

33112 Biology I (R)**1 credit****Gr: 9-12****Prerequisite:** None

Description: Biology provides instruction that allows students to conduct field and laboratory investigations, use scientific methods during investigations, and make informed decisions using critical thinking and scientific problem-solving. Students in Biology study a variety of topics that include: structures and functions of cells and viruses; growth and development of organisms; cells, tissues, and organs; nucleic acids and genetics; biological evolution; taxonomy; metabolism and energy transfers in living organisms; living systems; homeostasis; ecosystems; and plants and the environment.

33113 Honors Biology I (H)**1 credit****Gr: 9-12****Prerequisite:** None

Description: This course is designed to prepare students for AP Biology and provides instruction that allows students to conduct field and laboratory investigations, use scientific methods during investigations, and make informed decisions using critical thinking and scientific problem-solving. Students are also provided the opportunity to use technology as a tool and resource for learning biology. Students in Biology study a variety of topics that include: structures and functions of cells and viruses; growth and development of organisms; cells, tissues, and organs; nucleic acids and genetics; biological evolution; taxonomy; metabolism and energy transfers in living organisms; living systems; homeostasis; ecosystems; and plants and the environment. In addition, advanced critical-thinking and problem-solving skills will be developed with a group or individual project presented in a competitive public forum. *Honors courses address learning objectives at greater depth and faster pace along with higher expectations for student performance.

33114 Biology I (IntH)**1 credit****Gr: 9-12****Prerequisite:** Algebra I (H)

Description: [International Honors course offered only at GHS] IntH Biology prepares students for IB Biology by laying the foundation in basic and advanced laboratory skills, by teaching students to critically question, analyze, and interpret scientific information, by building oral and written science communication skills, and by instilling an awareness of the limitations of scientific knowledge and its constant state of flux. Students must be prepared to spend a minimum of 1/2 hour most evenings for Pre-lab reading and/or lab conclusion writings. Strong math skills, reading comprehension, and the ability to critically analyze data are essential to success in this course. Content of the course will involve the exploration of and laboratories relating to Biology of Man; Biology of Cells; Genetics; Evolution; Ecology; Biology of Plants; and an Independent Project for entrance in the Science Fair. All students will learn to develop an advanced level lab manual.

33115 Biology for English Learners (R)**1 credit****Gr: 9-12****Prerequisite:** English learner

Description: [ENGLISH LEARNER (EL) COURSE] This course is based on the TEKS for Biology as accommodated for students receiving services as English learners at the beginning, intermediate, and advanced levels of language proficiency. Accommodations occur for English learners in time, pacing, methodology, and/or method of assessment.

33116 MST Biology I (H)**1 credit****Gr: 9-12****Prerequisite:** none

Description: [Math-Science-Technology magnet course offered only at NGHS] This course is designed to prepare students for AP Biology and covers the fundamental principles applicable to all living organisms. The study includes a consideration of the molecular basis of life, cell structure and function, basic metabolic processes, microorganisms, and a brief survey of the plant kingdom. Advanced probe ware and software simulations are utilized to master biological concepts. Individual student projects and teamwork will be an integral part of the course. *MST courses address learning objectives at greater depth and faster pace along with higher expectations for student performance.

NOTE: All courses may not be offered on every campus.

33016 Integrated Physics and Chemistry (R)**1 credit****Gr: 9-12****Prerequisite:** none

Description: This course integrates the disciplines of physics and chemistry in the following topics: motion, waves, energy transformations, properties of matter, changes in matter, and solution chemistry. Integrated Physics and Chemistry provides students with field and laboratory investigations which are used to learn about the natural world. Through the investigations, students will use scientific methods and scientific inquiry to make informed decisions using critical-thinking and scientific problem-solving.

33019 Integrated Physics and Chemistry for English Learners (R)**1 credit****Gr: 9-12****EL****Prerequisite:** English learner,

Description: [ENGLISH LEARNER (EL) COURSE] This course is based on the TEKS for Integrated Physics and Chemistry as accommodated for students receiving services as English learners at the beginning, intermediate, and advanced levels of language proficiency. Accommodations occur for English learners in time, pacing, methodology, and/or method of assessment.

33121 AP Biology DC – Collegiate academy and early-college programs only 1 credit**Gr: 11-12****Prerequisite:** Biology and Chemistry

Description: This course is for science majors. A major goal of the course is to involve students in the activities and endeavors of science. They formulate hypotheses, design and conduct experiments, and interpret data. The course focuses on the process of scientific investigation. Students gain skills in investigation and apply those skills to in-depth studies of a few selected areas of biology. Considerable emphasis is placed on the role of science in society, the complex and extremely important interactions between science and the problems and decisions that citizens must make. This is a college-level course, and students taking this course will be prepared for the Advanced Placement test in this area while meeting the requirements of the dual credit courses. *AP and DC courses address learning objectives at greater depth and faster pace along with higher expectations for student performance.

33122 IB Biology I**1 credit****Gr: 10-12****Prerequisite:** IntH or Honors Biology

Description: (IB Biology I is only offered at GHS) This course is designed to prepare students for the IB HL course in grade 12. Topics covered are cell biology, molecular biology, genetics, ecology, evolution and biodiversity, and human physiology. Students are expected to participate in projects designed to encourage their involvement in the learning process.

