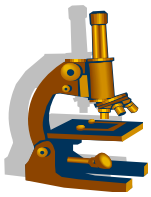
SCIENCE



The Science Department offers a wide range of classes to meet the needs and interests of all Hamilton Southeastern High School students.

Through a variety of learning experiences, students are encouraged to engage in scientific inquiry; to observe scientific principles; weigh facts and arrive at valid conclusions; appreciate the historical contributions of scientists; and recognize that science does not consist merely of facts and dogma, but that it is an exciting dynamic process!

The goals of the department are that students will develop the following:

- **an understanding of the fundamental laws of our universe,**
- **an understanding of how to apply these laws to physical and biological systems,**
- **an awareness of the manner in which science and technology affect the quality of their environment,**
- **a knowledge of the processes which will facilitate the making of informed decisions regarding issues concerning science, technology, and society.**

INTRODUCTORY COURSES

3024 BIOLOGY I (9, 10, 11, 12) This course uses a variety of methods in the study of ecology, cells, heredity, evolution, viruses, monerans, protists, fungi, plants and animals. Students will explore the characteristics of living things, the nature of biology and the chemical principles that underlie the processes of life. Students gain insight into the diversity of life by participating in regular laboratory, cooperative learning, dissection, and research activities as well as class discussions.

3024 #BIOLOGY I HONORS (9, 10, 11, 12) This is an accelerated study of genetics, biotechnology, cell biology, biochemistry, evolution, and ecology with emphasis on laboratory techniques, application, and critical thinking. Regular laboratory investigations will be emphasized. Honors Biology is designed for the student with a strong interest and background in science who, perhaps, will be pursuing further study in some area of life science in the future. **Requirement – Students must be identified for this course by their 8th grade science teacher. Credit will not be given for both Honors Biology and Biology.**

3064 CHEMISTRY I (10, 11, 12) This course is designed as an introduction into the study of the states of matter, organization and properties of the elements, behavior and interactions of elements and compounds, and the relationships between energy and matter. The mathematical relationships between substances and their physical surroundings are stressed. Hands-on laboratory experiences complement theoretical relationships and concepts. Students have opportunities to gain an understanding of the history of chemistry, study the structure of the atom and their interactions, write and perform chemical equations with the use of stoichiometry, and learn and practice laboratory safety during laboratory experiments. **Requirement – Juniors and Seniors: Successful completion of Algebra I. Sophomores choosing to take this course should have a "B" average in Algebra I. Recommendation: A "C" average in Algebra I for Juniors and Seniors.**

3064 #CHEMISTRY I - HONORS (10, 11, 12) This course is a fast-paced survey of the states of matter, the organization and properties of the elements, behavior and interaction of elements and compounds, and the relationships between energy and matter. Students will be expected to be very competent in algebraic manipulations. Higher-level thinking will be stressed through the use of laboratory investigations. Students will be expected to complete formal lab reports. Students will also perform extensive group work and grade-dependent collaborations. This course is designed for a student who wishes to pursue a STEM career. Success in Honors Biology does not necessarily predict success in this course. This course stresses mathematical applications. Credit will not be given for both Honors Chemistry and Chemistry. **Requirement – Successful completion of Geometry Recommendation: A "B" or higher average in Honors Geometry or an "A-" average or higher in Geometry.**

Office: 317-594-4190 Fax: 317-594-4199 Guidance: 317-594-4193

3044 EARTH AND SPACE SCIENCE (9, 10, 11) This course will provide students with the basic knowledge of earth and space science as it relates to them and their own range of experiences. The course will also develop the students' abilities to appreciate the basic concepts in earth and space science through discussion, technology, and hands-on laboratory experiences. Students will be exposed to geology, paleontology, meteorology, and astronomy, as well as discussions and activities concerning natural disasters, environmental influences, and space exploration. **Seniors may take this course with counselor approval only**.

