

SCIENCE PROGRAM

Level Expectations

	CP2	CP1	HR	A.P.
Organization	Organizational skills are addressed in class.	Good organizational skills but may need assistance	Organizational skills are very good.	Organizational skills are exemplary
Independence	Utilizes regular extra help, may require prompts.	Shows independence in learning, but benefits from prompts	An independent learner able to self-advocate and solve problems independently. Has developed higher order thinking skills.	An independent and self-regulating learner with awareness of strengths and weaknesses and learning style. Able to self-advocate. Excellent higher order thinking skills.
Writing Skills	Able to express themselves with minimal errors.	Able to express themselves with clarity and few errors.	Able to express themselves independently and with content specific vocabulary.	Able to express themselves independently and accurately with content specific vocabulary.
Reading Skills	Critical Reading skills near grade level with support.	Able to read critically, but sometimes needs support.	Consistently reads critically and independently.	Reads with a critical eye, able to make connections to new situations.
Analytical/Critical Thinking Skills	Able to make connections with material with assistance. Capable of some degree of analysis, but with prompts.	Good ability to make connections with material occasionally with assistance. Analytical skills are proficient.	Strong ability to make connections with material. High level analytical skills.	Effectively and frequently makes connections with material, often cross-curricular. Excellent analytical skills.
Homework	20 mins	20-30 mins including independent concept review	30-45 mins including independent concept review	45 mins including independent concept review
Time Commitment Outside of Class	Students need parental assistance with time management and frequent reminders of deadlines. Assignment notebook is essential.	Good time management skills, but sometimes need reminders of deadlines. Assignment notebook should be maintained independently.	Strong time management skills, ability to meet all deadlines and plan for long term projects independently.	Excellent time management skills, strong ability to meet all deadlines and plan for long term projects independently.
Participation	Students should participate on a daily basis to the best of their ability.	Students should participate on a daily basis to the best of their ability.	Students should participate on a daily basis to the best of their ability.	Students should participate on a daily basis to the best of their ability.
Math Skills	Some fundamental math skills	Basic algebraic & problem solving skills	Strong algebraic & problem solving skills	Ability to use advanced mathematical concepts

GRADE LEVEL COURSES

<u>Grade</u>	<u>Honors</u>	<u>College Prep 1</u>	<u>College Prep 2</u>
9	Biology	Integrated Science	Integrated Science
10	Chemistry	Biology	Biology
11	Physics	Chemistry	Earth Science
12	AP/Elective	Physics	Elective

Advanced Placement

Biology
Chemistry
Physics C

Electives

Environmental Science (CP1)
Engineering the Future
Genetics/Biotechnology (Hrs.)
Marine Science (CP1)
Anatomy & Physiology (Hrs. CP1 & CP2)
Earth Science (CP2)
Forensic Science
Weather and Climate
Science Fair

The science curriculum is based on the use of the methods of inquiry to participate in investigations and problem solving related to the standards delineated in The Massachusetts Science Frameworks. The process of seeking solutions is emphasized rather than the solutions themselves, making the laboratory, as well as other student activities, key to all courses. The structural content of the Science curriculum revolves around the core of Integrated Science, Biology, Chemistry and Physics as well as a fundamental understanding of the natural sciences. Science is also viewed as a human endeavor that relates people to the real world. At the same time, the Science curriculum embraces technology, including extensive use of classroom computers that are used throughout the curriculum.

INTEGRATED SCIENCE PROGRAM**INTEGRATED SCIENCE CP-1**

Year Course

Prerequisite: Teacher Recommendation,
8th grade science, minimum grade of 70

5 credits

Open to: Fr.

This course focuses on the skills necessary for successful completion of higher-level Science courses. Laboratory work will be extensive, often involving student inquiry leading to solutions. Much of the emphases of the last part of the course will be to develop the skills and foundation required to complete Biology the following year.

INTEGRATED SCIENCE CP-2

Year Course

5 credits

Prerequisite: Teacher Recommendation,
Any 8th grade Science course

Open to: Fr.

This course focuses on the skills necessary for successful completion of higher-level Science courses. Laboratory work will be extensive, often involving student inquiry leading to solutions. Much of the emphases of the last part of the course will be to develop the skills and foundations required to complete Biology the following year.

BIOLOGY PROGRAM**BIOLOGY-HONORS**

Year Course

5 credits

Prerequisite: Teacher Recommendation

Open to: Fr & So.

