

SCIENCE DEPARTMENT COURSE SEQUENCE

FRESHMAN SCIENCE COURSES	SOPHOMORE SCIENCE COURSES
Students will take one of the following	Students will take one of the following
Biology 200 Biology 300 Biology 400 – Honors Bilingual Biology - South only Integrated Studies Biology - South only	Chemistry 300 Chemistry 400 - Honors Physical Science 200 - South only Physical Science 300
Concurrent elective options	Concurrent elective options
Principles of Biomedical Science (PLTW)	AP Environmental Science Principles of Biomedical Science (PLTW) Innovations in STEM Research

JUNIOR SCIENCE COURSES	SENIOR SCIENCE COURSES
Students will take one of the following	Students will take one of the following
Physics 300 Physics 400 - Honors Chemistry 300	Physics 300 Anatomy and Physiology AP Biology AP Chemistry AP Environmental Science AP Physics C: Mechanics AP Physics C: Mechanics, Electricity and Magnetism Biology II: Research Questions in Biology* Principles of Biomedical Science (PLTW) Research Topics in Earth Science* Innovations in STEM Research
Concurrent elective options	
Anatomy and Physiology AP Biology AP Chemistry AP Environmental Science Biology II: Research Questions in Biology* Principles of Biomedical Science (PLTW) Research Topics in Earth Science* Innovations in STEM Research	

* Offered at North on alternate years. Offered at South every year.

Most college admissions criteria include a minimum of at least three laboratory, non-elective science credits. Students planning on attending college should take foundational science courses that specifically include Biology, Chemistry, and Physics in addition to any electives of interest.

BIOLOGY 200**Credit:** 1 unit**Eligible Grade Level:** 9, 10, 11, 12**Prerequisites:** Recommendation of Junior High Science Teacher, evaluation of assessment scores and junior high grades, and special placement by Science Department Chair.

Biology 200 is an introductory course in the life sciences, meets the graduation requirements of a District 99 life science course. Scientific themes regarding biological systems, diversity among living things, energy, evolution, and human impact on our Earth systems will be highlighted throughout this course. The curriculum is organized at a more moderate pace, which is conducive to the success of Biology 200 students; 200 level courses utilize modified materials and activities to promote science reading and quantitative reasoning to support Biology 200 students in the application of science and engineering practices and demonstration of scientific literacy. Laboratory work is an integral and required part of the course.

BIOLOGY 300**Credit:** 1 unit**Eligible Grade Level:** 9, 10, 11, 12**Prerequisites:** Recommendation of Junior High Science Teacher, evaluation of assessment scores and junior high grades, and special placement by Science Department Chair.

Biology 300 is an introductory course, which meets the graduation requirements of a District 99 life science course. Scientific themes regarding biological systems, diversity among living things, energy, evolution, and human impact on our Earth systems will be highlighted throughout this course. Biology 300 students will be engaged in the application of science and engineering practices and are expected to demonstrate scientific literacy by participating in scientific discourse. Laboratory work is an integral and required part of the course and is highly analytical in nature.

BIOLOGY 400 HONORS**Credit:** 1 unit**Eligible Grade Level:** 9, 10, 11, 12

Grade Weighted

Prerequisites: Recommendation of Junior High Science Teacher, evaluation of assessment scores and junior high grades, and special placement by Science Department Chair.

Biology 400 is an accelerated introductory course, which meets the graduation requirements of a District 99 life science course. This course is designed to prepare students for future 400 (honors) level classes, advanced science classes, and college level biology by providing a challenging learning environment in which the curriculum is organized at a more rigorous pace conducive to the success of all Biology 400 level students. Scientific themes regarding biological systems, diversity among living things, energy, evolution, and human impact on our Earth systems will be highlighted throughout this course. Biology 400 students will be engaged in the application of science and engineering practices and are expected to demonstrate scientific literacy by participating in scientific discourse. Laboratory work is an integral and required part of the course and is highly analytical in nature.

BIOLOGY II: RESEARCH QUESTIONS IN BIOLOGY**Credit:** 1 unit**Eligible Grade Level:** 11, 12**Prerequisites:** Completion of/or concurrent enrollment in Physics.

Biology II: Research Questions in Biology is a fourth year elective science option that provides a rigorous learning environment designed for college preparation. Biology II provides students with an opportunity to study new emerging issues in the biological sciences in a challenging learning environment. The course requires students to work individually and collaboratively to develop an understanding of the nature of science in order to answer biological questions dealing with genetic engineering, forensic science, human health and environmental action among others. The course uses a student-centered instructional approach, with students using various technological tools to facilitate the problem-solving process. Real-world research experiences, such as field work, provide authentic learning opportunities for students. Laboratory work is an integral and required part of the course and is analytical in nature.

