

## ADV WEIGHT TRAINING/CONDITIONING 1-2

Using their experience and knowledge gained in Weight Training 1-2 and Advanced Weight Training 1-2, students will research, design, and implement their own specialized workout program. As they progress through the class they will document their work. Instructor serves as an advisor throughout the process. Students will be allowed to work more independently than in other classes.

*Prerequisites:* Adv. Weight Training 1-2 teacher's signature or varsity head coach's signature or PE department chair signature (**Varsity athlete must have already passed Weight Training 1-2**).

*Duration:* 2 semesters

*Credit:* 1 per semester

*Grade Level:* 11, 12 (grade 11 for varsity athlete only)

## SCIENCE DEPARTMENT

Science and Technology are major influences in the lives of everyone. The Science Department offers a sequence of courses that give students basic science knowledge through the use of scientific processes and technology. The courses are designed sequentially to prepare students for each future science class, as well as to foster inquiry, problem solving skills which are needed to produce scientifically literate citizens. The continued advances in technology require citizens to have an appreciation and understanding of science and the role it plays in society. Each successive science course is developed by expanding and unifying the concepts and processes of the previous course. Each science course fulfills the requirements of the Nebraska Science Standards.

**Mrs. Janis Elliott – 402.557.3383**

### Number of Credits Required for Graduation:

Six

### Required Courses:

Biology 1-2

Chemistry 1-2

Two semesters of Elective Courses

OR

Physical Science 1-2

Biology 1-2

Two semesters of Elective Course(s)

College/University bound students are encouraged to take biology, chemistry and physics to prepare them for the rigor of higher education classes.

### Honors Courses:

Honors Physical Science 1-2

Honors Biology 1-2

Honors Anatomy and Physiology 1-2

Honors Chemistry 1-2

Honors Physics 1-2

Honors Science Seminar

### AP Courses:

AP Biology 1-2

AP Chemistry 1-2

AP Physics B 1-2

AP Physics C: Electricity and Magnetism 1-2

AP Physics C: Mechanics 1-2

### Elective Courses:

Honors Anatomy and Physiology 1-2

Anatomy and Physiology 1-2

Biology 3-4

Earth Science 3-4 (Honors Option)

Science Seminar 1-2 (Honors Option)

Forensics 1 (Honors Option)

Environmental Science 1 (Honors Option)

Astronomy 1 (Honors Option)

Marine Biology/Oceanography 1 (Honors Option)

**Advanced Science Sequence: This special sequence is designed for students that desire a high level of academic challenge, have mature work/study skills and are willing to take the Advance Placement (AP) exams that may lead to college/university credit.**

### Three Year Advanced Sequence:

Freshmen: Honors Biology 1-2

Sophomores: AP Biology

Juniors: AP Chemistry 1-2

Seniors: AP Physics B or C 1-2

### Two Year Advanced Sequence:

Freshmen: Honors Biology 1-2

Sophomores: Honors Chemistry 1-2

Juniors: AP Chemistry

Seniors: AP Physics B or C 1-2

### Requirements to enter the Advanced Science Sequence are:

Honors Biology 1-2 with a grade of "A" both semesters

Honors Geometry or Honors Algebra 3-4 with a grade of "A" or "B" both semesters

Completed entrance application (distributed prior to course registration in the spring)

Teacher recommendation

Parent approval (signature on application form)

## PHYSICAL SCIENCE 1-2

Physical Science is a course designed to expose students to selected concepts in chemistry, physics and earth science. Taught as from an inquiry base, topics includes states of matter, physical and chemical change, bonding, atomic structure, periodic table, motion/kinematics, Newton's Law, energy conversions and energy conservation, waves, sound and light. It is taught as a platform course for education upon high school graduation and competence on the state science test.

*Prerequisites:* None

*Duration:* 2 semesters (single period)

*Credit:* 1 per semester

*Grade Level:* 9

## HONORS PHYSICAL SCIENCE 1-2

Physical Science is a course designed to expose students to selected concepts in chemistry, physics and earth science. Taught as from an inquiry base, topics includes states of matter, physical and chemical change, bonding, atomic structure, periodic table, motion/kinematics, Newton's Law, energy conversions and energy conservation, waves, sound and light. It is taught as a platform course for education upon high school graduation and competence on the state science test.

*Prerequisites:* Completion of, or concurrent enrollment in, Algebra 1-2 with no junior high/middle school science or math grades less than "C" and teacher recommendation

*Duration:* 2 semesters (single period plus lab period every other day)

*Credit:* 1 per semester

*Grade Level:* 9

## **BIOLOGY 1-2**

Biology 1-2 is an inquiry based laboratory science that is required for all future science classes. The course curriculum is based on a survey of the structure and processes of living things and the world they live in. Topics include a study of the chemistry of life; the cell as the major structural, functional and reproductive unit of living things; the diversity and origin of life on Earth; and the investigation of the environments in which life forms are found. Laboratory work emphasizes problem solving skill.