Minimum science grade of 93, Minimum grade of 88 in Advanced Grade 8 Math,
Minimum grade of 93 in Grade 8 Math.

This course is designed for students whose post high school plans may include future study in science. The emphasis will be placed on critical thinking skills and on inquiry. The topics will include cellular Biology, Genetics, Evolution, Bio Diversity, Biochemistry and Anatomy & Physiology. However, there will be a greater emphasis on the logical development of concepts from facts. Laboratory and computer experience will be utilized. Students enrolled in this course will have the option to take the Biology MCAS in the spring of their freshman year. Otherwise they will be required to take the Chemistry MCAS exam sophomore year.

BIOLOGY CP-1

Year Course

5 credits

Prerequisite: Teacher Recommendation

Open to: So

Completed Physical Science CP-1, and Successful Completion of Algebra I CP-1

This course is organized around the topics of ecology, heredity, evolution, biodiversity, and cellular biology and is based on the Massachusetts Science Frameworks. The emphasis is placed on concepts, processes and skills of biological science. Laboratory work forms the foundation for the course. Students will be required to complete the Biology MCAS exam in the spring, which is necessary for graduation.

BIOLOGY CP-2

Year Course

5 credits

Prerequisite: Teacher Recommendation

Open to: So

Completed Physical Science CP-2

This course is organized around the topics of ecology, heredity, evolution, biodiversity, and cellular biology and is based on the Massachusetts Science Frameworks. Emphasis will be placed on study skills, reading and writing skills and hands on activities. Technology will be

integrated as well. Students will be required to complete the Biology MCAS exam in the spring, which is necessary for graduation.

CHEMISTRY PROGRAM

CHEMISTRY HONORS

Year Course

5 credits

Prerequisite: Teacher Recommendation

Open to: So., Jr., Sr.

Biology Honors grade of 80 or Biology CP-1 grade of 91, Honors Math grade of 80

This is a comprehensive, rigorous science course for students who have excelled in biology and math and have been recommended to take the course. Emphasis will be placed on higher order thinking skills related to classwork and labwork, with problem solving throughout the course. The laboratory work is an integral part of the course where the student discovers specific laws and principles as well as applying these laws to new situations. Students are often required to work independently in the design of experiments. This course takes a mathematical approach to chemistry and a strong background in algebra is needed. Computer technology will be employed throughout the course. All students enrolled, who have not taken and passed a science MCAS exam will be required to take the Chemistry MCAS in June.

CHEMISTRY CP-1

Year Course

5 credits

Prerequisite: Teacher Recommendation

Open to: Jr., Sr.

Passed Biology MCAS Exam , Algebra I CP-1 grade of 70

The goal of the Chemistry program is to expose the student to the concepts of chemistry as well as to give the student practical applications of science. The student is encouraged to develop habits of independent thinking; to ask questions rather than accept answers; and in some cases to develop their own line of inquiry for their questions. The laboratory work is an integral part of the course where in the student discovers specific laws and principles as well applying these laws to new situations. Students will write formal lab reports and/or maintain a lab journal. This course takes a mathematical approach to chemistry and a solid background in algebra is needed. Computer technology will be employed throughout the course.

PHYSICS PROGRAM**PHYSICS HONORS**

Year Course

5 credits

Prerequisite: Teacher Recommendation and Chemistry Honors minimum grade of 80, or CP-1 Chemistry grade of 91, Math grade of 80

Open to: Jr., Sr.

The goal of this course is to develop in the student a facility for analytical thought and a questioning attitude toward physical phenomena. This course offers an in-depth study of the principles of physics including mechanics, energy, heat, light, waves, and electricity, with a heavy reliance on mathematics and problem solving as well development of concepts. Laboratory exercises form an essential and regular part of this course with many of the experiments utilizing computer interfacing.

PHYSICS CP-1

Year Course

5 credits

Prerequisite: Algebra II (may be taken concurrently), and Chemistry CP-1 minimum grade of 70

Open to: Jr., Sr.

The goal of this course is to develop in the student a facility for analytical thought and a questioning attitude toward physical phenomena. This course emphasizes the conceptual ideas developed in mechanics and energy are carried through the discussion of heat, electricity, waves, light, atomic physics, and astronomy. Although less rigorous than in the honors course, mathematical problem solving is also emphasized. Laboratory exercises form an essential and regular part of this course with many of the experiments utilizing computer interfacing.

