Pathways in Technology Early College High School

MSAR #11304

Analysis Report

ED § 7-1806(b)

December 2023

MARYLAND STATE DEPARTMENT OF
EDUCATION
EQUITY AND EXCELLENCE

MARYLAND STATE DEPARTMENT OF EDUCATION

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Executive Summary

Pathways in Technology Early College High (P-TECH) Schools were developed by International Business Machine (IBM) to create clear pathways from high school to college and careers for students. In six years or less, students graduate with a high school diploma and a no-cost, two-year Associate of Applied Science (AAS) Degree. Each P-TECH program requires a partnership among a local education agency (LEA), local institution(s) of higher education (IHE), and local employer(s). P-TECH LEA staff collaborate with the Maryland State Department of Education (MSDE), industry partners, and a local institution of higher education to implement an academically rigorous and economically relevant curriculum aligned to workforce needs. The program includes one-on-one mentoring, workplace visits, skills instruction, paid summer internships, and first-in-line consideration for job openings with the school's partnering company.

Currently, P-TECH is implemented in nine high schools in the following LEAs and Baltimore City: Allegany, Baltimore, Harford, Montgomery, and Prince George's. With continued support from the Governor and General Assembly, Maryland is building a strong statewide network of P-TECH stakeholders working together to prepare Maryland students for high-wage, in-demand career opportunities. P-TECH in Maryland supports the Blueprint for Maryland's Future Pillar 3- College and Career Readiness by connecting high school students with postsecondary education, access to industry recognized credentials and work-based learning opportunities.

As outlined in the P-TECH Act of 2017, this report provides an analysis of the annual P-TECH data reported, and an evaluation of whether the P-TECH program is successful in preparing students for the workforce or for further postsecondary education. Key takeaways from this analysis are to continue P-TECH in Maryland through full completion of current cohorts, reconnect and reinvest industry partners through expansion of student engagement opportunities and apprenticeship models, and restructure and align all P-TECH programs with transfer agreements to 4-year IHE programs for greater access to postsecondary education.

Methods

MSDE's Office of College and Career Pathways (OCCP), in partnership with MSDE's Division of Assessment, Accountability, and Performance Reporting (DAAPR) developed policies, processes, and tools to collect and analyze required data submitted by each P-TECH LEA. Per the P-TECH Act of 2017 (Senate Bill 0319), MSDE is required to submit the following data points annually to the Governor and General Assembly:

- Number of students enrolled in each P-TECH school.
- Industry Partners Associated with Each P-TECH school.
- Pathway Sequence created for each P-TECH school.
- How P-TECH students performed on federal and state assessments.
- Number of P-TECH students graduating from each P-TECH school and receiving a high school diploma and an associate degree.
- The year in which each P-TECH student graduated and received the degree.
- Number of P-TECH students in each P-TECH school who receive paid internships with each industry partner.
- Number of P-TECH students in each P-TECH LEA school on track for on-time completion of the pathway sequence.
- The rate of attrition, if any, from each P-TECH school by grade and by cohort.
- Number of students at each P-TECH school who have an IEP plan, have a 504 plan, or are English language learners.

- Percentage of P-TECH students who meet the free and reduced meal plan income criteria in each P-TECH school.
- Number of P-TECH students in each P-TECH school who, by the 4th year of the pathway sequence, complete the requirements for a high school diploma.
- Number of P-TECH students in each P-TECH school who are employed after completion of the pathway sequence with each industry partner, or who matriculate to a public or private senior higher education institution after finishing the pathway sequence.
- Base and supplemental costs of operating a P-TECH school.
- Total amount of funds distributed to each P-TECH school.
- An accounting of each P-TECH school's expenditures.
- Whether all funds distributed were spent.

Please note that most P-TECH data, apart from funding data, is self-reported by the LEA. Additionally, not all data points included in the P-TECH Act of 2017 could be reported at the time of this analysis because most P-TECH students have not fully matriculated through the program.

OCCP will conduct site visits at each P-TECH school during the 2023-2024 school year to collect qualitative data through focus groups with P-TECH students, parents, teachers/counselors, administrators, and industry partners. Unfortunately, that data will not be available at the time of this report but will be used to continue to enhance the program by providing additional guidance and support for P-TECH in Maryland schools as more students fully complete their respective programs.

Results: Analysis of the Annual Data Reported

The P-TECH Analysis report requires MSDE to analyze annual data submitted by LEAs and determine whether the P-TECH program is successful in preparing students for the workforce or for further postsecondary education. The tables and charts below show the data categorized in the following sections: Overview; Enrollment, Attrition, and Completion Trends; Graduation Data; Assessment Performance Trends; Support Services; and Funding.

OVERVIEW

Table 1: Industry Partners and Pathway Sequence Associated with Each P-TECH School

P-TECH schools enable students to gain critical academic, technical, and workplace skills through the attainment of an in-demand, industry-recognized associate degree. Students participate in a rigorous, relevant academic and career pathway that starts in grade nine and culminates in the attainment of an associate degree and high school diploma in up to six years. The collaboration of the LEA, IHE(s), and industry partner(s) provides a career pathway focused on the knowledge and skills students need for targeted jobs in high-tech, high demand fields.

Table 1 displays the P-TECH LEA, school, IHE partner(s) and current and former industry partner(s). Industry partners with an asterisk are former industry partners.

LEA/ Institution of Higher Education	School	Career Pathway	Industry Partner	Program Start	1st 4-year Graduation Year	1st 6-year Graduation Year
Allegany County Public Schools / Allegany College of Maryland	Center for Career and Technical Education (Students attend the Center for CTE during 11th and 12th grades. Home high schools are Allegany High School, Bishop Walsh High School, Fort Hill High School or Mountain Ridge High School)	• Information Technology • Cybersecurity	• Allegany College of Maryland • Allegany County IT Department • Allegany County Public Defender's Office • Allegany County Public Schools • Exclamation Labs* • First United Bank and Trust* • IBM* • Maryland Business Roundtable • Northrop Grumman* • University of Maryland Extension • University of Pittsburg Medical Center Western Maryland (formerly Western MD Health Systems) • Willets Systems, Inc.	Fall 2017	2021	2023
Baltimore City Public Schools / Baltimore City Community College	Carver Vocational-Technical High School	• Cybersecurity Assurance • Computer Information Systems	• IBM	Fall 2016	2020	2022

LEA/ Institution of Higher Education	School	Career Pathway	Industry Partner	Program Start	1st 4-year Graduation Year	1st 6-year Graduation Year
	Digital Harbor High School (program offered at New Era Academy from 2018-2023)	• Supply Chain Management	• Baltimore Port Alliance	Fall 2018	2022	2024
	Paul Laurence Dunbar High School	• Nursing • Respiratory Care • Physical Therapy Assistant • Health Information Technology • Surgical Technology • General Science	• Johns Hopkins Hospital • Kaiser Permanente* • University of Maryland, Baltimore	Fall 2016	2020	2022
Baltimore County Public Schools / Community College of Baltimore County	Dundalk High School	• Engineering Technology	• Whiting-Turner Contracting • KCI Technologies • Stanley Black and Decker • Johnson Controls	Fall 2018	2022	2024
	Owings Mills High School	• Design, Fabrication, and Advanced Manufacturing	• Becton Dickinson • Direct Dimensions • McCormick & Company • North American Millwright • Northrop Grumman* • Potomac Photonics • Strategic Factory	Fall 2020	2024	2026

LEA/ Institution of Higher Education	School	Career Pathway	Industry Partner	Program Start	1st 4-year Graduation Year	1st 6-year Graduation Year
Harford County Public Schools / Harford Community College	Joppatowne High School	• Computer Information Systems • Cybersecurity	• U.S. Army Communications-Electronics Command (CECOM) at Aberdeen Proving Ground	Fall 2020	2024	2026
Montgomery County Public Schools / Montgomery College	Clarksburg High School	• Network and Information Technology	• Daly Computers, Inc. • Information Technology Foundation	Fall 2018	2022	2024
Prince George's County Public Schools / Prince George's Community College	Frederick Douglass High School	• Health Information Management • Hospitality Services Management	• Continental Societies Incorporated* • Employ Prince George's • Luminis • Marriott • MedStar • MGM National Harbor • Prince George's County Youth/Summer Youth Employment Program • Smart1 Management Solutions • Six Flags	Fall 2017	2021	2023

ENROLLMENT, ATTRITION, AND COMPLETION TRENDS

Figure 1 identifies the enrollment numbers from the start of each program through Fall 2023 for each P-TECH high school. LEAs submit P-TECH enrollment data to the MSDE P-TECH Fall Enrollment Validation File each year, which is used to verify the annual funding amount of $750 per enrolled student for each P-TECH school.

