Chesapeake Bay Watershed 2022 Environmental Literacy Report

Pennsylvania

Results from the ELIT Survey

Report: 4/10/2023

PREPARED BY

Jessica Sickler & Michelle Lentzner

J. Sickler Consulting

PREPARED FOR

NOAA, Chesapeake Bay Program

J. Sickler CONSULTING

Table of Contents

BACKGROUND

Study Purpose & Methods

ELIT Background & Purpose

The Chesapeake Bay Watershed Environmental Literacy Indicator Tool (ELIT) was developed to monitor the capacity and progress of public school districts toward meeting the environmental literacy goal stated in the 2014 Chesapeake Bay Watershed Agreement. The goal was to:

Enable every student in the region to graduate with the knowledge and skills to act responsibly to protect and restore their local watershed.

Three outcomes are stated in the agreement:

1. **Students**: Increase age-appropriate understanding of the watershed through meaningful watershed educational experiences (MWEEs) and rigorous, inquiry-based instruction, with a target of at least one MWEE in elementary, middle, and high school, depending on available resources.

2. **Sustainable Schools**: Increase the number of schools that reduce impact of buildings and grounds on their local watershed, environment, and human health through best practices, including student-led protection and restoration projects.

3. **Environmental Literacy Planning**: Develop a comprehensive and systemic approach to environmental literacy for all students, including policies, practices and voluntary metrics that support environmental literacy goals and outcomes.

The ELIT contributes to monitoring public school districts' progress toward these outcomes, collecting data about:

- School district preparedness to implement a comprehensive and systemic approach to environmental literacy education (Outcome 3);

- Student participation in MWEEs during the school year (Outcome 1);

- School district needs to support further improvements in environmental literacy education.

The ELIT tool was modified in 2022 to reduce the reporting burden on school districts. In this revision, questions about sustainable school practices were eliminated, as relevant data can be obtained through other means.

The ELIT is administered biennially to all local education agencies (LEAs) in six jurisdictions in the Chesapeake Bay Watershed. **This report presents results only from all responding LEAs in Pennsylvania, regardless of whether they are in or out of the watershed.**

ELIT Data Collection

Data Collection Procedure

The ELIT is typically administered every two years as an electronic survey. It is intended to be completed by a single representative from the administration of each LEA (school district) who is able to report on district-wide activities. Additional data-points that are more reliably obtained through non-survey means (e.g., in/out of watershed; student enrollment) are identified from external sources and merged with the survey responses.

Past ELIT data were collected in 2015, 2017, and 2019. Collection was paused in 2021, due to the substantial impacts on school districts due to the COVID-19 pandemic. Collection resumed in 2022 to assess where the region stands in the wake of these impacts on education systems.

NOAA's Chesapeake Bay Program organized data collection in 2022, and representatives from each state's education office led distribution of the survey to LEAs within their jurisdiction. ELIT data collection targets only public school districts. This report only includes responses from public school districts that fall within the Chesapeake Bay Watershed.

Data Collection Timing

The 2022 ELIT asked districts to report on the status of activities for the 2021-22 school year. To support this, the ELIT survey opened for responses in May 2022. The survey remained open for responses through the spring and summer. In response to demand from several states and LEAs for more time to complete the survey, the deadline for completion was extended through the end of November 2022.

Additional Information about Data

The most significant challenge of the ELIT is obtaining a strong response rate from more than 300 LEAs across six states. As greater numbers of LEAs report their activities into this dataset, the Chesapeake Bay Program has a more accurate understanding of the status of environmental literacy activities across the watershed.

The 2019 dataset, which is included in this report when comparing results year-to-year, was a combined dataset that included all 2019 districts that responded, as well as appending any 2017 data from districts that had not updated their responses in 2019. The underlying assumption was that changes in status within non-reporting districts was likely minor over the course of two years (as ELIT change tends to be incremental). This provided a more robust picture of the region at that time.

In 2022, because the last ELIT was three years ago, and in those three years there were many, major shifts in all aspects of education systems, we did not append this year's data with any historic data. All data are only what was reported this year.

2022 ELIT Response Rate

122 out of 499 LEAs in Pennsylvania completed the ELIT survey in 2022. This constituted a response rate of 24% of all districts, and 34% of enrolled students in the state.

Pennsylvania's response rate was slightly higher in 2022 than it was in 2019 (when 20% of districts responded to the survey). As only a quarter of LEAs representing about a third of enrolled students are represented in this data set, the data presented here should not be taken as a fully accurate representation of environmental literacy efforts statewide.

**ELIT Response Rate: Percentage of all LEAs and of Enrolled Students across the Jurisdiction 2022**

	Responded in 2022	No Response
Percentage of LEAs (n=499)	24%	76%
Percentage of Enrolled Students (n=1,509,081)	34%	66%

Availability of Paired Year-to-Year Data

Less than half of the LEAs in Pennsylvania that responded in 2022 also completed the ELIT in 2019.

In the analyses that follow, we use this paired dataset to explore the degree to which changes may have occurred over past years. By isolating comparisons to districts that responded in both current and previous years, we can look at the number of districts who reported increases or decreases in indicators in the past three years.

Repeat ELIT Respondents: Availability of Paired Year-to-Year Data

This graph considers the full, historic dataset of ELIT responses in Pennsylvania. Segments of the graph show the proportion of districts that were entirely new to ELIT reporting this year, those that have responded at both periods, and those who responded previously, but did not update their data in 2022

|	2022 Only	Paired 2022 & 2019	Past Data Only
Pennsylvania (n=211)	31%	27%	42%
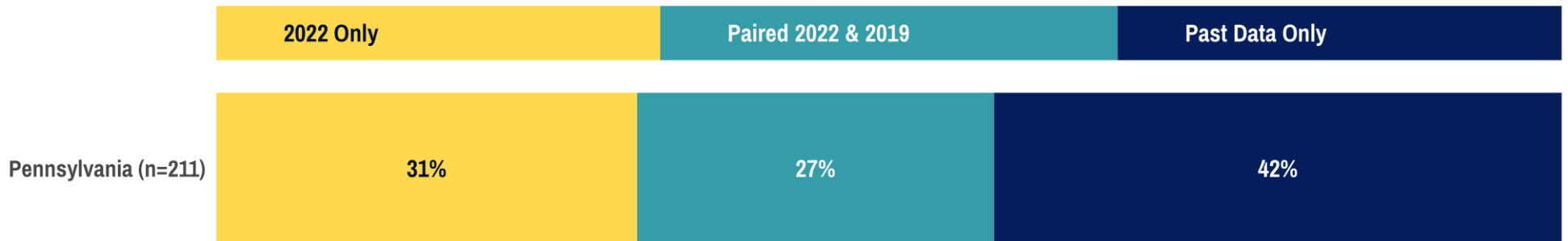
Staff Responsible for Sustainable Schools

More than quarter of the responding LEAs indicated that their district has dedicated staff responsible for sustainable schools.

The 2022 ELIT did not engage in a full inquiry of sustainable school practices, in order to reduce the burden on districts where data may be gathered elsewhere. Only one question was asked, which was to gauge if the district had dedicated staff responsible for sustainable school efforts.

Pennsylvania reported a fairly low rate of agreement with this question, with only 35 of 122 LEAs confirming that they had staff responsible for sustainable schools in 2022.