3108 INTEGRATED CHEMISTRY PHYSICS (ICP) (10, 11, 12) Integrated Chemistry Physics (ICP) is designed to serve as an introduction to future coursework in either chemistry and/or physics while ensuring a mastery of the basics of each discipline. The course will cover topics in both chemistry and physics. Chemistry topics, which will be covered during the first semester, include atomic structure, the periodic table, nomenclature, chemical reactions, and nuclear chemistry. Physics topics, which will be covered during second semester, include motion, forces, work, power, energy, wave properties, and electricity. The ultimate goal of the course is to produce scientifically literate citizens capable of using their knowledge of chemistry and physics to solve real world problems. Students may go on to earn additional physical science credits by taking physics and/or chemistry courses. This course is not available for students who have previously earned credit in Chemistry or Physics. One semester of ICP cannot be used to make up for a failed semester of Chemistry or Physics. **Requirement – Completion of Algebra I.**

3084 PHYSICS I (10, 11, 12) Physics is the study of matter and energy and their interactions including the study of motion, energy, and wave phenomenon, electricity, and nuclear physics. There will be strong emphasis on problem solving and laboratory activities. Students should have a good grasp of manipulating algebraic equations. This course is an excellent preparation for a college physics course. **Requirement - Successful completion of Algebra I, Geometry, and Algebra II (or concurrent enrollment in Algebra II). Sophomores choosing to take this course must have an "A-" average in Algebra I. Recommendation: Juniors and Seniors, completion of Algebra I with a "B" average.**

3084 PHYSICS HONORS (10,11,12) Honors Physics provides an intensive algebra-based year one study of mechanics and energy and their interaction. Topics will include mechanics, motion, energy, wave phenomenon, thermodynamics, optics, electricity, magnetism, electromagnetic waves, and nuclear physics. It provides additional opportunity to further develop and apply algebra-based problem solving with a strong emphasis on inquiry-based laboratory activities and write ups. Students will be also be conducting ICT (information and communication technology) investigations which use the following software applications; data logging, graph plotting, spreadsheet for data processing, database, and computer simulations. This course is for the very strong math student with emphasis on manipulating algebraic equations with the ability to apply prior knowledge to new and connected subject areas. **Credit will not be given for both physics and Honors Physics. Requirement- Pre Calculus/Trigonometry or concurrent enrollment in Pre-Calculus/Trigonometry. Recommended –an A in Algebra II with an A average in all math courses (or if in Honors Algebra II, at least a "B" in with at least B grades in all honors math courses) with at least a PSAT Math score of 550 or better (or the equivalent if PSAT is unavailable).**

5180 **NATURAL RESOURCES (9, 10, 11, 12) This course may be taken for one semester or the entire year. Hands-on learning activities in addition to leadership development, supervised agricultural experience and career exploration encourage students to investigate areas of environmental concern. Students are introduced to the following areas of natural resources: soils, the water cycle, air quality, outdoor recreation, forestry, rangelands, wetlands, animal wildlife and safety.

5229 SUSTAINABLE ENERGY ALTERNATIVES (11, 12) Sustainable Energy Alternatives broadens a student's understanding of environmentally friendly energies. In this course students will use a combination of classroom, laboratory, and field experiences to analyze, critique, and design alternative energy systems. Class content and activities center on renewability and sustainability for our planet. Topics covered in this course include the following types of alternative energies: solar, wind, geothermal, biomass and emerging technologies. Leadership development, supervised agricultural experience and career exploration opportunities in the field sustainable energy are also included. **Requirement: Natural Resources or AP Environmental Science.**

Office: 317-594-4190 Fax: 317-594-4199 Guidance: 317-594-4193

ADVANCED SCIENCE SPECIAL TOPICS COURSES

5276 ANATOMY AND PHYSIOLOGY (10, 11, 12) This year-long course will offer a basic study of human anatomy and physiology. The Human Anatomy/Physiology course focuses on the study of human structure and function. Topics covered include the skeletal and muscular systems and their interactions promoting body support, protection and mobility; the nervous system; cardiovascular system; respiratory system; and digestive system, all of which contribute to the balance of day to day body activities. The connection between the structures of the human body systems and their functions will be stressed throughout the course. Laboratory work could include microscopic study of tissues, dissection of specimens, bone study labs, and other physiological labs. **Requirement – Successful completion of Biology or Honors Biology, Recommendation – A "C" in Biology or Honors Biology.**

