SCIENCE DEPARTMENT

Graduating classes of 2020 & 2021

COURSE SEQUENCE FOR ALL STUDENTS

Year 1	Biology I or Honors Biology I	Earth & Space Science or Honors Earth & Space Science
Year 2	Chemistry I or Honors Chemistry I	Environmental Science or Honors Environmental Science
Year 3	Biology II or Honors Biology II	Physics or AP Physics I*

*All science courses are nine (9) weeks in length (0.5 credits) with the exception of AP Physics I (1 credit)

COURSE TITLES	CREDIT	GRADE LEVEL 9	10	11	12	PREREQUISITE
Required Courses						
Choose one Biology & one Earth & Science						
Earth and Space Science N	.5	x				None
Honors Earth and Space Science N	.5	x				None
Biology I N	.5	x				None
Honors Biology I N	.5	x				None
Chemistry I N	.5		x			Biology I and Earth and Space Science
Environmental Science N	.5		x			Biology I and Earth and Space Science
Honors Environmental Science N	.5		x			Biology I and Earth and Space Science
Biology II N (2018-2019)	.5			x		Chemistry I
Physics N (2018-2019)	.5			x		Algebra I, Geometry or teacher recommendation
Elective Courses						
AP Biology N	1			x	x	A grade of B or better in Biology II and Chemistry I
Honors Anatomy & Physiology N	1			x	x	Chemistry I (or Honors)
Astronomy II N	.5		x	x	x	Earth and Space Science (or Honors)
Chemistry II	.5		x	x	x	Algebra I, Chemistry I (or Honors)
Honors Chemistry II	.5		x	x	x	Algebra I, Honors Chemistry I or teacher recommendation
AP Chemistry N	1			x	x	Honors Chemistry II
AP Physics I N	1			x	x	Algebra II (Co-requisite)
Forensics N	.5			x	x	Biology II (or Honors)
AP Physics II N	1			x	x	AP Physics I

N - NCAA approved courses

*prerequisites for honors courses are the same as their corresponding courses

SCIENCE DEPARTMENT SEQUENCE (graduating classes of 2020 & 2021)

CAREER READINESS	COLLEGE READINESS	AP/HONORS
Biology 1 Earth and Space Science	Biology 1* Earth and Space Science*	Biology 1* Earth and Space Science*
Chemistry 1 Environmental Science	Chemistry 1* Environmental Science*	Chemistry 1* Environmental Science*
Biology II Physics	Biology II* Physics or AP Physics 1	Biology II* Physics or AP Physics 1
Astronomy II Forensics	Honors Anatomy & Physiology Astronomy II Chemistry II Forensics AP Biology AP Chemistry AP Physics 2	Honors Anatomy & Physiology Astronomy II Chemistry II Forensics AP Biology AP Chemistry AP Physics 2

*indicates honors course available

Graduating classes of 2020 & 2021 COURSE DESCRIPTIONS

The reference to standards in the NGSS course boxes is linked to the NGSS Standards Web page. They are all linked by clicking on the standard.

BIOLOGY I N **171131 GRADES: 9**
HONORS BIOLOGY I N **171141 GRADES: 9**
***PREREQUISITE: NONE .5 CREDIT/1 TERM**

This course will focus on Ecology, Evolution and Human Body Systems. Students will focus on using mathematical models and empirical evidence to construct models and evaluate explanations. Students will also communicate and design investigations to gain evidence about life.

STANDARDS:

NGSS High School Life Science: 4-1, 4-2, 4-3, 4-4, 4-5, 2-1, 2-2, 2-4, 2-6 & 2-8
NGSS High School Engineering and Technology Standards: 1-1, 1-2, 1-3 & 1-4

EARTH AND SPACE SCIENCE N **170121 GRADES: 9**
HONORS EARTH AND SPACE SCIENCE N **170131 GRADES: 9**
***PREREQUISITE: NONE .5 CREDIT/1 TERM**

This course covers topics in astronomy and plate tectonics. Students will focus on constructing explanations and developing models using mathematical computation and empirical evidence. Students will emphasize applying scientific reasoning to explanations and models of earth and space systems and how they are connected.

STANDARDS:

NGSS High School Earth and Space Science: 1-1, 1-2, 1-3, 1-4, 1-5, 1-6, 1-8, 2-1 & 2-3
NGSS High School Engineering and Technology: 1-1, 1-2, 1-3, & 1-4

AP BIOLOGY N **171511** **GRADES: 11-12**
***PREREQUISITE: A grade of B or better in Biology II and Chemistry I** **1 CREDIT/2 TERMS**

This course will prepare students to successfully pass the Advanced Placement Biology exam written by the College Board in May. It is designed to be the equivalent of a college introductory biology course usually taken by biology majors. AP Biology students are expected to read nightly, write weekly essays, complete study guides, take exams and perform several labs throughout the semester. AP Biology is taught as a college level class in the high school setting, so the grading scale is adjusted to accommodate the rigorous material.