IHEs submit student enrollment by course as a part of the annual funding request to MSDE. This is because the amount of P-TECH Supplemental College Funds awarded to IHEs is determined by the number of courses in which students enroll and not the total number of P-TECH students enrolled in college. P-TECH students take multiple postsecondary courses each year. An aggregate enrollment count of P-TECH students in IHEs would not be sufficient to determine the amount of funds required to cover per credit tuition costs and fees. As a result, total IHE enrollment is not included in this report.

Based on the data reported, most P-TECH schools increased enrollment for the first four years of the program. Additionally, P-TECH Digital Harbor was formerly offered at New Era Academy. Due to the transition from New

Era to Digital Harbor, enrollment dropped during the 2021 and 2022 school years. Enrollment increased in Fall 2023, the first semester the program was offered at Digital Harbor.

Figure 1: Number of Students Enrolled in each P-TECH School

Figure 1: Number of Students Enrolled in each P-TECH School

Legend: ■ 2016 ■ 2017 ■ 2018 ■ 2019 ■ 2020 ■ 2021 ■ 2022 ■ 2023
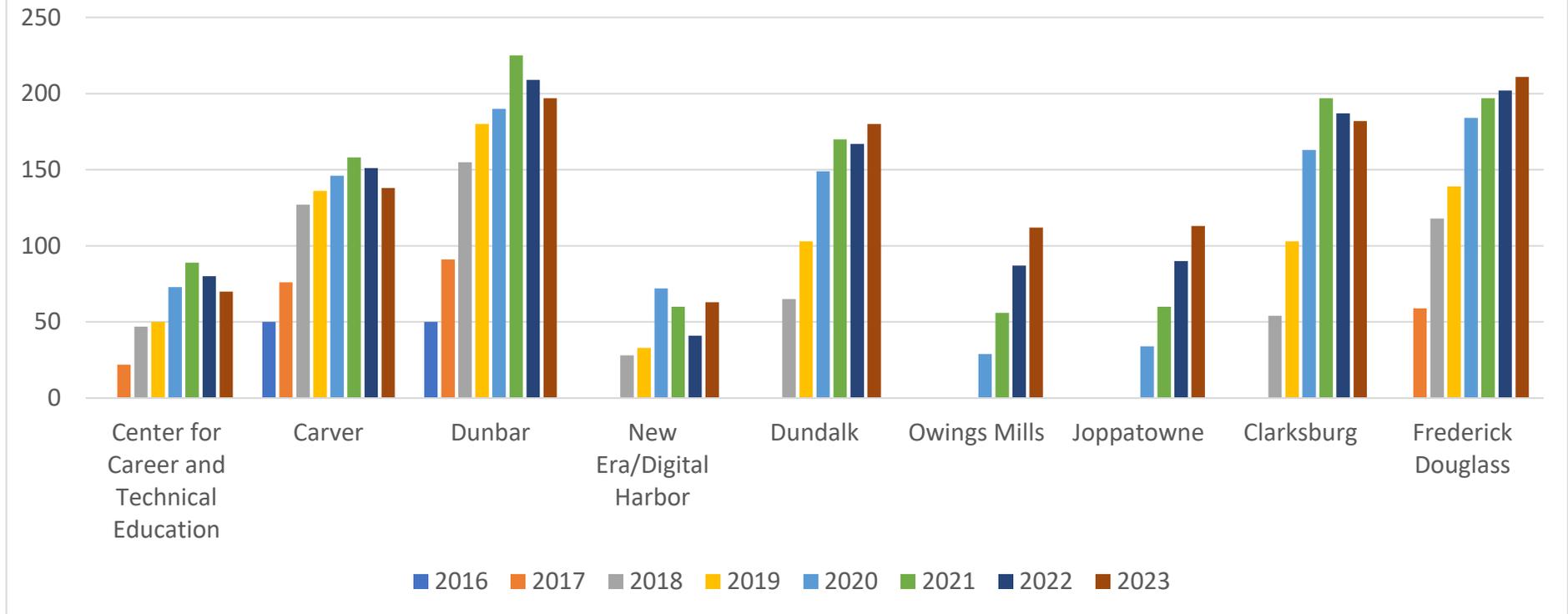
Table 2: The Rate of Attrition, if any, From Each P-TECH School by Grade and by Cohort

The Governor and General Assembly require MSDE to report the rate of attrition from each P-TECH school by grade and cohort. The attrition rates below describe the number of students that exited P-TECH pathways prior to earning their associate degree. Table 2 identifies the average rate of attrition by school and grade. While the average rate of attrition for all schools and grade levels is about 15%, some schools, including Owings Mills High School, saw an increase in overall enrollment.

Local Education Agency	School	Grade or Year	Average Attrition Rate
Allegany County	Center for Career and Technical Education	Grade 9	5%
		Grade 10	22%
		Grade 11	10%
Baltimore City	Carver Vocational-Technical High School	Grade 9	38%
		Grade 10	21%
		Grade 11	6%
	Digital Harbor High School (program offered at New Era Academy from 2018-2023)	Grade 9	18%
		Grade 10	31%
		Grade 11	27%
	Paul Laurence Dunbar High School	Grade 9	26%
		Grade 10	21%
		Grade 11	4%
Baltimore County	Dundalk High School	Grade 9	15%
		Grade 10	20%
		Grade 11	33%
	Owings Mills High School	Grade 9	20%
		Grade 10	+3%

Local Education Agency	School	Grade or Year	Average Attrition Rate
		Grade 11	+22%
Harford County	Joppatowne High Schools	Grade 9	11%
		Grade 10	4%
		Grade 11	32%
Montgomery County	Clarksburg High School	Grade 9	10%
		Grade 10	12%
		Grade 11	21%
Prince George's County	Frederick Douglass High School	Grade 9	10%
		Grade 10	10%
		Grade 11	3%

Table 3: P-TECH Completion Data

The Governor and General Assembly require MSDE to report the total number of students who have graduated from the program and the percentage of completion rates. Data is not reported for Owings Mills High School in Baltimore County and Joppatowne High School in Harford County because there were no seniors enrolled in the program until the 2023-2024 school year, which will not be collected until Fall 2024. As a result, only enrollment data are reported for P-TECH schools who have had graduating seniors through the 2022-2023 school year. Table 3 on the next page demonstrates the total numbers for the following data points:

- Number of P-TECH students in each P-TECH school on track for on-time completion of the pathway sequence.
- Number of P-TECH students in each P-TECH school who, by the fourth year of the pathway sequence, complete the requirements for a high school diploma.
- The Number of P-TECH students graduating from each P-TECH school and receiving a high school diploma and an associate degree.
- Number of P-TECH students in each P-TECH school who are employed after completion of the pathway sequence with each industry partner or who matriculate to a public or private senior higher education institution after finishing the pathway sequence.