Sustainable Schools: Presence of Support Staff

Responses to the question: Does your LEA have a staff lead or team responsible for coordinating sustainable schools efforts?

	Yes	I don't know	No

| PA (n=122) | 29% | 6% | 66% |
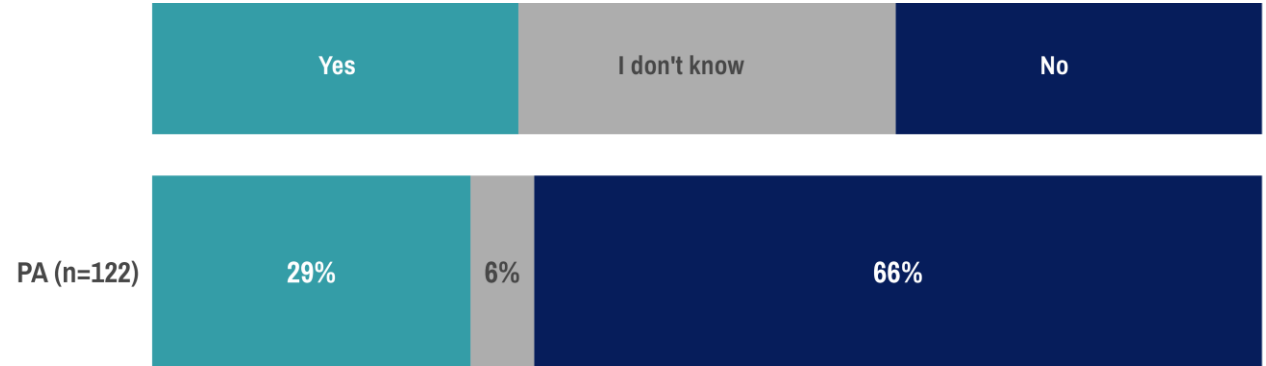
RESULTS

Preparedness to Implement Environmental Education

Measurement Overview

To assess each LEA's current capacity to implement a comprehensive and systemic approach to environmental education (EE), respondents considered six elements (below) and indicated for each whether it was:

- Not in place

- Partially in place

- Fully in place

The response for each element was scored with a value of 0, 1, or 2, respectively. These values were summed to arrive at a total preparedness score for the district.
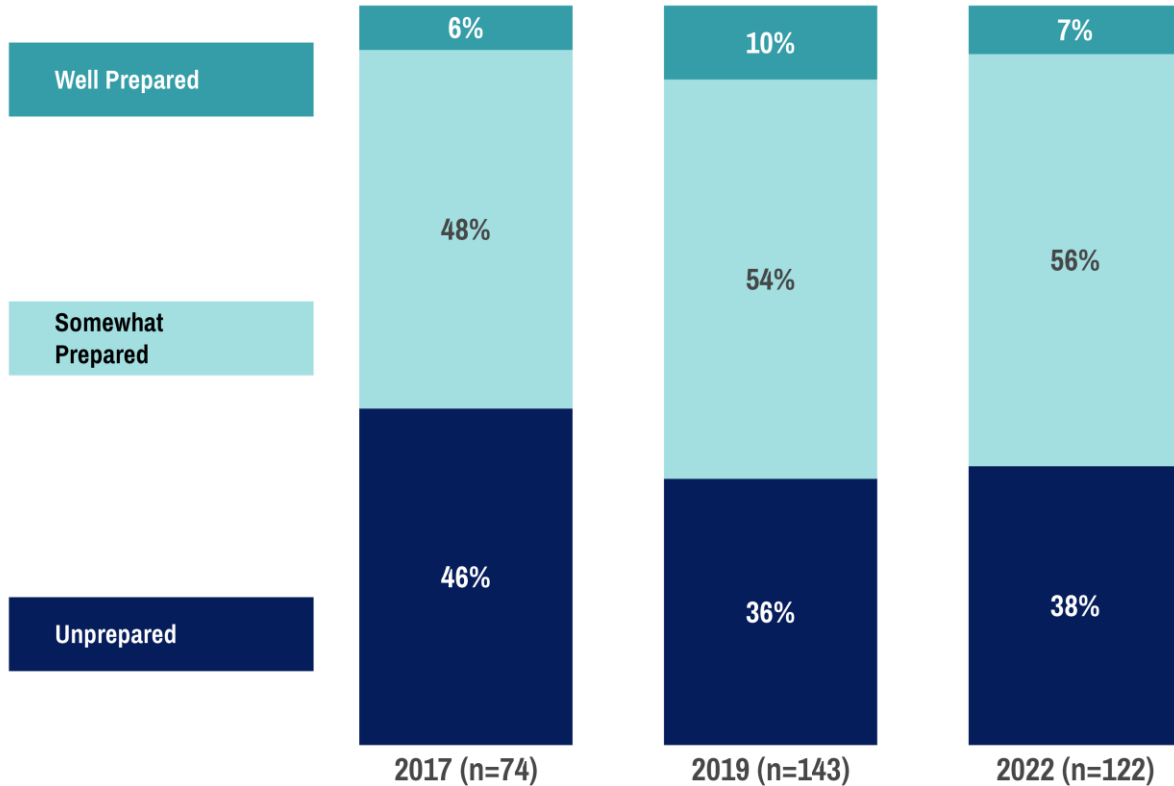
Six Elements Used to Determine LEA Preparedness for EE:

a) An established program leader for environmental education (providing effective, sustained, and system leadership).

b) An integrated program infusing environmental concepts into appropriate curricular areas.

c) Regular communication among staff responsible for environmental education curriculum and program implementation.

d) A support system in place that enables teachers and administrators to engage in high quality professional development in content knowledge, instructional materials, and methodology related to environmental education.

e) A plan to ensure opportunities for all students to engage in meaningful watershed educational experiences (MWEEs) at the elementary, middle and high school levels.

f) Established community partnerships for delivery of environmental education, including implementation of MWEEs.

LEA Preparedness: Trends Over Time

Changes in Environmental Literacy Preparedness Over Time (2017-2022)
Preparedness levels in all reporting LEAs in the jurisdiction

| | Well Prepared | Somewhat Prepared | Unprepared |

2017 (n=74): 6%, 48%, 46%
2019 (n=143): 10%, 54%, 36%
2022 (n=122): 7%, 56%, 38%

Comparing Paired 2019 and 2022 Data
Changes in preparedness within individual LEAs for which we have paired data within the jurisdiction (n=55).

Decrease 15% | No Change 67% | Increase 18%

Over half of LEAs in Pennsylvania are somewhat prepared to implement high quality environmental education in 2022.

Responding LEAs rated how fully their district has implemented the six indicators of planning and infrastructure for high quality EE. Total preparedness scores, across all indicators, were grouped into three levels of preparedness:

Well Prepared: scores from 9-12

Somewhat Prepared: scores from 4-8

Not Prepared: scores from 0-3

In 2022, rates of unprepared LEAs went up slightly, while rates of well-prepared LEAs went down. It is unclear whether this difference is due to changes in sample from year to year. When we look at the raw, total preparedness score (used to assign the levels), there was a slight increase in scores, from 4.60 in 2019 to 4.82 in 2022.

