SCIENCE

FOUNDATIONS OF BIOLOGY 2: EVOLUTION AND ECOLOGY **136150**
Grades: 10-11
FND BIO 2
1/2 Science Credit
Prerequisite: Foundations Biology 1: Cells and Variation

This semester course is designed for students who have had difficulty with prior courses in science. This course has a theme of "How is Life Interrelated?" Students will explore the unity and diversity of life through the study of evolution by natural selection. The structure of DNA and protein synthesis will be introduced. The interdependence of all living things will be explored with emphasis on ecological processes and human impact on the biosphere. The processes of photosynthesis and respiration will be introduced. These topics will be presented through numerous laboratory activities, lectures and discussions and will emphasize process and thinking skills. The Missouri Biology End of Course assessment is given at the conclusion of this course.

FOUNDATIONS OF FORCES AND MOTION IN ONE-DIMENSION
136310
Grades: 10-11
FND PHY:FORC
1/2 Science Credit
Prerequisite: Department approval

This class will cover topics including laboratory safety, measurement, scientific inquiry, graphical analysis, and forces and motion in one dimension. Group interaction, discussion, and cooperation during laboratory practice and mathematical problem-solving sessions will be commonplace. Open-ended lab experiences, requiring student collaboration and multiple-step problem solving execution, will be frequent.

FORCES AND MOTION IN ONE-DIMENSION
Grades: 10-11 **137310**
PHYSICS:FORC
1/2 Science Credit
Prerequisite: One semester Algebra 1 with C or better recommended or departmental approval

This semester course is the first in a recommended series of physics courses. This class will cover topics including laboratory safety, measurement, scientific inquiry, graphical analysis and the study of forces and motion in one dimension. Group interaction, discussion, and cooperation during laboratory practice and mathematical problem-solving sessions will be commonplace. Open-ended lab experiences requiring student collaboration and multiple-step problem solving execution will be frequent.

BIOLOGY 3: BIOTECHNOLOGY AND SYSTEMS
Grades 10-12 **137160**
BIO 3 TECH
1/2 Science Credit
Prerequisite: Biology 1: Cells and Variation, Biology 2: Evolution & Ecology, Matter & Change or departmental approval

This course completes the initial college preparatory sequence and has the themes: "How does biotechnology impact life?" and "How is life organized for success?" The students will investigate a variety of concepts such as DNA fingerprinting and genetic engineering. Students will explore and compare plants, and animals (including humans) at the system and molecular levels. Other topics will include photosynthesis and cellular respiration. These topics will be presented through numerous laboratory activities and will emphasize process and thinking skills.

HONORS BIOLOGY 3: BIOTECHNOLOGY AND SYSTEMS **138160**
Grades: 10-12
+BIO 3 TECH
1/2 Science Credit
Prerequisite: Honors Biology 1: Cells & Variation or departmental approval, Honors Biology 2: Evolution and Ecology, Honors Matter & Change or departmental approval

This course completes the initial college preparatory sequence and has the themes: How does biotechnology impact life? and How is life organized for success? The students will investigate a variety of concepts such as DNA fingerprinting and genetic engineering. Students will explore and compare microbes, plants, and animals (including humans) at the system and molecular levels. Other topics will include metabolism and disease. These topics will be presented through numerous laboratory activities and will emphasize process and thinking skills. This course is designed to challenge the top ten percent of students. It is more intensive and requires increased levels of critical thinking and mathematical reasoning. It is designed for the student who anticipates a science-based career, desires an accelerated science program, and intends to take advanced courses in science. A weighted grade is given.

CHEMISTRY **137201/137202**
Grades: 10-12
CHEMISTRY
1 Science Credit

SCIENCE

Prerequisite: Matter & Change and Algebra 1 with a recommended C or above or department approval

This course can fulfill the third required year of science credit and completes the recommended core curriculum in chemistry. Topics include atomic structure and history, The Periodic Table and periodicity, bonding and nomenclature, the mole and stoichiometry, states of matter, kinetics, thermochemistry, and acids and bases. Group interaction, discussion, and cooperation during laboratory practice and mathematical problem-solving sessions will be commonplace. Open-ended lab experiences, requiring student collaboration and multiple-step problem solving execution, will be frequent.