33124 IB Biology II**1 credit****Gr: 11-12****Prerequisite:** IB Biology I and Chemistry I (H or IB)

Description: [International Baccalaureate course offered only at GHS] This course is designed to prepare students for the IB SL/HL Level Biology Exam. This course extends upon concepts of IB Biology I and addresses all essential elements of AP Biology II. Preparation for external exams for college credit is integral to this course. Some field-based experience gives students an opportunity to gain insight into a few of the many different professions related to Biology. Students will also have a variety of opportunities to participate in projects designed to encourage their involvement in the learning process. Students are expected to participate in numerous scientific experiments and maintain structured lab notebooks.

33123 AP Biology**1 credit****Gr: 11-12****Prerequisite:** Biology and Chemistry

Description: A major goal of the course is to involve students in the activities and endeavors of science. They formulate hypotheses, design and conduct experiments, and interpret data. The course focuses on the process of scientific investigation. Students gain skills in investigation and apply those skills to in-depth studies of a few selected areas of biology. Considerable emphasis is placed on the

NOTE: All courses may not be offered on every campus.

role of science in society, the complex and extremely important interactions between science and the problems and decisions that citizens must make. This is a college-level course, and students taking this course will be prepared for the Advanced Placement test in this area. *AP courses address learning objectives at greater depth and faster pace along with higher expectations for student performance.

33212 Chemistry I (R)**1 credit****Gr: 10-12**

Prerequisite: Biology and Algebra I, previous or concurrent second mathematics course recommended

Description: Chemistry provides instruction that allows students to conduct field and laboratory investigations, use scientific methods during investigations, and make informed decisions using critical thinking and scientific problem-solving. Students study a variety of topics that include: characteristics of matter; energy transformations during physical and chemical changes; atomic structure; periodic table of elements; behavior of gases; bonding; nuclear fusion and nuclear fission; oxidation-reduction reactions; chemical equations; solutes; properties of solutions; acids and bases; and chemical reactions. Students will investigate how chemistry is an integral part of our daily lives.

33213 Honors Chemistry I**1 credit****Gr: 10-12**

Prerequisite: Biology and Algebra I, previous or concurrent second mathematics course recommended

Description: This course is designed to prepare students for AP Chemistry, and provides instruction that allows students to conduct field and laboratory investigations, use scientific methods during investigations, and make informed decisions using critical thinking and scientific problem-solving. Students are also provided the opportunity to use technology as a tool and resource for learning Chemistry. Students study a variety of topics that include: characteristics of matter; energy transformations during physical and chemical changes; atomic structure; periodic table of elements; behavior of gases; bonding; nuclear fusion and nuclear fission; oxidation-reduction reactions; chemical equations; solutes; properties of solutions; acids and bases; and chemical reactions. Students will investigate how chemistry is an integral part of our daily lives. In addition, advanced critical-thinking and problem-solving skills will be developed with a group or individual project presented in a competitive public forum. *Honors courses address learning objectives at greater depth and faster pace along with higher expectations for student performance.

33214 IB Chemistry I**1 credit****Gr: 10-12**

Prerequisite: Algebra II (IntH), or concurrent enrollment

Description: [International Baccalaureate course offered only at GHS] This course prepares students for the standard level IB exam by extensive curricula, application-based problem solving, extensive advanced labs, and development of lab manuals for external assessment. Students must be prepared to spend a minimum of 1/2 hour most evenings for Pre-lab reading and/or lab conclusion writings. Strong math skills, reading comprehension, and the ability to critically analyze data are essential to success in this course.

33216 MST Chemistry I (H)**1 credit****Gr: 10-12**

Prerequisite: MST Biology and Algebra I

Description: [Math-Science-Technology magnet course offered only at NGHS] This course is designed to prepare students for AP Chemistry, and provides an understanding of current atomic theory, molecular forces, hydration of ions, ionization of covalent compounds, acids, bases and salts, chemical equivalents, electrode potentials, molar solutions, and chemical equilibrium. The course utilizes various types of probe ware and software to display, collect, and analyze data. Gas chromatographs and spectrophotometers, both optical and atomic, will be employed. Integrated student projects will be an integral part of the course. *Honors courses address learning objectives at greater depth and faster pace along with higher expectations for student performance.

33217 Chemistry for English Learners (R)**1 credit****Gr: 10-12**

Prerequisite: English learner, Biology and Algebra I, previous or concurrent second mathematics course recommended

Description: [ENGLISH LEARNER (EL) COURSE] This course is based on the TEKS for Chemistry as accommodated for students receiving services as English learners at the beginning, intermediate, and advanced levels of language proficiency. Accommodations occur for English learners in time, pacing, methodology, and/or method of assessment.

NOTE: All courses may not be offered on every campus.