SCIENCE ELECTIVE COURSES**ANATOMY AND PHYSIOLOGY HONORS**

Year Course

5 credits

Prerequisite: Biology and Chemistry, minimum grade of 85 in both courses, Teacher Recommendation

Open to: Jr., Sr.

This course is concerned with the structure and function of the human body. There is a strong emphasis on laboratory work including microscopic studies, anatomical studies, and dissections. This course is highly recommended for students interested in pursuing a career in the fields of biology, medicine, (i.e. physician, RN, LPN, therapist, psychiatrist, veterinarian, etc.). The course is also recommended for anyone who would like to have a better understanding and appreciation for the workings of his/her body. This course will be more advanced than the CP-1 level course, but will cover the same basic material in greater depth. It fulfills the requirement for AP Biology.

ANATOMY AND PHYSIOLOGY CP-1

Year Course

5 credits

Prerequisite: Biology and Chemistry, minimum grade of 75 in both courses, Teacher Recommendation

Open to: Jr., Sr.

This course is focuses on the structure and function of the human body. Topics include anatomical terminology, history and a general understanding of all the human body systems. Closer studies are done on specific organs, system functions and disorders. The outline of the course includes readings, online assignments, and a dissection. This course is strongly recommended for anyone who would like to have a better understanding of the workings of the human body as well as those interested in careers in health care, biology or physical education. This course fulfills the requirement for AP Biology.

ANATOMY AND PHYSIOLOGY CP-2

Year Course

5 credits

Prerequisite: Biology and Physical Science

Open to: Jr., Sr.

This course is designed for those students interested in studying the fundamentals of the human body. Each major body system, its structures and functions, will be studied. The course will cover diseases that occur within the system as well as preventative maintenance and treatments. Technology will be integrated into the course as well as some laboratory work.

EARTH SCIENCE CP-2

Year Course

5 credits

Prerequisite: Teacher recommendation

Open to: Jr., Sr.

This course will emphasize the processes which created and shaped Earth and our Solar system. Topics will include rocks, minerals, sculpturing of Earth's surface, plate tectonics, earthquakes, volcanoes, geologic history, the atmosphere, weather, climate, and astronomy. This will be a lab based science class.

ENGINEERING THE FUTURE

Year Course

5 credits

Prerequisite: None

Open to: Fr., So., Jr., Sr.

"Engineering the Future: Designing the World of the 21st Century" is a full-year course developed by the Museum of Science, Boston. Students learn about the role of engineers in society and how they create the human-made world. Students can then examine how everyone is affected by changes in technology and how people influence future technological development by the choices they make as workers, consumers and citizens. The course is intended to help today's high school students understand the ways in which they will engineer the world of the future, whether or not they pursue technical careers. Engineering the Future maps directly to Massachusetts and national standards. Students who successfully complete this course will be eligible to take the Science and Engineering MCAS in June.

ENVIRONMENTAL SCIENCE CP-1

Year Course

5 credits

Prerequisite: Biology, Chemistry, or Physical Science
(Completion of two)

Open to: Jr., Sr.

This course will cover the science of our environment as well as the ethics, values, and laws that we must understand as responsible inhabitants of this planet. Topics beyond local ecology will be studied including global environmental issues.

FORENSIC SCIENCE

Semester

2.5 credit

Prerequisite: Biology & Chemistry

Open to: Jr., Sr.

This course is designed to introduce the student to practical applications of chemistry, physics, and biology in the study of forensics. This course will provide students with an introduction to the theoretical understanding and practical application of forensic science techniques including forensic DNA typing, bloodstain pattern analysis, forensic entomology, forensic toxicology, drugs and poisons, forensic anthropology, crime scene investigations, evidence collection and examination, ballistics, understanding of the relationship between forensic science and legal studies, and career opportunities in forensics. The class is designed around authentic performance assessments with students working in teams to solve crimes using scientific knowledge and reasoning.

GENETICS/BIOTECHNOLOGY HONORS

Year Course

5 credits

Prerequisite: Teacher Recommendation
Completed Biology

Open to: Jr., Sr.

Genetics/Biotechnology is an inquiry-based approach to the study of genetics and biotechnology. Students will review the fundamentals of genetics and explore gene expression within families and populations. The use of biotechnology in medical research, forensics, agriculture and genetic engineering will also be investigated. Emphasis will be placed on problem solving, independent research, projects, discussion, and laboratories that include DNA extractions, DNA fingerprinting (gel electrophoresis), tissue culture and bacterial transformation (genetic engineering).