P-TECH Reporting Requirements	Allegany County Public Schools	Baltimore City Public Schools			Baltimore County Public Schools		Harford County Public Schools	Montgomery County Public Schools	Prince George's County Public Schools
	Center for Career and Technical Education	Carver	Dunbar	New Era Academy[1]	Dundalk	Owings Mills	Joppatowne	Clarksburg	Frederick Douglass
Total number of students on track for on-time completion of the Pathway sequence[2]	179	313	445	108	544	149	200	657	687
Total number of P-TECH students who completed P-TECH (associate degree and high school diploma) in 4 years	*	16	*	*	*	N/A[3]	N/A[3]	24	94
Total number of students who graduated with a high school diploma and associate degree	11	21	*	*	*	N/A[3]	N/A[3]	24	94
Total number of P-TECH students employed by the industry partner after completion of program sequence	*	*	*	*	*	N/A[3]	N/A[3]	*	*
Total number of Post-graduates enrolled in 4-year institution of higher education	*	*	*	*	*	N/A[3]	N/A[3]	*	76

[1]Program transferred to Digital Harbor High School beginning in school year 2023-2024.

[2]This total number is a calculation of all students who were on track for on-time completion as reported each year. MSDE does not maintain student level data on file in order to filter duplications from year to year.

[3]Programs do not have graduates at the time of this report.

* Data are suppressed with an asterisk (*) when the number of students in the group is less than 10.

GRADUATION DATA

The data presented in tables 4, 5 and 6 demonstrate the year in which each P-TECH student graduated and received the degree. Table 4 lists the number of P-TECH students who graduated high school with an associate degree within four years. Table 5 lists the number of P-TECH students who graduated high school with an associate degree within five years. Table 6 lists the number of P-TECH students who graduated high school with

an associate degree within six years. N/A is listed for programs that did not have graduates during the respective school year. No data reported notes that the LEA did not provide data for the respective school year.

According to the data reported, a total of 141 P-TECH in Maryland students graduated from high school with a high school diploma and associate degree in four years, 13 total students graduated with a high school diploma and associate degree in five years, and 8 total students graduated with a high school diploma and associate degree in six years. Two P-TECH schools, Joppatowne and Owings Mills, did not have graduates at the time of this report. Additionally, over half of P-TECH programs do not yet have 6-year students.

Table 4: Number of P-TECH students who graduated high school with an associate degree within 4 years.

Local Education Agency	School	2020	2021	2022	2023
Allegany County Public Schools	Center for Career and Technical Education	N/A[1]	*	*	*
Baltimore City Public School System	Carver Vocational-Technical High School	13	No Data reported[2]	*	*
	Digital Harbor High School (formerly offered at New Era Academy)	N/A[1]	N/A[1]	*	*
	Paul Laurence Dunbar High School	*	*	*	*
Baltimore County Public Schools	Dundalk High School	N/A[1]	N/A[1]	*	*
	Owings Mills High School	N/A[1]	N/A[1]	N/A[1]	N/A[1]
Harford County Public Schools	Joppatowne High School	N/A[1]	N/A[1]	N/A[1]	N/A[1]
Montgomery County Public Schools	Clarksburg High School	N/A[1]	N/A[1]	*	24

Local Education Agency	School	2020	2021	2022	2023
Prince George's County Public Schools	Frederick Douglass High School	N/A[1]	21	38	35

Table 5: Number of P-TECH students who graduated high school with an associate degree within 5 years.

Local Education Agency	School	2020	2021	2022	2023
Allegany County Public Schools	Center for Career and Technical Education	N/A[1]	N/A[1]	*	*
Baltimore City Public School System	Carver Vocational-Technical High School	N/A[1]	No Data Reported	*	*
	Digital Harbor High School (formerly offered at New Era Academy)	N/A[1]	N/A[1]	N/A[1]	*
	Paul Laurence Dunbar High School	N/A[1]	No Data Reported	*	*
Baltimore County Public Schools	Dundalk High School	N/A[1]	N/A[1]	N/A[1]	*
	Owings Mills High School	N/A[1]	N/A[1]	N/A[1]	N/A[1]
Harford County Public Schools	Joppatowne High School	N/A[1]	N/A[1]	N/A[1]	N/A[1]
Montgomery County Public Schools	Clarksburg High School	N/A[1]	N/A[1]	N/A[1]	*

Local Education Agency	School	2020	2021	2022	2023
Prince George's County Public Schools	Frederick Douglass High School	N/A[1]	N/A[1]	*	*

Table 6: Number of P-TECH students who graduated high school with an associate degree within 6 years.

Local Education Agency	School	2020	2021	2022	2023
Allegany County Public Schools	Center for Career and Technical Education	N/A[1]	N/A[1]	N/A[1]	*
Baltimore City Public School System	Carver Vocational-Technical High School	N/A[1]	N/A[1]	*	*
	Digital Harbor High School (formerly offered at New Era Academy)	N/A[1]	N/A[1]	N/A[1]	N/A[1]
	Paul Laurence Dunbar High School	N/A[1]	N/A[1]	*	*
Baltimore County Public Schools	Dundalk High School	N/A[1]	N/A[1]	N/A[1]	N/A[1]
	Owings Mills High School	N/A[1]	N/A[1]	N/A[1]	N/A[1]
Harford County Public Schools	Joppatowne High School	N/A[1]	N/A[1]	N/A[1]	N/A[1]
Montgomery County Public Schools	Clarksburg High School	N/A[1]	N/A[1]	N/A[1]	N/A[1]

Local Education Agency	School	2020	2021	2022	2023
Prince George's County Public Schools	Frederick Douglass High School	N/A[1]	N/A[1]	N/A[1]	*

[1]N/A is listed for programs that did not have graduates during the respective school year.
[2]No data reported notes that the LEA did not provide data for the respective school year.
*Data are suppressed with an asterisk (*) when the number of students in the group is less than

Table 7: Industry Partner Paid Internships

Table 7 demonstrates the number of P-TECH students in each P-TECH school who received paid internships with the industry partner. Due to the COVID-19 pandemic, internships were not offered for any P-TECH program during the 2019-2020 school year. In 2020-2021, IBM offered all P-TECH students throughout the country an opportunity to participate in paid virtual internships. IBM is only an approved industry partner with Carver Vocational High School.

The following codes were used when no students received a paid internship with the industry partner:

- NA= Program not implemented during this school year
- NES= No Eligible Students
- NIP= Industry Partner Not Available
- Gray column= No Internship Due to COVID-19 pandemic

Based on the below data, there were a total of 233 paid internship opportunities with industry partners through 2022-2023. Most P-TECH in Maryland programs did not have eligible students to participate in paid internships until the 2019-2020 school year, which was during the start of the COVID-19 pandemic. Each P-TECH school and industry partner has developed guidelines regarding internship eligibility. Most students are eligible once they have passed required courses, and/or earned required certifications. Additionally, many industry partners were unable to offer paid internships until the 2022-2023 school year due to COVID mandates. Students in the P-TECH Joppatowne and Owings Mills programs became eligible to participate in paid internships during the 2022-2023 and 2023-2024 school years.