33223 AP Chemistry**1 credit****Gr: 10-12****Prerequisite:** Biology, Chemistry and Algebra II

Description: Students study descriptive chemistry of the elements in greater detail than in Chemistry (H/Pre AP). Other topics include crystallography, metallurgy, and chemical bonding. In addition to the laboratory activities supporting these topics, there is some experience with instrumental methods of chemical analysis. Understanding principles of reaction is enhanced through laboratory investigations in thermodynamics, chemical kinetics, and equilibrium. The course concludes with a study of selected topics in organic chemistry, biochemistry, and nuclear chemistry. This is a college-level course, and students taking this course will be prepared for the Advanced Placement test in this area. *AP courses address learning objectives at greater depth and faster pace along with higher expectations for student performance.

33224 IB Chemistry II**1 credit****Gr: 11-12****Prerequisite:** Chemistry I (IB)

Description: [International Baccalaureate course offered only at GHS] This course extends upon concepts of Chemistry I IB and addresses all essential elements of AP Chemistry II. In addition, students maintain detailed professional-level lab manuals which will be externally evaluated by the European IB designee. Preparation for external exams for college credit is integral to this program.

33311 Physics (R)**1 credit****Gr: 10-12****Prerequisite:** Biology, Algebra I

Description: Physics provides instruction that allows students to conduct field and laboratory investigations, use scientific methods during investigations, and make informed decisions using critical thinking and scientific problem-solving. Students study a variety of topics that include: laws of motion; changes within physical systems and conservation of energy and momentum; force; thermodynamics; characteristics and behavior of waves; and quantum physics. This course provides students with a conceptual framework, factual knowledge, and analytical and scientific skills.

33312 IB Physics I**1 credit****Gr: 9-12****Prerequisite:** Chemistry I (H or IB), Algebra II (IntH)

Description: [International Baccalaureate course offered only at GHS] This course is designed to build a foundation in the senior year for Standard Level International Baccalaureate Physics. Students use applied mathematics to solve problems from classical physics to relativity and astrophysics and demonstrate acquired knowledge through data collection in laboratory experience, data analysis, and evaluation in laboratory reports, textbook problems, and testing. Maintenance of a laboratory report portfolio and a working scientist's notebook for evaluation by International Baccalaureate examiners is required. Students also participate in the interdisciplinary group 4 project involving Physics I, Chemistry II and Biology II. Concurrent enrollment in 1622 Math Studies or 1632 Mathematics SL (IB) is recommended.

33313 Physics I (H)**1 credit****Gr: 10-12****Prerequisite:** Biology and Algebra I

Description: This course is designed to prepare students for AP Physics. In this course, students will explore topics that will serve as a foundation for future studies in science and engineering. Pre-AP Physics is a comprehensive introductory physics course covering the major topics of classical physics including mechanics, thermodynamics, waves, optics, electromagnetism, and atomic theory. This course will also help all students develop the quantitative and reasoning skills that will prepare them for college and future careers.*Honors courses address learning objectives at greater depth and faster pace along with higher expectations for student performance.

33315 IB Physics II**1 credit****Gr: 11-12****Prerequisite:** Physics I (IB), Chemistry I (H or IB)

NOTE: All courses may not be offered on every campus.

Description: [International Baccalaureate course offered only at GHS] This course is designed to meet the requirements for the second year of International Baccalaureate SL/HL Physics. This course expands on all the concepts introduced in IB Physics I and specifically prepares students for the IB SL/HL Physics exam for possible college credit, and entrance into a university physics, math or engineering program. Students demonstrate acquired knowledge through data collection in laboratory experience, data analysis and evaluation in laboratory reports, textbook problems, and testing, and maintain a laboratory report portfolio, in conjunction with a working scientist's notebook for evaluation by International Baccalaureate examiners. Concurrent enrollment in IB 1627 Mathematics (HL) is recommended.

33318 AP Physics C: Mechanics**1 credit****Gr: 11-12**

Prerequisite: AP Physics 1 and Calculus (may be concurrent)

Description: This is a full year, single blocked course. This course provides a systematic introduction to the main principles of Mechanics, which form a foundation for the study of other sciences, engineering, and technology. This calculus-based course emphasizes knowledge of the basic laws of nature, the ability to apply that knowledge to the particular phenomenon, and the ability to achieve its complete experimental and theoretical explanation. Modern technology is used to increase the level of study, which includes the use of computers, probe ware, and a multimedia approach to reports and projects. *AP courses address learning objectives at greater depth and faster pace along with higher expectations for student performance.

33319 Concepts in Physics (DC)**1 credit****Gr: 11-12**

Prerequisite: Chemistry, Algebra I, and satisfy Dual Credit enrollment criteria

Description: This course is offered at LCHS and NGHS only. Concepts in Physics (DC) is designed to introduce principles of physics for non-science majors. Emphasis is on classical mechanics, atomic nature of matter, thermodynamics, characteristics and behavior of waves, and forces in nature. The history of scientific developments and their impact on daily life are discussed. The principle of energy conservation is stressed, and current problems of worldwide energy production are examined. This course will provide credit for the high school physics requirement as well as dual credit through DCCCD. Students must meet the dual credit enrollment criteria in science. *Dual Credit courses address learning objectives at greater depth and faster pace along with higher expectations for student performance.