Exploring the subset of LEAs for which we have year-to-year data, around two-thirds of districts stayed at the same level. For those who did shift in the last few years, slightly more districts shifted to a higher level of preparedness than shifted to a lower level of preparedness.
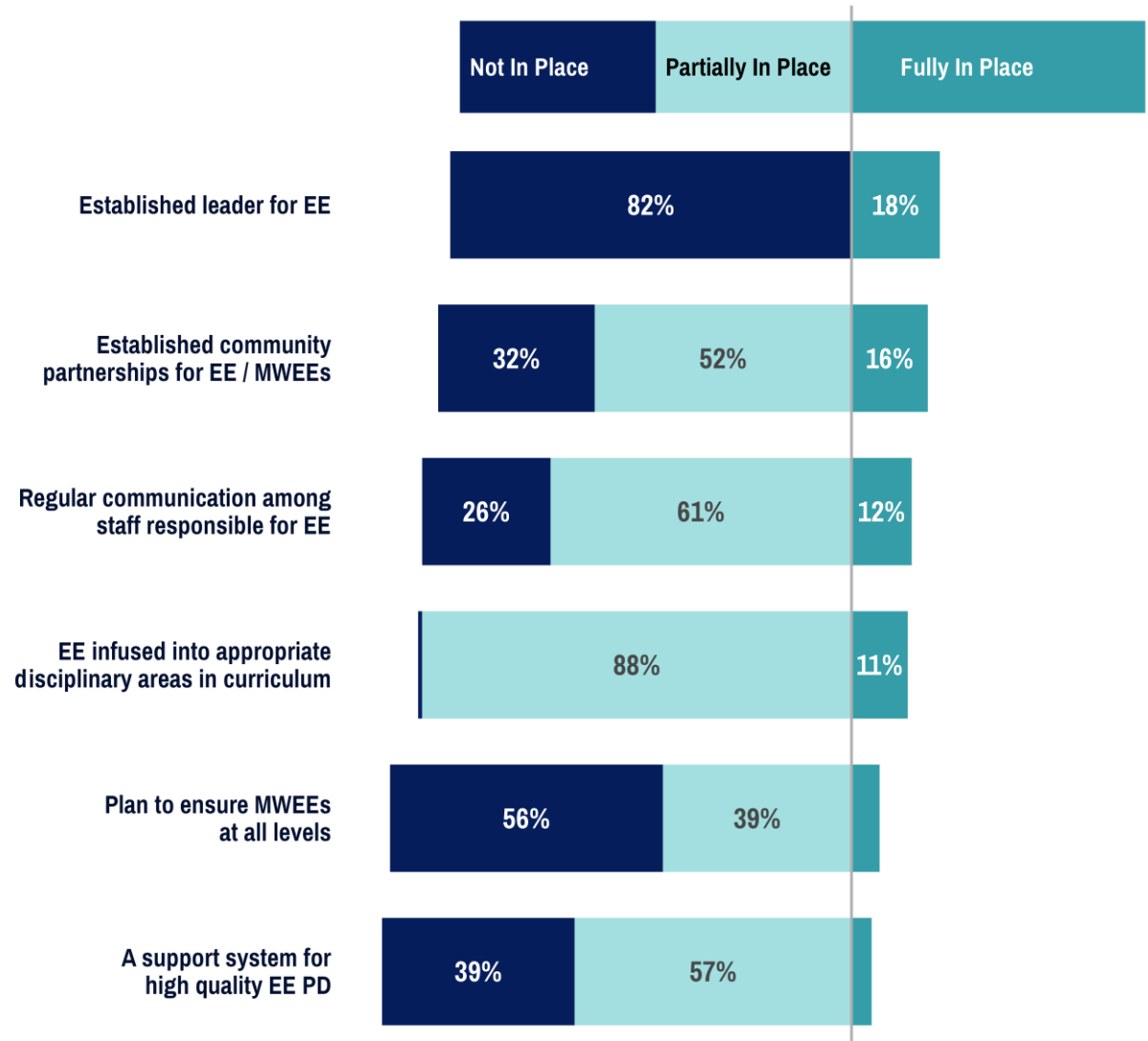
Breaking Down the Elements of Readiness

About 1 in 5 Pennsylvania LEAs reported having an established leader for EE, while 16% had community partnerships fully in place.

The breakdown of readiness within each element in the preparedness indicator show some trends in districts' strengths and challenges for planning. Similar to 2017 and 2019, creating an integrated program that infuses environmental topics across the curriculum is the area in which the greatest number of LEAs have made some progress (88%) but only 11% have fully achieved this element.

The next page further breaks down these data, by comparing the three sub-groups (well-prepared, somewhat prepared, or unprepared). It suggests that community partners, communication among EE staff, and establishing EE leadership are areas in which less-prepared districts make early strides toward greater preparedness.

Degree of Readiness for Each Element of LEA Planning and Infrastructure.
Distribution of ratings to individual items in the planning indicator by all LEAs in jurisdiction (n=122)

	Not In Place	Partially In Place	Fully In Place
Established leader for EE	82%		18%
Established community partnerships for EE / MWEEs	32%	52%	16%
Regular communication among staff responsible for EE	26%	61%	12%
EE infused into appropriate disciplinary areas in curriculum		88%	11%
Plan to ensure MWEEs at all levels	56%	39%	
A support system for high quality EE PD	39%	57%	

Elements Fully or Partially in Place
Comparing Strategies between Levels of Preparedness

% of LEAs with Element Partially in Place	% of LEAs with Element Fully in Place

Strategies at Well Prepared LEAs (n=8)   **Strategies at Somewhat Prepared LEAs (n=68)**   **Strategies at Unprepared LEAs (n=46)**

	Well Prepared — Partially	Well Prepared — Fully	Somewhat Prepared — Partially	Somewhat Prepared — Fully	Unprepared — Partially	Unprepared — Fully
Regular communication among staff responsible for EE		100%	84%	10%	39%	
Established leader for EE		88%		22%		
EE infused into appropriate disciplinary areas in curriculum	25%	75%	90%	10%	96%	2%
Established community partnerships for EE / MWEEs	25%	62%	72%	18%	28%	4%
A support system for high quality EE PD	50%	50%	82%	1%	20%	
Plan to ensure MWEEs at all levels	50%	50%	57%	4%	9%	

RESULTS

Student Participation in Meaningful Watershed Educational Experiences (MWEEs)
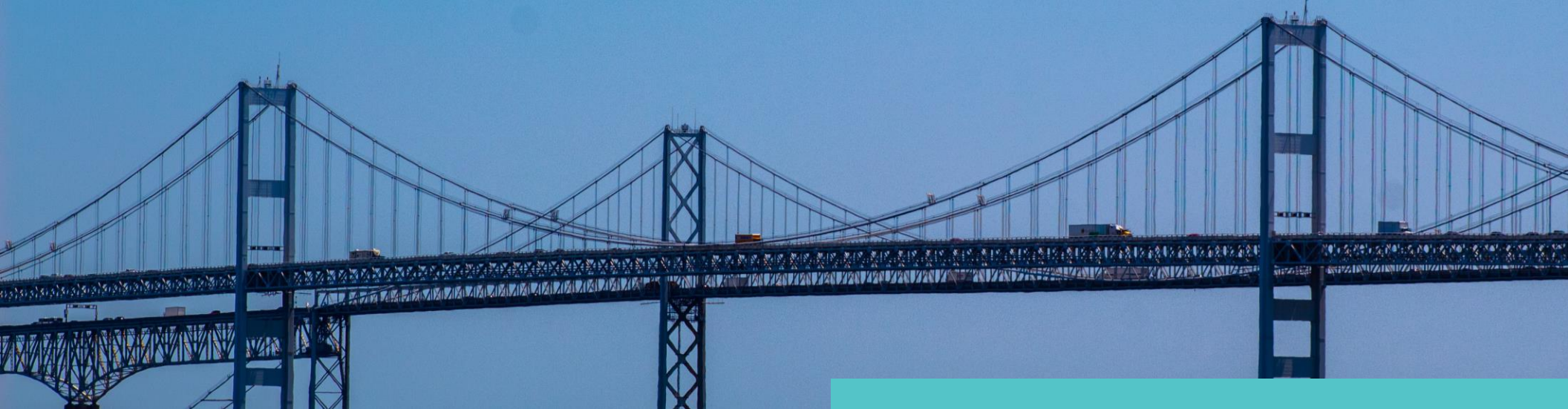
Measurement

