SCIENCE

* Course descriptions that are shaded are not being offered this school year.
* Students in the Class of 2020-2021 are required to take 3 credits in the following areas:
  + Biological Sciences – 1 credit
  + Chemical Science – 1 credit
  + Physical Sciences – 1 credit
* Students in the Class of 2022 and beyond are required to earn 3 credits of science in the following areas:
* Required courses – 2 credits – Students must complete all four courses listed below
  + Biology A – ½ credit
  + Chemistry A – ½ credit
  + Earth Science A – ½ credit
  + Physics A – ½ credit
* Elective courses – 1 credit – Students must complete two of the courses listed below
  + Biology B – ½ credit
  + Chemistry B – ½ credit
  + Earth Science B – ½ credit
  + Physics B – ½ credit
  + Additional Information
  + Students who enroll in and successfully complete 1 credit in a Career and Technical Education (CTE) course can use that credit to fulfill the elective Science credit.
  + Students who enroll in and successfully complete Advanced Placement (AP) Biology, Chemistry, or Physics can use those credits to fulfill the elective Science credit.
* Chemistry, AP Chemistry, Physics, AP Physics and STEM courses may be able to count as math-related courses as long as they are taken in the student’s senior year and are not counted as Science credits

**Agri-Science Leadership** 1 trimester Grade Level: 9 – 12

Course # 2601 Prequisite: None

This course is intended for those students directly involved in the FFA as an officer, as a committee chairperson, or for students who plan to participate in a leadership or ag skills contest. Basic information regarding parliamentary procedure, organizational management, and prepared public speaking will be taught.

**Anatomy/Physiology** 2 trimesters Grade Level: 10 – 12

Course # 2401 Prerequisites: C+ or better in

#2402 Biology

This course is designed to assist students in building a better understanding of how the human body performs. This course is most helpful for students interested in the medical field. Anatomy and physiology will assist students in developing knowledge required to pursue a career in nursing, human medicine, veterinary medicine or biotechnology. Laboratory techniques are emphasized, including numerous dissections.

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**AP Biology** 3 trimesters Grade Level: 10 - 12

Course # 2507 Prerequisites: Successful completion

#2508 of Biology, Chemistry is encouraged

#2509 and science teacher recommendation.

The AP Biology course is designed to be the equivalent of a college introductory biology course. It will enrich the student's knowledge of biology and help students develop laboratory skills and techniques. It is based on the national Advanced Placement Program and students will be prepared to take the Advanced Placement test in Biology in early May. In this course four big ideas will be covered:

* The process of evolution drives the diversity and unity of life.
* Biological systems utilize free energy and molecular building blocks to grow, reproduce, and maintain dynamic homeostasis.
* Living systems store, retrieve, transmit, and respond to information essential to life processes.
* Biological systems interact, and these systems and their interactions possess complex properties.

**AP Chemistry** 3 trimesters Grade Level: 10 - 12

Course # 2501 Prerequisites: Successful completion

#2502 Of Chemistry and science teacher

#2503 recommendation.

Advanced Placement Chemistry is a college level course for those interested in pursuing a career in the sciences. This class will be taught at a level equivalent to a first year college chemistry course. This is a rigorous course that will cover the six big ideas that have been outlined by the AP College Board

* **The chemical elements are fundamental building materials of matter, and all matter can be understood in terms of arrangements of atoms. These atoms retain their identity in chemical reactions.**
* **Chemical and physical properties of materials can be explained by the structure and the arrangement of atoms, ions, or molecules and the forces between them.**
* **Changes in matter involve the rearrangement and/or reorganization of atoms and/or the transfer of electrons.**
* **Rates of chemical reactions are determined by details of the molecular collisions.**
* **The laws of thermodynamics describe the essential role of energy and explain and predict the direction of changes in matter.**
* **Any bond or intermolecular attraction that can be formed can be broken. These two processes are in a dynamic competition, sensitive to initial conditions and external perturbations.**

Laboratory work is a necessary and vital component of this class and will be conducted weekly and occasionally bi-weekly. In the laboratory setting students will be asked to make connections and show evidence of higher level thinking skills.