3092* ADVANCED SCIENCE, SPECIAL TOPICS, GENETICS (10, 11, 12) This one semester, second year biology course will offer an in-depth study of Genetics. Students will study gene inheritance and expression, the pathway from DNA to protein synthesis, cytogenetics, epigenetics, genetic engineering, bioethics, pharmacogenomics, GMO foods, RNA, forensics, and bioethics. Activities include microscope work, DNA fingerprinting, development of pedigrees, karyotyping, PCR, electrophoresis, and bioethical discussions. Emphasis is placed on the students' practical use of the information, as they become responsible adults. **Requirement – Successful completion of Biology or Honors Biology, Recommendation: "B" average in Biology or Honors Biology. Core 40.**

3092* ADVANCED SCIENCE, SPECIAL TOPICS, MICROBIOLOGY (10, 11, 12) This one semester, second year biology course will offer an in-depth study of Microbiology. In Microbiology, students will study microorganisms such as bacteria, fungi, viruses, and parasites. There will be an emphasis on bacteria and their interaction with the human body. Other topics include microbe-based diseases, infectious diseases, antimicrobial medicine, epidemiology, immune system function, as well as environmental, industrial, and ecological microbiology. There will be a focus on lab activities including standard staining and culture techniques, microscope work, antiseptic and disinfectant culturing techniques, and antimicrobial testing. **Requirement – Successful completion of Biology or Honors Biology, Recommendation: "C" average in Biology or Honors Biology. Core 40.**

3092* ADVANCED SCIENCE, SPECIAL TOPICS, ZOOLOGY (10, 11, 12) This one semester, second year biology course will offer an in-depth study of Zoology. This course will involve the study of the structure and bodily functions of invertebrate and vertebrate animals, development and adaptations, habitats, their relationship with one another and with their environment, their classification, and many other features. Activities include dissection of various animals, microscope studies, and live animal observations. **Requirement – Successful completion of Biology or Honors Biology, Recommendation: A "C" average in Biology or Honors Biology. Core 40.**

3066 CHEMISTRY II (11, 12) This course is designed to be a continuation of Chemistry I. The primary goal is to further prepare students for entry-level college chemistry classes. Students will perform experiments, participate in research, as well as participate in lectures and demonstrations to examine various advanced chemistry principles. Topics include: crystal structure, electrochemistry, equilibrium, food chemistry, the impact of chemicals in our lives and environment, kinetics, nuclear chemistry, polymers and other modern materials, as well as quantitative analysis of consumer products. Technological aspects of chemistry will be emphasized during the many laboratory experiences through the student use of instruments from the Purdue Science Express Project. **Requirement: Successful completion of Chemistry I. Recommendation: A "C" average in Chemistry I.**

3092* ADVANCED SCIENCE, SPECIAL TOPICS, PRINCIPLES OF ORGANIC AND BIOCHEMISTRY (10, 11, 12) The one semester **Principles of Organic and Biochemistry** is a course intended for students with a future interest in health fields, biological or chemical sciences. The main focus will be the study of carbon containing compounds including the four primary biomolecules and their real world applications. Students will learn to identify important organic functional groups, apply naming rules, describe physical and chemical properties and write equations for reactions involving these molecules. Students will explore applications including petroleum chemistry, polymers, flavors and fragrances, pharmaceuticals, and dietetics. **Prerequisite- Successful completion of Biology/Honors Biology and Chemistry/Honors Chemistry. Core 40.**

Office: 317-594-4190 Fax: 317-594-4199 Guidance: 317-594-4193

3092* ADVANCED SCIENCE, SPECIAL TOPICS, ASTRONOMY I (10, 11, 12) This astronomy course is a one semester study of the basic principles of astronomy. Topics include: the history of astronomy, light, optics, telescopes, planets of our solar system, asteroids, comets, and meteors. This course incorporates lab investigations, related videos, internet and online database research projects, web quests, model construction, and further investigations. Please note – **Students are not to be concurrently enrolled in Earth and Space I when completing this course. Earth and Space I is recommended, but not a prerequisite for this course. Due to the level of mathematics involved, it is recommended that students have successfully completed Algebra II. Core 40.**