To assess the level of student participation in MWEEs within each LEA, respondents were asked to assess the presence of MWEEs within curricular offerings within each grade level (K-12), considering if they were system-wide or isolated to schools or classes. (See detail, right.) Respondents were given a reminder of the complete definition of a MWEE before the questions.

Although respondents reported at individual grade levels, analysis aggregated these data to report results by grade band (elementary, middle, or high school). The aggregation grouped each LEA into one of three levels within each grade band:

- At least one system-wide MWEE provided in the grade band;

- Some MWEE programming in the grade band, but not system-wide;

- No MWEE programming provided in the grade band.

For elementary (K-5) and middle school (6-8) grades, respondents indicated whether the district had:

- A system-wide MWEE experience for students in this grade

- Some schools or classes in this grade participate in MWEEs

- No evidence that students in this grade participate in a MWEE

For high school, MWEEs are more likely to correspond to a course than a grade level. Therefore, respondents reflected on courses at the high school level, indicated if the course was required or elective and whether the district had:

- A system-wide MWEE experience for students in this course

- Some schools or classes participate in MWEEs for this course

- No evidence that students in this course participate in a MWEE

The MWEE level was computed based only on courses that were indicated to be graduation requirements (i.e., needed for all students).
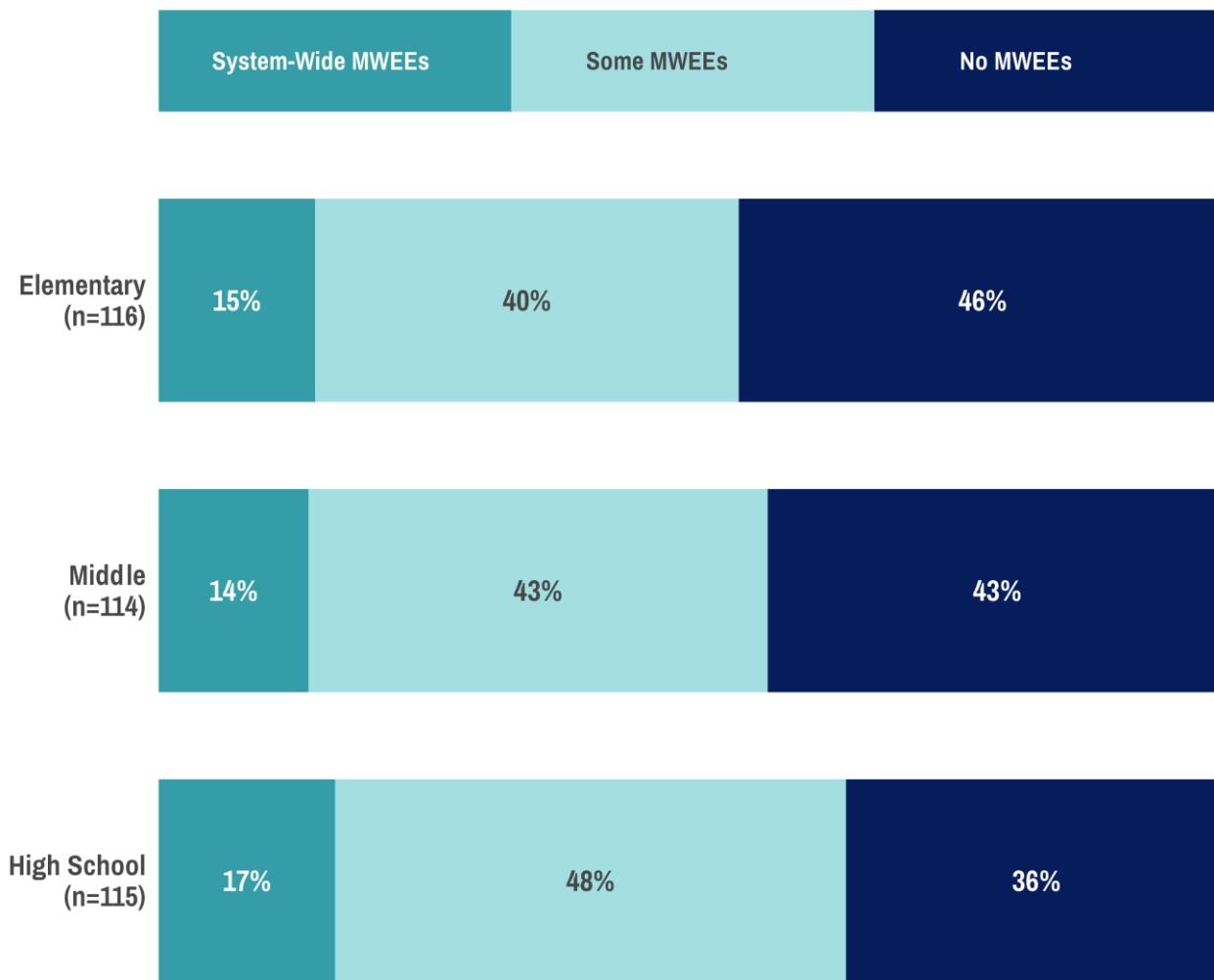
Student Participation in MWEEs

Rates of system-wide MWEEs were relatively equal across all three grade bands, ranging from 14% to 17% of responding LEAs.

