

# SCIENCE

## ADVANCED PLACEMENT BIOLOGY

<b>Grade Level:</b> 11-12	<b>Credits:</b> 2	<b>College Credit:</b> Yes	<b>Fine Arts Credit:</b> No	<b>Prerequisite:</b> Cellular Biology and Biological Systems
---------------------------	-------------------	----------------------------	-----------------------------	--

This is an Advanced Placement (AP) course designed at the college level. Topics/Concepts included are: Biochemistry, Cellular Biology, Energy Systems, Genetics, Evolution, Plants, Human Body Systems, and Ecology. Lectures, text readings, and college-level lab experiments are utilized to understand the concepts of biology. Chemistry and/or Anatomy and Physiology are also helpful prerequisites, but not required.

## ADVANCED PLACEMENT CHEMISTRY

<b>Grade Level:</b> 11-12	<b>Credits:</b> 3	<b>College Credit:</b> Yes	<b>Fine Arts Credit:</b> No	<b>Prerequisite:</b> None, this is an alternative path to regular chemistry and is meant for students that will need chemistry for their college major.
---------------------------	-------------------	----------------------------	-----------------------------	---

If you need chemistry for your major in college (medical fields, science fields, etc.), then taking AP chemistry is a great idea. We will cover all the topics that are covered in the first year of college chemistry, but it will be an easier pace, with fewer students, and we'll try to have some fun. AP chemistry covers the chemistry/physics requirement for graduation. Testing out of some college classes is possible, but at least everything you see in your college class should be a review. Students in this course will attain a depth of understanding of fundamentals and a reasonable competence in dealing with chemical problems. The third trimester will finish up major ideas and review for the AP test. After the test we will focus on learning some basics of organic chemistry. Topics include: atomic structure, quantum mechanics, stoichiometry, concentrations, thermochemistry, equilibrium, kinetics, nuclear chemistry, and organic chemistry.

## ANATOMY AND PHYSIOLOGY

<b>Grade Level:</b> 11-12	<b>Credits:</b> 2	<b>College Credit:</b> No	<b>Fine Arts Credit:</b> No	<b>Prerequisite:</b> Cellular Biology and Biological Systems
---------------------------	-------------------	---------------------------	-----------------------------	--

Most individuals are very curious about how their body works; it's one of the greatest mysteries of the world! This course explores the marvels of how the human body is put together and how it functions; for example, 'What does a blood pressure reading mean?', 'Are cracking your knuckles bad for you?', 'What is myopia?', and 'What is the difference between the common cold and the flu?' Questions like these are designed for students who wish to better understand the human body, as well as those anticipating a biological or medical-related career. The body systems studied include: skeletal, muscular, nervous, circulatory, cardiovascular, digestive, respiratory, and urinary. Laboratory activities & projects (ex. bone & muscle identification, reflex testing, blood typing, EKG's, urinalysis testing, dissections of the eye, heart, and CAT), case studies, lecture, field trips to Ridgeview Medical Center, guest speakers, medical websites, LabQuest hand-held devices that measure medical data, and videos will be used to demonstrate the structure & function of the human body.

## BIOLOGICAL SYSTEMS

<b>Grade Level:</b> 10	<b>Credits:</b> 1	<b>College Credit:</b> No	<b>Fine Arts Credit:</b> No	<b>Prerequisite:</b> Principles of Chemistry, Principles of Physics, Principles of Engineering
------------------------	-------------------	---------------------------	-----------------------------	--

This course investigates the macro-understanding of the biological world. Topics covered include plants, animals, animal body systems, behavior, ecology, and pig dissection.

## BIOTECHNOLOGY: MEDICINE, ENVIRONMENT, AND ETHICS

<b>Grade Level:</b> 10-12	<b>Credits:</b> 1	<b>College Credit:</b> No	<b>Fine Arts Credit:</b> No	<b>Prerequisite:</b> Completion of Cellular Biology and Biological Systems is recommended
---------------------------	-------------------	---------------------------	-----------------------------	---

Students will investigate current topics in the biomedical field, the environmental technology field and bioethics. Topics include: genetic testing and DNA technology; current advances in organ and limb transplants; biodegradable plastics and styrofoam; and biofuels made from organic materials. Class projects include research, presentations, and labs.