ANATOMY AND PHYSIOLOGY

Credit: 1 unit

Eligible Grade Level: 11, 12

Prerequisites: Completion of/ or concurrent enrollment in Physics.

Anatomy and Physiology is a fourth year elective science option that provides a challenging learning environment designed for college preparation. This course involves a detailed study of the structures and functions of major body systems, and is intended to prepare students for collegiate level health services career based majors. College level materials are used. The core topics covered in Anatomy and Physiology are: anatomical terminology, biochemistry, cytology, histology and body systems such as the skeletal, nervous, circulatory, endocrine, respiratory, digestive, urinary, and reproductive systems. Units of study are fast paced and requires the student to integrate knowledge and understanding. The course requires that students conduct physiological experiments and that anatomical study is aided by multiple dissections, including a detailed dissection of a laboratory mammal.

AP BIOLOGY

Credit: 1 unit

Eligible Grade Level: 11, 12

Grade Weighted

Prerequisites: Completion of/or concurrent enrollment in Physics.

AP Biology is designed to meet the objectives of a first-year college general biology course. College level materials are used and the curriculum is established by the National College Board. The core topics covered in AP Biology are: molecular biology, plant and animal biology, anatomy and physiology, genetics, ecology, and evolution. Per teacher discretion, preparatory work for this course may be assigned for students to complete during the summer prior to the school year of enrollment. Laboratory work is an integral and required part of the course and is highly analytical in nature.

Students should have an interest in the sciences along with a well-established work ethic for success in this college level course. AP Biology prepares the student to write, in May, a college level Examination of the National Advanced Placement Program (AP Biology). Success on this exam may entitle the student to college credit, advanced college placement, or both.

AP ENVIRONMENTAL SCIENCE

Credit: 1 unit

Eligible Grade Level: 10, 11, 12

Grade Weighted

Prerequisites: Completion of/or concurrent enrollment in Physics. Sophomores concurrently enrolled in Chemistry 400 may be enrolled with department chair approval. Recommendation by a current science teacher is required.

AP Environmental Science is designed to meet the objectives of a one semester introductory college course in environmental science. College level materials are used and the curriculum is established by the National College Board. The goal of the course is to provide students with the scientific principles, concepts, and methodologies required to understand the interrelationships of the natural world, to identify and analyze environmental problems both natural and human-made, to evaluate the relative risks associated with these problems, and to examine alternative solutions for resolving or preventing them. Environmental science is an interdisciplinary course; embracing a wide variety of topics from different areas of study, yet is built around several major unifying ideas. The themes that provide the foundation for the structure of the AP Environmental Science course are: 1. Science is a process. 2. Energy conversions underlie all ecological processes. 3. The Earth itself is one interconnected system. 4. Humans alter natural systems. 5. Environmental problems have a cultural and social context. 6. Human survival depends on developing practices that will achieve sustainable systems. Field experiences and laboratory work are an integral and required part of the course and are highly analytical in nature.

Students should have an interest in the sciences along with a well-established work ethic for success in this college level course. AP Environmental Science prepares the student to write, in May, a college level Examination of the National Advanced Placement Program (AP Environmental Science). Success on this exam may entitle the student to college credit, advanced college placement, or both.

RESEARCH TOPICS IN EARTH SCIENCE**Credit:** 1 unit**Eligible Grade Level:** 12**Prerequisites:** Completion of/or concurrent enrollment in Physics.

Research Topics in Earth Science is a fourth year elective science option that provides a challenging learning environment designed for college preparation. Research Topics in Earth Science is a technology based research and data driven course that provides students with an opportunity to study earth system science. Earth as a system consists of geosphere, hydrosphere, atmosphere, and biosphere. Scientific disciplines that are traditionally grouped into the earth sciences are geology, meteorology, astronomy, and oceanography. The core topics covered in Research Topics in Earth Science are; natural resources, fossil record, natural disasters, climate change and astronomy. Research skills developed in this class will prepare students for college work. Course work will require students to collect, organize, and analyze information to achieve a fuller understanding of the planet. Students will conduct research in the classroom, the laboratory, as well as in the field. Laboratory work is an integral and required part of the course and is highly analytical in nature.

PHYSICAL SCIENCE 200**(SOUTH CAMPUS ONLY) Credit:** 1 unit**Eligible Grade Level:** 10, 11, 12**Prerequisites:** Students are enrolled in this course by special selection.

Physical Science 200 is an introductory course in the physical sciences, which is designed to meet the graduation requirements of a District 99 physical science course. The core chemistry and physics topics covered in Physical Science 200 are: the scientific method, measurement, properties of matter, acids and bases, energy, forces, motion, sound, and light. The curriculum is organized at a more moderate pace, which is conducive to the success of Physical Science 200 students. The 200 level utilizes modified materials and activities to promote science reading and quantitative reasoning to support Physical Science 200 students in the application of science and engineering practices and demonstration of scientific literacy. Laboratory work is an integral and required part of the course.