33320 AP Physics I**1 credit****Gr: 9-12**

Prerequisite: Algebra I, Geometry, Algebra II (may be concurrent)

Description: AP Physics 1 provides instruction that allows students to conduct field and laboratory investigations, use scientific methods during investigations, and make informed decisions using critical thinking and scientific problem-solving. Students are also provided the opportunity to use technology as a tool and resource for learning Physics. This physics course is the equivalent to a first-semester college course in algebra-based physics. The course covers Newtonian mechanics (including rotational dynamics and angular momentum); work, energy, and power; and mechanical waves and sound. It will also introduce electric circuits. Students taking this course will be prepared for the Advanced Placement Physics 1 exam. *AP courses address learning objectives at greater depth and faster pace along with higher expectations for student performance.

33321 AP Physics II**1 credit****Gr: 10-12**

Prerequisite: AP Physics 1, Algebra II and Precalculus (may be concurrent); Chemistry is highly recommended

Description: Physics 2 AP is the equivalent to a second-semester college course in algebra-based physics. The course covers fluid mechanics; thermodynamics; electricity and magnetism; optics; and atomic and nuclear physics. Physics 2 is a laboratory-oriented course with laboratory investigations conducted in mechanics, optics, heat, electricity, magnetism, radiation, atomic structure, and nuclear phenomena. Students acquire information using the senses and instrumentation. Students taking this course will be prepared for the Advanced Placement Physics 2 exam. *AP courses address learning objectives at greater depth and faster pace along with higher expectations for student performance.

33322 AP Physics C: Electricity and Magnetism**1 credit****Gr: 11-12**

NOTE: All courses may not be offered on every campus.

Prerequisite: AP Physics 1 and Calculus (may be concurrent)

Description: This course of study builds on the conceptual understanding attained in the first course of physics. This is a one-semester, double blocked course. This course provides a systematic introduction to the main principles of Electricity and Magnetism, which form a foundation for the study of other sciences, engineering, and technology. This calculus-based course emphasizes knowledge of the basic laws of nature, the ability to apply that knowledge to the particular phenomenon, and the ability to achieve its complete experimental and theoretical explanation. Modern technology is used to increase the level of study, which includes the use of computers, probe ware, and a multimedia approach to reports and projects. Students may take this course in the spring, after completing AP Physics C: Mechanics in the fall. *AP courses address learning objectives at greater depth and faster pace along with higher expectations for student performance.

33323 AP Physics C: Mechanics

1 credit

Gr: 11-12



Prerequisite: AP Physics 1 and Calculus (may be concurrent)

Description: This course of study builds on the conceptual understanding attained in the first course of physics. This is a one-semester, double blocked course. This course provides a systematic introduction to the main principles of Mechanics, which form a foundation for the study of other sciences, engineering, and technology. This calculus-based course emphasizes knowledge of the basic laws of nature, the ability to apply that knowledge to the particular phenomenon, and the ability to achieve its complete experimental and theoretical explanation. Modern technology is used to increase the level of study, which includes the use of computers, probe ware, and a multimedia approach to reports and projects. Students may take this course in the fall, followed by AP Physics C: Electricity & Magnetism in the spring. *AP courses address learning objectives at greater depth and faster pace along with higher expectations for student performance.

33324 AP Physics C: Electricity and Magnetism

1 credit

Gr: 11-12



Prerequisite: AP Physics 1 and Calculus (may be concurrent)

Description: This course of study builds on the conceptual understanding attained in the first course of physics. This is a full year, single blocked course. This course provides a systematic introduction to the main principles of Electricity and Magnetism, which form a foundation for the study of other sciences, engineering, and technology. This calculus-based course emphasizes knowledge of the basic laws of nature, the ability to apply that knowledge to the particular phenomenon, and the ability to achieve its complete experimental and theoretical explanation. Modern technology is used to increase the level of study, which includes the use of computers, probe ware, and a multimedia approach to reports and projects. *AP courses address learning objectives at greater depth and faster pace along with higher expectations for student performance.

33402 Earth & Space Science (R)

1 credit

Gr: 11-12

Prerequisite: Biology and 2 other science credits (3 Credits of Science) and 3 credit of math

Description: Earth and Space Science (ESS) is a 12th-grade capstone science course that focuses on three major science concepts: the Earth in Space and Time, Solid Earth, and Fluid Earth. Topics covered in this course include geology, oceanography, meteorology, cosmology, and astronomy, and within the significant secondary sciences of tectonics, geochemistry, geophysics, stratigraphy, geochronology, paleontology, planetary geology, marine geology, climatology, and physical oceanography

33414 Astronomy (R)

1 credit

Gr: 11-12

Prerequisite: Biology, recommended as a third or fourth science credit

Description: Astronomy provides instruction that allows students to conduct field and laboratory investigations, use scientific methods during investigations, and make informed decisions using critical thinking and scientific problem-solving. Students study the following topics: information about the universe; scientific theories of the evolution of the universe; characteristics and the life cycle of stars; exploration of the universe; the role of the Sun in our solar system; planets; and the orientation and placement of the Earth.

33417 Environmental Systems (R)

1 credit

Gr: 11-12

Prerequisite: Biology and either Chemistry, Physics or IPC (one life science and one physical science).

NOTE: All courses may not be offered on every campus.