System-wide MWEEs were only present in 14 to 17% of LEAs. Over 40% of LEAs reported not having any MWEEs in elementary or middle school grades. Rates of MWEE availability in high school was slightly higher, with only 36% of LEAs reporting no MWEEs at this level.
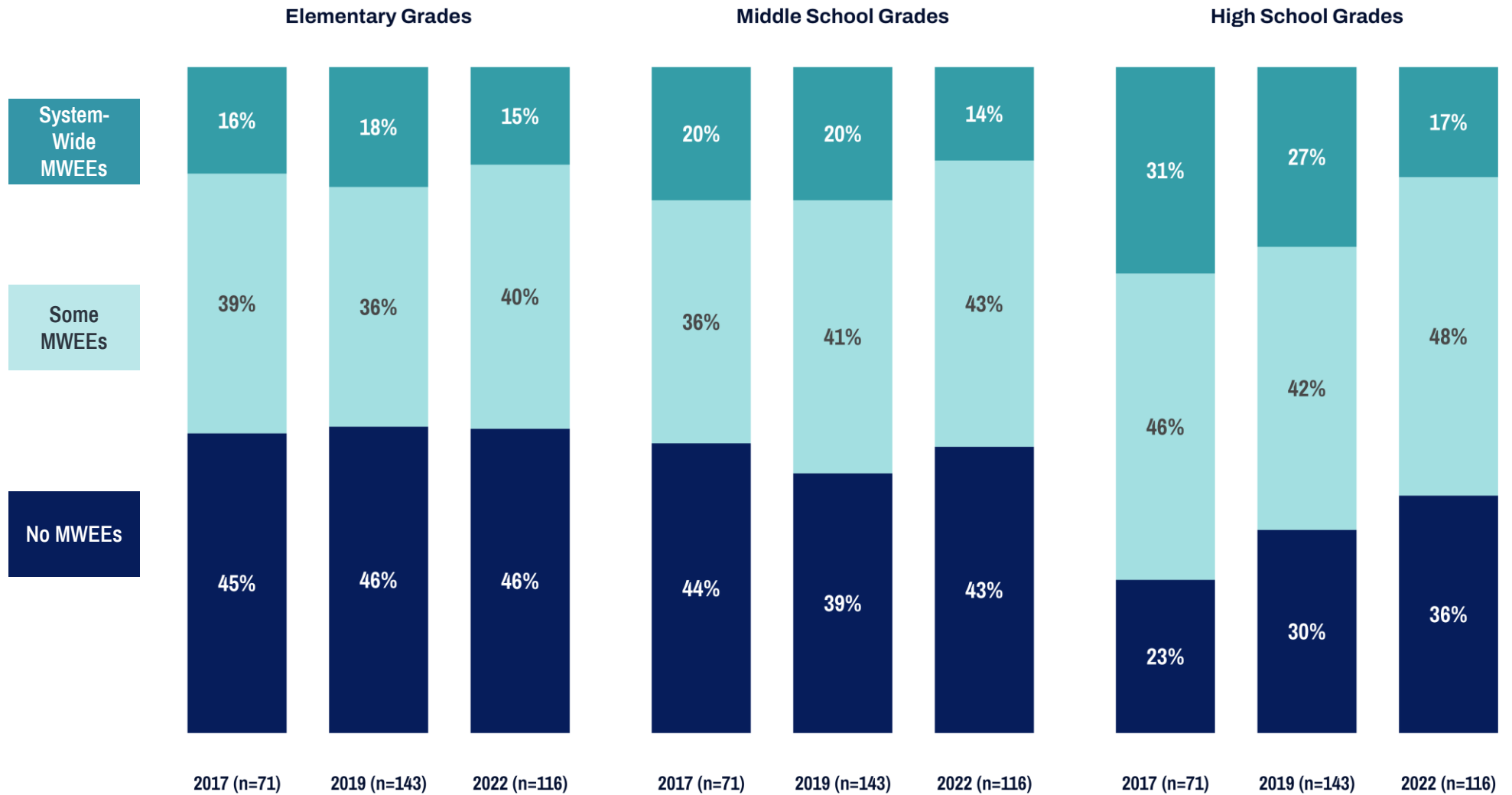
On the next page, 2017, 2019, and 2022 results are compared. Overall, rates of system-wide MWEEs seemed to decreased in middle and high school grades, while they largely stayed static in elementary school grades. However, this may be due to difference in sample between years.

MWEE Availability among LEAs within Pennsylvania in 2022

Rates of availability across all resopnding LEAs. If a district reported there was a system-wide MWEE at any grade level(s), they were scored as having "System-Wide MWEEs"; "No MWEEs" indicates no MWEEs at any grade in the band.
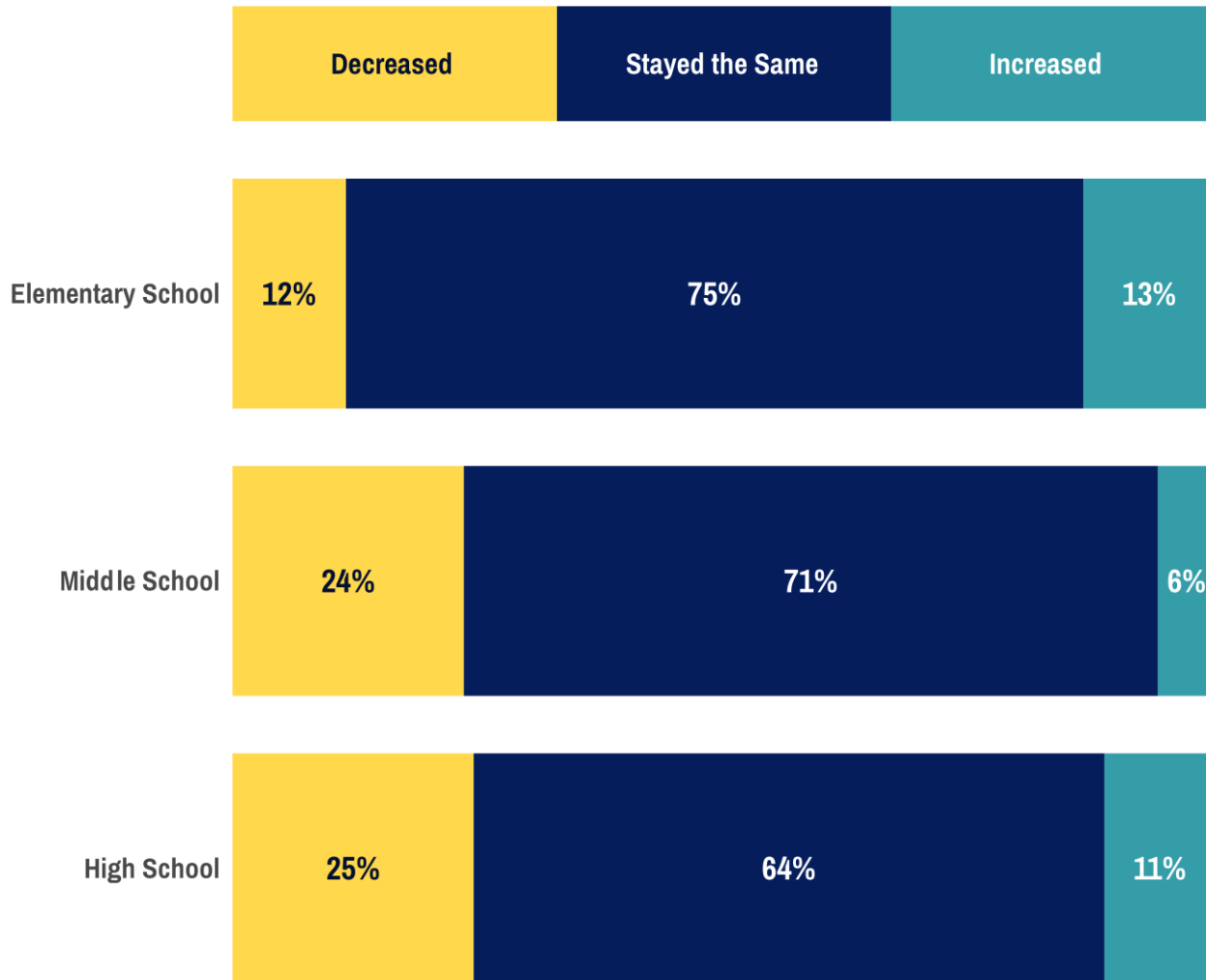
	System-Wide MWEEs	Some MWEEs	No MWEEs
Elementary (n=116)	15%	40%	46%
Middle (n=114)	14%	43%	43%
High School (n=115)	17%	48%	36%