**AP Physics 1** 2 trimesters Grade Level: 11 - 12

Course # 2504 Prerequisite: 1) Physics

# 2505 2) Physics teacher recommendation

AP Physics is designed to be the equivalent of an introductory math-based college freshmen course in Kinematics. Units of student include mechanics, energy, momentum, circular motion, gravitational forces, and electric circuits. The ultimate goal of this course is to prepare students to be successful on the AP Physics 1exam at the end of the year.

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**Biology A** 1 trimester Grade Level: 9 - 11

Course # 2205 Prerequisite: None

Biology A is designed to give students an overall view of Environmental Biology.  The major areas of study are aligned with the Next Generation Science Standards.  Units of study will include 1) Matter and energy in ecosystems, with specific areas of study on photosynthesis, cellular respiration, matter and energy cycles 2) Interdependent relationships in Ecosystems, with an emphasis on biodiversity and carrying capacity 3) Human Activity and Biodiversity, with an emphasis on reducing human impacts 4) Natural Selection looking at variation of traits, adaptations of populations, speciation and extinction.

**Biology B** 1 trimester Grade Level: 9 - 11

Course # 2206 Prerequisite: Biology A

Biology B is designed to give students an overall view of Heredity: Inheritance and Variation of Traits.  The major areas of study are aligned with the Next Generation Science Standards.  Units of study will include 1)  DNA Structure and Function investigating protein synthesis, variation in organisms and mutations  2)  Mitosis, Meiosis and Cell Differentiation where students will explore the process and purpose of cell division as well as the process where cells develop into specific somatic cells  3)  Mendelian and Modern Genetics exploring the inheritance of traits and sources of genetic variation and 4) Evolution with an emphasis on evidence of common ancestry and diversity as well as factors that cause evolution.

**Botany & Greenhouse Management** 3 trimesters Grade Level: 9 - 12

Course # 2606 Prerequisite: None

# 2607

# 2608

This course provides students awesome hands on experiential learning opportunities. Students will learn plant anatomy, physiology, soils and plant nutrition, tree and wildflower identification, maple syrup production, forestry and greenhouse management. Hands on experience in our greenhouse, woodlot and maple syrup production operation will take learning out of the classroom into real life scenarios. This course is appropriate for advanced students and students of all ability levels. Students in this class will have opportunities to improve leadership, personal growth and practical skills through participation in the Mason FFA Chapter.

**Chemistry A** 1 trimester Grade Level: 9 – 11

Course # 2301

This course will explore the basic foundations of the chemical world. This course will focus on experiencing and explaining phenomena, participating in class discussions, laboratory investigations, and problem solving activities. A scientific calculator is needed for this course.

**Chemistry B** 1 trimester Grade Level: 9 – 11

Course # 2302 Prerequisites: Chemistry A

This course is aimed at students who are looking to advance their understanding of chemical concepts. Students planning on pursuing a four-year degree are encouraged to enroll. The course will focus on experiencing and explaining phenomena, participating in class discussions, laboratory investigations, and problem solving activities. A scientific calculator is needed for this course.

**Earth Science A** 1 trimester Grade Level: 9-11

Course # 2101 Prerequisites: none

As an introduction to earth science concepts students will study content on the history of the earth. Students will learn about land forms, plate tectonics, earth cycle systems, natural resources and resource management. Students will work through real-world problems and address issues such as global climate change and human impact on the planet. Emphasis will be placed on student modeling and problem solving.

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**Earth Science B** 1 trimester Grade Level: 10-12

Course # 2102 Prerequisites: Earth Science A

As an extension of Earth Science A this course will focus on more detailed concepts involving human impact to the planet, formation of the solar system, and earth’s composition. This course will challenge students to use higher level thinking, modeling, and problem solving. Small group work and projects will be utilized in this class and students will have a capstone project to present at the end of the course.

