

# SPS Science Alignment Questions and Answers

Below is a list of questions that have been asked about the purpose, process, and impact of our alignment to the Washington State Science Standards (NGSS).

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## Purpose of Alignment

### 1. *Why does SPS Science need to align?*

Washington state adopted [Next Generations Science Standards \(NGSS\)](#) as our state standards in 2013. These standards are more rigorous than our previous standards and require a change in pedagogy. Starting with the class of 2019, the Washington State Board of Education will also require [24 credits for graduation \(Core 24\)](#). Additionally, we also must consider the new high-stakes [Washington Comprehensive Assessment of Science \(WCAS\)](#) from the Office of the Superintendent of Public Instruction (OSPI) and the implications these

mandates have for student graduation. Seattle Public Schools science departments must change the scope and sequence of our core science courses to prepare students to meet NGSS, obtain 24 credits, and pass the WCAS.

2. *Why do we need a common scope and sequence?*

There are two main drivers of having a common scope and sequence across Seattle Public Schools. First, we are a large district with a wealth of wonderful teachers with excellent ideas, and a common scope and sequence will allow us to take best advantage of these resources. If we all work together on the same courses, we can make far better progress on improving those classes for students across Seattle Public Schools. Additionally, we have many students who change schools within the district during their high school careers. A common scope and sequence will allow the transition between schools to be easier for these students.

3. *Why must all courses change?*

The new state standards require Earth and Space Science (ESS) standards as well as Engineering, Technology and Application (ETS) content and skills. These will be embedded into each new science course. One key feature of this sequence is that all students will have access to core Biology, Chemistry and Physics content as well as ESS and ETS.

4. *Why is this shift happening now?*

In addition to responding to standards (NGSS) adopted in Washington in 2013, new credit requirements (Core 24), and a new high-stakes test (WCAS), this work was commissioned in response to a changing society. Today’s graduates require different skills than in the past. By shifting teaching practice and aligning to standards—which incorporate not only discipline-specific knowledge, but also scientific practices such as Engaging in Argumentation Based on Evidence, Constructing Explanations, and Designing Solutions—students will develop and refine skills that support strong engagement in a global community.

5. *When will the WCAS count for graduation?*

WCAS is required for graduation for the class of 2021 who will take the assessment in Spring 2010. Class of 2019 and 2020 will take the WCAS in Spring 2018 and 2019 respectively for federal accountability.

<b>Class of...</b>	<b>Science Assessment Spring 2018</b>	<b>Science Assessment Spring 2019 and beyond</b>
<b>2018</b>	None	None
<b>2019</b>	WCAS for federal accountability	None
<b>2020</b>	None	WCAS for federal accountability in 11th grade (2019)

2021	None	WCAS for graduation and federal accountability in 11th grade (2020)
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6. *Was the expressed reason for this change because of the test?*

In summary, these are the reasons for the change:

- We are moving from a 2-year science credit requirement to 3.
- Current 9th grade students will need to pass the Washington Comprehensive Assessment of Science to graduate.
- The rearranged course content ensures that standards for earth and space as well as engineering are covered in the first two years of science courses.
- The new standards are research-based and offer equitable opportunities for all students to build science literacy. The purpose of realignment is to prepare teachers with the pedagogical tools to ensure all students can meet standards in chemistry, physics, biology, earth and space, and related engineering standards.

## Process of Alignment

7. *Who is aligning SPS science?*

A science alignment team was formed in spring of 2016 to align SPS science. The team is represented by teachers from each of the district high schools and by teachers across the three core science content areas (Biology, Chemistry, Physics and Earth Science). Moreover, several of the Alignment Team members are the chair of their building Science Department, many are SPS Career Ladder Teachers and Content Demonstration Teachers, many have post-graduate degrees in science and/or education, and many are parents of current SPS students, or soon-to-be SPS students.

8. *What is the purpose of the Alignment Team?*

The alignment team was commissioned to create a standards-aligned common scope and sequence that would meet new graduation requirements for the class of 2021 and all students that follow. Additionally, the team communicated and sought input from the other science teachers in each building. Accordingly, all SPS high school science teachers had voice in this process.

9. *How long has the alignment process taken?*

The alignment began in 2013 through collaborations of teachers in both physical science and biology. These teachers came together to understand the new standards and to learn the requirements for changing their teaching practice. In the spring of 2016, the Alignment Team was commissioned. The team began its work together to make sense of the new standards, understand the shift in practice, and bundle the NGSS performance expectations into discrete courses. The team brought two proposals for bundling options to their buildings in the spring of 2017 seeking input from their building colleagues. The brought the input back to the team to discuss further. In June of 2017, the scope of the courses was

determined, with the sequence still to be determined. Again, options were brought back to the buildings in October 2017 for possible sequences. The Alignment Team met one final time in December of 2017 where each representative shared their building's views, asked questions of each other, and ultimately came to consensus on the sequence. Each individual on the alignment team contributed more than 120 hours on this alignment, including seeking feedback from colleagues and using that feedback to drive the decision around scope and sequence.

Now that the scope and sequence has been determined, we continue our alignment work to inform the community, develop curriculum, and provide supports for teachers in shifting their practice.