MWEEs by Grade Band: Change Over Time

Elementary Grades

Middle School Grades

High School Grades

System-Wide MWEEs

Some MWEEs

No MWEEs

	2017 (n=71)	2019 (n=143)	2022 (n=116)
Elementary — System-Wide	16%	18%	15%
Elementary — Some	39%	36%	40%
Elementary — No	45%	46%	46%
Middle — System-Wide	20%	20%	14%
Middle — Some	36%	41%	43%
Middle — No	44%	39%	43%
High — System-Wide	31%	27%	17%
High — Some	46%	42%	48%
High — No	23%	30%	36%

Comparing Change in Paired 2019 and 2022 Data

Comparing Changes in Preparedness within Paired 2019 and 2022 Data

Whether preparedness levels (prior page) increased, decreased, or stayed at the same levels, within individual LEAs in Pennsylvania for which year-to-year data were available. (n=53)

Decreased	Stayed the Same	Increased

Elementary School — Decreased 12% | Stayed the Same 75% | Increased 13%

Middle School — Decreased 24% | Stayed the Same 71% | Increased 6%

High School — Decreased 25% | Stayed the Same 64% | Increased 11%

A majority of LEAs in Pennsylvania maintained their MWEE availability from 2019 to 2022.

Middle school and high school grades saw the largest shifts in LEAs that decreased, which reflects overall year-to-year changes shown on the previous page.

HS MWEE Measurement

A change was made to how data about high school MWEEs was collected in 2022, in an effort to make it easier on LEAs and improve accuracy of what was reported.

In past years' ELIT survey, data suggested there may be inaccuracies in how courses were reported, particularly regarding clarifying whether MWEE reporting was clearly limited to *required* courses (a critical part of being considered system-wide). For example, an AP course might be listed as a system-wide MWEE, which indicates the task of focusing on requirements and electives separately was difficult for LEAs to do.

In 2022, the question was streamlined, providing LEAs with an inventory of more specific subjects, including: biology, chemistry, physics, Earth/environmental science, history, government/civics, geography, algebra I, algebra II, geometry, language arts, literature, health/physical education, AP science, AP English, AP math, AP history, with space for write-in courses. LEA representatives reported the presence of MWEEs in each of these courses (system-wide, some schools, no evidence) – *regardless* of if it was required or elective. This allowed LEAs to focus on course topics.

A secondary question provided the same list of core subjects (without AP items) and asked them to indicate which courses were graduation requirements. Analysis used this response to distinguish if each MWEE rating (above) pertained to a requirement (for the indicator) or an elective.
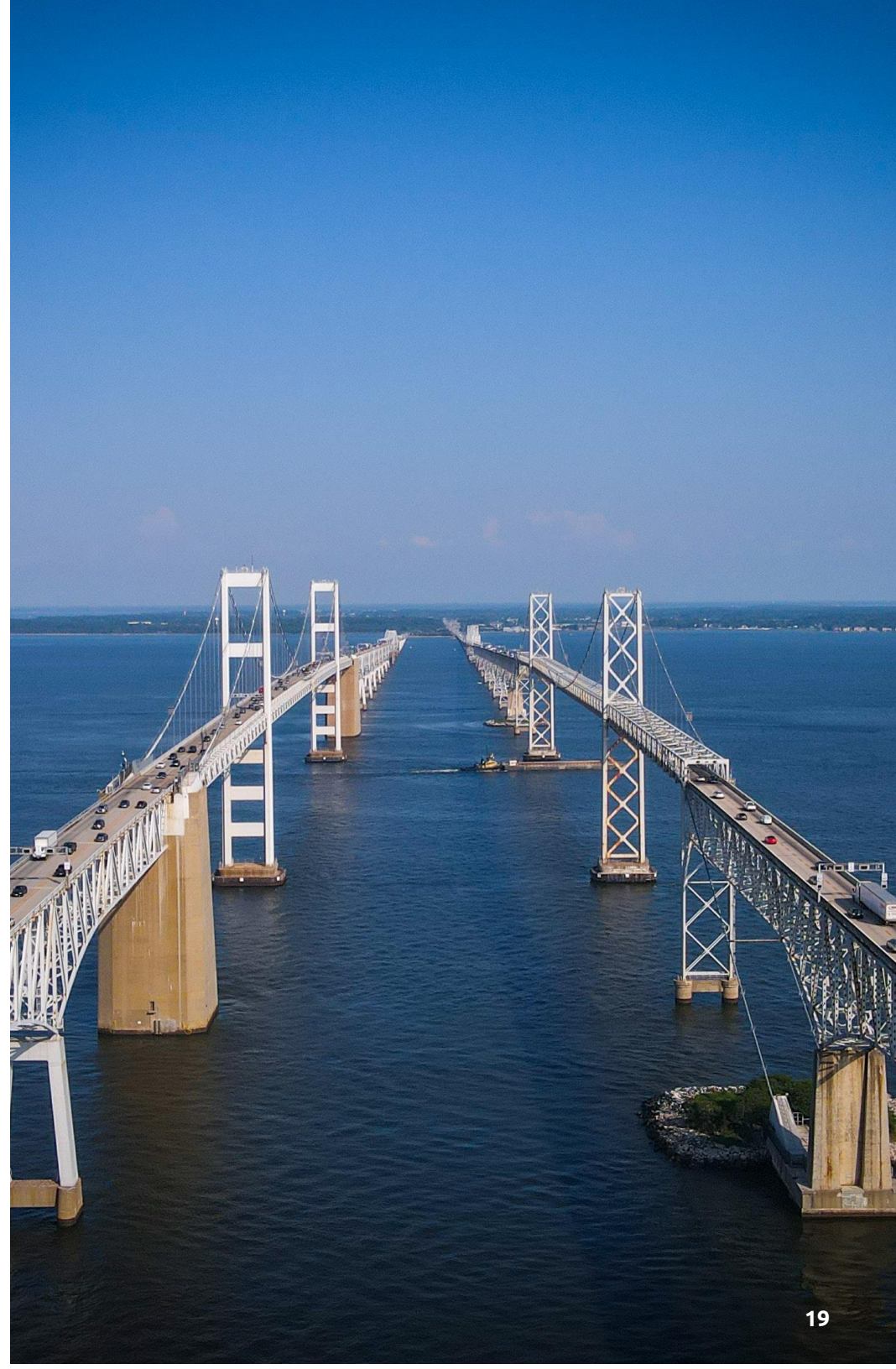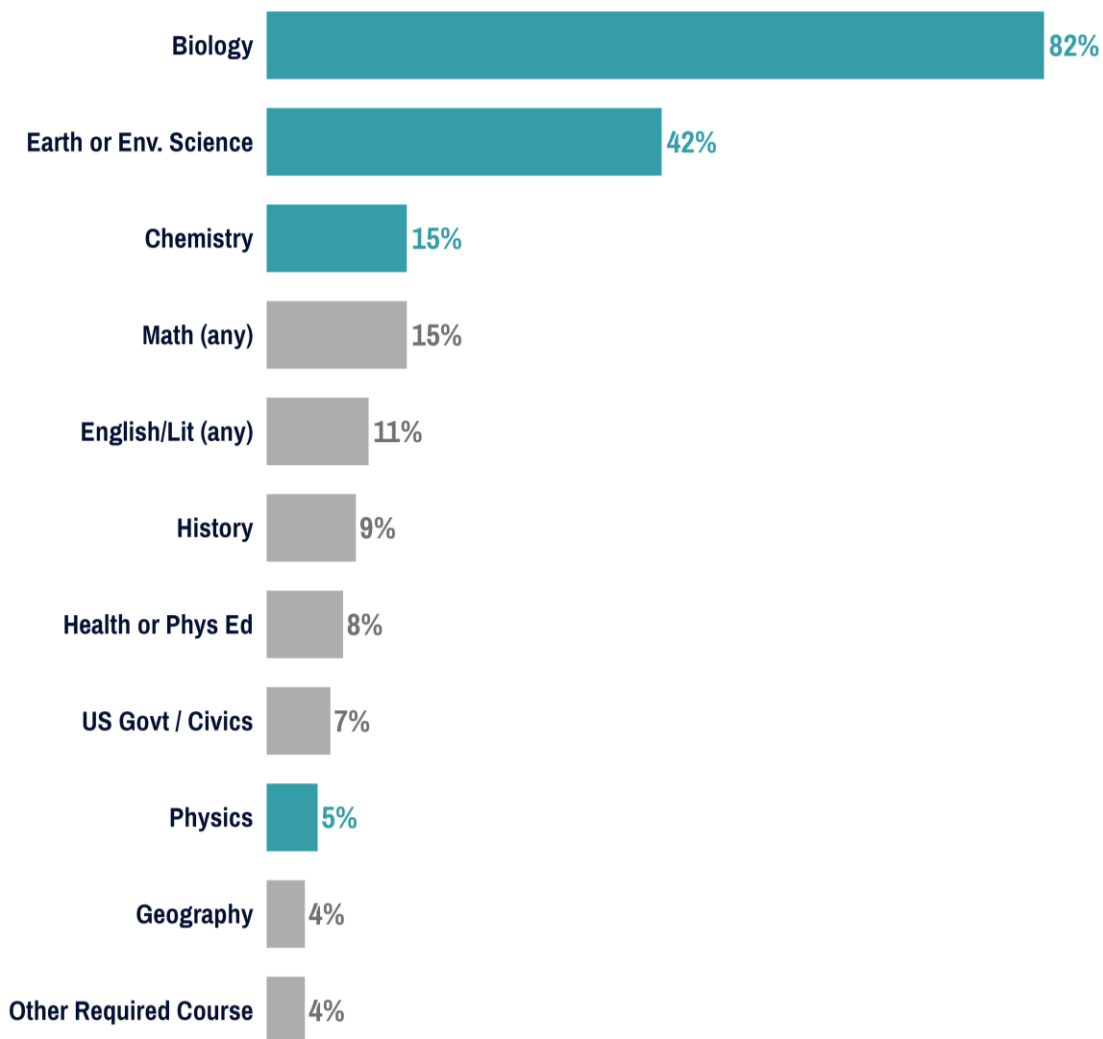
High School: Required Courses Using MWEEs