Description: In this course, students will conduct field and laboratory investigations, use scientific methods during investigations, and make informed decisions using critical thinking and scientific problem-solving. Students study a variety of topics that include: biotic and abiotic factors in habitats; ecosystems and biomes; interrelationships among resources and an environmental system; sources and flow of energy through an environmental system; the relationship between carrying capacity and changes in populations and ecosystems; and changes in environments.

33435 IB Sports, Exercise, and Health Science**2 credits****Gr: 12****Prerequisite:** IntH Biology, IntH Algebra II

Description: An experimental science course combining academic study with practical and investigative skills. The course incorporates the discipline of anatomy and physiology, biomechanics, psychology, and nutrition. Students cover a range of core and option topics and carry out practical experimentation investigations in both laboratory and field settings.

33426 AP Environmental Science**1 credit****Gr:****11-12****Prerequisite:** Biology and either Chemistry, Physics or IPC (one life science and one physical science); and Algebra I

Description: This course would provide an advanced level of studies in the relationships of organisms to their habitats. People's use of planetary resources and cost/benefit ratios will be presented. This course is laboratory/field-oriented with special emphasis on those topics delineated in the Advanced Placement Course Description. This is a college-level course, and students taking this course will be prepared for the Advanced Placement test in this area. *AP courses address learning objectives at greater depth and faster pace along with higher expectations for student performance.

33427 MST Earth Science (H)**1 credit****Gr: 11-12****MST****Prerequisite:** Biology, Chemistry, Physics (Three Credits of Science)

Description: [Math-Science-Technology magnet course offered only at NGHS] In this course combining Geology, Meteorology, and Oceanography, students will conduct field and laboratory investigations, use scientific methods during investigations, and make informed decisions using critical thinking and scientific problem-solving. Students will study the characteristics and conditions of the Earth, the formation, and history of the Earth, plate tectonics, and origin and composition of minerals and rock and the rock cycle. In addition, they will study processes and products of weathering, natural energy resources, interaction in a watershed, characteristics of oceans, characteristics of the atmosphere, and the role of energy in weather and climate.

33428 MST Aquatic Science (H)**1 credit****Gr: 10-12****MST****Prerequisite:** Biology, Chemistry is recommended (may be concurrent)

Description: [Math-Science-Technology magnet course offered only at NGHS] Students will conduct field and laboratory investigations, use scientific methods during investigations, and make informed decisions using critical thinking and scientific problem-solving. Students will study components of aquatic ecosystems (pond, saltwater, and river), relationships among aquatic organisms, changes within aquatic environments, geological phenomena and fluid dynamics effects, and the origin and use of water in a watershed.

33429 Aquatic Science (R)**1 credit****Gr: 10-12****Prerequisite:** Biology, Chemistry is recommended (may be concurrent)

Description: Students will conduct field and laboratory investigations, use scientific methods during investigations, and make informed decisions using critical thinking and problem-solving. Students study a variety of topics that include: components of an aquatic ecosystem, relationships among aquatic habitats and ecosystems, roles of cycles within an aquatic environment, adaptations of aquatic organisms, changes with aquatic environments, geological phenomena and fluid dynamics effects, and the origin and use of water in a watershed. Students will describe the aquatic environment using physical, mathematical and conceptual models. Students will collect and analyze global environmental data and baseline quantitative data from an aquatic environment using technology. Students will evaluate trends in data to determine the factors that impact an aquatic ecosystem and analyze the impact of human influences including fishing, transportation, and recreation.

NOTE: All courses may not be offered on every campus.

33431 IB Environmental Systems and Societies SL**1 credit****Gr: 11-12****Prerequisite:** Honors or IB science credit (H, Algebra II (IntH))

Description: [International Baccalaureate course offered only at GHS] The prime intentions of this course are to provide students with a coherent perspective of the interrelationships between environmental systems and societies and to enable students to adopt an informed personal response to the wide range of pressing environmental issues. The teaching approach will be conducive to students evaluating the scientific, ethical and socio-political aspects of the issues. This course will combine the techniques and knowledge associated with Group 4 (the experimental sciences) with those associated with Group 3 (individual and society). IB students will be able to use this course as an IB Diploma required 6th subject and as a 4th science credit required for high school graduation.

83225 Chemistry II for Non-Science Majors (DC)**1 credit****Gr: 11-12****Prerequisite:** Chemistry, Physics, Algebra II, and satisfy Dual Credit enrollment criteria

Description: [Collegiate Academy Dual Credit course offered only by select campus. This course is for non-science majors. The first semester of this course involves fundamental concepts presented through lecture and laboratory including the periodic table, atomic structure, chemical bonding, reactions, stoichiometry, states of matter, properties of metals, nonmetals and compounds, chemical nomenclature, acid-base theory, oxidation-reduction, and solutions. Descriptive chemistry is emphasized. In the second semester, organic chemistry and biochemistry are surveyed. The reactions, syntheses, nomenclature, uses, purposes, and properties of the important classes of organic and biochemical compounds are studied. *Dual Credit courses address learning objectives at greater depth and faster pace along with higher expectations for student performance.

83424 Scientific Research & Design (H)**1 credit****Gr: 10-12****Prerequisite:** Biology, and Chemistry and Physics or IPC.