Allegany County Public Schools							
Industry Partner	FY 2016-2017	FY 2017-2018	FY 2018-2019	FY2019-2020[1]	FY2020-2021	FY2021-2022	FY2022-2023
University of Pittsburgh Medical Center Western Maryland (UPMC Western Maryland)	NA	NES	NES		NIP	1	1

Allegany County Public Schools							
Industry Partner	FY 2016-2017	FY 2017-2018	FY 2018-2019	FY2019-2020[1]	FY2020-2021	FY2021-2022	FY2022-2023
Exclamation Labs	NA	NES	NES		NIP	NIP	NIP
Willets Systems, Inc.	NA	NES	NES		NIP	2	1
First United Bank and Trust	NA	NES	NES		NIP	NIP	NIP
IBM	NA	NES	NES		11	NIP	NIP
Allegany College of Maryland	NA	NES	NES		NIP	2	1
Allegany County Government IT department	NA	NES	NES		NIP	2	2
Allegany County Public Schools	NA	NES	NES		NIP	NIP	2
University of Maryland Extension	NA	NES	NES		NIP	NIP	1
Maryland Business Round Table	NA	NES	NES		NIP	NIP	1

Allegany County Public Schools							
Industry Partner	FY 2016-2017	FY 2017-2018	FY 2018-2019	FY2019-2020[1]	FY2020-2021	FY2021-2022	FY2022-2023
Allegany Office of the Public Defender	NA	NES	NES		NIP	NIP	3
Northrop Grumman	NA	NES	NES		NIP	NIP	NIP

Baltimore City Public Schools- Carver Vocational Technical High School							
Industry Partner	FY 2016-2017	FY 2017-2018	FY 2018-2019	FY2019-2020[1]	FY2020-2021	FY2021-2022	FY2022-2023
IBM	NA	NA	11		16	13	7

Baltimore City Public Schools- New Era Academy							
(Program transferred to Digital Harbor High School during the FY2023-2024 school year)							
Industry Partner	FY 2016-2017	FY 2017-2018	FY 2018-2019	FY2019-2020[1]	FY2020-2021	FY2021-2022	FY2022-2023
Baltimore Port Alliance	NA	NA	NES		0	0	0

Baltimore City Public Schools- Paul Laurence Dunbar High School							
Industry Partner	**FY 2016-2017**	**FY 2017-2018**	**FY 2018-2019**	**FY2019-2020[1]**	**FY2020-2021**	**FY2021-2022**	**FY2022-2023**
Johns Hopkins Hospital	0	0	0		0	0	4
Kaiser Permanente	0	0	0		0	0	0
University of Maryland, Baltimore	0	0	0		0	0	0

Baltimore County Public Schools- Dundalk High School							
Industry Partner	**FY 2016-2017**	**FY 2017-2018**	**FY 2018-2019**	**FY2019-2020[1]**	**FY2020-2021**	**FY2021-2022**	**FY2022-2023**
Whiting-Turner Contracting	NA	NA	NES		NES	3	3
KCI Technologies	NA	NA	NES		NES	1	2
Stanley Black and Decker	NA	NA	NES		NES	5	6
Johnson Controls	NA	NA	NES		NES	0	3

Baltimore County Public Schools- Owings Mills High School						
Industry Partner	FY 2016-2017	FY 2017-2018	FY 2018-2019	FY2019-2020[1]	FY2020-2021	FY2021-2022	FY2022-2023
Becton Dickinson	NA	NA	NA		NES	NES	0
Direct Dimensions	NA	NA	NA		NES	NES	1
McCormick & Company	NA	NA	NA		NES	NES	0
North American Milwright	NA	NA	NA		NES	NES	0
Potomac Photonics	NA	NA	NA		NES	NES	4
Strategic Factory	NA	NA	NA		NES	NES	2

Harford County Public Schools						
Industry Partner	FY 2016-2017	FY 2017-2018	FY 2018-2019	FY2019-2020[1]	FY2020-2021	FY2021-2022	FY2022-2023
U.S. Army Communications Electronics Command (CECOM) at Aberdeen Proving Ground	NA	NA	NA		NES	NES	NES

Montgomery County Public Schools							
Industry Partner	FY 2016-2017	FY 2017-2018	FY 2018-2019	FY2019-2020[1]	FY2020-2021	FY2021-2022	FY2022-2023
Daly Computers, Inc	NA	NA	NES		NES	12	14
Information Technology Foundation	NA	NA	NES		NES	0	1
IBM (non-industry partner)	NA	NA	NES		NES	29	0

Prince George's County Public Schools							
Industry Partner	FY 2016-2017	FY 2017-2018	FY 2018-2019	FY2019-2020[1]	FY2020-2021	FY2021-2022	FY2022-2023
Continental Sciences Incorporated	NIP	NIP	NIP		NIP	NIP	NIP
Employ Prince George's	NA	NES	NES		NIP	NIP	NIP
IBM (non-industry partner)	NA	NES	NES		21	NIP	NIP
Luminis	NA	NES	NES		NIP	1	NIP

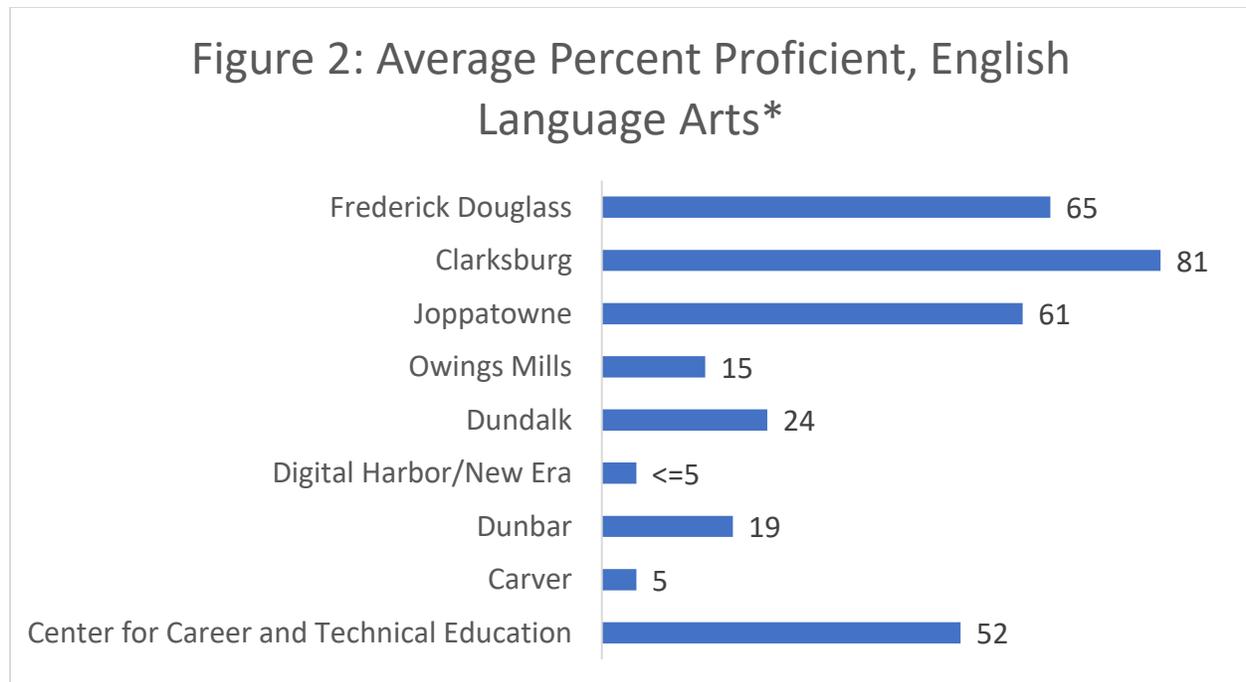| Prince George's County Public Schools							
Industry Partner	FY 2016-2017	FY 2017-2018	FY 2018-2019	FY2019-2020[1]	FY2020-2021	FY2021-2022	FY2022-2023
Marriott	NA	NES	NES		NIP	NIP	NIP
MedStar	NA	NES	NES		NIP	3	14
MGM National Harbor	NA	NES	NES		NIP	NIP	NIP
Prince George's County Youth/Summer Youth Employment Program	NA	NES	NES		0	7	18
Smart1 Management Solutions	NA	NES	NES		NIP	NIP	NIP
Six Flags	NA	NES	NES		2	0	0

[1]No internships offered due to the COVID-19 pandemic.