*Prerequisites: None*

*Duration: 2 semesters (single period)*

*Credit: 1 per semester*

*Grade Level: 10*

## **HONORS BIOLOGY 1-2**

Honors Biology is an inquiry based laboratory science that uses a molecular and evolutionary approach to the study of living things. Topics include the chemical organization of living things; the structure and function of cells; the genetics and evolution of populations; and the diversity of and the ecological relationships between all living things. Laboratory work is designed to develop problem solving skills through research, experimentation, data collection, and analysis. All laboratory work is written in formal laboratory reports.

*Prerequisites: Completion of or currently enrolled in Algebra 1-2 with no junior high/middle school science or math grades less than "C" and teacher recommendation*

*Duration: 2 semesters (single period plus lab period every other day)*

*Credit: 1 per semester*

*Grade Level: 9, 10*

## **BIOLOGY 3-4**

Biology 3-4 is a laboratory science course that explores areas of life science that were not covered in Biology 1-2. The course reinforces and builds on content from Biology 1-2 through the use of problem solving methods.

*Prerequisites: Physical Science 1-2, Biology 1-2*

*Duration: 2 semesters (single period)*

*Credit: 1 per semester*

*Grade Level: 11, 12*

## **AP BIOLOGY 1-2**

AP Biology is a laboratory course designed to prepare students to take the college advanced placement test giving them potential college credit for the course. This college course in life sciences is inquiry based with a goal of providing students with the conceptual framework, factual knowledge, and analytical skills necessary to deal critically with the rapidly changing science of biology. The curriculum includes the study of the structure and function of organic molecules and cells; the continuity and diversity of living things; the history and evolution of living things; and the relationships of organisms and their environment.

*Prerequisites: Physical Science 1-2, Biology 1-2, with no grade less than a "C" and teacher recommendation, or admission through the Advanced Science Sequence requirements*

*Duration: 2 semesters (two class periods)*

*Credit: 1 per semester*

*Grade Level: 10, 11, 12*

## **ANATOMY AND PHYSIOLOGY 1-2**

This course enables students to understand the workings of the human body. Students explore the structure and function of the human organ systems through inquiry-based laboratory experiences using up-to-date technology. Students examine the representatives diseases related to each of the human systems by recognizing the symptoms, suggested treatments and effects on individuals and communities.

*Prerequisites: Biology 1-2, Chemistry 1-2, Physics 1-2*

*Duration: 2 semesters (single period)*

*Credit: 1 per semester*

*Grade Level: 11, 12*

## **HONORS ANATOMY AND PHYSIOLOGY 1-2**

Honors Anatomy and Physiology takes an in-depth look into the workings of the human body. Students study the structure and function of human organ systems and the major medical problems that impact those systems. Laboratory exercises center around the identification of the major organs and structural components of the human systems. This course is not recommended for students who have not taken an honor science class.

*Prerequisites: Biology 1-2, Chemistry 1-2, Physics 1-2 with no grade less than a "C" and teacher recommendation*

*Duration: 2 semesters (single period)*

*Credit: 1 per semester*

*Grade Level: 11, 12*

## **EARTH SCIENCE 3-4 (Honors Option)**

Students will explore geology and how humans are constantly affected by geologic processes on Earth. The study of geology includes plate tectonics, rocks and minerals, natural resources, the history of the Earth, weathering, mountain building, earthquakes, and volcanoes. Oceanography explores the effects that the ocean and it's currents have on the global weather, as well as how the ocean affects the shoreline and life on Earth. Meteorology explores why weather happens and how long-term changes in weather patterns can affect humans and change climates. Astronomy includes a survey of the planets and celestial bodies. The overview of stars, asteroids, meteors, and comets leads to an analysis of how these phenomena have affected life on Earth.

*Prerequisites: Physical Science 1-2, Biology 1-2*

*Duration: 2 semesters (single period)*

*Credit: 1 per semester*

*Grade Level: 11, 12*

## **CHEMISTRY 1-2**

Chemistry 1-2 is an inquiry based, laboratory science course that studies the general patterns of elements and compounds, and an explanation of their chemical and physical properties. The curriculum includes the study of unit conversions, atomic structure, nomenclature, chemical reactions, chemical bonding, states of matter, gas laws, and energy, and investigates patterns and trends within the Periodic Table of Elements. Inquiry skills are developed in structured laboratory work emphasizing problem solving and detailed lab reports. The course is designed for students that have good mathematical skills and are interested in a challenging class in a modern lab.

