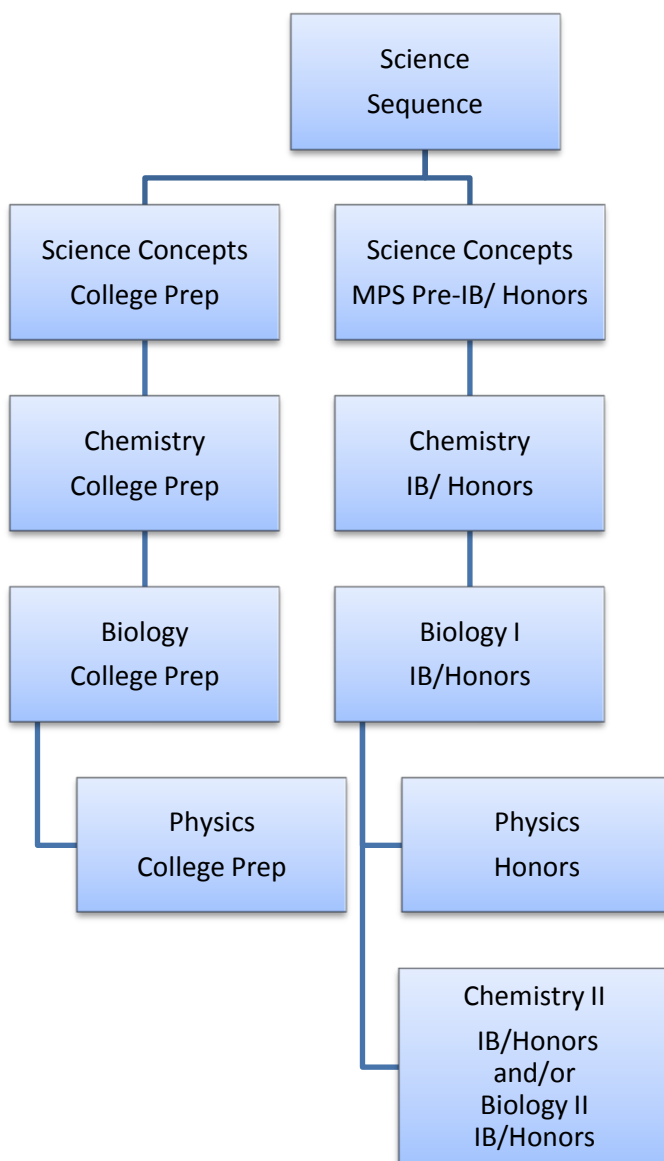


SCIENCE

The science program at MPS is designed to aid the student in learning scientific principles and problem solving in a continually changing world. The courses offered allow students to develop both practical and theoretical knowledge in the major disciplines. Three years (3 credits) of science are needed for graduation and four are highly recommended. All students must take Science Concepts and Biology, and a minimum of one year in a physical science is recommended. Teacher approval is required for enrollment in all honor level courses.



SCIENCE CONCEPTS – COLLEGE PREP

#4001

Freshman, Sophomore

1.00 credit

Yearlong

In this increasingly global community, it is important for our young people to have a solid foundation that allows them to enter any scientific or technological field. This course provides these skills. It is designed to provide students with a background in the physical science disciplines of chemistry and physics. Course material will strengthen reading and study skills in the sciences. Attention will be given to developing technical writing skills and incorporating math skills in the science area, as well as to the use of technology. Laboratory techniques will be introduced and lab skills will be expanded.

A Science Concepts course is a prerequisite for all upper level science classes.

SCIENCE CONCEPTS – MPS PRE-IB/HONORS

#4002

Freshman, Sophomore

1.00 credit

Yearlong

Prerequisite: A strong background in mathematics

The study of higher level science requires a strong foundation in the fundamentals of physics and chemistry. This course aims to provide that foundation. Science Concepts Honors is an intensive course that reinforces the importance of topics like the SI system and basic mathematics from a scientist's perspective. We will explore the concept of energy in great depth and use that knowledge to explore atoms, compounds and the periodic table in a new light. Throughout the class your analytical and critical thinking skills in the sciences will be honed. We will pay special attention to mastering laboratory techniques and the technical writing of a formal lab report, necessary for any college science course. This class will pave the way for success in the higher IB/Honors science courses.

Science Concepts is a prerequisite for all upper level science classes.

CHEMISTRY – COLLEGE PREP

#4003

Sophomore, Junior, Senior

1.00 credit

Yearlong

Prerequisite: Science Concepts

Chemistry is defined as a science concerned with the composition, structure, and properties of matter, as well as the changes it undergoes during a chemical reaction. Throughout this course students will attain a depth of understanding of fundamentals and reasonable knowledge in dealing with chemical problems. This course will contribute to the development of the students' abilities to think clearly and to express their ideas, orally and in writing, with clarity and logic.

