Science

Class of 2029 & Beyond

Benilde St. Margaret's science department engages students in a rigorous and diverse curriculum designed to promote a deep understanding of science principles. The department is committed to fostering critical thinking, inquiry-based learning and experiential investigation. The department seeks to make interdisciplinary connections, encouraging students to apply scientific concepts to real-world concerns. All students are required to take biology, chemistry, and physics to graduate. They are further encouraged to participate in science electives that appeal to their individual interests.

Department Chair: Mark Peterson mpeterson@bsmschool.org

Freshmen	Sophomore	Junior	Senior
	S = Semester Course	YR = Year Long Course	
Earth Science YR	Biology YR	General Chemistry YR	Physics YR
Honors Earth Science YR	Honors Biology YR	Chemistry YR	AP Physics YR
		Honors Chemistry YR	AP Biology YR
			AP Chemistry (PACC) YR
			AP Environmental Science YR
	Additional Electives (So)	**Additional Electives (Jr)**	Ecology YR
Electives may be taken concurrently with core science courses	Ecology YR	Ecology YR	Bio Med I, II, or III YR
	Bio Med I YR	Bio Med I, II YR	Forensic Science YR
	Forensic Science YR	Forensic Science YR	Forensic Science II YR

Science

Class of 2026, 2027, & 2028

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Freshmen	Sophomore	Junior	Senior
	S = Semester Course	YR = Year Long Course	
Earth Science YR	General Chemistry YR	Physics YR	Physics YR
Honors Earth Science YR	Chemistry YR	Ecology YR	Ecology YR
	Honors Chemistry YR	Bio Med I, II YR	Bio Med I, II, or III YR
		Forensic Science YR	Forensic Science YR
		Forensic Science II YR	Forensic Science II YR
		AP Biology YR	AP Biology YR
	Additional Electives (So)	AP Chemistry YR	AP Chemistry YR
	Ecology YR	AP Environmental Science YR	AP Environmental Science YR
	Bio Med I YR	AP Physics YR	AP Physics YR
	Forensic Science YR		

Electives may be taken concurrently with core science courses

Science

Earth Science (YR)

Two Semesters, two credits

This introductory Earth Science course provides students with a broad understanding of Earth's dynamic systems and their interactions. Through engaging lessons and hands-on investigations, students explore topics such as plate tectonics, weather and climate, Earth's resources, and human impacts on the environment. Emphasis is placed on developing scientific reasoning, data analysis, and problem-solving skills. Students will investigate phenomena such as earthquakes, hurricanes, and climate change, using MNSS-based science practices like constructing models and analyzing real-world data. By the end of the course, students will have a foundational understanding of how Earth's processes shape our planet and the role humans play in maintaining its balance. This Earth Science course prepares students for future science coursework with the emphasis on science practices and crosscutting concepts.

Honors Earth Science (YR)

Two Semesters, two credits

Prerequisite: Recommendation from BSM junior high science department OR 85th percentile or higher on a standardized test science section; if no standardized test score is on file, the student must have earned an "A-" or better in both 7th and 8th grade science courses.

This rigorous, accelerated Earth Science course delves deeply into the interconnected systems of our planet, emphasizing critical thinking, advanced scientific practices, and real-world applications. Students will explore complex topics, including plate tectonics, geochemical cycles, climate systems, and human impacts on Earth. Hands-on labs, independent research projects, and the use of cutting-edge technology and datasets will challenge students to apply MNSS-based science practice skills like modeling, argumentation, and data-driven inquiry. This course also emphasizes collaboration and communication through project-based learning and scientific presentations. Designed for motivated learners, Honors Earth Science prepares students for advanced science coursework and fosters an appreciation for the challenges and opportunities in understanding our changing planet.

Biology (YR) ** Transfer Students Only (Class of '26, '27, '28)**

Two semesters, two credits

BSM biology is a year-long course that asks students to conduct investigations to generate the majority of the information to construct an understanding of biology. This course is a direct reflection of the vision of science learning called for by the National Academies of Sciences. Students learn by engaging in science and engineering practices. In an iterative process, students develop understanding of disciplinary core ideas (DCIs) and crosscutting concepts (CCCs) through the use of science and engineering practices (SEPs). This course focuses on storylines to build the core ideas around: Matter and Energy Flow Through Ecosystems, Natural Selection and Evolution, Human Body Systems, Cells and Cellular Processes, Cell Reproduction, and Genetics and Information Flow Between Generations.

Honors Biology (YR)

Not Running for the 2025 - 2026 School Year

General Chemistry (YR)

Two semesters, two credits

Prerequisite: concurrent enrollment in Intermediate Algebra.

