

# SCIENCE



## Philosophy Statement

A broad understanding of the living world and the physical laws fundamental to all science is essential in today's technological society. A quality education includes significant study in the areas of biology, chemistry, earth and space science, and physics. In accordance with state academic standards, the Science department recommends that students take a minimum of one year in Biology or Life Science and one year in a physical science such as Earth Science, Chemistry or Physics during their high school tenure. The science curriculum is designed to give each student as many options for success after high school as possible.

The science faculty is committed to the success of each student. Each course is designed to be content rich, activity centered, and student friendly. Varied techniques will ensure that individual learning styles will be addressed. A cooperative classroom atmosphere will create the best possible learning environment. We are committed to showing students the importance, the wonder, and the joy inherent in the study of science.

## Science

### Course Descriptions

- All Advanced Placement science students earn 0.5 units of credit for semester one and 1.0 units of credit for semester two. Advanced Placement courses may be used to satisfy college science requirements. If prerequisites are met, sophomores may request AP placement through the Science Supervisor.

## Advanced Placement Biology

Course No.: 4002

Prerequisite: *Biology and Chemistry*

Credit: 1.5 / Full Year

Fees:

Grades: 11, 12

Other: *This course meets 1.5 periods each day.*

**Advanced Placement Biology** assumes students are familiar with basic biological concepts. It is designed to be the equivalent of a first year college introductory biology course usually taken by biology majors. The two main goals are to help students develop a conceptual framework for modern biology and to help students gain an appreciation of science as a process. The unifying themes of interdependence in nature, structure and function, evolution, energy, and regulation integrate the major topics of biology. Application of biological knowledge and critical thinking related to environmental and social concerns are also stressed. Teaching methods include lecture, discussion, outside reading, group projects, and laboratory experiences.

## Advanced Placement Chemistry

Course No.: 4004

Prerequisite: *Two years of Algebra and one year of Chemistry.*

Credit: 1.5 / Full Year

Fees:

Grades: 11, 12

Other: *This course meets 1.5 periods each day.*

**Advanced Placement Chemistry** provides an in-depth and quantitative study of molecular structure, chemical reactions, stoichiometry, thermochemistry, behavior of gases, equilibrium, chemical kinetics, thermodynamics, redox chemistry, and electrochemical systems. Topics are developed through lecture, laboratory, demonstrations and computer problem sets.

## Advanced Placement Physics B

Course No.: 4008

Prerequisite: *Geometry and Algebra II*

Credit: 1.5 / Full Year

Fees:

Grades: 11, 12

Other: *This course meets 1.5 periods each day. A grade of "B" or better in Algebra II is recommended as algebra is an integral component of this course.*

**Advanced Placement Physics B** provides a systematic introduction to the principles and applications of both classical and modern physics. Fundamental concepts of kinematics, dynamics, thermodynamics, fluids, electricity, magnetism, optics, and quantum and nuclear physics are developed through lectures, demonstrations, laboratory, and computer experience. Computer work outside of class is required.

### **Advanced Placement Physics C**

*Course No.: 4010*

*Prerequisite: Physics or AP Physics B and Calculus AB or BC (which may be taken concurrently).*

*Credit: 1.5 / Full Year*

*Fees:*

*Grades: 12*

*Other: This course meets 1.5 periods each day.*

**Advanced Placement Physics C** provides a foundation in physics for students entering the fields of engineering, medicine, mathematics, physics, and chemistry. The basics of mechanics, electricity, and magnetism are developed through lectures, demonstrations, and laboratory and computer experiences. Quantitative relationships are developed using the basic concepts of differential and integral calculus. Computer work outside of class is required.

### **Biology**

*Course No.: 4020*

*Prerequisite: Placement*

*Credit: 1.0 / Full Year*

*Fees:*

*Grades: 9, 10, 11, 12*

*Other:*

This is the first **Biology** course taken by college bound students. Important themes stressed are energy flow through the biosphere, essential biological processes, evolution, and genetic continuity. Individual projects, laboratory activities, cooperative learning groups, lecture/discussion, and library research are all utilized to give each student the essential scientific background and skills for future success.