CHEMISTRY I – IB/HONORS

#4004

Sophomore, Junior, Senior

1.00 credit

Yearlong

Prerequisite: Science Concepts and a strong background in mathematics.

Since all materials, big and small, are comprised of atoms, the field of chemistry is the basis of all science. In our expanding global environment, students need to understand how materials respond and react, not only to other materials but to external changes. This course begins the study of chemistry as outlined by the International Baccalaureate program to prepare the student for possible future study in technological, physical or medical sciences. It encompasses in-depth study of atomic theory, nuclear chemistry, periodicity, bonding, states of matter, chemical compounds and reactions, stoichiometry, solutions, acids and bases, and organic chemistry. Students will expand laboratory techniques as well as develop skills in the interpretation, analysis, and application of collected data to strengthen their technical writing and math skills.

CHEMISTRY II – IB/HONORS

#4006

Senior

1.00 credit

Yearlong

Prerequisites: Chemistry I - IB/Honors; Biology I – previously or concurrently and Physics – previously or concurrently

Students who are continuing their academic studies in a science field, particularly in health professions, will find one of their first college courses will be chemistry. In preparation for this and for a broader awareness of the impact atoms and compounds have on our global environment, this course will extend material covered in Chemistry I IB/Honors following the International Baccalaureate syllabus. Areas of study will include stoichiometry, atomic theory, periodicity, bonding, states of matter, energetics, kinetics, equilibrium, acids and bases, oxidation and reduction, organic chemistry, biochemistry, and environmental chemistry. Emphasis will also be placed on further development of experimental techniques as chemical principles are applied in laboratory investigations to enhance and strengthen technical writing, data interpretation, and math applications. Students will complete a group 4 project. All students will be expected to take the IB exam upon completion of the course.

Completion of this course will prepare students for both the subsidiary and higher level IB exams.

BIOLOGY – COLLEGE PREP

#4007

Junior, Senior

1.00 credit

Yearlong

Prerequisite: Chemistry

With the passage of time, it becomes more evident that we are the caretakers of this planet. Consequently, this course will explore key biological concepts within an ecological systems based context. Students will be introduced to the basic requirements for and by life – with the cell as that basic unit. The life functions and organization of microorganisms, plants, and animals will be compared and contrasted. The dissection of a vertebrate will be a component of this course not only serving to allow students a perspective on their own anatomy but also to permit them a typical laboratory experience since so many of our students choose a career in the health fields. Taxonomy, genetics and biotechnology will be presented and coupled with current evolutionary theory. All of these concepts will be framed in an environmental perspective with an emphasis on the connections between functions and organisms.

BIOLOGY I – IB/HONORS

#4008

Junior, Senior

1.00 credit

Yearlong

Prerequisite: Chemistry I – IB/Honors

The curriculum is based on the International Baccalaureate biology program and students must achieve a particular level of scientific aptitude to participate in this course. We humans are bound to this earth and possess an intense and dynamic relationship with all creatures. So, students will study those living systems from the very simple to the very complex - from the molecular level to that of the biosphere. Students are introduced to the concepts of biochemistry, cell biology, energetics, Mendelian and population genetics, evolutionary theory, and taxonomy. A comparative study of the structure and function of microorganisms, plants, and animals will follow. Students will also dissect a selected vertebrate specimen to gain an appreciation of their own vertebrate system and also that of life itself. Successful students may, if they wish, choose to subsequently participate in the Biology II – IB/Honors class.

BIOLOGY II – IB/HONORS

#4010

Senior

1.00 credit

Yearlong

Prerequisites: Biology I - IB/Honors; Chemistry I - IB/Honors and Physics – previously or concurrently

This course, the second in this IB sequence, is based on the curriculum outlined by the International Baccalaureate higher level biology program. The earth's ecology and the impact of humans on this planet require a lengthy investigation. Comparative anatomy, physiology and behavior will also be explored in depth. Historical developments and current research in these areas will give the students a perspective on the manner in which science pursues the answers to life's questions. Twenty-five percent of class time will be used for pertinent laboratory investigations. Students will also complete the Group 4 Project. All students will be expected to take the IB exam upon completion of the course.

In the fall, students will have an opportunity to indicate their intent to sit for the IB Biology exam at either the Subsidiary or Higher level.

