

## Next Generation Science Standards (NGSS) and High School Course Sequences in Science Frequently Asked Questions

### Why are changes being made to the science program?

- In 2018, the Maryland State Department of Education (MSDE) made changes to graduation requirements in science. These changes require that students receive three credits in organized instruction aligned to the Next Generation Science Standards (NGSS), which engage students in the application of [science and engineering practices](#), [crosscutting concepts](#), and [disciplinary core ideas](#) of earth/space science, life science, physical science (chemistry and physics), engineering, and technology. MCPS began curriculum development and implementation of new curriculum aligned to these new standards beginning in 2013 with biology, 2015 with chemistry, and 2017 with physics.

### How has MCPS addressed the science requirements for graduation?

- In MCPS, graduation credit requirements in science will continue to include three credits (specific NGSS-aligned courses), one of which must be life science and one of which must be physical science. This approach offers a core pathway of biology, chemistry, and physics, or students can continue to take advantage of offerings in Advanced Placement (AP) courses and International Baccalaureate (IB) courses as options within the three-credit requirement.
- For the science assessment requirement, students graduating in June 2021 are scheduled to be required to pass the Maryland Integrated Science Assessment ([MISA](#)), according to MSDE. As of March 2019, passing scores have not been set.
- The secondary science curriculum has been developed to ensure that all standards, also known as performance expectations (PEs), are embedded in three core NGSS content areas (biology, chemistry, and physics), each with earth/space science PEs incorporated. AP courses and International Baccalaureate IB courses in science also satisfy the science credit requirements for graduation and infuse the necessary content areas.

### What are the recommended course options?

- The core NGSS pathway for students is biology, chemistry, and physics. These courses provide the opportunity for students to master all NGSS expectations. Other approved pathways also include AP/IB courses or physics in Grade 9. The [high school science course pathways chart](#) shows various sequences approved by the Office of Curriculum and Instructional Programs.

### Is Physics a required course?

- No. The NGSS physics course was designed to provide students an opportunity to experience the comprehensive course content in physical science, and earth/space science traditionally associated with physics. While success in this class will support success on

the MISA, the physics course is one of many options to fulfill the NGSS credit requirements. For students who opt to enroll in AP/IB courses in lieu of physics, instructional modules that include necessary concepts in physical science, and earth and space science will be embedded. In most cases, AP/IB courses are offered in double periods or over two years, providing additional instructional time to embed the necessary content.

### **How does a school decide which pathways to offer their students?**

- Schools are expected to offer the core pathway and also pathways that include AP or IB science courses. Many schools offer physics in Grade 9. These course offerings are based on multiple indicators, student interest, and input from the school community.

### **What is the High School Maryland Integrated Science Assessment?**

- The High School Maryland Integrated Science Assessment (HS MISA) is the new state science assessment that all students will be required to pass by 2021, aligned to the NGSS. Students in any of the approved pathways will be provided with sequences of instruction to master scientific concepts needed for success on the assessment. The integrated nature of the assessment means that test items will include concepts from life science, physical science (chemistry and physics), and earth/space science, but also includes application, crosscutting concepts, and engineering practices.
- The HS MISA consists of five, 40-minute sessions. In each of the sessions, students will read information and analyze data about two separate phenomena and respond to items about the phenomena. One of those items will be a constructed response item, and the others will be a combination of selected responses, fill-in-the-blanks, matching, and other technology-enhanced item types. More detail about the format of the MISA, as well as practice tests, can be found [here](#).

### **When is the MISA given and why?**

- Students take the HS MISA in the year they are enrolled in their third NGSS-aligned course. If the student is completing their third NGSS-aligned course during their sophomore year, they will take the HS MISA in May. If the student is completing their third NGSS-aligned course during their junior year, they will take the HS MISA in January.

### **Since the MISA is an integrated assessment, when are students given the opportunity to master the standards MSDE has identified as the targets for MISA?**

- All of the Performance Expectations (PEs) in the NGSS are distributed among the three core courses (biology, chemistry, and physics) and the AP/IB equivalents. The PEs associated with earth/space science are incorporated into the three core courses or within AP/IB instruction.

### **What is considered a passing score on the HS MISA to meet the graduation requirement?**

- The passing score for the HS MISA has yet to be determined by MSDE. MSDE has indicated that these scores will be released in November 2019.

**If a student passes an AP or IB exam, does she or he still need to take the MISA?**

- Yes. Presently, MSDE has not approved exempting students from the MISA even with passing scores from AP or IB assessments.

**In which concepts on the HS MISA will students be expected to show proficiency?**

- There are specific standards that will be assessed in four content areas; biology, chemistry, physics, and earth/space science. All of the Performance Expectations (PEs) in the NGSS are distributed among the three core courses (biology, chemistry, and physics) and the AP/IB equivalents. The PEs associated with earth/space science are incorporated into the three core courses or within AP/IB instruction.

**Which courses satisfy the science credit graduation requirement?**

- Per the 2019–2020 MCPS High School Course Bulletin, students must take three NGSS credits, including one life science (NGSS-BC) and one physical science (NGSS-PC) credit. The third science credit can be obtained from any course with the NGSS designation.

**Where can I go for more information about NGSS and the HS MISA?**

- The MSDE [website](#) provides additional information about the structure of the MISA and its content. A listing of all the standards in the NGSS are provided [here](#).

**What are the MCPS high school course sequences in science?**

| CORE PATHWAY |                |              |                  |
|--------------|----------------|--------------|------------------|
| GRADE 9      | GRADE 10       | GRADE 11*    | GRADE 12         |
| NGSS Biology | NGSS Chemistry | NGSS Physics | AP/IB Science    |
|              |                |              | Science Elective |

Other NGSS-aligned sequences, including options for AP and IB, also are available. For example, other approved pathways might include but are not limited to:

| PATHWAY OPTION 1 |                |               |  |
|------------------|----------------|---------------|--|
| GRADE 9          | GRADE 10       | GRADE 11*     | GRADE 12                                       |
| NGSS Biology     | NGSS Chemistry | AP/IB Science | AP/IB Science<br><b>OR</b><br>Science Elective |

| PATHWAY OPTION 2                           |                |  |               |
|--|----------------|--|---------------|
| GRADE 9                                    | GRADE 10       | GRADE 11*                                  | GRADE 12      |
| NGSS Physics<br><b>OR</b><br>AP/IB Physics | NGSS Chemistry | NGSS Biology<br><b>OR</b><br>AP/IB Biology | AP/IB Science |

\*Indicates students have completed the course requirements to take the MISA at the end of the grade level identified