*Prerequisites: Successful completion of Algebra 1-2*

*Duration: 2 semesters (single period)*

*Credit: 1 per semester*

*Grade Level: 10, 11, 12*

## HONORS CHEMISTRY 1-2

Honors Chemistry is laboratory science course for students interested in a challenging class with substantial laboratory work. The course studies the general patterns of substances (elements and compounds) and an explanation of their chemical and physical properties. The curriculum includes: scientific reasoning, scientific principles of investigation, atomic structure, nomenclature, chemical bonding, chemical reactions, chemical quantities, properties of gases, introductory kinetics, and introductory energetics. Structured laboratory work is an important part of the course emphasizing problem solving skills with detailed lab reports.

*Prerequisites: Biology 1-2 with a grade of "B" or better, Honors Biology 1-2 with a grade of "C" or better, Algebra 1-2 with a "B" or better, and teacher recommendation. Concurrent enrollment in Honors Geometry 1-2 or a higher level math course is required. Special permission to take the course can be made with approval of the science department chairman and teacher recommendation.*  
*Duration: 2 semesters (single period plus lab period every other day)*  
*Credit: 1 per semester*  
*Grade Level: 10, 11, 12*

## AP CHEMISTRY 1-2

AP Chemistry is a first-year college level course. The prescribed course curriculum is designed to expand and study in greater depth the physical concepts and skills begun in Chemistry 1-2, including atomic structure, chemical bonding, chemical quantities, chemical reactions, properties of gases, kinetics, and energetics. The course will also include an introductory organic chemistry unit. The course rigor is designed so students gain proficiency and confidence in numerical problem solving and essay explanation of the processes of physical, inorganic chemistry. Students who pass the AP Exam may receive advanced educational credit for the course depending on the requirements of the college or university.

*Prerequisites: Biology 1-2, Honors Chemistry 1-2, Physics 1-2 and Trigonometry/Pre-Calculus 1-2 with no grade less than "B" and teacher recommendation, or admission through the Advanced Science Sequence requirements*  
*Duration: 2 semesters (two class periods)*  
*Credit: 1 per semester*  
*Grade Level: 11, 12*

## PHYSICS 1-2

Physics is the study of the nature and effects of fundamental physical principles of our world. Topics include: the study of light, momentum, energy, electricity, velocity, vectors, acceleration, force and astronomy. This course is designed for students that need help mathematically working story problems. Advanced or honors math students should not register for this course.

*Prerequisites: Successful completion of Algebra 1-2*  
*Duration: 2 semesters (single period)*  
*Credit: 1 per semester*  
*Grade Level: 11, 12*

## AP PHYSICS 1

AP Physics 1 is an inquiry based, laboratory science course designed to study how the physical world works. The course includes the study of motion, forces, energy, momentum, electromagnetic spectrum, electricity, and waves. Laboratory exercises utilize sensors, software probes, to develop an understanding of the physical world. Physics is an important college preparatory course; however, it is not designed just for the science/engineering majors. All future college students should enroll in this course.

*Prerequisites: Physical Science 1-2, Biology 1-2, Geometry 1-2, and concurrent enrollment in Algebra 3-4 or higher math class (a good background in algebra and geometry is essential), and teacher recommendation with no grade less than a "C".*  
*Duration: 2 semesters (single period plus lab period every other day)*  
*Credit: 1 per semester*  
*Grade Level: 11, 12*

## AP PHYSICS 2

AP Physics 2 is a first-year college course taught in the high school setting. This is a trig-based course designed for students interested in medicine, in basic engineering, or in just learning more about physics. Topics covered include vectors, kinematics, dynamics, energy, work, momentum, rigid body motion, gravitation and planetary motion, oscillations, special relativity, heat, kinetic theory, wave motion, electricity, magnetism, sound, mirrors, and light. The goals of the course are to teach students to read, understand, and interpret physical information- verbally, mathematically, and graphically; describe and explain the sequence of steps in the analysis of a particular physical phenomenon or problem; use basic mathematical reasoning where appropriate in a physical situation or problem; and, perform experiments and interpret the results of observations, including assessment of experimental uncertainties. Students who successfully pass the AP Exam may receive advanced educational credit for the course depending on the requirements of the college or university.