PHYSICAL SCIENCE 300**Credit:** 1 unit**Eligible Grade Level:** 10, 11, 12**Prerequisites:** Completion of Biology and completion of or concurrent enrollment in Math 1.

Physical Science 300 is an introductory course in the physical sciences, which is designed to meet the graduation requirements of a District 99 physical science course. The core chemistry and physics topics covered in Physical Science 300 are: the scientific method, measurement, properties of matter, chemical reactions, energy, forces, and motion. The Physical Science 300 curriculum is designed to prepare students for Chemistry 300 and Physics 300. Physical Science 300 students will be engaged in the application of science and engineering practices and are expected to demonstrate scientific literacy by participating in scientific discourse. Laboratory work is an integral and required part of the course.

CHEMISTRY 300**Credit:** 1 unit**Eligible Grade Level:** 10, 11, 12**Prerequisites:** Completion of Biology and completion of Math 1 with a grade of “C” or better or completion of Physical Science.

Chemistry 300 is an introductory course, which meets the graduation requirements of a District 99 physical science course. The core topics covered in Chemistry 300 are: conservation of mass, gas laws, periodicity, molecular structures, reactions, stoichiometry, conservation of energy, solutions, kinetics/equilibrium. Chemistry 300 courses may discuss acids/bases and nuclear topics as time permits. This course follows an inquiry model of instruction, which aids students in discovering fundamental principles and uses the mathematics needed for college chemistry and other related fields. Chemistry 300 students will be engaged in the application of science and engineering practices and are expected to demonstrate scientific literacy by participating in scientific discourse. Laboratory work is an integral and required part of the course and is highly analytical in nature.

CHEMISTRY 400 HONORS**Eligible Grade Level:** 10, 11, 12**Prerequisites:** Completion of Biology 400, or completion of Biology 300 with a grade of “B” or better. Concurrent enrollment in Math 2 or higher.**Credit:** 1 unit

Grade Weighted

Chemistry 400 is an accelerated introductory course, which meets the graduation requirements of a District 99 physical science course. This investigative course is designed to prepare students for future 400 (honors) level classes, advanced science classes, and college level chemistry by providing a challenging learning environment in which the curriculum is organized at a more rigorous pace conducive to the success of all Chemistry 400 level students. The core topics covered in Chemistry 400 are: conservation of mass, gas laws, periodicity, molecular structures, reactions, stoichiometry, conservation of energy, solutions, kinetics/equilibrium. Chemistry 400 courses may discuss acids/bases and nuclear topics as time permits. This course follows an inquiry model of instruction, which aids students in discovering fundamental principles and uses the mathematics needed for college chemistry and other related fields. Chemistry 400 students will be engaged in the application of science and engineering practices and are expected to demonstrate scientific literacy by participating in scientific discourse. Laboratory work is an integral and required part of the course and is highly analytical in nature.

AP CHEMISTRY**Eligible Grade Level:** 11, 12**Prerequisites:** Completion of/or concurrent enrollment in Physics. Completion of/or concurrent enrollment in Math 3 Honors is strongly recommended. For those students who earned less than a B in Chemistry 400 or for those previously in Chemistry 300, there is additional support in the form of an AP Chemistry Summer Bridge course that is highly recommended in order to enhance a student’s preparation for AP Chemistry.**Credit:** 1 unit

Grade Weighted

AP Chemistry is designed to meet the objectives of a first-year college general chemistry course. College level materials are used and the curriculum is established by the National College Board. Preparatory work for this course will be assigned for students to complete during the summer prior to the school year in which they are enrolled in this course. Laboratory work is an integral and required part of the course and is highly analytical in nature.

Students should have an interest in the sciences along with a well-established work ethic for success in this college level course. AP Chemistry prepares the student to write, in May, a college level Examination of the National Advanced Placement Program (AP Chemistry). Success on this exam may entitle the student to college credit, advanced college placement, or both.

PHYSICS 300**Eligible Grade Level:** 11, 12**Prerequisites:** Completion of Chemistry and concurrent enrollment in Math 3 or higher.**Credit:** 1 unit

Physics 300 is an introductory Physics course, which is designed to prepare students for advanced science classes, and college level courses. The core topics covered in Physics 300 are: kinematics, dynamics, energy, and electricity. Physics 300 students will be engaged in the application of science and engineering practices and are expected to demonstrate scientific literacy by participating in scientific discourse. Students will understand that scientific content is organized around scientific models which represent a set of interconnected, evidence-based ideas that are useful for describing the natural world. Students will understand how to use evidence-based reasoning to build and test a data-based model. Students will engage in scientific discourse to identify their misconceptions and refine their thinking. Laboratory work is an integral and required part of the course and is highly analytical in nature.

