credit Grades 10-11

Advanced Chemistry is a rigorous course that moves at an accelerated pace to cover a more in-depth study of chemistry topics. The goal of this course is to equip students with the knowledge and skills needed to be successful in AP Chemistry. This course is an in-depth student of topics including introduction of equilibrium, redox reactions, nuclear chemistry and electrochemistry, to name a few. This course is encouraged for students interested in pursuing postsecondary education at the two-year or four-year level.

Prerequisite(s): Completion of Biology, preferably Advanced Biology; and completion of Algebra I (or Algebra A and B).

Note: This course will satisfy the physical science requirement needed for graduation.

Additional Quality Point: +0.5 if student receives a final grade of A, B, C or D.

Summer Assignment: Yes

NCAA: Approved

Fee: \$25.00

220064 Chemistry AP 1 Credit Grades 11-12

AP Chemistry is a college-level course that includes advanced studies in chemical interactions. This course is designed for the academically talented student who is considering a degree in science, engineering or medicine. It involves complex material and stresses problem-solving. Advanced laboratory experiments are an integral part of

this course and may require additional time outside of the allotted class time to complete. Some independent research is recommended and may also be required. This course is encouraged for students interested in pursuing postsecondary education in a STEM field at the two-year or four-year level.

Prerequisite(s): (1) Completion of Biology and Chemistry, preferably at the advanced level, and (2) successful completion of Algebra II with Trigonometry.

Note: This course fulfills one of the science credits required for graduation.

Note: Students who take this course are expected to take the AP Exam in May. Students may be eligible for college credit with a qualifying score on the AP Exam. Since colleges vary in acceptable AP scores, students should check with colleges to determine policies regarding AP credit.

Additional Quality Point: +1 if student receives a final grade of A, B, C or D.

Summer Assignment: Yes

NCAA: Approved

Fee: \$25.00

AP Exam Fee: Yes

220028aa Anatomy and Physiology Advanced SV 1 Credit Grades 11-12

Advanced Anatomy and Physiology explores the structure and function of cells, tissues, and organs; organization of the human body; biochemistry; and the skeletal, muscular, nervous, endocrine, digestive, respiratory, cardiovascular, integumentary, immune, urinary, and reproductive systems. This course will go in-depth in topic coverage and requires a large amount of laboratory work. This course is for students who have an interest in pursuing a career in nursing, medicine or other health-related sciences, and who plan to pursue a postsecondary education at the two-year or four-year level.

Prerequisite(s): Completion of Biology and Physical Science or Chemistry, preferably at the advanced level.

Note: This course fulfills one of the science credits required for graduation.

Additional Quality Point: +0.5 if student receives a final grade of A, B, C or D.

Summer Assignment: Yes

NCAA: Approved

Fee: None or \$25.00 (If this course is used to fulfill one of the four science credits required for an Alabama High School Diploma, there is no fee. However, if this course is taken beyond the four sciences needed for an Alabama High School Diploma, then a fee of \$25.00 will incur.)

220057 Physics 1: Algebra Based, AP 1 Credit Grades 10-12

AP Physics 1 is an algebra-based, introductory college-level physics course. Students will explore principles of Newtonian mechanics (including rotational motion); work, energy, and power; mechanical waves and sound; and introductory, simple circuits. Advanced laboratory experiments are an integral part of this course and may require additional time outside of the allotted class time to complete. Some independent research is recommended and may require additional time outside of the allotted class time to complete. This course is encouraged for students interested in pursuing postsecondary education in a STEM field at the two-year or four-year level.

Prerequisite(s): (1) Completion of Biology and Chemistry, preferably at the advanced level, and (2) completion of Advanced Geometry and concurrently enrolled in Advanced Algebra II with Trigonometry.

Note: This course will satisfy the physical science requirement for graduation.

Note: Students who take this course are expected to take the AP Exam in May. Students may be eligible for college credit with a qualifying score on the AP Exam. Since colleges vary in acceptable AP scores, students should check with colleges to determine policies regarding AP credit.

Additional Quality Point: +1 if student receives a final grade of A, B, C or D.

Summer Assignment: Yes

NCAA: Approved

Fee: \$25.00

AP Exam Fee: Yes

220058 Physics 2: Algebra Based, AP 1 Credit Grades 11-12

AP Physics 2 is an algebra-based, introductory college-level physics course. Students will cultivate an understanding of physics through inquire-based investigations. Topics include fluid statics and dynamics; thermodynamics with kinetic theory; PV diagrams and probability, electrostatics; electrical circuits with capacitors; magnetic fields, electromagnetism; physical and geometric optics, and quantum, atomic, and nuclear physics. Advanced laboratory experiments are an integral part of this course and may require additional time outside of the allotted class time to complete. Some independent research is recommended and may also be required. This course is encouraged for students interested in pursuing postsecondary education in a STEM field at the two-year or four-year level.

Prerequisite(s): (1) Completion of AP Physics 1, (2) completion of Algebra II with Trigonometry, and (3) concurrent enrollment in Pre-Calculus.

Note: This course will satisfy the physical science requirement for graduation.