HONORS CHEMISTRY **138201/138202**
Grades: 10-12
+CHEM
1 Science Credit
Prerequisite: Honors Matter & Change or department approval

This course can fulfill the third required year of science credit and completes the recommended core curriculum in chemistry. Topics include atomic structure, periodicity, bonding, nomenclature, chemical reactions, stoichiometry, gas laws and physical states, thermochemistry, solutions, kinetics and equilibrium, acids and bases, nuclear science and energy, and an introduction to organic chemistry. Group interaction, discussion, and cooperation during laboratory practice and mathematical problem-solving sessions will be commonplace. Open-ended lab experiences, requiring student collaboration and multiple-step problem solving execution, will be frequent. It is more intensive and requires more critical thinking than Chemistry. It is designed for the student who has an exceptional interest in science and desires an accelerated science program. Class lectures will often feature advanced, cognitive material delivered at a great pace and depth. A weighted grade is given.

PHYSICS **137301/137302**
Grades: 11-12
PHYSICS
1 Science Credit
Prerequisite: Forces & Motion in 1D, Algebra 2 / Trig, or departmental approval

Physics is essential for all students. It is an exploration of physical concepts where students do hands-on exercises and investigative activities to discover relationships and develop equations relevant to the physical world. Problem-solving is emphasized. Students will investigate the following units: forces, motion in two-dimensions, energy and momentum, mechanical waves, light and optics, and electricity. Additional topics may include rotational motion, GPS, fluid mechanics, thermodynamics, nuclear physics, material science, and magnetism.

AP PHYSICS 1 **139411/139412**
Grades: 11-12
+ AP PHYS 1
1 Science Credit
Prerequisite: Honors Forces & Motion, Honors Algebra 2 / Trig

AP Physics 1: Trigonometry-Based, is the equivalent of a first-semester college course in algebra-based physics. It is taught over a full academic year to enable AP students to develop deep understanding of the content and to focus on applying their knowledge through inquiry labs. The full year also allows time for inclusion of physics content specified by state standards. The course covers Newtonian mechanics (including rotational dynamics and angular momentum); work, energy, and power; and mechanical waves and sound. It also introduces electric circuits.

AP PHYSICS C - MECHANICS **139321/139322**
Grade: 11-12
+AP PHYS C:M
1 Science Credit
Prerequisite: Honors Forces and Motion, concurrent enrollment in Honors Pre-Calculus or Calculus

AP Physics C: Mechanics is a calculus-based physics course that covers kinematics, dynamics, energy, momentum, rotation, gravitation and oscillation. This course is the first of a two-course sequence that is equivalent to the introductory physics sequence taken by science and engineering students at most colleges and universities.

AP BIOLOGY **139151/139152**
Grades: 11-12
+AP BIOLOGY
1 Science Credit
Prerequisite: 2 Semesters of Biology or Biology Honors, 2 Semesters of Chemistry or Chemistry Honors or currently enrolled

This course is designed for those students who are considering science as a profession or wish to earn college credit during high school. The content is equivalent to that of a freshman college course. The research techniques of the biologist and major biological concepts will be covered. Some topics include: the cell, biochemistry, photosynthesis, respiration, molecular genetics, transmission genetics, population genetics, evolution, phylogeny, plant and animal development and function. The course prepares students to take the College Board Advanced Placement Biology examination. A weighted grade is given.

SCIENCE

AP CHEMISTRY 139251/139252
Grades: 11-12
+AP CHEM
1 Science Credit
Prerequisite: Chemistry or Honors Chemistry or department approval

The AP Chemistry course is a year of inorganic chemistry. Students in this course will attain a depth of understanding of fundamentals and competence in dealing with chemical problems. This is achieved by qualitative and quantitative study of topics that will include: atomic theory and atomic structure, chemical bonding, gases, liquids and solids, chemical reactions, stoichiometry, equilibrium, kinetics, and thermodynamics. This course provides laboratory experience comparable to a year-long college course.