ASSESSMENT PERFORMANCE TRENDS

The Governor and General Assembly require MSDE to annually report student performance on federal and state assessments.

The Every Student Succeeds Act (ESSA) requires that states administer annual statewide assessments to all students in English Language Arts/Literacy and Mathematics in grades 3-8 and once in high school, as well as in science once in each grade span (3-5, 6-8 and high school), and annual English language proficiency assessments in grades K-12 for all English learners. In addition to these federally mandated assessments, Maryland State law (Md. Ed. Art §7-203) requires a social studies assessment once in the middle school grade band (which will be administered in Grade 8) and the High School Assessment in American Government.
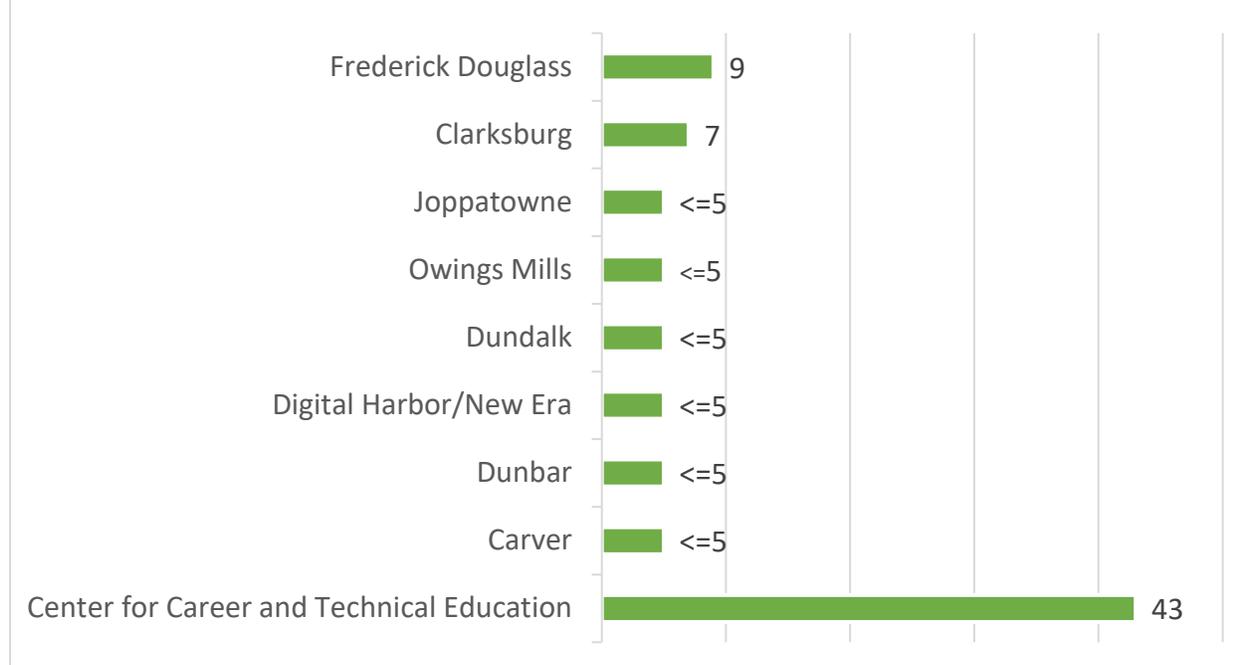
Due to the COVID-19 pandemic, the state did not offer any assessments during the school year 2019-2020. Additionally, the Maryland Comprehensive Assessment Program (MCAP) data for the school year 2020-2021 are unique due to how schools operated during the COVID-19 pandemic. MSDE received a waiver from the US Department of Education to administer a shortened statewide assessment for 2020-2021 during the early fall of the 2021-2022 school year.

Maryland administers all required state assessments as part of the Maryland Comprehensive Assessment Program (MCAP). Figures 2, 3, 4, and 5 identify the average percentage of students tested from program start to school year 2022-2023, who were proficient by subject.

Figure 2: Average Percent Proficient, English Language Arts*

School	Percent Proficient
Frederick Douglass	65
Clarksburg	81
Joppatowne	61
Owings Mills	15
Dundalk	24
Digital Harbor/New Era	<=5
Dunbar	19
Carver	5
Center for Career and Technical Education	52

* Data are suppressed when the number of students tested is less than 10 and/or proficiency levels are less than or equal to 5% or greater than or equal to 95%.

Figure 3: Average Percent Proficient, Math*

School	Value
Frederick Douglass	9
Clarksburg	7
Joppatowne	<=5
Owings Mills	<=5
Dundalk	<=5
Digital Harbor/New Era	<=5
Dunbar	<=5
Carver	<=5
Center for Career and Technical Education	43

*Data are suppressed when the number of students tested is less than 10 and/or proficiency levels are less than or equal to 5% or greater than or equal to 95%.

Figure 4: Average Percent Proficient, High School Science*

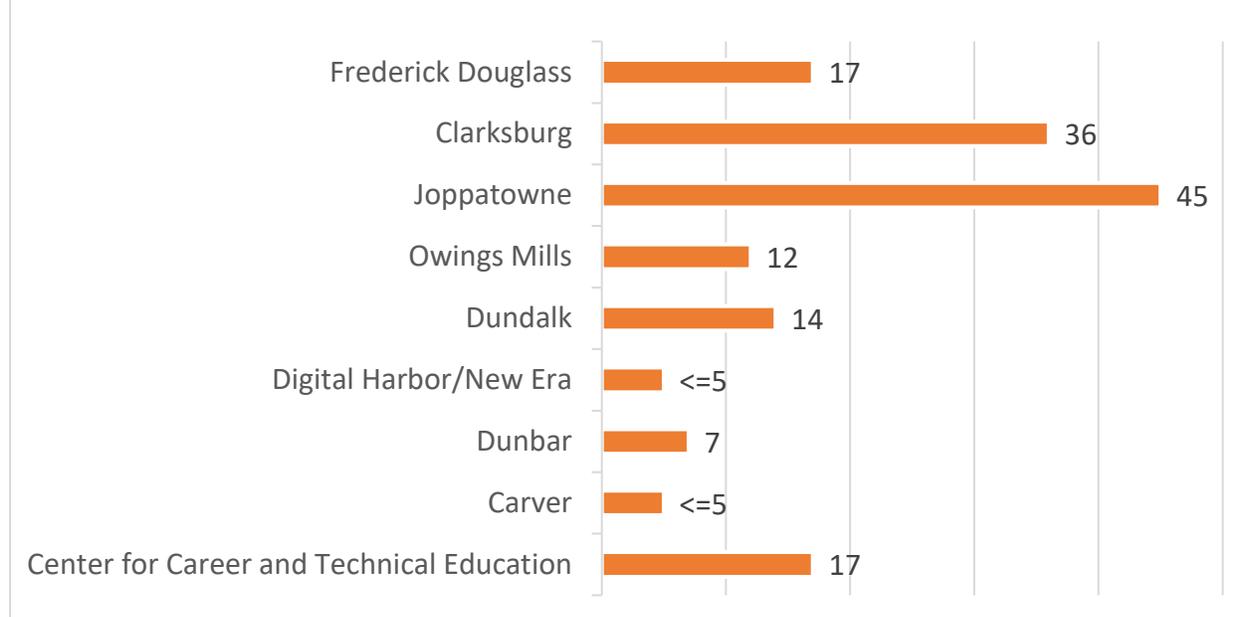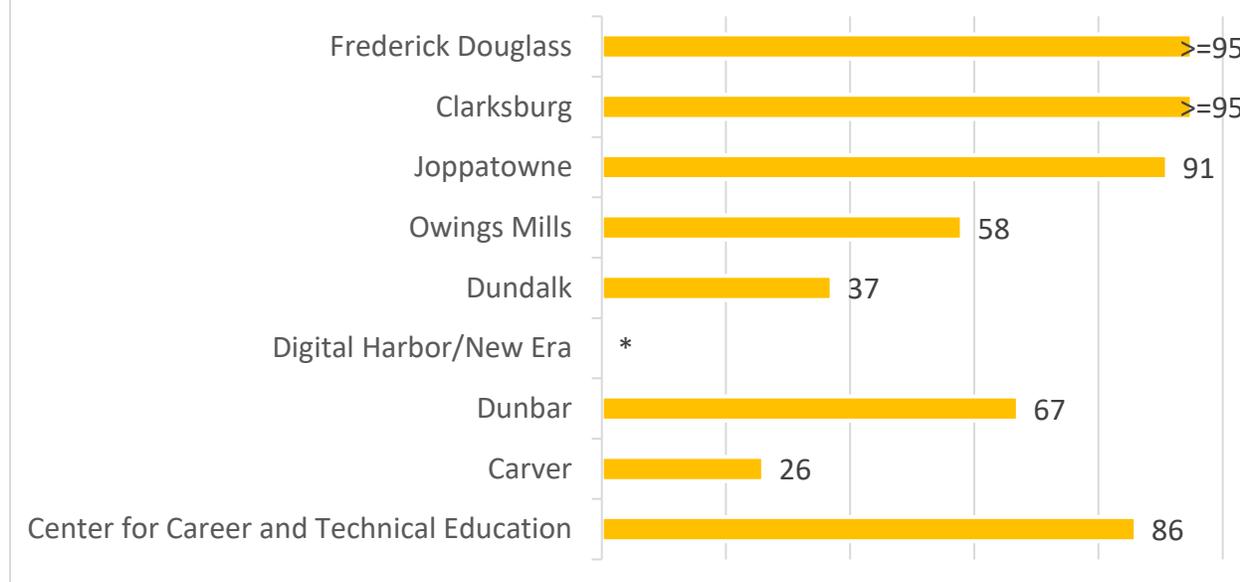| School	Value
Frederick Douglass	17
Clarksburg	36
Joppatowne	45
Owings Mills	12
Dundalk	14
Digital Harbor/New Era	<=5
Dunbar	7
Carver	<=5
Center for Career and Technical Education	17