Of the 74 LEAs that reported having at least some MWEE experiences within required high school course(s), most tended to be within in science courses.

Biology was the most common required subject that incorporated MWEEs – whether in individual courses or system-wide. Environmental science was another common required course for MWEEs at the high school level.

Among required non-science courses, health or physical education, English, and mathematics were the most common subject for a MWEE to be present. This graph and analysis has combined these subjects, to see greater patterns.

Percentage of LEAs that Provide MWEEs within Each Required Subject (n=74)

Sample is just of LEAs that reported having MWEE(s) in at least one required high school course. Data rely on accurate self-reports that courses are requirements. Teal-colored bars indicate science-focused courses (the most common broad subject area); gray bars indicate non-science courses

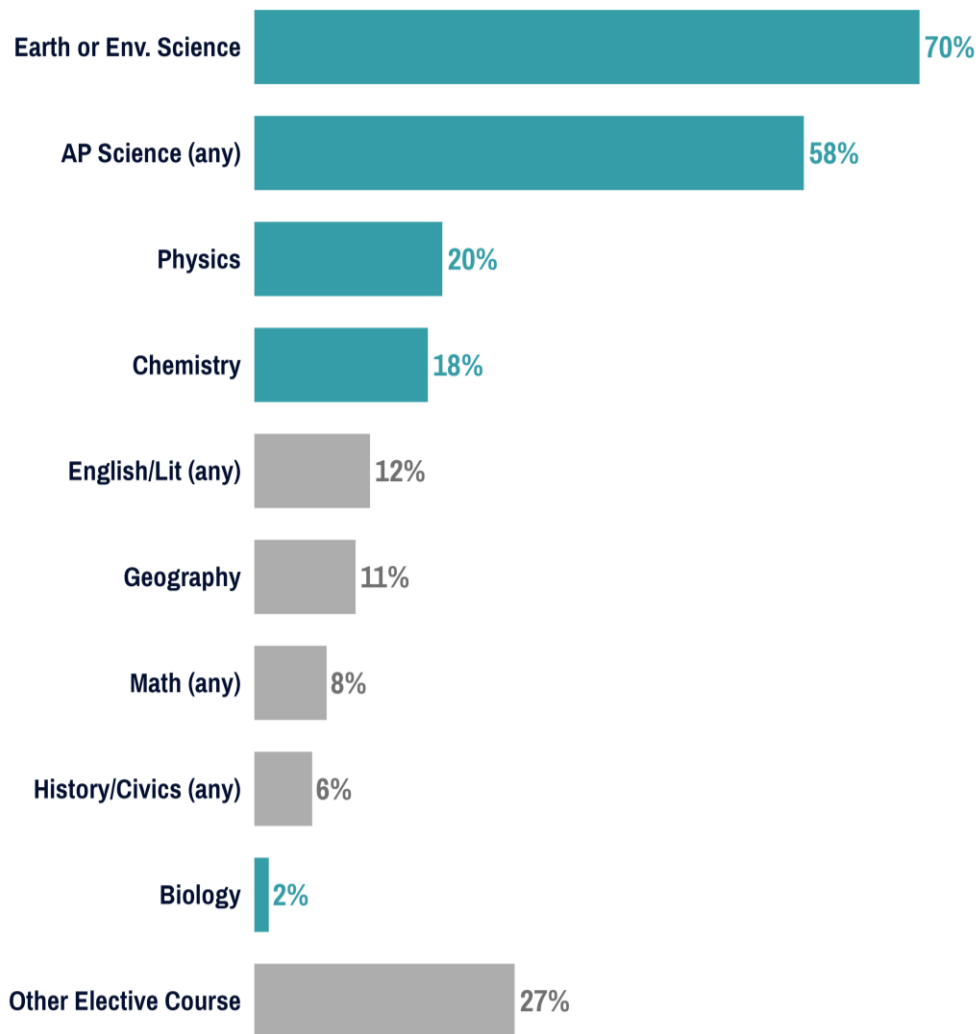| Subject	Percentage
Biology	82%
Earth or Env. Science	42%
Chemistry	15%
Math (any)	15%
English/Lit (any)	11%
History	9%
Health or Phys Ed	8%
US Govt / Civics	7%
Physics	5%
Geography	4%
Other Required Course	4%

High School: Elective Courses Using MWEEs

66 Pennsylvania LEAs reported offering MWEEs within high school elective courses; most of these were in environmental science or AP science courses.

