

SCIENCE

The North Carolina Science Essential Standards maintain the respect for local control of each Local Education Authority (LEA) to design the specific curricular and instructional strategies that best deliver the content to their students. Nonetheless, engaging students in inquiry-based instruction is a critical way of developing conceptual understanding of the science content that is vital for success in the twenty-first century. The process of scientific inquiry, experimentation and technological design should not be taught nor tested in isolation of the core concepts drawn from physical science, earth science and life science. A seamless integration of science content, scientific inquiry, experimentation and technological design will reinforce in students the notion that “what” is known is inextricably tied to “how” it is known. A well-planned science curriculum provides opportunities for inquiry, experimentation and technological design. Teachers, when teaching science, should provide opportunities for students to engage in “hands-on/minds-on” activities that are exemplars of scientific inquiry, experimentation and technological design.

Science as Inquiry

Traditional laboratory experiences provide opportunities to demonstrate how science is constant, historic, probabilistic, and replicable. Although there are no fixed steps that all scientists follow, scientific investigations usually involve collections of relevant evidence, the use of logical reasoning, the application of imagination to devise hypotheses, and explanations to make sense of collected evidence. Student engagement in scientific investigation provides background for understanding the nature of scientific inquiry. In addition, the science process skills necessary for inquiry are acquired through active experience. The process skills support development of reasoning and problem-solving ability and are the core of scientific methodologies.

North Carolina requires three units of science for high school graduation. The science graduation requirements include Biology, one course in a physical science (to include Physical Science, Chemistry, Physics) and one course in an earth/environmental science.

EARTH AND ENVIRONMENTAL SCIENCE

Course Code: 35012X0C **Fee (if applicable):** \$5

Offered at: All High Schools **Grade(s):** 9,10,11,12

Prerequisite: None

EARTH AND ENVIRONMENTAL SCIENCE-HONORS -

Course Code: 35015X0C

This course is designed to expand students' knowledge of matter, energy, environmental awareness, material availability, and the cycles that circulate energy and material through the earth. The unifying concepts for the earth and environmental curriculum includes: Earth in the Universe, Earth Systems, Structures and Processes, and Human Impact on the Earth and its Systems. In order to develop a greater understanding of the processes that shape out everyday lives, the curriculum will integrate inquiry investigations and a variety of technologies with the study of earth as a system. The results of student investigation should be communicated through presentations and formal laboratory reports. Enrichment and integration with other disciplines is encouraged. Students should design, conduct, and evaluate independent scientific investigations. Earth and Environmental Science is a required course for graduation in the state of North Carolina.

ENVIRONMENTAL SCIENCE-ADVANCED PLACEMENT

Course Code: 3A027X0CAP **Fee (if applicable):** \$5

Offered at: JHS, NHS, RHS, SBHS, SWHS, WOHS **Grade(s):** 10,11,12

Prerequisite: None

Recommendation: Earth and Environmental Science, Biology, Chemistry, Math II

This course is a rigorous program focusing on the application of scientific concepts and principles to the understanding and solution of environmental problems and issues. A broadly interdisciplinary course, it builds upon the scientific principles from Chemistry, Physics, Biology, Ecology and Earth Science. The course includes a substantial laboratory and field component to help students learn about the environment through careful observation and experimentation. The course utilizes problem-solving, critical thinking and communication skills. Students are encouraged to take the Advanced Placement Environmental Science exam.

BIOLOGY

Course Code: 33202X0C **Fee (if applicable):** \$5

Offered at: All High Schools **Grade(s):** 9,10,11,12

Prerequisite: None

BIOLOGY-HONORS - Course Code: 33205X0C

The North Carolina Essential Standards for Biology was written to provide deeper understanding of life science content learned throughout Grades K–8. Biology is designed to meet graduation requirements. Emphasis is on the nature of science and scientific inquiry. These are developed by use of process skills and manipulative skills through laboratory activities. Laboratory and content study combine to help the student develop a positive attitude toward science and to understand the contributions of science and technology in shaping society. The course is constructed around three major themes: Chemical and Physical Basis of Life, Continuity of Life, and Ecology. Students are required to take a state EOC exam.