*Data are suppressed when the number of students tested is less than 10 and/or proficiency levels are less than or equal to 5% or greater than or equal to 95%.

Figure 5: Average Percent of Students Passing the American Government Assessment*

School	Percent
Frederick Douglass	>=95
Clarksburg	>=95
Joppatowne	91
Owings Mills	58
Dundalk	37
Digital Harbor/New Era	*
Dunbar	67
Carver	26
Center for Career and Technical Education	86

*Data are suppressed when the number of students tested is less than 10 and/or proficiency levels are less than or equal to 5% or greater than or equal to 95%.

SUPPORT SERVICES

Table 8: IEP, 504 Plans, English Language Learners, and FARMS

The P-TECH model recognizes that the students who are least likely to complete a college degree are those most in need of early and engaging college experiences. The P-TECH legislation requires that the program is open to all students within the district that the program is offered, regardless of academic or financial background. Additionally, the law requires that each P-TECH program reserve at least 50% of the available space for students who meet the free and reduced meal plan income criteria.

Table 8 shows the number of students at each P-TECH school who have an IEP, a 504 plan or are English language learners; and the average percentage of P-TECH students who meet the free and reduced meal plan income criteria in each P-TECH school.

The data below demonstrates that most P-TECH students with an IEP or 504 plan are enrolled in the Baltimore City Public School System. The largest population of P-TECH English language learners are enrolled in Baltimore County Public Schools, while three schools have not served English language learners through the P-TECH program. Additionally, almost half of P-TECH schools did not reserve at least 50% of available space for students who meet the free and reduced meal plan income criteria.

Number of P-TECH students who have an IEP								
	Allegany County Public Schools	Baltimore City Public Schools			Baltimore County Public Schools		Harford County Public Schools	Montgomery County Public Schools	Prince George's County Public Schools
School Year	Center for Career and Technical Education	Carver	Dunbar	Digital Harbor	Dundalk	Owings Mills	Joppatowne	Clarksburg	Frederick Douglass
2016-2017	N/A	*	*	N/A	N/A	N/A	N/A	N/A	N/A
2017-2018	*	*	*	N/A	N/A	N/A	N/A	N/A	*
2018-2019	*	23	17	*	*	N/A	N/A	*	*
2019-2020	*	22	20	*	*	N/A	N/A	*	*
2020-2021	*	25	17	16	*	*	*	*	*
2021-2022	*	27	13	13	14	*	*	*	*
2022-2023	*	33	*	10	12	11	*	*	*

Number of students who have a 504 Plan								
	Allegany County Public Schools	Baltimore City Public Schools			Baltimore County Public Schools		Harford County Public Schools	Montgomery County Public Schools	Prince George's County Public Schools
School Year	Center for Career and Technical Education	Carver	Dunbar	Digital Harbor	Dundalk	Owings Mills	Joppatowne	Clarksburg	Frederick Douglass
2016-2017	N/A	*	*	N/A	N/A	N/A	N/A	N/A	N/A
2017-2018	*	*	*	N/A	N/A	N/A	N/A	N/A	*
2018-2019	*	*	10	*	*	N/A	N/A	*	*

Number of students who have a 504 Plan									
2019-2020	*	*	*	*	*	N/A	N/A	*	*
2020-2021	*	*	13	*	10	*	*	10	*
2021-2022	*	*	13	*	10	*	*	12	*
2022-2023	*	*	13	*	*	*	*	11	*

Number of English Language Learners									
	Allegany County Public Schools	Baltimore City Public Schools			Baltimore County Public Schools		Harford County Public Schools	Montgomery County Public Schools	Prince George's County Public Schools
School Year	Center for Career and Technical Education	Carver	Dunbar	Digital Harbor	Dundalk	Owings Mills	Joppatowne	Clarksburg	Frederick Douglass
2016-2017	N/A	*	*	N/A	N/A	N/A	N/A	N/A	N/A
2017-2018	*	*	*	N/A	N/A	N/A	N/A	N/A	*
2018-2019	*	*	*	*	10	N/A	N/A	*	*
2019-2020	*	*	*	*	*	*	*	*	*
2020-2021	*	*	*	*	*	*	*	*	*
2021-2022	*	*	*	*	14	*	*	*	*
2022-2023	*	*	*	*	11	*	*	*	*

*Data are suppressed when the count of students is less than 10.

Average percentage of students who meet Free and Reduced Meal Plan Income Criteria									
	Allegany County Public Schools	Baltimore City Public Schools			Baltimore County Public Schools		Harford County Public Schools	Montgomery County Public Schools	Prince George's County Public Schools
School Year	Center for Career and Technical Education	Carver	Dunbar	Digital Harbor	Dundalk	Owings Mills	Joppatowne	Clarksburg	Frederick Douglass
Average Percentage	47%	63%	56%	59%	52%	41%	54%	26%	32%

FUNDING

The State of Maryland allocates approximately $1.9 million to support the P-TECH program annually. LEAs with P-TECH enrollment are awarded $750 per student annually, verified through the Fall Enrollment Validation Data File. LEAs are required to provide a 100% match to support the P-TECH program within the district. Additionally, each IHE offering college courses to support the completion of the associate degree receive reimbursement for mandatory tuition and fees at the rate of 25% or 50%, depending on whether their county received the Disparity Grant in the prior year. Since the implementation of P-TECH in Maryland, Baltimore City, Allegany, and Prince George's counties have received the Disparity Grant, thus allowing the P-TECH IHEs in those districts to receive 50% tuition and fee reimbursement.