AP ENVIRONMENTAL SCIENCE 139501/139502
Grades: 11-12
+AP ENVIROSCI
1 Science Credit
Prerequisite: 1 credit of Biology, 1 credit Chemistry (Chemistry may be taken concurrently.)

Advanced Placement Environmental Science is a course devoted to applying the scientific processes and reasoning to understanding the environment. The focus is on the natural and the human-made challenges affecting the environment. This course will include a study of the natural and man-made environmental cycles, pollution, population dynamics, resource pressure, and human responsibility in both the political and personal form. Students will gain new information through lectures, guest speakers, and individual research. They will also design and conduct a number of laboratory investigations related to the processes affecting the environment.

AP PHYSICS 2 139421/139422
Grades: 11-12
+AP PHYS 2
1 Science Credit
Prerequisite: AP Physics 1 or AP Physics C and Pre-Calculus

This course culminates the study of trigonometry-based physics, and is a college level equivalent to General Physics. This course prepares students for a collegiate education, especially for those interested in a career in science or engineering. This course prepares students to take the College Board Advanced Placement Physics 2 examination and is appropriate for students who have completed either AP Physics 1 or AP Physics C. Instructional methods include lecture, discussion, demonstration, literature research, and open inquiry laboratories. Students will investigate the following units: Fluid statics and dynamics, Thermo-dynamics, PV diagrams and probability, Electrostatics, Electrical circuits, Magnetic fields, Electromagnetism, Physical and geometric optics, and Topics in modern physics. A weighted grade is given.

SEMESTER ELECTIVES IN SCIENCE

ANIMAL BEHAVIOR 137400
Grade: 11-12
ANIMAL BEHVR
1/2 Science Credit
Prerequisite: Biology 1: Cells & Variation and Biology 2: Evolution & Ecology

This course is designed for students to gain an understanding of behavioral research. Students will learn the basics of experimental design and statistical analysis of results. Students will investigate animal response, mating strategies, habitat usage, and social behaviors. Students interested in human behaviors and psychology will find this course a valuable tool in understanding research based psychology and sociology.

ASTRONOMY AND METEOROLOGY 137550
Grades: 11-12
ASTRO/METEOR
1/2 Science Credit
Prerequisite: Successful completion of Bio 1: Cells and Variation, Bio 2: Evolution & Ecology, Matter and Change and Forces & Motion

The NASA program, the space race, and the observations made by astronomers and astrophysicists have allowed a greater depth of knowledge of the solar system. This course requires students to combine mathematical skills with knowledge of physical mechanics to broaden their understanding of the universe. The content of this course extends beyond the historical accounts of space. Students will use physical laws of nature in their analysis of the universe. Satellite imagery has allowed us to view the earth in real time. Using this and other information from Doppler radar, barometers, and local spotters, data is integrated to predict weather patterns. Weather safety is explored as well man's influence on climate change.

BIOCHEMISTRY 137440
Grades: 11-12
BIOCHEMISTRY
1/2 Science Credit
Prerequisite: Chemistry and Biology 3

Biochemistry highlights the introductory global terminology for structures, buffer systems, medicinal chemistry, and its applications in living systems.

SCIENCE

CONCEPTS OF CHEMISTRY **136201/136202**
Grades: 10-12
CON CHEM
1 Science Credit
Prerequisite: Matter & Change and Algebra 1

This course is designed for those students who wish to obtain an understanding of the science of chemistry and its application in everyday life. The major concepts of chemistry are introduced with a minor emphasis on mathematical applications. The course will include topics such as atomic structure, periodic trends, physical and chemical properties, chemical formulas, chemical equations, chemical bonding, properties of gases, acid/base chemistry, solutions and nuclear chemistry. Additional topics may include organic chemistry, energy resources, mineral resources and chemistry in medicine. Wherever possible, the study of these topics will be complemented by activities and laboratory investigations.