3092* ADVANCED SCIENCE, SPECIAL TOPICS, ASTRONOMY II (10, 11, 12) This astronomy course is a one semester study of principles of astronomy not covered in Astronomy I. Topics include going beyond our solar system to study celestial bodies, stellar evolution, the sun, galaxies, living and working in space, the history of space explorations and NASA's goal to travel to Mars. This course incorporates lab investigations, related videos, technology based projects, web quests, and model construction. Prerequisite: Astronomy I. **Please note – Students are not to be concurrently enrolled in Earth and Space I when completing this course. Core 40.**

3092* ADVANCED SCIENCE, SPECIAL TOPICS, METEOROLOGY (10, 11, 12) This course is an introduction to Meteorology, with much attention given to conceptual understanding through lab exercises, diagrams and graphs. In addition to the lab exercises, reading and/or algebra-based problem assignments are given several times per chapter. The central theme of the course is the understanding and application of meteorological principles and careers. The units studied: Earth-Sun Relationships; Atmospheric Properties; Warming the Earth and the Atmosphere; Humidity, Condensation, and Clouds; Precipitation; Air Pressure and Winds; Atmospheric Circulations; Air Masses, Fronts, and Middle-Latitude Cyclones; Weather Forecasting, Thunderstorms and Tornadoes; Hurricanes; Air Pollution; Global Climate; Climate Change; Light, Color, and Atmospheric Optics. Career exploration includes: Meteorology broadcasting, aviation and Meteorologist. **Due to the level of mathematics involved, it is recommended that students are concurrently enrolled in or have successfully completed Algebra II. Core 40.**

5070 ADVANCED LIFE SCIENCE: ANIMALS (10, 11, 12) Advanced Life Science, Animals, is a standards-based interdisciplinary science course, geared to college bound and honors level students that integrates biology, chemistry and microbiology in an agricultural context. Students investigate concepts that enable them to understand animal life and animal science as it pertains to agriculture. Through instruction, including laboratory, fieldwork, leadership development, supervised agricultural experience and the exploration of career opportunities, they will recognize concepts associated with animal taxonomy, life at the cellular level, organ systems, genetics, evolution, and ecology, historical and current issues in animal agriculture in the area of advanced life science in animals. This year long course qualifies as a 3rd science credit towards an Academic Honors Diploma. Complete your science credits in a new and exciting way! This course provides excellent preparation for Purdue University's Advanced Credit Examination, which could allow students who excel the opportunity to earn college credit through Purdue University. **AHD and Core 40. Requirement: Successful completion of two of the following - Biology, Chemistry or ICP**

5074 ADVANCED LIFE SCIENCE: PLANTS AND SOILS (10, 11, 12) Advanced Life Science, Plant and Soils, is a standards-based Interdisciplinary science course, geared to college bound and honors level students, that integrates biology, chemistry and earth science in an agricultural context. Students study concepts, principles and theories associated with plants and soils. Students recognize how plants are classified, grown, function and reproduce. Students explore plant genetics and the use of plants by humans. They examine plant evolution and the role of plants in ecology. Students investigate, through laboratory and fieldwork, how plants functions and the influence of soil in plant life. This year long course qualifies as a 3rd science credit towards an Academic Honors Diploma. Learn about how plant life effects everyday life and learn your science credits in a new exciting way at the same time! This course provides excellent preparation for Purdue University's Advanced Credit Examination, which could allow students who excel the opportunity to earn college credit through Purdue University. **AHD and Core 40. Requirement: Successful completion of two of the following - Biology, Chemistry or ICP**

5229 SUSTAINABLE ENERGY ALTERNATIVES (11, 12) Sustainable Energy Alternatives broadens a student's understanding of environmentally friendly energies. In this course students will use a combination of classroom, laboratory, and field experiences to analyze, critique, and design alternative energy systems. Class content and activities center on renewability and sustainability for our planet. Topics covered in this course include the following types of alternative energies: solar, wind, geothermal, biomass and emerging technologies. Leadership development, supervised agricultural experience and career exploration opportunities in the field sustainable energy are also included. **Requirement: Natural Resources or AP Environmental Science.**