Science subjects within elective courses that used MWEEs were more diverse than was seen in data about required courses. The 2022 data show a broader range of elective courses with MWEEs, as compared to 2019 data. This may be an area in which the new question changed reporting, with districts more accurately identifying specific electives.

The "other electives" that use MWEEs and were listed included environmental science (not AP); agricultural sciences; forestry and wildlife management; ecology; freshwater biology; plant science; and science in literature, among others.

Percentage of LEAs that Provide MWEEs within Each Elective Subject (n=66)

Sample is just of LEAs that reported having MWEE(s) in at least one elective high school course. Data relies on accurate self-reports that courses are requirements. Teal-colored bars indicate science-focused courses (the most common broad subject area); gray bars indicate non-science courses.

Subject	Percentage
Earth or Env. Science	70%
AP Science (any)	58%
Physics	20%
Chemistry	18%
English/Lit (any)	12%
Geography	11%
Math (any)	8%
History/Civics (any)	6%
Biology	2%
Other Elective Course	27%

RESULTS

Environmental Education Support Needs

Greatest Needs for EE Support

In Pennsylvania, funding for programming and supplies was rated as the greatest need, on average.

Notably, all of the items focused on funding and professional development (PD) were those that were rated as the highest areas of need across LEAs. The exception was PD to use outdoor learning spaces, which was an area of more moderate need across the districts.
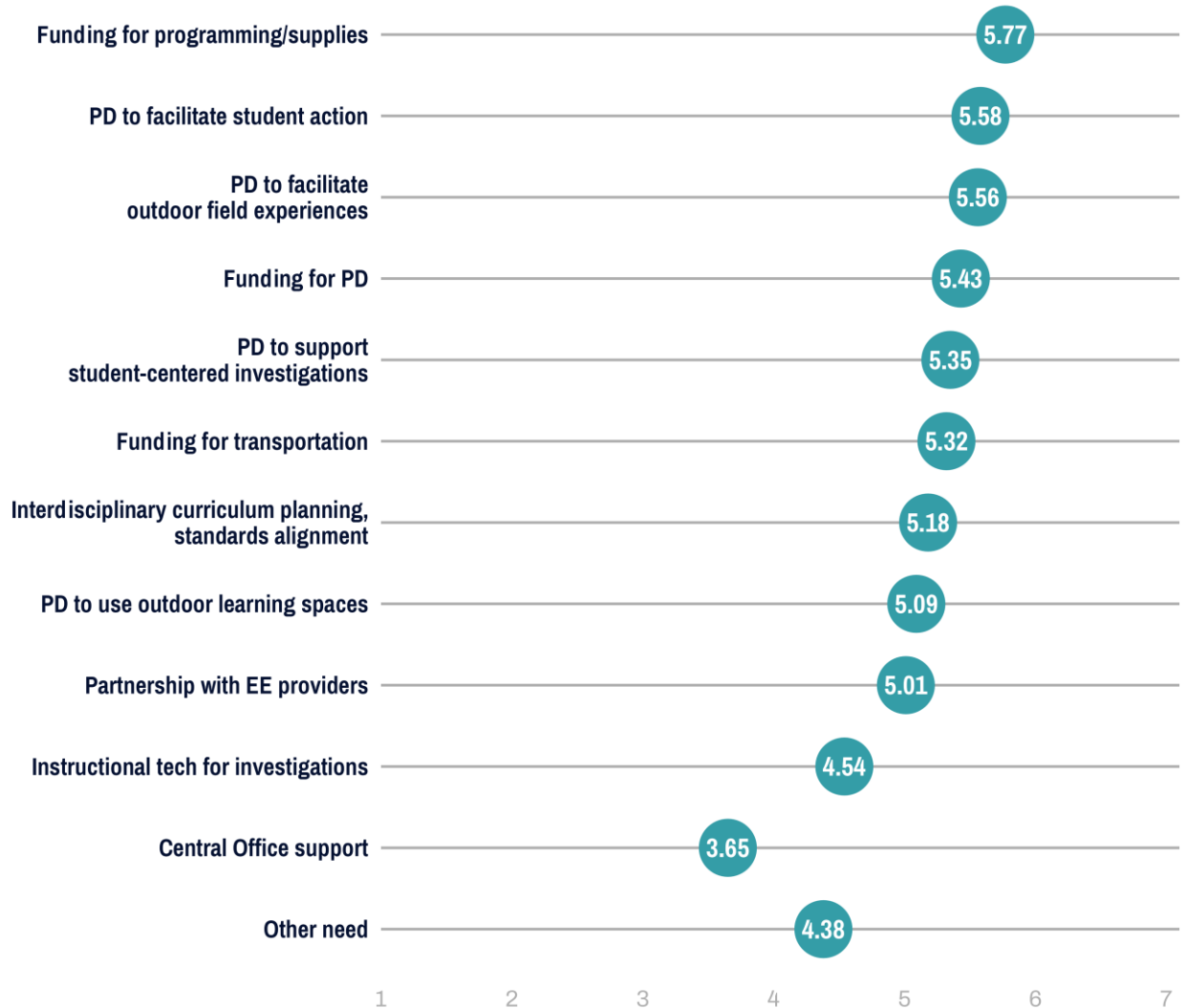
Support from the central office / administration was rated the lowest need, by far. There also seemed to be somewhat less need for instructional technology to support investigations.

Nine districts Specific write-in responses that identified "Other need" are shared on the next page.

Note: the items asked were revised for the 2022 ELIT survey; as a result, there is no year-to-year comparison possible.

Average Ratings of Need for Support in Each Area Statewide (n=113)

Responding LEAs rated their level of need for support in each area from 1 to 7, with 7 being the greatest need.

	Rating
Funding for programming/supplies	5.77
PD to facilitate student action	5.58
PD to facilitate outdoor field experiences	5.56
Funding for PD	5.43
PD to support student-centered investigations	5.35
Funding for transportation	5.32
Interdisciplinary curriculum planning, standards alignment	5.18
PD to use outdoor learning spaces	5.09
Partnership with EE providers	5.01
Instructional tech for investigations	4.54
Central Office support	3.65
Other need	4.38

Other Needs for EE Support

The additional needs emphasized by Pennsylvania districts focused primarily on funding – for staff and substitutes – as well as additional time.

Written-in responses to the item "Other Need" are provided in the table to the right.

Additional areas of need for support for environmental education noted by districts.

All written-in responses within the category of "other need" in the 2022 ELIT survey. No indicated rating means a respondent wrote in a need but did not also assign it a rating.

Need Level (1-7)	Written Need
7	Additional Staffing and funds to pay for staffing
7	Funding for substitutes.
7	Substitute availability
7	Support from Board of Education
7	TIME!!!
6	$for subs/subs
	Changes to the accountability system to allow for more diverse priorities to be emphasized.
	Time to provide PD
	Time/opportunities to collaborate with outside organizations for possible educational opportunities.

J. Sickler
CONSULTING