Table 10 describes the base and supplemental costs of operating a P-TECH school, which is calculated based on the total supplemental grants and matching funds divided by the total enrollments to date. Figure 6 demonstrates the funds awarded to each P-TECH school and how much of those funds were expended. Figure 7 demonstrates the funds awarded to each P-TECH IHE and how much of those funds were expended.

Based on the total amount of funds awarded plus required matching funds, divided by the total enrollment, the average cost per P-TECH student was approximately $1,909. Over $3.9 million was awarded to P-TECH LEAs through supplemental grants. Eighty-three percent of supplemental funds awarded to P-TECH schools was expended. Additionally, P-TECH IHEs were awarded just over $2.2 million, while 91% of funds were expended. It is important to note that due to COVID-19 pandemic limitations, funds were not fully spent. P-TECH schools and IHEs reported that cancelled field trips, internships and other pre-planned opportunities were primary reasons for not expending full grant funding.

Each P-TECH school also received a planning grant to support the launch and implementation of the P-TECH program. Due to limitations in the MSDE financial reporting system, the awarded and expended amounts for planning grants are not included in this report.

## Table 10: The Base and Supplemental Costs of Operating a P-TECH School

Local District	Total Student Enrollment from start of program to the 2022-2023 school year	Total Supplemental LEA Grants	Total LEA Match Funds	Total Supplemental College Grants	Average Cost Per Student (includes local and state funds)
Allegany County	431	$372,250	$372,250	$124,497	$2,016
Baltimore City	2,576	$1,922,750	$1,922,750	$958,836	$1,865
Baltimore County	1,118	$836,531	$836,531	$184,337	$1,661
Harford County	297	$238,750	$238,750	$47,168	$1,767
Montgomery County	886	$650,938	$650,938	$266,271	$ 1,770
Prince George's County	1,110	$889,250	$889,250	$847,465	$2,366
Total	**6,418**	**$4,910,469**	**$4,910,469**	**$2,428,574**	$1,909

Figure 6: Funds Awarded to P-TECH High Schools and Amount of Funds Spent
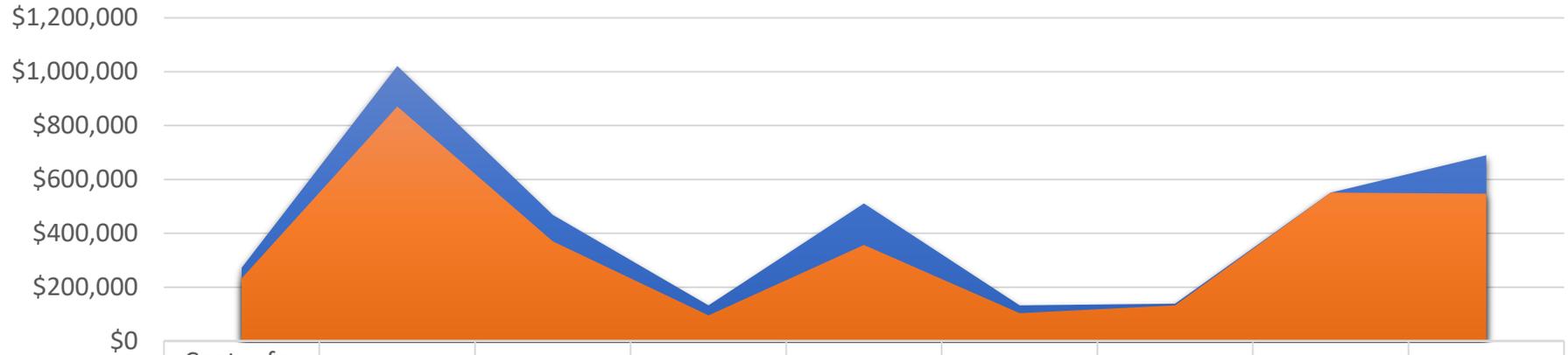
	Center for Career and Technical Education	Carver	Dunbar	New Era/Digital Harbor	Dundalk	Owings Mills	Joppatowne	Clarksburg	Frederick Douglass
■ Funds Awarded	$272,250	$1,021,250	$468,750	$132,750	$510,750	$132,750	$138,750	$551,250	$689,250
■ Funds Spent	$233,308	$870,941	$370,089	$95,802	$356,358	$103,148	$132,891	$551,133	$546,746

Figure 7: Funds Awarded to P-TECH Colleges and Amount of Funds Spent
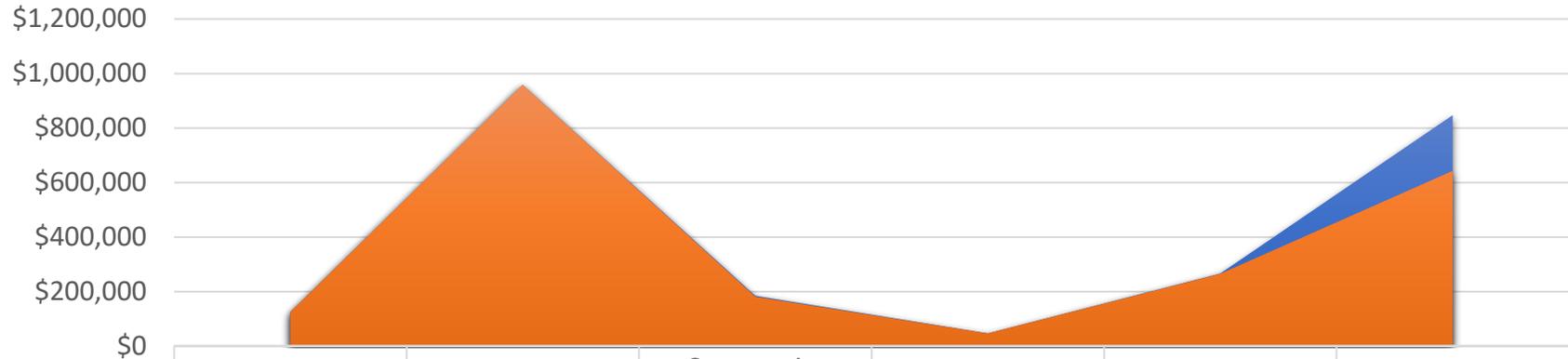
	Allegany College of Maryland	Baltimore City Community College	Community College of Baltimore County	Harford Community College	Montgomery College	Prince George's Community College
■ Funds Awarded	$124,497	$958,836	$184,337	$47,168	$266,271	$847,465
■ Funds Spent	$124,497	$958,836	$181,099	$46,287	$264,516	$642,885

Conclusion

EVALUATION OF WHETHER THE P-TECH PROGRAM IS SUCCESSFUL

In conclusion, P-TECH in Maryland has served hundreds of high school students in preparation for the workforce and postsecondary education. Whether students decide to enter the workforce, pursue postsecondary education, or exit prior to receiving the associate degree, most students receive some benefit from the program. Those benefits may include receiving college and career coaching, participating in a cohort of like-minded students in pursuit of career advancement, gaining industry-recognized credentials, and/or receiving college credits that may be used for future postsecondary opportunities.

P-TECH is an open-access program that allows students of all abilities and backgrounds access to early college opportunities at no cost to them. P-TECH provides opportunity for early access and exposure for disadvantaged students who may be deemed otherwise as unlikely to pursue postsecondary education. According to *Early College as a Model for Schooling: Creating New Pathways for Access to Higher Education* published by Harvard Education Press, "at the high school level, results show that early colleges provide a more positive learning environment, with students demonstrating a range of favorable outcomes… At the postsecondary level, research has shown that early college students are more likely to enroll in postsecondary education and more likely to complete a postsecondary credential" (Edmunds et al., 2022, p. 47-48).