This laboratory-based course focuses on the key concepts of chemistry. Students will develop their problem- solving and critical thinking skills by collaborating on research projects and laboratory experiments. This course will focus on the following topics: measurement and the metric system, states of matter, atomic structure, kinetic molecular theory, mixtures and compounds, solutions, the periodic table, chemical formulas, chemical reactions, bonding, gas laws, and stoichiometry.

Chemistry (YR)

Two semesters, two credits, must meet the math requirement

Prerequisite: Completion of, or concurrent enrollment in, Algebra II or Honors Algebra II.

This course is intended for those students who seek a solid chemistry background in preparation for college or desire a complete understanding of chemistry principles. Students will study the structure, properties, and changes in matter as well as the laws, principles, and theories describing matter. Classroom activities will include lectures, demonstrations, problem solving, and experiments.

Science

Honors Chemistry (YR)

Two semesters, two credits, must meet the math requirement

Prerequisite: Completion of Algebra II or Honors Algebra II with at least an "A-" or concurrent enrollment in Honors Algebra II

Honors Chemistry is a rigorous course designed to challenge students who have a great curiosity and ability in science. Students should be self-motivated and enjoy challenges. Problem solving skills are very important. The faster pace of this course covers the same material as the regular Chemistry course while allowing additional topics to be covered. Because of the faster pace, students will be expected to be independent problem solvers, motivated learners, and able to grasp scientific concepts quickly.

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Electives

Physics (YR)

Two semesters, two credits

Prerequisite: Completion of, or concurrent enrollment in, Algebra II or Honors Algebra II.

This course is designed for students who have a natural curiosity about how the world works. Have you ever wondered why you get pushed to the outside of a car when going around a curve? Why do spaceships "slingshot" themselves past other planets? Why does your hair get more "static-y" during the winter? We'll focus on topics like kinematics and motion, forces, energy, momentum, electricity, magnetism, waves, light, and sound. Through labs and engineering challenges, students will gain a better understanding of how the rules of nature can explain our everyday experiences. Students will complete lab assignments and 1-2 major projects. This course is designed for anyone who has an interest in science.

Ecology (YR)

Two semesters, two credits

Ecology will provide hands-on, often outdoor, learning experiences through project-based problem-solving activities. Students will learn about the interrelationships of living things and their physical environments. Students will engage in the study of environmental topics affecting the world in which they live.

Forensic Science (YR)

Two semesters, two credits

Are you intrigued by CSI? Does a statement like, "We're not quite sure of the C.O.D but there is some GSR on our vic," resonate with you? If so, this class might be for you! Forensic science is a challenging investigative course that applies scientific principles and technological practices from biology, chemistry, and physics for the purpose of justice. Some major themes of study include collecting physical evidence, glass and soil, fingerprints, hair and fiber, DNA typing, chemical analysis, sound waves, blood spatter analysis, entomology, casts, impressions, and tool marks. This is a year-long course that will require critical thinking, problem solving and an investigative and curious mind as we build upon these themes at an advanced level.

Forensic Science II (YR)

Two Semesters, two credits

Prerequisite - Forensic I

Second year forensics is a year long elective course aimed at learning scientific principles, laboratory techniques and reasoning skills to solve crimes. We will delve deeper into various topics already studied in Forensics 1 as well as expanding into many areas not yet studied such as toxicology, anthropology, ballistics and accident reconstruction. Students will also analyze real-world criminal cases focusing on how forensic evidence is interpreted and presented in court.

Biomedical Science I: Investigations (YR)

Two semesters, two credits.
Order of enrollment preference:
sophomores, juniors, seniors

Prerequisites: Completion of Biology with an "A-" or Honors Biology with a "B" or higher. A summer assignment is required and due on the first day of school.

This course is a hands-on, lab-oriented class designed for those students interested in medicine and medical technologies teaching them how the body works together to maintain health. Students will explore how the body works using Vernier technology, real life medical equipment, act as doctors to diagnose and treat fictitious patients, create, and present models of different systems/organs in the human body. Coursework includes dissections, case studies, simulations, and guest speakers. The course will culminate with students exploring a disease from beginning to end and creating and presenting their own patient case study.

