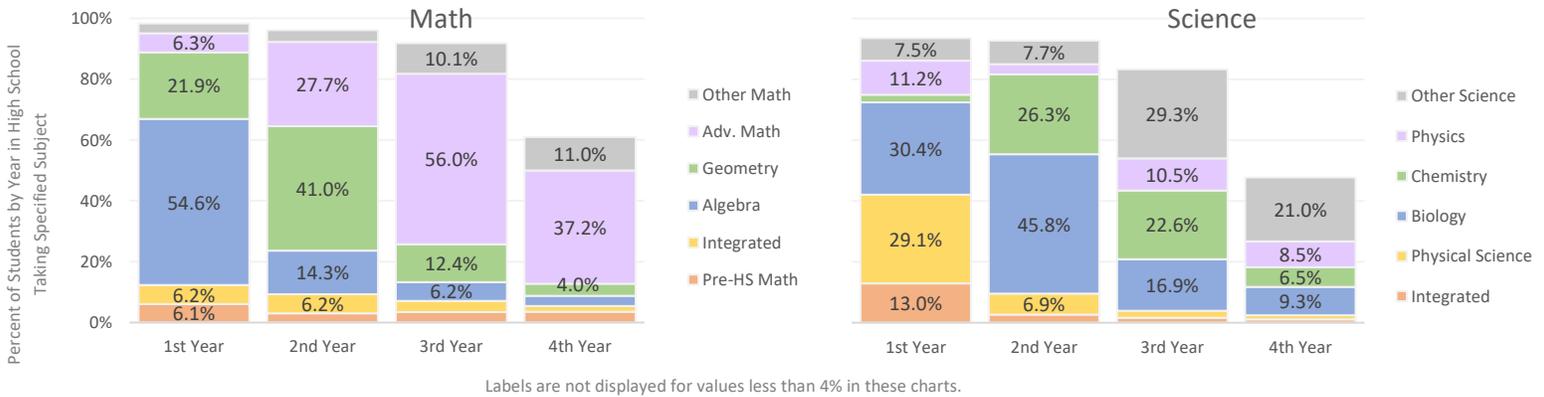


## High School Math and Science Course Taking Patterns

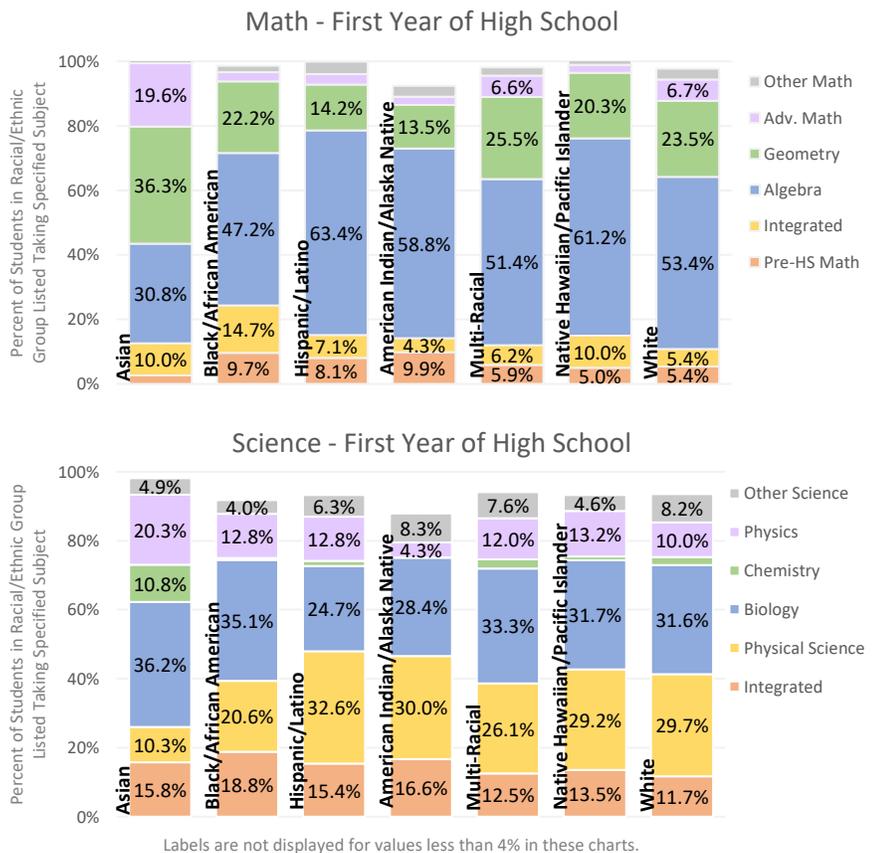
### Percentage of Students Taking Math and Science Courses by Course Type and Year in High School