Description: In this course, students will conduct laboratory and/or field investigations to describe the natural world using physical, mathematical and conceptual models. Investigations will be conducted by students to learn about a specific area of interest. Scientific investigations will include questioning, observing and drawing conclusions as well as critical thinking and scientific problem-solving. A scientific research project is required to be completed for this course.

83430 MST Scientific Research & Design (H)**1 credit****Gr: 10-12****MST****Prerequisite:** Physics

Description: [Math-Science-Technology magnet course offered only at NGHS] This course is an advanced practicum for the construction of individual student projects and research into individual student problems. It involves the construction of models, analysis of research, development of investigative design, collection, organization, and evaluation of qualitative data, and synthesis of valid conclusions from qualitative and quantitative data. Electron Microscopy is the primary research mechanism for this class.

88125 MST Scientific Research & Design - World Health**1 credit****Gr: 10-12****MST****Prerequisite:** Biology and Chemistry

Description: [NGHS only] This course examines world health problems and emerging technologies as solutions to these medical concerns. The course is designed to improve students' understanding of the cultural, infrastructural, political, educational, and technological constraints and inspire ideas for appropriate technological solutions to global medical care issues. The student, for at least 40% of instructional time, conducts laboratory and field investigations using safe, environmentally appropriate, and ethical practices. These investigations must involve actively obtaining and analyzing data with physical equipment but may also involve experimentation in a simulated environment as well as field observations that extend beyond the classroom.

8A410 Advanced Animal Science (R)**1 credit****Gr: 11-12**

Prerequisite: Prerequisites: Biology and Chemistry or Integrated Physics and Chemistry (IPC); Algebra I and Geometry; and either Small Animal Management, Equine Science, or Livestock Production.

NOTE: All courses may not be offered on every campus.

Description: [Career and Technical Education course offering science credit only at GHS and SGHS] Advanced Animal Science examines the interrelatedness of human, scientific, and technological dimensions of livestock production. Instruction is designed to allow for the application of scientific and technological aspects of animal science through field and laboratory experiences. Note: This course satisfies a science credit requirement for students on the Foundation High School Program.

8A418 Advanced Plant & Soil Science (R)**1 credit****Gr: 11-12**

Prerequisite: Prior completion of one AFNR course, or teacher recommendation; Biology, Chemistry, IPC or Physics.

Description: [Career and Technical Education course offering science credit only at NFHS] Advanced Plant and Soil Science provides a way of learning about the natural world. Students should know how plant and soil science has influenced a vast body of knowledge, that there are still applications to be discovered, and that plant and soil science is the basis for many other fields of science. To prepare for careers in plant and soil science, students must attain academic skills and knowledge, acquire technical knowledge and skills related to plant and soil science and the workplace. Note: This course satisfies a science credit requirement for students on the Foundation High School Program.

8H310 Anatomy & Physiology of Human Systems (R)**1 credit****Gr: 11-12**

Prerequisite: Biology and second science credit. Recommended prerequisite: a course from the Health Science Career Cluster

Description: The Anatomy and Physiology course is designed for students to conduct laboratory and field investigations, use scientific methods during investigations, and make informed decisions using critical thinking and scientific problem-solving. Students in Anatomy and Physiology will study a variety of topics, including the structure and function of the human body and the interaction of body systems for maintaining homeostasis. Note: This course satisfies a science credit requirement for students on the Foundation High School Program.

8H310 Anatomy & Physiology of Human Systems (H)**1 credit****Gr: 11-12**

Prerequisite: Biology and second science credit. Recommended prerequisite: a course from the Health Science Career Cluster

Description: The Anatomy and Physiology course is designed for students to conduct laboratory and field investigations, use scientific methods during investigations, and make informed decisions using critical thinking and scientific problem-solving. Students in Anatomy and Physiology will study a variety of topics, including the structure and function of the human body and the interaction of body systems for maintaining homeostasis. Note: This course satisfies a science credit requirement for students on the Foundation High School Program.

8H740 MST Medical Microbiology (H)**1 credit****Gr: 11-12****MST**

Prerequisite: Biology, Chemistry, and Principles of Health Science

Description: [Math-Science-Technology magnet course offered only at NGHS] Students in Medical Microbiology explore the microbial world, studying topics such as pathogenic and non-pathogenic microorganisms, laboratory procedures, identifying microorganisms, drug-resistant organisms, and emerging diseases. Diseases of man will be studied. The student will grow bacteria, make slides, learn gram and acid-fast staining techniques, learn to identify morphological types of bacteria, how to subculture, do antibiotic sensitivities, test milk for preventative antibiotic presence, and many other diagnostic techniques. Students will also prepare their own plates and slants and grow their own stocks of bacteria.

8H770 MST Pathophysiology (H)**1 credit****Gr: 11-12****MST**

Prerequisite: Biology, Chemistry, and Principles of Health Science

Description: [Math-Science-Technology magnet course offered only at NGHS]. The Pathophysiology course is designed for students to conduct laboratory and field investigations, use scientific methods during investigations, and make informed decisions using critical thinking and scientific problem-solving. Students in Pathophysiology will study disease processes and how humans are affected. Emphasis is placed on the prevention and treatment of disease. Students will differentiate between normal and abnormal physiology. Students should know that some questions are outside the realm of science because they deal with phenomena that are not scientifically testable. Note: This course satisfies a science credit requirement for students on the Foundation High School Program. MST courses will require an application and acceptance into the magnet program.