In Maryland, P-TECH is the only legislated and state-funded early college program that offers an associate degree upon completion and direct connection to the workforce. The Blueprint for Maryland's Future Pillar 3 mandates that 45% of Maryland high school graduates earn an industry-recognized credential and/or complete a registered apprenticeship. P-TECH students have access to IRCs, paid internships, and industry mentorships, as well as college credit and/or an associate degree. MSDE is observing the progress and implementation of P-TECH and early college programs in other states, such as Texas and Colorado, to continue to acquire data needed to develop best practices and guidance for P-TECH in Maryland to inform future programming.

Preparation for the Workforce

P-TECH schools help students expand their understanding of potential careers and enable them to acquire the skills and experiences they will need to thrive in those careers. P-TECH students are matched with industry mentors and have opportunities to participate in workplace visits and internships. Employers are integral partners in the development of the P-TECH program. They create an up-to-date skills map for the industry that identifies essential job requirements and collaborate with LEAs and IHEs to identify the associate degree program that will ensure students meet industry expectations. The involvement of employers helps students understand the connection between coursework and expectations of the workplace.

At the time of this report, over 200 students received a paid internship opportunity through P-TECH in Maryland programs. However, most P-TECH programs have not completed a full 6-year cycle; therefore, there is limited data to determine the effectiveness of the P-TECH program in preparing students for the workforce, as most students have not reached eligibility to participate in paid internship opportunities.

Preparation for Further Postsecondary Education

In Maryland, the desire for access to postsecondary education while in high school has increased exponentially within the last decade. Per the Maryland Longitudinal Data Services (MLDS) Center's Dual Enrollment in Maryland: Annual Report to the General Assembly and Governor Larry Hogan (2022), the number of Maryland high school students enrolling in dual enrollment courses increased from 4,569 to 19,872 from school years 2010-2011 to 2020-2021. Additionally, most P-TECH program enrollments have increased annually, even throughout the COVID-19 pandemic.

Many P-TECH completers use P-TECH as a pathway to postsecondary education. For example, 90% of P-TECH graduates in Prince George's County earned a high school diploma and associate degree in 4 years during the 2022-2023 school year. Of those students, 94% attended a 4-year IHE directly after high school graduation. As more P-TECH students matriculate through the program, MSDE will collect additional student postsecondary matriculation data, regarding IHE selection, financial aid awards, major of study, and other postsecondary data.

Recommendations

CONTINUE P-TECH IN MARYLAND

P-TECH in Maryland began implementation with two high schools in Baltimore City during Fall 2016. Since then, there have been an additional seven P-TECH schools that were launched between Fall 2017 and Fall 2020. Currently, 56% of P-TECH Schools have not completed a full 6-year cohort cycle. Additionally, two programs have not yet reached year 4 of the program, resulting in inconsistent completion and graduation data. An analysis of P-TECH in Maryland would be more valuable when each P-TECH school has at least completed the full 6-year cohort cycle.

Not only is P-TECH in Maryland still in the implementation phase, the COVID-19 pandemic created unforeseen circumstances that slowed down the potential progress and expansion for P-TECH in Maryland. More analysis and research on the program are needed to determine the success of preparing students for the workforce and postsecondary education.

RECONNECT AND REINVEST THE INDUSTRY

P-TECH emphasizes partnerships with institutions of higher education and industry partners. All partners are involved in developing each P-TECH program's program of study and scope and sequence guidelines. While industry partners participate in the P-TECH planning and implementation process through mentorship and internship opportunities, the return on investment is slow and steady. P-TECH programs prepare students for the workforce and/or postsecondary education upon high school graduation. This process takes at least 4 to 6 years, which in turn, may not meet the industry's immediate needs.

As we continue to matriculate students successfully through the P-TECH program, industry partners will begin to receive the return on their investments. However, while implementation is happening, there should be some concerted effort to ensure continued buy-in from industry partners. Industry needs and roles may not directly align to secondary and postsecondary educational systems and may require additional collaboration between each partner to ensure a robust and quality early college program, with direct connection to the workforce. Extensive collaboration between the LEA, IHE(s) and industry partners could create opportunities for recruitment events such as STEM and tech conferences for high school and middle school students, job fairs for rising 11th and 12th graders and 5th and 6th year students, and college fairs to promote continuing education and stackable credentialing.

RESTRUCTURE AND ALIGN

Currently, all P-TECH in Maryland programs have a partnership between the LEA, the local community college, and one or more industry partner(s). One of P-TECH's goals is to prepare students for postsecondary education. The P-TECH Act of 2017 allows for increased partnership among IHEs, as long as the college courses support the pathway associate degree. P-TECH in Maryland has the opportunity to restructure programs of study to include reverse transfer credits from 4-year IHEs to support the 2-year associate degree. In addition to aligning the programs of study with reserve transfer credits, articulation agreements will be developed to allow for direct access to bachelor's degree programs and beyond, upon completion of P-TECH.

Additionally, programs of study will be aligned to stackable credentials that will allow students to earn industry-recognized credentials that have a pathway leading to higher-wage career opportunities. There are current discussions amongst MSDE, Baltimore City Public Schools, the Baltimore City Community College and other local IHEs on expanding the P-TECH Baltimore City students' access to 4-year IHEs and industry connections thus increasing the P-TECH postsecondary pipeline.

Bibliography

Annual Report to Governor and General Assembly on Pathways in Technology Early College High (P-
        TECH) Schools (Chapter 144, Acts of 2016). (2016). Baltimore, MD: Maryland State Department
        of Education.

Annual Report to Governor and General Assembly on Pathways in Technology Early College High (P-
        TECH) Schools (Chapter 591, Acts of 2017). (2017). Baltimore, MD: Maryland State Department
        of Education.

Annual Report to Governor and General Assembly on Pathways in Technology Early College High (P-
        TECH) Schools (Chapter 591, Acts of 2017). (January 2019). Baltimore, MD: Maryland State
        Department of Education.

Annual Report to Governor and General Assembly on Pathways in Technology Early College High (P-
        TECH) Schools (Chapter 591, Acts of 2017). (November 2019). Baltimore, MD: Maryland State
        Department of Education.

Annual Report to Governor and General Assembly on Pathways in Technology Early College High (P-
        TECH) Schools (Chapter 591, Acts of 2017). (2020). Baltimore, MD: Maryland State
        Department of Education.

Edmunds, J., Unlu, F., Glennie, E., & Arshavsky, N. (2022). *Early College as a Model for Schooling: Creating
        New Pathways for Access to Higher Education*. Harvard Education Press.

Maryland Higher Education Commission. (2022). 2022 Maryland State Plan for Higher Education.
        Baltimore, MD: Maryland Higher Education Commission.

Maryland State Department of Education. (2021). 2021 Early Fall Assessments. Maryland State
        Department of   Education.
        https://www.marylandpublicschools.org/about/Pages/DAAIT/Assessment/2021-Fall-
        Assessments.aspx.

MLDS Center. (2022). Dual Enrollment in Maryland: Annual Report to the General Assembly and Governor
        Larry Hogan. Baltimore, MD: Maryland Longitudinal Data System Center.

Pathways in Technology Early College High School Annual Report. (2021). Division of Career and College
        Readiness. Baltimore, MD: Maryland State Department of Education.

Pathways in Technology Early College High School Annual Report. (2022). Division of Career and College
        Readiness. Baltimore, MD: Maryland State Department of Education.

Pathways in Technology Early College High School Legislative Report. (2023). Baltimore, MD: Maryland
        State Department of Education.