### **Biology Honors**

*Course No.: 4022*

*Prerequisite: Placement*

*Credit: 1.0 / Full Year*

*Fees:*

*Grades: 9, 10, 11, 12*

*Other:*

**Biology Honors** is a course that takes a molecular and scientific inquiry approach to facilitate the understanding of the fundamental concepts and processes of biology. Topics covered are based on five themes: science as a process, interdependence in nature, relationship of structure and function, energy transfer, and evolution. In comparison to Biology, this curriculum is taught at an accelerated pace and in greater depth. Emphasis is on group projects, outside readings and laboratory work.

### **Chemistry**

*Course No.: 4026*

*Prerequisite: Algebra (placement for grade 10)*

*Credit: 1.0 / Full Year*

*Fees:*

*Grades: 10, 11, 12*

*Other: A grade of "B" or better in Algebra is highly recommended.*

**Chemistry** is a laboratory-oriented approach for investigating chemical concepts. Example concepts include chemical bonding, physical and chemical properties, naming compounds, chemical quantities, thermochemistry, and nuclear chemistry. Decision-making skills based on chemical knowledge are included. Connections to relevant societal and technological issues are discussed.

### **Chemistry Honors**

*Course No.: 4028*

*Prerequisite: Algebra (placement for grade 10)*

*Credit: 1.0 / Full Year*

*Fees:*

*Grades: 10, 11, 12*

*Other: Completion or concurrent enrollment in Algebra II is recommended*

**Chemistry Honors** is a laboratory-oriented course that moves at a faster pace and includes more math than chemistry. The course investigates fundamental chemical concepts such as atomic structure, periodic properties, chemical bonding, mass and energy changes in chemical reactions, physical and chemical equilibrium, and organic and nuclear chemistry. Connections to relevant societal and technological issues are emphasized.

### **Earth Science**

*Course No.: 4030*

*Prerequisite: None*

*Credit: 1.0 / Full Year*

*Fees:*

*Grades: 10, 11, 12*

*Other:*

Earth Science is a college preparatory, lab-oriented course that is commonly taught during the second year of a four-year science program option including Biology, Earth Science, Chemistry and Physics. This course involves major units in astronomy, geology, meteorology, and physical geography. Emphasis is placed on the study of natural cycles in each of the above areas and the relationships between them.

### **Earth Science Honors**

*Course No.: 4032*

*Prerequisite: Algebra*

*Credit: 1.0 / Full Year*

*Fees:*

*Grades: 10, 11, 12*

*Other: Students have the opportunity to enroll in and receive credit for GEO120 at the College of Lake County.*

**Earth Science Honors** is a laboratory-oriented course covering the same basic topics as Earth Science with more in-depth exploration of astronomy, geology, and meteorology. In addition, topics are covered in greater detail supported by other science disciplines. Individual projects, reports, and outside readings will also be required. Emphasis is placed on each area's impact on modern society.

### **Human Genetics**

*Course No.: 4037F, 4038S*

*Prerequisite: One year of Biology*

*Credit: 0.5 / Semesters 1 and 2*

*Fees:*

*Grades: 10, 11, 12*

*Other:*

**Human Genetics** is a lab science course designed for students interested in learning about recent developments in human genetics and the possible bioethical implications of new technologies. Areas of genetic research studied include DNA/RNA, chromosomal abnormalities, genetic birth defects, hereditary diseases, genetic engineering, cloning and genetic counseling. Students with average or better success in Biology should consider Human Genetics as a beneficial option.

### **Human Physiology I**

*Course No.: 4041F, 4042S*

*Prerequisite: One year of Biology*

*Credit: 0.5 / Semesters 1 and 2*

*Fees:*

*Grades: 11, 12*

*Other:*

**Human Physiology I** is a lab science course that deals with the functional activities of the human as a whole, as well as the individual parts of the body. Included is the study of the different human organ systems such as skin, muscular, skeletal and nervous. Special emphasis is placed on the recent developments in physiology and the many feedback mechanisms that operate in the body. Human Physiology I is recommended for students who desire an extra semester of science and for those interested in medical careers or a better understanding of their bodies.

### **Human Physiology II**

*Course No.: 4043F, 4044S*

*Prerequisite: Human Physiology I*

*Credit: 0.5 / Semesters 1 and 2*

*Fees:*

*Grades: 11, 12*

*Other:*

**Human Physiology II** is a lab science course that builds on the concepts and processes learned in Human Physiology I by exploring additional body systems not covered in Human Physiology I. Body systems covered in this course will include: special senses, endocrine, cardiovascular, respiratory, digestive, urinary, and reproductive.