54.6% of students who were in their first year of high school took Algebra<sup>1</sup>, and there is a clear pattern of progression with students in their second year having taken Geometry and students in their third year having taken advanced math courses.<sup>2</sup> In science, roughly the same percentage of students who were in their first year of high school took Physical Science as took Biology. However, Biology was the most common science course taken by students in their second year (45.8%).<sup>3</sup> See page 3 of this report for more information about students not enrolled in math and science.



### Race/Ethnicity

Breaking this down into student racial/ethnic groups for students who were in their first year of high school, the most common math course taken by all racial/ethnic groups except Asian students was Algebra. This is particularly noticeable with 63.4% of Hispanic students having taken Algebra and only 30.8% of Asian students having taken this course. The most common math course for Asian students was Geometry, and a trend can be found with Asian students having taken advanced math courses throughout their high school years. In Science, 36.2% of Asian students and 35.1% of Black/African American students were taking Biology, making it the most common science course for these student groups. 32.6% of Hispanic students were taking Physical Science, making this the most common science course for this student group.



<sup>1</sup> School Districts might interpret course codes differently depending on the local instruction provided.

<sup>2</sup> Advanced math courses include Algebra II or higher.

<sup>3</sup> Data are pulled for the 2016-17 school year and include students who were reported in both the 16-17 Class Roster Collection and the 16-17 3<sup>rd</sup> Period Cumulative ADM Collection. Data are limited to students who were enrolled in courses on May 1, 2017 at an Oregon public school for more than 25 consecutive days, whose High School Entry Cohort Year is 13-14, 14-15, 15-16, 16-17, and who were enrolled within their reporting district for a full-academic year. It excludes students whose only ADM records were for "college coursework". Totals may not sum to 100 due to rounding or students taking more than one math/science course at the same time.

### Gender

These tables show the percent of students (within their gender group and year in high school) enrolled in the listed courses. The differences are shown in bold.<sup>4</sup>

1st Year	Pre-HS	Geometry	Biology
Female	5.0%	23.3%	31.6%
Male	7.1%	20.6%	29.2%
Difference	<b>-2.1%</b>	<b>2.7%</b>	<b>2.4%</b>

2nd Year	Algebra	Geometry	Adv. Math	Chemistry
Female	12.6%	42.1%	29.5%	27.6%
Male	15.9%	39.9%	25.9%	25.0%
Difference	<b>-3.2%</b>	<b>2.1%</b>	<b>3.6%</b>	<b>2.6%</b>

3rd Year	Adv. Math	Other Sci.	Physics	Biology
Female	58.8%	31.6%	7.8%	18.2%
Male	53.4%	27.1%	13.1%	15.7%
Difference	<b>5.4%</b>	<b>4.5%</b>	<b>-5.3%</b>	<b>2.5%</b>