ENVIRONMENTAL SCIENCE **137500**
Grades: 11-12
ENVIRON SCI
1/2 Science Credit
Prerequisite: One credit of Biology and Junior or Senior Class standing

Environmental Science centers on the principles of ecology. The student will investigate the way nature operates when left undisturbed and when influenced by man. Major concepts include: studies of soil, air, water, wildlife, biotic and abiotic factors, urban ecology, population dynamics, indicator organisms, succession, pathology of the environment, energy and conservation. The student will use laboratory experiences, field trips, audio-visuals, current literature, guest speakers, and textbook studies in an investigation of nature's way.

FORENSIC SCIENCE - C **137480**
Grades: 11-12
FORENSIC SCI
1/2 Science Credit
Prerequisite: Recommended C or better in the following courses: Matter & Change, Bio 1 Cells & Variation, Forces & Motion

This course is intended to introduce the student to the field of forensic science, science as applied to the law. Forensic science includes all areas of scientific endeavor, such as medicine, anthropology, entomology, physics, chemistry and biology. This course will emphasize the chemical systems involved in forensic investigations. The student will also be introduced to criminalistics, and services normally provided by crime laboratories, through various laboratory experiments. By stepping into the role of crime scene investigator, the student will learn various scientific strategies and skills.

GEOLOGY **137490**
Grades: 11-12
GEOLOGY
1/2 Science Credit
Prerequisite: Biology 1: Cells & Variation and Biology 2: Evolution & Ecology, Matter and Change and Forces and Motion

Earth is a dynamic planet with many forces shaping its surface. From the eroding of canyons to the folding of mountains, this course will explore the processes that build and destroy. Virtual field trips to glaciers, volcanoes, and the ocean floor help us to understand our home and all of its inhabitants of today and yesteryear.

HUMAN ANATOMY & PHYSIOLOGY
Grades: 11-12 **137461/137462**
HUM ANATOMY
1 Science Credit
Prerequisite: Successful completion of Biology 1: Cells & Variation, Biology 2: Evolution & Ecology

This course will examine, through lecture, dissection, and group work, the major human systems that support, move, maintain, and control the body. Medical terminology will be used and reviews of patient case studies will be incorporated. Normal functioning of human tissues, organs, and systems will be compared to pathologic conditions. This class will benefit anyone who wants to learn more about the human body. An optional field trip to view cadavers will be offered.

MEDICAL SCIENCE **137470**
Grade: 11-12
MEDICAL SCI
1/2 Science Credit
Prerequisite: Biology 1: Cells & Systems and Biology 2: Evolution & Ecology

The nature of human health and disease is stressed with an emphasis on normal functioning of tissues, organs and systems versus pathologic conditions. Major units will include cardiovascular, respiratory, endocrine, and immune systems. A medical vocabulary will be taught along with each unit. Information will be taught through lecture, dissection, group work, and discussion.

SCIENCE LABORATORY ASSISTANT **137930**
Grades: 11-12
LAB ASST
1/2 Elective Credit
Prerequisite: "B" average in Science, Junior or Senior standing, departmental approval

This is a special course for students to have the opportunity to learn laboratory skills needed for any scientific career. The

student will develop skills in making chemical solutions, raising laboratory animals, microbiology techniques, maintaining equipment and supplies used in science classes, and assisting teachers in preparing for laboratory activities. They may also work on a scientific project under teacher supervision. Students must be reliable and enjoy working with science materials. Permission from the science department is required. The number of students accepted per class period is very limited.

ZOOLOGY **137450**

Grades: 11-12
ZOOLOGY
1/2 Elective Credit
Prerequisite: "C" or better in both Biology 1: Cells & Variation and Biology 2: Evolution & Ecology or Foundations of Biology 2

This course is designed as an introduction to the major phyla of the animal kingdom. In each phylum, students will study the animals' characteristics and examples of each class. The course is structured on the phylogenetic development of the animal kingdom. There will also be laboratory studies, both microscopic and macroscopic, and could include dissection of representative organisms. The second area of study will be learning to shelter and care for animals and observing the animal's behavior.