ADVANCED PLACEMENT AND DUAL CREDIT

3090 #ADVANCED SCIENCE, COLLEGE CREDIT, ANATOMY (11, 12) (Formerly Honors Anatomy and Physiology) (ANAT 201) This two semester course will offer an in-depth study of Human Anatomy. Emphasis will be placed on gross and functional anatomy. Topics covered include: the skeletal and muscular systems and their interactions promoting body support, protection and mobility, the nervous system, the cardiovascular system, the respiratory system, the reproductive systems, and the digestive system, all of which contribute to the balance of day-to-day body activities. Laboratory work may include microscopic study of tissues, dissection of specimens, bone study labs, cardiovascular stress activities, and the use of anatomical models. This course offers students the option to enroll in the Ball State University course ANAT 201 in which they may earn 3 hours of transcripted college credit. This is a dual credit course through Ball State University. **Students must have at least a 3.0 GPA, and a 22 or higher composite score on the ACT, or a 1250 or higher composite on the SAT**. **Prerequisite: successful completion of Biology I/Honors Biology I and current enrollment in, or successful completion of Chemistry I/Honors Chemistry I. Recommended: Human Anatomy/Physiology or PLTW Human Body Systems.**

3020 ##ADVANCED PLACEMENT/ADVANCED SCIENCE, COLLEGE CREDIT, BIOLOGY (11, 12)-BSU BIO 111/111L This course is designed to be the equivalent of a college introductory biology course usually taken by biology majors during their first year of college. After showing themselves to be qualified on the Advance Placement Examination, some students may receive college credit. Topics discussed in the course include; biological chemistry, cells, energy transformations, cellular respiration, molecular genetics, heredity, evolution, taxonomy, surveys of monerans, protists, fungi, plants, animals, and ecology. Many laboratory experiences will be conducted. In addition, students will have exposure to research and information from scientists around the globe. This course offers students the option to enroll in the Ball State University course BIO 111/111L in which they may earn 4 hours of transcripted college credit. This is a dual credit course through Ball State University. . **Students must have at least a 3.0 GPA, and a 22 or higher composite score on the ACT, or a 1250 or higher composite on the SAT . Requirement – Successful completion of Biology or Honors Biology, Chemistry or Honors Chemistry. Recommendation – A "B" average in Biology/Honors Biology and Chemistry/Honors Chemistry.**

3060 ## ADVANCED PLACEMENT CHEMISTRY (11, 12) The AP Chemistry Course is designed to be the equivalent of the college introductory chemistry course usually taken by chemistry majors during their first year of college. Topics covered in the course include atomic theory, chemical bonding, nuclear chemistry, states of matter, reactions, stoichiometry, thermodynamics, kinetics, electrochemistry, equilibrium, and organic chemistry. Lecture, laboratory activities, problem solving, and student research activities are all components of this course. After showing themselves to be qualified on the Advanced Placement Examination, some students may receive college credit provided the college chosen allows for the credit. **Requirement – Successful completion of both Chemistry I and Algebra II Recommendation: Average grade of "B" in Honors Chemistry or Chemistry I and Algebra II.**

3090 ADVANCED SCIENCE, COLLEGE CREDIT, ELEMENTARY CHEMISTRY I — IU CHEM C101/121 ELEMENTARY CHEMISTRY I (3 cr.)/ELEMENTARY CHEM LAB I (2 cr.)
Prerequisite: HS algebra. C101: Essential principles of chemistry, atomic and molecular structure, bonding, properties and reactions of elements and compounds, stoichiometry, solutions, and acids and bases. For students who are not planning careers in the sciences. C121: Introduction to the techniques and reasoning of experimental chemistry. Emphasis is given to study of physical and chemical properties of inorganic compounds. Credit given for only one of C101-C121 or C103.
Student must have successfully completed Chemistry I or Chemistry I Honors. Additionally, students taking IU classes through ACP must:

- **meet all course prerequisites, earning grade of C or better (20% of the grade for IU is an ACS exam)**
- **have a GPA of 2.70 or above on a 4.00 scale through their most recently completed semester of high school**
- **have completed 9th grade**

3012 ##ADVANCED PLACEMENT ENVIRONMENTAL SCIENCE (11, 12) The AP Environmental Science course is a rigorous, interdisciplinary science class designed to be the equivalent of a one-semester, introductory college environmental science course. This class stresses scientific principle and analysis and includes a laboratory and field investigation component. The goal of the AP Environmental Science course is to provide students with the scientific principles, concepts, and methodologies required to understand the interrelationships of the natural world, to identify and analyze environmental problems both natural and human-made, to evaluate the relative risks associated with these problems, and to examine alternative solutions for resolving and/or preventing them. After showing themselves to be qualified on the Advanced Placement Examination, some students may earn college credit. **Information regarding the required summer reading assignment will be announced in May. Requirement – Successful completion of Biology I or Honors Biology and ICP or Chemistry or Honors Chemistry. Recommendation – A "B" average in all math classes.**

3088 ## ADVANCED PLACEMENT PHYSICS C (11, 12) is designed as a second year calculus based physics course based on content established by the College Board for the Mechanics and Electricity and Magnetism tests. The mechanics semester provides instruction in kinematics, Newton's laws of motion, work-energy-power, systems of particles and linear momentum, circular motion and rotation, and oscillations and gravitation. The electricity and magnetism semester provides instruction in electrostatics, conductors-capacitors-dielectrics, electric circuits, magnetic fields, and electromagnetism. Methods of calculus are used wherever appropriate in formulating physical principles and in applying them to physical problems. Strong emphasis is placed on solving a variety of challenging problems; some requiring calculus as well as student based experimental design and execution. **Requirement – Completion of Physics I or Honors Physics I AND completion or concurrent enrollment in ACP Calculus Survey or AP Calculus AB or AP Calculus BC.**

3090 ## ADVANCED SCIENCE, COLLEGE CREDIT, PHYSICS – AP Physics 1 & 2 (11, 12) is designed as a second year general physics course based on content established by Indiana University (for their P221 Physics course) and by the College Board for the AP Physics 1 and AP Physics 2 tests. Topics covered in this course include classical mechanics (kinematics, forces, work & energy, momentum, rotational motion, gravitation, simple harmonic motion), waves, fluids, electricity & magnetism, light, atomic physics, and nuclear physics. These topics will include all the material necessary to earn college credit for IU's P221, as well as prepare the students to take either or both of the AP Physics 1 & 2 exams. Some basic calculus may be used in some areas of the course. (This calculus can be taught within the course.) Strong emphasis is placed on solving a variety of challenging problems. **Requirement – Completion of Physics I, or Honors Physics AND completion or concurrent enrollment in Pre-Calculus.** Additionally, students taking IU classes through ACP must:

- **meet all course prerequisites, earning grade of C or better**
- **have a GPA of 2.70 or above on a 4.00 scale through their most recently completed semester of high school**
- **have completed 9th grade**

BIOMEDICAL SCIENCES - PROJECT LEAD THE WAY

The PLTW™ Biomedical Sciences program consists of a sequence of four courses: **Principles of the Biomedical Sciences, Human Body Systems, Medical Intervention**, and **Biomedical Innovation**. The goal of the program is to provide rigorous and relevant curriculum that is project and problem-based in order to engage and prepare high school students for the post-secondary education and training necessary for success in the wide variety of careers associated with the Biomedical Sciences Such careers include: physicians, nurses, veterinarians, medical and pharmaceutical research scientists, allied health professionals, and technicians.