NOTE: All courses may not be offered on every campus.



High School Course Guide

Science Course Descriptions

8H775 MST Pathophysiology (H)/DC

1 credit

Gr: 11-12

MST D

Prerequisite: Biology, Chemistry, and Physics

Description: [Math-Science-Technology magnet course offered only at NGHS] Topics included in this course include homeostasis, biological and chemical processes at the cellular level, and examining cells, tissues, organs and systems for the detection of neoplasm. Pathogenic organisms will be studied, as will methods of transmission, prevention, and treatment. Symptoms and effects of disease on the patient will also be studied. MST courses will require an application and acceptance into the magnet program.

8I450 Food Science (R)

1 credit

Gr: 10-12

Prerequisite: Three units of science, including Chemistry and Biology. Recommended Prerequisite: Principles of Hospitality and Tourism.

Description: In Food Science students conduct laboratory and field investigations, use scientific methods during investigations, and make informed decisions using critical thinking and scientific problem-solving. Food Science is the study of the nature of foods, the causes of deterioration in food products, the principles underlying food processing, and the improvement of foods for the consuming public. Laboratory experiments will comprise 40% of the course work. Students will also be given opportunities to express themselves through projects, exhibits, and competitions. Note: This course satisfies a science credit requirement for students on the Foundation High School Program.

8L300 Forensic Science (R)

1 credit

Gr: 11-12

Prerequisite: Biology and Chemistry) Prior completion of one credit in the Law and Public Safety Cluster

Description: To receive credit in science, students must meet the 40% laboratory and fieldwork requirements identified. Forensic Science is a course that introduces students to the application of science to connect a violation of law to a specific criminal, criminal act, or behavior and victim. Students will learn terminology and procedures related to the search and examination of physical evidence in criminal cases as they are performed in a typical crime laboratory. Using scientific methods, students will collect and analyze evidence such as fingerprints, bodily fluids, hairs, fibers, paint, glass, and cartridge cases. Students will also learn the history and the legal aspects as they relate to each discipline of forensic science. Scientific methods of investigation can be experimental, descriptive, or comparative. The method chosen should be appropriate to the question being asked. Note: This course satisfies a science credit requirement for students on the Foundation High School Program.

8O310 Engineering Design and Problem Solving (R)

1 credit

Gr: 11-12

Prerequisite: Algebra I and Geometry **Recommended Prerequisites:** two Science, Technology, Engineering, and Mathematics Career Cluster credits. The Engineering Design and Problem-Solving course is the creative process of solving problems by identifying needs and then devising solutions. The solution may be a product, technique, structure, or process depending on the problem. Science aims to understand the natural world, while engineering seeks to shape this world to meet human needs and wants. Engineering design takes into consideration limiting factors or "design under constraint." Various engineering disciplines address a broad spectrum of design problems using specific concepts from the sciences and mathematics to derive a solution. The design process and problem-solving are inherent to all engineering disciplines. This course satisfies a high school science graduation requirement. Students shall be awarded one credit for successful completion of this course. Note: This course satisfies a science credit requirement for students on the Foundation High School Program.

8O710 MST Engineering Design and Problem Solving (R)

1 credit

Gr: 11-12

MST

Prerequisite: Algebra I and Geometry **Recommended Prerequisites:** two Science, Technology, Engineering, and Mathematics Career Cluster credits. The Engineering Design and Problem-Solving course is the creative process of solving problems by identifying needs and then devising solutions. The solution may be a product, technique, structure, or process depending on the problem. Science aims

NOTE: All courses may not be offered on every campus.

to understand the natural world, while engineering seeks to shape this world to meet human needs and wants. Engineering design takes into consideration limiting factors or "design under constraint." Various engineering disciplines address a broad spectrum of design problems using specific concepts from the sciences and mathematics to derive a solution. The design process and problem-solving are inherent to all engineering disciplines. This course satisfies a high school science graduation requirement. Students shall be awarded one credit for successful completion of this course. Note: This course satisfies a science credit requirement for students on the Foundation High School Program.

80740 MST Project Lead the Way - Principles of Engineering (R)**1 credit****Gr: 9-12****MST****Prerequisite:** 8640 MST PLTW Introduction to Engineering Design

Description: [Math-Science-Technology magnet course offered only at NGHS] This survey course exposes students to major concepts they will encounter in a postsecondary engineering course of study. Topics include mechanisms, energy, statics, materials, and kinematics. They develop problem-solving skills and apply their knowledge of research and design to create solutions to various challenges, document their work and communicate solutions.