### **Life Science**

*Course No.: 4060*

*Prerequisite: Placement*

*Credit: 1.0 / Full Year*

*Fees:*

*Grades: 9, 10, 11, 12*

*Other:*

**Life Science** is a lab science course dealing with the important themes of biology. The course centers around four areas of study: ecology, survey of living organisms, human physiology, and genetics. Materials are presented, using a hands-on approach, to accommodate a wide range of reading and analytical abilities.

### **Physical Science**

*Course No.: 4064*

*Prerequisite: Placement*

*Credit: 1.0 / Full Year*

*Fees:*

*Grades: 10, 11, 12*

*Other:*

**Physical Science** is a lab science course designed to give students an introduction to principles of chemistry, physics, and earth science. A hands-on approach is followed to allow students to improve lab techniques and problem solving skills, as well as prepare them for future science classes.

### **Physics**

*Course No.: 4070*

*Prerequisite: Algebra and Geometry*

*Credit: 1.0 / Full Year*

*Fees:*

*Grades: 11, 12*

*Other: A grade of "B" or better in Algebra is recommended because algebra is an integral part of the Physics course.*

**Physics** provides an introduction to the basic principles of classical physics. The concepts of force, motion, energy, electricity, magnetism, sound, and light are developed through lectures, demonstrations, and laboratory experiences. Students develop an understanding of the methods and applications of physics.

### **Pre-Engineering Honors**

*See Applied Technology listing for course description.*

# Science Department

## Course Sequences

9

10

11

12

<ul style="list-style-type: none"> <li>** Life Science</li> <li>** Biology</li> <li>** Biology Honors</li> </ul>
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<ul style="list-style-type: none"> <li>** Physical Science</li> <li>** Earth Science</li> <li>** Earth Science Honors</li> <li>** Chemistry</li> <li>** Chemistry Honors</li> <li>* Human Genetics</li> </ul>
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<ul style="list-style-type: none"> <li>Earth Science</li> <li>Chemistry</li> <li>Physics</li> <li>** Chemistry Honors</li> <li>AP Biology</li> <li>AP Physics B</li> <li>AP Chemistry</li> <li>Earth Science Honors</li> <li>* Human Genetics</li> <li>* Human Physiology I</li> <li>* Human Physiology II</li> </ul>
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<ul style="list-style-type: none"> <li>Chemistry</li> <li>Physics</li> <li>AP Biology</li> <li>AP Physics B</li> <li>AP Chemistry</li> <li>AP Physics C</li> <li>Earth Science Honors</li> <li>* Human Genetics</li> <li>* Human Physiology I</li> <li>* Human Physiology II</li> </ul>
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\* Semester Course

\*\* Departmental placement / recommendation

All AP Science courses meet 1.5 periods per day for 1.5 credits

### Common Science Sequences:

<ul style="list-style-type: none"> <li>** Biology</li> <li>Earth Science</li> <li>Chemistry</li> <li>Physics</li> <li>(4.0 credits)</li> <li>College Prep Sequence</li> </ul>
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<ul style="list-style-type: none"> <li>** Life Science</li> <li>** Physical Science or Earth Science</li> <li>* Human Genetics</li> <li>* Human Physiology I</li> <li>(3.0 Credits)</li> </ul>
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<ul style="list-style-type: none"> <li>** Biology</li> <li>** Chemistry</li> <li>Physics</li> <li>* Human Genetics</li> <li>* Human Physiology I</li> <li>(4.0 Credits)</li> </ul>
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<ul style="list-style-type: none"> <li>** Biology Honors</li> <li>** Chemistry Honors</li> <li>Earth Science Honors</li> <li>AP Science</li> <li>(4.5 Credits)</li> </ul>
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<ul style="list-style-type: none"> <li>** Biology Honors</li> <li>** Chemistry Honors</li> <li>Physics</li> <li>AP Science</li> <li>(4.5 Credits)</li> </ul>
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<ul style="list-style-type: none"> <li>** Biology Honors</li> <li>** Chemistry Honors</li> <li>AP Science</li> <li>AP Science</li> <li>(5.0 Credits)</li> </ul>
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