Note: Students who take this course are expected to take the AP Exam in May. Students may be eligible for college credit with a qualifying score on the AP Exam. Since colleges vary in acceptable AP scores, students should check with colleges to determine policies regarding AP credit.

Additional Quality Point: +1 if student receives a final grade of A, B, C or D.

Summer Assignment: Yes

NCAA: Approved

Fee: \$25.00

AP Exam Fee: Yes

220081 Earth and Space Science 1 Credit Grades 11-12

Earth & Space Science is designed to provide students with a depth of conceptual understanding to adequately prepare for college, career and citizenship with an appropriate level of scientific literacy. Content includes practical knowledge of earth and space science including scientific process and application skills; energy in the earth system; weather; seasons; theories for origin and age of the universe; stars, pulsars, quasars, black holes, and galaxies; earth and space scientists; and space exploration. This course is appropriate for students interested in a wide range of postsecondary options.

Prerequisite(s): Biology

NCAA: Approved

Fee: None or \$25.00 (If this course is used to fulfill one of the four science credits required for an Alabama High School Diploma, there is no fee. However, if this course is taken beyond the four sciences needed for an Alabama High School Diploma, then a fee of \$25.00 will incur.)

410025 Forensic and Criminal Investigations 1 Credit Grade 12

Forensic and Criminal Investigations focuses on the analysis of evidence collection, the decomposition process, crime scenes, skeletal remains, toxicology, and document validity. Case studies and crime scenarios help students understand the implications and complicated issues that are emerging as the science of forensics continues to develop.

Prerequisite(s): (1) Completion of Biology or Advanced Biology, and (2) completion of Physical Science or Chemistry.

NCAA: Approved

Fee: \$25.00

Alternate Achievement Standards Pathway: Science

Students who are working to earn an Alabama High School Diploma following the Alternate Achievement Standards Pathway are enrolled in science classes that are using alternate achievement standards (Extended Standards) which are aligned to the *Alabama Course of Study*. Permission to take these courses is documented in a student's Individualized Education Plan (IEP).

NCAA: NOT Approved

Fee: None

600479	AAS: Science 9	1 Credit
600480	AAS: Science 10	1 Credit
600481	AAS: Science 11	1 Credit
600482	AAS: Science 12	1 Credit

Essentials Pathway: Science

Students who are working toward an Alabama High School Diploma following the Essentials Pathway will take the following courses in science which follow the *Alabama Course of Study*. Permission to take these courses is documented in a student's Individualized Education Plan (IEP).

750101	Essentials: Physical Science	1 Credit	Grade 10
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Essentials: Physical Science is designed to provide students with practical knowledge of physical science including scientific process and application skills; periodic table; solutions; bonding; chemical formulas; physical and chemical change; gravitational, electromagnetic, and nuclear forces; motion; energy; energy transformation; electricity and magnetism; nuclear science; and metric units.

Prerequisite(s): Essentials: Biology

NCAA: NOT Approved

Fee: None

750201	Essentials: Biology	1 Credit	Grade 9
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Essentials: Biology is designed to provide students with practical knowledge of biology including process and application skills, cell processes, cell theory, photosynthesis and cellular respiration, genetics, classification, plants, animals, ecology and biogeochemical cycles.

Prerequisite(s): Physical Science 8

NCAA: NOT Approved

Fee: None

750301	Essentials: Earth and Space Science	1 Credit	Grade 12
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Essentials: Earth and Space Science is designed to provide students with practical knowledge of earth and space science including scientific process and application skills; energy in the earth system; weather; seasons; theories for origin and age of the universe; stars, pulsars, quasars, black holes, and galaxies; earth and space scientists; and space exploration.

Prerequisite(s): Essentials: Environmental Science

NCAA: NOT Approved

Lab Fee: None

750401	Essentials: Environmental Science	1 Credit	Grade 11
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Essentials: Environmental Science is designed to provide students with a practical knowledge of environmental science including scientific process and application skills, natural and human impacts, carrying capacity, renewable and nonrenewable energy resources, properties and importance of water, land use practices, and composition and erosion of soil.

Prerequisite(s): Essentials: Physical Science

NCAA: NOT Approved

Fee: None

Dual Enrollment: Science

When science classes are taken at a two-year community college, they are generally accepted at in-state four-year institutions based on agreements between community colleges and four-year institutions. These courses are marked with an asterisk. *

***Introduction to Biology I (BIO 101 or BSC 108)** **1 HS Credit/4 College Credits** **Grades 11-12**
901400 **(2-Year College Number)**
220045 **(4-Year College Number)**

This course is the first of a two-course sequence for non-science majors. It covers historical studies illustrating the scientific method, cellular structure, bioenergetics, cell reproduction, Mendelian and molecular genetics, and a survey of human organ systems. A 120-minute laboratory is required.

Prerequisite(s): Students must have a minimum prerequisite of high school Biology and Chemistry.

Additional Quality Point: +1 for a final grade of A, B, C or D in this course.

Note: This course is taught at Jefferson State Community College, Lawson State Community College or The University of Alabama Early College.