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BIOLOGY-ADVANCED PLACEMENT

Course Code: 3A007X0CAP **Fee (if applicable):** \$5

Offered at: DHS, NHS, RHS, SBHS, SWHS, WOHS **Grade(s):** 11,12

Prerequisite: Biology I; Biology II-Honors at SBHS; Chemistry-WOHS

This course is an in-depth and detailed study of Biology which includes topics in cell physiology, genetics, evolution, anatomy and ecology. AP Biology is intended to provide a rigorous introductory college level biology course with intense inquiry based laboratory activities. Students should consider the extensive time that is required for reading assignments, lab reports, and independent study. Students are encouraged to take the Advanced Placement Biology exam in the Spring. When a minimum score of 3.0 on the AP Biology Test is achieved the student will be able to receive college credit depending on the University or College of choice.

BIOLOGY II-HONORS

Course Code: 33215X0C **Fee (if applicable):** \$5

Offered at: SBHS **Grade(s):** 11,12

Prerequisite: Chemistry

This lab-based college prep course is a prerequisite to the AP Biology Course. The course includes the following topics: Biochemistry, Cell Biology, Heredity, Molecular Genetics, and Evolutionary Biology. Independent research and in-depth laboratory experiences are integral parts of the program.

PHYSICAL SCIENCE

Course Code: 34102X0C **Fee (if applicable):** \$5

Offered at: All High Schools **Grade(s):** 9,10,11,12

Prerequisite: Earth/Environmental Science

Recommendation: Math I

The Physical Science curriculum is designed to continue the investigation of the concepts begun in earlier grades that guide inquiry in the disciplines of Chemistry and Physics. The curriculum includes: Forces and Motion, Matter: Properties and Change, Energy: Conservation and Transfer. Inquiry and laboratory activities will be an integral part of the curriculum experience. A cumulative NC Final exam is required at the end of the course. This is not a required course but can fulfill one of the science credits required for graduation.

CHEMISTRY

Course Code: 34202X0C **Fee (if applicable):** \$5

Offered at: All High Schools **Grade(s):** 10,11,12

Prerequisite: Biology

Recommendation: Math III

CHEMISTRY-HONORS - Course Code: 34205X0C

Prerequisite: Biology

Recommendation: Math III

This class is designed to introduce the student to the basic Concepts of Chemistry; the study of matter, the changes matter undergoes, and the energy required to undergo these changes. Lab experiences will be structured, not inquiry based. Proper laboratory technique and safety will be taught and stressed. Some formal lab reports will be required. Students will be expected to take notes and combine lecture content with online/textbook reference content. Students will be expected to work as a cooperative member of a laboratory team and work in problem solving situations. Mathematical applications in problem solving will be presented. Mathematical applications in problem solving will be presented. Students should have a calculator with scientific notation and know how to use it.

CHEMISTRY-ADVANCED PLACEMENT

Course Code: 3A017X0CAP **Fee (if applicable):** \$5

Offered at: NHS, SBHS, WOHS **Grade(s):** 11,12

Prerequisite: Chemistry

It is highly desirable that a student have a course in secondary school physics and a four-year college preparatory program in mathematics. Students must be able to work at an accelerated pace independently. Students will be expected to work independently in the laboratory and problem solving coursework that will add greater scope and detail to topics already covered in Honors Chemistry. Principles and concepts concerning thermodynamics, kinetics, molecular structure, equilibria, and electrochemistry will be discussed and applied. When scheduling, students should consider the extensive time requirements that accompany a course of this type including outside review sessions. Students will be highly encouraged to take the Advanced Placement Chemistry exam.