PHYSICS 400 HONORS**Eligible Grade Level:** 11, 12**Prerequisites:** Completion of Chemistry and concurrent enrollment in Math 3 or higher. Completion of/or concurrent enrollment in Math 3 Honors is strongly recommended.**Credit:** 1 unit

Grade Weighted

Physics 400 is an accelerated introductory Physics course, which is intended to give the student a sufficient background in classical physics and prepare students for advanced science classes, and college level physics by providing a challenging learning environment in which the curriculum is organized at a more rigorous pace conducive to the success of all Physics 400 level students. The core topics covered in Physics 400 are: kinematics, dynamics, energy, and electricity. Physics 400 students will be engaged in the application of science and engineering practices and are expected to demonstrate scientific literacy by participating in scientific discourse. Students will understand that scientific content is organized around scientific models which represent a set of interconnected, evidence-based ideas that are useful for describing the natural world. Students will understand how to use evidence-based reasoning to build and test a data-based model. Students will engage in scientific discourse to identify their misconceptions and refine their thinking. Laboratory work is an integral and required part of the course and is highly analytical in nature.

AP PHYSICS C: MECHANICS, ELECTRICITY AND MAGNETISM**Eligible Grade Level:** 12**Prerequisites:** Completion of Physics 400 with a grade of “B” or better is strongly recommended. Completion of/or concurrent enrollment in AB Calculus or higher**Credit:** 1 unit

Grade Weighted

AP Physics is designed to meet the objectives of a first-year college general physics course. College level materials are used and the curriculum is established by the National College Board. This course in physics is designed to give students an in-depth study of classical physics at the university level. It is the expectation that calculus will be provided and used. Laboratory work is an integral and required part of the course and is highly analytical in nature.

Students should have an interest in the sciences along with a well-established work ethic for success in this college level course. AP Physics prepares the student to write, in May, TWO college level Physics Examinations of the National Advanced Placement Program (AP Physics C: Mechanics and AP Physics C: Electricity and Magnetism). Success on this exam may entitle the student to college credit, advanced college placement, or both.

AP PHYSICS C: MECHANICS**Eligible Grade Level:** 12**Prerequisites:** Completion of Physics. The appropriate placement for students in BC Calculus or higher is AP PHYSICS C: MECHANICS, ELECTRICITY AND MAGNETISM.**Credit:** 1 unit

Grade Weighted

AP Physics is designed to meet the objectives of a first semester college physics course. College level materials are used and the curriculum is established by the National College Board. This college physics course is designed to give students an in-depth study of mechanics at the university level. Extended time will be devoted in this course to the study and practice of necessary mathematical techniques for college level physics. Laboratory work is an integral and required part of the course and is highly analytical in nature.

Students should have an interest in the sciences along with a well-established work ethic for success in this college level course. AP Physics prepares the student to write, in May, a college level Physics Examination of the National Advanced Placement Program (AP Physics C: Mechanics). Success on this exam may entitle the student to college credit, advanced college placement, or both.

NEW COURSES FOR 2019-2020

PRINCIPLES OF BIOMEDICAL SCIENCE (PLTW)

Credit: 1 unit

Eligible Grade Level: 9,10,11,12

Prerequisites: None. This elective does not meet the science requirement for graduation.

This is the first course in the PLTW (Project Lead The Way) Biomedical Science pathway. The Principles of Biomedical Science (PBS) course provides an introduction to biomedical science through hands-on projects and problems. Students investigate concepts of biology and medicine as they explore health conditions including heart disease, diabetes, sickle-cell disease, hypercholesterolemia, and infectious diseases. The activities and projects in PBS introduce students to human physiology, basic biology, medicine, and research processes and allow students to design experiments to solve problems. Key biological concepts, including maintenance of homeostasis in the body, metabolism, inheritance of traits, and defense against disease are embedded in the curriculum.

The course requires that students conduct physiological experiments and that anatomical study is aided by multiple dissections.

STUDENT DESIGNED RESEARCH IN STEM

Credit: 1 unit

Eligible Grade Level: 10, 11, 12

Prerequisites: None. This elective course does not meet the science requirements for graduation.

Students will experience science through individualized, original research. Student Designed Research in STEM will provide students with an opportunity to acquire skills and concepts inherent in the science research experience. This course is intended to teach students to be creative, careful, patient and exacting in their methods of study and laboratory investigations. Students will practice scientific thinking and learn scientific research methodologies. Students will develop the ability to communicate scientifically.