**Forensic Science** 2 trimesters Grade Level: 11 - 12

Course # 2403 Prerequisite: Chemistry and/or

# 2404 Physics

Forensic Science is the application of science to the law. The study of science offers the knowledge and technology needed for the use of evidence in both criminal and civil cases. Problem solving will be the focus for this science course.

Students will be expected to work in teams, theorize, design experiments, research forensic methodologies analyze and synthesize information, and make conclusions based on evidence.

**Leadership Development A** 1trimester Grade Level: 9 - 12

Course # 6610 Prerequisite: None

This course is designed for students with a strong interest and commitment to personal developing their leadership skills. Students who are interested in serving as an officer of an organization in or out of our school are strongly encouraged to enroll. Areas of growth will include self-awareness, goal setting, facilitation, teamwork, group dynamics, and project planning management.

**Leadership Development B** 1trimester Grade Level: 9-12

Course # 6611 Prerequisite: Leadership A

(C+ or better)

This course has been designed to allow students to apply the learning from Leadership A in practical ways. Students in this course will be expected to take on leadership roles and plan activities within the school and the community. Leadership B is designed for any student who wants to lead but is also geared at students who are currently serving in leadership capacities in the school.

**Natural Resources Management** 2 trimesters Grade Level: 9 - 12

Course # 2603 Prerequisites: None

# 2604

This course will take a local perspective on the scientific principals and issues related to different ecosystems (prairies, forests, aquatic, etc.). Focus will be given to water quality, soils, and land use. This course will also focus on practical knowledge and identification of local trees, wildflowers, wildlife and aquatic species.

**STEM (Science, Tech. Engineering, and Math)** 1 trimester Grade Level: 10-12

Course # 2107 Prerequisites: Algebra 1

Science, Technology, Engineering and Math (STEM) is a project and lab based course where students will have the opportunity to explore and experience the process of engineering. The projects and labs are inspired by the sciences while integrating math and technology throughout. This course will focus on the process of defining a problem, designing a solution, constructing prototypes, and redesigning prototypes to improve results.

**THIS COURSE IS PENDING APPROVAL BY THE BOARD OF EDUCATION**

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**Physical Science** 2 trimesters Grade Level: 11-12

Course # 2304 Prerequisites: Teacher approval

Course # 2305

This course aims to give students a solid background in the main areas of physics: motion, Newton's laws, momentum, energy, magnetism, electricity, waves, sound, and light. The use of math is not a heavy component of the course, and the understanding and application of ideas in lab settings and everyday life will be stressed.

**Physics A** 1 trimester Grade Level: 9 - 11

Course # 2306 Prerequisite: Algebra 1

As an introduction to Physics ideas, students in this course will study motion in one dimension, Newton’s laws, work and energy, electric circuits, and waves and sound. Students will have many lab opportunities to apply the ideas they are learning and will be asked to solve real-world problems as well. Use of mathematics is not a primary aim of the course, but mathematical thinking and reasoning is very important, and students will be expected to apply many ideas from Algebra 1.

**Physics B** 1 trimester Grade Level: 10 - 12

Course # 2307 Prerequisite: Algebra 1, Geometry and Physics A

Physics B, intended primarily for those students who will pursue a four-year degree or who have a strong interest in the physical sciences, aims to add to, and to broaden, the ideas learned in Physics A. Students will study motion in two dimensions, momentum, gravitational forces, electrostatics, and magnetism and electromagnetism. Students have the opportunity to apply many of the ideas learned in a hands-on final exam in class or an interactive final exam at Cedar Point Amusement Park.

**Zoology & Veterinary Science** 3 trimesters Grade Level: 9 - 12

Course # 2610 Prerequisite: None

2611

2612

This course provides students awesome hands on experiential learning opportunities. All aspects of animal anatomy, physiology and health will be taught in the classroom and brought to life with experiential learning opportunities. Experiential projects include incubation of eggs, raising broiler chickens, managing a small flock of sheep and managing pregnant pigs through the birthing and nursing process. This course is appropriate for advanced students and students of all ability levels. Students in this class will have opportunities to improve leadership, personal growth and practical skills through participation in the Mason FFA Chapter.

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