MARINE SCIENCE CP-1

Year Course

5 credits

Prerequisite: Biology and one of the following:
(Chemistry or Physical Science)

Open to: Jr., Sr.

This is a full year course which focuses on the marine environment. The year of study will be broken down into three basic categories: oceanography, marine biology, and marine policies and issues. Some of the typical topics covered in the study of oceanography are

currents, tides, and wave action. The marine biology section of the course will center on living parts of the ocean and their interactions with the environment. Finally, marine policies and issues will deal with laws, practices, and environmental issues surrounding this ecosystem.

SCIENCE FAIR

Year Course 2.5 credits
Prerequisite: Must be currently enrolled in a Science course Open to: Fr., So., Jr., Sr.

Students will complete a Science fair project to be entered in South Sectional Regional Science Fair representing Walpole High School. Project must be original student work incorporating all aspects of the experimental process. Science faculty advisor will mentor student in research and development of project. Multiple-year enrollment will not serve to replace a lab course as graduation requirement.

WEATHER AND CLIMATE

Semester 2.5 credit
Prerequisite: Integrated Science or Biology Open to: So., Jr., Sr.

This course focuses on introducing the student to basic concepts involved in the analysis of weather and climate. Major topics include structure of the atmosphere and the role of moisture in the development of dew, clouds, and precipitation; air masses, fronts, cyclones, thunderstorms, severe weather (such as tornadoes, flash floods and hurricanes) as well as climatology and climate change. This course will be hands on and with an emphasis on current events.

ADVANCED PLACEMENT SCIENCE PROGRAM**AP BIOLOGY**

Year Course 5 credits
Prerequisite: Honors Biology, Honors Chemistry,
Or Department Head approval Open to: Sr.

The Advanced Placement Biology course is designed to be the equivalent of the introductory biology course taken during the first year of college. This course is to be taken only after successful completion of courses in biology, chemistry, physics, anatomy, and physiology. Students will take this course to pursue an interest in biology, to prepare for college, and/or obtain college credit.

The approach will develop advanced problem solving skills both in class and in the lab. Twelve major laboratory projects are studied during the year, and a variety of laboratory skills will be addressed. A significant amount of problem solving and research will be done outside of class. Topics will include evolution, genetics, biochemistry, microbiology, and population ecology. Students who take this course must take the Advanced Placement Examination in May.

AP CHEMISTRY

Year Course

5 credits

Prerequisite: Honors Biology, Honors Chemistry, Honors Physics

Open to: Jr., Sr.

(may be taken concurrently) and Algebra II, or Department Head approval

The Advanced Placement Chemistry course is designed to be the equivalent of the introductory chemistry course taken during the first year of college. This course is to be taken only after successful completion of courses in biology, chemistry, and physics. Students will take this course to pursue an interest in chemistry, to prepare for college, and/or obtain college credit. Topics will include modern atomic theory, Stoichiometry, redox reactions, equilibrium, kinetics and thermodynamics. A series of laboratory projects are studied during the year and recorded as part of a scientific journal. The course will also include considerable research and problem solving that is done out of the classroom. Students who take this course must take the Advanced Placement Exam in May.

AP ENVIRONMENTAL SCIENCE

Year Course

5 credits

Prerequisite: Honors Biology & Honors Chemistry

Open to: Jr., Sr.

Department Head Approval

The AP Environmental Science course is designed to be the equivalent of an introductory college course in environmental science. Topics will include earth systems and resources, the living world, population biology, land and water use, energy resources and consumption, pollution and global change and opportunities for lab/fieldwork investigation activities. It is designed 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. Students who take this course must take the Advanced Placement Examination in May.

ADVANCED PLACEMENT PHYSICS C

When Given: Year Course

5 credits

Prerequisite: Completion of Honors Physics, completion or concurrent enrollment in Calculus, Department Head approval

Open to: Sr.

The Advanced Placement Physics C is an intensive, calculus based first year college level physics course offered to qualified honors students who have demonstrated superior achievement in mathematics and science. In the Physics C course, the first semester is devoted to mechanics and the use of calculus in problem solving and in derivations is expected to increase as the course progresses. During second semester the primary emphasis is on classical electricity and magnetism. By the end of the course, calculus will be used freely in formulating principles and in solving problems. Students who take this course must take one of the two Physics C Advanced Placement Exams in May.