## CELLULAR BIOLOGY

<b>Grade Level:</b> 10	<b>Credits:</b> 1	<b>College Credit:</b> No	<b>Fine Arts Credit:</b> No	<b>Prerequisite:</b> Principles of Chemistry, Principles of Physics, Principles of Engineering
------------------------	-------------------	---------------------------	-----------------------------	--

This course will focus on the living world at the cellular level. The topics covered are the nature of science, cells, genetics, evolution, and microbiology. This course will provide a general background for the student to pursue a more in-depth study in other classes.

## CHEMISTRY

<b>Grade Level:</b> 11-12	<b>Credits:</b> 2	<b>College Credit:</b> No	<b>Fine Arts Credit:</b> No	<b>Prerequisite:</b> Principles of Chemistry
---------------------------	-------------------	---------------------------	-----------------------------	--

This course is designed to meet the chemistry/physics requirement for students. The course is also designed to help students improve problem solving skills that they may see at a postsecondary institution. Taking chemistry will be a great help to any student planning to major in science, engineering, or something in the medical field. It will review everything from 9th grade chem with more depth, add many new topics, and more math equations to better prepare students for post-secondary. Getting some of the basic ideas down will make the transition to a college chemistry class much easier to start. Basic algebra skills are applied with the student given significant lab experience. Topics covered include measurement, matter, atoms, bonding, reactions, stoichiometry, gases, acids and bases, and equilibrium.

## COLLEGE IN THE SCHOOLS PHYSICS

<b>Grade Level:</b> 11-12	<b>Credits:</b> 3	<b>College Credit:</b> Yes	<b>Fine Arts Credit:</b> No	<b>Prerequisite:</b> Algebra 2
---------------------------	-------------------	----------------------------	-----------------------------	--------------------------------

Introductory College Physics I (PHYS 1101W) is a traditional algebra-based introductory college physics course. The course provides students with the opportunity to learn fundamental physics principles and complex problem-solving skills needed for more advanced study. PHYS 1101W is an appropriate course for students who are good at math and who are interested in studies in science or engineering. PHYS 1101W is a required course at the U of M for students with majors in fields such as architecture, pre-vet, pre-med and kinesiology.

## CLIMATE IN CRISIS

<b>Grade Level:</b> 10-12	<b>Credits:</b> 1	<b>College Credit:</b> No	<b>Fine Arts Credit:</b> No	<b>Prerequisite:</b> Completion of Cellular Biology and Biological Systems is recommended
---------------------------	-------------------	---------------------------	-----------------------------	---

Students will investigate the science of climate change. This course will range from understanding the greenhouse effect and the carbon cycle to the examination of current and future alternative energy sources. Topics include: carbon science; green technology; and geothermal energy. This course is designed to be continually updated as new technology is developed. Class projects include research, presentations, and labs.

## CSI FORENSICS

**Grade Level:** 11-12

**Credits:** 1

**College Credit:** No

**Fine Arts Credit:** No

**Prerequisite:** Cellular Biology and Biological Systems

Is CSI your favorite show? Then this might just be the course for you. Students that elect to take this course will investigate several aspects of forensic science. Some of the topics to be uncovered are: DNA analysis, fingerprinting, blood spatter, crime scene processing, using insects to determine time of death, and the history of forensics. This course will consist of experiments, mini-crime scenes, demonstrations, projects and lectures.

## ENVIRONMENTAL STUDIES

**Grade Level:** 11-12

**Credits:** 1

**College Credit:** No

**Fine Arts Credit:** No

**Prerequisite:** Cellular Biology and Biological Systems

This project-based course explores a variety of teacher driven topics including Aquaponics, meat science, & climate change. This course focuses on student-driven topics through trimester long research that culminates with a small group presentation of the topic. Outside field studies include on campus and off campus connections to environmental resources.