STANDARDS:

The students will utilize the 4 "Big Ideas" in biology to explain and apply the "Enduring Understandings" as directed by the College Board. These Ideas along with their Enduring Understandings are listed in detail on page 8 of the College Board Document

Big Ideas:

1. The process of evolution drives the diversity and unity of life.
2. Biological systems utilize energy and molecular building blocks to grow, to reproduce and to maintain homeostasis.
3. Living systems store, retrieve, transmit and respond to information essential to life processes.
4. Biological systems interact, and these interactions possess complex properties

AP CHEMISTRY N **172511** **GRADES: 10-12**
***PREREQUISITE: Honors Chemistry II** **1 CREDIT/2 TERMS**

This is a college level course that expands topics covered in honors chemistry as well as introduce new areas of study such as electrochemistry and organic chemistry. It provides students a wide opportunity to develop and improve their investigative skills. Basic concepts of chemistry are reviewed, then developed into increasingly sophisticated ideas that are useful in other physical, biological, and applied sciences such as medicine, engineering, agriculture, and consumer sciences. Students completing AP Chemistry may elect to take the National CEEB Advanced Placement Exam to earn college credit.

The students will:

- understand and apply knowledge of the structure of atoms
- understand and apply knowledge of the structure and properties of matter.
- understand and apply knowledge of chemical reactions.
- understands and applies knowledge of interactions of energy and matter.
- understand and apply knowledge of conservation of energy and increase in disorder.
- demonstrate a sound understanding of technology concepts, systems and operations.
- apply digital tools to gather, evaluate, and use information.
- use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.

AP PHYSICS I N **173621** **GRADES: 11-12**
***PREREQUISITE: Algebra II & Geometry** **1 CREDIT/2 TERMS**

AP® Physics 1 is the first course in a two course sequence for AP Physics. AP® Physics 1: Algebra-based and AP Physics 2: Algebra-based is a two-year sequence equivalent to the first and second semesters of a typical introductory, algebra-based, college physics course. This two year sequence gives teachers the time needed to foster greater depth of conceptual understanding through the use of student-centered, inquiry based instructional practices. There will be an AP exam available at the end of this course to help students earn college credit. Each of the two courses in the sequence will have their own individual AP exams.

Major Concepts:

- Objects and systems have properties such as mass and charge. Systems may have internal structure.
- Fields existing in space can be used to explain interactions.
- The interactions of an object with other objects can be described by forces.
- Interactions between systems can result in changes in those systems.
- Changes that occur as a result of interactions are constrained by conservation laws.
- Waves can transfer energy and momentum from one location to another without the permanent transfer of mass and serve as a mathematical model for the description of other phenomena.

AP PHYSICS II N **173623**
GRADES: 11-12
***PREREQUISITE: AP Physics I** **1 CREDIT/2 TERMS**

AP® Physics 2 is the second course in a two course sequence for AP Physics. AP® Physics 1: Algebra-based and AP Physics 2: Algebra-based is a two-year sequence equivalent to the first and second semesters of a typical introductory, algebra-based, college physics course. This two year sequence gives teachers the time needed to foster greater depth of conceptual understanding through the use of student-centered, inquiry based instructional practices. This course will cover many of the topics from the first in the sequence, adding depth and additional concepts throughout the semester. There will be an additional AP exam available at the end of this course to help students earn college credit.

Major Concepts:

- Objects and systems have properties such as mass and charge. Systems may have internal structure.
- Fields existing in space can be used to explain interactions.
- The interactions of an object with other objects can be described by forces.
- Interactions between systems can result in changes in those systems.
- Changes that occur as a result of interactions are constrained by conservation laws.
- Waves can transfer energy and momentum from one location to another without the permanent transfer of mass and serve as a mathematical model for the description of other phenomena.

ASTRONOMY II N **176121** **GRADES: 10-12**
***PREREQUISITE:** Earth and Space Science (or Honors) **.5 CREDIT/1 TERM**

This course would be designed to be an extension of Astronomy I. The first 9-week class covers astronomical history, how we gather and interpret light from afar and studies each of the planets of the solar system, including Earth. Astronomy II students would be able to apply and extend this prior knowledge to study the theories involving our Sun, stellar lives and evolution, galaxies and the universe. Teaching strategies would continue to involve drawing on students' interests through discussion, multimedia presentations, labs, papers, projects and additional planetarium usage.

The students will:

- summarize the overall properties, structure and nature of the Sun.
- use the H-R diagram correctly in its many stellar applications.
- explain how original mass is related to most stellar properties.
- describe the differences in the evolutionary paths of stars of differing solar mass.
- understand how observational evidence supports the modern theories of star formation.
- compare and contrast the properties of stellar remnants.
- describe the overall structure of the Milky Way and how we came to attain this knowledge.
- explain the origin of the heavier elements and how they fit into stellar evolution.
- summarize the different types of galaxies, their distribution and evolution.
- describe "anti-matter" and background radiation and their significance.
- discuss the cosmological principle, the "big bang" and theories on universal evolution.
- evaluate the probability of existence of other life in the universe.