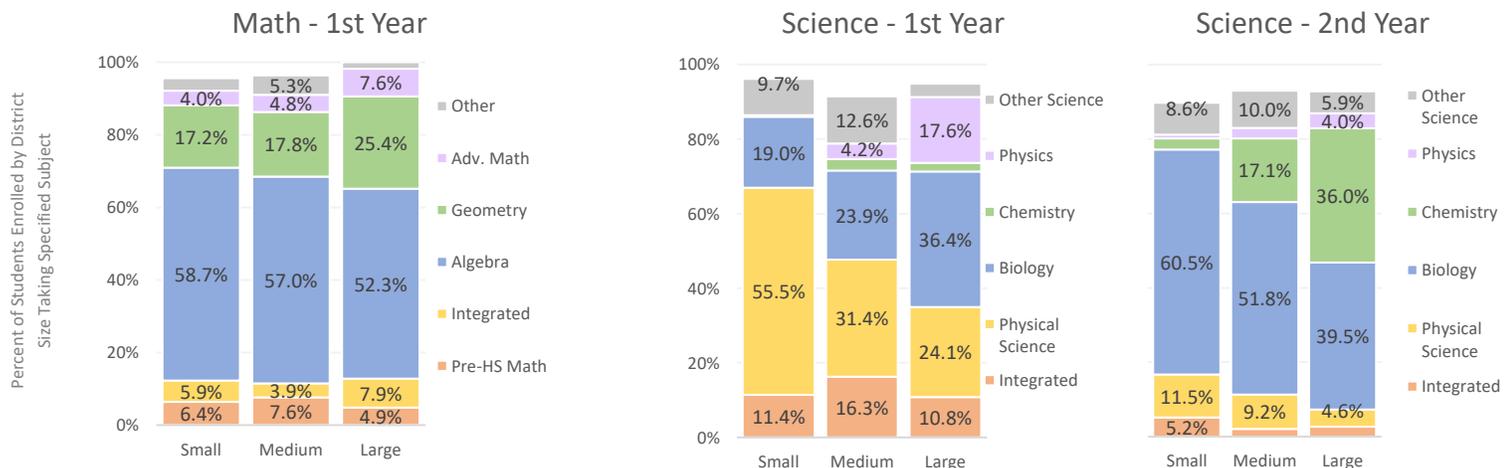
4th Year	Physics	Biology
Female	6.7%	10.4%
Male	10.3%	8.2%
Difference	<b>-3.7%</b>	<b>2.2%</b>

In Math, females are more likely to be taking higher level math courses earlier in their high school career than males. In Science, female students are also more likely to be taking higher level courses earlier, but the advanced course taking subjects show much variation between females and males in the 3<sup>rd</sup> and 4<sup>th</sup> years of high school. Female students are more likely to take Biology or other Biology-related courses, whereas male students are more likely to take Physics. In their 4<sup>th</sup> year in high school, 9.4% of the female population took Advanced Biology compared to 5.8% of the male population, and 10.5% of the female population took Anatomy and Physiology, while only 5.3% of the male population took this course.

### District Size

When these data are broken down by the size of the district<sup>5</sup> in which a student attends, large districts have a larger percentage of students taking higher level math courses by year in high school than small or medium districts, and they also have a larger percentage of students taking math courses on May 1 overall. These data are displayed in the *Math – 1<sup>st</sup> Year* chart below.

Science classes vary even more amongst district size. The majority of students who were in their first year of high school and who attended school in a large district were enrolled in Biology, while the majority of students in medium or small districts were enrolled in Physical Science. This pattern of larger districts having a larger percentage of students having taken higher level science courses continues into the second year of high school, with 36.0% of students in large districts and only 3.0% of students in small districts having taken Chemistry.

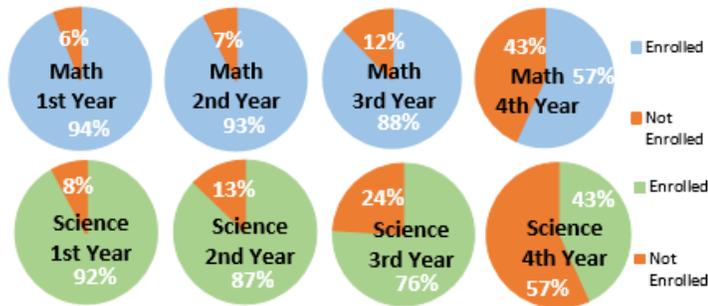


Labels are not displayed for values less than 4% in these charts.

<sup>4</sup> Gaps of less than 2% are not included in these charts.