*10. Who has been informed of the changes in science?*

The Alignment Team, as well as Ms. Welch, have also worked diligently to inform stakeholders in this work. The team has repeatedly met with their own science departments to provide information, ideas, and receive feedback. They have also met with their own building administrations to share progress and clarify questions and concerns. Ms. Welch has met with building principals, counselors and registrars, and has scheduled community meetings at multiple high schools in the coming month.

The dates of upcoming professional development sessions taking place in the spring of 2018 will be shared with all teachers across the district, in addition to other opportunities, including a week-long session in August.

*11. Why have parents not been informed?*

Parents have been informed each year during curriculum nights. Teachers who have participated in the alignment through physical science and biology collaborations have shared their shift to the new standards through these evening parent events in their schools. Teachers have shared how their team is learning how to craft a unit by starting with an engaging, authentic real-world phenomenon, eliciting students' prior knowledge and then carefully crafting a series of evidence gathering activities to help their student make sense of the phenomena. The unit culminates with student explaining the phenomena by citing evidence. The teachers have shared the data of student learning gains through the assessment data and case study data that we have collected in collaboration with our university partners.

*12. What has informed your considerations for the unit development?*

Our work as an Alignment Team has been informed by multiple evidence-based practices. In collaboration with multiple universities, including the University of Washington, we have worked to understand and implement the methodology of using explanatory phenomenon and a complimentary driving question(s) to deepen students' understanding of core science content by arranging well-crafted lessons in a storyline that allows students to figure out key learnings.

While there is some new content in NGSS, much of the content remains the same as past standards. What has changed is the arrangement of this content into semester courses to make use of this pedagogy.

*13. Are teachers creating this on their own?*

Science teachers across the district, have been part of professional development opportunities and district-wide curriculum collaborations funded by grants obtained by the SPS Science Program that support implementation of these pedagogical practices and standards. For example, Biology has been collaborating with Michigan State University through an NSF grant for the past 4 years, and Phys A and Chem A teachers have been working together through a collaborative grant with Seattle Pacific University and Boeing for the past 5 years. Furthermore, each year, SPS science teachers meet for one week in the summer and three release days during the year to understand deeply the shift in pedagogy, new assessments and how to organize the content for alignment.

## **Impact of Alignment**

*14. What is the new standard sequence?*

	9 <sup>th</sup> grade	10 <sup>th</sup> grade	11 <sup>th</sup> grade
Semester 1	Physics A	Biology A	Chemistry B
Semester 2	Chemistry A	Biology B	Physics B

*15. Why is physics and chemistry split into 9th and 11th grade?*

The Alignment Team considered the concern regarding student preparation for mathematical portions of chemistry and physics. The standards which required a deeper understanding of mathematics were placed into the Chem B and Phys B courses which students would take as 11th graders when they would have deeper mathematical foundations. “Using mathematical and computational thinking” is one the Science and Engineering Practices required by NGSS.

The timing of the WCAS in 11th grade is another reason for the chosen sequence. 11th graders taking both chemistry and physics in their assessment year is an opportunity for teachers to review standards from their 9th grade year in preparation for the WCAS.

Science is inherently integrated and interdisciplinary. Ultimately, students will be able to use principles of Physics to develop their understanding of Chemistry, and their understanding of Chemistry to develop their understanding of Biology, and so on. Consequently, the determined scope and sequence takes a spiraling approach such that students revisit standards multiple times throughout the science education, helping strengthen knowledge and prepare them for the new high-stakes science assessment given at the end of the 11th grade year.

We made a commitment that all students will have touchpoints in each of chemistry, physics and biology in the first 2 years. This will offer students a deeper understanding of each discipline to make a best choice for their junior year options. Additionally, since these courses are contained within one semester, it will offer opportunities for remediation if necessary in any one semester course without losing an entire year of credit.

*16. When can my student take advanced courses such as AP and IB?*

Multiple pathways are possible in the 11th grade year. AP/IB courses may substitute for Chemistry B and/or Physics B. We will work throughout the upcoming year to determine the prerequisites for each of our AP and IB courses moving forward.

*17. Will universities accept a chemistry or physics course that is split over 2 years?*

Outreach to many universities, including the University of Washington and Seattle Pacific University, has proven that these institutions are supportive and excited by changes being made to science teaching because of this alignment.

*18. How will this alignment impact academies such as Ballard's Biotech Academy?*

The district Curriculum, Assessment and Instruction department is working with schools that have unique pathways requirements, including Ballard's Biotech Academy to accommodate the pathway for those students. We are fully supporting these academies.

*19. How will this alignment disrupt the electives?*

With the new 3-year graduation requirement for science, we are anticipating an increased interest in students taking electives after their core. It is the obligation of our district to provide all students with standards-aligned courses required for graduation. The first two years provide the core requirements for all students. Selections can be made by students and their parents during the 3rd year with guidance from teachers and counselors.

*20. How will this alignment impact HCC students?*

HCC students have been tested in to a highly capable program and have alternative pathways in subjects besides science. Currently HCC students are on a two-year accelerated pathway and as they have learned required high school standards, can opt for different alternative courses.

*21. Are ALL schools required to do this sequence? Or is this "recommended"?*

Our High School Alignment Team, represented by all Seattle high schools, was commissioned to create a standards-aligned common scope and sequence that would meet new graduation requirements for current 9th graders and all students that follow. As the scope and sequence will create student capacity to take the newly-required 3rd year of science, the sequences are required.