*Prerequisites: Physical Science, Biology 1-2, Chemistry 1-2, Physics 1-2, with no grade less than "C". Completion of or concurrent enrollment in Precalc/Trig (for AP Physics B) or Calculus (for AP Physics C) and teacher recommendation*  
*Duration: 2 semesters (two class periods)*  
*Credit: 1 per semester*  
*Grade Level: 11, 12*

## **AP PHYSICS C: MECHANICS (Semester 1)**

### **AP PHYSICS C: ELECTRICITY AND MAGNETISM (Semester 2)**

AP Physics C is a two-semester course for students with a strong interest and aptitude in science, mathematics or engineering. The primary goal of the course is to provide students with a strong conceptual understanding of physics, while developing analytical and problem-solving skills. Students will improve their abilities to read, understand, and interpret physical information verbally, mathematically, and graphically. The first semester places a primary emphasis on Newtonian mechanics. The second semester places a primary emphasis on electricity and magnetism. The course requires and employs a basic understanding of calculus (differentiation and integration).

This course offers advanced educational credit for students who successfully pass the AP Exam. In addition, students may elect dual enrollment credit through the University of Nebraska-Omaha (UNO).

*Prerequisite: Completion of or concurrent enrollment in calculus.*

*Duration: 2 semesters (two class periods)*

*Credit: 1 per semester*

*Grade Level: 11, 12*

### **SCIENCE SEMINAR 1-2 (Honors Option)**

This elective course gives interested students direct exposure to scientific research. Students will independently investigate scientific problems and develop projects for state and local level competitions. Presentation of research at science competitions is required. The ideas and concepts taught in biology, chemistry, and physics will be reinforced.

*Prerequisites: Science interest*

*Duration: 1 or 2 semesters*

*Credit: 1 per semester*

*Grade Level: 10, 11, 12*

### **BIOLOGY TOPICS 1-2**

### **CHEMISTRY TOPICS 1-2**

### **PHYSICAL SCIENCE TOPICS 1-2**

### **PHYSICS TOPICS 1-2**

Topics courses are designed for students that have failed Biology 1-2, Chemistry 1-2 and/or Physics 1-2. These classes are for credit recovery.

*Prerequisites: Permission of the Science Department Head and enrollment by the Guidance Department*

*Duration: As needed*

*Credit: 1 per topics course*

*Grade Level: 12*

### **FORENSIC SCIENCE 1 (Honors Option)**

This course will integrate science, information technology, digital microscopy, and writing skills by using real-life applications and case studies to analyze crime scene evidence. Topics covered will include: The collection, handling, and examination of trace evidence such as hair, fibers, soil, pollen, and glass; fingerprint, blood, and blood splatter examination; DNA, drug and toxicology testing; handwriting and tool mark analysis; voice examination; impressions; ballistics, and forensic anthropology.

*Prerequisites: Physical Science 1-2, Biology 1-2*

*Duration: 1 semester*

*Credit: 1*

*Grade Level: 11, 12*

### **ENVIRONMENTAL SCIENCE 1 (Honors Option)**

Environmental Science is an interdisciplinary course that employs the approaches and insights of numerous disciplines from the natural sciences to the social sciences. This interdisciplinary pursuit stands at the vanguard of the current need to synthesize academic disciplines and to incorporate their contributions into a big-picture understanding of the world and our place in it. We live in extraordinary times. Human impact on our environment has never been so intensive or so far reaching. The future of our society and the future of Earth's systems depend more critically than ever on the way we interact with the world around us. Therefore, emphasis will be given in this course to the role humans play in natural systems. The primary aim of this course is for students to develop critical-thinking skills to help them navigate the gray areas at the juncture of science, policy, and ethics. Students enrolled in the honors option will have additional experiences that require a more rigorous program of study.

*Prerequisites: Biology 1-2*

*Duration: 1 semester*

*Credit: 1*

*Grade Level: 11, 12*

### **ASTRONOMY 1 (Honors Option)**

This course is a study of the objects in the night sky, their size, motions, composition, and relation to one another. Students develop techniques to help them locate and identify objects through the use of a planetarium, study the earth-moon system, diagram objects in the solar system, explore the leading theories for the origin of the universe, and outline the life cycle of a star.

*Prerequisites: Physical Science 1-2, Biology 1-2*

*Duration: 1 semester*

*Credit: 1*

*Grade Level: 11, 12*

### **MARINE BIOLOGY/OCEANOGRAPHY 1**

The purpose of this course is to provide an overview of the marine environment. Laboratory investigations of selected topic in the content, which also include the use of scientific method, measurement, laboratory apparatus, and safety procedure, are an integral part of this course. The content includes, but is not be limited to, the following: The nature of science, the origins of the oceans, chemical, physical, and geological aspects of the marine environment, ecology of various sea zones, marine communities, diversity of marine organisms, characteristics of major marine ecosystems, characteristics of major marine phyla/divisions, and the interrelationship between man and the ocean.

*Prerequisites: Physical Science 1-2, Biology 1-2*

*Duration: 1 semester*

*Credit: 1*

*Grade Level: 11, 12*