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PHYSICS-HONORS

Course Code: 34305X0C **Fee (if applicable):** \$5

Offered at: DHS, NHS, RHS, SBHS, SWHS **Grade(s):** 11,12

Prerequisite: Chemistry

Recommendation: Math III, AFM

Honors Physics uses the North Carolina Essential Standards for Physics as a foundation for more challenging and advanced study that enriches key topics and broadens the student's view of the larger physics community including current research. Substantial class time should be devoted to student-directed exploration and experimentation, and independent student investigation. Honors Physics is an appropriate course for students with a strong mathematics and chemistry background. Success in Honors Physics will require the student to: 1) operate with algebraic expressions to solve complex equations which include trigonometric functions, 2) use exponents to solve problems, and 3) describe graphically, algebraically and verbally real-world phenomena as functions. This course will stress problem solving over a wide range of topics: Kinematics, Mechanics, Thermodynamics, Waves, Optics and Electromagnetism.

PHYSICS-ADVANCED PLACEMENT

Course Code: 3A057X0CAP **Fee (if applicable):** \$5

Offered at: NHS, RHS **Grade(s):** 11,12

Prerequisite: Honors Physics or Physics and currently enrolled in Calculus.

Physics AP should provide instruction in each of the following five content areas: Newtonian mechanics, fluid mechanics and thermal physics, electricity and magnetism, waves and optics, and atomic and nuclear physics. A knowledge of algebra and basic trigonometry is required for the course; the basic ideas of calculus may be introduced in connection with physical concepts. Understanding of the basic principles involved and the ability to apply these principles in the solution of problems should be the major goals of the course. Consequently, the course should utilize guided inquiry and student-centered learning to foster the development of critical thinking skills.

ANATOMY & PHYSIOLOGY

Course Code: 33302X0C **Fee (if applicable):** \$5

Offered at: DHS, RHS, SBHS (Honors Only), SWHS (Honors Only) **Grade(s):** 11,12

Prerequisite: Biology

ANATOMY & PHYSIOLOGY HONORS - Course Code: 33305X0C

This class is designed for students who wish to pursue a career in a medically related field. Topics covered will be the skeletal, muscular, and organ systems of the body, and the effect of both diet and disease on the body.

GEOLOGY-HONORS

Course Code: 35305X0C **Fee (if applicable):** \$5

Offered at: SWHS **Grade(s):** 10,11,12

Prerequisite: Earth/Environmental Science and a physical science

This course is a laboratory-based science class emphasizing the function of the earth's system. Emphasis is placed on the non-human aspects of the Earth's geologic and environmental systems, predictability of a dynamic Earth, origin and evolution of the Earth system and universe, geochemical cycles and energy in the Earth system. A deep understanding of the chemistry of minerals, the matter that makes up the chemicals of minerals, identifying their crystal structures, and understanding how these structures allow minerals to form bonds will be discussed. Other topics studied will be: physical and chemical changes in Earth's atmosphere over time, and identification of specific landforms and what they represent in geology with a goal of familiarizing the student with the basic concepts and practices of the modern Earth Sciences, with a particular emphasis on Physical Geology, especially the geology of North Carolina.

ART OF SCIENCE

Course Code: 30202X0C **Fee (if applicable):** \$5

Offered at: SWHS **Grade(s):** 10,11,12

Prerequisite: Earth/Environmental Science (or AP Environmental) and Biology

The Art of Science is an elective science class to open up opportunities to students who find interest in science and arts, particularly photography. Students will explore numerous EES and Biology Essential Standards through the lens of a camera. This course will provide an introduction into possible career choice of science/nature photographer. It is meant to build upon certain Essential Standards from EES and Biology allowing for the student to study/view the beauty of science through the lens of a camera.

Students will be required to compile and complete a working portfolio that consist of their photographs of work along with detailed written reports outlining the scientific principles being observed through their photograph. The completed portfolio along with a test on essential standard material will compose their final exam grade.