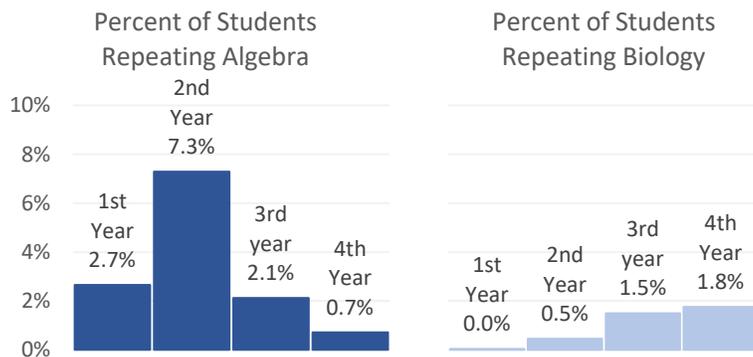
<sup>5</sup> Large districts are defined as districts with more than 6999 students; Medium districts are defined as districts with a student count between 1000 and 6999; Small districts are defined as districts with less than 1000 students. Labels are not displayed for values less than 4% in these charts.

**Enrolled vs. Not Enrolled**



The percentage of students not enrolled in math and science increases each high school year, and does so significantly in the 4<sup>th</sup> year. 56.8% of students in their fourth year of high school were not enrolled in a science course and 43.1% were not enrolled in a math course. To receive an Oregon diploma, students must complete 3 years of math, starting at Algebra I or higher<sup>6</sup>, and 3 years of science. Some students take multiple math or science courses at the same time to achieve these requirements. 8.4% of students in their second year of high school were enrolled in more than one science course at the same time.

**Repeating Algebra I**



Algebra I is a required course for receiving an Oregon High School Diploma. Looking at repetition rates, 7.3% of students who were in their second year of high school were repeating Algebra, which is the most common year to repeat this course. Another common course, Biology, is displayed above for comparison, since it is not specifically required for graduation.<sup>7</sup> There are very few students who repeat Algebra for a third year. The largest percent by year is 0.8% of students who were in their third year of high school, relative to 1.3% who were taking it for a second time in their third year of high school.

**Students in their 2<sup>nd</sup> Year of High School**

There are significant differences in the race/ethnicity of students who were repeating Algebra. 10.7% of Hispanic students in their second year of high school were repeating Algebra, followed by 9.8% of American Indian/Alaska Native students. Only 1.6% of Asian students in their second year of high school repeated Algebra.

Race/Ethnicity	Percent <sup>8</sup>
Asian	1.6%
Black/African American	7.7%
Hispanic	10.7%
American Indian/Alaska Native	9.8%
Multi-Ethnic	6.5%
Native Hawaiian/Pacific Islander	6.9%
White	6.5%

In conclusion, differences in math and science course taking patterns can be seen based on different factors, such as years in high school, race/ethnicity, gender, district size, and graduation requirements. Based on the number of students who were not taking a math or science course in their fourth year of high school and the number of students who repeated Algebra, one of the strongest factors to predict math and science enrollment may be the Oregon Diploma requirements, but other factors should also be considered. Many research studies about math and science course taking patterns exist. One study (Martinez, 2017)<sup>9</sup> concludes that student race/ethnicity can predict math course taking patterns due to student attitudes about their own math achievement. Another study (Reyes & Domina, 2017)<sup>10</sup> points out the correlation between taking four years of math courses in high school and the student's college expectations.

<sup>6</sup> Applied and integrated courses aligned to standards can meet credit requirements.

<sup>7</sup> Three years of science are required for the Oregon Diploma, but specific science courses are not.

<sup>8</sup> Displays the percent of students within that particular racial/ethnic group who are repeating Algebra.

<sup>9</sup> Martinez, James. "Mathematics Attitudes and Achievement of US High School Sophomores Based on Race." *Critical Questions in Education* 8.1 (2017): 17-26

<sup>10</sup> Reyes, Marcela, and Thurston Domina. "Track Placement and the Motivational Predictors of Math Course Enrollment." *Teachers College Record* 119.12 (2017): n12.