80713 MST Scientific Research & Design**1 credit****Gr: 12****MST****Prerequisite:** Biology, and Chemistry, and Physics or IPC

Description: Scientific Research and Design is a broad-based course designed to allow districts and schools considerable flexibility to develop local curriculum to supplement any program of study or coherent sequence. The course has the components of any rigorous scientific or engineering program of study from the problem identification, investigation design, data collection, data analysis, formulation, and presentation of the conclusions. These components are integrated with the career and technical education emphasis of helping students gain entry-level employment in high-skill, high-wage jobs and/or continue their education. Students must meet the 40% laboratory and fieldwork requirements. This course satisfies a high school science graduation requirement. Students may take this course with different course content for a maximum of three credits. Note: This course satisfies a science credit requirement for students on the Foundation High School Program.

80790 MST Biotechnology I**1 credit****Gr: 10-12****MST****Prerequisite:** Biology. Recommended Prerequisites: Principles of Biosciences and Chemistry.

In Biotechnology I, students will apply advanced academic knowledge and skills to the emerging fields of biotechnology such as agricultural, medical, regulatory, and forensics. Students will have the opportunity to use sophisticated laboratory equipment, perform statistical analysis, and practice quality-control techniques. Students will conduct laboratory and field investigations, use scientific methods during investigations, and make informed decisions using critical thinking and scientific problem-solving. Students in Biotechnology I will study a variety of topics that include structures and functions of cells, nucleic acids, proteins, and genetics. Students must meet the 40% laboratory and fieldwork requirements. Note: This course satisfies a science credit requirement for students on the Foundation High School Program.

39021 Applied Environmental Awareness IV (B)**1 credit****Gr: 9-12****Prerequisite:** Eligible for A. L. E. program/placement by the ARD Committee.

Description: [Applied Learning Environment (A. L. E.) Course] This is a locally designed course aligned with the Texas Essential Knowledge and Skills for Biology and determined by the ARD Committee to be a suitable substitute for Biology.

39022 Applied Environmental Awareness V (B)**1 credit****Gr: 9-12****Prerequisite:** Eligible for A. L. E. program/placement by the ARD Committee.

Description: [Applied Learning Environment (A. L. E.) Course] This is a locally designed course aligned with the Texas Essential Knowledge and Skills for Integrated Physics and Chemistry and determined by the ARD Committee to be a suitable substitute for Integrated Physics and Chemistry.

39023 Applied Environmental Awareness VI (B)**1 credit****Gr: 9-12****Prerequisite:** Eligible for A. L. E. program/placement by the ARD Committee.

NOTE: All courses may not be offered on every campus.

Description: [Applied Learning Environment (A. L. E.) Course] This is a locally designed course aligned with the Texas Essential Knowledge and Skills for science and determined by the ARD Committee to be a suitable substitute for science.

39024 Applied Environmental Awareness VII (B) **1 credit** **Gr: 9-12**



Prerequisite: Eligible for A. L. E. program/placement by the ARD Committee.

Description: [Applied Learning Environment (A. L. E.) Course] This is a locally designed course aligned with the Texas Essential Knowledge and Skills for science and determined by the ARD Committee to be a suitable substitute for science.

39025 Applied Environmental Awareness VIII (B) **1 credit** **Gr: 9-12**



Prerequisite: Eligible for A. L. E. program/placement by the ARD Committee.

Description: [Applied Learning Environment (A. L. E.) Course] This is a locally designed course aligned with the Texas Essential Knowledge and Skills for science and determined by the ARD Committee to be a suitable substitute for science.

39074 Basic Astronomy (B) **1 credit** **Gr: 9-12**



Prerequisite: Physics required by ARD as denoted on Schedule Page.

Description: [Base/ABC/PAC] This is a locally designed course aligned with the Texas Essential Knowledge and Skills for Astronomy and determined by the ARD Committee to be a suitable substitute for Astronomy.

39076 Basic Biology (B) **1 credit** **Gr: 9-12**



Prerequisite: Middle School Science required by ARD as denoted on Schedule Page.

Description: [Base/ABC/PAC] This is a locally designed course aligned with the Texas Essential Knowledge and Skills for Biology and determined by the ARD Committee to be a suitable substitute for Biology.

39077 Basic Environmental Systems (B) **1 credit** **Gr: 9-12**



Prerequisite: Physics required by ARD as denoted on Schedule Page.

Description: [Base/ABC/PAC] This is a locally designed course aligned with the Texas Essential Knowledge and Skills for Environmental Systems and determined by the ARD Committee to be a suitable substitute for Environmental Systems.

39100 Basic Chemistry (B) **1 credit** **Gr: 9-12**



Prerequisite: Biology required by ARD as denoted on Schedule Page.

Description: [Base/ABC/PAC] This is a locally designed course aligned with the Texas Essential Knowledge and Skills for Chemistry and determined by the ARD Committee to be a suitable substitute for Chemistry.

39105 Basic Physics (B) **1 credit** **Gr: 9-12**



Prerequisite: Chemistry required by ARD as denoted on Schedule Page.

Description: [Base/ABC/PAC] This is a locally designed course aligned with the Texas Essential Knowledge and Skills for Physics and determined by the ARD Committee to be a suitable substitute for Physics.

39106 Organic Chemistry **1 credit** **Gr: 11-12**

Prerequisite: AP Chemistry

Description: Organic Chemistry is an introductory course that is designed for the student who intends to continue future study in the sciences. The student will learn the concepts and applications of organic chemistry.

NOTE: All courses may not be offered on every campus.