PHYSICS – COLLEGE PREP

#4011

Junior, Senior

1.00 credit

Yearlong

Prerequisites: Chemistry and Biology - previously or concurrently

A solid foundation in Physics is essential in today's society to understand increasing advances and changes on our planet both technologically and environmentally. In this course students will study and apply the principles of classical and modern physics to problem solve topics of importance in today's world. Topics include motion, mechanics, heat, electricity, magnetism, and waves with continual references to how they impact our students' lives. Class activities will include lecture, laboratory investigations, and problem solving with emphasis on practical application of the concepts learned.

Students need signatures of approval from their current science teacher AND current math teacher.

PHYSICS – HONORS

#4012

Junior, Senior

1.00 credit

Yearlong

Prerequisites: Chemistry I IB/Honors and Biology I IB/Honors – previously or concurrently

For students interested in a scientific career in either the health fields or physical science fields, a solid background in Physics is vital. Young people today will need to be able to apply concepts learned to interpret and problem solve issues both globally and locally. In order to accomplish this, the Physics curriculum will include topics such as motion, mechanics, thermodynamics, electricity, magnetism, waves, and particle physics. These concepts are explored in depth with emphasis on how they relate to current societal issues and future careers in science. Problem solving and laboratory investigations will entail higher level math skills including trigonometry. Students will be required to do independent projects.

Students need signatures of approval from both their current science teacher AND current math teacher.

EARTH & SPACE SCIENCE

#4101

Sophomore, Junior, Senior

1.00 credit

Yearlong

Prerequisite: Science Concepts

This elective class may be taken as a yearlong or by terms. Taking all three terms would cause the course to be considered a yearlong science course. One term will be Geology, one term will be Astronomy and one term will be Environmental Science. For more details on each class, please see the course description below the individual course listings.

EARTH & SPACE SCIENCE (BY TERMS) (#4105, #4107, #4109)**HYDROLOGIC SYSTEMS**

#4105

Sophomore, Junior, Senior

.33 credit

Term course

Prerequisite: Science Concepts

Many analysts have said that the wars of the future will be fought, not over land or oil, but over water. What's the big deal? Water has properties that make it unique and invaluable. This course will investigate the immense role of water in our lives. We will discover some of those interesting properties of water (why is it odd that ice floats and what would happen if it didn't?). Water is also the largest agent of change to the surface of the Earth and we will explore many of those processes. Special attention will be paid to the Great Lakes system and our local watershed in relating the physical and chemical properties of water systems to the organisms they support. We will also address the global social, economic and political roles of water in a rapidly growing population.

INTRODUCTION TO ASTRONOMY

#4107

Sophomore, Junior, Senior

.33 credit

Term course

Prerequisite: Science Concepts

Did you know that NASA has actual photographs of the universe from billions of years ago? What happens if you fall into a black hole? Can we travel to distant planets in other solar systems? Why isn't Pluto a planet anymore? For millennia people have looked to the sky in wonder. We will explore some of that wonder and try to answer some of those puzzling questions too. This course is a survey of astronomy from the seemingly simple motions of the Earth and Sun to the brain stretching phenomena occurring in black holes.

ENVIRONMENTAL SCIENCE

#4109

Sophomore, Junior, Senior

.33 credit

Term course

Prerequisite: Science concepts

This course will cover ecological principles and how humans have impacted them. Topics for investigation will include ecosystem analysis, population studies and biomes. Emphasis on problems in the environment will include land use, pollution and energy conservation.

HUMAN ANATOMY AND PHYSIOLOGY – COLLEGE PREP

#4115 & #4117

Senior

.66 credits

Two term course

Prerequisite: Biology or Biology I - IB/Honors; Health I & II

Human Anatomy and Physiology is a two term course. Students must sign up for both #4115 and #4117.

Are you aware that the occupations with the fastest rate of growth are in health care? If you enjoy biology and chemistry, medical issues, and working with people, then this class will prepare you for a variety of career paths – from pharmacy to physical therapy. The focus of this course will be the structure and function of the human body in lecture and laboratory investigations that include dissection of vertebrate organs and human cadaver anatomy. Because of the vocabulary and pace of topics, this is considered a rigorous course and is recommended for seniors who are seriously considering a career or profession in health care.

PHARMACY TECHNICIAN

#4119

Senior

.33 credit

Term course

Prerequisites: Chemistry; Biology; Anatomy & Physiology recommended.

Completion of application process through the science department.

Students who complete this course will be trained to assist the pharmacist in meeting the needs of the customer in numerous ways. Upon successful completion of the course, students will be awarded a Pharmacy Certificate of Achievement which will serve as proof of commitment and interest in the profession of pharmacy and preferential employment opportunities. For more details, see your science instructor.