BIOLOGY II (honors) N **GRADES: 11**
***PREREQUISITE: Biology 1, Chemistry 1** **.5 CREDIT/1 TERM**

This course will focus on topics in biology that involve chemistry. Topics include the structure and function of DNA and its part in cell division, interacting systems in multicellular organisms, the link between homeostasis and feedback and the interdependence of photosynthesis and respiration. Students will be expected to construct explanations, develop models and apply concepts of math and statistics to arguments and investigations.

STANDARDS:

NGSS High School Life Science Standards: 1-1, 1-3, 1-4, 1-5, 1-6, 1-7, 2-3, 2-5, 3-1, 3-2 & 3-3

CHEMISTRY I N **172111** **GRADES: 10**
HONORS CHEMISTRY I N **172121**
***PREREQUISITE: Biology 1 and Algebra 1** **.5 CREDIT/1 TERM**

This course assesses standards dealing with chemical reactions and atomic structure. There will be a second semester of chemistry offered as an elective for students

STANDARDS:

NGSS High School Physical Science Standards: 1-1, 1-2, 1-3, 1-4, 1-5, 1-6, 1-7, 1-8, 2-6, 3-1, 3-2 & 3-4
NGSS High School Engineering and Technology Standards: 1-1, 1-2, 1-3, & 1-4

CHEMISTRY II **GRADES: 10-12**
HONORS CHEMISTRY II
***PREREQUISITE: Chemistry 1** **.5 CREDIT/1 TERM**

This is a course to follow Chemistry I for those students who want to enhance their chemistry background. It is recommended for the college bound student, especially those who want to continue in a science field.

STANDARDS:

NGSS High School Physical Science Standards: 1-1, 1-2, 1-3, 1-4, 1-5, 1-6, 1-7, 1-8, 2-6, 3-1, 3-2 & 3-4
NGSS High School Engineering and Technology Standards: 1-1, 1-2, 1-3, & 1-4

ENVIRONMENTAL SCIENCE N **GRADES: 10**
HONORS ENVIRONMENTAL SCIENCE N **GRADES: 10**
***PREREQUISITE: Biology 1** **.5 CREDIT/1 TERM**

This course deals with impacts of change on our environment. Students will develop mathematical models and form solutions to environmental issues. Students will plan and conduct at least one investigation into an environmental issue using their models. Students will evaluate arguments about what impacts certain actions have on the environment.

STANDARDS:

High School Earth Science Standards: 2-2, 2-4, 2-5, 2-6, 2-7, 3-1, 3-2, 3-3, 3-4, 3-5 & 3-6
High School Life Science Standard: 2-7
High School Engineering and Technology Standards: 1-1, 1-2, 1-3, & 1-4

FORENSICS N **174141** **GRADES: 11-12**
***PREREQUISITE: Biology II, Chemistry or Physical Science** **.5 CREDIT/1 TERM**

Students in Forensic Science will learn the services of a crime laboratory and rules of processing evidence from a crime scene. Students will study methods of analyzing physical evidence including hair, fiber, glass, DNA, fingerprints, bone, and serology evidence.

The students will:

- understand and apply knowledge of the molecular basis of heredity.
- understand and apply knowledge of structure and properties of matter.
- understand and apply knowledge of chemical reactions.
- develop and display technology literacy, employability skills and civic literacy.

HONORS ANATOMY & PHYSIOLOGY N **171311** **GRADES: 11-12**
***PREREQUISITE: Biology and Chemistry** **1 CREDIT/2 TERMS**

This course is designed primarily for students who have an interest in pursuing one of the health related fields or biology as a career. The course contains the following topics: mammalian anatomy, digestive system, nutrition, circulatory system, excretory system, respiratory system, muscular-skeletal system, nervous system, and the reproductive system. Where practical, the students act as the laboratory test subjects. All students should have a well based understanding of mammalian anatomy and physiology as well as some knowledge of the improper functioning of human physiological activities upon completion of the course.

The students will:

- understand and apply knowledge of the cell.
- understand and apply knowledge of the behavior of organisms.

PHYSICS N **173111** **GRADES: 11**

***PREREQUISITE: Algebra I & Chemistry I** **.5 CREDIT/1 TERM**

This course will focus on forces of gravity, electricity and magnetism and how they impact motion and collisions. Ideas of momentum and energy will be applied to motions and collisions. Students will apply mathematical models to design, refine and evaluate investigations and arguments in science.

STANDARDS:

NGSS High School Physical Science Standards: 2-1, 2-2, 2-3, 2-4, 2-5, 3-3, 3-5, 4-2, 4-3, 4-4 & 4-5
NGSS High School Engineering and Technology Standards: 1-1, 1-2, 1-3, & 1-4