5218 ADVANCED SCIENCE – SPECIAL TOPICS: PRINCIPLES OF BIOMEDICAL SCIENCES (9, 10) This course provides an introduction to the biomedical sciences through exciting "hands-on" projects and problems. Student work involves the study of human medicine, research processes and an introduction to bio-informatics. Students investigate the human body systems and various health conditions including heart disease, diabetes, sickle-cell disease, hypercholesterolemia, and infectious diseases. A theme through the course is to determine the factors that led to the death of a fictional person. After determining the factors responsible for the death, the students investigate lifestyle choices and medical treatments that might have prolonged the person's life. Key biological concepts including: homeostasis, metabolism, inheritance of traits, feedback systems, and defense against disease are embedded in the curriculum. Engineering principles including: the design process, feedback loops, fluid dynamics, and the relationship of structure to function are incorporated in the curriculum where appropriate. The course is designed to provide an overview of all the courses in the Biomedical Sciences program and to lay the scientific foundation necessary for student success in the subsequent courses. **CORE 40, AHD. Requirement – Completion of Algebra and concurrent enrollment in, or successful completion of Biology or Honors Biology.**

5216 ADVANCED SCIENCE – SPECIAL TOPICS: HUMAN BODY SYSTEMS (10, 11) Students will engage in the study of the processes, structures, and interactions of the human body systems. Important concepts in the course include: communication, transport of substances, locomotion, metabolic processes, defense, and protection. The central theme is how the body systems work together to maintain homeostasis and good health. The systems will be studied as "parts of the whole," working together to keep the amazing human machine functioning at an optimal level. Students will design experiments, investigate the structures and functions of body systems, and use data acquisition software to monitor body functions such as muscle movement, reflex and voluntary actions, and respiratory operation. Students will work through interesting real world cases and often play the role of biomedical professionals to solve medical mysteries. **CORE 40, AHD. Requirement – successful completion of Principals of Biomedical Sciences**. **Completion or concurrent enrollment in Chemistry I or Honors Chemistry I.**

5217 #ADVANCED SCIENCE – SPECIAL TOPICS: MEDICAL INTERVENTION (11, 12) In the Medical Interventions™ course, students will investigate the variety of interventions involved in the prevention, diagnosis and treatment of disease as they follow the lives of a fictitious family. A "How-To" manual for maintaining overall health and homeostasis in the body, the course will explore how to prevent and fight infection, how to screen and evaluate the code in our DNA, how to prevent, diagnose and treat cancer, and how to prevail when the organs of the body begin to fail. Through these scenarios, students will be exposed to the wide range of interventions related to Immunology, Surgery, Genetics, Pharmacology, Medical Devices, and Diagnostics. Each family case scenario will introduce multiple types of interventions and will reinforce concepts learned in the previous two courses, as well as present new content. Interventions may range from simple diagnostic tests to treatment of complex diseases and disorders. These interventions will be showcased across the generations of the family and will provide a look at the past, present, and future of biomedical science. Lifestyle choices and preventive measures are emphasized throughout the course as well as the important role scientific thinking and engineering design play in the development of interventions of the future. **CORE 40, AHD. Requirement – successful completion of Principals of Biomedical Sciences and Human Body Systems. Completion or concurrent enrollment in Chemistry I or Honors Chemistry I. If the student has completed Chemistry 1 or Honors Chemistry 1, concurrent enrollment in an additional Core 40 science course is required.**

Office: 317-594-4190 Fax: 317-594-4199 Guidance: 317-594-4193

5219 # ADVANCED SCIENCE – SPECIAL TOPICS: BIOMEDICAL INNOVATION (11, 12) In Biomedical Innovation™, the fourth course of the PLTW Biomedical Science Program, students will use the knowledge they have to design and conduct experiments related to the diagnosis, treatment, and prevention of disease or illness. They will apply the knowledge and skills learned in the previous courses; Principles of Biomedical Science, Human Body Systems, and Medical Interventions, to answer questions or to solve problems related to the biomedical sciences. They may work with a mentor or have an advisor from a university, hospital, physician's office, or industry during the second semester as they complete their work. Students will be expected to make a presentation of their work to an adult audience that may include representatives from the local community or the school's PLTW® partnership team. CORE 40, AHD. Requirement – successful completion of Principals of Biomedical Sciences, Human Body Systems, and Medical Interventions. Concurrent enrollment in an additional Core 40 science class is required. Special permission may be sought to allow a student to take Medical Interventions and Biomedical Innovation concurrently.

Office: 317-594-4190 Fax: 317-594-4199 Guidance: 317-594-4193