NCAA: Approved

Cost: Yes

***Introduction to Biology II (BIO 102 or BSC 109)** **1 HS Credit/4 College Credits** **Grades 11-12**
901401 **(2-Year College Number)**
220045aa **(4-Year College Number)**

This course is the second of a two-course sequence for non-science majors. It covers evolutionary principles and relationships, environmental and ecological topics, classification, and a survey of biodiversity. A 120-minute laboratory is required.

Prerequisite(s): Students must have satisfactorily completed BIO 101.

Additional Quality Point: +1 for a final grade of A, B, C or D in this course.

Note: This course is taught at Jefferson State Community College, Lawson State Community College or The University of Alabama Early College.

NCAA: Approved

Cost: Yes

***Principles of Biology I (BIO 103 or BSC 114/115)** **1 HS Credit/4 College Credits** **Grades 11-12**
901402 **(2-Year College Number)**
220045ab **(4-Year College Number)**

This course is the first of a two-course sequence designed for science majors. It covers physical, chemical, and biological principles common to all organisms. These principles are explained through a study of cell structure and function, cellular reproduction, basic biochemistry, cell energetics, the process of photosynthesis, and Mendelian and molecular genetics. Also included are the scientific method, basic principles of evolution, and an overview of the diversity of life with emphasis on viruses, prokaryotes, and protists. A 120-minute laboratory is required.

Prerequisite(s): Students must have a minimum prerequisite of high school Biology and Chemistry.

Additional Quality Point: +1 for a final grade of A, B, C or D in this course.

Note: This course is taught at Jefferson State Community College, Lawson State Community College or The University of Alabama Early College.

NCAA: Approved

Cost: Yes

***Principles of Biology II (BIO 104 or BSC 116/117)** **1 HS Credit/4 College Credits** **Grades 11-12**
901403 **(2-Year College Number)**
220045ac **(4-Year College Number)**

This course is the first of a two-course sequence designed for science majors. It covers the basic ecological and evolutionary relationships of plants and animals and a survey of plant and animal diversity including classification, morphology, physiology, and reproduction. A 120-minute laboratory is required.

Prerequisite(s): Students must have satisfactorily completed BIO 103.

Additional Quality Point: +1 for a final grade of A, B, C or D in this course.

Note: This course is taught at Jefferson State Community College, Lawson State Community College or The University of Alabama Early College.

NCAA: Approved

Cost: Yes

Human Anatomy & Physiology I (BIO 201) **1 HS Credit/4 College Credits** **Grade 12**
901415 (2-Year College Number)
220027aa (4-Year College Number)

This course covers the structure and function of the human body. Included is an orientation of the human body, basic principles of chemistry, a study of cells and tissues, metabolism, joints, the integumentary, skeletal, muscular, nervous system, and the senses. Dissection, histological studies, and physiology are featured in the laboratory experience. A 120-minute laboratory is required.

Prerequisite(s): Students must have satisfactorily completed BIO 103 and BIO 104.

Additional Quality Point: +1 for a final grade of A, B, C or D in this course.

Note: This course is taught at Jefferson State Community College or Lawson State Community College.

NCAA: Approved

Cost: Yes

***College Chemistry I (CHM 111 or CH 101)** **1 HS Credit/4 College Credits** **Grade 12**
902005 (2-Year College Number)
220068 (4-Year College Number)

This course is the first course in a two-semester sequence designed for the science or engineering major who is expected to have a strong background in mathematics. Topics in this course include measurement, nomenclature, stoichiometry, atomic structure, equations and reactions, basic concepts of thermochemistry, chemical and physical properties, bonding, molecular structure, gas laws, kinetic-molecular theory, condensed matter, solutions, colloids, colligative properties, acids and bases and some descriptive chemistry topics. Laboratory is required.

Prerequisite(s): Students must have satisfactorily completed MTH 112 or have an equivalent math placement score.

Additional Quality Point: +1 for a final grade of A, B, C or D in this course.

Note: This course is taught at Jefferson State Community College, Lawson State Community College or The University of Alabama Early College.

NCAA: Approved

Cost: Yes

***College Chemistry II (CHM 112 or CH 102)** **1 HS Credit/4 College Credits** **Grade 12**
902005 (2-Year College Number)
220068 (4-Year College Number)

This course is the first course in a two-semester sequence designed for the science or engineering major who is expected to have a strong background in mathematics. Topics in this course include chemical kinetics, chemical equilibria, acids and bases, ionic equilibria of weak electrolytes, solubility product principle, chemical thermodynamics, electrochemistry, oxidation-reduction, nuclear chemistry, and introduction to organic chemistry and biochemistry, atmospheric chemistry, and selected topics in descriptive chemistry including the metals, nonmetals, semimetals, coordination compounds, transition compounds, and post-transition compounds. Laboratory is required.

Prerequisite(s): Students must have satisfactorily completed CHM 111.

Additional Quality Point: +1 for a final grade of A, B, C or D in this course.

Note: This course is taught at Jefferson State Community College, Lawson State Community College or The University of Alabama Early College.

NCAA: Approved

Cost: Yes