

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.

ANATOMY & PHYSIOLOGY HONORS

Course Code: 33305X0C **Fee (if applicable):** \$5

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

Prerequisite: Biology

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.

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.

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- 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.

SCIENCE

CHEMISTRY

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-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 chemistry 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.

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, OECHS, **Grade(s):** 10,11,12
RHS, SBHS, SWHS, WOHS

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.

GENETICS

Course Code: 33602X0C **Fee (if applicable):** \$5

Offered at: SWHS **Grade:** 11,12

Prerequisite: Biology

This course covers principles of prokaryotic and eukaryotic cell genetics. Emphasis is placed on the molecular basis of heredity, chromosome structure, patterns of Mendelian and non-Mendelian inheritance, evolution, and biotechnological applications. Upon completion, students should be able to recognize and describe genetic phenomena and demonstrate knowledge of important genetic principles. (S12198)

MARINE SCIENCE-HONORS

Course Code: 35355X0C **Fee (if applicable):** \$5

Offered at: SBHS **Grade(s):** 9,10,11,12

Prerequisite: Earth/Environmental Science

This course is designed to reinforce scientific concepts as they relate to the ocean. Students will become familiar with many aspects of marine science. Some of the topics to be studied include geology, public policy relating to marine science, and marine biology to include a survey of plants and animals that live in the sea, their habitats and marine ecosystems. Special emphasis will be placed on factors that are relevant to the North Carolina coast.

SCIENCE

MICROBIOLOGY-HONORS

Course Code: 33705X0C

Fee (if applicable): \$5

Offered at: SBHS

Grade(s): 10,11,12

Prerequisite: Earth/Environmental Science, Biology

Students in Microbiology explore the microbial world, studying topics such as pathogenic and non-pathogenic microorganisms, laboratory procedures, identifying microorganisms, drug resistant organisms, and emerging diseases. Students will develop a working understanding of the skills necessary to cultivate and study bacteria. In this course, students learn microbiological techniques such as preparation of agar plates, isolation of bacteria from food, serial dilution, and plating. Focus of study on viruses and bacteria and includes a survey of infectious diseases caused by these microorganisms. Students should expect to develop an understanding of infectious diseases and the prevention/control of its spread.

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.

PHYSICS-ADVANCED PLACEMENT

Course Code: 3A057X0CAP

Fee (if applicable): \$5

Offered at: JHS, NHS

Grade(s): 11,12

Prerequisite: Honors Math III

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.

PHYSICS-HONORS

Course Code: 34305X0C

Fee (if applicable): \$5

Offered at: DHS, NHS, RHS, SBHS,
SWHS, WOHS

Grade(s): 11,12

Prerequisite: Chemistry

Recommendation: Math III

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.