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Advanced Placement

AP Biology (YR)

Two semesters, two credits

This course is eligible for PACC credit.
Prerequisite: Completion of Biology or Honors Biology; completion of Chemistry or Honors Chemistry.
This course is a second-year biology course, designed to be equivalent to an introductory biology course intended for biology majors during the first year of college. This course prepares students for the Advanced Placement exam in Biology. Students will explore major concepts in Biology, including cell structure and function, the cell cycle, DNA structure and function, principles of genetic inheritance, physiology and anatomy of animals and plants, biodiversity, ecology, and evolution. Students should have a strong understanding of basic biology and chemistry concepts. Given the amount of material covered on the AP exam, the course will move at a quick pace.

AP Chemistry (YR)

Two semesters, two credits

Prerequisite: Completion of Chemistry or Honors Chemistry.
This course is available for PACC credit. This course is a second-year chemistry course, designed to be the equivalent of the general course taken during the first year of college. This course prepares students for the Advanced Placement exam. It is structured around the six big ideas as described in the AP Curriculum Framework: including the structure of matter, properties of matter, chemical reactions, the rates of chemical reactions, thermodynamics, and equilibrium. A special emphasis will be placed on the seven science practices, which capture important aspects of the work in which scientists engage. Learning objectives will combine content with inquiry and reasoning skills during multiple hands-on laboratory investigations.

AP Environmental Science (YR)

Two semesters, two credits

Students should have completed one year of biology and one year of chemistry. Due to the quantitative analysis required in the course, students should also have taken at least one year of algebra.
The goal of this interdisciplinary course is to provide students with the scientific practices required to understand the interrelationships of the natural world. Students cultivate their understanding through inquiry-based lab investigations as they explore concepts such as energy transfer, interactions between earth systems, interactions between different species and the environment, and sustainability. Students learn to identify man-made and natural environmental problems, evaluate the relative risks associated with these problems, and identify sustainable solutions for resolving or preventing them. The AP Environmental Science course is designed to be the equivalent of a one-semester, introductory college course in environmental science.

AP Physics I (YR)

Two semesters, two credits

Prerequisite: Completion of Precalculus or Precalculus Blended Online.
AP Physics I is an algebra-based, introductory college-level physics course. Students cultivate their understanding of Physics through inquiry-based investigations as they explore the topics of kinematics, dynamics, circular motion and gravitation, energy, momentum, simple harmonic motion, torque and rotational motion, electrical charge and force, DC circuits, and mechanical waves and sound. Students should have a basic algebra background before enrolling in this course. Students should also plan to spend at least 25% of instructional time doing hands-on laboratory work, with an emphasis on inquiry- based investigations that allow opportunities to demonstrate foundational physics principles and apply important scientific practice.

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Biomedical Science II: AP Seminar: (YR)

Two semesters, two credits

Prerequisite: Biomedical Science I: Investigations. Students are required to complete a summer assignment due on the first day of school.

AP Seminar: Biomedical Science is first and foremost a science class. Students will focus their efforts on using the processes of biomedical science to study current areas of debate such as: genetic engineering in humans, animal use in research, effectiveness of stem cell therapies, pandemic preparedness, and cell phone radiation. Using the AP framework, Q.U.E.S.T. (Question, Understand, Evaluate Perspectives, Synthesize Ideas, and Team, Transmit, and Transform), will allow students to look deeply and thoroughly at complex issues through multiple lenses. Each topic addressed will have a series of experiments focused on the biomedical aspect. These experiments and the accompanying research techniques will offer a jumping off point for more questions and answers. The College Board will ask students to engage in two Performance Tasks: one as a team, the other as an individual. Each of these has a multimedia portion and an individual writing assignment. This course prepares the student for the AP Exam in May. College credit may be earned as part of the AP Capstone program. (see page 6 for Capstone program information).

Biomedical Science III: AP Research: (YR)

Two semesters, two credits, seniors only

Prerequisite: Completion of Biomedical Science II: AP Seminar.

Students will collaborate with other students, teachers, and/or professionals in their field of study to design and implement a research project or product. Students will focus on an area of personal interest in the biomedical field and study it in depth. Outcomes from the course may include publishing research findings, a professional poster symposium, participating in national research-related competitions, and/or an internship in the field. AP Research, the second course in the AP Capstone experience, allows students to deeply explore an academic topic, problem, issue, or idea of individual interest. Students' design, plan, and implement a yearlong investigation to address a research question. Through this inquiry, they further the skills they acquired in the AP Seminar course by learning research methodology, employing ethical research practices, and accessing, analyzing, and synthesizing information. Students reflect on their skill development, document their processes, and curate the artifacts of their scholarly work through a process and reflection portfolio. The course culminates in an academic paper of 4,000– 5,000 words (accompanied by a performance, exhibit, or product where applicable) and a presentation with an oral defense.