Environmental Studies is a course designed with the goal to explore different environmentally related topics while focusing on depth rather than breadth.

## FISH AND WILDLIFE BIOLOGY

**Grade Level:** 11-12

**Credits:** 1

**College Credit:** No

**Fine Arts Credit:** No

**Prerequisite:** Cellular Biology and Biological Systems

This course has a focus on the variety of wildlife that inhabits our MN natural areas. This course will discuss wildlife and natural habitat as well as examine ecological and management principles associated with hunting/fishing regulations, recreation, and the enjoyment of our resources. Study topics include: habitat and wildlife management, birds of prey, game birds, and song birds, game fish, mammals, amphibians and reptiles. Wildlife current events will be covered for each topic along with magazine article reviews. Experiences include: bird ID, fish ID and dissection, live trapping, skinning and tanning lab, habitat assessment and improvement project, outdoor field trips, and guest speakers. This course is designed for those who enjoy hunting and fishing and have an interest in Minnesota wildlife.

## PHYSICS

**Grade Level:** 11-12

**Credits:** 2

**College Credit:** No

**Fine Arts Credit:** No

**Prerequisite:** Principles of Physics

This is an introductory physics course that uses a mathematical representation to describe the physical world. Topics include kinematics, Newton's laws of motion, energy, momentum, rotational motion, fluids, gravitation, oscillations and waves, and thermodynamics. This course will fulfill the chemistry/physics requirement for graduation.

## PRINCIPLES OF CHEMISTRY

**Grade Level:** 9

**Credits:** 1

**College Credit:** No

**Fine Arts Credit:** No

**Prerequisite:** None

40 Principles of Chemistry consists of one trimester of introductory chemistry. Students will learn about matter by studying its properties, structure, and change. One very important aspect is the atom and how it combines with other atoms to form the wide variety of materials in our world. Students will be introduced to the periodic table of elements, chemical reactions, and the more familiar acids and bases.

## PRINCIPLES OF ENGINEERING

**Grade Level:** 9

**Credits:** 1

**College Credit:** No

**Fine Arts Credit:** No

**Prerequisite:** Principles of Physics

Principles of Engineering is a project-based course that introduces students to the profession of engineering and engineering technology, by exploring various technologies related to manufacturing processes, and engineering systems. Students will use critical thinking skills to analyze, synthesize, and design engineering systems. Students will apply skills and knowledge of math, science, communication, and technology in complex problem solving activities. Students also learn how to document their work and communicate their solutions to peers and members of the professional community. Principles of Engineering is a portion of a course in the Project Lead the Way sequence (PLTW).

## PRINCIPLES OF PHYSICS

**Grade Level:** 9

**Credits:** 1

**College Credit:** No

**Fine Arts Credit:** No

**Prerequisite:** None

Principles of Physics is a project-based course that introduces students to the major concepts they'll encounter in engineering and physics based courses of study. Topics of study include pressure, forces, energy, and heat. Students will use critical thinking skills to analyze, synthesize, and design solutions to various challenges. Students will apply skills and knowledge of math, science, communication, and technology in complex problem solving activities. Students also learn how to document their work and communicate their solutions to peers and members of the professional community. Principles of Physics is a portion of a course in the Project Lead the Way sequence (PLTW).

## WINTER BIOLOGY

**Grade Level:** 11-12

**Credits:** 1

**College Credit:** No

**Fine Arts Credit:** No

**Prerequisite:** Cellular Biology and Biological Systems

This course offers students experience in the elements of winter. Practical work and knowledge of our winter environment and how we deal with winter's wrath will be covered. Outdoor experiences are frequent. Topics covered include: humans in the cold (frostbite and hypothermia info.), winter survival, car kits, glaciers – snow – and avalanches, Minnesota plant and wildlife adaptations, making snowshoes, and building a survival shelter and fire in the snow. We do go outside in the cold! So bundle up and experience winter first hand.

Interested in a career in science, math, technology, or engineering? Check out Project Lead the Way course offerings in this registration guide.