



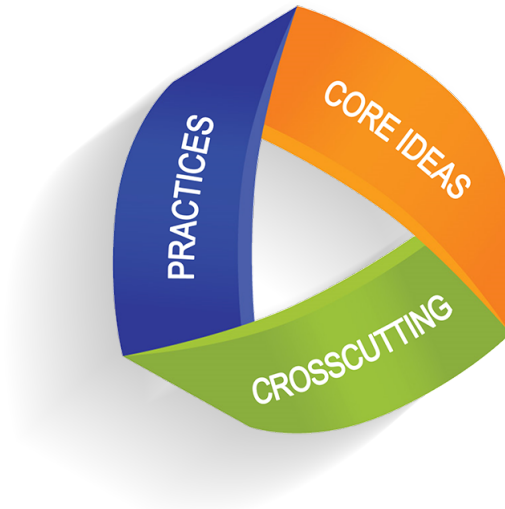
Developing Scientific Thinkers

The Office of Science believes that every student is a natural scientist. Children at very young ages ask questions and have a natural curiosity about the world. Through a robust curriculum and numerous experiences beyond the classroom, HCPS students of science expand their natural curiosity and discover a lifelong passion for science.

Harford County Public Schools Office of Science follows the standards established by the Maryland State Department of Education, which adopted the Next Generation Science Standards (NGSS) in 2013, replacing the Voluntary State Curriculum. The NGSS represents knowledge that students should have upon graduation from high school and was developed by a diverse group of scientists, researchers, and teachers.

Three dimensions of science are interwoven to provide a robust scientific experience for students. Unlike prior standards, the three dimensions of the NGSS give equal weight to the Disciplinary Core Ideas, the Science and Engineering Practices, and the Crosscutting Concepts, allowing for the integrated nature of the Next Generation Science Standards.

[Link to MSDE science site](#)



Disciplinary Core Ideas (DCIs) are the key ideas in science that have broad importance within or across multiple science or engineering disciplines. These core ideas build on each other as students progress through grade bands and are grouped into the following four domains: Physical Science, Life Science, Earth and Space Science, and Engineering.

Science and Engineering Practices describe what scientists do to investigate the natural world and what engineers do to design and build systems. The practices better explain and extend what is meant by “inquiry” in science and the range of cognitive, social, and physical practices that it requires. Students engage in practices to build, deepen, and apply their knowledge of core ideas and crosscutting concepts.

Crosscutting Concepts help students explore connections across the four domains of science, including Physical Science, Life Science, Earth and Space Science, and Engineering Design.

When these concepts, such as “cause and effect”, are made explicit for students, they can help students develop a coherent and scientifically based view of the world around them.

The Next Generation Science Standards provides progression charts for how students should develop in their understanding of science by providing guidance for skills, content, and thinking which align with a child’s cognitive development. HCPS Curriculum writers used these progressions, along with the NGSS and Evidence Statements to develop curriculum for the students of HCPS.

[Progression Chart for Crosscutting Concepts](#)

[Progression Chart for Science and Engineering Practices](#)

[Progression Chart for Disciplinary Core Ideas](#)

[Evidence Statements](#)

Maryland Integrated Science Assessment (MISA)

In Maryland, Science learning is formally assessed by the State of Maryland at three points during a student's learning career. Students in Grade 5 take the MISA, which assesses learning in Earth, Life, and Physical Sciences, as well as the Science and Engineering Practices and Crosscutting Concepts from grades 3-5. Students in Grade 8 take the MISA which assesses learning in Earth, Life, and Physical Sciences, as well as the Science and Engineering Practices and Crosscutting Concepts from grades 6-8. Students enrolled in High School Biology take the MISA which assesses the three-dimensional learning of Life Science content.

Unlike the other MISA exams, a student must take the HS LS MISA to graduate and it serves as an End of Course assessment for Biology students, taking the place of the school-based final exam. The score on the LS MISA will directly impact the student's course grade, as it will count 20% of the student's overall grade for the course. Students must pass the Biology course in order to meet MSDE graduation requirements. For further information about the Maryland Integrated Science Assessment and sample test items from each of the three assessments, please visit the [MSDE MISA webpage](#).

Science Instruction within HCPS

The Office of Science supports teachers of science through curriculum which is aligned to MSDE standards and developed by teams of HCPS teachers. Curriculum writers developed curriculum maps and corresponding lessons to provide to teachers of science from kindergarten through grade 12.

The [elementary curriculum](#) spirals from Kindergarten through Grade five. Each of the three disciplines, Earth, Life, and Physical sciences, is covered during each school year. Secondary students have a dedicated content during each of their years. MSDE standards, HCPS units and HCPS lesson titles can be accessed through clicking on the appropriate link below.

Primary	Intermediate	Middle School	High School*
Kindergarten	Grade 3	Grade 6 Earth Science	Grade 9 Biology
Grade 1	Grade 4	Grade 7 Life Science	Grade 10 Chemistry Integrated Physics and Chemistry

<u>Grade 2</u>	<u>Grade 5</u>	<u>Grade 8</u> <u>Physical Science</u>	<u>Grade 11</u> <u>Earth and</u> <u>Environmental Systems</u> <u>Physics</u>
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* Please note that a student’s specific course sequence may vary from what is listed and will be confirmed by the student’s counselor.

The curriculum provided by the Office of Science serves as a guide to classroom teachers. Classroom teachers have the autonomy to supplement curriculum and to substitute appropriate lessons which also align with the Next Generation Science Standards. Should you have questions about what is being taught in your student’s classroom, please reach out to your student’s teacher.

In addition to classroom curriculum, students extend their learning through various experiences that are offered. Fifth grade students participate in an overnight program at [Harford Glen](#) which serves as a culminating experience to their elementary science instruction. Students learn about environmental stewardship and are encouraged to develop and implement a stewardship project at their schools. Well-vetted High School students serve as counselors for the fifth-grade students, providing a unique opportunity for high school and elementary students to work alongside each other.

From elementary through high school, students have lessons embedded within the curriculum which take place ‘on the dome’ at one of our [three planetaria](#), led by one of our two planetarium directors. Since the planetarium space can be controlled for variables such as light and dark, the sky at any point in history can be displayed on the dome. This provides an astronomy experience for students that cannot be replicated in the classroom. Students can also experience lessons aligned with chemistry through emission spectra and how colored light impacts what our eyes see.

